

# THE DUTCH, FRENCH AND BRITISH SPECIES OF PSATHYRELLA

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## FOREWORD

Systematics is one of the few disciplines in biology where amateurs can produce significant contributions to science. They have to be people then, like dr. Kits van Waveren: not only amateur in the sense of 'lover', not only amateur in the sense of 'not professionally employed', but also persevering, willing to spend a lot of time on their 'hobby', willing to learn from the professionals, able to digest new literature, new data, new methods and to use them where appropriate.

Well-balanced modern monographs of the larger European genera of Agaricales are still rather scarce. No doubt there is a relation between this phenomenon and the scarceness of full-time professional agaricologists. So much the better when amateurs reach the professional level.

The large genus *Psathyrella* is generally considered a difficult genus and a comprehensive taxonomic work on the European species is still missing, notwithstanding the extensive contributions by Mr. H. Romagnesi. The present work will, I hope, fill the existing gap to a large extent although the author restricted himself almost completely to the study of material from three countries.

A formal connection between dr. Kits van Waveren and the Rijksherbarium exists since 1970, when he was nominated 'honorair medewerker', but in our archives we also have letters and postcards from and to him and dr. Catherina Cool, the first mycologist on our staff, which are dating from the twenties.

Dr. Kits van Waveren is a highly valued honorary associate, for several reasons. Let me mention some, in order of importance.

He is an old-fashioned personality which may also be gathered from the style of writing in the present book. This adds distinctly to the diversity in our institute and diversity after all is the taxonomists staff of life.

He has donated his valuable mycological collection to the Rijksherbarium and has established a Fund for mycological research in a most generous way.

Above all: he has contributed to our scientific production, adding a distinctive name to the list of valued mycologists who in past or present were or are connected to the Rijksherbarium.

I hope that he will remain active in the field of mycology and in the Rijksherbarium for a long time after the publication of this, his *opus magnum*.

Prof. Dr. C. Kalkman  
Director of the Rijksherbarium

## INTRODUCTION

The sole object of the present work is to furnish a monograph dealing exclusively with the species of the genus *Psathyrella* (exclusive of *Lacrymaria*, see Chapter VI) reported from the Netherlands, France and the British Isles. Ever since 1958 we intensively collected, described, depicted and stored in our herbarium these species from many parts of the Netherlands and later studied the exsiccata microscopically. From 1960 on we did the same practically every year for some three weeks in many parts of the British Isles, often during the annual forays of the British Mycological Society, and particularly in Wales and Scotland. Moreover through the valuable aid from Dr. D. A. Reid, Dr. D. N. Pegler and Dr. R. Watling and the information supplied by the 'New Check List of British Agarics and Boleti' (Dennis, Orton & Hora, 1960) we became very well acquainted with the British species of *Psathyrella*. Mr. H. Romagnesi's vast knowledge of and experience with the French species of *Psathyrella* and the great co-operation between him and us resulted in our becoming extensively informed about the French species of the genus. Our frequent exchanges of information and exsiccata even led to Romagnesi's discovery of a new species (*P. phegophila* Romagn.) in his own herbarium, which he very kindly publishes in the present work. The results of our observations on *Psathyrella* in the three countries of course were compared with those published by A. H. Smith in his monograph on the North American species, hitherto the only monograph of this genus.

As we aimed at a book that above all is a practical guide for the identification of species of *Psathyrella*, we have paid little or no attention to morphological items of less practical importance such as clamps, caulocystidia, pileal and hymenophoral trama, (ultra)structure of spore walls, the influence of chemicals on the pigmentation of hyphae, the history, ecology and geographical distribution of the genus, its relationship with other genera, and evolutionary aspects. Fortunately we can refer the reader for these items to Smith's monograph.

We hope that with the help of the present work most *Psathyrella*-material both in the three countries dealt with and perhaps even also elsewhere in Europe can be identified. Nevertheless we feel sure that the users of this book (in particular those elsewhere in Europe) are bound to come rather frequently across collections that do not completely answer any of the species dealt with in our monograph. This may be due to the fact that of many if not most species of *Psathyrella* the still unknown or insufficiently realised great variability of both macro- and microscopical characters often is at stake and therefore may be playing a trick. Besides, there are strong indications that in some cases (see our observations on *P. gracilis*, *P. microrrhiza*,

and *P. prona*) intermediate forms exist between closely related species which we nevertheless wish to maintain as independent. Moreover undoubtedly new species will be and are indeed still being discovered. Furthermore, species described from outside Europe, particularly from North America, may appear in Europe also, as in the case of the recently discovered *P. fragrans*, *P. seymourensis*, *P. variata*, and *P. mucrocystis* dealt with in the present work.

The infrageneric classification proposed in this work deviates strongly from the classification of A. H. Smith (1972), Singer (1975) and Romagnesi (1982).

We hope and trust that new species to be described will be accommodated without great problems in our classification.

### ACKNOWLEDGEMENTS

To Dr. C. Bas we are exceedingly grateful for having taught us the art and practice of modern mycological taxonomy and making us to know hundreds of species of agarics since after an interval of 40 years we took up mycology for the second time in 1958. His stimulating guidance and enthusiasm has been the foundation stone of our great interest in and knowledge of agarics in general, particularly the genus *Psathyrella*, and has raised wide interest in and a revival of agaricology in the Netherlands. We are greatly indebted to him for critically reading and correcting our present work in numerous both minor and major respects. We are extremely happy having found Dr. Bas willing to take upon his shoulders the difficult and time-consuming task of unraveling and sorting out the correct names at subgeneric and sectional level and the accessory types in *Psathyrella*. He performed this task with great dedication sticking rather rigidly to the International Code of Nomenclature. At specific level we have tried to follow his example. Both of us fear that in the field of nomenclature some of our results may not be very gratefully received.

From Mr. H. Romagnesi we received ever since 1972 the greatest conceivable co-operation, manifested by a frequent and lively correspondence in which he taught us a great deal of his wide experience with the species of *Psathyrella* and in which we exchanged our opinions about many observations in and aspects of this genus. He very kindly supplied us not only with quite a number of exsiccata of species not or insufficiently known to us but also quite a number of full descriptions of such species which he granted us permission to publish in our work. Without the great and very stimulating interest he took in our efforts to cope with our 'genre terrible', as we used to call *Psathyrella* in our correspondence, the present work would never have been brought about.

We are greatly indebted to the late Dr. M. A. Donk for having guided us from 1958 until his passing away in 1972 in our attempts to get a grip on the agarics, to Dr. R. A. Maas Geesteranus for his tuition in mycology and writing or correcting the diagnoses of many of our species in latin and to both him and Dr. J. van

Brummelen for the manifold aid they gave us in the Rijksherbarium. Many thanks are due to Dr. D. A. Reid and Dr. D. N. Pegler from Kew Herbarium and Dr. R. Watling from the Royal Botanic Garden Edinburgh, who supplied us with exsiccata and information about British species of *Psathyrella* and for their support in general. Thanks are also due to all those in the Netherlands who supplied us with either fresh or dried material, in particular to Mr. J. Daams (Kortenhoef), Mrs. G. J. M. G. Tjallingii-Beukers (Wageningen), Mr. P. B. Jansen (Lelystad), furthermore to Dr. D. J. Antrobus (England, Worcester, Pedmore) and Mr. O. Weholt (Norway, Frederikstad).

We wish to thank the Directors of the Herbarium at Kew, the Botanical Museum at Helsinki and the University Herbarium at Ann Arbor for letting us have on loan valuable herbarium specimens.

Many thanks indeed are due to Prof. Dr. C. G. G. J. van Steenis and Prof. Dr. C. Kalkman, former and present director of the Rijksherbarium at Leiden, for providing working facilities. Finally we wish to convey our sincere gratitude to the following members of the technical staff of the Rijksherbarium: Mr. J. H. van Os for the many many hours he spent on inking our textfigures, to Miss J. M. de Wolf for typing the final version of our manuscript, and to the librarian Mr. L. Vogelenzang – gifted with an encyclopedic knowledge of mycological literature – and the members of his staff Miss H. Punt and Messrs. C. W. J. Lut and D. N. F. Kiehl for kind and continuous help with bibliographic problems.

# A . G E N E R A L P A R T

## CHAPTER I

### METHODS AND PRESENTATION

The vast majority of the descriptions of the macroscopical characters in the present work is based on personal observations in the field, but above all on our descriptions of fresh material made in the laboratory and on drawings of the carpophores. All descriptions of the microscopical characters also are based on our own observations on and drawings of the microscopical structures found in the fresh material after drying. With herbarium specimens received from Mr. H. Romagnesi, several Dutch mycologists, and the Rijksherbarium at Leiden we generally relied on the collector's data (if present) for the macroscopical characters, but the microscopical characters we always studied ourself. When descriptions from others were copied, e.g. in the case of some of Romagnesi's species of which we never saw the fresh stage, this is clearly indicated.

In our descriptions of the colours of cap, gills, stem, flesh, the hymenophoral trama of the 'washed' gill under the binocular lens, and the colours of the spores sub micr. we have always used the colour code of Munsell Soil Colour Charts (Munsell Color, Baltimore); 'Munsell', being abbreviated 'Mu.'. For the colours of the fresh material of every taxon we have always recorded the whole range of colours of cap, gills, stems and flesh occurring in all available collections, both in the moist and dried-out stages.

The density of the gills is usually not mentioned in our descriptions as this character is subject to a good deal of variation and seems to have little taxonomic importance. We have mentioned it only in those cases in which the gills are conspicuously crowded or distant.

Spore-sizes as given in our descriptions are based on 20 measured mature spores lying on a gill of a mature specimen. Spores were measured in units of 0.45  $\mu\text{m}$ ; the figures obtained were rounded off to half and full micrometers. Per collection cited one sample was taken and mean values of length and width of the spores were calculated for each sample.

Unless mentioned otherwise, the collections studied have been deposited in the Rijksherbarium at Leiden (L). Collections from other herbaria have been marked with the abbreviations for these herbaria proposed in Index Herbariorum I, Ed. 7 of Holmgren & al. (1981).

Names of collectors have been omitted from the lists of collections examined, the great majority of these collections having been gathered by ourselves.

Under the heading 'Habitat & distribution' the frequency of occurrence of the taxon concerned is given only for the Netherlands. For France and the British Isles we have restricted ourself to mentioning only whether the taxon had been reported from these countries or not.

The illustrations of both the macroscopical and microscopical characters have for each taxon been taken and selected from all collections available of the taxon involved in order to demonstrate the great variability of all characters. All our pictures of fruitbodies were drawn at natural size or x 2 and for reproduction in this monograph reduced to either  $\frac{1}{2}$  x or 1 x that size. The scale of these drawings is always indicated in our illustrations. Spores were drawn with a magnification of x 2420 and reduced to x 1210; basidia and cystidia were drawn x 1150 and reduced to x 575; these magnifications are the same throughout the whole book and are not indicated in our illustrations or legends.

Some abbreviations used:

I.C.B.N. / International Code of Botanical Nomenclature.

misappl. / misapplied.

not val. publ. / not validly published.

s.n. / sine numero = without a (collector) number.

As for the nomenclature, the recent changes in the I.C.B.N. accepted at Sydney (1982) did not cause great problems. Only very rarely and much to our regret they necessitated the replacement of a firmly established name by another name. In some cases, e.g. (i) simultaneous or successive sanctioning of synonymous names and (ii) lectotypification of sanctioned names, they caused difficulties because the consequences of the accepted changes have not or unsatisfactorily been worked out.

## CHAPTER II

### COLLECTING, DESCRIBING AND PRESERVING PSATHYRELLA

In agaricology in general and especially in the case of the almost always hygrophanous species of *Psathyrella* it is best to collect in the morning, to study and above all make extensive and accurate descriptions and drawings of all macroscopical characters in the laboratory in the afternoon, at the end of which 1 or 2 specimens can be used for making a spore print while all remaining fruit-bodies should then as soon as possible be put in the dryer for preservation. Before starting this sequence it is with *Psathyrella*, however, highly recommended to have a quick look at a gill, mounted in  $\text{NH}_4\text{OH}$  10% under the microscope to get a rough idea of what species one might be dealing with and to verify whether the cheilocystidia carry mucoid deposits staining bluish green in  $\text{NH}_4\text{OH}$  10% (e.g. in *P. lutensis*, *P. narcotica*, *P. multipedata*, *P. populina*) or not, as this phenomenon gradually disappears in exsiccata.

The specimens selected for examination should be kept in a damp atmosphere, e.g. in a closed box, so as not to let them dry out too quickly before and while making the description and drawings. In our experience study, recording and drawing of microscopical characters can best be performed on exsiccata. These are much easier to handle than the flabby, frèsh material, while this study can be done months if not years later.

Far and away most species of *Psathyrella* being very fragile, most of them moreover small, it is best to put them immediately after collecting in small separate, preferably transparent plastic boxes. Once dried most specimens are extremely brittle and should therefore not be stored in envelopes but in boxes; for species with very small fruit-bodies matchboxes are ideal.

During collecting the greatest care should be taken to dig out the entire stem, as in many species (sect. *Psathyrella*) the stems are rooting, while in others they are bulbillate (sect. *Atomatae*) and neither the pseudorrhiza nor the small bulbus should be overlooked. The base of the stem of many species is strigose and care should be taken to note whether the base of a seemingly terrestrial specimen is not really attached by means of the white hairs of the strigose base to a piece of wood in or on the ground.

Great care should be taken to try and find and then collect specimens of all stages of development (primordia and postprimordial, young, mature and very old stages) chiefly with the object of studying the presence and development of the veil. In many species the veil is present but little developed and/or fugacious and therefore only perceptible in the earliest stages. Another chief object is to record the great variation of sizes, shapes and also colours and striation of the cap. The colours of

the still very young and fresh caps should be noted, also those of mature and old caps and if possible written down on the spot as many caps dry out very rapidly and have lost their initial colour by the time the carpophores reach the laboratory.

Finally mode of growing (caespitose, gregarious, solitary) and habitat (lignicolous, terrestrial, nature of wood and soil etc.) should be noted and date and location of the find should be recorded. In the laboratory the specimens can be photographed (black and white or colour). It is beyond the scope of the present work to describe the technique of making these photographs. Colour photographs, of which we have taken some 200, of single or groups of carpophores, some of which cross-sectioned, can later be very useful in writing up full descriptions. But staying unprotected even for only a short while at room temperature and being exposed to the heat of strong spotlights accelerates the process of drying of the hygrophanous caps and causes considerable colour changes.

Our further remarks on describing *Psathyrella* concern the following items: (i) Sizes and shapes of caps, gills and stems. — (ii) Colours. — (iii) The veil. — (iv) Miscellaneous characters. — (v) Spore prints. — (vi) Colour of the 'washed' gill under the binocular lens. — (vii) Searching pleuro- and cheilocystidia. — (viii) Microscopic drawings. — (iv) Spores.

#### *Sizes and shapes of caps, gills and stems.*

It is very strongly recommended, especially for future reference, to make accurate drawings of cross-sections of entire specimens of the species under study at various stages of their development and of the various shapes they may take at any time of these stages. Such drawn outlines of cross-sections will reveal practically all morphological data needed for identification such as sizes and shapes of cap (conical, paraboloid, convex, plane shape; umbo; incurved, deflexed or revolute marginal area etc.), of gills (shape, breadth, straight or ventricose, horizontal or ascending, attachment to stem), of stem (size and shape, cylindrical, attenuated towards apex, swollen at or near base, pseudorrhiza, cavity etc.) and of flesh (thickness). These characters, of course, also should be described and figures for the sizes should be given.

#### *Colours.*

For the description of the colours of cap, gills, stem, and flesh it is strongly recommended to use colour charts. For the species of genus *Psathyrella* 'Munsell Soil Color Charts' and their code designating the colours are recommended as they cover very well the bulk of colours occurring in *Psathyrella*. But always an attempt should also be made to describe the colours in words as not every reader will have these charts at his or her disposal. Designations in writing, however, are very subjective and usually evoke quite different images with different persons. Reversely, six clearly different shades of brown on the Munsell charts for instance are designated there by the same words 'reddish brown'.

#### *Veil.*

The veil can only be depicted on habit sketches of carpophores. Nature, degree of development, occurrence, fugacity etc. of the veil can only be described. For

details and taxonomic importance of the veil the reader is referred to the chapter on the macroscopical characters.

*Miscellaneous characters.*

Characters such as pruinosity at the apex of the stem, striation or wrinkling of the surface of the cap, minutely fimbriate and almost always white gill edge, red underlining of the edge occurring in some species, density of the gills and finally smell, of course, can only be recorded in writing.

*Spore prints.*

In order to obtain a spore print it almost always suffices to cut off the stem at the level of the margin of the mature cap and place the cap on a piece of white paper or glass in a damp atmosphere in a closed box for a couple of hours. Better and quicker results are obtained by sticking the stem of an entire carpophore through a hole in a piece of white paper covering a glass or mug filled with so much water as to just cover the base of the stem and then place the glass – the cap resting on the paper – for some hours in a closed cupboard or box. After removal of the carpophore from the paper the colour of the spore print is to be assessed after it has been left to dry for some 15 minutes. We have never scraped the spores together for assessment, neither have we assessed the colour with the Munsell charts, limiting ourselves to describing the colour of the print.

*Colour of the 'washed' gill under the binocular lens.*

Although of relatively little taxonomic importance (see chapter on microscopical characters) we assessed and recorded in our descriptions of almost all species the pigmentation of the hymenophoral trama as observed on a 'washed' gill. To this end we examined neither the gills of young nor those of very old specimens as in the former the pigmentation may be either in the making or too strong if compared with the pigmentation of 'middle aged' carpophores and as in the latter the pigmentation may already have disappeared. Obviously the choice which gill to take is rather arbitrary. Also one has to take into account the individual variability, the loss of pigment during the process of aging and environmental circumstances. The procedure which we used and recommend of studying both the pigmentation of the hymenophoral trama and also the pleuro- and cheilocystidia is described below and is in its entirety performed under the binocular lens. Exsiccata lend themselves much better for this procedure than the flabby tissue of fresh caps and gills.

A cap is put upside down on a slide under the binocular lens and one large gill is removed from the cap by cutting on both sides of the gill through the flesh of the cap from the margin of the cap to the insertion of the gill on the stem. For this a cheap easily breaking razor blade is used and broken length-wise in two halves. By holding each half at both ends between thumb and forefinger of both hands, each half is twisted to the effect that it will break obliquely in the middle into two parts, one of which having a very sharp point at one end. The gill is then put on its side on a slide and along its base the flesh of the cap is removed with the sharp point of the blade. In very dry and brittle exsiccata it is often possible and easier to merely push

and break the gill from the cap at its base. The gill is then brought in a few drops of  $\text{NH}_4\text{OH}$  10% on the slide and by tapping its surface gently with a dissecting needle while keeping the gill in sight under the binocular lens with a second needle, the spores will detach themselves from the tissue and start floating in the fluid. With filter paper the fluid is then removed and replaced two or three times and the tapping of the gill is resumed until there will be hardly any spores left on the gill of which the true colour is then quite clear.

Under the binocular lens and viewed against a white background (paper), well lit by daylight but not by direct sunlight, the trama will clearly show its colour, which can be assessed with the Munsell charts. In most cases the colour is some shade of pale brown (Mu. 10 YR 7/3, 7/4, 6/3, 6/4) but in most species of section *Hydrophilae* it is darker, up to yellowish brown (Mu. 10 YR 5/4, 5/6), while here the yellowish tissue strands mentioned in the chapter on microscopical characters are clearly visible. In other species (e.g. *P. gracilis*, *P. candolleana*, *P. marcescibilis*, *P. leucotephra*) the gill tissue is practically colourless (Mu. 10 YR 7/2). In this stage of the examination the frequently occurring, e.g. in section *Hydrophilae*, brown coloration of the cheilocystidia (sometimes even of the pleurocystidia) can be seen because the edge is brown, but above all the red underlining of the gill edge, if present, often only near the margin of the cap, becomes clearly visible. In fact, 'washing' of the gills is the best way to search for this red underlining. In  $\text{NH}_4\text{OH}$  10% the colour is not red any longer but has turned dark greenish brown. In order to study the pigmentation microscopically one should at this stage put a coverslip on the gill, disrupt the tissue slightly by tapping the slip and then study the material under the microscope.

#### *Searching for pleuro- and cheilocystidia.*

The next step in the examination of the gill, deprived of almost all its spores, is the search for pleuro- and cheilocystidia. To that end the  $\text{NH}_4\text{OH}$  10% is almost entirely removed with filter paper, leaving the gill moist and stuck to the slide. Starting at one end of the gill, the edge is very carefully cut off and removed from the rest of the gill with the sharp edge of the razor blade, applied as close to the edge as possible (width of the edge 1/2-1 mm). This is done with the blade in one hand while the other hand fixes the facial part of the gill with a dissecting needle, this needle gently pushing the facial part away from the edge, the blade cutting its way towards the other end of the gill.  $\text{NH}_4\text{OH}$  10% is then added again, edge and the rest of the gill then floating separately in the fluid. The part of the gill without edge, containing exclusively pleurocystidia (if at all present) is next brought on another slide or on the other end of the same slide. Both parts should now be stained with Congo Red in  $\text{NH}_4\text{OH}$  10% in order to stain the cystidia.

The edge is made to float again in a droplet of  $\text{NH}_4\text{OH}$  10% which is then immediately removed with filter paper and replaced by Congo Red, which is hereupon heated a little and very gently till the preparation is just dry.  $\text{KOH}$  5% is then added and spread over the edge and the surrounding dry Congo Red with a horizontally held dissecting needle in order to remove the Congo Red. With filter paper the (by now) red  $\text{KOH}$  is removed and replaced by fresh  $\text{KOH}$ , which again is

spread over the preparation and this 'washing' with KOH is repeated 2 or 3 times until the added KOH will be practically colourless, the edge itself deeply red. A coverslip is applied and by gently tapping it the cheilocystidia will detach themselves from the subhymenium. The tapping is to be carried out in the area of the very edge (the cheilocystidia) and to be so very slight as to produce only a faint blurring of the very edge when observed under the binocular lens. The preparation will then beautifully show the red cheilocystidia on one side and a few pleurocystidia sticking out on the opposite, facial, side.

Staining the pleurocystidia with Congo Red and KOH is done in the same manner. Here it is recommended first to disrupt the part of the gill without edge with dissecting needle and razor blade into only a few smaller pieces before beginning the staining with Congo Red. Disrupting into very small pieces should be carried out when 2 - 3 times 'washing' with KOH has resulted in almost colourless KOH. A final drop of KOH is then added and a coverslip applied. If the final drop of KOH is too large, fluid, possibly also with air bubbles, will have to be removed with filter paper from the sides of the cover slip, which will cause many floating pleurocystidia to disappear into the filter paper. This may cause the pleurocystidia seemingly to be less numerous than in fact they are.

Face and gill edge will have to be mounted exclusively in  $\text{NH}_4\text{OH}$  10% for the purpose of studying the pigmentation of the cystidia. For this we used a gill from which we had removed only a number of spores by 'washing' only once with  $\text{NH}_4\text{OH}$  10%. This guaranteed that many mature spores would be present and available for measuring while at the same time in such a preparation the cystidia are sufficiently easy to find.

#### *Microscopic drawings.*

All our text figures of spores, basidia and cystidia were drawn with the aid of a microscope fitted with a monocular tube at an angle of  $45^\circ$  and above the eyepiece with a horizontal mirror projecting the preparation on white paper lying on the table. By using a strong light with proper adjustment of diaphragm and condensor, the cells, beautifully coloured red by the Congo Red, were projected and drawn on firm white cards, measuring 15 x 15 cm. By projecting a stage micrometer in the same way a scale on paper was obtained with which all drawn cells can be measured. Depending on the size (and number) of the cells it is usually possible to draw some 15-30 pleurocystidia on one card, more of the usually smaller cheilocystidia, the enlargement of the cells being 1150 x. Our method has the great advantage that one quick glance at a card immediately reveals the variability of sizes and shapes and that only the largest and the smallest cell on a card need to be measured for getting to know the variability of the size.

#### *Spores.*

Spores under oil immersion were drawn in the same manner. The enlargement of the spores on our cards is 2420 x. We measured only the darkest (= ripe) spores, directly through the microscope, not from the drawings. There is in *Psathyrella* a great deal of variation in spore colour under the microscope due to the degree of ripeness of the spores; only the darkest (= ripe) spores were chosen for assessment

of the colour and only spores floating in the medium, not lying on tissue. The colours were assessed on spores mounted in water,  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5% and as soon as possible after the gill with its spores had been put in the medium as discolouration soon sets in. Apart from describing the colours in words we also assessed them with the Munsell charts while using a rather strongly lit field of view and oil immersion but with a fairly low power eye piece so as to have a fair number of spores to choose the darkest from in vision. The basidia of most species being either spheropedunculate or clavate, we depicted only a few of these cells.

In an earlier paper (1968: 133) we introduced the terms sporogram, basidiogram, pleurocystidiogram for the cards mentioned above.

## CHAPTER III

### MACROSCOPICAL FEATURES OF PSATHYRELLA AND THEIR VARIABILITY

#### *Sizes and shapes.*

Sizes and shapes of carpophores, their caps and stems and therewith their habits for one and the same species of *Psathyrella* greatly vary as demonstrated by the pictures illustrating our descriptions.

Young caps usually are almost semiglobose, glandiform or paraboloid; eventually they expand to convex with deflexed marginal area or plane, if not even with revolute margin. On maturing in many species an umbo may develop and the margin may tear. In collections of reputedly umbonate species some specimens may not show an umbo, while reversely some specimens of a collection of a reputedly non-umbonate species may have an umbo. The variability of sizes and shapes usually is particularly evident in gregariously growing large numbers of specimens.

#### *Colours of caps.*

As for the colours of caps it is, we feel, insufficiently realised that the caps of far and away most species of *Psathyrella* in their primordial, subprimordial and early fresh stages are very dark reddish brown. The loss of pigment, however, very soon sets in; in some species, or even specimens of the same species, faster than in others, while from the start the amount of pigment varies. The result is that in many field notes and published descriptions the red colour is missing, the caps being called brown, whereas in point of fact they were dark reddish brown in the very beginning.

The caps of practically all species of *Psathyrella*, moreover, are hygrophanous. The process of drying is retarded by rain and dampness, accelerated by sunshine, drought and wind. In some species the drying sets in very early, in others later and the speed by which it is executed varies individually and from one species to another. The result of the drying always is an immense change of colour, which usually becomes very pale brown, pale greyish brown or alutaceous, at centre slightly darker. Very often it is insufficiently realised that, although specimens are seemingly still quite fresh, the process of drying has already begun, so that the fresh caps are erroneously called just brown or even fairly pale brown. Many descriptions in the literature obviously were based on specimens of which the caps already were in the process of drying.

A typical example of these changes of colour is furnished by *P. conopilus*, of which the caps dry out very soon and rapidly. In the earliest stages the caps are very dark reddish brown, but this is rarely mentioned in the literature, very soon merely dark brown but in the dry stage very pale yellowish brown or alutaceous. Lange

(1939: 99, pl. 155 D and E) described the cap of *P. conopilus* as 'hardly hygrophanous, without striation, dingy alutaceous, clay-white when dry', the cap of *P. conopilus* var. *subatrata* as 'very hygrophanous, dark fuscous and striate while whitish pale like the form when dry'. His plates 155 D and E clearly show that both taxa represent one and the same species. From Fries's descriptions also it is quite clear that his *Agaricus conopilus* represents the dry stage of his *A. subatratus*.

The caps of only a few species (e.g. *P. candolleana*, *P. leucotephra*, *P. vestita*, *P. pervelata*) contain little pigment from the beginning; their earliest stages being fairly or very pale ochreous or ochreous brown and in later stages almost white.

The task of the describer is complicated by the pink colour appearing during the process of drying in several species of section *Atomatae*, some species of section *Psathyrella*, and a few other species. This phenomenon is of taxonomical importance, but should not be overrated as its occurrence is capricious and in our experience largely dependant on the speed by which the caps dry. The reader is referred to our elaborate discussion on the appearance of pink colours in our observations on *P. prona* and its forms, in which the phenomenon is most pronounced.

#### *Colours of gills.*

We have always assessed the colour of the gills not by looking from underneath the cap but by using a cross-section of the cap and study the face of the fresh, not yet dry or drying gills. If viewed from underneath the cap, the true colour of the gills is obscured by the accumulation of spores at and near the edge and – if present – the red underlining of the gill edge.

The colour of the gills greatly changes with age and is at all stages determined by two elements: the pigmentation of the hymenophoral trama and the number and colour of the spores. With increasing age the pigmentation of the trama decreases (see Chapter III) while the number and pigmentation of the spores greatly increase. No wonder the colours of both developing and mature gills vary and therewith are of limited taxonomical value. Only for some species, particularly those with pale spores, the colour is fairly characteristic.

In species of which the hymenophoral trama is not or scarcely pigmented, the young gills are white, whitish or very pale grey. They gradually become purplish, or purplish with scarcely a brown hue, finally purplish black or black (e.g. *P. atrolaminata*, *P. tephrophylla*) if the spores are very dark.

In species in which the trama is distinctly pigmented, the young gills are distinctly (pale) brown, particularly near the base. With increasing numbers of mature spores the colour of the gills in mature specimens becomes some shade of purplish, purplish brown, tobacco brown and then normally browner near the base and more purplish towards and near the edge, the colour of the spores overshadowing the pigmentation of the trama. In species in which the spores are purplish brown but predominantly brown, the colour of the gills will be browner.

In the species of section *Hydrophilae* the colour of the gills is in the main strikingly brown due to the fact that on the one hand the trama is strongly pigmented while on the other hand the spores usually are distinctly and in several species even strikingly pale brown.

On rare occasions (see observations on *P. tephrophylla*) there must have been some arrest in the process of maturation of the spores, resulting in all or far and away most spores instead of becoming dark purplish black, remaining brown and the colour of the gills being dark reddish brown instead of black as they normally are (see also *Drosophila squamosa* var. *ochrospora* in discussion *P. artemisiae*). The not simultaneously ripening of all spores is often seen in other species also and uncoloured and various degrees of little coloured spores are normally seen in varying numbers in all preparations of gills sub micr. This phenomenon affects the colour of the gills.

The red underlining of the gill edge plays a role in distinguishing the various species of section *Atomatae* and *Psathyrella*. The reader is referred to our observations on *P. prona* in which the capriciousness and unreliability of this character is discussed. Its presence furnishes substantial evidence but its absence does not. In cases in which red underlining is suspected or should be present but is not found with the naked eye or lens, a thorough search on several 'washed' gills under the binocular lens or microscope should be carried out in several mature specimens and particularly near the margin of the cap.

#### *Veil.*

As for the veil one has to be aware of the great variability of its presence and development within one and the same species. Smith (1941: 56) already stated that 'in certain species one may find collections with no trace of a veil on buttons at one time and a few days later in the same place find new fruiting bodies coming up in which a slight veil is present'. We (1971: 299) described *P. amstelodamensis* as a new species close to *P. olympiana* but differing from the latter species by a very strongly developed veil as at that time *P. olympiana* was believed to be a species in which the veil was absent or rudimentary. Since our 1971 publication several collections from different parts of the Netherlands, however, came to our attention of which the collectors had been very much in doubt whether they were dealing with either *P. olympiana* or *P. amstelodamensis*, the development of the veil being intermediate between the two extremes. Time and again Romagnesi (in litt.) correctly pointed out that both species are synonymous.

In addition the fugacity of the veil plays a trick. In many species it is great, causing the veil sooner or later and often very soon to vanish as a result of ageing of the carpophores and environmental conditions (rain, wind, shrinkage, etc.). The presence and development of a veil should be and is best studied on primordia and young fresh stages and these very often are absent when only a few mature fresh specimens are found. When carpophores are found the first thing to be done therefore is to look for the presence of very young stages (e.g. at the foot of older specimens).

For the reasons mentioned above the veil is unsuitable as a major key character in classifying the species of *Psathyrella*. It should be brought in at the lowest possible level in the keys as we already pointed out earlier (1976: 351). This is contrary to A. H. Smith (1972: 30), who in his key to the subgenera of *Psathyrella* after having keyed out nine subgenera (three of which are considered to be

separate genera by others, viz. *Panaeolina*, *Lacrymaria* and *Conocybella*), divided the remaining bulk of the species in two subgenera, *Psathyrella* ('veil thin to rudimentary or absent; check button stages') and *Pannucia* ('outer veil and/or partial veil more or less well developed; pileus margin appendiculate with remains of partial veil or combinations of both'). This has resulted in several awkward placings of species in his classification. *Psathyrella gracilis*, for instance, finds itself in subgenus *Psathyrella* while *P. microrrhiza* (*P. squamifera* with Smith) finds itself in subgenus *Pannucia*. Both species are very closely related, often difficult to distinguish from each other and even linked by intermediate forms. In trying to identify a species with Smith's keys one is often in doubt which of the two subgenera to tackle first.

The many forms in which the veil occurs in the genus will be dealt with in the descriptions of the species. If the veil is strongly developed, both cap and stem will be covered by a white lanose, floocose layer, with appendiculate denticles along the margin of the cap. In most species the veil is much less strongly developed and in mature specimens only present as minute fibrils or bundles of fibrils in a narrow zone along the margin of the cap and scattered fibrils on the stem. In old specimens of such species one often has to carry out a thorough search with a lens near the margin of the cap in order to detect a few scattered fibrils. Only in *P. conopilus*, *P. cernua*, *P. spadicea*, *P. narcotica*, and *P. ochracea* the veil is believed to be entirely absent.

#### *Stems.*

Stems are hollow (the cavity sometimes penetrating into the flesh of the cap) and very often thicken towards their base; their thickness and length vary a great deal within one and the same species. In most species the stems are white, but isabelline or pale to sometimes even distinctly brown lower down or only near the base. The stems of the species of section *Psathyrella* are rooting and this is sometimes the case in *P. spadiceogrisea*. The stems of several species of section *Atomatae* have a small basal bulb.

#### *Flesh and smell.*

The thickness of the flesh of the cap varies very little within one and the same species and depends on which species one is dealing with. The smell of the flesh is very rarely characteristic. In most species the fresh flesh, at least in its superficial layer of the cap, is concolorous with the surface of the cap, but after having cross-sectioned the cap it will very rapidly change colour and particularly will lose the reddish colour of the surface of the cap, becoming some shade of dark dingy brown or greyish brown.

## CHAPTER IV

### MICROSCOPICAL FEATURES OF PSATHYRELLA AND THEIR VARIABILITY.

#### *Spores.*

Spores sizes and particularly lengths play a major role in the taxonomy of *Psathyrella*. The spores are large — length (10.5–)11.5–13.5(–16)  $\mu\text{m}$  — in subgenus *Psathyrella*, small — length not exceeding 10  $\mu\text{m}$  — in subgenus *Psathyra* of which only a few species have somewhat larger spores, while the species of section *Hydrophilae* are characterised by the mean length of the spores in general not exceeding 7.5  $\mu\text{m}$ .

Spore sizes vary to some extent within one and the same species. This is brought to light when one introduces the concept of mean values for the spore size, to be obtained by examining more than one and preferably many collections. Following Pegler (1966: 74) we expressed to this end spore sizes both as a range and by mean values. This turned out to be of great advantage. From the mean values for length and width we learned that, although spore sizes are important, their importance should not be overrated and that not too much importance should be attached to slight differences in size. The mean values obtained from many collections of one species always diverged to some extent and sometimes not inconsiderably, illustrating the variability. As usual, in 2-spored forms the spores are larger than in 4-spored forms of the same species. The width of the spores has been measured with the spores in profile, but in flattened spores also in face view.

The common shape of the spores in *Psathyrella* is in face view narrowly to broadly ellipsoid (both ends rounded, both sides somewhat convex), in profile ellipsoid and adaxially flattened. In face view the spores not infrequently are ellipsoid-ovoid and very rarely subtriangular or even triangular. Often the adaxial face is slightly depressed in the middle, causing the spore in profile to be bean- or kidney-shaped: phaseoliform. Rarely the adaxial face is slightly depressed just above the hilar appendix. Although on the whole size and shape of the spores in one and the same species resp. on one gill are more or less uniform, one often finds next to a majority of ellipsoid spores a number of ellipsoid-ovoid spores or a few spores which in profile are phaseoliform.

The thickness of the spore wall is too slight to be measured accurately with the ordinary light microscope and varies from one species to another. In itself the thickness hardly plays a role in distinguishing the species of *Psathyrella*, but indirectly it does as thick walls, as in most species of subgenus *Psathyrella* (and only some in subgenus *Psathyra*), cause the spore to be very dark and opaque and the germ pore to be very distinct.

Size and shape of the hilar appendix also vary from one species to another (large

in *P. caput-medusae*) and are of no or very little taxonomic importance.

In all species of *Psathyrella* the surface of the spores is smooth.

The germ pore is of great taxonomical importance, although here too there is some variation both in size and perceptibility within one and the same species and even in spores lying on one gill. In some species the germ pore is absent, the spore wall at the apex being equably thin and pigmented as elsewhere. In other spores, with only very slightly thicker walls, the wall at the apex is very slightly thinner than elsewhere and not or scarcely paler (hardly noticeable with the light microscope), in which cases the area is designated as 'callus'. In most spores, however, the spore wall is slightly to distinctly thicker and a perceptible germ pore present. The pore is not a hole at the apex but a colourless hyaline part of the spore wall, covered by a very thin outer layer of the wall. Its size and perceptibility vary and accordingly the germ pores are designated here with the words indistinct, distinct and very distinct. Its width has always been measured (estimated) and varies between 0.5-2.5 (-3)  $\mu\text{m}$ . The area of the pore is sometimes collapsed (flattened or even depressed), sometimes, and particularly when the spores are mounted in KOH 5%, bulging. Very rarely (*P. coprophilus*, *P. conopilus*) the pore is eccentric.

In the genus *Psathyrella* the colour of the spores sub micr. ranges from very dark purplish black to very pale brown (rarely practically colourless) and therewith is taxonomically important. For our method of assessing colours of spores under the microscope see chapter II. On a gill a small or larger number of immature, paler and usually larger spores are always present, but this is also the case when spores are taken from a spore print. The fact that sometimes all spores do not seem to have matured and remain pale in mature fruiting-bodies has been mentioned already in the previous chapter under colour of gills.

#### *Basidia.*

In the species of subgenus *Psathyrella* the basidia are spheropedunculate: they have a short pedicel and rather thick upper part, which is 9.6-16  $\mu\text{m}$  broad. In the species of subgenus *Psathyra* their shape varies more, ranging from subspheropedunculate, clavate, subclavate to subcylindrical; except for a few cases their upper part is only 10  $\mu\text{m}$  broad or less, their pedicel relatively longer and thinner. In the species of both subgenera the width-length ratio may vary greatly with the location of the basidia on the gill. Those located in the middle of the face of the gill are longer (longer pedicels!) than those near or at the edge. This may be one of the reasons for grossly divergent sizes given for the basidia in the literature.

#### *Cystidia.*

These sterile cells of very great diversity occur as pleurocystidia on the face of the gills (in the genus *Psathyrella* always longer than the basidia; in section *Spintrigerae* absent), as cheilocystidia ('marginal cells') on the edge of the gills and as caulocystidia at the apex of the stem. Pileocystidia have not been recorded in *Psathyrella*, but numerous dark brown, thick-walled and very long (100-400  $\mu\text{m}$ ) hairs occur on the caps of *P. conopilus*.

Of the marginal cells two types can be distinguished: (i) pleurocystidioid cheilocystidia, more or less of the same shape as the pleurocystidia of the same gill but

almost always smaller and their shape more variable, and (ii) spheropedunculate and clavate cells, which are smaller than the pleurocystidioid cheilocystidia, usually numerous and varying considerably in size from one species to another and also on one gill. If small and in the presence of numerous pleurocystidioid cheilocystidia the spheropedunculate and clavate cells may be very inconspicuous and difficult to find and if very small almost indistinguishable with certainty from very young basidia. Transitions between the two types of cheilocystidia frequently occur. It is important to know that if in the case of the pleurocystidia one is in doubt whether to call them utriform or merely fusoid (or ellipsoid with obtuse to very obtuse apex, the pleurocystidioid cheilocystidia sometimes give the answer by being distinctly utriform (for instance by showing a subcapital constriction, which is not clear in the pleurocystidia) or distinctly fusoid or ellipsoid.

Caulocystidia in our experience reflect the two types of cheilocystidia, but they are larger, very variable in size and shape and often occur in clusters, the spheropedunculate and clavate cells often in short chains of a few cells. In our experience the caulocystidia are of no taxonomical value, so that we have never mentioned them in our descriptions.

Descriptions even in the recent literature never give a detailed account of the pattern of the cellular lining of the gill edge, of the ratio between the number of pleurocystidioid cheilocystidia and the number of the spheropedunculate and clavate cells and the nature of the latter. In our experience this pattern and this ratio and the hitherto neglected characters of the spheropedunculate and clavate cells are taxonomically most important. Using this ratio we were able to delimit our subsection *Spadiceogriseae* from subsection *Lutenses*, two taxa with utriform pleurocystidia.

*Psathyrella gracilis* and *P. microrrhiza*, often difficult to distinguish from each other, can be readily distinguished by their quite different patterns of cellular lining of their gill edges. For several other species this pattern also is very characteristic. Great care, however, should be taken to use only the mid-portion of the edge for examination of the pattern and not the area near the margin of the cap, as in the latter part the spheropedunculate and clavate cells usually by far dominate the picture.

Shapes and sizes of pleurocystidia and accordingly of pleurocystidioid cheilocystidia differ considerably from one species to another (hence their taxonomical value) but may also vary considerably from one collection to another within one and the same species (e.g. *P. piluliformis*) and sometimes even on one gill. Our cystidiograms illustrate this very clearly.

The pleurocystidia of young specimens usually are smaller than those of mature specimens, so that one should take mature specimens for examination. In some species or specimens pleurocystidia are very scarce, needing a thorough search with the method outlined in Chapter II.

One should be on one's guard against overrating the values of differences in sizes and minor variations from the norm such as slight thickening of cell walls in a collection of a species of which the pleurocystidia normally are thin-walled, forking of an occasional or even a few cells at their apex (although often seen in the species

of the *P. spadiceogrisea* group), occasional occurrence of colourless small droplets or granules on the cell walls, variations in lengths of pedicels etc. The same goes for the pleurocystidioid cheilocystidia. In the literature one finds many instances of such overrating, often having resulted in the erection of new species or varieties. We have regarded such variations as being taxonomically unimportant and have omitted them in our descriptions.

Pictures do better than words in describing the shape of cystidia. Nevertheless it is customary to give a verbal description of the main types of cystidia. These are in *Psathyrella*: (i) lageniform = flask-shaped, the swollen cell body equipped with a short to long and rather narrow neck, passing gradually or more or less abruptly into the cell body the neck having a subobtuse, subacute or acute apex (see species of section *Pennatae*); (ii) utriform, a concept and name introduced by Romagnesi, = a thick-set cell with short neck and obtuse to very obtuse apex, often but not necessarily delimited from the lower part of the cell by a subapical constriction, the diameter of the apical portion surpassing half the largest diameter of the lower part of the cell (see species of section *Spadiceogriseae*); (iii) fusoid or fusiform = a cell with its thickest part in the middle and attenuated at both ends into a narrower neck, resp. pedicel (see *P. pseudocasca*, *P. frustulenta*, *P. friesii*). All three types of cystidia possess a pedicel of which width and also shape vary.

Although intermediate forms occur (fusoid-ventricose, capitate, obclavate and the like) and although it is sometimes difficult to decide whether cystidia are to be called fusoid or lageniform with a very thick neck and obtuse apex or utriform, distinguishing these three types of cells in our experience in the main works very well in the taxonomy of *Psathyrella*. It furnishes for instance an excellent means of separating in subgenus *Psathyra* the species of section *Spadiceogriseae* from those of the other sections.

In many species, particularly those of section *Hydrophilae*, the pleurocystidia and pleurocystidioid cheilocystidia and also the spheropedunculate and clavate cells are pale but sometimes very distinctly brown in  $\text{NH}_4\text{OH}$  10% (if the cells of the latter category are large they often are slightly thick-walled). The wall of many, if not most thin-walled cystidia is thinnest at the apex, sometimes even so thin that the apex scarcely stains in Congo Red and sometimes even collapses (*P. artemisiae*, *P. pennata*).

#### *Pileipellis.*

This term, introduced by Bas (1969: 327) refers to the cortical layer ('cuticle') of the basidiomycetous fruit-body, not belonging to the veil. In *Psathyrella* the pileipellis is a 2-5 cells deep layer of globose, subglobose, obpyriform, napiform, and sometimes oblong or clavate, thin- to somewhat thicker-walled cells, often more or less angled from mutual pressure. Taxonomically the pileipellis plays no role in *Psathyrella*, except for the fact that it is a hymeniderm in *P. conopilus*, a cutis of more or less radially arranged elements in *P. marcescibilis*, and a monostromatic layer in *P. fatua*. Its cells usually are colourless but not infrequently very pale brown in  $\text{NH}_4\text{OH}$  10%, particularly in the species of section *Hydrophilae*.

*Hymenophoral trama.*

Structure and pigmentation of this trama only play a very minor role in the delimitation of species of *Psathyrella*. Although specific differences do exist, we will not embark on a full analysis, description and discussion of both. The pigmentation of the gills (if present) is chiefly membranal and concentrated in the narrow hyphae of the subhymenium, the broader hyphae of the mediostratum being much less pigmented.

In those species in which the pigmentation is strong, the hyphae are distinctly brown in  $\text{NH}_4\text{OH}$  10% and some or many hyphal septa are distinctly yellow, while minute encrustations are sometimes present. In the beginning of our studies in *Psathyrella* we overrated the taxonomical value of the pigmentation of the hymenophoral trama and Romagnesi confessed (1982: 9) having done the same. Nevertheless the absence, resp. presence of pigmentation of the hymenophoral trama is a major key character in section *Psathyrella* and in the species of section *Hydrophilae* the pigmentation usually is particularly strong. When observed on a 'washed' gill (see previous chapter) one will notice in most species of section *Hydrophilae* that quite a number of strongly pigmented brownish yellow tissue strands run from the base of the gill to the edge through the tissue of which the ground colour is pale brown. The strands merge near and at the base of the gill. In most species of *Psathyrella*, however, the brownish yellow strands are absent or only very vaguely present.

The pigmentation is strongest in young specimens and gradually decreases on aging, possibly due to external conditions, while — as most characters in *Psathyrella* — the pigmentation is also subject to individual variability.

*Pileal trama.*

Although here too differences exist, structure and pigmentation of the trama of the cap play no role of any importance in distinguishing the species of *Psathyrella*, so that we have refrained from giving descriptions of the various layers of the context of the cap and their pigmentation. The pigmentation is particularly strong in the tramal layer just beneath the pileipellis. Yellow hyphal septa and encrustations frequently are present, often in large numbers; they decrease in number on ageing.

## CHAPTER V

### SPECIES, VARIETIES, AND FORMS AND BIOLOGICAL TESTS.

As made clear in the previous chapters, in the genus *Psathyrella* sizes, shapes of the carpophores, their caps and stems, the colours of caps and gills and the degree of the development of the veil greatly vary between different collections of what is regarded here as one and the same species and even within one collection. The same goes for sizes and shapes of pleurocystidia and pleurocystidioid cheilocystidia, the spheropedunculate cells, the pattern of the cellular lining of the gill edge and the sizes and colours of the mature and immature spores.

This variability very often greatly hampers making decisions with regard to separating taxa, be it species, varieties or forms. Next, in *Psathyrella* the morphological taxonomist faces the problem whether, and if so how, to take into account the remarkable results of the biological experiments (interfertility tests in cultures with mycelia obtained from spores) as carried out in a few centres. For many species of *Psathyrella* they have been carried out by Quintanilha (1944) and more recently and on a large scale by Galland (1972 and 1973), also by Jurand (1973 and 1975) and Kemp (1977). These experiments are strongly advocated by Romagnesi (1975a and 1975b).

Galland (1973) found three different taxa, emerging from isolates of material identified as *Psathyrella candolleana*, which were intersterile both mutually and with *P. candolleana* itself. Jurand (1975) confirmed these findings and Romagnesi described these taxa as species under the names *P. elegans*, *P. proxima*, and *P. scotospora* (1975a). Macro- and microscopically these species are indistinguishable from *P. candolleana* and in our opinion such interspecific differences as there seemed to be, fall within the range of the variability of the characters involved of *P. candolleana*. With *P. elegans*, for instance, the spores were slightly paler than those of *P. scotospora* and slightly darker than those of *P. candolleana*, the gills were considered to be perhaps less reddish than in *P. candolleana* and the veil was white instead of, as it usually but not always is, ochreous. Stranger still, the two collections on which *P. proxima* was based were not only indistinguishable from *P. candolleana* but mutually they showed such distinct differences, although for us all within the *P. candolleana*-variability, that one collection was believed to be possibly a variety of the other. Figures given in the cases of *P. proxima* and *P. scotospora* for sizes and shapes of spores and cystidia in an attempt to show a difference with *P. candolleana* are by no means convincing.

In the *P. prona*-group Galland (1973) and Romagnesi (1975a) met with a different surprise, which they were not quite able to explain: The authors distinguish *P. atomata* (gills ash-grey to blackish, veil absent) and *P. albidula* (gills dark

tobacco brown, veil present). On this basis two collections had been identified as *P. albidula*, one as *P. atomata*, but all three were interfertile and in the end were taken to represent *P. atomata*. Five weeks after one of the so-called *P. albidula*-collections had been found, a fourth collection was found on the very same spot. Here the gills were grey, then blackish (as in *P. atomata*), scarcely brownish but the veil was fibrillose and covered the marginal area of the cap fairly high up (as in *P. albidula*). This collection turned out to be intersterile with the previous collections and was given a full description as an understood intermediate form between *P. atomata* and *P. albidula*.

Observations as outlined above and the fact that in these biological tests the scientists repeatedly came across spores which refused to germinate (e.g. in *P. prona* f. *picta*) or germinated only after months, and that the experts in this field occasionally had to try and explain away some unintelligible observation (Galland in the *albidula-atomata* case mentioned above) inevitably make morphological taxonomists shy to try and integrate the results of these experiments in their efforts to establish a well-balanced classification. Kemp's conclusion (1977: 273) that 'the geneticist should recognize that two species need not be completely intersterile to belong to different species' is not encouraging either.

Next we have the matter of the 4- and 2-spored forms of some species of *Psathyrella* (frequent in section *Atomatae*) and *Coprinus*. It has been shown both in *Psathyrella* by Galland and in *Coprinus* by Jurand and Kemp that 4- and 2-spored variants of a taxon can be intersterile. This, it is felt, must then be the result of fundamental differences in the nuclear composition (Romagnesi, 1975b), reason why Romagnesi, convinced that the nature of the 2-spored variant of the 4-spored type basically differs from the common concept of a 'forma', proposed the term 'pseudovariety' for these 2-spored variants (e.g. *P. prona* pseudovariety *bisporigera*). In *Coprinus* Orton & Watling (1979) raised these 2-spored variants to specific rank.

In an earlier paper (1972: 27) we pointed out that, although in many species of *P. prona* the basidia are exclusively 4-spored, in others they are both 4- and 2-spored or 2- and 1-spored. Romagnesi (in litt.) confirmed this, stating that the coexistence of 4- and 2-spored basidia is not rare, that 3-spored basidia can be found in specimens of which the majority of the basidia is either 4- or 2-spored, that in cases of bispory a sharp dividing line between 4- and 2-spored specimens rarely exists, and that in the *P. prona*-group the designation '2-spored' merely means that the majority is 2-spored. Also, not infrequently one may suddenly find a 2-spored basidium in a specimen of which all basidia are seemingly 4-spored. Obviously there is as yet no unanimity among mycologists with regard to the interpretation and classification of 2-spored variants.

After all that is said above we hope the reader will accept that in the present study for purely practical reasons and because of the impossibility to make use of the results of the biological experiments in keys, we go and feel having to go exclusively by morphological characters in circumscribing the taxa and drafting the keys.

In the present study we are using the rank of variety for 2- and 4-spored variants of one morphological species and of form for taxa, showing if compared to the

typical variant of the species, subspecies or varieties to which they belong, small differences of which we do not quite know the taxonomical value (e.g. *P. gracilis* f. *albolimbata*, f. *corrugis*, etc.).

It should be mentioned here that there do exist a number of 'forms' which are intermediate between two relatively well-defined species. Both Romagnesi (1975: 220) and we (1971: 277) called attention to collections of which the specimens in some respects resembled *P. gracilis*, in others *P. microrrhiza*. They have to be regarded as intermediate forms between these two well-known species but were not named by us. For the time being it seems better that the existence of such forms does not lead to integration of *P. gracilis* and *P. microrrhiza*. A. H. Smith (1972) described quite a number of species, which what he called 'integrated' between well-known species.

In the present study we use the term variety for those taxa that differ from the species or subspecies to which they belong by the presence of one, or rarely more, clear and probably hereditary characters and which occur mixed with the typical variety in the same population.

We reserve the rank of subspecies for infraspecific taxa showing differences of some importance which are correlated with a difference in geographical distribution. For instance we think that *P. velibrunnescens* A. H. Smith should be considered as being a subspecies of *P. chondroderma* (see discussion on that species).

In conclusion: The biological experiments mentioned above have yielded striking and important results. Professional and amateur mycologists, however, experience the greatest difficulty in integrating these results into their approach to taxonomy, which up till the present day and of necessity and for practical purpose had and for the time being still has to be based mainly on morphological data.

It seems to us that there is still a great task for the mycologist working on macromycete-taxonomy, viz. careful examination of many collections of wide geographical origin in order to learn and record the ranges of morphological variability of the taxa involved and to establish an elaborate system of species, varieties and forms. Afterwards or simultaneously interfertility and other tests will have to be done on a much larger scale than up to now to correct if necessary the morphological system.

## CHAPTER VI

### INFRAGENERIC CLASSIFICATION AND NOMENCLATURE

The creator created species; mankind genera, subgenera, sections etc. In the past each of the numerous authors who presented an infrageneric classification of the genus *Psathyrella*, produced one which differed both as to grouping and nomenclature from all previous classifications. Singer constructed four classifications (1951: 463; 1962a: 504; 1962b: 67; 1975: 497), A. H. Smith two (1949: 550 and 1972), Romagnesi two (1944: 51 and 1982: 10). This is not in the least surprising as so much depends on the emphasis put on the various key characters.

In the present work we are continuing this habit by giving yet another classification, brought about by putting into use two additional characters, hitherto not shown to full advantage, viz. the mean length of the spores (as calculated from measuring at least 20 mature spores per sample) and the pattern of the cellular lining of the gill edge, a hitherto totally neglected feature. Next we reintroduced the partition of the subgenera *Psathyrella* and *Psathyra*, already made by Fries, adopted by Quélet and other authors and again practised to a major extent by Kühner & Romagnesi (1953: 352). It is based on what we still consider to be the most fundamental character in the genus: size of spores in combination with shape of basidia. The result is that we only distinguish two subgenera, *Psathyrella* and *Psathyra*, and reduce to sectional, rarely subsectional, status many groups which most authors gave subgeneric status. In order not to saddle up the infrageneric classification with a rigid system of smaller units, we have refrained from formally arranging the species in series.

Following Watling (1979: 369) and other authors, we have excluded *Lacrymaria* from our treatise on *Psathyrella* on account of its species according to Watling having the following combination of characters: strongly developed veil forming a primary innate covering of the entire cap, the spore wall consisting of a thin, pale limiting layer, covering very dark verrucae with between them a honey-coloured to colourless material, and the apex of the spore consisting of a tubular apical extension, equipped with a prominent germ pore.

The sometimes arising difficulty in deciding whether cystidia should be called lageniform or ellipsoid but with very broad neck and obtuse apex or utriform sinks into nothingness if compared with the difficulty in dealing with the capriciousness of the development and the fugacity of the veil. Our decision to use the characters of the veil only at the lowest possible level and not as a major key character as done by A. H. Smith (1972: 31) has been amply elucidated in Chapter III.

Finally we have striven for rigid application of the rules of nomenclature laid down in the International Code of Botanical Nomenclature. Regrettably this

resulted in a number of inescapable substitutions and validations of often time-honoured specific names. Not being at all familiar with botanical nomenclature and its rules we are extremely glad that Dr. C. Bas from the Leiden school of mycology took for us upon his shoulders the unrewarding task of sorting out the correct nomenclature for and synonymy and type species of the various subdivisions of the genus *Psathyrella* accepted in the present work, once we had framed and handed him our classification. The conclusions of his investigations in the literature resulted in the much regretted necessity of changing resp. introducing a number of names at infrageneric level.

## CHAPTER VII

### SYNOPSIS OF THE TAXA DEALT WITH IN THE PRESENT WORK

<i>Psathyrella</i>		27. <i>P. prona</i> var. <i>prona</i>	
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Section <i>Psathyrella</i>		28. <i>P. prona</i> var. <i>utriformis</i>	p. 89
1. <i>P. narcotica</i>	p. 41	29. <i>P. infida</i>	p. 92
2. <i>P. gracilis</i> f. <i>gracilis</i>	p. 43	30. <i>P. palustris</i>	p. 93
3. <i>P. gracilis</i> f. <i>substerilis</i>	p. 47	31. <i>P. romagnesii</i>	p. 94
4. <i>P. gracilis</i> f. <i>corrugis</i>	p. 48	32. <i>P. waverenii</i>	p. 95
5. <i>P. gracilis</i> f. <i>clavigera</i>	p. 49	33. <i>P. hirta</i>	p. 96
6. <i>P. gracilis</i> f. <i>albolimbata</i>	p. 49	34. <i>P. stercoraria</i>	p. 98
7. <i>P. pseudogracilis</i>	p. 50	35. <i>P. coprophila</i>	p. 99
8. <i>P. melanophylloides</i>	p. 52	Section <i>Ammophilae</i>	
9. <i>P. atrolaminata</i>	p. 54	36. <i>P. ammophila</i>	p. 101
10. <i>P. pellucidipes</i>	p. 56	Section <i>Subatratae</i>	
11. <i>P. polycystis</i>	p. 58	37. <i>P. conopilus</i>	p. 104
12. <i>P. microrrhiza</i>		Section <i>Bipelles</i>	
f. <i>microrrhiza</i>	p. 60	38. <i>P. bipellis</i>	p. 107
13. <i>P. microrrhiza</i> f. <i>pumila</i>	p. 64	Subgenus <i>Psathyra</i>	
14. <i>P. orbicularis</i>	p. 64	Section <i>Cystopsathyra</i>	
15. <i>P. ochracea</i>	p. 66	39. <i>P. sphaerocystis</i>	p. 113
16. <i>P. stellata</i>	p. 67	Section <i>Pseudostropharia</i>	
17. <i>P. bifrons</i>	p. 69	40. <i>P. melanthina</i>	p. 117
18. <i>P. connata</i>	p. 72	41. <i>P. caput-medusae</i>	p. 118
19. <i>P. trepida</i>	p. 74	42. <i>P. populina</i>	p. 121
20. <i>P. opaca</i>	p. 75	43. <i>P. maculata</i>	p. 124
21. <i>P. longicauda</i>	p. 76	44. <i>P. cotonea</i>	p. 127
22. <i>P. ridicula</i>	p. 78	45. <i>P. storea</i>	p. 130
Section <i>Atomatae</i>		Section <i>Spintrigerae</i>	
23. <i>P. prona</i> var. <i>prona</i>		46. <i>P. typhae</i> var. <i>typhae</i>	p. 134
f. <i>prona</i>	p. 81	47. <i>P. typhae</i> var. <i>sulcato-</i>	
24. <i>P. prona</i> var. <i>prona</i>		<i>tuberculosa</i>	p. 135
f. <i>picta</i>	p. 85		
25. <i>P. prona</i> var. <i>prona</i>			
f. <i>cana</i>	p. 86		
26. <i>P. prona</i> var. <i>prona</i>			
f. <i>albidula</i>	p. 87		

48. *P. typhae* var. *bispora* p. 136
49. *P. lacuum* p. 136
50. *P. badiophylla*  
var. *badiophylla* p. 137
51. *P. badiophylla*  
var. *neglecta* p. 138
52. *P. badiophylla*  
var. *microspora* p. 139
53. *P. canocephs* p. 140
54. *P. marcescibilis* p. 141
55. *P. involuta* p. 144
56. *P. leucotephra* p. 145
57. *P. spintrigera* p. 147
58. *P. candolleana* p. 149
59. *P. pseudogordonii* p. 152
- Section *Spadiceae*
60. *P. pygmaea* p. 155
61. *P. variata* p. 157
62. *P. cernua* p. 159
63. *P. spadicea* p. 161
64. *P. sarcocephala* p. 164
65. *P. olympiana*  
f. *olympiana* p. 167
66. *P. olympiana*  
f. *amstelodamensis* p. 169
67. *P. olympiana*  
f. *caespitosa* p. 170
68. *P. spintrigeroides* p. 171
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69. *P. laevissima* p. 174
70. *P. subpapillata* p. 176
71. *P. hydrophiloides* p. 179
72. *P. piluliformis*  
(= *P. hydrophila*) p. 180
73. *P. fragrans* p. 184
74. *P. mucrocystis* p. 185
75. *P. umbrina* var. *umbrina* p. 187
76. *P. umbrina*  
var. *utriformis* p. 189
77. *P. frustulenta* p. 189
78. *P. chondroderma* p. 191
79. *P. pseudocasca* p. 194
80. *P. rannochii* p. 195
81. *P. obtusata* var. *obtusata* p. 197
82. *P. obtusata*  
var. *utriformis* p. 200
- Section *Spadiceogriseae*  
Subsection *Lutenses*
83. *P. lutensis* p. 201
84. *P. sphagnicola* p. 203
85. *P. pannucioides* p. 205
86. *P. vestita* p. 207
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89. *P. panaeoloides* p. 212
90. *P. reticulata* p. 214
91. *P. noli-tangere* p. 215
92. *P. fusca* p. 218
- Subsection *Spadiceogriseae*
93. *P. almerensis* p. 221
94. *P. fatua* p. 223
95. *P. clivensis* p. 225
96. *P. phegophila* p. 227
97. *P. casca* p. 228
98. *P. niveobadia* p. 230
99. *P. pseudocorrugis* p. 231
100. *P. phaseolispora* p. 233
101. *P. spadiceogrisea*  
f. *spadiceogrisea* p. 234
102. *P. spadiceogrisea*  
f. *phaeophylla* p. 237
103. *P. spadiceogrisea*  
f. *vernalis* p. 237
104. *P. spadiceogrisea*  
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105. *P. spadiceogrisea*  
f. *exalbicans* p. 239
- Section *Pennatae*
106. *P. flexispora* p. 242
107. *P. pennata* p. 243
108. *P. artemisiae*  
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var. *microspora* p. 248
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111. <i>P. friesii</i>	p. 250	118. <i>P. fulvescens</i>	
112. <i>P. gossypina</i>	p. 251	var. <i>brevicystis</i>	p. 260
113. <i>P. basii</i>	p. 253	119. <i>P. multipedata</i>	p. 263
114. <i>P. dunensis</i>	p. 254	120. <i>P. murcida</i>	p. 264
115. <i>P. dunarum</i>	p. 256	121. <i>P. seymourensis</i>	p. 266
116. <i>P. dicrani</i>	p. 257	122. <i>P. ocellata</i>	p. 268
117. <i>P. fulvescens</i>		123. <i>P. senex</i>	p. 269
var. <i>fulvescens</i>	p. 258		

## B. SPECIAL PART

### PSATHYRELLA (Fr.) Quél.

*Agaricus* trib. *Psathyra* Fr., Syst. mycol. 1: 11, 295. 1821. — *Agaricus* subgen. *Psathyra* (Fr.) Loudon, Encycl. Pl.: 1004. 1829. — *Psathyra* (Fr.) Kumm., Führ. Pilzk.: 20, 70. 1871 (non *Psathura* Comm. ex Juss. 1789 = *Psathyra* Spreng. 1818.) — Lectotype (Donk 1949): *Agaricus fibrillosus* Pers.: Fr<sup>1</sup>.

*Agaricus* trib. *Psathyrella* Fr., Epicr.: 237. 1838. — *Agaricus* subgen. *Psathyrella* Fr., Summ. Veget. Scand. 2: 297. 1849. — *Psathyrella* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 152. 1872 (Champign. Jura Vosges). — Lectotype (Earle 1909): *Agaricus gracilis* Fr.

*Pannucia* P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: XXVI, 512. 1879. — Lectotype (Donk 1962): *Psathyra fibrillosa* (Pers.: Fr.) Kumm.

*Drosophila* Quél., Enchir. Fung.: 115. 1886. — Lectotype (Donk 1962): *Psathyra fibrillosa* (Pers.: Fr.) Kumm.

*Astylospora* Fayod in Ann. Sc. nat. (Bot.) VII, 9: 376. 1889 (= '*Atylospora* Murrill' in Mycologia 10: 18. 1918). — Lectotype (Earle 1909): *Psathyra corrugis* (Pers.: Fr.) Quél. (= *Psathyrella gracilis* f. *corrugis* (Pers.: Fr.) Kits van Wav.).

*Gymnochilus* Clem. in Bot Surv. Nebraska 4: 23. 1896. — Lectotype (Donk 1962): *Agaricus fibrillosus* Pers. per Fr.

*Hypholomopsis* Earle in Bull. N.Y. bot. Gdns 5: 436. 1909. — Lectotype (Donk 1962): *Agaricus fibrillosus* Pers.: Fr.

NOTE: *Pluteopsis* Fayod (1889) and *Psalliotina* Velen. (1939) are excluded from the synonymy of *Psathyrella* as their types (respect. *Agaricus pellospermus* Bull. and *Psalliota ludmiliae*) do not belong to the genus *Psathyrella*.

*Lacrymaria* Pat. is considered to represent a genus in its own right (see p. 31).

Caps 2-120 mm broad, at first hemispherical or paraboloid, later spreading to convex or plane, sometimes with revolute margin, usually striate, often with umbo, in earliest stages usually dark reddish brown, sometimes ochre, later some shade of brown, purplish or greyish brown, hygrophanous and drying out to much paler colours; surface of caps never deeply furrowed along the back of the gills; caps and gills never deliquescent; gills adnexed or adnate, very rarely almost free, wedge-shaped in cross-section; stems 2-190 × 1-10 mm; veil present, except in *P. conopilus*, *P. ochracea*, *P. cernua*, *P. narcotica*, and *P. spadicea*, often very fugacious, composed of hyphae, but of spherocytes in section *Cystopsathyra*. Pileipellis composed of a polystratic, 2-5 cells deep layer (very rarely monostromatic and hymeniform) of globose, subglobose, clavate, napiform, turbinate or obpyriform cells (or mixtures of these forms) frequently more or less angled from mutual pressure, very rarely heterocellular (*P. marcescibilis*). Spores sub micr. very dark purple to almost black, dark reddish brown to pale brown, but in *P. melanthina* practically colourless; colour fading to greyish in concentrated H<sub>2</sub>SO<sub>4</sub>; surface without any ornamentation; usually with distinct, more rarely indistinct germ pore, very rarely without germ pore. Spore print black, purplish

<sup>1</sup> See footnote on p. 112

black, chocolate coloured or some shade of chocolate brown or brown. Basidia 4-, sometimes 2-spored, clavate or spheropedunculate, not 2- or 3-morphic, not regularly interspersed with pseudoparaphyses. Pleurocystidia always present except in the species of section *Spintrigerae* and in *P. conopilus*. Cheilocystidia always present. Hymenophoral trama pigmented to (almost) colourless, regular.

## KEY TO THE SUBGENERA, SECTIONS AND SUBSECTIONS

1. Spores large (10.5–)11.5–13.5(–16)  $\mu\text{m}$  long, usually very dark and opaque, never phaseoliform; basidia (9–)9.5–13(–16)  $\mu\text{m}$  broad, spheropedunculate with short pedicel; cap never innately fibrillose-squamose. Spore print black or very dark purplish black. Exceptionally spores 9–11 (–11.5) long, but then strong smell of scatol and veil absent.<sup>1</sup> . . . . Subgenus *Psathyrella* p. ~~27~~
  2. Stem rooting (pseudorrhiza 0.5–2 mm thick); carpophores sometimes caespitose or subcaespitose, not growing in coastal sand dunes; caps 15–40 mm, often showing pink on drying; gill edge often red underlined; stems up to 150(–180) mm long; basidia always 4-spored  
Section *Psathyrella*, p. ~~25~~
    2. Stem not rooting; carpophores never caespitose or subcaespitose.
    3. Carpophores small and fragile, not growing exclusively in coastal sand dunes; caps 6–20 (–25) mm.
      4. Carpophores terrestrial; stem 18–65(–80)  $\times$  1–2 mm, usually with small bulb; caps often showing pink on drying; gill edge often red underlined; basidia often 2-spored.  
Section *Atomatae*, p. 80
      4. Carpophores growing on remnants of culms (*Typha*, *Phragmites*); stems 12–26  $\times$  1–2 mm, without bulb; caps not showing pink on drying; gill edge not red underlined.  
See section *Spadiceogriseae*: *P. almerensis*, p. 221
  3. Carpophores medium-sized to large, firm; caps (10–)15–55 mm; stems (1.5–)2–6 mm thick.
    5. Carpophores exclusively in shifting coastal sand dunes; caps fleshy; stems not rooting but lower 1/2–1/3 sunk in the sand . . . . . Section *Ammophilae*, p. 101
    5. Not as above.
      6. Carpophores often gregarious, large; caps 25–55(–65) mm, conical, dark reddish brown, very soon dark brown, hygrophanous, drying without showing pink; veil absent; stems 90–190 mm long; pleurocystidia absent; pileipellis hymeniform with numerous brown setae. . . . . Section *Subatratae*, p. 103
      6. Not as above.
        7. Carpophores medium-sized; caps 10–40 mm, very dark purple to purplish red; gills purplish brown; stem pale purplish; pleurocystidia abundant and often with guttulate contents in upper parts . . . . . Section *Bipelles*, p. 107
        7. Not as above.
          8. Pleurocystidia utriform. . . . . See subsection *Lutenses*: *P. tephrophylla*, p. 210
          8. Pleurocystidia lageniform. . . . . See section *Pennatae*: *P. dicrani*, p. 257
  1. Spores small, not (or scarcely) longer than 10  $\mu\text{m}$ , not opaque, sometimes subopaque, usually not very dark, often purplish brown or brown, often phaseoliform: basidia 10  $\mu\text{m}$  broad or less, clavate, rarely subspheropedunculate; spore print purplish black, often purplish brown, sometimes brown. Exceptionally spores larger than 10  $\mu\text{m}$ , but then pleurocystidia and thick-walled hair-like pileocystidia lacking, or intermediate species keyed out in both subgenera<sup>1</sup>. Subgenus *Psathyra*, p. 112

<sup>1</sup>See note at end of key on p. 38

9. Veil granulose, chiefly composed of spherocytes. . . . . Section *Cystopsathyra*, p. 113
9. Veil composed of hyphae.
10. Surface of cap innately fibrillose-squamulose. . . . . Section *Pseudostropharia*, p. 115
10. Surface of cap smooth under the veil.
11. Pleurocystidia absent . . . . . Section *Spintrigerae*, p. 132
11. Pleurocystidia present.
12. Pleurocystidia and most pleurocystidioid cheilocystidia with wall at least 0.5  $\mu\text{m}$  thick, but almost always thicker either everywhere or only locally (apex, ventral portion or/and in or near pedicel) up 2–3.6  $\mu\text{m}$  thick, muricate, but granulate in *P. spintrigeroides*. . . . . Section *Spadiceae*, p. 154
12. Not as above.
13. Mean length of mature spores rarely exceeding 7.5  $\mu\text{m}$ <sup>1</sup>. Often much less; spores sub micr. brown and often pale; cap and gills preponderantly brown; pleurocystidia, marginal cells and cells of pileipellis often pale brown in  $\text{NH}_4\text{OH}$  10%; hymenophoral trama strongly to moderately pigmented.  
Section *Hydrophilae*, p. 172
13. Mean length of mature spores usually exceeding 7.5  $\mu\text{m}$ ; rather exceptionally between 6.3 and 7.5  $\mu\text{m}$ , viz. in: (i) *P. pennata*, with heavy veil, very pointed cystidia and growing on burned ground, (ii) in *P. artemisiae*, with heavy veil and pointed, pale brown pleurocystidia with refractive and slightly thickened wall, (iii) in *P. gossypina*, with cystidia with oil-like inclusions, (iv) in *P. multipedata*, with fruit-bodies densely caespitose with long stems and small caps, (v) in *P. casca*, with pleurocystidioid cheilocystidia scarce to almost absent, and (vi) *P. noli-tangere*, growing on decaying leaves at muddy places.
14. Pleurocystidia utriform or in the main so (see *P. lutensis*)  
Section *Spadiceogriseae*, p. 200
15. Pleurocystidioid cheilocystidia numerous.  
Subsection *Lutenses*, p. 200
15. Pleurocystidioid cheilocystidia (very) scarce or even absent; gill edge almost exclusively lined with (usually large) spheropedunculate and clavate cells. . . . . Subsection *Spadiceogriseae*, p. 220
14. Pleurocystidia lageniform or fusoid, with obtuse to subacute or acute apex. . . . . Section *Pennatae*, p. 240

NOTE: Included in subgenus *Psathyrella*: *P. narcotica* (although spores only 9–11 (–11.5)  $\mu\text{m}$  long and basidia only 9.5–11  $\mu\text{m}$  broad), the species being rooting and having the habit of *P. gracilis*.

Excluded from subgenus *Psathyrella* (and included in subgenus *Psathyra*): the four species with large spores of section *Spintrigerae* (pleurocystidia absent), furthermore *P. dicrani* (spores 10–11.5  $\mu\text{m}$  long, a species intermediate between the subgenera *Psathyrella* and *Psathyra*), *P. almerensis* (spores 10–11.5  $\mu\text{m}$  long), and *P. tephrophylla* (spores (9–)10–11 (–12.5) long and basidia 9.5–11  $\mu\text{m}$  broad), these three species belonging as for habit of carpophores and microscopical characters to subgenus *Psathyra*. The last three species are keyed out in both subgenera.

Two small-spored species placed in subgenus *Psathyra*, *P. canocephs* and *P. leucotephra*, have basidia 9.5–11  $\mu\text{m}$  broad.

<sup>1</sup>*Psathyrella obtusata*, perfectly fitting in section *Hydrophilae* but rather frequently having spores with a mean length between 7.5 and 7.9  $\mu\text{m}$ , is also keyed out in subsection *Spadiceogriseae*.

## Subgenus PSATHYRELLA

*Agaricus* (tribus) *Psathyrella* Fr., Epicr.: 237. 1838. — *Drosophila* subgen. *Psathyrella* (Fr.) Quél., Enchir. Fung.: 119. 1886. — *Coprinarius* subgen. *Psathyrella* (Fr.) J. Schroet. in Kryptog.fl. Schlesiens 3(1): 563. 1889. — *Psathyra* subgen. *Psathyrella* (Fr.) J. Lange in Dansk bot. Ark. 9(1): 5. 1936 — Lectotype (Earle 1909): *Agaricus gracilis* Fr.

*Psathyrella* subgen. *Eupsathyrella* Sing. in Lilloa 22: 469. 1951 (inval., inadmissible name, art. 21.3 of I.C.B.N.). — Type: *Psathyrella gracilis* (Fr.) Quél.

Spores large, (10.5–)11.5–13.5(–16)  $\mu\text{m}$  long, very dark, opaque, never phaseoliform; basidia (9–)9.5–13(–16)  $\mu\text{m}$  broad, spheropedunculate; pleurocystidia present (except in *P. conopilus*); veil present (except in *P. narcotica* and *P. conopilus*); cap never innate fibrillose-squamulose; spore print black or very dark purplish black.

The reasons for including in subgenus *Psathyrella* *P. narcotica* and excluding *P. dicrani*, *P. almerensis*, *P. tephrophylla*, *P. caniceps*, and *P. leucotephra* are given in a note on p. 38.

### Section *Psathyrella emend.* Kits van Wav.

*Psathyrella* (sect.) *Graciles* Morgan in J. Mycol. 13: 56. 1907. — Type: *Psathyrella gracilis* (Fr.: Fr.) Quél.

*Drosophila* sect. *Microrrhizae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 53. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Microrrhizae* (Romagn.) ex Sing. in Sydowia 15: 68. 1962. — Type: *Drosophila microrrhiza* (Lasch) Quél.

*Drosophila* sect. *Graciles* Romagn. in Bull. Mens. Soc. linn. Lyon 13: 54. 1944. (not val. publ., no latin) — *Psathyrella* sect. *Graciles* (Romagn.) ex Romagn. in Bull. Soc. mycol. Fr. 98: 11. 1982 — Type: *Psathyrella gracilis* (Fr.) Quél.

*Psathyrella* sect. *Eupsathyrella* Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 122. 1948 (not val. publ., no latin). — Lectotype (mih): *Psathyrella gracilis* (Fr.) Quél.

Carpophores solitary, caespitose or subcaespitose, often gregarious, small to medium-sized; caps 15–40 mm, some shade of reddish brown, brown or greyish brown, striate, hygrophanous, often with pink on drying; veil varying from a seemingly absence to a very distinct presence, but fugacious; gill edge often red underlined; stems up to 150(–180) mm long, rooting; basidia 4-, very rarely 2-spored; hymenophoral trama varying from practically colourless to distinctly pigmented.

This section has been emended by us (Kits van Waveren, 1976: 352) by bringing into one section the species which Romagnesi (1944: 53, 54) had spread over two sections (*Graciles* and *Microrrhizae*). Singer (1962: 68), although giving a latin description of Romagnesi's section *Microrrhizae*, did not explicitly include the species of section *Graciles* in this section either.

## KEY TO THE SPECIES OF SECTION PSATHYRELLA

1. Strong smell of scatol, like *Coprinus narcoticus*; veil absent; mucoid deposits, staining bluish green in NH<sub>4</sub>OH 10%, on the pleurocystidioid cheilocystidia; spores 9-11 x 4.5-6 µm.<sup>1</sup> . *P. narcotica*, p. 41
1. Not as above, spores larger; veil absent only in *P. conopilus*.
  2. Gill trama colourless or almost so.
    3. Gill edge red underlined.
      4. Pleurocystidia narrowly fusoid, subaciculate, subulate, slender, with subacute to acute (rarely subcapitate) apex.
        5. Carpophores tender; caps 6-30 mm, smooth or rugulose; stem 20-110 mm.
          6. Caps dark brown, then brown, soon greying; gills dark grey to purple black.
            - P. gracilis* f. *gracilis*, p. 43
          6. Caps pale yellowish brown or yellowish to white; gills white, carrying very few or no spores. .... *P. gracilis* f. *substerilis*, p. 47
        5. Carpophores firm; caps 15-50 mm, predominantly grey, moderately to strongly rugose; stem 60-150 mm ..... *P. gracilis* f. *corrugis*, p. 48
      4. Pleurocystidia versiform (partly as in *P. gracilis*, partly plumper, cylindrical, subcylindrical and then often constricted in the middle, sublageniform, subclavate, rarely subutriform) or utriform.
        7. Pleurocystidia versiform (as above under second 4), not utriform.
          - P. gracilis* f. *clavigera*, p. 49
        7. Pleurocystidia utriform ..... *P. pseudogracilis*, p. 50
    3. Gill edge not red underlined.
      8. Germ pore deep and distinct, ± 2 µm diam.; carpophores solitary.
        9. Pleurocystidia as above under first 4. .... *P. gracilis* f. *gracilis*, p. 43
        9. Pleurocystidia as above under first 7. .... *P. gracilis* f. *albolimbata*, p. 49
      8. Germ pore shallow and more or less indistinct, 1.5-1.8 µm diam.; gills dark grey to black; carpophores caespitose, subcaespitose, sometimes solitary (see also *P. longicauda*).
        10. Caps medium-sized (10-30 mm), conical, at maturity with revolute margin; carpophores usually caespitose or subcaespitose.
          11. Pink in colour of drying cap; gills ventricose and narrowly adnate; pleurocystidia rather numerous, slender, 50-70 × 7.5-10 µm. *P. melanophylloides*, p. 52
          11. No pink in colour of drying cap; gills straight, broadly adnate; pleurocystidia scarce, 35-60 × 9-15 µm. .... *P. atrolaminata*, p. 54
        10. Caps small (10-15 mm), paraboloid to thimble-shaped, with marginal area not revolute; carpophores solitary. .... *P. pellucidipes*, p. 56
  2. Gill trama to some extent pigmented.
    12. Gill edge red underlined.
      13. Pleurocystidia abundant, slender, often with swollen, spatula-like apex.
        - P. polycystis*, p. 58
    13. Not as above.
      14. Pleurocystidioid cheilocystidia abundant, densely packed.
        15. Veil strongly developed (fibrils, fascicles of fibrils, flocci, appendiculate denticles); carpophores large (caps 20-50 mm, stems 40-190 × 1-4 mm).
          - P. microrrhiza* f. *microrrhiza*, p. 60
        15. Veil forming finer network, not appendiculate; carpophores small (caps 7-25 mm, stems 20-70 × 1-2 mm).
          16. Carpophores terse (caps 7-25 mm, stems 20-40 (-45) × 1-2 mm).
            - P. microrrhiza* f. *pumila*, p. 64
          16. Carpophores slender (caps 10-17 mm, stems 30-70 × 1 mm).
            - P. orbicularis*, p. 64

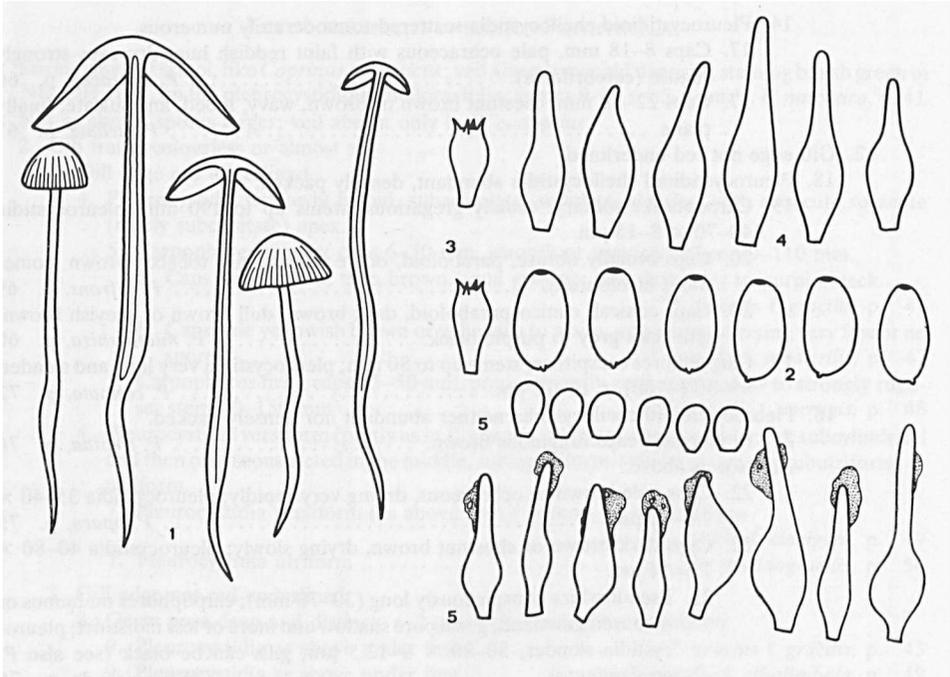
<sup>1</sup> If spores larger (11-12.5 x 6.5-7) and/or deposits on cystidia lacking, see discussion on p. 43 (under *P. narcotica*).

14. Pleurocystidioid cheilocystidia scattered to moderately numerous.
17. Caps 8–18 mm, pale ochraceous with faint reddish hue; dry caps strongly rugose (cerebriform). . . . . *P. ochracea*, p. 66
17. Caps 22–38 mm, chestnut brown or brown, wavy, lobed, and sulcate, finally plane . . . . . *P. stellata*, p. 67
12. Gill edge not red underlined.
18. Pleurocystidioid cheilocystidia abundant, densely packed.
19. Carpophores solitary, usually gregarious; stems up to 190 mm; pleurocystidia 40–70 × 8–15 μm.
20. Caps broadly obtuse, paraboloid, ochre brown; gills tobacco brown (sometimes bicoloured). . . . . *P. bifrons*, p. 69
20. Caps conical, conico-paraboloid, dark brown, dull brown or greyish brown; gills dark grey to purple black. . . . . *P. microrrhiza*, p. 60
19. Carpophores caespitose; stems up to 80 mm; pleurocystidia very long and slender, 65–80 (–100) × 10–12 μm. . . . . *P. connata*, p. 72
18. Pleurocystidioid cheilocystidia neither abundant nor densely packed.
21. In marshes; caps fuliginous brown. . . . . *P. trepida*, p. 74
21. Not as above.
22. Caps pale brown or ochraceous, drying very rapidly; pleurocystidia 35–40 × 7.5–10 μm. . . . . *P. opaca*, p. 75
22. Caps dark brown or chestnut brown, drying slowly; pleurocystidia 40–80 × 7.5–14 μm.
23. Pseudorrhiza conspicuously long (30–70 mm); carpophores on humus or manured grassland; germ pore shallow and more or less indistinct; pleurocystidia slender, 50–80 × 9–12.5 μm; gills can be black (see also *P. atrolaminata*) . . . . . *P. longicauda*, p. 76
23. Pseudorrhiza short (5–15 mm); carpophores subcaespitose round tree trunk; germ pore distinct; pleurocystidia 40–60 × 7.5–14 μm.  
*P. ridicula*, p. 78

***Psathyrella narcotica* Kits van Wav. — Figs. 1-5.**

*Psathyrella narcotica* Kits van Wav. in *Persoonia* 6: 305, Figs. 13-16. 1971.

Cap 9–20(–26) mm, hemispherical-paraboloid to paraboloid, only slightly expanding, at first pale yellowish brown (slightly paler than Mu. 10 YR 5/4), soon becoming distinctly greyer from margin, later grey (Mu. 10 YR 6/1, 6/2) to pale brownish grey (Mu. 2.5 Y 6/2), at centre slightly browner, finally dark grey (Mu. 10 YR 4/1, 4/2), at centre with a trace of brown (Mu. 10 YR 4/3), at margin purplish grey (Mu. 5 YR 4/1) (colour of gills shining through), striate up to 2/3 from margin, hygrophanous, rapidly drying out to almost white, alutaceous (Mu. 10 YR 8/1, 8/2; 2.5 Y 8/2), at apex very pale brown (Mu. 10 YR 8/3), without pink, neither micaceous nor rugulose. Veil absent. Gills 1–3 mm broad, not crowded, ventricose near margin of cap, then straight, ascending, broadly adnate, at first pale grey to slightly purplish grey (Mu. 5 YR 6/1, 6/2) with a trace of brown (Mu. 10 YR 6/3) at base, later darker and finally very dark purplish grey (Mu. 5 YR 5/1), faintly brown (Mu. 10 YR 6/2) at base; edge white. Stem 25–65 × 1–2 (–2.5) mm, cylindrical or slightly thickening towards base, white but in lower 1/2–1/3 isabelline, hollow, rooting (pseudorrhiza 10–25 mm, not fixed to either wood or dung); with pruinose apex, lower parts glabrous. Flesh of cap in centre 0.5–2 mm thick, pale yellowish brown (paler than Mu. 10 YR 5/4), of stem alongside gills concolorous with cap, for the rest white but isabelline in lower 1/2–1/3. Strong smell of scatol. exactly like *Coprinus narcoticus*. Trama of ‘washed’ gill practically colourless. Spore print purplish black.



Figs. 1–5. *Psathyrella narcotica*. — 1. Carpophores (x 1). — 2. Spores. — 3. Basidia. — 4. Pleurocystidiogram. — 5. Cheilocystidiogram.

Spores  $9\text{--}11\text{--}(11.5) \times 4.5\text{--}6 \mu\text{m}$  (mean values  $9.9\text{--}10 \times 5.4 \mu\text{m}$ : 3 collections), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6) in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in KOH 5% sordid brown (Mu. 7.5 YR 4/2), not opaque, with distinct germ pore ( $1.5\text{--}2 \mu\text{m}$ ) and small hilar appendix. Basidia  $17.5\text{--}22.5 \times 10\text{--}11.5 \mu\text{m}$ , 4-spored. Pleurocystidia  $35\text{--}55 \times 10\text{--}15 \mu\text{m}$ , scattered, lageniform, thin-walled, colourless, at apex often covered with a small granular mucoid deposit staining bluish green in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia  $27.5\text{--}50 \times 7.5\text{--}15 \mu\text{m}$ , numerous, at apex and alongside neck covered by very small, medium-sized or larger (up to  $16 \mu\text{m}$ ), irregularly shaped, elongate or globose, minutely to coarsely granular mucoid deposits staining bluish green in  $\text{NH}_4\text{OH}$  10%; intermixed with locally varying numbers of small inconspicuous spheropedunculate cells,  $10\text{--}15 \times 7.5\text{--}10 \mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless, with a trace of yellowish membranous pigment at base of gill; no yellowish hyphal septa or encrustations. Pileipellis consisting of (sub)globose, colourless cells  $16\text{--}32 \mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Gregarious in grass on sandy soil. Oct.-Nov. Very rare. Reported from France and the Netherlands, not from the British Isles.

**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S: prov. Noord-Holland, Bakkum, estate 'Koningsbos', 22 Nov. 1969, 3 Nov. 1972 (type L); IJsselmeerpolders, Oost Flevoland, 20 Oct. 1980. — F R A N C E, Paris, Parc de Sceaux, 30 Nov. 1970 (herb. Romagn. V 1101).

In spite of the somewhat small size of its spores and basidia in comparison with the sizes of spores and basidia in the other members of section *Psathyrellā* we have incorporated this — because of its smell and mucoid deposits — remarkable species

in section *Psathyrella* because of its habit, colours, distinctly rooting stem, absence of a veil and colourless hymenophoral trama.

We examined a collection, received by Romagnesi from the Paris region and cited by him (1976: 196) as *P. narcotica* on the basis of its strong smell of scatol, its habit, its colours, its pleurocystidia etc., and the habitat in which it was found. There are, however, two differences: the mucoid deposits are lacking (but – according to Romagnesi in litt. – they are also sometimes lacking in *P. lutensis*) and both Romagnesi and we found larger spores ( $11\text{--}12.5 \times 6.5\text{--}7 \mu\text{m}$ ; mean values  $11.6 \times 6.6 \mu\text{m}$ ) and basidia ( $27.5\text{--}32.5 \times 12.5 \mu\text{m}$ ) in this material.

### *Psathyrella gracilis* (Fr.) Quél.<sup>1</sup>

*Agaricus corrugis* Pers. in Neues Mag. Bot. 1: 104. 1794. — *Agaricus corrugis* Pers.: Fr., Syst. mycol. 1: 298. 1821. — *Coprinarius corrugis* (Pers.: Fr.) Kumm., Führ. Pilzk.: 69. 1871. — *Psathyra corrugis* (Pers.: Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 148. 1872. — *Drosophila corrugis* (Pers.: Fr.) Quél., Enchir. Fung.: 116. 1886. — *Psathyrella gracilis* var. *corrugis* (Pers.: Fr.) J. Lange in Dansk bot. Ark. 9 (1): 15. 1936. — *Psathyrella corrugis* (Pers.: Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 123. 1948. — *Psathyrella gracilis* var. *corrugis* (Pers.: Fr.) Pears. & Dennis in Trans. Brit. mycol. Soc. 31: 185. 1948. — *Drosophila gracilis* f. *corrugis* (Pers.: Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 357. 1953 ('ss. Bres.'). — Neotype (Kits v. Wav., 1971: 259): '*Agaricus* (*Pratella*) *corrugis*-*pelosporus* Bull.' (in herb. Persoon, L 910.258-411).

*Agaricus gracilis* Fr., Syst. mycol. 1: 299. 1821. — *Prunulus gracilis* (Fr.) S. F. Gray, Natur. Arr. Brit. Pl. 1: 630. 1821. — *Coprinarius gracilis* (Fr.) Kumm., Führ. Pilzk.: 68. 1871. — *Psathyrella gracilis* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 152. 1872. — *Drosophila gracilis* (Fr.) Quél., Fl. mycol. 57: 1888. — *Psathyra gracilis* (Fr.) Bertrand in Bull. Soc. mycol. Fr. 17: 277. 1901.

*Agaricus* (*Coprinus*) *caudatus* Fr., Obs. mycol.: 187. 1818. — *Agaricus gracilis* β *A. caudatus* (Fr.): Fr., Syst. mycol. 1: 299. 1821. — *Agaricus caudatus* Fr., Epicr.: 239. 1838. — *Psathyrella caudata* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 258. 1872. — *Coprinarius caudatus* (Fr.) Quél., Enchir. Fung.: 120. 1886. — *Panaeolus caudatus* (Fr.) Quél., Fl. mycol. Fr.: 55. 1888. — *Psathyra caudata* (Fr.) J. Lange, Fl. agar. dan. 4: 99, pl. 155A. 1939 (misappl.). — *Drosophila caudata* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953. (misappl.).

Excluded. — *Psathyra caudata* sensu J. Lange, l.c. (= *P. atrolaminata*). — *Drosophila caudata* sensu Kühn. & Romagn., l.c. (= *P. atrolaminata*).

### forma *gracilis* — Figs. 6–9, 11–12

DESCRIPTIONS & ILLUSTRATIONS. — Fries, Icon. sel. Hym. 2: pl. 138, fig. 1. 1879; Cooke, Ill. Brit. Fungi 4: pl. 616/594B. 1884-1886 (as *Agaricus bifrons* var. *semitinctus*), ditto 5: pl. 635/634. 1886-1888 (as *Agaricus gracilis*); Rick., Blätterp.: 264, pl. 68 fig. 2. 1913; Bres., Iconogr. mycol. 18: pl. 871. 1931; J. E. Lange, Fl. agar. dan.: 100, pl. 154B. 1939; Konrad & Maubl., Icon. select. fung. 1: pl. 39. fasc. 5. 1929; Kühn. & Romagn., Fl. anal. Champ. sup. 357. 1953 (as *Drosophila gracilis*); A. H. Smith in Mem. N.Y. Bot. Gdn 24: 330. 1972; Kits van Waveren in Persoonia 6: 250. 1971; Romagnesi in Bull. trimest. Soc. mycol. Fr. 91: 219. 1975; Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 428, pl. 277. 1981.

Cap at first (primordia, 2–7 mm), paraboloid, not striate, at centre dark reddish brown (Mu. 5 YR 3/4), towards margin paler and browner (Mu. 7.5 YR 4/4; 10 YR 4/4, 5/6, 6/6),

<sup>1</sup> The synonyms *Agaricus corrugis* Pers. (1794): Fr. (1821) and *A. gracilis* Fr. (1821) are both to be considered sanctioned by Fries in 1821. As long as it is not clearly indicated in the I.C.B.N. which of the two is the correct one, we prefer to maintain for this species the most commonly used name. Eventually it may have to be replaced by *Psathyrella corrugis* (Pers.: Fr.) Konr. & Maubl.

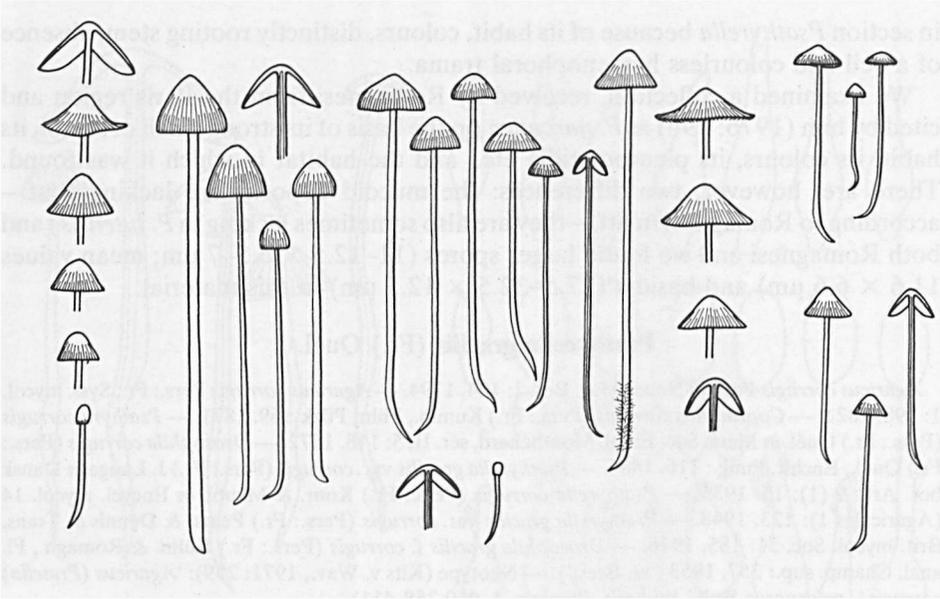
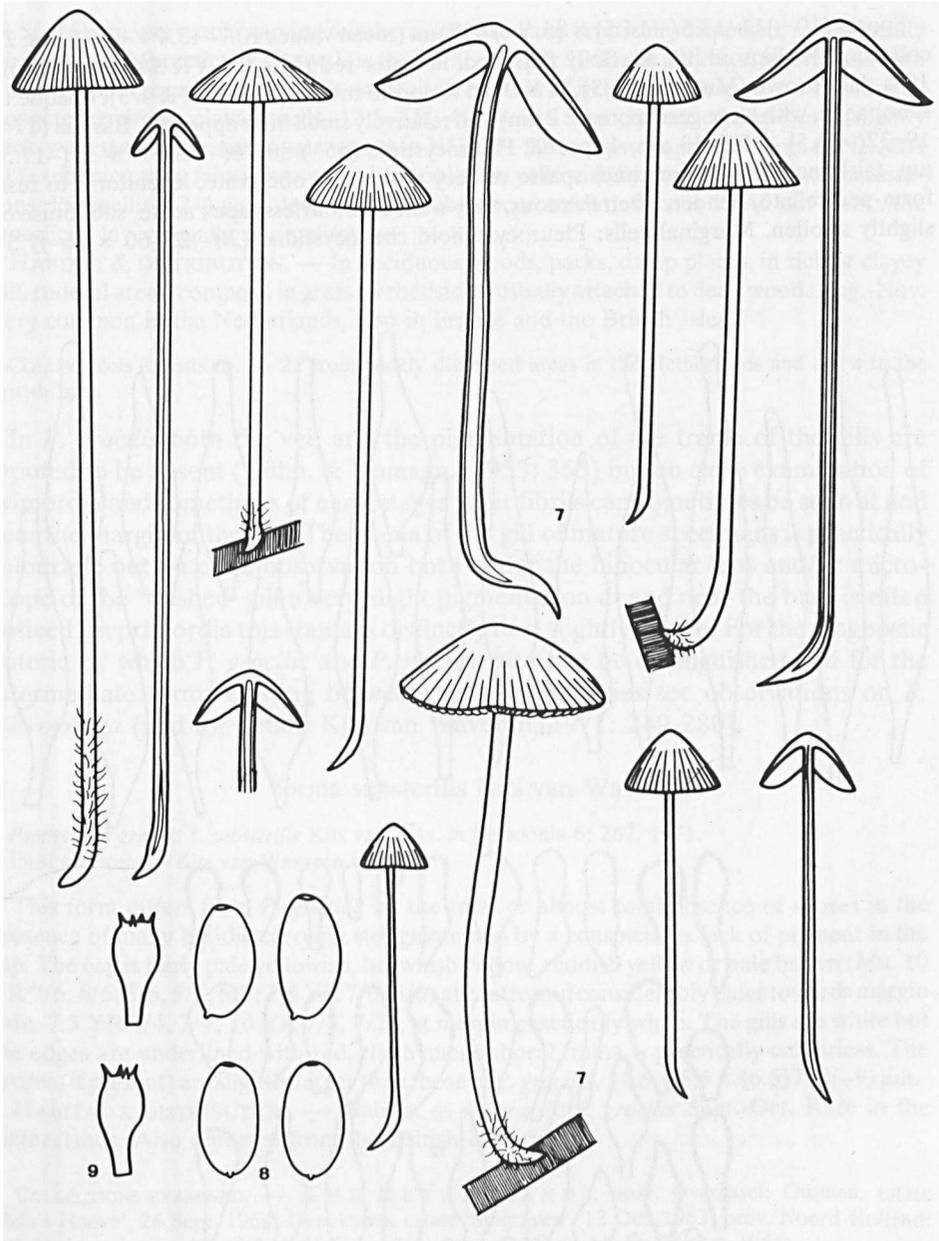


Fig. 6. *Psathyrella gracilis*. — Carpophores ( $\times 0.5$ ).

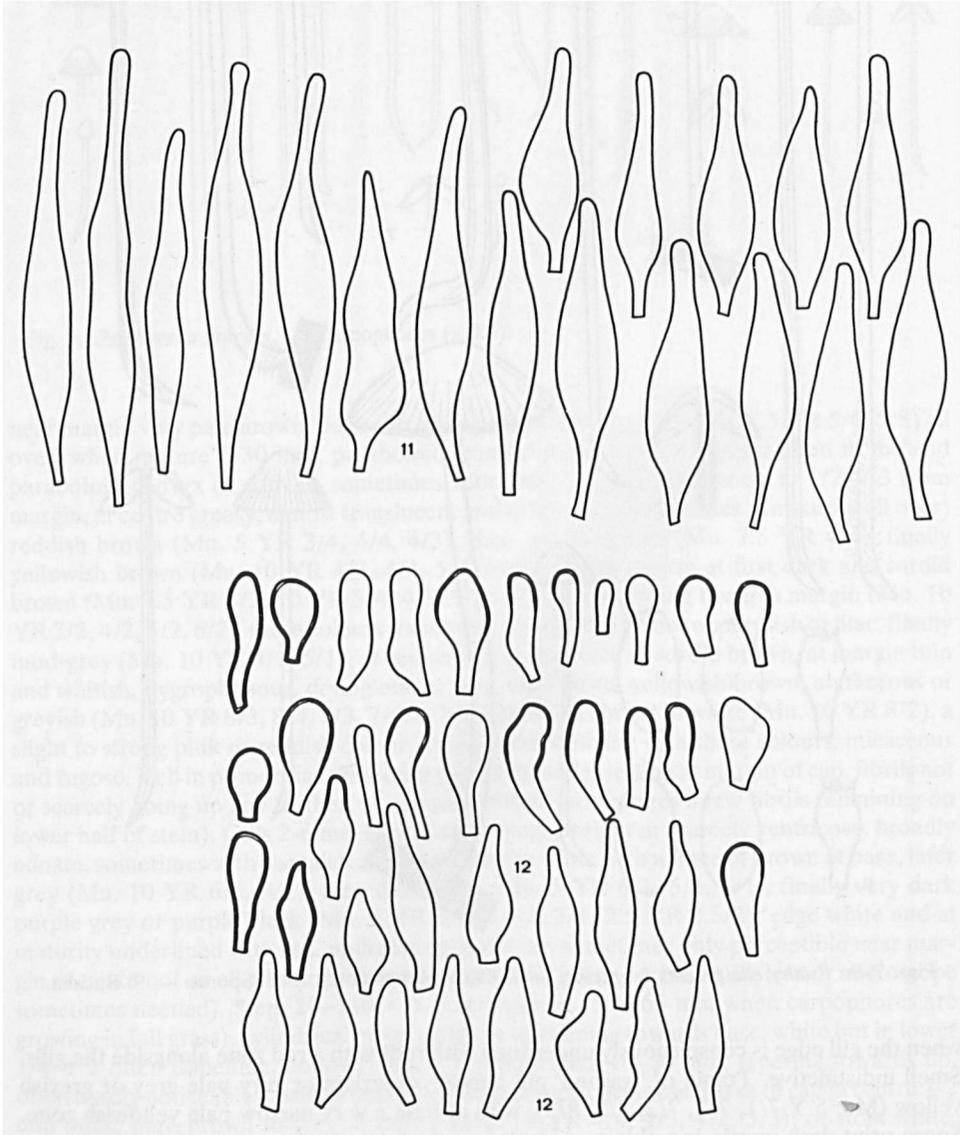
near margin very pale brown, but quite often pale yellowish ochre (Mu. 7.5 YR 5/6, 5/8) all over, when mature 6-30 mm, paraboloid, conical-paraboloid or conical often in the end paraboloid-convex or convex, sometimes with umbo, strongly striate up to  $1/2$ – $1/3$  from margin, at centre greasy, almost translucent and at first (and sometimes at maturity all over) reddish brown (Mu. 5 YR 3/4, 4/4, 4/3), then strong brown (Mu. 7.5 YR 4/4), finally yellowish brown (Mu. 10 YR 4/3, 4/4, 5/4, 6/4); outside centre at first dark and sordid brown (Mu. 7.5 YR 4/2; 10 YR 5/4, 4/3, 3/3), very soon greying towards margin (Mu. 10 YR 3/2, 4/2, 5/2, 6/2), these colours sometimes mixed with a trace of purplish or lilac, finally mud-grey (Mu. 10 YR 4/1, 5/1), at centre with still a trace of sordid brown, at margin thin and whitish, hygrophanous, drying out to very pale brown, yellowish brown, alutaceous or greyish (Mu. 10 YR 8/3, 8/4, 7/3, 7/4, 6/3), sometimes almost to white (Mu. 10 YR 8/2), a slight to strong pink or reddish colour almost always mixing with these colours, micaceous and rugose. Veil in primordia connecting stem with and inserting at margin of cap, fibrils not or scarcely going up any further, at maturity absent (sometimes a few fibrils remaining on lower half of stem). Gills 2-6 mm broad, ascending, straight or scarcely ventricose, broadly adnate, sometimes with a small tooth, in primordia white with a trace of brown at base, later grey (Mu. 10 YR 6/1, 5/1), then darkening (Mu. 5 YR 6/1, 5/1, 4/1), finally very dark purple grey or purple black (Mu. 5 YR 3/2, 2.5/2, 3/1; 2.5 YR 2.5/2); edge white and at maturity underlined with red, underlining, however, sometimes only perceptible near margin of cap or not on all gills (examination of 'washed' gill under binocular lens or microscope sometimes needed). Stem 20-110  $\times$  1-3 mm (up to 150-165 mm when carpophores are growing in tall grass), cylindrical or very slightly thickening towards base, white but in lower  $1/4$ – $1/2$  often isabelline, hollow, rooting (pseudorrhiza 10-50 mm, tapering towards tip, often hardly noticeable); base usually very strigose; apex pruinose. Flesh of cap in centre 1-2 mm thick, dark brown to greyish brown (Mu. 10 YR 4/4, 4/3, 4/2, 3/3); of stem white, sometimes isabelline at base, grey-brown in extreme apex of stem and usually (almost always



Figs. 7-9. *Psathyrella gracilis* f. *gracilis*. — 7. Carpophores (x 1). — 8. Spores. — 9. Basidia.

when the gill edge is conspicuously underlined with red) with a red zone alongside the gills. Smell indistinctive. Trama of 'washed' gill almost colourless or very pale grey or greyish yellow (Mu. 5 Y 7/1, 7/2, 7/3, 8/2, 8/3), with at base a very narrow pale yellowish zone. Spore print dark purple in a thin and black in a thick layer.

Spores (10–)11–13.5(–14.5)  $\times$  (5.5–) 6–7  $\mu\text{m}$  (mean values 10.7–13.4  $\times$  6–6.7  $\mu\text{m}$ : 24 collections), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3), in KOH 5% sordid brown (Mu. 10 YR 4/3), opaque to subopaque, with large germ pore ( $\pm 2 \mu\text{m}$ ) and relatively small hilar appendix. Basidia (17–) 19–32(–33.5)  $\times$  9.5–13  $\mu\text{m}$ , 4-spored. Pleurocystidia (45–) 50–70(–100)  $\times$  8–15(–17.5)  $\mu\text{m}$ , fairly numerous, sometimes sparse or very numerous, obclavate, lageniform to fusi-form-pedicellate, slender, often flexuous, thin-walled, colourless; apex acute, subobtuse or slightly swollen. Marginal cells: Pleurocystidioid cheilocystidia, (20–)25–60  $\times$  (6–)7.5–



Figs. 11–12. *Psathyrella gracilis* f. *gracilis*. — 11. Pleurocystidiogram. — 12. Cheilocystidiogram.

12.5(-15)  $\mu\text{m}$ , present in varying numbers, scattered and erratically dispersed, rarely locally fairly crowded (practically always less than 100 cells per 1000  $\mu\text{m}$  gill edge) intermixed with numerous spheropedunculate cells and quite a number of irregularly shaped, subcylindrical, elongate versiform clavate cells, 12.5-35(-40)  $\times$  4-15  $\mu\text{m}$ , many of these cells slightly thick-walled and sometimes pale brown in  $\text{NH}_4\text{OH}$  10%. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very faintly brown, at base only few yellowish hyphal septa and no encrustations. Pileipellis a 2-4 cells deep layer of subglobose colourless cells 15-40  $\mu\text{m}$  diam., the superficial layer usually  $\pm$  a palissade.

**HABITAT & DISTRIBUTION.** — In deciduous woods, parks, damp places, in rich or clayey soil, ruderal areas, compost, in grass by roadsides, usually attached to dead wood. Aug.-Nov. Very common in the Netherlands, also in France and the British Isles.

**COLLECTIONS EXAMINED.** — 21 from widely dispersed areas in the Netherlands and a few in the British Isles.

In *P. gracilis* both the veil and the pigmentation of the trama of the gills are reputed to be absent (Kühn. & Romagn., 1953: 355) but on close examination of primordia and sometimes of early stages velar fibrils can sometimes be seen at and near the margin of the cap. The trama of the gill of mature specimens is practically colourless but on close observation both under the binocular lens and/or microscope of the 'washed' gill a very slight pigmentation at and near the base is often noticed. In primordia this trama is distinctly be it slightly brown. For the diagnostic criteria by which *P. gracilis* and *P. microrrhiza* can be distinguished and for the intermediate forms existing between these two species see observations on *P. microrrhiza* (and for details Kits van Waveren, 1971: 249-280).

#### forma *substerilis* Kits van Wav.

*Psathyrella gracilis* f. *substerilis* Kits van Wav. in *Persoonia* 6: 267. 1971.

**DESCRIPTION.** — Kits van Waveren l.c.

This form differs from *P. gracilis* by the total or almost total absence of spores in the presence of many basidia carrying sterigmata and by a conspicuous lack of pigment in the cap. The cap is fairly pale yellowish, brownish yellow, reddish yellow or pale brown (Mu. 10 YR 7/6, 6/6, 5/6, 5/4, 6/3; 7.5 YR 7/6, 6/6) at centre and considerably paler towards margin (Mu. 7.5 YR 6/4, 7/4; 10 YR 7/3, 7/2), at margin practically white. The gills are white but the edges are underlined with red, the hymenophoral trama is practically colourless. The spores (if present) are slightly larger than those in *P. gracilis*, 11.5-15.5  $\times$  (6.5)7-8(-9)  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — Habitat as *P. gracilis* f. *gracilis* Sept.-Oct. Rare in the Netherlands. Also reported from the British Isles (E).

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel: Ommen, estate 'Ada's Hoeve', 26 Sept. 1964; Denekamp, estate 'Singraven', 12 Oct. 1963; prov. Noord-Holland: Amsterdam, Amsterdam Wood, 25 Oct. 1961; prov. Limburg, Mook, 24 Oct. 1964.

This form was described by J. E. Lange (1936: 15 and 1939: 100) but not given a valid name.

**forma corrugis (Pers.: Fr.) Kits v. Wav. — Fig. 10**

*Psathyrella gracilis* f. *corrugis* (Pers.: Fr.) Kits van Wav. in *Persoonia* 6: 259. 1971. For further synonymy see p. 43.

DESCRIPTIONS & ILLUSTRATIONS. — J. E. Lange, *Fl. agar. dan.* 4: 100, pl. 153 B 1939; Kühn. & Romagn., *Fl. anal. Champ. sup.*: 357. 1953; Kits van Wav. in *Persoonia* 6: 259. 1971.

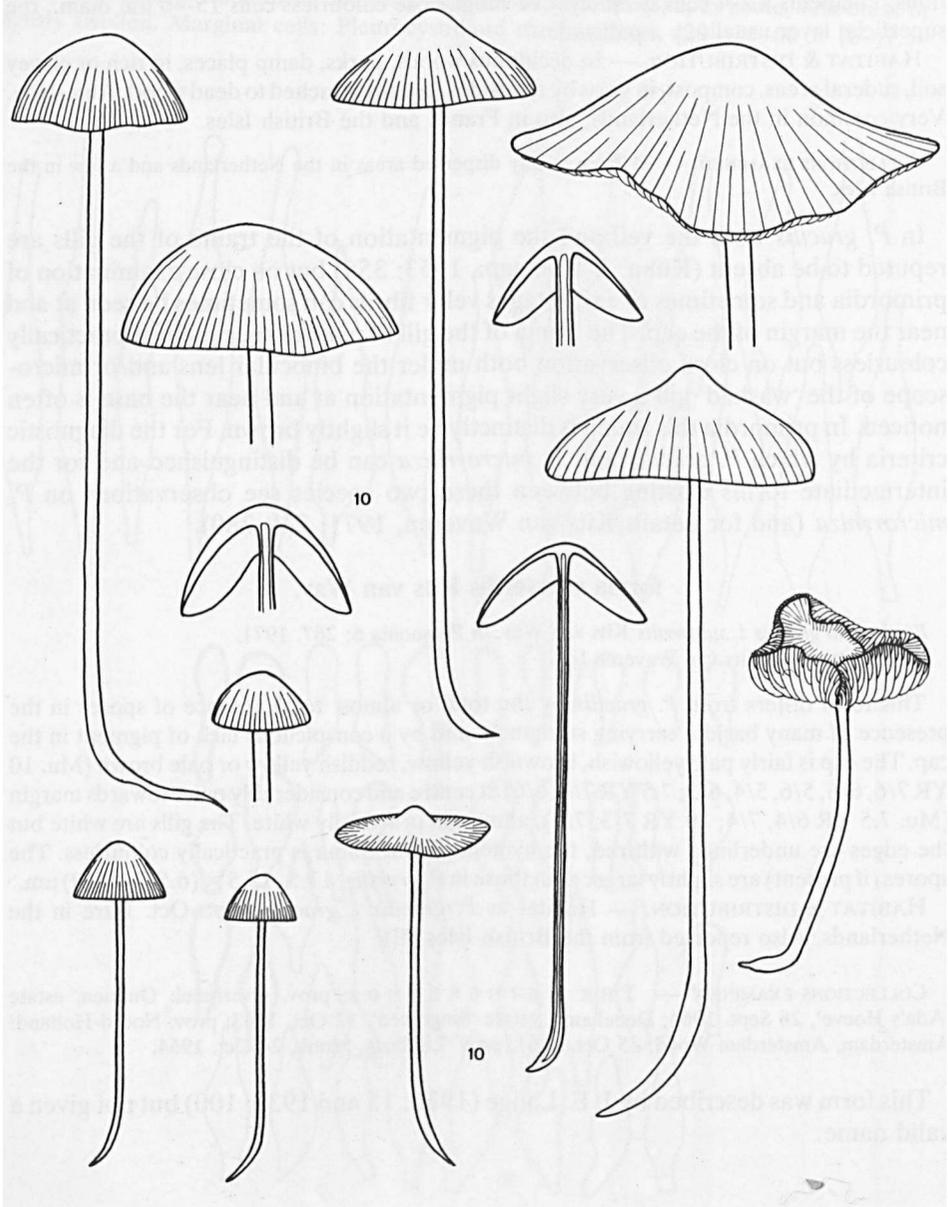


Fig. 10. *Psathyrella gracilis* f. *corrugis*. — Carpophores (x 1, but carpophore at extreme right x 1/2).

This form differs from *P. gracilis* by its robuster habit and larger size (cap 15–50 mm, stem 60–150 × 2–4 mm), its cap in the final stages being more convex, often with strongly revolute marginal area, its distinct umbo and greyer colour (Mu. 10 YR 4/2, 3/2, 2/2, 4/3, 3/3). On drying the cap usually turns very pink or reddish the surface becoming rugose. The microscopical characters are identical with those of *P. gracilis*.

**HABITAT & DISTRIBUTION.** — Habitat as *P. gracilis*. Aug.-Nov. Fairly common in the Netherlands, also in France and the British Isles.

**COLLECTIONS EXAMINED.** — Seven from various parts of the Netherlands.

There is no sharp delimitation between *P. gracilis* and its form *corrugis*; intermediate forms exist. For the nomenclatural aspects see Kits van Waveren (1971: 26:). At specific level *P. gracilis* f. *corrugis* figures in the literature under several generic names (*Coprinarius*, *Drosophila*, *Psathyra*, *Psathyrella*), but it is rarely treated at variety level and never as a form of *P. gracilis*. A collection of *Agaricus corrugis* present in Persoon's herbarium (L) was chosen as neotype.

**forma *clavigera* Kits van Wav. — Fig. 13.**

*Psathyrella gracilis* f. *clavigera* Kits van Wav. in *Persoonia* 6: 265. 1971.

**DESCRIPTION & ILLUSTRATIONS.** — Kits van Wav., l.c.

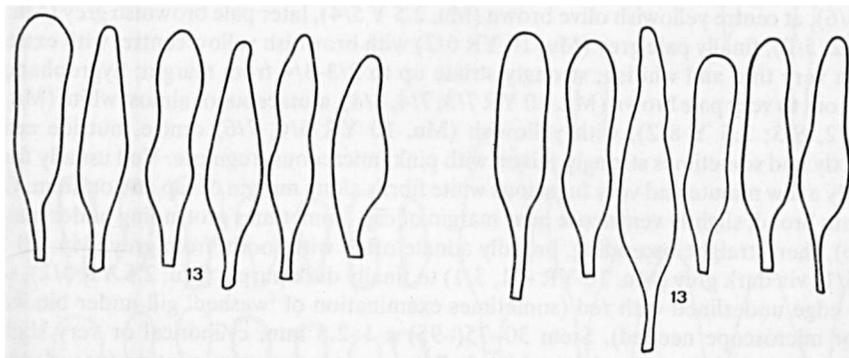


Fig. 13. *Psathyrella gracilis* f. *clavigera*. — Pleurocystidiogram.

This form differs from *P. gracilis* by the very versiform and rather numerous pedicellate pleurocystidia which are clavate, obclavate, cylindrical or subcylindrical (and then often constricted in the middle), subutriform or lageniform with obtuse to acute apex.

**HABITAT & DISTRIBUTION.** — Habitat as *P. gracilis*. Aug.-Nov. Rare in the Netherlands, not reported from France or the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel, Ommen, estate 'Ada's Hoeve', 15 Oct. 1963; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 5 Nov. 1959 and 27 July 1960.

**forma *albolimbata* Kits van Wav.**

*Psathyrella gracilis* f. *albolimbata* Kits van Wav. in *Persoonia* 6: 265. 1971.

**DESCRIPTION & ILLUSTRATIONS.** — Kits van Wav., l.c.

This form differs from *P. gracilis* by the absence, both on examination under the binocular lens and microscope of the 'washed' gills, of red underlining of the cheilocystidia and by the atypical and variable pleurocystidia (elongate or cylindrical with obtuse apices or distinctly small, 30–45 × 8–11 μm).

**HABITAT & DISTRIBUTION.** — Habitat as *P. gracilis*. Oct.–Nov. Rare in the Netherlands. Not reported from France, once from the British Isles.

**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S: prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 13 Nov. 1962; prov. Limburg, Linnerbroek, 6 Oct. 1962. — B R I T I S H I S L E S, Oxfordshire, Oxford, 'Bagley Wood', 15 Sept. 1969.

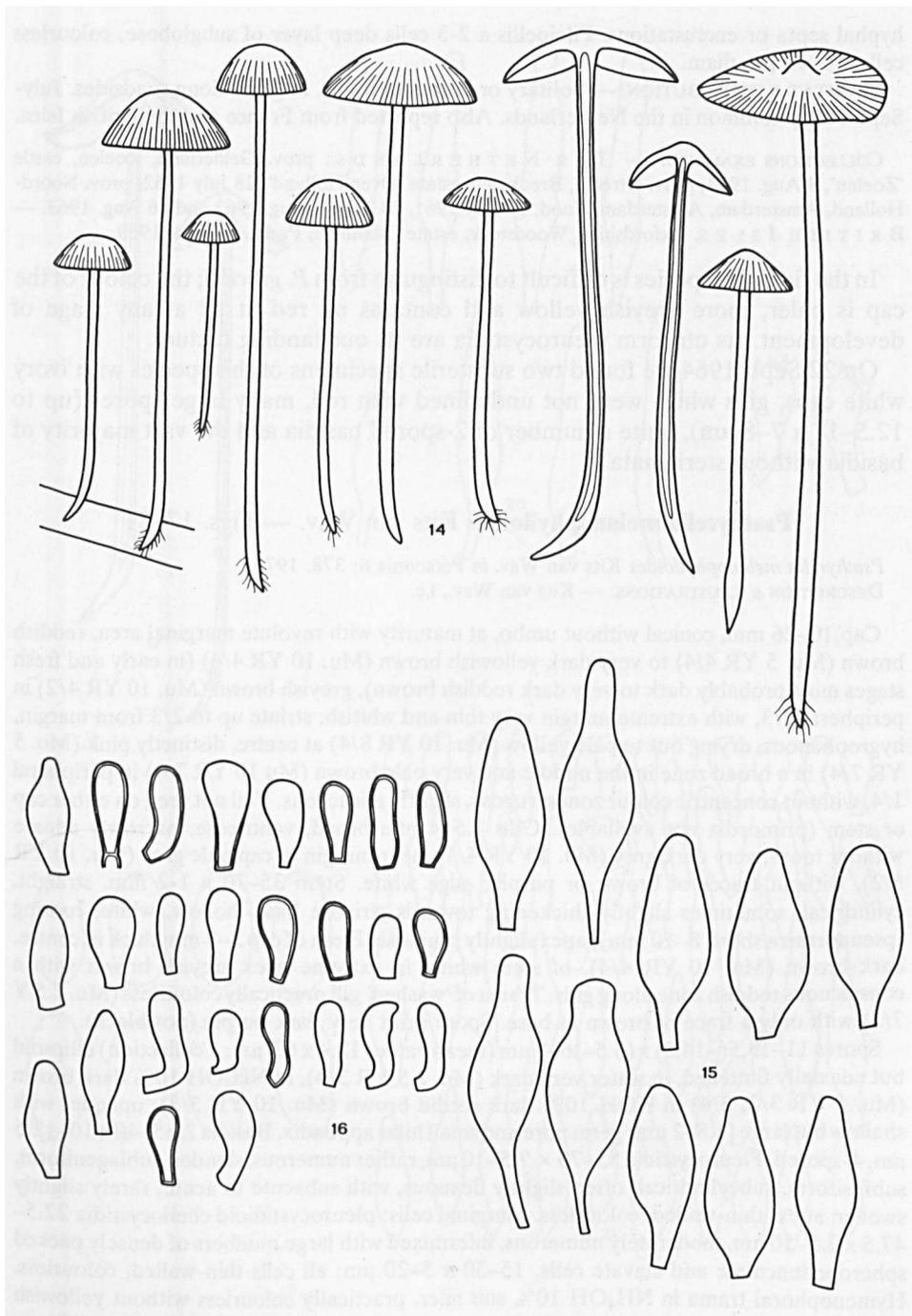
***Psathyrella pseudogracilis* (Romagn.) Mos. — Figs. 14–16.**

*Drosophila pseudogracilis* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella pseudogracilis* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3 Aufl.: 214. 1967.

**DESCRIPTIONS & ILLUSTRATIONS.** — Kühn. & Romagn., Fl. anal. Champ. sup.: 357. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 218. 1975 (as *Drosophila pseudogracilis* f. *minor*) and ditto 98: 16. 1982; Malenç. & Bertault, Fl. Champ. sup. Maroc 1: 190. 1970; Kits van Wav. in Persoonia 8: 396. 1976.

Cap 9–25 mm, paraboloid-convex to convex, sometimes with umbo, at first fairly dark brown (Mu. YR 3/3, 4/3), but very soon fading to pale yellowish brown (Mu. 10 YR 4/4, 5/4, 5/6), at centre yellowish olive brown (Mu. 2.5 Y 5/4), later pale brownish grey (Mu. 10 YR 4/2, 5/2), finally pale grey (Mu. 10 YR 6/2) with brownish yellow centre, with extreme margin very thin and whitish; strongly striate up to 2/3–3/4 from margin; hygrophanous, drying out to very pale brown (Mu. 10 YR 7/3, 7/4, 8/4), alutaceous or almost white (Mu. 10 YR 8/2, 8/3; 2.5 Y 8/2), with yellowish (Mu. 10 YR 6/6, 7/6) centre, outside centre distinctly and sometimes strongly mixed with pink, micaceous, rugulose. Veil usually forming only a few minute and very fugacious white fibrils along margin of cap and on stem. Gills 2–4 mm broad, slightly ventricose near margin of cap (sometimes protruding under margin of cap), then straight, ascending, broadly adnate often with tooth, from grey (Mu. 10 YR 6/1, 5/1) via dark grey (Mu. 10 YR 4/1, 3/1) to finally dark purple (Mu. 2.5 YR 3/2), with white edge underlined with red (sometimes examination of 'washed' gill under binocular lens or microscope needed). Stem 30–75(–95) × 1–2.5 mm, cylindrical or very slightly thickening towards base, straight, white, hollow, pruinose at apex, rooting (pseudorrhiza 3–10 mm long), at base more or less strigose with white hairs. Flesh of cap in centre 1–2 mm thick, greyish brown, of stem white, very pale brown alongside cavity. Trama of 'washed' gill practically colourless or very pale grey to yellowish (Mu. 2.5 Y 7/2; 10 YR 7/2). Spore print purplish black.

Spores 11.5–13 × 6.5–7 μm (mean values 11.8–12.6 × 6.5–6.9 μm; 7 collections), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6) in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/3) in KOH 5% sordid brown (Mu. 10 YR 3/3), opaque to subopaque, with distinct germ pore (± 2 μm) and small hilar appendix. Basidia 19.5–33.5 × 10.5–13 μm, 4-spored. Pleurocystidia 40–70(–77.5) × 10–20 μm, fairly numerous, ventricose-utriform or subutriform, often distinctly pedicellate, thin-walled, colourless. Marginal cells: pleurocystidioid, sublageniform or subfusiform cheilocystidia 25–50 × 7.5–17.5(–20 μm), crowded to scattered; spheropedunculate and clavate cells (12.5–)15–25(–30) × 5–12.5 μm, in varying numbers, all cells thin-walled (some spheropedunculate and clavate cells with slightly thickened walls, as in *P. gracilis*). Hymenophoral trama in NH<sub>4</sub>OH 10% submicroscopically colourless or very pale yellowish in basal part from membranal pigment, without yellow



Figs. 14–16. *Psathyrella pseudogracilis*. — 14. Carpophores (x 1). — 15. Pleurocystidiogram. — 16. Cheilocystidiogram.

hyphal septa or encrustations. Pileipellis a 2-3 cells deep layer of subglobose, colourless cells, 16–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary or in small groups, in grass along roadsides. July–Sept. Fairly common in the Netherlands. Also reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S.**: prov. Gelderland, Zoelen, castle 'Zoelen', 9 Aug. 1974; prov. Utrecht, Breukelen, estate 'Over-Holland', 28 July 1962; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 27 July 1961, 24 July, 7 Aug. 1962 and 16 Aug. 1963. — **B R I T I S H I S L E S**, Oxfordshire, Woodstock, estate 'Blenheim Park', 16 Sept. 1969.

In the field this species is difficult to distinguish from *P. gracilis*; the colour of the cap is paler, more greyish yellow and contains no red at all at any stage of development. Its utriform pleurocystidia are its outstanding feature.

On 22 Sept. 1964 we found two substerile specimens of this species with ivory white caps, gills which were not underlined with red, many large spores (up to 12.5–17 x 7–8  $\mu\text{m}$ ), quite a number of 2-spored basidia and the vast majority of basidia without sterigmata.

### ***Psathyrella melanophylloides* Kits van Wav. — Figs. 17–21**

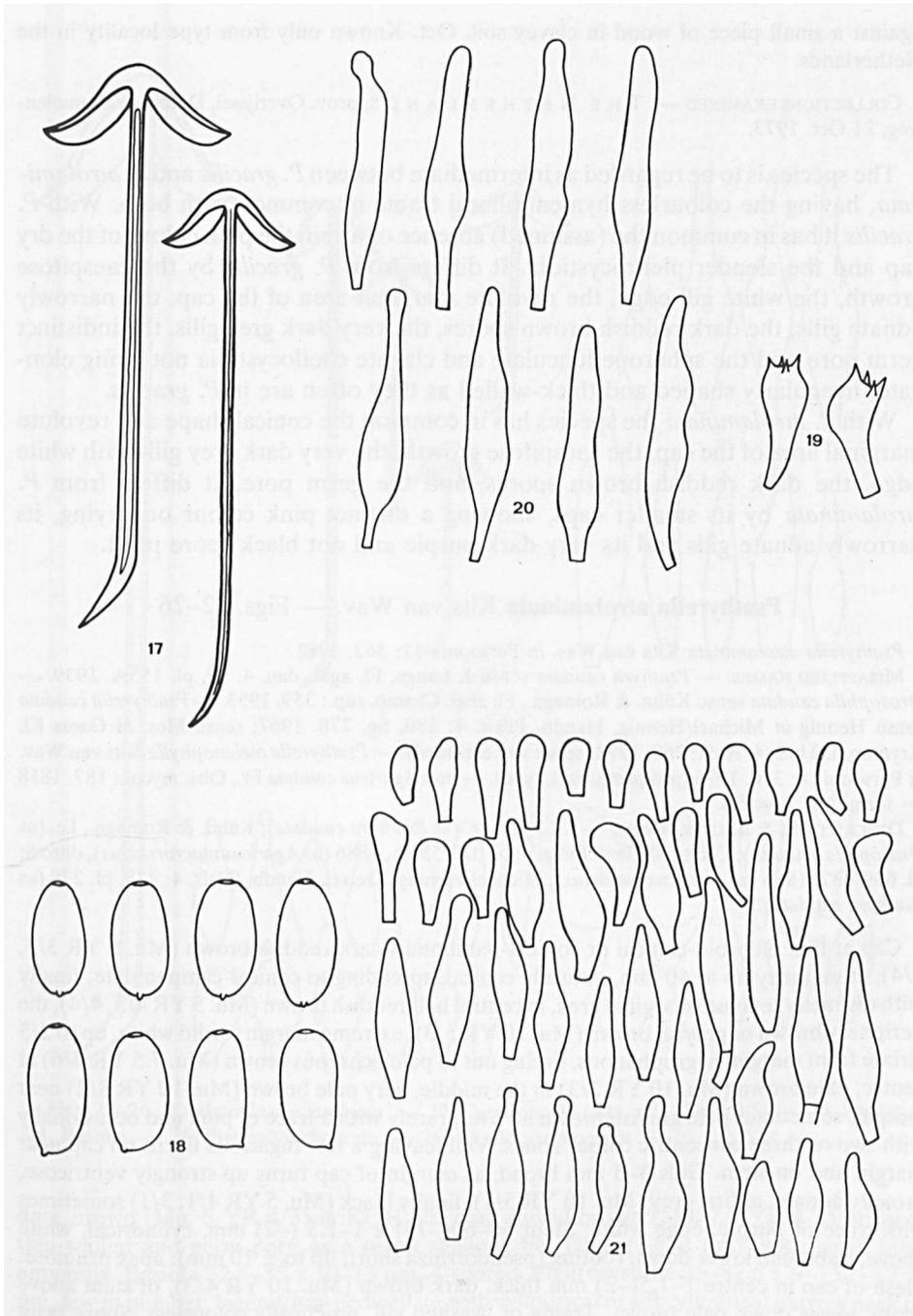
*Psathyrella melanophylloides* Kits van Wav. in *Persoonia* 8: 378. 1976.

**DESCRIPTION & ILLUSTRATIONS.** — Kits van Wav., l.c.

Cap 10–26 mm, conical without umbo, at maturity with revolute marginal area, reddish brown (Mu. 5 YR 4/4) to very dark yellowish brown (Mu. 10 YR 4/4) (in early and fresh stages most probably dark to very dark reddish brown), greyish brown (Mu. 10 YR 4/2) in peripheral 2/3, with extreme margin very thin and whitish, striate up to 2/3 from margin, hygrophanous, drying out to pale yellow (Mu. 10 YR 8/4) at centre, distinctly pink (Mu. 5 YR 7/4) in a broad zone in the middle and very pale brown (Mu. 10 YR 7/4) in peripheral 1/4, without concentric colour zones, rugose, slightly micaceous. Veil not seen on either cap or stem (primordia not available). Gills 2.5–4 mm broad, ventricose, narrowly adnate without tooth, very dark grey (Mu. 10 YR 4/1), near margin of cap pale grey (Mu. 10 YR 5/2), without traces of brown or purple; edge white. Stem 35–70 x 1–2 mm, straight, cylindrical, sometimes slightly thickening towards strigose base, hollow, white, rooting (pseudorrhiza short, 8–10 mm); apex slightly pruinose. Flesh of cap 2–3 mm thick in centre, dark brown (Mu. 10 YR 4/4), of stem white, in extreme apex greyish brown with a conspicuous reddish zone along gills. Trama of 'washed' gill practically colourless (Mu. 2.5 Y 7/2) with only a trace of brown at base. Spore print very dark purple (not black).

Spores 11–13.5(–14.5) x (5.5–)6–7  $\mu\text{m}$  (mean values 12.4 x 6.3  $\mu\text{m}$ : 1 collection) ellipsoid but adaxially flattened, in water very dark (Mu. 2.5 YR 3/4), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3, 3/4) in  $\text{KOH}$  10% dark sordid brown (Mu. 10 YR 3/3), opaque, with shallow but large (1.8–2  $\mu\text{m}$ ) germ pore and small hilar appendix. Basidia 22.5–40 x 10–12.5  $\mu\text{m}$ , 4-spored. Pleurocystidia 55–70 x 7.5–10  $\mu\text{m}$ , rather numerous, slender, sublageniform, subfusiform, subcylindrical, often slightly flexuous, with subacute to acute, rarely slightly swollen apex, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 22.5–47.5 x 7.5–10  $\mu\text{m}$ , moderately numerous, intermixed with large numbers of densely packed spheropedunculate and clavate cells, 15–30 x 5–20  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless without yellowish hyphal septa or encrustations. Pileipellis composed of roundish cells, 16–48- $\mu\text{m}$  diam., colourless.

**HABITAT & DISTRIBUTION.** — Terrestrial and caespitose ( $\pm$  10 specimens in a bunch)



Figs. 17–21. *Psathyrella melanophylloides*. — 17. Carpophores (x 1). — 18. Spores. — 19. Basidia. — 20. Pleurocystidiogram. — 21. Cheilocystidiogram.

against a small piece of wood in clayey soil. Oct. Known only from type locality in the Netherlands.

COLLECTIONS EXAMINED — T H E N E T H E R L A N D S, prov. Overijssel, Delden, Zaagmolenweg, 21 Oct. 1973.

The species is to be regarded as intermediate between *P. gracilis* and *P. atrolaminata*, having the colourless hymenophoral trama in common with both. With *P. gracilis* it has in common the (assumed) absence of a veil, the pink colour of the dry cap and the slender pleurocystidia. It differs from *P. gracilis* by the caespitose growth, the white gill edge, the revolute marginal area of the cap, the narrowly adnate gills, the dark reddish brown spores, the very dark grey gills, the indistinct germ pore and the spheropedunculate and clavate cheilocystidia not being elongate, irregularly shaped and thick-walled as they often are in *P. gracilis*.

With *P. atrolaminata* the species has in common the conical shape and revolute marginal area of the cap, the caespitose growth, the very dark grey gills with white edge, the dark reddish brown spores, and the germ pore. It differs from *P. atrolaminata* by its smaller caps, showing a distinct pink colour on drying, its narrowly adnate gills and its very dark purple and not black spore print.

### *Psathyrella atrolaminata* Kits van Wav. — Figs. 22–26

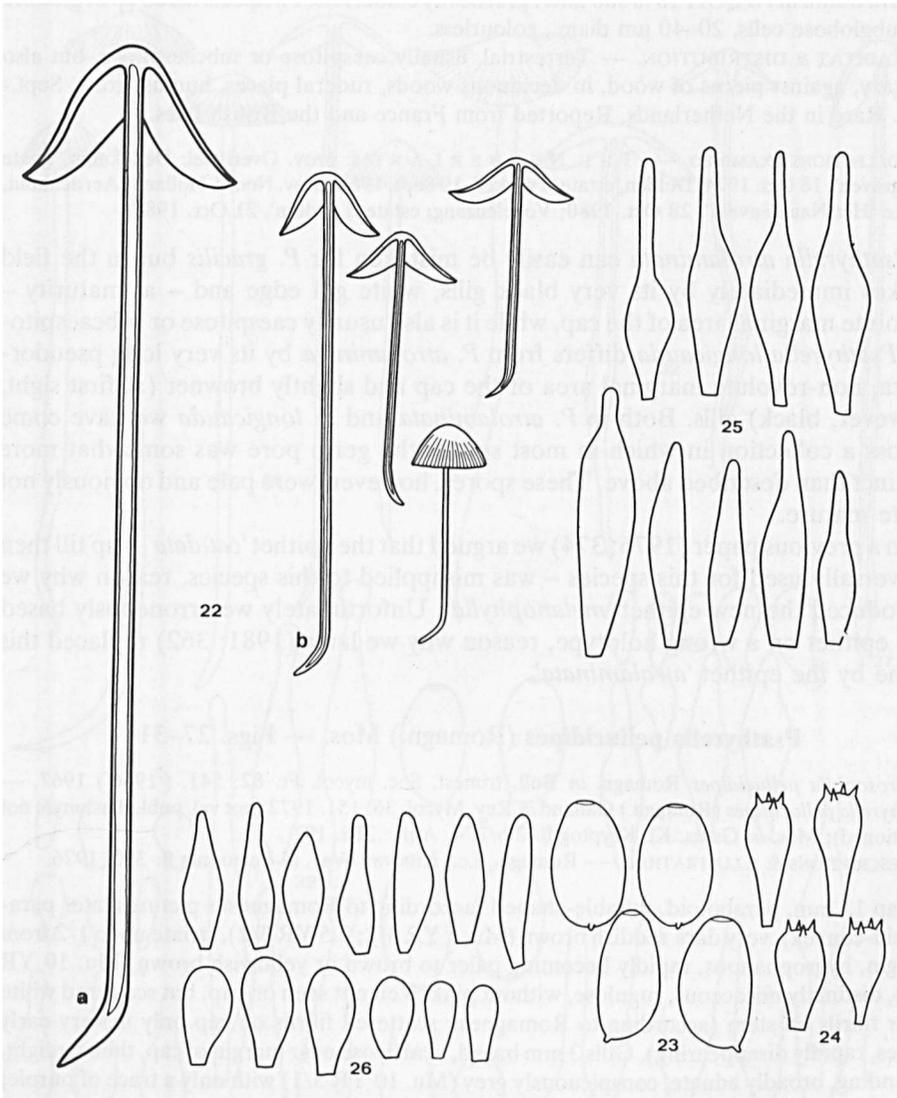
*Psathyrella atrolaminata* Kits van Wav. in *Persoonia* 11: 362. 1981.

MISAPPLIED NAMES. — *Psathyra caudata* sensu J. Lange, Fl. agar. dan. 4: 99, pl. 155A. 1939. — *Drosophila caudata* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953. — *Psathyrella caudata* sensu Hennig in Michael/Hennig, Handb. Pilzfr. 4: 280, fig. 278. 1967; sensu Mos. in Gams Kl. Kryptog. fl. 2 b/2, 4. Aufl.: 268. 1978 (spore size excluded). — *Psathyrella melanophylla* Kits van Wav. in *Persoonia* 8: 370. 1976 (pro parte, excl. type). — non *Agaricus caudata* Fr., Obs. mycol.: 187. 1818 (= form of *P. gracilis*).

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, l.c. (as *Psathyra caudata*); Kühn. & Romagn., l.c. (as *Drosophila caudata*); Cooke, Ill. Brit. Fungi 4: pl. 622/596A, 1886 (as *Agaricus macrorrhizus*), ditto 5: pl. 639/637, 1886 (as *Agaricus caudatus*); Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 428, pl. 278 (as *Psathyra caudata*).

Cap at first ellipsoid-conical or conical-paraboloid dark reddish brown (Mu. 5 YR 3/3, 3/4), at maturity up to 40 mm, obtusely conical, spreading to conical-campanulate, finally with distinctly revolute marginal area, in central half reddish brown (Mu. 5 YR 4/3, 4/4), the periphery brown or greyish brown (Mu. 10 YR 5/3), extreme margin sordid white, up to 2/3 striate from margin, hygrophanous, drying out to pale ochreous brown (Mu. 7.5 YR 7/6) at centre, pale brown (Mu. 10 YR 7/3) in the middle, very pale brown (Mu. 10 YR 8/2) near margin, sometimes pale greyish brown all over, rarely with a trace of pink and occasionally with two or three concentric colour zones. Veil leaving a few fugacious fibrils on cap near margin and on stem. Gills 3–5 mm broad, as margin of cap turns up strongly ventricose, broadly adnate, at first grey (Mu. 10 YR 5/1), finally black (Mu. 5 YR 4/1, 3/1) sometimes with trace of purple; edge white. Stem 50–60(–75) x 1–1.5 (–2) mm, cylindrical, white above, isabelline lower down, rooting (pseudorrhiza short, up to ± 10 mm); apex pruinose. Flesh of cap in centre 1–1.5(–2) mm thick, dark brown (Mu. 10 YR 4/3), of stem above white, lower down pale brown. Trama of 'washed gill' practically colourless. Spore print black.

Spores 11–14.5 x 6.5–7.5 µm (mean values 11.6–13.5 x 6.5–7.3 µm: 4 collections), ellipsoid but adaxially flattened, in water very dark red (2.5 YR 3/2, 3/4), in NH<sub>4</sub>OH 10%



Figs. 22–26. *Psathyrella atrolaminata*. — 22. Carpophores (22a, x 1; 22b, x 0.5). — 23. Spores. — 24. Basidia. — 25. Pleurocystidiogram. — 26. Cheilocystidiogram.

dark brown (Mu. 5 YR 4/3) in KOH 5% dark sordid brown (Mu. 7.5 YR 4/2) opaque, thin-walled and germ pore as a result shallow, but large (1.8–2  $\mu\text{m}$ ), with small hilar appendix. Basidia 22.5–35 x 10–13  $\mu\text{m}$ , 4-spored. Pleurocystidia 35–82.5 x 9–15 (–17.5)  $\mu\text{m}$ , few in number, lageniform-pedicellate with cylindrical or subcylindrical narrow neck or subfusoid, sometimes slender, with acute to subacute apex, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 22.5–55 x 6–15  $\mu\text{m}$ , scattered; spheropedunculate and clavate cells 10–27.5 x 7.5–12.5  $\mu\text{m}$ , numerous; all cells thin-walled, colourless. Hymeno-

phoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless. Pileipellis made up of globose to subglobose cells, 20–40  $\mu\text{m}$  diam., colourless.

**HABITAT & DISTRIBUTION.** — Terrestrial, usually caespitose or subcaespitose, but also solitary, against pieces of wood, in deciduous woods, ruderal places, humus, grass. Sept.-Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel: Denekamp, estate 'Singraven', 18 Oct. 1974; Delden, estate 'Twickel', 19 Sept. 1964; prov. Noord-Holland: Aerdenhout, estate 'Het Naaldenveld', 28 Oct. 1980; Vogelenzang, estate 'Leyduin', 21 Oct. 1980.

*Psathyrella atrolaminata* can easily be mistaken for *P. gracilis* but in the field strikes immediately by its very black gills, white gill edge and – at maturity – revolute marginal area of the cap, while it is also usually caespitose or subcaespitose. *Psathyrella longicauda* differs from *P. atrolaminata* by its very long pseudorhiza, non-revolute marginal area of the cap and slightly browner (at first sight, however, black) gills. Both in *P. atrolaminata* and *P. longicauda* we have come across a collection in which in most spores the germ pore was somewhat more distinct than described above. These spores, however, were pale and obviously not quite mature.

In a previous paper (1976: 374) we argued that the epithet '*caudata*' – up till then universally used for this species – was misapplied to this species, reason why we introduced the new epithet '*melanophylla*'. Unfortunately we erroneously based this epithet on a wrong holotype, reason why we later (1981: 362) replaced this name by the epithet '*atrolaminata*'.

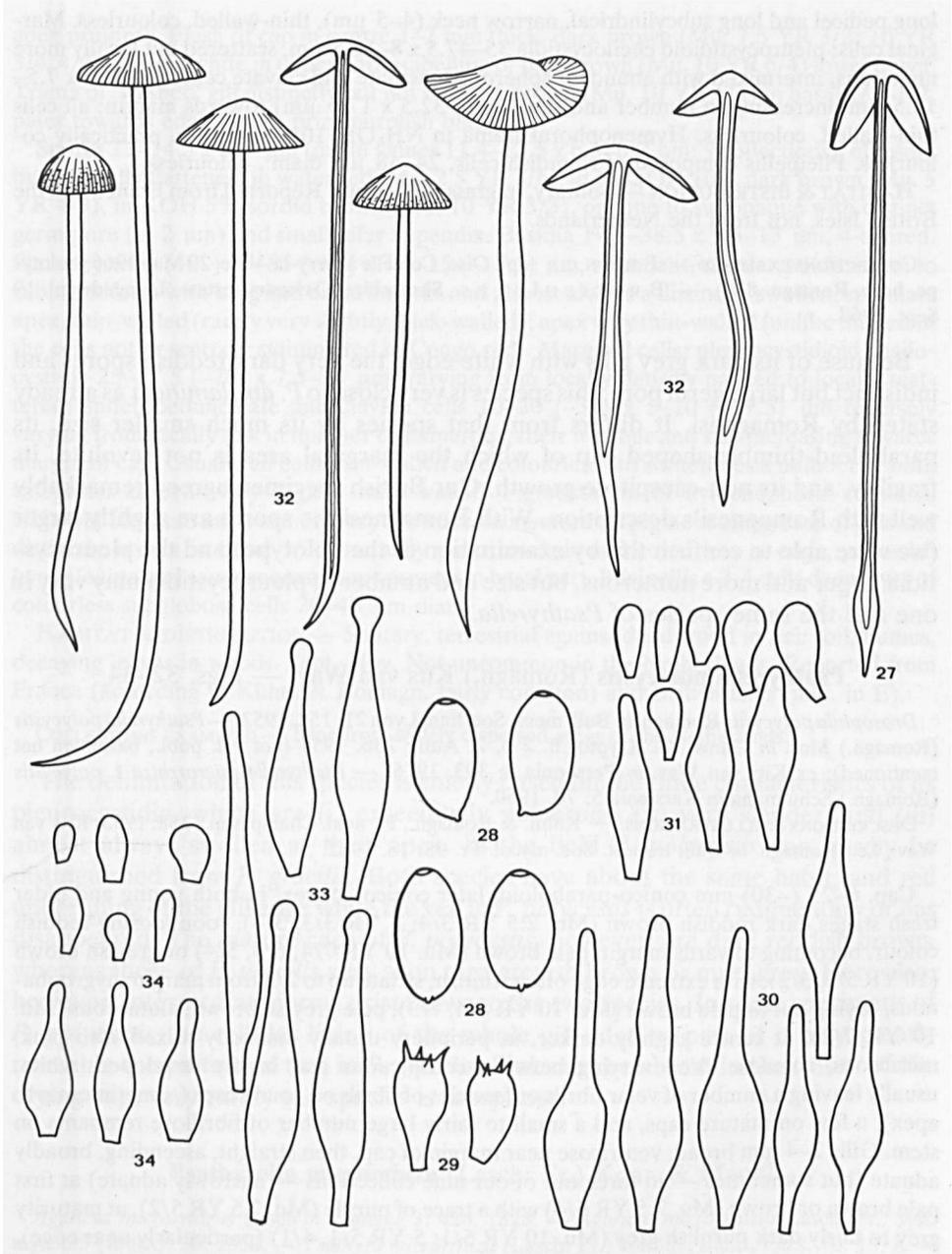
### *Psathyrella pellucidipes* (Romagn.) Mos. — Figs. 27–31

*Drosophila pellucidipes* Romagn. in Bull. trimest. Soc. mycol. Fr. 82: 541. ('1966') 1967. — *Psathyrella pellucidipes* (Romagn.) Galland in Rev. Mycol. 36: 151. 1972 (not val. publ.; basionym not mentioned); Mos. in Gams. Kl. Kryptog. fl. 2 b/2, 4. Aufl.: 268. 197.

**DESCRIPTIONS & ILLUSTRATIONS.** — Romagn., l.c.; Kits van Wav. in Persoonia 8: 390. 1976.

Cap 13 mm, paraboloid, thimble-shaped (according to Romagnesi's pictures later paraboloid-convex), very dark reddish brown (Mu. 5 YR 3/2; 2.5 YR 3/2), striate up to 1/2 from margin, hygrophanous, rapidly becoming paler to brown or yellowish brown (Mu. 10 YR 6/4), distinctly micaceous, rugulose, without pink. Veil not seen on cap, but scattered white velar fibrils on stem (according to Romagnesi: scattered fibrils on cap only in very early stages, rapidly disappearing). Gills 3 mm broad, ventricose near margin of cap, then straight, ascending, broadly adnate, conspicuously grey (Mu. 10 YR 5/1) with only a trace of purple; edge white. Stem 70 x 1.75 mm, cylindrical, slightly thickened at base, straight, rooting (pseudorrhiza very short, 8 mm), hollow (cavity loosely filled with white spongy tissue) whitish to pale brown (Mu. 7.5 YR 6/4); apex minutely pruinose. Flesh of cap in centre 1 mm thick, very dark brown (Mu.  $\pm$  10 YR 3/4), of stem pale brown (Mu. 7.5 YR 6/4) but dark brown (Mu.  $\pm$  10 YR 3/4) alongside gills. Trama of 'washed' gill practically colourless with a very narrow yellowish (Mu. 10 YR 5/6) brown strip at base. Spore print black.

Spores 11.5–13.5 x 6.5–7  $\mu\text{m}$  (mean values 12.7–13.5 x 6.7–7  $\mu\text{m}$ : 2 collections), ellipsoid but adaxially flattened, in water very dark red (Mu. 2.5 YR 3/4) in  $\text{NH}_4\text{OH}$  10% very dark brown (Mu. 5 YR 3/3), in KOH 5% dark sordid brown (Mu. 7.5 YR 3/2), opaque; germ pore shallow but large,  $\pm$  1.8  $\mu\text{m}$ . Basidia 22.5–27.5 x 10–12  $\mu\text{m}$ , 4-spored. Pleurocystidia 40–55 x 10–12.5  $\mu\text{m}$  (Romagnesi: 60–75 x 10–18  $\mu\text{m}$ ), scattered, sublageniform with fairly



Figs. 27-31. *Psathyrella pellucidipes*. — 27. Carpophores (x 1). — 28. Spores. — 29. Basidia. — 30. Pleurocystidiogram. — 31. Cheilocystidiogram.

Figs. 32-34. *Psathyrella polycystis*. — 32. Carpophores (x 1). — 33. Pleurocystidiogram. — 34. Cheilocystidiogram.

long pedicel and long subcylindrical, narrow neck (4–5  $\mu\text{m}$ ), thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 35–47.5 x 8–12.5  $\mu\text{m}$ , scattered but locally more numerous, intermixed with abundant spheropedunculate and clavate cells, 15–22.5 x 7.5–12.5  $\mu\text{m}$ , increasing in number and size (up to 32.5 x 17.5  $\mu\text{m}$ ) towards margin; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless. Pileipellis composed of roundish cells, 24–48  $\mu\text{m}$  diam., colourless.

HABITAT & DISTRIBUTION — Solitary, in grass. May–Sept. Reported from France and the British Isles, not from the Netherlands.

COLLECTIONS EXAMINED — F R A N C E, dpt. Oise, Comelle à Orry-la-Ville, 29 May 1966 (holotype, herb. Romagn. 878). — B R I T I S H I S L E S, Shropshire, Oswestry, estate 'Llangedwyn', 19 Sept. 1967.

Because of its dark grey gills with white edge, the very dark reddish spores and indistinct but large germ pore, this species is very close to *P. atrolaminata* as already stated by Romagnesi. It differs from that species by its much smaller size, its paraboloid-thimble-shaped cap from which the marginal area is not revolute, its fragility, and its non-caespitose growth. Our British specimen agreed remarkably well with Romagnesi's description. With Romagnesi the spores are slightly larger (we were able to confirm this by examination of the holotype) and the pleurocystidia larger and more numerous, but size and number of pleurocystidia may vary in one and the same species of *Psathyrella*.

### *Psathyrella polycystis* (Romagn.) Kits van Wav. — Figs. 32–34

*Drosophila polycystis* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella polycystis* (Romagn.) Mos. in Gams. Kl. Kryptog.f. 2 b, 2. Aufl.: 236. 1955 (not val. publ.; basionym not mentioned); ex Kits van Wav. in Persoonia 8: 393. 1976. — *Psathyrella microrrhiza* f. *polycystis* (Romagn.) Schulmann in Karstenia 5: 70. 1960.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 358. 1953; Kits van Wav., l.c.; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 18. 1982.

Cap. 6–25 (–30) mm conico-paraboloid, later conico-convex, in both young and older fresh stages dark reddish brown (Mu. 2.5 YR 3/4; 5 YR 3/3, 3/4), soon losing reddish colour, becoming towards margin pale brown (Mu. 10 YR 7/4, 6/3, 5/4) or greyish brown (10 YR 5/3, 5/2), with extreme edge often whitish; striate up to 2/3 from margin; hygrophanous, drying out to pale brown (Mu. 10 YR 8/4, 7/3), pale greyish brown, alutaceous (Mu. 10 YR 7/2), at centre slightly darker, in periphery usually distinctly mixed with pink, micaceous, rugulose. Veil varying between conspicuous and hardly developed, white, usually leaving a number of velar fibrils or fascicles of fibrils on young caps (sometimes up to apex), a few on mature caps, and a small to fairly large number of fibrillose remnants on stem. Gills 2–4 mm broad, ventricose near margin of cap, then straight, ascending, broadly adnate (but sometimes — in three out of our nine collections — narrowly adnate) at first pale brown or brown (Mu. 7.5 YR 6/4) with a trace of purple (Mu. 7.5 YR 5/2), at maturity grey to fairly dark purplish grey (Mu. 10 YR 5/1; 5 YR 5/1, 4/1) (particularly near edge), browner towards base (Mu. 10 YR 5/2); edge white and distinctly underlined with red (sometimes examination of 'washed' gill under binocular lens or microscope needed). Stem 35–80 (–95) x 1–3 mm, straight, cylindrical or slightly thickening towards base, smooth or minutely longitudinally striate, white above, isabelline or pale brown (Mu. 10 YR 7/3, 6/3) towards base, hollow, rooting (pseudorrhiza 3–30 mm long); base strigose with white hairs;

apex pruinose. Flesh of cap in centre 1–2 mm thick, dark brown (Mu. 7.5 YR 3/2; 10 YR 3/4, 4/3), of stem white in upper part, isabelline or pale brown (Mu. 10 YR 6/4) lower down. Trama of 'washed' gill distinctly but not strongly brown (Mu. 10 YR 6/4) in basal 1/3–1/2, paler towards edge. Spore print purplish black.

Spores 11–14.5 x 6–7  $\mu\text{m}$  (mean values 11.4–13.5 x 6.3–6.7  $\mu\text{m}$ : 9 collections), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3), in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 3/3), opaque to subopaque with distinct germ pore ( $\pm 2$   $\mu\text{m}$ ) and small hilar appendix. Basidia 17.5–38.5 x 9.5–13  $\mu\text{m}$ , 4-spored. Pleurocystidia (40–) 55–85 (–90) x 7.5–15 (–17.5)  $\mu\text{m}$ , abundant, slender, subfusiform to sublageniform with long and narrow necks and almost always a distinctly swollen, spatulate apex, thin-walled (rarely very slightly thick-walled); apex very thin-walled (unlike the rest of the cells not or scarcely staining red in Congo red). Marginal cells: pleurocystidioid cheilocystidia 25–57.5 (–70) x 7.5–15  $\mu\text{m}$ , varying from locally densely packed to locally scattered; spheropedunculate and clavate cells 10–20 (–35) x 5–10 (–17.5)  $\mu\text{m}$  reversely varying from locally few in number to numerous, their number and size increasing towards margin of cap. Usually all cells thin-walled and colourless but sometimes a number of both categories of cells very slightly thick-walled. Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. usually very brown from membranal pigment along base of gills and distinctly brown in basal 1/3, gradually paler towards and colourless at edge, yellowish hyphal septa and some encrustations present in basal part. Pileipellis a 3–4 cells deep layer of colourless subglobose cells 20–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION** — Solitary, terrestrial against dead wood in rich soil, humus, decaying leaves in woods. Sept.–Nov. Not uncommon in the Netherlands. Reported from France (according to Kühn. & Romagn. fairly common) and British Isles (mat. in E).

**COLLECTIONS EXAMINED** — Nine from widely dispersed areas of the Netherlands.

The delimitation of this species is chiefly based on the three characteristics of its pleurocystidia, which are (i) exceedingly numerous, (ii) very slender, and (iii) almost always swollen at their apex. In the field *P. polycystis* can hardly be distinguished from *P. gracilis*. Both species have about the same habit, and red underlining of the gill edge while the veil in *P. polycystis* is often rudimentary or has disappeared. The mature caps of *P. polycystis*, however, are dark reddish brown, whereas those of *P. gracilis* very soon turn greyish brown or mud-grey. Here also, however, intermediate forms exist between the two species. In some specimens of *P. polycystis* the cellular lining of the whole gill edge or part of it may greatly resemble the pattern of that in *P. gracilis*. Pink may be absent in the colour of the drying cap, very rarely the species is caespitose.

### ***Psathyrella microrrhiza* (Lasch: Fr.) Konr. & Maubl.**

*Agaricus microrrhizus* Lasch in Linnaea 3: 426. 1828. — *Agaricus microrrhizus* Lasch: Fr., Syst. mycol. 3 (Index): 30. 1832. — *Psathyra microrrhiza* (Lasch: Fr.) Kumm., Führ., Pilzk. 70. 1871. — *Drosophila microrrhiza* (Lasch: Fr.) Quél., Enchir. Fung.: 118. 1886. — *Psilocybe microrrhiza* (Lasch: Fr.) Feltgen in C.r. Soc. Nat. Luxembourg 16: 232. 1906. — *Psathyrella microrrhiza* (Lasch: Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 123. 1948.

*Agaricus semivestita* Berk. & Br. in Ann. Mag. nat. Hist., ser. III, 7: 376. 1861. — *Psathyra semivestita* (Berk & Br.) Rick., Blätterp.: 258. 1913 (misapplied).

*Psathyrella squamifera* P. Karst. in Medd. Soc. Fauna Fl. fenn. 5: 60. 1882.

*Psathyrella badiovestita* P.D. Orton in Trans. Brit. mycol. Soc. 43: 368. 1960.

DESCRIPTIONS & ILLUSTRATIONS — Cooke, Ill. Brit. Fungi 4: pl. 578 (617). 1886 (as *Agaricus semivestitus*); Rick. Blätterp.: 257. 1913; ditto: 258, pl. 67 fig. 4. 1913 (as *Psathyra semivestita*); J. Lange, Fl. agar. dan. 4: 101, pl. 154 A. 1939 (as *Psathyra squamifera*); Kühn. & Romagn., Fl. anal. Champ. sup.: 358. 1953; Kits van Wav. in Persoonia 6: 269. 1971; A. H. Smith in Mem. N.Y. bot. Gdn 24: 198. 1972 (as *Psathyrella squamifera*); P. D. Orton, l.c. (as *Psathyrella badiovestita*).

forma **microrrhiza** — Figs. 35–39

Cap at first (in primordia and slightly older specimens) 4–12 mm, paraboloid, at centre dark reddish brown (Mu. 2.5 YR 3/2; 5 YR 3/3, 3/4) or dark brown (Mu. 7.5 YR 3/2), in peripheral half brown, paler towards margin (Mu. 7.5 YR 4/4, 10 YR 5/4), rarely pale yellowish ochreous all over, not striate, in mature specimens 20–50 mm broad, paraboloid, conical-paraboloid, conical, in final stages sometimes with revolute extreme margin, at centre still reddish brown (Mu. 5 YR 3/3, 3/4, 4/4), but usually dark brown (Mu. 7.5 YR 3/2, 4/2, 4/4), paler and dull brown towards margin (Mu. 10 YR 4/4, 3/3, 4/3, 5/4, 5/3), in final stages greyish brown (Mu. 10 YR 4/2, 5/2) or brownish grey (Mu. 10 YR 6/2), strongly striate to striate-sulcate up to 1/2–3/4 from margin, at centre greasy, translucent, hygrophanous, drying out via yellowish (Mu. 10 YR 7/6) to pale brown or greyish yellow brown (Mu. 10 YR 6/3, 7/4, 7/3, 7/2, 8/3), alutaceous, with centre slightly darker, these colours often to some extent mixed with pink, rarely almost white, usually slightly micaceous, rugulose. Veil strongly developed but strongly deterrent, in earliest stages forming a coating of white fibrils and patches of interwoven bundles of fibrils often reaching the top, increasing in number towards margin, at maturity sometimes forming tufts of fibrils or flocci reaching up to 1/3–2/3 from margin, sometimes forming appendiculate denticles at margin, on stem forming scattered patches of adpressed velar remnants in lower 2/3. Gills 2–7 mm broad, ascending, straight or very slightly ventricose, broadly adnate, normally with a distinct tooth, in primordia and very young stages distinctly brown (Mu. 10 YR 6/3, 7/2, 7/3, 7/4) or greyish brown (Mu. 10 YR 5/2) in basal 1/3–1/2 and greyish (Mu. 10 YR 6/2, 7/1, 6/1, 5/1) towards edge, at maturity dark purple grey to purple black (Mu. 5 YR 4/1, 3/1, 3/2, 2,5/2), towards base slightly but distinctly browner; edge in primordia and very young specimens white, later underlined with red but often only near margin of cap and then often not on all gills (sometimes a search on 'washed' gill under binocular lens or microscope needed). Stem 40–190 x 1–4 mm, cylindrical or slightly thickening towards base, white in upper part, whitish, isabelline and sometimes pale brown in lower 1/3, hollow, rooting (pseudorrhiza up to 30 mm long, but sometimes very short) its base usually very strigose with white hairs over 15–40 mm. Flesh of cap in centre, 0.5–3 mm thick, brown to dark brown (Mu. 10 YR 4/3, 4/4, 3/3, 3/4) or dark greyish brown (Mu. 10 YR 4/2), of stem whitish in upper part, isabelline or pale brown lower down, grey-brown alongside gills and usually (almost always when gill edge is conspicuously red) with narrow red zone alongside gills. Trama of 'washed' gill distinctly brown at base, for the rest pale brown, almost colourless near edge. Spore print purple in a thin and black in a thick layer.

Spores 10–13.5 (–14.5) x (5.5–)6–7  $\mu\text{m}$  (mean values 10.4–13.1 x 5.6–6.8  $\mu\text{m}$ : 23 collections), ellipsoid, but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/3), in KOH 5% sordid brown (Mu. 10 YR 4/3), opaque to subopaque, with large germ pore ( $\pm 2 \mu\text{m}$ ) and relatively small hilar appendix. Basidia 19–35 x 9.5–13  $\mu\text{m}$ , 4-spored. Pleurocystidia 40–70 x 8–15  $\mu\text{m}$ , not infrequently up to 75–85  $\mu\text{m}$  and then slightly flexuous (rarely up to 100  $\mu\text{m}$ ), fairly numerous, rarely scarce or very numerous, versiform, lageniform-pedicellate (pedicel sometimes long and thin, 20–25 x 2–3  $\mu\text{m}$ ), with obtuse to subobtuse apex, not infrequently subcapitate, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 20–55 x 5–13  $\mu\text{m}$ , abundant and

densely packed (more than 100 cells per 1000  $\mu\text{m}$  gill edge), intermixed with a relatively small number of inconspicuous spheropedunculate cells, 10–25(–30)  $\times$  4–12 (–14)  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. normally rather distinctly but not strongly brownish from membranal pigment, strongest at and near base with a fair number of yellowish hyphal septa and few encrustations. Pileipellis a 2–4 cells deep layer of subglobose, colourless cells, 15–40  $\mu\text{m}$  diam.; superficial layer usually  $\pm$  a hymeniderm.

HABITAT & DISTRIBUTION. — In deciduous woods, parks, damp places, rich or clayey soil, in grass by roadsides, among rotting leaves, on compost, in ruderal areas, often gregarious, with pseudorrhizas usually attached to dead wood. Aug.–Nov. Common in the Netherlands, France, and the British Isles.

COLLECTIONS EXAMINED. — 23 Collections from widely dispersed areas in the Netherlands.

The conspicuous veil on the cap and the brown trama of the gills are the chief characters by which *P. microrrhiza* differs from *P. gracilis* (veil absent, gill trama colourless) from which it is sometimes difficult to distinguish. But external conditions (rain!) and age may cause the complete disappearance of the veil and most of the pigment. With regard to the minor differences between the two species there is considerable overlapping: In *P. microrrhiza* the carpophores usually are larger and firmer, the caps browner and with less tendency to turn pink on drying, the pleurocystidia are less slender. We found the number (density) of the pleurocystidioid cheilocystidia per 1000  $\mu\text{m}$  gill edge to be by far the most reliable means to distinguish between the two species.

In *P. microrrhiza* these cells are abundant and densely packed, always more than 100 cells (preponderantly between 140 and 240) per 1000  $\mu\text{m}$  gill edge, whereas in *P. gracilis* they are much less numerous, more scattered, always less than 100 cells (preponderantly between 9 and 40) per 1000  $\mu\text{m}$  gill edge. Also, in *P. microrrhiza* the spheropedunculate cells are small and difficult to find, whereas in *P. gracilis* they are numerous, larger, often clavate, elongate or irregularly shaped, many somewhat thick-walled. When growing in clayey soil the carpophores of *P. microrrhiza* usually are large.

A chain of puzzling intermediate forms exists between *P. gracilis* and *P. microrrhiza* (Romagnesi, 1975a: 220, and Kits van Waveren, 1971a: 270). Forms were found in which the pleurocystidia were slender (*gracilis*-like) but the gill trama distinctly pigmented and the pleurocystidioid cheilocystidia abundant; forms in which velar fibrils reached up to 1/4 from margin and the pleurocystidia were *microrrhiza*-like, whereas the gill trama was colourless; forms in which velar fibrils reached up to half-way the apex of the cap and the pleurocystidia were *microrrhiza*-like but in which the number of pleurocystidioid cheilocystidia was small; finally forms with distinctly pigmented hymenophoral trama but in which no velar remnants were seen and the pleurocystidioid cheilocystidia were few in number.

In Kew herbarium we were enabled to examine the type specimens of Berkeley's *Agaricus semivestitus*, which – as we had expected – we found to be distinctly rooting. A careful search revealed the presence of rather numerous pleurocystidia, which were, as also the spores, fully identical with those of *P. microrrhiza*. A red underlining of the cheilocystidia was not found but the specimens must have been quite young as they are small and as their caps – as is clear from Berkeley's picture

(1861: 376) — were covered with abundant veil (hence the name). Cooke's plate 578 (617) shows specimens, named *Agaricus semivestitus*, which are typical of *P. microrrhiza* (red gill edge). Kühner & Romagnesi (1953: 371, note 3) state that

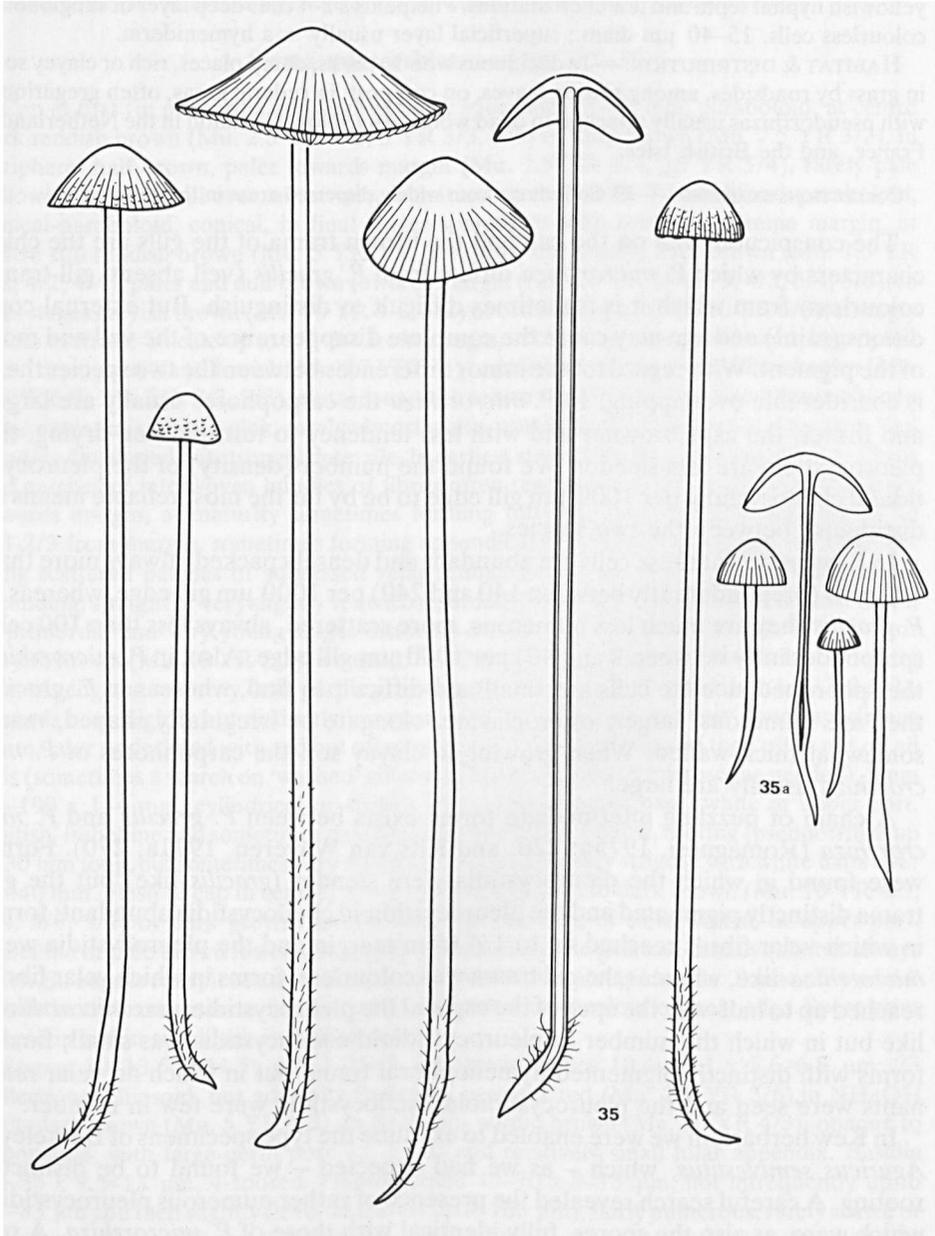
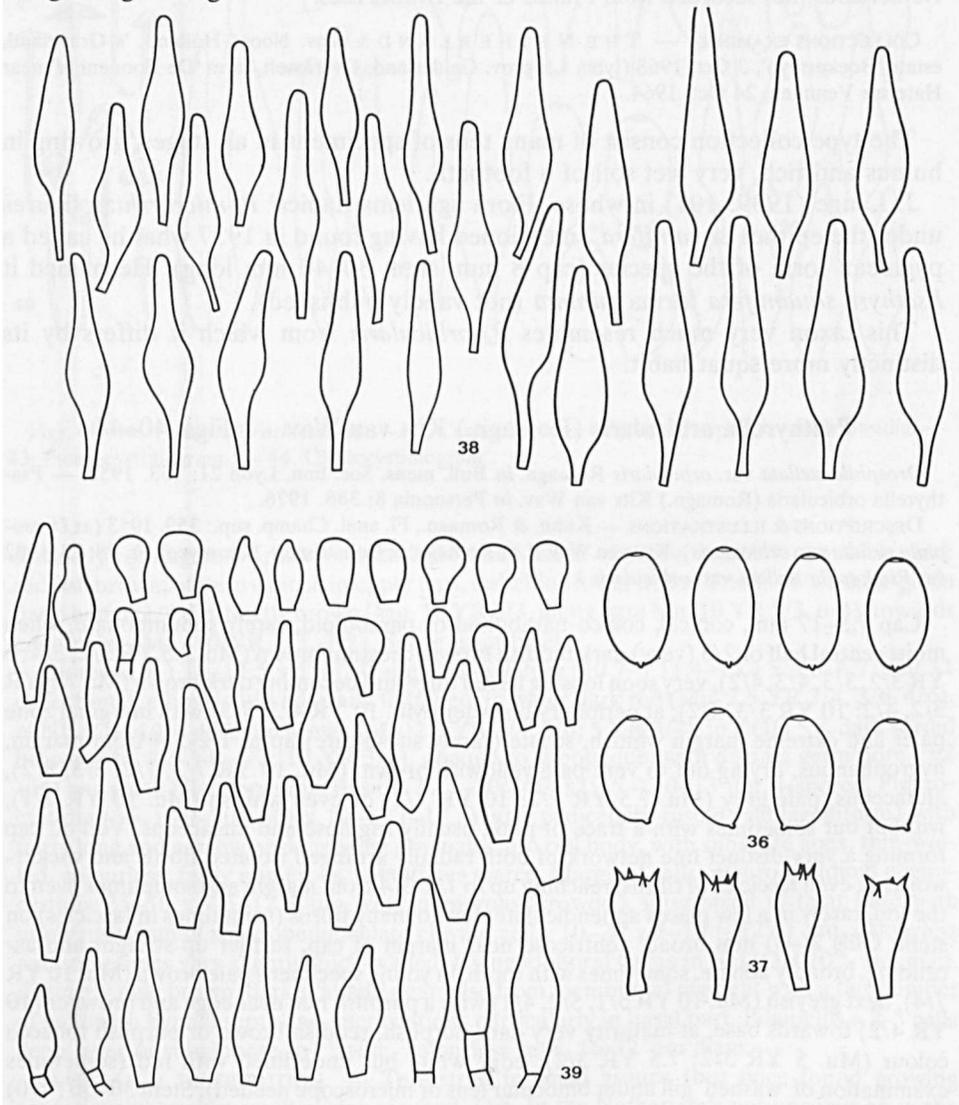


Fig. 35. *Psathyrella microrrhiza* f. *microrrhiza*. — Carpophores (x 1).

Fig. 35a. *Psathyrella microrrhiza* f. *pumila*. — Carpophores (x 1).

they could not see how Ricken separated *P. semivestita* from *P. microrrhiza*. For details see Kits van Waveren (1971: 274).

A. H. Smith (1972: 198), following J. E. Lange (1939: 101), chose the epithet *squamifera* for this species. For the reasons why we did not follow Smith: see Kits van Waveren (1976: 382). Romagnesi (1949: 130) published, but not validly (and in litt.: 'with little confidence'), *Drosophila microrrhiza* var. *pseudobifrons* (also mentioned by Kühn. and Romagn., 1953: 358), as differing from *P. microrrhiza* by the gill edge being white.



Figs. 36–39. *Psathyrella microrrhiza*. — 36. Spores. — 37. Basidia. — 38. Pleurocystidiogram. — 39. Cheilocystidiogram.

**forma pumila Kits van Wav. — Fig. 35a**

*Psathyrella microrrhiza* f. *pumila* Kits van Wav. in the present work, p. 281. 1985.

This form differs from the type by its overall small size of the carpophores (caps 7–25 mm, stems 20–40 (–45) x 1–2 mm, pseudorrhizas up to 12 mm) and its veil, although distinct, in accordance with the small sizes less strongly developed, in this manner that the caps have no velar flocci on their surface and no appendiculate flocci at their margin.

HABITAT & DISTRIBUTION. — As in the type, gregarious. Sept.–Oct. Very rare in the Netherlands; not recorded from France or the British Isles.

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S: prov. Noord-Holland, 's Graveland, estate 'Boekesteyn', 3 Oct. 1968 (type, L); prov. Gelderland, Overasselt, farm 'De Boonenhof' near Hatertse Vennen, 24 Oct. 1964.

The type collection consist of many tens of specimens in all stages, growing in humus and rich, very wet soil of a footpath.

J. Lange (1939: 101) in whose 'Flora agaricina danica' *P. microrrhiza* figures under the epithet '*squamifera*', mentioned having found in 1937 what he called a pygmean form of the species (cap 8 mm, stem 30–40 mm long). He named it *Psathyra squamifera* forma *minima* (not validly published).

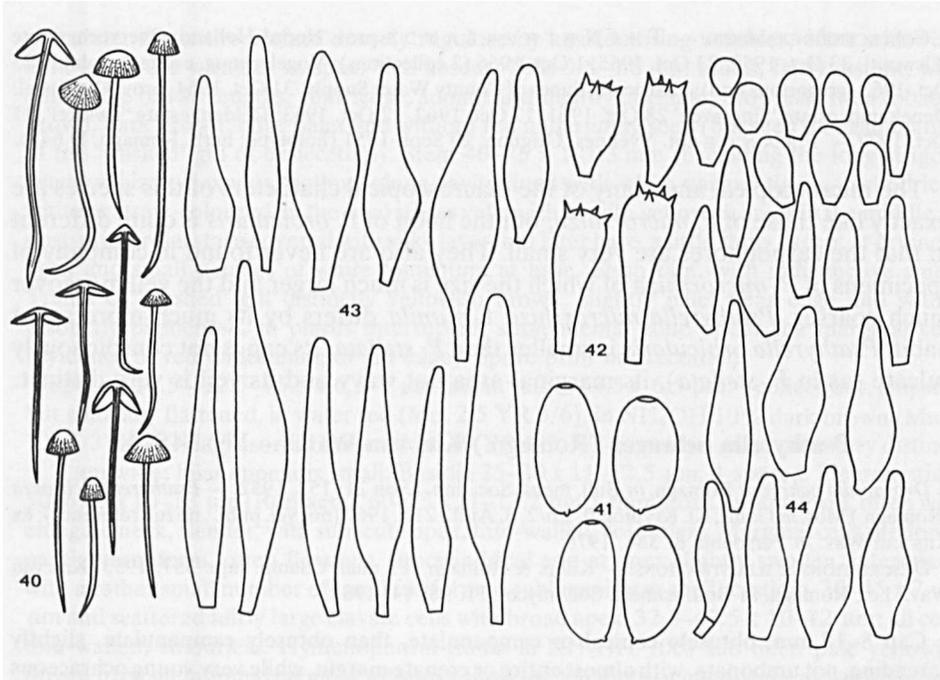
This taxon very much resembles *P. orbicularis* from which it differs by its distinctly more squat habit.

***Psathyrella orbicularis* (Romagn.) Kits van Wav. — Figs. 40–44**

*Drosophila stellata* var. *orbicularis* Romagn. in Bull. mens. Soc. linn. Lyon 21: 153. 1952. — *Psathyrella orbicularis* (Romagn.) Kits van Wav. in *Persoonia* 8: 388. 1976.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953 (as *Drosophila stellata* var. *orbicularis*); Kits van Wav., l.c.; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 23. 1982 (as *Psathyrella stellata* var. *orbicularis*).

Cap 7.5–17 mm, conical, conico-paraboloid or paraboloid, rarely subumbonate, when moist central half or 2/3 (very) dark reddish brown, chestnut brown (Mu. 2.5 YR 3/2, 3/4; 5 YR 3/2, 3/3, 4/3, 4/2), very soon losing its red tinge and becoming dark brown (Mu. 7.5 YR 3/2, 4/2; 10 YR 3/3, 4/2), at periphery browner (Mu. 10 YR 4/3, 5/3), with marginal zone paler and extreme margin whitish, striate (rarely subsulcate) up to 1/2–3/4 from margin, hygrophanous, drying out to very pale yellowish brown. (Mu. 10 YR 7/3, 7/2, 8/3, 8/2), alutaceous, pale grey (Mu. 7.5 YR 7/2; 10 YR 7/2) or even whitish (Mu. 10 YR 7/1), without but sometimes with a trace of pink, usually rugulose and micaceous. Veil on cap forming a very distinct fine network of both radially arranged isolated fibrils and wickerworks or even fascicles of fibrils, reaching up to 1/2–3/4 from margin and sometimes even to the top, rarely in a few places appendiculate; few to many fibrils (sometimes in fascicles) on stem. Gills 2(–3) mm broad, ventricose near margin of cap, further up straight and ascending, broadly adnate, sometimes with tooth, in young specimens pale brown (Mu. 10 YR 7/4), next greyish (Mu. 10 YR 5/1, 5/2, 4/1) with a purplish hue near edge and browner (10 YR 4/2) towards base, at maturity very dark purplish, reddish brown or purplish tobacco colour (Mu. 5 YR 3/2; 7.5 YR 3/2); edge white but underlined with red (sometimes examination of 'washed' gill under binocular lens or microscope needed). Stem 30–50 (–70) x 1–1.5 mm, cylindrical, often flexuous, hollow, glossy, conspicuously pruinose at apex, whitish in upper part, isabelline lower down, sometimes pale brown near strigose and



Figs. 40–44. *Psathyrella orbicularis*. — 40. Carpophores (x 0.5). — 41. Spores. — 42. Basidia. — 43. Pleurocystidiogram. — 44. Cheilocystidiogram.

distinctly rooting base (pseudorrhiza 5–15 mm). Flesh of cap in centre 1 mm thick, dark reddish brown, of stem whitish in upper part, isabelline lower down. Trama of 'washed' gill in basal half or 1/4 distinctly brown (Mu. 10 YR 6/3, along base Mu. 10 YR 5/3, 6/4), towards edge paler (Mu. 10 YR 7/3, 7/2). Spore print black.

Spores (10–) 11–13.5 x 5.5–7.0  $\mu\text{m}$  (mean values (10.7–) 11.4–13.1 x 5.8–6.7  $\mu\text{m}$ : 11 collections), ellipsoid but adaxially flattened, in water dark red (Mu. 2.5 YR 3/4, 3/6, 4/6), in  $\text{NH}_4\text{OH}$  10% dark red brown (Mu. 2.5 YR 3/4, 3/6; 5 YR 3/4), in  $\text{KOH}$  5% dark sordid brown (Mu. 7.5 YR 4/2; 10 YR 3/3), opaque to subopaque, with distinct germ pore ( $\pm 2$   $\mu\text{m}$ ) and small hilar appendix. Basidia 17.5–30(–40) x (9.5–) 10–13  $\mu\text{m}$ , 4-spored. Pleurocystidia (35–) 40–70(–80) x 10–15 (–17.5)  $\mu\text{m}$ , pedicellate fusoid (sublageniform) with fairly long and narrow neck, passing gradually into cell body, with subacute apex, thin-walled, colourless, fairly numerous, sometimes scarce. Marginal cells: pleurocystidioid cheilocystidia 25–50 x 7.5–12.5  $\mu\text{m}$ , very numerous, crowded, intermixed at their base with unobtrusive small spheropedunculate clavate cells, 10–20 x 5–10 (–12.5)  $\mu\text{m}$ , colourless and sometimes very slightly thick-walled. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pale brown, darker at and near base from membranal pigment with a fair number of yellowish hyphal septa and encrustations particularly in basal part. Pileipellis a 2–3 cells deep layer of subglobose to clavate, colourless cells, 16–32  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial in small groups (but once found growing gregariously) against small pieces of wood. Oct. In the Netherlands not uncommon in the wooded parts of the coastal dunes, very rare elsewhere. Recorded from France, not from the British Isles.

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S: prov. Noord-Holland: Overveen, estate 'Elswout', 23 Oct. 1959, 23 Oct. 1965, 1 Oct. 1966 (2 collections); Vogelenzang, estate 'Leyduin', 25 Oct. 1963 (gregarious find); Castricum, dunes of County Water Supply, 31 Oct. 1964; prov. Overijssel: Denekamp, estate 'Singraven' 28 Oct. 1961, 17 Oct. 1962, 12 Oct. 1963; Delden, estate 'Twickel', 11 Oct. 1977. — F R A N C E: Yvelines, Grignon, 29 Sept. 1951 (holotype; herb. Romagn. D 642).

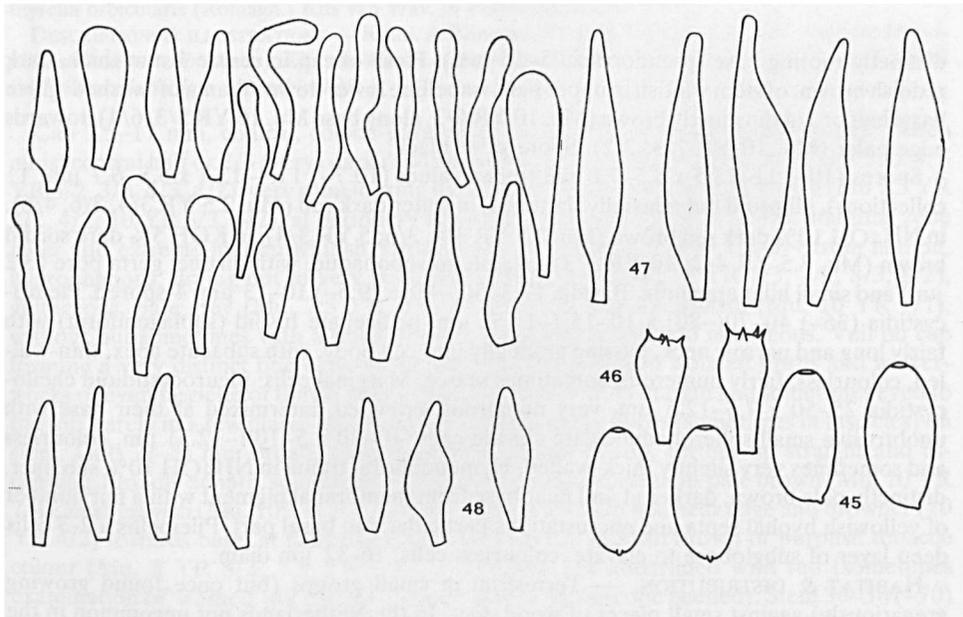
The microscopical and many of the macroscopical characters of this species are exactly like those of *P. microrrhiza*, but the habit of *P. orbicularis* is quite different in that the carpophores are very small. They also are never found in company of specimens of *P. microrrhiza* of which the size is much larger and the veil moreover much coarser. *Psathyrella microrrhiza* f. *pumila* differs by its much more squat habit. *Psathyrella orbicularis* is smaller than *P. stellata*, its cap is not conspicuously sulcate (as in *P. stellata*), its marginal area not wavy and its veil is very distinct.

***Psathyrella ochracea* (Romagn.) Kits van Wav. — Figs. 45–48**

*Drosophila ochracea* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella ochracea* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2 b/2, 3. Aufl.: 213. 1967 (not val. publ., no full reference); ex Kits van Wav. in Persoonia 8: 384. 1976.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 357. 1953; Kits van Wav., l.c.; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 14. 1982.

Cap 8–18 mm, obtusely conical or campanulate, then obtusely campanulate, slightly spreading, not umbonate, with almost entire or crenate margin, while very young ochraceous and slightly reddish, but remarkably pale and substriate, subsequently pale cream to sub-ochraceous, hygrophanous, drying out to cream-coloured without pink, remarkably rugose-



Figs. 45–48. *Psathyrella ochracea*. — 45. Spores. — 46. Basidia. — 47. Pleurocystidiogram. — 48. Cheilocystidiogram.

reticulate, the entire surface densely rugulose by anastomosing wrinkles, often with very dark cerebroid wrinkles at apex. Veil absent. Gills 3.5–4.6 mm broad, fairly distant, with lamellulae of two lengths, ventricose, adnate and slightly uncinata, brownish, then tobacco brown, dark brown; edge paler and without red underlining seen (but seen on examination of the 'washed' gill of exsiccatum). Stem 40–75 x 1–1.3 mm (excluding the long strigose pseudorrhiza), flexuous, hollow, along cavity lined with white narrow tissue, cylindrical, white or straw-coloured, in the final stages yellowish or with yellowish areas in the middle, in post-primordial stage covered with silky layer, but later bare, a little shiny except at pruinose apex and small patches of white tomentum at base. Flesh thin, with indistinctive smell. Trama of 'washed' gill distinctly yellowish brown, slightly paler near edge and with a distinctly pigmented, in places interrupted, subhymenial zone under the marginal cells (evidence of red underlining of gill edge). Spore print not recorded.

Spores (11.5–)12.5–15.5 x 6.5–7  $\mu\text{m}$  (mean values 13.5 x 6.5  $\mu\text{m}$ : 1 collection), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3) in KOH 5% sordid brown (Mu. 10 YR 4/3, 4/4), opaque; germ pore very distinct,  $\pm 2$   $\mu\text{m}$  wide; hilar appendix small. Basidia 25–30 x 11–12.5  $\mu\text{m}$ , 4-spored. Pleurocystidia 50–67.5 x 10–13  $\mu\text{m}$  (Romagn.: '60–75 x 11–13.2  $\mu\text{m}$ '), numerous, subfusiform, often with elongate neck, slender, with subacute apex, thin-walled, colourless. Marginal cells predominantly vermiform, often flexuous, subcylindrical and at apex slightly swollen, intermixed with a rather small number of small fusiform to sublageniform cheilocystidia, 30–45 x 7–10  $\mu\text{m}$  and scattered fairly large clavate cells with broad apex, 32.5–47.5 x 10–12  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale yellowish brown from membranous pigment without yellow hyphal septa or encrustations, with distinct, narrow, yellowish brown strip in subhymenium under marginal cells (red underlining of gill edge). Pileipellis made up of roundish colourless cells, 20–40  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — In humus, gregarious. Very rare. Oct. Reported from France, not from the Netherlands and the British Isles.

COLLECTION EXAMINED. — F R A N C E, dpt. Yvelines, St. Germain-en-Laye, 3 Oct. 1944 (holotype, herb. Romagnesi D 425).

The above description of the macroscopical characters is a translation of a full description, received from Romagnesi. The description of the microscopical characters is based on our examination of an exsiccatum of the holotype, received from Romagnesi. The distinct brown colour of the hymenophoral trama does not justify placing this species in the group '*Graciles*' (Kühn. & Romagn. 1953: 357) of which the species are stated to have a 'trame sensiblement incolore'. We found the vast majority of the cheilocystidia vermiform. This curious shape of these cells was also noticed by Romagnesi, who described them as 'variables de forme, beaucoup claviformes, entremêlées de cystidioles et articles cylindracés grêles'.

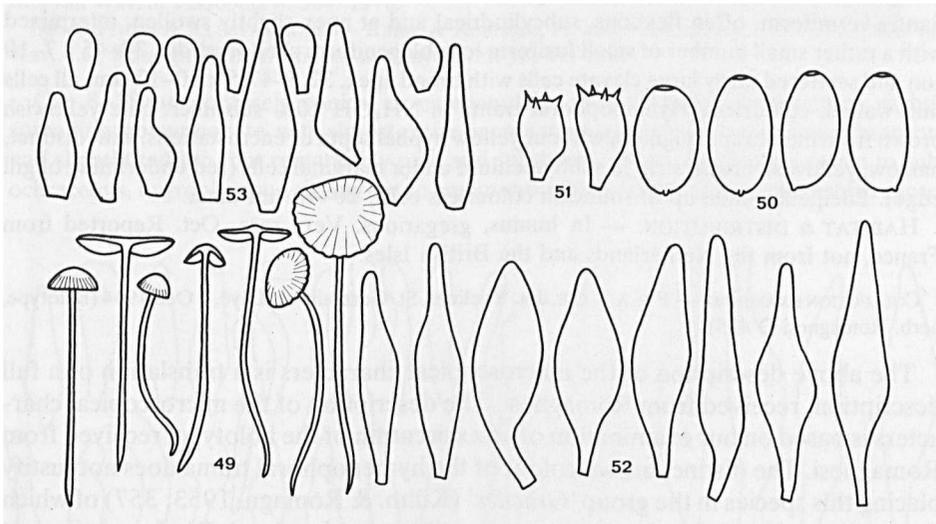
The pale ochraceous colour of the fresh cap, the very strongly rugose surface of the drying cap, the absence of a veil and the abundant vermiform cheilocystidia are the essential characters of this species.

### *Psathyrella stellata* (Romagn.) Bon — Figs. 49–53

*Drosophila stellata* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella stellata* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2 b/2, 3. Aufl.: 215. 1967 (not val. publ., no full reference); ex Bon in Docum. mycol. 12 (48): 52. 1982.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953; Kits van Wav. in *Persoonia* 8: 401. 1976; Romagn. in *Bull. trimest. Soc. mycol. Fr.* 98: 21. 1982.

Cap 20–35 mm at first obtusely conical or paraboloid, soon spreading to convex, finally almost plane, often with more or less revolute and typically undulating, lobed, coarsely sulcate margin, sometimes umbonate, fragile, strongly striate-sulcate, dark reddish brown (Mu. 5 YR 3/2, 3/3; 2.5 YR 3/2), soon becoming dark brown (Mu. 5 YR 4/3), in periphery dark greyish brown (Mu. 10 YR 5/2, 5/3), hygrophanous, at centre drying out to rufous, fulvous or ochraceous, for the rest distinctly pale brown or alutaceous, sometimes mixed with pink, micaceous, not rugulose, Veil very fugacious, leaving scattered fibrils and minute fascicles of fibrils up to half way from margin of cap or only a few fibrils near margin. Gills 2–6 mm broad, fairly to very broadly adnate, ventricose, in earliest stages pale brown (Mu. 10 YR 5/4), soon greyish brown (Mu. 10 YR 5/2, 6/2) and at base browner (Mu. 10 YR 5/4), finally tobacco colour with purplish hue (Mu. 7.5 YR 4/2; 5 YR 4/2), with pruinose white edge underlined with red (examination under binocular lens or microscope often needed). Stem 50–90 x 1.5–3 mm, cylindrical, sometimes flexuous, rooting, whitish, isabelline or even rufous and pallescent, hollow, with pruinose apex. Flesh of cap in centre 1.5–2 mm thick, very dark reddish brown (Mu. 5 YR 3/3; 7.5 YR 3/2), in periphery dark



Figs. 49–53. *Psathyrella stellata*. — 49. Carpophores (x 0.5). — 50. Spores. — 51. Basidia. — 52. Pleurocystidiogram. — 53. Cheilocystidiogram.

sordid brown (Mu. 10 YR 3/3), of stem whitish, isabelline or pale brown, darker towards base. Trama of 'washed' gill very distinctly brown throughout entire gill, strongest at base. Spore print purplish black.

Spores 10–12.5 x 6–7  $\mu$ m (mean values 10.7–12 x 6.1–6.5  $\mu$ m: 3 collections) ellipsoid but adaxially flattened in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3, 3/3), in  $\text{KOH}$  5% dark sordid brown (Mu. 7.5 YR 4/2), opaque, with distinct germ pore ( $\pm$  1.8–2  $\mu$ m and small hilar appendix. Basidia 17.5–29 x 10–12.5  $\mu$ m (Romagnesi: 28–35 x 12–13  $\mu$ m), spheropedunculate, 4-spored. Pleurocystidia 45–65 x 9–17.5  $\mu$ m, scattered to moderately numerous, fusoid-pedicellate with more or less long

necks, fairly slender to sometimes ventricose, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 20–50 x 8–15  $\mu$ m, numerous, intermixed with quite a number of small and unobtrusive spheropedunculate and clavate cells 10–17.5 x 5–10  $\mu$ m; all cells colourless and thin-walled. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. distinctly yellowish brown from membranal pigment from base to edge, strongest at base with many yellow hyphal septa and some encrustations near base. Pileipellis a 2–3 cells deep layer of subglobose, colourless cells, 24–32  $\mu$ m diam.

HABITAT & DISTRIBUTION. — On rotting stems, in ruderal places and road verges, solitary or subgregarious. Oct. Very rare in the Netherlands. Rare in France, not reported from the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Oldenzaal, verge of main road, 13 Oct. 1967; prov. Noord-Holland, Castricum, dunes of County Water Supply, 30 Oct. 1976. — FRANCE, dpt. Yonne, Sens, Oct. 1940 (lectotype, herb. Romagn. D 245; fragments in L).

The above description is based on our two Netherlands' collections, supplemented with a few data from Romagnesi's descriptions.

***Psathyrella bifrons* (Berk.) A. H. Smith — Figs. 54–57**  
(sensu W. G. Smith, Ricken, Kühn & Romagn.; non Quél.,  
Cooke, Rea. A. H. Smith, etc.)

*Agaricus bifrons* Berk. in Hooker, English Flora J. E. Smith 5(2): 114. 1836. — *Pannucia bifrons* (Berk.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 514. 1879 (misappl.). — *Psathyra bifrons* (Berk.) Quél. in Bull. Soc. bot. Fr. 26: 52. ('1879') 1880 (misappl.). — *Drosophila bifrons* (Berk.) Quél., Enchir. Fung.: 117. 1886 (misappl.). — *Psilocybe bifrons* (Berk.) P. Hennings in Engler & Prantl, Natürl. Pfl. Fam. I (1\*\*): 235. 1898. — *Hypholoma bifrons* (Berk.) Big. & Guill., Fl. Champ. sup. Fr.: 281. 1913 (misappl.). — *Psathyrella bifrons* (Berk.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 40. 1941 (misappl.).

EXCLUDED. — *Agaricus bifrons* sensu Fr., Hym. europ.: 307. 1874 (= *A. conopilus*?); Monogr. Hym. Suec. 2: 347. 1857 (= *A. conopilus*?); Ic. sel. Hym. 2: 38, pl. 138 fig. 2 1879 (= *A. conopilus*?). — *Agaricus bifrons* sensu Cooke, Ill. Brit. Fungi 4: pl. 616/594. 1884–1886 (= *A. conopilus*?). — *Psathyra bifrons* sensu Rea, Brit. Basidiomyc.: 416. 1922 (= .....?).

DESCRIPTIONS & ILLUSTRATIONS. — Rick., Blätterp.: 257, pl. 67. 1913; Kühn. & Romagn., Fl. anal. Champ. sup.: 358. 1953; Kits van Wav. in Persoonia 8: 356, pl. 60. 61. 1976; Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 430, pl. 281. 1981.

Cap at first (primordia: cap 3–5 mm) ellipsoid, dark reddish brown (Mu. 5 YR 3/4–4/4) or dark yellowish brown (Mu. 5 YR 4/6), not striate, later (cap 8–10 mm) hemispherical-paraboloid, reddish (Mu. 5 YR 4/4, 4/6) only at centre, for the rest dark brown (Mu. 7.5 YR 4/4), paler towards margin, at margin ochraceous. Mature caps 15–45(–50) mm, 11–30 mm high, broadly obtuse, paraboloid, sometimes subhemispherical, in final stages sometimes vaguely lobed, sometimes with grooved surface, very thin slightly revolute extreme margin, dark ochre brown with a faint reddish hue (Mu. 5 YR 5/6, 5/8, 6/6), paler towards margin (Mu. 7.5 YR 7/6, 8/6); finally pale sordid ochre-brown (Mu. 10 YR 5/4, 6/4), sometimes in some areas with a trace of grey or purplish, striate almost up to centre, hygrophanous, drying out to pale alutaceous, very pale yellowish brown or sordid white (Mu. 10 YR 8/4, 8/3), slightly darker at centre, sometimes slightly micaceous, rugulose, without pink. Veil rather strongly developed, in young stages forming white fibrils and bundles of fibrils or even flocci arranged at random on cap, reaching up to 1/2–2/3 from margin and increasing in number towards margin, sometimes appendiculate flocci and denticles, easily detersile, in mature specimens usually absent. Gills 4–6 mm broad, slightly ventricose near margin of cap, then

straight and ascending, broadly adnate with tooth, in very young specimens pale brown (Mu. 10 YR 7/2, 7/3) at base, whitish towards and white near edge, at maturity according to Kühner & Romagnesi tobacco brown (see observations); edge white. Stem 70–180 x 2–4 mm, straight, rather firm, cylindrical or slightly thickening towards base, whitish in upper part, isabelline to pale brown in lower 2/3, sordid brown at base, hollow, rooting (pseudorrhiza short, 4–10 mm, easily overlooked); base strongly strigose with white and often long hairs; apex pruinose. Flesh of cap 1.5 mm thick in centre, sordid ochre brown, of stem pale brown, darker at base, white in upper part. Trama of 'washed' gill distinctly brown (Mu. 10 YR 6/3, 6/4, 5/6) in a fairly narrow zone along base, for the rest pale brown (Mu. 10 YR 7/3, 7/4) up to edge. Spore print purplish black.

Spores 11.5–14.5 x 6.5–7.5  $\mu\text{m}$  (mean values 12.5–12.9 x 6.5–6.8  $\mu\text{m}$ : 5 collections) excluding spores 14.9  $\mu\text{m}$  or longer (37 spores out of a total of 250 spores measured, probably coming from 2- or 1-spored basidia), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5% dark brown (Mu. 5 YR 4/3, 3/3), opaque; germ pore very distinct,  $\pm 2$   $\mu\text{m}$ ; hilar appendix distinct. Basidia 17.5–33.5 x (10.5–)11–12  $\mu\text{m}$ , 4-spored (some 2-spored, very few 1-spored). Pleurocystidia 45–70 x 10–15(–17.5)  $\mu\text{m}$ , fairly numerous, lageniform with apex sometimes slightly swollen, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 20–45(–50) x (5–)7.5–12.5  $\mu\text{m}$ , abundant, densely packed, intermixed with a small number of hardly noticeable spheropedunculate and clavate cells, 10–20 x 2.5–7.5  $\mu\text{m}$ , thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brownish from base to edge from membranal pigment, strongest in basal half, yellow hyphal septa and some encrustations. Pileipellis a 2–4 cells deep layer of subglobose colourless cells, 32–48  $\mu\text{m}$  diam..

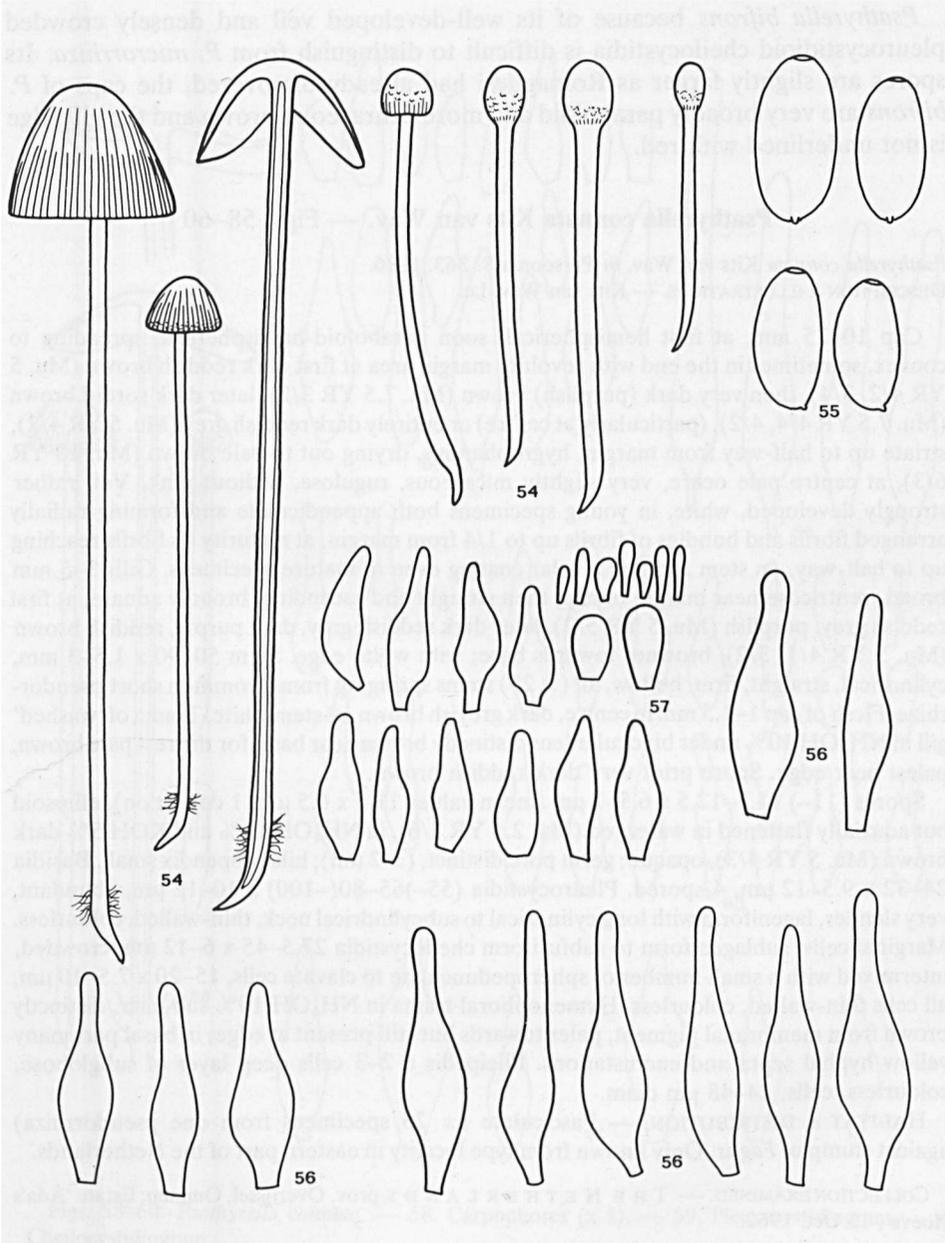
HABITAT & DISTRIBUTION. — Gregarious, terrestrial in clayey soil against small pieces of wood, Oct.–Nov. Very rare in the Netherlands. Reported from France and by Berkeley and other early British authors from the British Isles, but not known by present-day British mycologists.

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Noord-Holland, Amsterdam, Amsterdam Wood, 20 Nov. 1958, 6 Nov. 1959, 9 Oct. 1960, 10 Nov. 1960, and 7 Nov. 1961.

The characteristic features of this species are the very broad, obtusely paraboloid and never conical, strikingly ochraceous brown cap, the absence of pink in the drying cap, and the rather strongly developed veil. These items are in full agreement with Berkeley's original description of *Agaricus bifrons*. W. G. Smith (1908: 192) added an important character, the rooting stem, Ricken (1913: 257) and Kühner & Romagnesi (1953: 358) followed suit and we have adopted their interpretation, regarding the epithet '*bifrons*' used by most earlier authors as misapplications. In Fries' descriptions a pseudorrhiza is not mentioned, the six carpophores, depicted on his plate 138 fig. 2 show non-rootings stems, non-striate caps, and no velar remnants and look like medium and small-sized forms of *Psathyrella conopilus* as stated by Fries himself. A. H. Smith (1972: 219) described the cap of what he called *P. bifrons* as 'obtusely conic', the stem as not rooting, the spores as small (8–11 x 4.5–5.5  $\mu\text{m}$ ) and pleurocystidia are said to be absent.

In our collections the mature gills were conspicuously bicoloured: in their basal part very pale brown, towards the edge and particularly towards the stem greyer. Moreover the entire surface was fairly densely and minutely speckled by spore accumulations, more densely towards the edge and near the stem, also often denser

in some areas than in others, with the brown colour of the gill trama visible between them. This striking bicolouration is also mentioned (and even depicted) by Ricken (1913: 257, pl. 67 fig. 2) and by Buch (1952: 270). We have attributed both the



Figs. 54–57: *Psathyrella bifrons*. — 54. Carpophores (x 1). — 55. Spores. — 56. Pleurocystidiogram. — 57. Cheilocystidiogram.

bicolouration and the speckled appearance to abnormal sporogenesis, causing many basidia to be sterile (in our material basidia with well-developed sterigmate often were very scarce, others 2- or even 1-spored, a unique phenomenon in section *Psathyrella*).

*Psathyrella bifrons* because of its well-developed veil and densely crowded pleurocystidioid cheilocystidia is difficult to distinguish from *P. microrrhiza*. Its spores are slightly larger as Romagnesi had already discovered, the caps of *P. bifrons* are very broadly paraboloid and more ochraceous-brown and the gill edge is not underlined with red.

### *Psathyrella connata* Kits van Wav. — Figs. 58–60

*Psathyrella connata* Kits van Wav. in *Persoonia* 8: 363. 1976.

DESCRIPTION & ILLUSTRATIONS. — Kits van Wav. l.c.

Cap 10–35 mm, at first hemispherical, soon paraboloid-hemispherical, spreading to convex, sometimes in the end with revolute margin area at first dark reddish brown (Mu. 5 YR 4/2, 3/4), then very dark (purplish) brown (Mu. 7.5 YR 3/2), later dark sordid brown (Mu. 7.5 YR 4/4, 4/2), (particularly at centre) or entirely dark reddish grey (Mu. 5 YR 4/2), striate up to half-way from margin, hygrophanous, drying out to pale brown (Mu. 10 YR 6/3), at centre pale ochre, very slightly micaceous, rugulose, without pink. Veil rather strongly developed, white, in young specimens both appendiculate and forming radially arranged fibrils and bundles of fibrils up to 1/4 from margin, at maturity its fibrils reaching up to half-way, on stem forming a velar coating even in mature specimens. Gills 3–5 mm broad, ventricose near margin of cap, then straight and ascending, broadly adnate, at first reddish grey, purplish (Mu. 5 YR 5/2), later dark reddish grey, dark purple, reddish brown (Mu. 5 YR 4/1, 3/2), browner towards base; with white edge. Stem 50–90 x 1.5–3 mm, cylindrical, straight, firm, hollow, all ( $\pm 25$ ) stems springing from a common short pseudorrhiza. Flesh of cap 1–1.5 mm in centre, dark greyish brown, of stem white. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens distinctly brown near base, for the rest pale brown, palest near edge. Spore print very dark reddish brown.

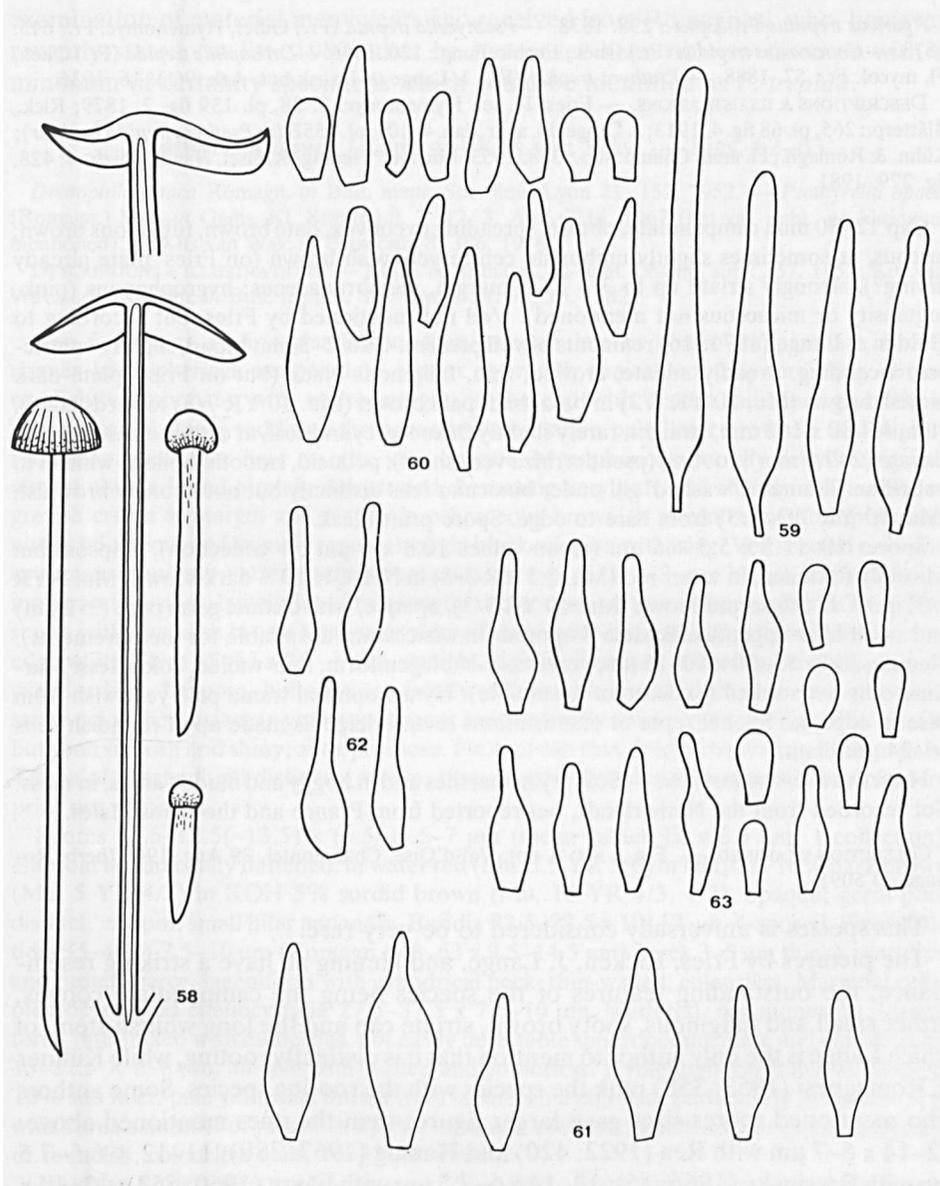
Spores (11–) 11.5–12.5 x 6.5–7  $\mu\text{m}$  (mean values 11.5 x 6.5  $\mu\text{m}$ : 1 collection), ellipsoid but adaxially flattened in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% and KOH 5% dark brown (Mu. 5 YR 4/3), opaque; germ pore distinct, ( $\pm 2 \mu\text{m}$ ); hilar appendix small. Basidia 24–32 x 9.5–12  $\mu\text{m}$ , 4-spored. Pleurocystidia (55–)65–80(–100) x 10–12  $\mu\text{m}$ , abundant, very slender, lageniform with long cylindrical to subcylindrical neck, thin-walled, colourless. Marginal cells: sublageniform to subfusiform cheilocystidia 27.5–45 x 6–12  $\mu\text{m}$ , crowded, intermixed with a small number of spheropedunculate to clavate cells, 15–20 x 7.5–10  $\mu\text{m}$ , all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brown from membranal pigment, paler towards but still present at edge; in basal part many yellow hyphal septa and encrustations. Pileipellis a 2–3 cells deep layer of subglobose, colourless, cells, 24–48  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — Fasciculate ( $\pm 25$  specimens from one pseudorrhiza) against stump of *Fagus*. Only known from type locality in eastern part of the Netherlands.

COLLECTION EXAMINED. — T H E N E T H E R L A N D S, prov. Overijssel, Ommen, Estate 'Ada's Hoeve', 13 Oct. 1962.

This species differs from *P. polycystis* by the lack of pink in the dry cap, the absence of red underlining of the gill edge, the strongly fasciculate growth, the

rather strongly developed and in young specimens even appendiculate veil, and the pleurocystidia not being swollen at their apex. It differs from *P. atrolaminata* by its gills not being black (pigmented hymenophoral trama), the not very dark but warm



Figs. 58–60. *Psathyrella connata*. — 58. Carpophores (x 1). — 59. Pleurocystidiogram. — 60. Cheilocystidiogram.

Fig. 61. *Psathyrella trepida*. — Pleurocystidiogram.

Figs. 62–63. *Psathyrella opaca*. — 62. Pleurocystidiogram. — 63. Cheilocystidiogram.

brown spores which also have a distinct germ pore (spore print not black), and the very numerous pleurocystidia.

***Psathyrella trepida* (Fr.) Gillet — Fig. 61**

*Agaricus trepidus* Fr., Epicr.: 298. 1838. — *Psathyrella trepida* (Fr.) Gillet, Hymenomyc. Fr.: 615. 1878. — *Coprinarius trepidus* (Fr.) Quél., Enchir. Fung.: 120. 1886. — *Drosophila trepida* (Fr.) Quél., Fl. mycol. Fr.: 57. 1888. — *Psathyra trepida* (Fr.) J. Lange in Dansk bot. Ark. 9(1): 16. 1936.

DESCRIPTIONS & ILLUSTRATIONS. — Fries, Ic. sel. Hymenomyc. 2: 38, pl. 139 fig. 2. 1879; Rick., Blätterp.: 265, pl. 68 fig. 4. 1913; J. Lange, Fl. agar. dan. 4: 101, pl. 155B (as *Psathyra trepida* f. *minor*); Kühn. & Romagn., Fl. anal. Champ. sup.: 358. 1953; Michael/ Hennig/ Kreisel, Handb. Pilzfr. 4: 428, fig. 279. 1981.

Cap 12–30 mm, campanulate, obtuse, spreading to convex, date brown, fuliginous brown, fuscous, at sometimes slightly umbonate centre yellowish brown (on Fries' plate already drying?), strongly striate up to 3/4 from margin, membranaceous; hygrophanous (pink, rugulosity or micaceous not mentioned). Veil not mentioned by Fries, but according to Gulden & Lange (1971: 16) remnants of veil present. Gills 2–3 mm broad, slightly ventricose, ascending, broadly adnate, crowded, thin, fuliginous black (but on Fries' plate dark greyish brown (Mu. 10 YR 4/2) in basal half, pale brown (Mu. 10 YR 7/3) towards edge). Stem 45–80 x 1–2 mm, straight, rarely slightly flexuose, cylindrical, at extreme base slightly clavate (2–2.5 mm), rooting (pseudorrhiza very short), pellucid, smooth, hollow, whitish to isabelline. Trama of 'washed' gill under binocular lens distinctly but not strongly brownish (Mu. 10 YR 7/3, 6/3) from base to edge. Spore print black.

Spores 10–11.5 x 5.5–6.5  $\mu\text{m}$  (mean values 10.8 x 6  $\mu\text{m}$ ; 1 collection), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6) in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3) in KOH 5% sordid brown (Mu. 10 YR 3/3), opaque, with distinct germ pore ( $\pm 2 \mu\text{m}$ ) and small hilar appendix. Basidia 4-spored (in exsiccatum unsuitable for measurements). Pleurocystidia 35–50 x 10–16  $\mu\text{m}$ , ventricose-sublageniform, thin-walled, colourless. Marginal cells not studied (exsiccatum unsuitable). Hymenophoral trama pale yellowish from base to edge, no hyphal septa or encrustations seen. Pileipellis made up of roundish cells 16–24  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — Solitary in marshes and in boggy and muddy areas, in moss. Not recorded from the Netherlands, but reported from France and the British Isles.

COLLECTION EXAMINED. — F R A N C E, dpt. Val-d'Oise, Chaumontel, 29 Aug. 1945 (herb. Romagn. D 509).

This species is universally considered to be very rare.

The pictures by Fries, Ricken, J. Lange, and Hennig all have a striking resemblance, the outstanding features of the species being the campanulate-convex, rather small and fuliginous, sooty brown, striate cap and the long whitish stem, of which Lange is the only author to mention that it is distinctly rooting, while Kühner & Romagnesi (1953: 358) rank the species with the rooting species. Some authors who mentioned spores sizes gave larger figures than the ones mentioned above: 12–14 x 6–7  $\mu\text{m}$  with Rea (1922: 420) and Hennig (1967: 280); 11–12 x 6.5–7.5  $\mu\text{m}$  with Bresinsky (1966: 15); 12–14 x 6–7.5  $\mu\text{m}$  with Favre (1960: 552); 12–14 x 5.5–6  $\mu\text{m}$  with Lange (1939: 101) and 10–12(–13.2) x 6–6.5  $\mu\text{m}$  with Kühn. & Romagn. (1953: 358).

In our description the macroscopical characters have been compiled from the

descriptions and plates given by Fries (1838: 238; 1857: 449; 1874: 314 and 1877-1884: 39 pl. 139 fig. 2), J. Lange (1939: 101), Ricken (1913: 265. pl. 68 fig. 4) and Michael/Hennig/Kreisel (1981: 428. fig. 279). The description of the colour of the trama of the gills and of the microscopical characters is based on our own examination of material many years ago received from Romagnesi, who, however recently stated (in litt. 1982) that he has never been able to discover with a minimum of certainty specimens which could be identified as *P. trepida*.

***Psathyrella opaca* (Romagn) Kits van Wav. — Figs. 62–63**

*Drosophila opaca* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella opaca* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 214. 1967 (not val. publ., no basionym mentioned); ex Kits van Wav. in Persoonia 8: 386. 1976.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 357. 1953; Kits van Wav., l.c.; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 16. 1982.

Cap 6–15 mm, at first glandiform, then campanulate or conico-campanulate, finally convex-hemispherical, campanulate-convex or broadly conical, not fully spreading, obtuse or slightly umbonate, with entire margin, in the end with distant indistinct grooves, in subprimordial stages reddish-ochraceous brown; margin pale, later brownish and slightly reddish, vaguely lilac near margin, very opaque, hygrophanous, rapidly dehydrating and almost always found already dehydrated, becoming very pale and slightly ochraceous or greyish cream at margin and very pale ochraceous-brownish at centre, without pink, minutely micaceous and vaguely rugose; margin blackening on withering. Veil seen on only one specimen as minute very fugacious remnants on cap. Gills 2–3 mm broad, fairly close to moderately distant, lamellules of two lengths, ventricose, obtuse in front, adnate, in earliest stages with a reddish brown tinge near stem, then greyish-brownish, finally tobacco brown; edge white. Stem 35–65 x 0.7–1 mm, straight, rigid, cylindrical, with long, strongly strigose pseudorrhiza, flexuose, hollow, very faintly yellow with a reddish hue, in old specimens straw-coloured; surface in young specimens longitudinally striate by small silky white fibrils, but soon smooth and shiny; apex pruinose. Flesh of cap thin, fragile, brownish, of stem pale. Trama of 'washed' gill distinctly brown, though pale, from base to edge. Colour of spore print not recorded.

Spores 11.5–12.5(–13.5) x (5.5–)6.5–7  $\mu\text{m}$  (mean values 12 x 6.5  $\mu\text{m}$ : 1 collection), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6) in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3) in KOH 5% sordid brown (Mu. 10 YR 4/3, 4/2), opaque; germ pore distinct,  $\pm 2 \mu\text{m}$ ; small hilar appendix. Basidia 22.5–27.5 x 10–12  $\mu\text{m}$ , 4-spored. Pleurocystidia 35–40 x 7.5–10  $\mu\text{m}$  (Romagn.: 48–63 x 9.5–14.5  $\mu\text{m}$ ) (neck 3–5  $\mu\text{m}$  thick), scattered and rather scarce, lageniform with cylindrical neck, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 27.5–37.5 x 7.5–10  $\mu\text{m}$ , scattered, not numerous, lageniform, intermixed with numerous, not easily detectable spheropedunculate and clavate cells, 15–22.5 x 6–8  $\mu\text{m}$ , all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale yellowish brown from membranal pigment, particularly in basal 1/3, in which area a number of yellowish hyphal septa and a few encrustations. Pileipellis composed of roundish, colourless cells, 16–32  $\mu\text{m}$  diam.,

HABITAT & DISTRIBUTION. — In grass. Aug.–Sept. According to Romagnesi not rare in France, but not recorded from the Netherlands and the British Isles.

COLLECTIONS EXAMINED. — FRANCE, dpt. Oise, Asnière-sur-Oise, 12 Sept. 1946 (herb. Romagn. 523).

The above description of the macroscopical characters is a translation of a full description, received from Romagnesi, the description of the microscopical characters is based on our examination of an exsiccatum, received from Romagnesi. Kühner & Romagnesi (1953: 357) stated in bold face that the cap of this species dries remarkably rapidly and that as a result fresh stages can be studied only on very young specimens.

***Psathyrella longicauda* P. Karst. — Figs. 64–69**

*Psathyrella longicauda* P. Karst. in *Hedwigia* 30: 298. 1981. — *Drosophila longicauda* (P. Karst.) Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953 (not val. publ.).

MISAPPLIED. — *Psathyrella caudata* sensu Rick., Blätterp.: 265, pl. 68 Fig. 1. 1913.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., l.c.; Kühn. & Romagn., l.c.; Kits van Wav. in *Persoonia* 11: 365. 1981.

Cap in earliest stages (7–11 mm) paraboloid, dark reddish brown (Mu. 5 YR 3/2, 3/3; 7.5 YR 3/2), paler towards margin, scarcely striate, later 15–30 mm, spreading to conical or conico-paraboloid, reddish colour making way for dark brown (Mu. 10 YR 3/2, 3/3) at centre, elsewhere brown (Mu. 10 YR 4/3), near margin greyish brown (Mu. 10 YR 5/2) or both at centre and in marginal area brown (Mu. 10 YR 3/3, 3/4) and between these two areas still reddish brown (Mu. 5 YR 3/3), at margin whitish, 2/3 striate, hygrophanous, long remaining ochreous brown (Mu. 7.5 YR 5/6, 5/8) but finally pale brown (Mu. 10 YR 7/2, 7/3, 7/4), ochreous brown at centre, without pink, sometimes with concentric colour zones, sometimes micaceous, usually rugulose. Veil in earliest stages distinct, connecting stem with margin, fibrils reaching only 1 mm upwards on cap. Gills 2–3 mm broad, ventricose near margin of cap, then straight, ascending, broadly adnate, at first grey (Mu. 5 YR 5/1; 10 YR 5/1) with a trace of purple or brown, finally dark purplish black with a trace of brown; edge white. Stem at maturity 70–90 x 2–3 mm, straight or slightly flexuous, at base usually thickened (up to 4 mm), white, lower down usually isabelline, strongly rooting (pseudorrhiza 30–70 mm); apex pruinose. Flesh of cap in centre 1–2 mm thick, dark brown (Mu. 10 YR 3/3, 4/3, 4/4), of stem also brown (Mu. 7.5 YR 5/4; 10 YR 5/3) but with white superficial layer. Trama of 'washed' gill brown (Mu. 10 YR 6/6, 6/4, 6/3) in a narrow zone along base, elsewhere pale brown (Mu. 10 YR 7/2). Spore print purplish black to black.

Spores 11–14.5 x 6.5–8 µm (mean values 12.1–13.5 x 6.5–7.6 µm: 5 collections), ellipsoid but adaxially flattened, in water very dark red (Mu. 2.5 YR 3/4), in NH<sub>4</sub>OH 10% very dark reddish brown (Mu. 2.5 YR 2.5/4), in KOH 5% very dark brown (Mu. 5 YR 3/2, 3/3), opaque to subopaque, thin-walled; germ pore as a result shallow and indistinct, but large (1.8–2 µm), with small hilar appendix. Basidia 25–30 x 9–15(–17.5) µm, 4-spored. Pleurocystidia 42.5–80 x 7.5–15(–17.5) µm, few in number, fusoid-pedicellate with fairly long subcylindrical to cylindrical neck (4–5 µm) and acute to subacute apex, sometimes very slender. Marginal cells: pleurocystidioid cheilocystidia 22.5–40 x 7.5–10(–12.5) µm, scattered, spheropedunculate and clavate cells numerous to crowded, 10–30 x 5–15(–17.5) µm; all cells thin-walled, colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. at and near base yellowish brown. Pileipellis a 3–5 cells deep layer of subglobose cells, 30–6(–80) µm diam., colourless.

HABITAT & DISTRIBUTION. — Terrestrial, solitary or subcaespitose, in humus, decaying leaves, rotting hay, manured grass. Rare. Oct.-Nov. Reported from France, the British Isles and the Netherlands.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Oldenzaal, estate

'Egheria' (Dykhuis) 11 Oct. 1963; prov. Noord-Holland, Vogelenzang, estate 'Leyduin', 21 Oct. 1980; prov. Zuid-Holland, Goedereede, 'Middelduinen', 11 Nov. 1969. — FINLAND, Tammela, Mustiala, Oct. 1891, P. A. Karsten 1239 (type, H); Tammissaario, 17 June 1960 (H).

See observations *P. atrolaminata* and for more details Kits van Waveren (1981: 365).

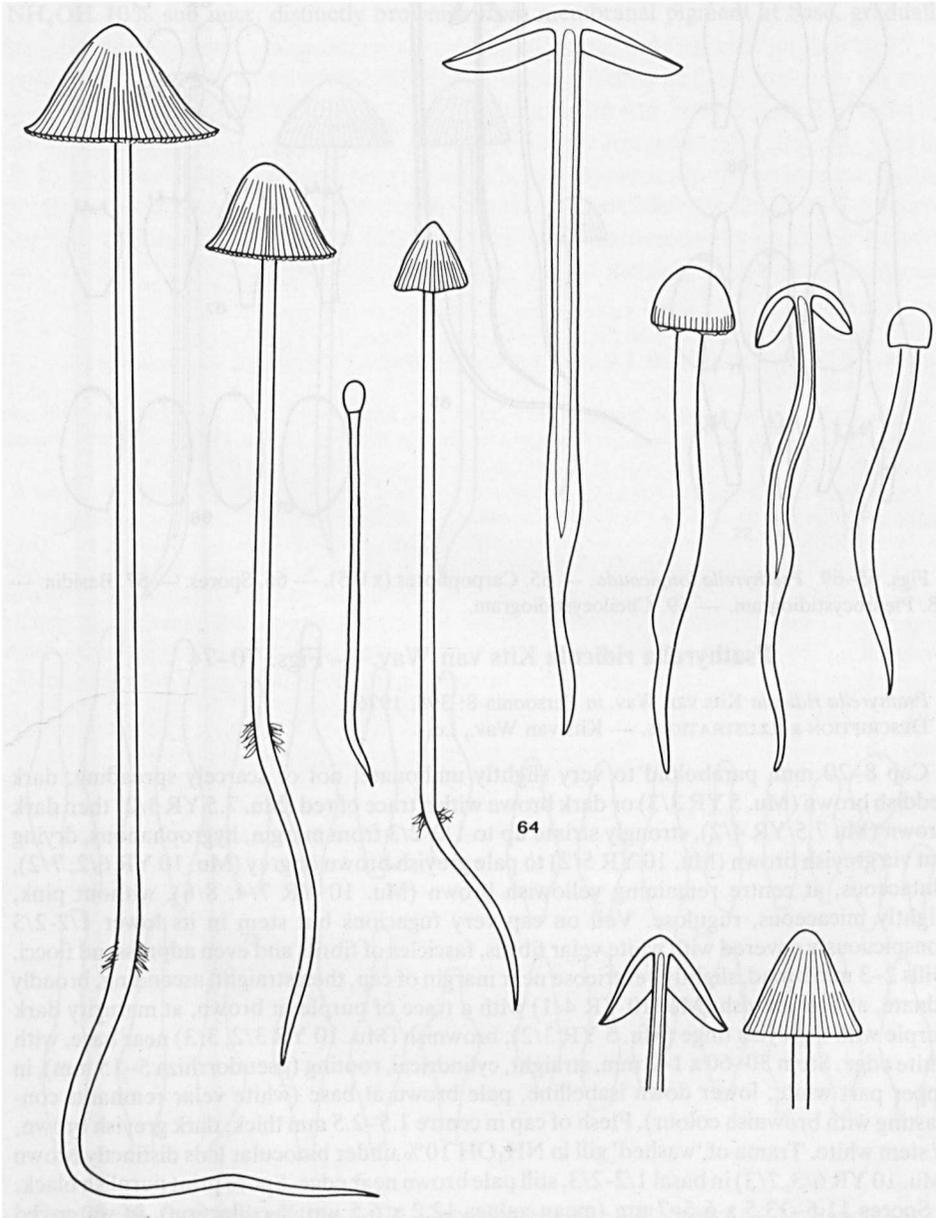
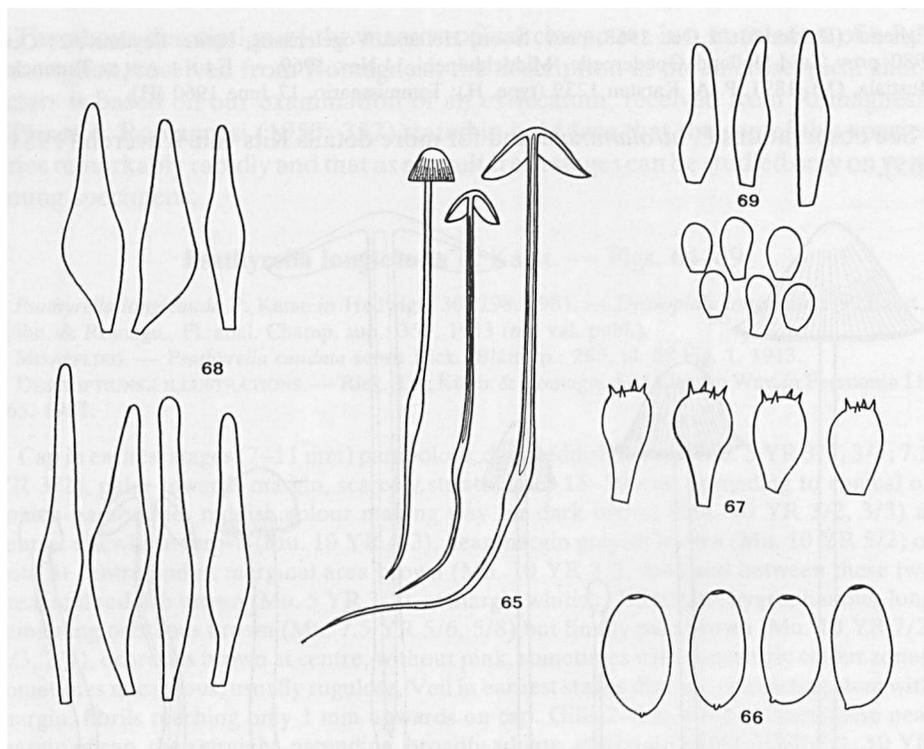


Fig. 64. *Psathyrella longicauda*. — Carpophores (x 1).



Figs. 65–69. *Psathyrella longicauda*. — 65. Carpophores (x 0.5). — 66. Spores. — 67. Basidia. — 68. Pleurocystidiogram. — 69. Cheilocystidiogram.

### *Psathyrella ridicula* Kits van Wav. — Figs. 70–74

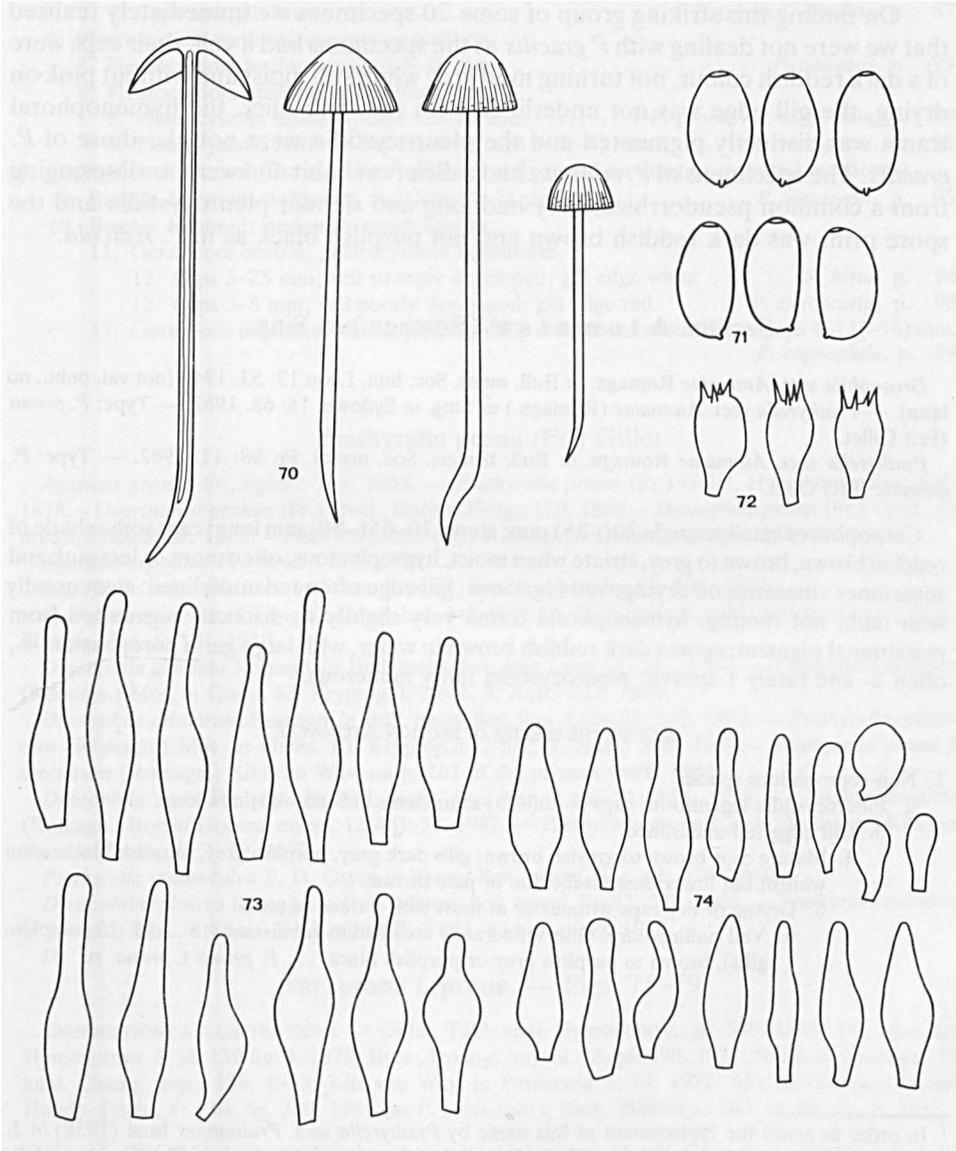
*Psathyrella ridicula* Kits van Wav. in *Persoonia* 8: 398. 1976.

DESCRIPTION & ILLUSTRATIONS. — Kits van Wav., l.c.

Cap 8–20 mm, paraboloid to very slightly umbonate, not or scarcely spreading, dark reddish brown (Mu. 5 YR 3/3) or dark brown with a trace of red (Mu. 7.5 YR 3/2) then dark brown (Mu. 7.5 YR 4/2), strongly striate up to 1/2–2/3 from margin, hygrophanous, drying out via greyish brown (Mu. 10 YR 5/2) to pale greyish brown or grey (Mu. 10 YR 6/2, 7/2), alutaceous, at centre remaining yellowish brown (Mu. 10 YR 7/4, 8/6), without pink, slightly micaceous, rugulose. Veil on cap very fugacious but stem in its lower 1/2–2/3 conspicuously covered with white velar fibrils, fascicles of fibrils and even adpressend flocci. Gills 2–3 mm broad, slightly ventricose near margin of cap, then straight, ascending, broadly adnate, at first greyish (Mu. 10 YR 4/1) with a trace of purple or brown, at maturity dark purple with a greyish tinge (Mu. 5 YR 3/2), brownish (Mu. 10 YR 3/2, 3/3) near base, with white edge. Stem 30–60 x 1–2 mm, straight, cylindrical, rooting (pseudorrhiza 5–15 mm), in upper part white, lower down isabelline, pale brown at base (white velar remnants contrasting with brownish colour). Flesh of cap in centre 1.5–2.5 mm thick, dark greyish brown, of stem white. Trama of ‘washed’ gill in  $\text{NH}_4\text{OH}$  10% under binocular lens distinctly brown (Mu. 10 YR 6/3, 7/3) in basal 1/2–2/3, still pale brown near edge. Spore print purplish black.

Spores 11.5–13.5 x 6.5–7  $\mu\text{m}$  (mean values 12.2 x 6.5  $\mu\text{m}$ : 1 collection), in water red (Mu. 2.5 YR 3/6) in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4&3) in  $\text{KOH}$  5% sordid brown

(Mu. 10 YR 4/3, 3/3), opaque, with distinct germ pore ( $\pm 2 \mu\text{m}$ ) and small hilar appendix. Basidia 20-32 x 9.5-12.5  $\mu\text{m}$ , 4-spored. Pleurocystidia 40-60 x 7.5-14 (-17.5)  $\mu\text{m}$ , moderately numerous, sublageniform, many with slightly swollen apices, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 30-45 x 6-10  $\mu\text{m}$ , varying from locally fairly crowded to scattered, intermixed with spheropedunculate and clavate cells, 15-20 x 7.5-12.5  $\mu\text{m}$  in varying numbers; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brownish from membranous pigment at base, gradually



Figs. 70-74. *Psathyrella ridicula*. — 70. Carpophores (x 1). — 71. Spores. — 72. Basidia. — 73. Pleurocystidiogram. — 74. Cheilocystidiogram.

paler towards edge, with many yellow hyphal septa and encrustations in basal part. Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 16–32  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary and subcaespitose around stump of *Fagus* in sandy soil (dunes). Known only from type locality in the Netherlands.

**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S: prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 11 Aug. 1962 (type L).

On finding this striking group of some 20 specimens we immediately realised that we were not dealing with *P gracilis* as the specimens had a veil, their caps were of a dark reddish colour, not turning mud grey while still moist and without pink on drying, the gill edge was not underlined with red. Sub micr. the hymenophoral trama was distinctly pigmented and the pleurocystidia were not like those of *P. gracilis*. The specimens of *P. connata* had a different habit and were  $\pm$  all springing from a common pseudorrhiza, they had long and slender pleurocystidia and the spore print was dark reddish brown and not purplish black as in *P. ridicula*.

### Section *A t o m a t a e*<sup>1</sup> (Romagn.) ex Sing.

*Drosophila* sect. *Atomatae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 53. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Atomatae* (Romagn.) ex Sing. in Sydowia 15: 68. 1962. — Type: *P. prona* (Fr.) Gillet.

*Psathyrella* sect. *Atomatae* Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 11. 1982. — Type: *P. atomata* (Fr.) Quél.

Carpophores small; caps 3–20(–25) mm; stems 10–65(–80) mm long; caps some shade of reddish brown, brown to grey, striate when moist, hygrophanous, often more or less pink and sometimes vinaceous on drying; veil fugacious; gill edge often red underlined; stem usually with bulb, not rooting; hymenophoral trama very slightly to distinctly pigmented from membranous pigment; spores dark reddish brown in water, with large germ pore; basidia 4-, often 2- and rarely 1-spored; pleurocystidia fairly numerous.

#### KEY TO THE SPECIES OF SECTION ATOMATAE

1. Non-coprophilous species.
2. Pleurocystidia lageniform; caps 6–20(–25) mm; stems (15–65(–80) mm long.
3. Gill edge red underlined.
  4. Mature caps brown to greyish brown; gills dark grey, purplish grey, purplish black; stem whitish but lower down isabelline or pale brown.
  5. Drying or dry caps without or at most with a trace of pink.
  6. Veil rudimentary. Gills moderately crowded to subdistant (13...15–20 complete gills), brown to purplish grey or purplish black ... *P. prona* f. *prona*, p. 81

<sup>1</sup> In order to avoid the replacement of this name by *Psathyrella* sect. *Pruinatipes* Imai (1938) in J. Facult. Agric. Hokkaido imp. Univ.: 43: 295, introduced with two species, viz. *P. atomata* and *P. disseminatus*, that sectional name is herewith lectotypified by *P. disseminatus* (Pers.: Fr.) Quél. (= *Coprinus disseminatus* (Pers.: Fr.) S. F. Gray).

6. Veil well-developed. Gills relatively distant (13–18 complete gills), brown to tobacco brown. (Species doubtfully distinct from *P. prona*.) ..... *P. infida*, p. 92
5. Drying or dry caps with conspicuous pink, red or vinaceous colours.  
*P. prona* f. *orbitarum*, p. 88
4. Mature caps and gills dark brown; stems lower down brown to reddish brown.  
*P. prona* f. *picta*, p. 85
3. Gills not red underlined.
7. Caps and gills grey ..... *P. prona* f. *cana*, p. 86
7. Caps and gills brown ..... *P. prona* f. *albidula*, p. 87
2. Pleurocystidia utriform, capitate or fusiform.
8. Pleurocystidia fusiform; caps 3.5–10 mm. .... *P. palustris*, p. 93
8. Pleurocystidia utriform or capitate.
9. Pleurocystidia utriform; caps 7.5–25 mm. .... *P. prona* var. *utriformis*, p. 89
9. Pleurocystidia fusiform but capitate; caps 3–5(–8) mm. .... *P. romagnesii*, p. 94
1. Coprophilous species. (But see also *P. prona*, rarely found on dung or manured meadows.)
10. Basidia 2-spored; sterigmata very long (7–11  $\mu$ m). .... *P. waverenii*, p. 95
10. Basidia 4-spored; sterigmata much shorter.
11. Germ pore central; pleurocystidia lageniform.
12. Caps 3–25 mm; veil strongly developed; gill edge white ..... *P. hirta*, p. 96
12. Caps 3–8 mm; veil poorly developed; gill edge red. .... *P. stercoraria*, p. 98
11. Germ pore eccentric; pleurocystidia chiefly utriform or subutriform; caps 4–11(–18) mm.  
*P. coprophila*, p. 99

### *Psathyrella prona* (Fr.) Gillet

*Agaricus pronus* Fr., Epicr.: 239. 1838. — *Psathyrella prona* (Fr.) Gillet, Hyménomycètes: 618. 1878. — *Coprinarius pronus* (Fr.) Quél., Enchir. Fung.: 120. 1886. — *Drosophila prona* (Fr.) Quél., Fl. mycol. France: 57. 1888. — *Psathyra prona* (Fr.) J. Lange in Dansk bot. Ark. 4(9): 16. 1936.

*Agaricus expolitus* Fr., Epicr.: 239. 1838.

*Psathyrella subprona* Clel. in Trans. Proc. R. Soc. S. Australia 51: 306. 1927.

*Psathyra subatomata* J. Lange in Dansk bot. Ark. 9(1): 16. 1936 (not val. publ., no latin); ex J. Lange, Fl. agar. dan. 5: VII. 1940.

*Drosophila albidula* Romagn. in Bull. mens. Soc. linn Lyon 21: 151. 1952. — *Psathyrella albidula* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 215. 1967.

*Drosophila orbitarum* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella orbitarum* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 215. 1967. — *Psathyrella prona* f. *orbitarum* (Romagn.) Kits van Wav. on p. 281 of the present work. 1985.

*Drosophila picta* Romagn. in Bull. mens. Soc. linn. Lyon 21: 151. 1952. — *Psathyrella picta* (Romagn.) Bon in Docum. mycol. 12(48): 52. 1982. — *Psathyrella prona* f. *picta* (Romagn.) Kits van Wav. in Persoonia 7: 39. 1972.

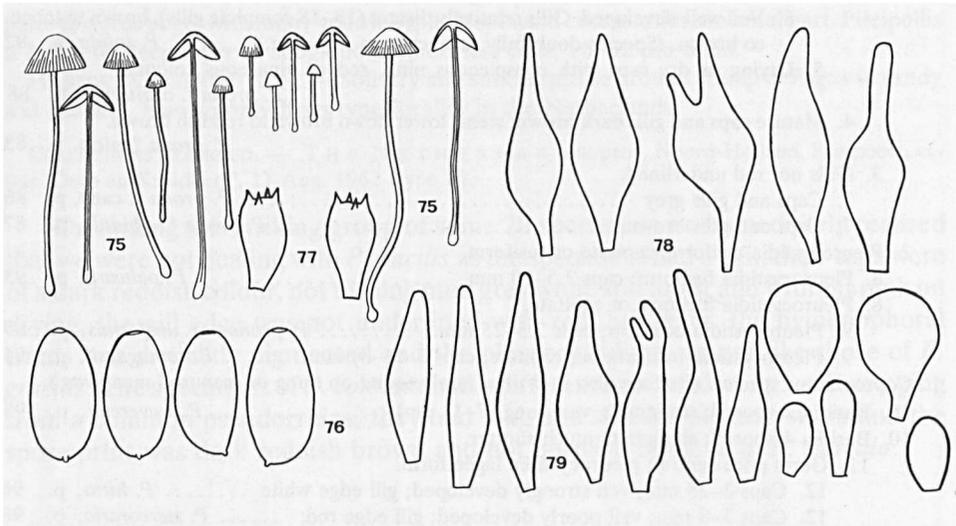
*Psathyrella vinosofulva* P. D. Orton in Trans. Brit. mycol. Soc. 43: 378. 1960.

*Drosophila calcarea* Romagn. in Bull. trimest. Soc. mycol. Fr. 82: 539. 1966. — *Psathyrella calcarea* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 4. Aufl.: 269. 1978.

#### var. *prona* f. *prona*. — Figs. 75–79

DESCRIPTIONS & ILLUSTRATIONS. — Gillet, Tabl. anal. Hyménomyc.: pl. 589. 1884; Fr., Icon. sel. Hyménomyc. 2: pl. 139 fig. 3. 1879; Bres., Iconogr. mycol. 18: pl. 890. 1931; Kühn. & Romagn., Fl. anal. Champ. sup.: 356. 1953; Kits van Wav. in Persoonia 7: 24. 1972; Michael/Hennig/Kreisell, Handb. Pilzfr., 4: 430, fig. 280. 1981 (as *P. orbitarum*); Rick., Blätterp.: 265, pl. 68. fig. 6. 1915.

Cap 6–29(–25) mm, both in early and later stages paraboloid or conico-paraboloid, conical, sometimes hemispherical or with slight umbo, spreading to paraboloid-convex, strongly sulcate-striate up to 1/2–2/3 from margin; in early stages chocolate or dark reddish



Figs. 75–79. *Psathyrella prona* var. *prona*. — 75. Carpophores (x 0.5). — 76. Spores. — 77. Basidia. — 78. Pleurocystidiogram. — 79. Cheilocystidiogram.

brown (Mu. 5 YR 3/3, 4/3, 4/2) to dark brown (Mu. 7.5 YR 3/2, 4/2) especially in central 2/3, at maturity centre and ridges between striae dark brown to greyish brown (Mu. 10 YR 3/3, 3/2, 4/3, 4/2, 5/3, 5/2), in striae brownish grey (Mu. 10 YR 6/2), both paler towards margin, overall colour finally predominantly grey (Mu. 10 YR 4/1, 5/1, 6/1), only a trace of brown (Mu. 10 YR 5/2) at apex, hygrophanous, drying out to pale grey (Mu. 10 YR 6/1, 7/1), very pale brownish grey (Mu. 10 YR 6/2), alutaceous or almost white (these colours often mixed with pink), moderately to strongly micaceous, and moderately rugose. Veil rudimentary, white; in mature specimens on cap fibrils usually scanty if at all present; only in very early stages distinct networks of fibrils reaching up to 2/3 from margin and/or connecting margin with stem; on stem sparsely spread fibrils. Gills 2–3 mm broad, moderately crowded to subdistant (13–20 complete gills), broadly adnate, usually with a distinct tooth, rounded near and sometimes protruding under margin of cap, ascending, straight, in early stages brown (Mu. 10 YR 6/4, 6/3, 5/3, 5/4, 5/6) in basal 1/3, for the rest very pale brown (Mu. 10 YR 7/3, 7/2) to even whitish, but soon greying (Mu. 10 YR 6/2) towards edge; later grey (Mu. 5 YR 5/1) with a brown hue (Mu. 10 YR 6/2, 5/2, 4/2) near base, finally dark grey (Mu. 10 YR 4/1 or purplish grey (Mu. 5 YR 5/1) to purplish black (Mu. 10 YR 3/1, 5 YR 3/1); edge at first white, later underlined with red (sometimes only perceptible near margin of cap or only on some gills; examination of ‘washed’ gill under binocular lens or microscope sometimes needed). Stem (13–)18–65(–80) x (0.5–)1–1.5(–2) mm, cylindrical, straight but often flexuous, with a distinct small bulb at non-rooting rarely substrigose base, usually covered by a thin whitish tomentose layer; white in upper part, isabelline, pale brown and rarely distinctly brown lower down (Mu. 10 YR 8/2, 8/3, 7/3, 6/3), pruinose at apex. Flesh of cap in centre 0.5–1.5 mm thick, dark greyish brown (Mu. 10 YR 3/3, 4/2, 4/3, 4/4, 5/2), of stem in upper part white (often with narrow red zone alongside gills), lower down pale brown. Smell indistinctive. Trama of ‘washed’ gill distinctly but to a variable extent pigmented, usually pale brown (Mu. 10 YR 7/4, 6/3, 6/4, even 5/3) in basal 1/4–1/3 of gill, paler towards edge, near edge (sometimes even entire gill) practically colourless. Spore print purplish black to black.

Spores (11.5–)12.5–15.5(–16) x 5.5–8  $\mu\text{m}$  (mean values 12.7–14.7 x 6.6–7.9  $\mu\text{m}$ : 12 collections) in specimens with 4-spored basidia, 12.5–16 x 6.5–8  $\mu\text{m}$  in specimens with 2- and 4-spored basidia, (12.5–) 14.5–17 (–18) x (6.5–)7–8  $\mu\text{m}$  in specimens with exclusively 2-spored or 2- and 1-spored basidia, ellipsoid but adaxially flattened, in water dark to very dark red (Mu. 2.5 YR 3/4), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in KOH 5% dark sordid brown (Mu.  $\pm$  7.5 YR 4/2), opaque to subopaque, with large germ pore (1.8–2  $\mu\text{m}$ ) and small hilar appendix. Basidia (17.5–)20–30(–35) x (10–)11–13(–15)  $\mu\text{m}$ , spheropedunculate, 4-, 2- or 1-spored. Pleurocystidia 35–65(–80) x 10–17.5(–20)  $\mu\text{m}$ , moderately to fairly numerous, rarely scarce, lageniform with usually fairly long cylindrical neck (2–3  $\mu\text{m}$  wide) more or less sharply delimited from the ventricose cell body or with subcylindrical neck broadening towards and passing gradually into cell body, thin-walled, colourless, with acute, rarely forked apex. Marginal cells: pleurocystidioid cheilocystidia (25–)35–65(–70) x 7.5–17.5  $\mu\text{m}$ , usually absent or scarce near margin of cap, but conspicuously increasing in number and usually becoming quite crowded towards the middle of the gill and or towards stem, intermixed with abundant (particularly near margin of cap) spheropedunculate cells, (12.5–)15–50 x 7.5–20(–25)  $\mu\text{m}$ . All cells thin-walled, colourless. Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pale brown, increasingly brown towards base, sometimes  $\pm$  colourless near edge; yellowish hyphal septa fairly numerous; encrustations present. Pileipellis a 1–2 cells deep layer of inflated cells, on the surface covered by a hymeniform palissade-like layer of chiefly obpyriform (pear-shaped), but also clavate cells, 20–40  $\mu\text{m}$  diam. colourless.

**HABITAT & DISTRIBUTION.** — In grass by roadsides, parks, manured meadows, muddy cart tracks, woods, sometimes on compost or decaying vegetable matter, rarely on manure. Solitary or not infrequently gregarious, rarely subcaespitose. June–Nov. Fairly common in the Netherlands. Recorded from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel, Denekamp, estate 'Singraven', 4 Aug. 1962 and 5 July 1963 (4- and 2-spored form); prov. Gelderland: Doetinchem, estate 'Byvanck', 20 June 1953 (2-spored form); Wageningen, Plant Research Centre, 20 Nov. 1963; prov. Utrecht, Haarzuilens, estate 'De Haar', 31 Oct. 1969; prov. Noord-Holland: Amsterdam, 'Amsterdam Wood', 21 and 23 June 1961, 12 Aug. 1967, 19 July 1962 (2- and 1-spored form); Castricum, dunes of County Water Supply, 30 Oct. 1976; prov. Zuid-Holland: Leiden, 23 Sept. 1969 (2- and 1-spored form); prov. Noord-Brabant, Nuenen, 5 Oct. 1962; prov. Limburg, Epen, 25 Sept. 1964. — **S C O T L A N D:** Kinloch Rannoch (Perthshire), 'Rannoch School', 31 Aug. 1965. — **S W I T Z E R L A N D:** Bôle, 2 June 1965 and 12 July 1966 (4- and 2-spored form).

In a previous study (Kits van Waveren, 1972: 30) we discussed at length the great variability within the species of section *Atomatae* with regard to the colours of the moist and dry caps and the gills. As in most species of *Psathyrella* the caps of primordia and very young stages of species in this section are dark reddish brown; mature caps show some shade of reddish brown, brown, greyish brown or grey and when dry the colour is very pale brown, greyish brown, grey or alutaceous. The appearance of pink, red, or vinaceous colours in the drying caps is very capricious, varying within one and the same species and even collection and in our experience depending largely on the speed by which the process of drying proceeds. A slow speed favours the appearance of pink, while rapid drying will not bring out this colour; moisture and climatic conditions also seeming to play a role. Specimens from one and the same collection of *P. prona* or *P. prona* f. *orbitarum*, which are put in a heater to dry, or on or near the radiator of the central heating, will not show pink resp. vinaceous colours, while others, having been lying about will dry slowly and produce these colours. Remoistened specimens on drying usually fail to produce pink.

As for the colour of gills, the amount of pigment in the hymenophoral trama (largest in the early stages) varies considerably and diminishes at maturity, while the number of mature spores (the main source of the colour of gills) gradually increases. We therefore fully agree with Romagnesi, that one should use the colours of caps and gills with the greatest caution.

In the same paper (1972: 28), we discussed the capriciousness and unreliability of the red underlining of the white gill edge. Out of our 16 collections, which — on account of the presence of red underlining of the gill edge — could be identified as *P. prona*, no less than six had been described as having a white gill edge. In all six careful examination (usually on a 'washed' gill under binocular lens and/or microscope) revealed the presence of red underlining, be it sometimes after a long search or only on a very small part of a gill (usually near the margin of the cap). The specimens of one of these six collections fully answered the current description of *P. atomata* (grey caps, dark grey gills, white gill edge, absence of veil). Romagnesi (in litt.) agreed with our distrust of the value of this red underlining. With regard to many descriptions in the literature in which the gill edge is called white, there is justified doubt as to whether the author really carried out an intensive search for the red underlining.

The unserviceableness of these colours was excellently illustrated by a collection of *P. prona* we found in August 1981 in grass at a road-side. The moist caps were dark sordid brown, the dry caps very pale yellowish brown without pink, the hymenophoral trama was colourless, the gill edge beautifully red underlined. Because of the combination colourless hymenophoral trama, red underlining of the gill edge and no pink in the drying cap, this collection did not answer either *P. prona* or *P. atomata* or any of the other forms of *P. prona*. We refrained from describing this collection as yet another form of *P. prona*, convinced of the taxonomically unimportance of these colour variations, which evidently occur in all conceivable combinations.

Whether the stem of a species of section *Atomatae* is flexuous or not, in our experience, is of equally little or no taxonomical importance (see same paper, 1972: 33). The degree to which the gills are distant and are broadly adnate varies and so does — as in most species of *Psathyrella* — the development of the veil in one and the same species. The habitat is for all forms of *P. prona* the same. The variability of sizes and colours sub micr. of the spores between collections that can be regarded as representing one and the same species of the *prona*-group (see figures for the mean values of the spore sizes) turned out to be so great that both seem to be of little taxonomical value. Partly this variability may be caused by the fact that not infrequently some 2-spored basidia occur unnoticed in what seemingly are exclusively 4-spored specimens.

We fully agree with Romagnesi (in litt.) that the pleurocystidia in section *Atomatae* are of far greater taxonomical importance than the spores. Among the non-coprophilous species of section *Atomatae* these cells enable us to distinguish clearly between on the one hand *P. prona* with its various forms (all with lageniform pleurocystidia and pleurocystidioid cheilocystidia having fairly long necks) and on the other hand the species with quite different cystidia (*P. prona* var. *utriformis* with utriform cystidia, *P. palustris* with fusiform cystidia, *P. romagnesi* with capitate fusoid cystidia). Recently Romagnesi (1975: 137) published descriptions of 24 species of *Psathyrella* referring with regard to five species of our section *Atomatae* to our paper (1972: 23-54) in which we dealt with all species of that section. In a

number of these 24 species, particularly in those of section *Atomatae*, the distinction of the species was based on biological tests (culture experiments) carried out by M. C. Galland (1972: 1973). As for section *Atomatae* Romagnesi gave descriptions of *Psathyrella* (*Drosophila* with Romagnesi) *orbitarum*, *P. atomata*, *P. albidula*, *P. palustris* and *P. calcarea*, unfortunately leaving out *P. infida*, *P. picta* and the commonest and best known species of this section, *P. prona*. Having studied Romagnesi's and Galland's publications, we feel that — although often very remarkable — the results of these biological tests in the common practice of mycology are as yet inapt for the purpose of distinguishing species of *Psathyrella*, particularly those of section *Atomatae*. In that section the explanation of a few findings remained obscure even to the experimenters and sometimes the tests were unable to provide a clear cut answer to the identification of specimens. Also it proved impossible to bring into culture material of what had been identified as *P. picta* (a form of *P. prona* recognisable in the field by its dark brown colours).

Colours of caps, gills and gill edges obviously constitute the sole directly perceptible differences between *P. prona*, *P. orbitarum*, *P. atomata*, *P. picta* and *P. albidula*, recognised as separate species by Romagnesi and other authors. But these colors are very capricious and quite unreliable to go by in distinguishing these taxa as separate species. This being so, we decided (1972: 23) to regard these taxa as mere colourforms (often quite striking in the field) of *P. prona*, irrespective of the outcome of biological tests. This view is supported by the facts that intermediate forms between these colourforms clearly exist (also noticed and mentioned by Romagnesi) and that the microscopical features (although also subject to some degree of variability) of these forms are basically the same (see also our observations on *P. prona* f. *orbitarum*).

**var. *prona* f. *picta* (Romagn.) Kits van Wav.**

*Drosophila picta* Romagn. in Bull. mens. Soc. linn. Lyon 21: 151. 1952. — *Psathyrella prona* f. *picta* (Romagn.) Kits van Wav. in Persoonia 7: 39. 1972.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 356. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 12. 1982.

This very rare form is conspicuous in the field by its at first very dark reddish brown, chocolate brown (Mu. 5 YR 3/2, 3/4), later dark brown (Mu. 7.5 YR 3/2, 4/2, 4/4; 10 YR 4/3) colour of the moist cap, its distinctly brown gills (Mu. 10 YR 4/4, 4/3, 4/2, 5/2), which are dark greyish purplish brown (Mu. 5 YR 5/2, 5/1) towards the white but red underlined edge, and the stem being pale brown to whitish in its upper part, soon browner (Mu. 10 YR 7/3, 6/3, 5/3) towards and rather dark reddish brown at the bulbous base. Veil present as fugacious small fibrils near margin of cap. Habit and sizes as *P. prona* f. *prona*. Spore sizes according to Romagnesi (1953: 256) 12-15.5 x 6.5-7.2  $\mu\text{m}$ , (1982: 12) 12-18(-19) x 6.5-7.7(-8.2)  $\mu\text{m}$ , while our own figures from the type material were 14.5-17 x 6.5-8  $\mu\text{m}$  (mean values 15.9 x 7.6  $\mu\text{m}$ ). In the Dutch material we measured 11.5-15.5 x 6.5-7.5  $\mu\text{m}$  (mean values 13.2-14 x 6.3-6.8  $\mu\text{m}$ ) and pleurocystidia 40-60 x 10-15  $\mu\text{m}$  (of the '*prona*-type'). In our 1961 collection we came across quite a number of 2-spored basidia and in our 1966 collection, found at the very same site, most basidia were 2-spored (mean spore sizes: 13.2 x 6.8  $\mu\text{m}$ ). Hymenophoral trama very distinctly and in some gills even rather strongly pigmented from base to edge.

HABITAT & DISTRIBUTION. — Same habitats as *P. prona*. Apr.-July. Very rare in the Netherlands. Reported from France, not from the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Noord-Holland, Amsterdam, 'Amsterdam Wood', 23 April 1961, 16 July 1966. — FRANCE, Ess., Bois de Cerçay, 18 June 1942 (type; herb. Romagn. D 309).

We fully agree with Romagnesi that by its colours *P. prona* f. *picta* is very conspicuous and easily recognisable in the field, but feel, that — because it only differs from *P. prona* by its colours — this does not warrant recognition as a full species in its own right, as strongly advocated by Romagnesi (in litt.). With Favre (1960: 550), the only other author who gave a description of *P. picta*, the colour of the cap is paler and the gill edge not underlined with red. Romagnesi (1982: 12) found the majority of the basidia 2-spored.

var. *prona* f. *cana* Kits van Wav.

*Psathyrella prona* f. *cana* Kits van Wav. in *Persoonia* 7: 37. 1982.

MISAPPLIED. — *Psathyrella atomata* sensu Bres., *Iconogr. mycol.* 18: pl. 889 fig. 1. 1931. — *Psathyra atomata* sensu J. Lange, *Fl. agar. dan.* 4: 102, pl. 156 C. 1939 (non *Agaricus atomatus* Fr., *Syst. mycol.* 1: 298. 1821. = *nomen dubium*).

DESCRIPTION & ILLUSTRATIONS. — Bres., l.c. (pink flush on caps to be deleted); J. Lange, l.c.; Kühn. & Romagn., *Fl. anal. Champ. sup.*: 355. 1953; Romagn. in *Bull. trimest. Soc. mycol. Fr.* 91: 207. 1975; Michael/Hennig/Kreissel 4: 430 fig. 282. 1981.

Cap 12–25 mm, paraboloid to conico- or convex-paraboloid, pale grey, at centre pale brownish, striate when moist, not striate or slightly grooved when dry, hygrophanous, drying out to very pale grey, almost white, at centre very pale brown, without pink (but according to some descriptions rarely with a trace of pink), micaceous, rugulose. Veil present as white fibrils and very small bundles of fibrils on cap close and parallel to margin, very fugacious, usually absent; no remnants on stem. Gills 3 mm broad, straight, ascending, broadly adnate, dark grey with scarcely a trace of purple; edge white, not underlined with red. Stem 65–70 x 1 mm, cylindrical, distinctly flexuous, hollow, smooth, very pale isabelline but at base darker, brownish grey; base with small bulb and strigose, not rooting; apex pruinose. Flesh of cap in centre 1 mm thick, dark brown, of stem very pale brown, at base greyish brown. Trama of 'washed' gill practically colourless with narrow very pale brown strip at base.

Spores 12.5–15.5 (–16) x 7–7.5 (–9)  $\mu\text{m}$  (mean values 14(–15) x 7.2(–8): 3 collections), shape and colours as in *P. prona*, opaque to subopaque, with large germ pore ( $\pm 1.8 \mu\text{m}$ ) and small hilar appendix. Basidia 20–25 x 12.5–14(–15  $\mu\text{m}$ ), spheropedunculate, 4-spored. Pleurocystidia 22.5–60 x 12.5–14  $\mu\text{m}$ , scarce fusiform-pedicellate with fairly long subcylindrical neck passing gradually into cell body, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 22.5–40 x 10–15  $\mu\text{m}$ , fairly numerous; spheropedunculate and clavate cells 10–25 x 7–12.5  $\mu\text{m}$ . All cells thin-walled, colourless. Pigmentation of gill trama in  $\text{NH}_4\text{OH}$  10% sub micr. in basal part very pale yellowish brown from membranal pigment with some yellowish hyphal septa, without incrustations, for the rest  $\pm$  colourless.

HABITAT & DISTRIBUTION. — Same habitats as *P. prona*, also in grass and on horse dung. June–July. Very rare in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Overijssel, Boekelo, Riding School, 29 July 1967. — FRANCE, Luzarches (V.d' O.), 22 July 1946 (herb. Romagn. D 502). — SWITZERLAND, Altkirch, 16 June, 1958.

This form differs from *P. prona* by its predominantly grey cap and its ash<sup>grey</sup>, later blackish gills without red underlining of the white gill edge. In an earlier paper

(1972: 35), to which the reader is referred, we argued at length why Fries's *Agaricus atomatus* is to be regarded as a *nomen dubium*. Romagnesi had already come to this conclusion, reason why he adopted Bresadola's interpretation of *A. atomatus* in the 'Flore analitique' and why we — reducing the taxon to forma status — gave it the new epithet 'cana'.

In the leading descriptions of this taxon there are many confusing contradictions clearly illustrating how very close *P. prona* is to its forma *cana*. In the 'Flore analytique' of Kühner & Romagnesi the gills are called ash grey and blackish grey without any brown hues, the moist caps ash grey, the dry caps very pale ash grey to white (only pale ochre or pale reddish at centre), without pink, while the veil is said to be absent. This is not in accordance with Bresadola's descriptions and plate 889<sup>1</sup>, in which the cap is called 'fumoso-roseus vel griseus', the plate clearly showing a pink hue in the peripheral 2/3 of the cap.

In the observations following his recent full description of *Drosophila atomata* Romagnesi (1975: 210) stressed the absence of pink in the colours of the cap, its grey to blackish gills and the absence of velar fibrils. But in the description itself the young caps are called yellow ochraceous bistre (brownier at the margin) or reddish brown, while the gills in young stages are called grey, slightly brownish, later becoming blackish-brownish. These are the colours of *P. prona*. Pink is not mentioned by Romagnesi, but it is with Lange (1939: 102). As for the veil, called absent in the 'Flore analytique', the 1975 description states that the cap usually is without distinct traces of veil, but that the veil is present at the margin of the cap of very young specimens and fugacious (in the observations, however, it is stated that velar fibrils had never been seen in *Drosophila atomata*). Finally, the cap is pellucidly striate with Bresadola, but according to the 'Flore analytique' and Lange never striate, while Romagnesi (1975: 208) did not mention striation. Earlier (1972: 37) all these conflicting data about this apparently rare taxon added to our decision to regard it as merely a colour form of *P. prona*.

Above we refrained from mentioning Ricken's description (1915: 265, plate 68 fig. 5) of *Psathyrella atomata*. Kühner & Romagnesi did not venture on an interpretation of Ricken's description and plate, while we think they represent the 2-spored form of *P. prona* f. *orbitarum* (large spores, measuring 15–18 x 7–8 µm).

**var. *prona* f. *albidula* (Mos.) Kits van Wav.**

*Psathyra subatomata* J. Lange in Dansk bot. Ark. 9(1): 16. 1936 (non *Psathyrella subatomata* P. Karst, 1885); ex J. Lange, Fl. agar. dan. 5: VII. 1940. — *Drosophila albidula*<sup>1</sup> Romagn. in Bull. mens. Soc. linn. Lyon 21; 151. 1952 (change of name; superfluous name). — *Psathyrella albidula* Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 215. 1967. — *Psathyrella prona* f. *albidula* (Mos.) Kits van Wav. in Persoonia 7: 43. 1972.

<sup>1</sup>As *Psathyra subatomata* J. Lange ex J. Lange (1940) is not a later homonym of *Psathyrella* (!) *subatomata* P. Karst (1885), Romagnesi should have used the epithet 'subatomata J. Lange' in *Drosophila* instead of creating a new name. However, when Moser (1967) transferred the epithet 'albidula Romagn.' to *Psathyrella* this was correct, as the epithet 'subatomata J. Lange' could not be used in *Psathyrella* because of the existence of *Psathyrella subatomata* P. Karst. (1885). According to Art. 72 Note 1 of the I.C.B.N. the resulting combination should be treated as new, hence the notations '*Psathyrella albidula* Mos.' and '*Psathyrella prona* f. *albidula* (Mos.) Kits van Wav.'

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 102, pl. 153C. 1939 (as *Psathyra subatomata*). — Kühn. & Romagn., Fl. anal. Champ. sup.: 356. 1953. — Romagn. *in* Bull. trimest. Soc. mycol. Fr. 91: 214. 1975.

Habit and sizes of cap, gills, and stem are the same as in *P. prona* (long stems in tall grass!). Cap dull brown, greyish brown (between the conspicuously grey colour in *P. prona* f. *cana* and the distinctly brown, in early stages even chocolate brown, colour in *P. prona* f. *prona*).

The hygrophanous caps dry out without showing pink. In the early stages the gills are fairly brown, particularly near the base, later they are distinctly browner than the purely grey gills of *P. prona* f. *cana*, sometimes even quite brown; their white edge is not underlined with red. Veil is, according to Romagnesi, abundant in primordia (according to Lange specimens in bud sparingly set with very fugacious fibrils), but in our own two mature collections it was absent. The figures for the mean values of the spore sizes in our six collections (11.5–14.6 x 6.4–7.4  $\mu\text{m}$ ) fully correspond with those recently (1975: 215) given by Romagnesi (11.5–14.7 x 6.7–7.5  $\mu\text{m}$ ). In five of these six collections the figures for the mean values varied very little (14.2–14.6 x 7.2–7.8  $\mu\text{m}$ ) while in the 6th the mean values were smaller, 11.5 x 6.4  $\mu\text{m}$ . The pleurocystidia (40–70 x 10–15  $\mu\text{m}$ ) and pleurocystidioid cheilocystidia were of the 'prona-type' (ventricose-pedicellate and fairly long-necked). In one collection the basidia were both 4- and 2-spored. In all collections the hymenophoral trama was distinctly be it not much more pigmented than in *P. prona* f. *cana*.

HABITAT & DISTRIBUTION. — The same habitat as *P. prona*. Apr.–Aug. Rare in the Netherlands, reported from France and the British Isles.

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S: prov. Overijssel, Weerselo, estate 'Roderfeld', 10 Oct. 1974; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 30 April 1961 and 4 Aug. 1976; prov. Noord-Brabant, Dorst, 25 April 1965. — F R A N C E: dpt. Yonne, Sens, Apr. 1940 (herb. Romagn. D 223, type). — S W I T Z E R L A N D, Kant. Neuchâtel, Bôle, 28 June 1961 (L).

#### var. *prona* f. *orbitarum* (Romagn.) Kits van Wav.

*Drosophila orbitarum* Romagn. *in* Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella prona* f. *orbitarum* (Romagn.) Kits van Wav. *in* the present work (p. 281). 1985.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 356. 1953; Romagn. *in* Bull. trimest. Soc. mycol. Fr. 91: 203. 1975; Rick., Blätterp.: 265, pl. 68. fig. 5. 1915 (as *P. atomata*).

The chief character of this form of *Psathyrella prona* is that the drying or dry caps under appropriate circumstances show striking pink, reddish or vinaceous colours.

On 31 Oct. 1969 we found a group of some 30 specimens, the caps of most of which at one time or another showing conspicuous pink and vinaceous colours. Slightly smaller specimens of a small group growing only at a short distance, however, never showed a trace of pink. The former group had to be identified as *P. prona* f. *orbitarum*, the latter as actually *P. prona* f. *prona*.

In March 1972 some 20 specimens were collected from decaying straw in a hothouse. Because of their reddish-vinaceous colours they were identified as *P. prona* f. *orbitarum*. Three weeks later from the very same place young specimens were collected of which only some showed a trace of pink as often present in *P. prona* f. *prona*.

In token of the complexity of the interpretation of *P. prona* f. *orbitarum* and its very close relationship if not full identity with *P. prona* f. *prona* (the former described by Romagnesi (1975: 203) as a species in its own right) Romagnesi (in

litt.) stated in 1973 that he shared our doubts about the validity of the differences between *P. prona* and *P. orbitarum* and in 1980 he agreed to assimilate both taxa. According to Romagnesi (in litt.) the description of *P. prona* in the 'Flore analytique' had been based on two collections, which in biological tests carried out by Quintanilha in 1944 had been found intersterile with three collections which had been identified as *P. orbitarum*. In the 'Flore analytique' the three carpophores depicted on Lange's plate 155 C as *P. prona* are quoted as representing *P. orbitarum*, while the three carpophores of plate 155 C<sup>1</sup>, also called *P. prona* by J. Lange, although looking exactly like those of plate 155 C, are not quoted to represent either *P. prona* or *P. orbitarum*. Dennis & al. (1960: 147) interpreted both plates as to represent *P. orbitarum*. In our previous paper (1972: 41) we proposed to regard both taxa as conspecific.

The spores sizes of our five 4-spored collections of *P. prona* f. *orbitarum* were about the same as those of *P. prona*, mean values being 11.4–13.7 x 5.5–7.3 µm. Of the two 2-spored collections these values were 14.5–14.9 x 7.1–7.3 µm and for our one 4- and 2-spored collection 14.9 x 7.3 µm.

**HABITAT & DISTRIBUTION.** — Habitat as of *P. prona*. March–Oct. Rare in the Netherlands. Reported from France, but not from the British Isles.

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Utrecht: Haarzuilens, estate 'De Haar', 31 Oct. 1969; Vleuten, 31 March 1972; prov. Noord-Holland: 's-Graveland, 8 April 1970; Amsterdam, Amsterdam Wood, 19 July 1962 (4- + 2-spored form), 27 July 1960 (2-spored form). — **FRANCE:** dpt. Yonne, Sens, Oct. 1939 (herb. Romagn. D 218); Paris, 30 July 1970 (herb. Romagn. 1079). — **SWITZERLAND,** Kant. Vaud, St. Cergue, 23 Sept. 1966 (2-spored form).

**var. *utriformis* Kits van Wav. — Figs. 80–84**

*Psathyrella vinosofulva* P. D. Orton in Trans Brit. mycol. Soc. 43: 378. 1960.

*Drosophila calcarea* Romagn. in Bull. trimest. Soc. mycol. Fr. 82: 539. 1966. — *Psathyrella calcarea* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 4. Aufl.: 269. 1978.

*Psathyrella prona* var. *utriformis* Kits van Wav. in Persoonia 7: 43. 1972.

**DESCRIPTIONS & ILLUSTRATIONS.** — P. D. Orton, l.c. (as *Psathyrella vinosofulva*); Romagn. l.c. & in Bull. trimest. Soc. mycol. Fr. 91: 216. 1975 (as *Drosophila calcarea*); Kits van Wav., l.c.

Cap 7.5–25 mm, hemispherical, paraboloid, convex-paraboloid, obtuse-conical, sometimes subumbonate, little expanding, striate up to 1/2–2/3 from margin, at first dark reddish brown (Mu. 10 R 3/4), chocolate brown, very soon losing the reddish colour, becoming brown or dark greyish brown (Mu. 10 YR 5/2, 5/3), hygrophanous, drying out to pale brown, pale ochraceous cream, alutaceous (Mu. 10 YR 8/3, 8/4, 7/4), usually (but not always) mixed with a striking pink to vinaceous red colour, with only the apex very pale brown or yellowish brown, usually distinctly micaceous and rugulose to rugose. Veil rudimentary, forming fugacious, minute fibrils on cap near margin and on stem, but usually absent. Gills 2–5 mm broad, rather distant (16–20 large gills), ventricose, broadly adnate, sometimes protruding under margin of cap, at first grey (Mu. 10 YR 4/1; 5 YR 5/1) with a brown hue (particularly at base), finally dark purple greyish brown to tobacco brown; edge white, usually distinctly underlined with red. Stem 20–60(–90) x 1–3 mm, straight, sometimes flexuous, cylindrical but often slightly thickening towards base, in upper part white, lower down isabelline to pale brown near base, hollow, smooth; base sometimes with small bulb, usually strigose with white hairs, not rooting; apex pruinose. Flesh of cap in centre ± 1 mm thick, brown to greyish brown, of stem whitish in upper part, pale brown lower down

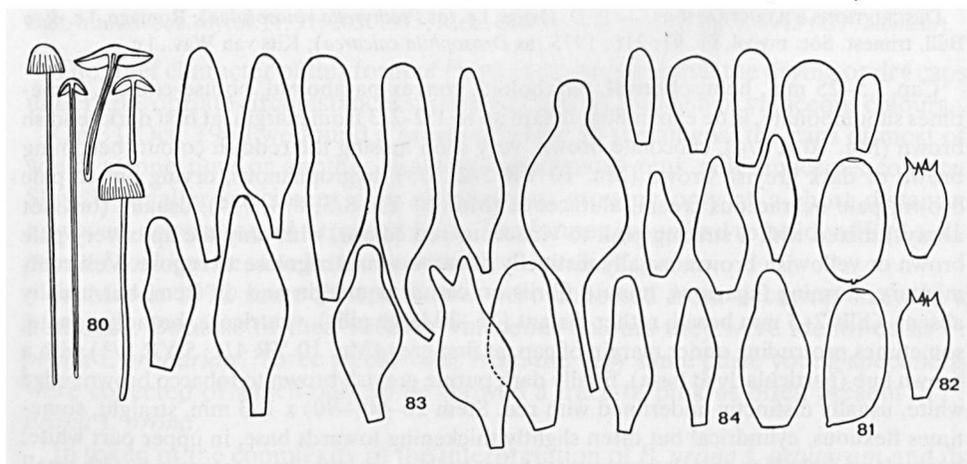
with sometimes a red line in apex alongside gills. Trama of 'washed' gill usually very pale greyish brown in basal part, for the rest (or even everywhere)  $\pm$  colourless. Spore print blackish.

Spores (9-)11.5-14.5(-15.5)  $\times$  5.5-8  $\mu$ m (mean values 11.4-14  $\times$  5.9-8  $\mu$ m: 10 collections), ellipsoid, but adaxially flattened, in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/4, 4/3), in KOH 5% dark sordid brown (Mu.  $\pm$  7.5 YR 3/2), opaque to subopaque, with large germ pore ( $\pm$  2  $\mu$ m) and small hilar appendix. Basidia 19-27.5(-30)  $\times$  11-14  $\mu$ m, spheropedunculate, 4-spored, rarely 4- and 2-spored. Pleurocystidia (35-)40-65(-77.5)  $\times$  11-20  $\mu$ m, scarce to numerous, utriform with very obtuse apex, thin-walled, colourless. Marginal cells: versiform, utriform, fusoid, sublageniform cheilocystidia, 20-50(-60)  $\times$  9-15(-20)  $\mu$ m, numerous and rather crowded, intermixed with many inconspicuous small spheropedunculate and clavate cells, 12.5-20  $\times$  7.5-15  $\mu$ m. All cells colourless, thin-walled. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. in basal part yellowish brown to brown from membranous pigment, for the rest varying from practically colourless to distinctly brown, with yellowish hyphal septa, without encrustations. Pileipellis a 2-4 cells deep layer of subglobose colourless cells, 24-48  $\mu$ m diam.

HABITAT & DISTRIBUTION. — In grass, sometimes against pieces of wood, also in cart-tracks; most collections found on calcareous soil. Apr.-Nov. Rare in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Delden, Bornscheweg, 9 Aug. 1974; prov. Utrecht, Amerongen, estate 'Kleidyk', 19 Sept. 1955; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 16 Aug. 1962, 30 July 1974; prov. Zuid-Holland, Leiden, estate 'Nieuwerood', 19 Sept. 1960; prov. Limburg, Echt, 6 Oct. 1962. — FRANCE: dpt. Oise, Pontpoint, Forêt d'Halatte, forêtière des Falaises, 22 June 1968 (herb. Romagn. 991); dpt. Var, Salernes, 28 Sept. 1960; dpt. Ain, Simandre, 21 Aug. 1957. — BRITISH ISLES, Devonshire, Downland, Landslip, Rousdon, 29 Nov. 1958 (K).

It is, we feel warranted to assemble under one denominator (pending the results of future observations), what may seem to be a medley of the nine collections mentioned above and name them *Psathyrella prona* var. *utriformis*. All specimens of these collections are characterized by the presence of utriform pleurocystidia —



Figs. 80-84. *Psathyrella prona* var. *utriformis*. — 80. Carpophores ( $\times$  0.5). — 81. Spores. — 82. Basidia. — 83. Pleurocystidiogram. — 84. Cheilocystidiogram.

unique in the non-coprophilous species of section *Atomatae* — and a strikingly uniform pattern of the cellular lining of the gill edge. In other respects, regarded by us as being of subordinate importance, the collections mutually differed (see below). The variety comprises *Drosophila calcarea* Romagn. (type examined) and *P. vinosofulva* P. D. Orton (type examined), which we venture to synonymise. Seven collections found either in the Netherlands or (by H. S. C. Huijsman) in France represent the same variety.

Romagnesi (1966: 539, 1975a: 216, and 1981 in litt.) is convinced that his *Drosophila calcarea* is a species in its own right and quite different from *P. vinosofulva* because of its extreme sub-xerophilous habitat (dry sunny slopes of calcareous grassland mixed with moss), its vernal appearance, and the total absence of red or pink in the colour of the mature cap. As for the habitat, among the 7 other collections 4 were found on calcareous soil (only one of these on a grass slope, the other three in woods) and so was *P. vinosofulva* (be it in a *Fraxinus* wood). Except for the vernal collections of *Drosophila calcarea* (April-June) all other collections were found in July-September and *P. vinosofulva* even in November in the mild climate of Devonshire.

As for the absence of red colours on the cap, in his first description Romagnesi (1966: 539) called the colour of the moist cap dark chocolate, of the dry cap without the slightest trace of pink. Later, however, Romagnesi (1975a: 216) used the designation 'miel fauvâtre pale' for the moist and 'ocre fauvâtre clair' for the dry cap and in 1981 (in litt.) he stated that only in the very young stages (up to immediately postprimordial) the colour of the caps was chocolate or 'fauvâtre', fading very quickly.

Previously we pointed out that the appearance of pink and vinaceous colours in the caps in species in which they usually occur (e.g. *P. gracilis*, *P. microrrhiza*, *P. prona*) depends on the speed by which the caps dry. A great speed will not bring out these colours and the speed is bound to be great in spring when the hot sun shines on and dries out the grass slopes in France.

In 5 out of our 7 collections a vinaceous or pink colour on the dry cap was seen. For Orton the conspicuous 'vermilion tinge' and 'wine-reddish' colours of the dry cap obviously were the most striking character, hence the name. His description of *P. vinosofulva* and the characters of its type material, which we examined, sufficiently correspond with our *P. prona* var. *utriformis* and not with *P. bipellis* (a possibility suggested by Romagnesi in litt. and rejected by Orton himself).

*Psathyrella prona* var. *utriformis* is a typical member of section *Atomatae*. As in other members of that section we came across both 4- and 2-spored basidia in our 1962 collection; in the type specimen of *P. vinosofulva* we found a 1-spored basidium. Spore sizes — as usual — varied to some extent and were largest in the 1962 collection (4- and 2-spored basidia).

On a gill of one specimen of *Drosophila calcarea*, of the exsiccatum of *P. vinosofulva* and of one of our own collections we found surprisingly few pleurocystidia (once even only one).

For both *Drosophila calcarea* and *P. vinosofulva* the gill edge was described as white and indeed, on examination we found them not underlined with red as also in

one of our other seven collections (in another the edge had been described as white but a scrutinous examination revealed red underlining of small parts of some gills). In 6 out of our 7 collections therefore there was red underlining. Both Romagnesi and Orton described the gills as ventricose (unusual in section *Atomatae*) and so they were in all our 7 collections.

According to Romagnesi (1975a: 217, 1980 in litt.) intersterility was always found between *Drosophila calcarea* and collections from the *prona*- and *albidula* group of section *Atomatae*. Intersterility tests between *Drosophila calcarea* and *P. vinosofulva* and other collections belonging to section *Atomatae* and having utriform pleurocystidia but not strictly answering Romagnesi's criteria and conception of *D. calcarea*, have not been carried out.

### *Psathyrella infida* Quél.

*Psathyrella infida* Quél. in Bull. Soc. bot. Fr. 23: 329. 1876, — *Agaricus infidus* (Quél.) Cooke & Quél., Clav. syn. Hymenomyc. eur.: 102. 1878 — *Drosophila infida* (Quél.) Quél., Fl. mycol.: 61. 1888. — *Hypholoma infidum* (Quél.) Big. & Guill., Fl. Champ. sup. 2: 281. 1913. — *Coprinarius pronus* var. *infidus* (Quél.) Quél., Enchir. Fung.: 120. 1886.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 365. 1953; Einhelinger in Ber. bayer. bot. Ges. 44: 38. 1973.

Cap 6–17 mm, at first campanulate-conical, distinctly umbonate, later campanulate-convex, not entirely plane and not acute conical but more or less umbonate, at margin obtusely deflexed but not incurved, later coarsely grooved, slightly wavy, very dark brown ochre with very faint reddish hue, hygrophanous, fading to brownish cream, slightly more ochre at umbo with an incarnate hue at margin, when moist fairly dull, when dry vaguely to distinctly rugulose, scarcely micaceous. Veil enveloping entire primordium, later as white fibrils, scattered in marginal area of cap and remaining on stem. Gills 2.5–4 mm broad, at maturity relatively distant (13–18 large gills), broadly adnate, slightly uncinatate, more or less segmentiform, subtriangular, brown, later tobacco brown; edge white, slightly underlined with red. Stem 20–40 x 0.7–2 mm, subflexuous, cylindrical, with small bulb at base, sometimes slightly attenuated below bulb, hollow, relatively distinctly coloured, dark reddish brown but without a reddish hue as in *P. picta*, fading at maturity and rapidly becoming hyalin or pale yellow at apex, remaining with a reddish hue lower down, in the beginning striate with silvery fibrils, later smooth, particularly towards apex, finally polished all over except base with white adpressed mycelium. Flesh in centre fairly thick, reddish brown when moist, pale brown when dry. Trama of 'washed' gill very distinctly brown, particularly in basal half. Spore print not recorded.

Spores 11.5–12.5 x 6.5(–7)  $\mu\text{m}$  (mean values 12.1 x 6.5  $\mu\text{m}$ : 1 collection), ellipsoid but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3, 4/4), in KOH 5% sordid brown (Mu. 10 YR 3/3, 3/4), opaque to subopaque, with distinct germ pore ( $\pm 1.8 \mu\text{m}$ ) and small hilar appendix. Basidia 17.5–22.5 x 11–12.5  $\mu\text{m}$ , spheropedunculate, 4-spored (one 1-spored basidium seen). Pleurocystidia 47.5–70 x 12.5–15  $\mu\text{m}$ , scarce, sublageniform, subfusiform with short or fairly long subcylindrical neck passing gradually into cell body ('*prona*-type'), with subacute apex, thin-walled, colourless. Marginal cells (according to Romagnesi): predominantly claviform cells, 23–35 x 11–15  $\mu\text{m}$ . Hymenophoral trama (according to Romagnesi) very distinctly pigmented (but less than in *P. picta*); hyphae 7.5–22  $\mu\text{m}$ . Pileipellis (acc. to Romagnesi) composed of globose, subglobose or vesiculose claviform cells 20–40 x 17–36  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — Damp cart-tracks in deciduous woods, spring and summer, rare in France, not recorded from the Netherlands and the British Isles.

**COLLECTIONS EXAMINED.** — FRANCE, Luzarches (V.-d'O), 10 May 1945 (herb. Romagn. D 451).

**NOTE:** The above description of the macroscopical characters, the habitat and a few microscopical characters is a translation of a full description, received from Romagnesi. The description of most microscopical characters is based on our own examination of an exsiccatum received from Romagnesi.

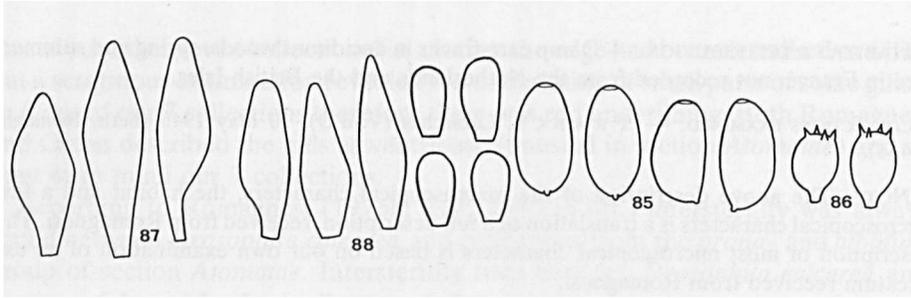
On the authority of Romagnesi, we inserted *P. infida* in the present study as a species in its own right although in a previous paper (1972: 39), to which the reader is referred, we argued that we regarded *P. infida* identical with *P. prona*. At our request Romagnesi (in litt.) listed the following characters by which *P. infida* is believed to differ from *P. prona*: (i) gills more distant, thicker and more broadly adnate, (with Quélet: 'triangulaires'); (ii) cap less hygrophanous; (iii) veil more strongly developed (with Quélet: 'villeux, floconeux'). Kühner & Romagnesi (1953: 356) described (in bold face) the gills as tobacco brown and distant. But in three of our own collections of *P. prona* the gills in some specimens also were distant (14–18 large gills). We look upon the thickness of the gills as a rather feeble character in this group (Romagnesi did not even mention it in his description) and in *P. prona* the gills are also broadly adnate, occasionally even triangular (Fries: 'subtriangularis'). Differences in degree of being hygrophanous seem difficult to evaluate in this group. The velar development in most species of *Psathyrella* — as Romagnesi always and rightly emphasizes — is very capricious and in his own description of *P. infida* the velar development is by no means portrayed as very conspicuous. So we see no significant differences between *P. infida* and *P. prona* other than differences in degree, but we gladly concede never having seen fresh specimens and Romagnesi assured us that in the field the difference between the two species is quite obvious and that descriptions are in a way incapable of making these differences clear. According to Romagnesi (in litt.) *P. infida* turned out to be intersterile with *P. prona* and its forma *orbitarum*.

### ***Psathyrella palustris* (Romagn.) Mos. — Figs. 85–88**

*Drosophila albidula* var. *palustris* Romagn. in Bull. mens. Soc. linn. Lyon 21: 151. 1952. — *Drosophila palustris* (Romagn.) Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 211. 1975. — *Psathyrella palustris* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 4. Aufl.: 269. 1978.

**DESCRIPTION & ILLUSTRATIONS.** — Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 211, figs. 51, 52. 1975.

Cap 3.5–10 mm, at first glandiform, next campanulate to convex, almost obtuse or slightly umbonate, sulcate when drying, sometimes lobed, when moist dark ochre brownish, hygrophanous, drying to sordid cream-coloured or brownish, at centre cream-ochre or reddish, rugulose. Veil scanty, white, consisting of only very fugacious fibrils on cap. Gills rather distant, slightly ventricose, broadly adnate, grey, but slightly brownish, finally brownish-greyish or blackish; edge white, not underlined with red. Stem 20–32 x 0.7–2 mm, cylindrical, a little flexuous, slightly tickened or subbulbous at base, narrowly fistulose, whitish or



Figs. 85–88. *Psathyrella palustris*. — 85. Spores. — 86. Basidia. — 87. Pleurocystidiogram. — 88. Cheilocystidiogram.

brownish, usually a little more coloured lower down, striate with white silky fibrils, satiny, shining. Trama of 'washed' gill pale brown, near edge  $\pm$  colourless. Spore print purplish black.

Spores 11–11.5(–12.5)  $\times$  (5.5–)6–6.5  $\mu\text{m}$  (mean values 11.5  $\times$  6.1  $\mu\text{m}$ ; 1 collection), ellipsoid, but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/3, 4/4), in KOH 5% dark sordid brown (Mu. 10 YR 3/3), with large germ pore ( $\pm$  1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 15–17.5  $\times$  11–12  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia 40–52.5  $\times$  10–15  $\mu\text{m}$ , fusiform-pedicellate with subacute apex, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 30–40  $\times$  10–16  $\mu\text{m}$ , numerous, with subacute to obtuse apex; spheropedunculate cells 15–20  $\times$  7.5–10  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brown with many yellowish hyphal septa and a small number of minute encrustations. Pileipellis cellular; cells 14–25  $\mu\text{m}$  diam. (acc. to Romagnesi).

**HABITAT & DISTRIBUTION.** — In muddy ditch, some fruit-bodies adherent to a small root. June–Aug. Not recorded from the Netherlands or the British Isles, very rare in France.

**COLLECTION EXAMINED.** — F R A N C E, dpt. Oise, Maysel, 1 June 1968 (herb. Romagn. 989).

The description of the macroscopical characters and the habitat is a translation of Romagnesi's recent description (1975a: 211), the description of the microscopical characters is based on our own examination of an exsiccatum, received from Romagnesi.

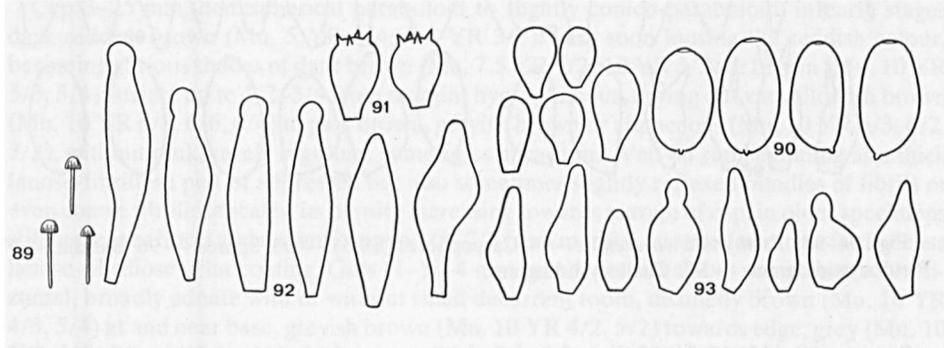
### ***Psathyrella romagnesii* Kits van Wav. — Figs. 89–93**

*Psathyrella romagnesii* Kits van Wav. in *Persoonia* 7: 44. 1972.

**DESCRIPTIONS & ILLUSTRATIONS.** — Kits van Wav., l.c.; Arnolds in *Biblioth. mycol.* 90: 436, pl. 8d. 1982.

Cap 3–8 mm, hemispherical to hemispherical-paraboloid, striate, up to 1/2–2/3 from margin, at first dark chocolate brown, very soon brown to greyish brown (Mu. 10 YR 4/3, 6/3, 6/2), hygrophanous, drying out to very pale alutaceous without pink, smooth, strongly micaceous, not rugose. Veil poorly developed but leaving distinct, scanty, very small white fibrils near margin of cap, none on stem. Gills 1–2 mm broad, distant to subdistant (9–14 large gills), rounded near margin of cap, then straight and ascending, very broadly adnate with small decurrent tooth, greyish brown (Mu. 10 YR 5/2), to purplish brown (Mu. 7.5 YR 5/2). Stem 8–15(–22)  $\times$  0.25–1 mm, cylindrical, straight, hollow, not rooting, white if upper

part, lower down pale brown or pinkish brown, pruinose at apex, with distinctly bulbous base, strigose with very small white hairs. Flesh of cap very thin, colour not recorded. Trama of 'washed' gill in basal 1/4–1/3 distinctly brown (slightly paler than Mu. 10 YR 6/3), for the rest very pale brown (Mu. 10 YR 7/3, 7/2) and almost colourless near edge. Spore print blackish.



Figs. 89–93. *Psathyrella romagnesii*. — 89. Carpophores (x 0.5). — 90. Spores. — 91. Basidia. — 92. Pleurocystidiogram. — 93. Cheilocystidiogram.

Spores (10.5–)11–12.5 x (5.5–)6–7  $\mu\text{m}$  (mean values 10.7–11.9 x 5.5–6.4  $\mu\text{m}$ : 5 collections), ellipsoid, but adaxially flattened, in water red (Mu. 2.5 YR 4/6), in  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 5 YR 4/6), in KOH 5% dark brown (Mu. 5 YR 3/4), opaque to subopaque, with large germ pore ( $\pm 1.8 \mu\text{m}$ ) and small hilar appendix. Basidia 16–24 x 9.6–12  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia 32.5–55 x 10–17.5  $\mu\text{m}$ , scattered to fairly numerous, fusoid-capitate(-subcapitate) to subutriform, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 25–40 x 7.5–12.5  $\mu\text{m}$ , fairly crowded, intermixed with abundant small spheropedunculate and clavate cells, 12.5–25 x 7.5–15  $\mu\text{m}$ , all cells thin-walled. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. in basal 1/3–2/3 part pale but distinctly brown with many yellow hyphal septa and few encrustations.

**HABITAT & DISTRIBUTION.** — On stems of decaying grass or hay. Rare in the Netherlands. Sept.-Oct. Not recorded from France and the British Isles.

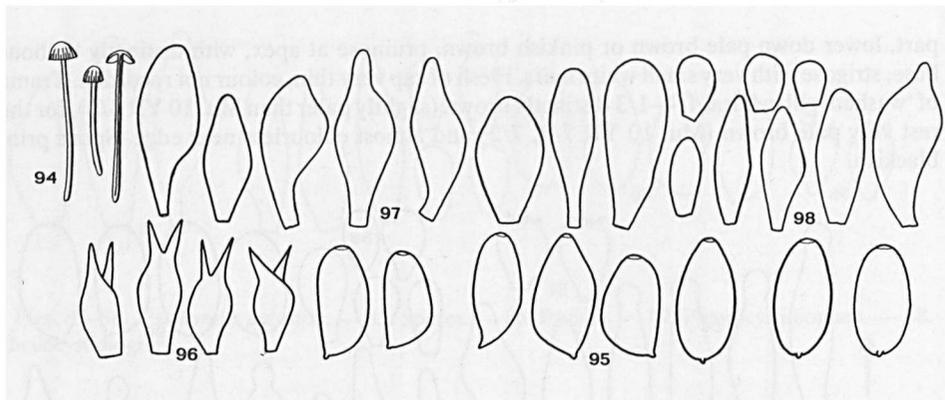
**COLLECTIONS EXAMINED.** — THE NETHERLANDS; prov. Drente: Beilen, 18 Sept. 1974; Wijster, 27 Oct. 1976; prov. Overijssel, Staphorst, 10 Sept. 1976; prov. Limburg: Bommerig, Elzeter Bosch, 3 Oct. 1964 (type); Overasselt, farm 'Boonenkamp', 12 Oct. 1964.

Because of its very small size, habit, shape of cystidia and habitat this species is not regarded as belonging to the *P. prona*-group.

### *Psathyrella waverenii* Arnolds — Figs. 94–98

*Psathyrella waverenii* Arnolds in *Biblioth. mycol.* 90: 439. 1982.

Cap 3–4 mm, hemispherical to obtusely conical, when moist rather dark brown (Mu. 7.5 YR 4/2, 4/4), paler towards margin, striate up to centre, hygrophanous, drying out to pale ochre brown. Veil not seen. Gills straight, ascending, rounded at margin, fairly pale to dark purplish brown (Mu. 10 R 5/3, 3/1). Stem 12–20 x 0.3–0.5 mm, cylindrical, white, pruinose at apex, glabrous elsewhere. Trama of 'washed' gill distinctly brown (Mu.  $\pm$  10 YR 6/3–6/4), darkest at base.



Figs. 94–98. *Psathyrella waverenii*. — 94. Carpophores (x 0.5). — 95. Spores. — 96. Basidia. — 97. Pleurocystidiogram. — 98. Cheilocystidiogram.

Spores (10–)11–11.5(–12.5) x 5.5–6.5  $\mu\text{m}$  (mean values 11 x 5.9  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, but many spores aberrant, limoniform, deformed, with adaxial face strongly indented above hilar appendix, etc., in  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 7.5 YR 4/4, 5/4) or brown with reddish hue (Mu. 5 YR 4/4, 4/6), almost always with one large oil drop, sometimes with two of these drops or the large drop accompanied by a number of small droplets, not staining in  $\text{NH}_4\text{OH}$  10%; germ pore usually distinct ( $\pm 1 \mu\text{m}$ ) but sometimes indistinct. Basidia 17.5–22.5 x 9–11(–12.5), spheropedunculate, provided with two, very seldom three very large sterigmata and these at their base 2.5–3  $\mu\text{m}$  broad, 7.5–11  $\mu\text{m}$  long, and with sharply pointed apex. Pleurocystidia 30–40 x 10–17.5  $\mu\text{m}$ , moderately numerous, versiform, fusoid-pedicellate with or without short subcylindrical neck, clavate, utriform, sublageniform, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 27.5–40 x 7.5–15  $\mu\text{m}$ , scattered, intermixed with many small spheropedunculate cells, 10–17.5 x 7.5–10  $\mu\text{m}$ , and many basidia; all cells thin-walled, colourless. Hymenophoral trama sub micr. distinctly brown from membranous pigment with many yellow hyphal septa and, particularly at and near base, many small encrustations. Remnants of what may have been red underlining of the gill edge.

HABITAT & DISTRIBUTION. — On cow dung in heavily fertilized haymeadow (*Poa-Lolietum*). Only known from type locality.

COLLECTION EXAMINED. — T H E N E T H E R L A N D S, prov. Drente, Anderen, nature reserve 'Eexterveld', 28 Oct. 1976 (type).

We never saw fresh material of this — because of its minute size, 2-spored basidia and extremely long sterigmata — unique species. The macroscopical description is taken from the author's notes, the microscopical description is based on our own examination of the type material.

### *Psathyrella hirta* Peck — Figs. 99–103

*Psathyrella hirta* Peck in Rep. N.Y. State Mus. 50: 107. 1897.

*Agaricus pennatus* var. *fimicola* G. Bernard, Champ. Rochelle: 136, pl. 36 fig. 2. 1882.

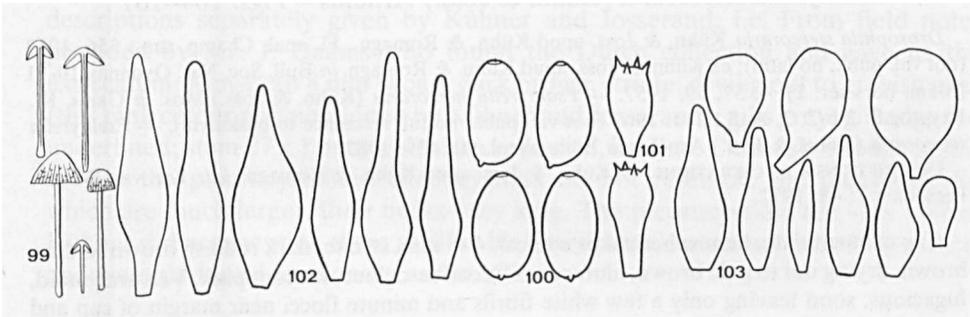
*Psathyra semivestita* var. *coprobia* J. Lange in Dansk bot. Ark 9(1): 7. 1936 (not val. publ., no latin). — *Psathyra coprobia* (J. Lange) ex J. Lange, Fl. agar. dän. 5: VII. 1940. — *Psathyrella coprobia* (J.

Lange ex J. Lange) A. H. Smith, Contr. Univ. Mich. Herb. 5: 44. 1941. — *Drosophila coprobia* (J. Lange ex J. Lange) Kühn. & Romagn., Fl. anal. Champ. sup.: 355. 1953.

MISAPPLIED. — *Psathyra semivestita* sensu C. H. Kauffm., Agaric. Mich.: 271. 1918.

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 93, pl. 152 F. 1939 (as *Psathyra coprobia*); Kühn. & Romagn., l.c.; Kits van Wav. in Persoonia 7: 45. 1972 (as *Psathyrella coprobia*).

Cap 3–25 mm, hemispherical paraboloid to slightly conico-paraboloid, in early stages dark reddish brown (Mu. 5 YR 3/4; 7.5 YR 3/2), very soon loosing the reddish colour, becoming various shades of dark brown (Mu. 7.5 YR 4/2; 10 YR 3/3) or brown (Mu. 10 YR 5/3, 5/4); striate up to 1/2–3/4 from margin; hygrophanous, drying out via yellowish brown (Mu. 10 YR 6/8, 6/6, 6/4) to pale brown, greyish brown or alutaceous (Mu. 10 YR 6/3, 6/2, 7/3), without pink, rarely rugulose, sometimes micaceous. Veil on cap beginning as a thick lanose-fibrillose pelt of adpressed but also sometimes slightly reflexed bundles of fibrils or even coarse fibrillose scales, its density increasing towards margin of cap, in older specimens still present as flocci and networks up to 1/3–2/3 from margin, on stem forming a fairly dense lanose-fibrillose velar coating. Gills (1–)2–4 mm broad, ascending but sometimes subhorizontal, broadly adnate with or without small decurrent tooth, distinctly brown (Mu. 10 YR 4/3, 5/4) at and near base, greyish brown (Mu. 10 YR 4/2, 5/2) towards edge, grey (Mu. 10 YR 6/1, 5/1, 4/1) at the white edge, which is not red underlined. Stem (15–)25–50 x



Figs. 99–103. *Psathyrella hirta*. — 99. Carpophores (x 0.5). — 100. Spores. — 101. Basidia. — 102. Pleurocystidiogram. — 103. Cheilocystidiogram.

(0.5–)1–2 mm, cylindrical, straight, normally with distinct small bulb at base or gradually thickening at base, not rooting, hollow, whitish to very pale brown, pruinose at apex. Flesh of cap 0.75–1.5 mm thick in centre, dark grey-brown (Mu. 10 YR 3/2, 3/3), of stem whitish but very pale brown alongside cavity. Trama of 'washed' gill distinctly be it not very strongly brown, stronger at and near base or even in basal half. Spore print purplish black to black.

Spores (9–)10–12.5(–13.5) x (4.5–)5–7  $\mu$ m, (mean values 9.8–11.7 x 5.1–6.5  $\mu$ m: 11 collections), ellipsoid, but adaxially flattened, in water red (Mu. 2.5 YR 3/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 3/4), in KOH 5% dark brown (Mu. 5 YR 3/4), subopaque, with large germ pore (1.5–1.8  $\mu$ m) and small hilar appendix. Basidia 16–27.5 x 9.6–12.5  $\mu$ m, spheropedunculate, 4-spored. Pleurocystidia (20–)30–55(–60) x 10–17.5  $\mu$ m, fairly numerous, lageniform with neck usually rather long, tapering towards subacute apex and either more or less sharply delimited from or gradually broadening towards ventricose cell body. Marginal cells: pleurocystidioid cheilocystidia 25–25 x 7.5–15  $\mu$ m in variable numbers (sometimes locally crowded); spheropedunculate and clavate cells 12.5–30(–40) x 7.5–25  $\mu$ m, abundant, all cells thin-walled, colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. distinctly brown from membranal pigment, with yellowish hyphal septa and few

encrustations. Pileipellis a 2–3 cells deep layer of suglobose to slightly oblong, colourless cells 25–50  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — On (cow) horse dung. June–Oct. Rare in the Netherlands. Reported from France, common in British Isles (Scotland!).

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Denekamp, estate 'Singraven', 15 Oct. 1962; prov. Noord-Holland, Hilversum, 27 Oct. 1970; prov. Noord-Brabant, Etten & Leur, estate 'Haagsche Beemden', 6 June 1965. — BRITISH ISLES, Scotland: Braemar, estate 'Invercauld', 25 Aug. 1961; Kinloch Rannoch, estate 'Carmichael', 24 Aug. 1965 and estate 'Dunalastair', 14 Sept. 1966; Glenisla, estate 'Brewlands', 28 Aug. 1966; Tomich, 17 Oct. 1968; Glen Affric, 11 Sept. 1968; exsiccata obtained from M. Jurand, Edinburgh, dated 1967 and 1972.

In our earlier papers both A. H. Smith (1941: 74) and we (Kits van Waveren 1972: 45) overlooked the fact that Peck (1897: 107) had already given a full description of the above species, which in every respect agrees with all later descriptions in the literature under the specific epithet '*coprobia*'. Smith (1972: 270) examined Peck's type, gave a full description of it and rightly concluded that the epithet given by Peck has priority.

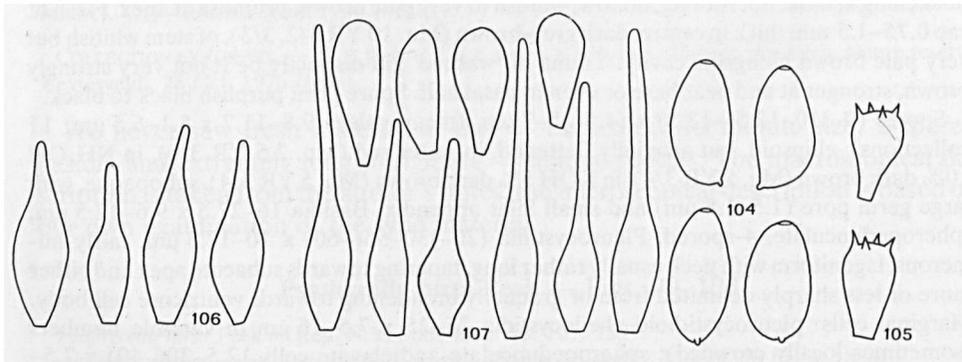
### *Psathyrella stercoraria* (Kühn. & Joss.) Arnolds – Figs. 104–107

*Drosophila stercoraria* Kühn. & Joss. apud Kühn. & Romagn., Fl. anal. Champ. sup.: 356. 1953 (not val. publ., no latin); ex Kühn. & Joss. apud Kühn. & Romagn. in Bull. Soc. Nat. Oyonnax 10-11 (Mém. hors sér. 2): 4, 57, 59. 1957. — *Psathyrella stercoraria* (Kühn. & Joss.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 215. 1967 (not val. publ., no full reference to basionym). — *Psathyrella stercoraria* (Kühn. & Joss.) Arnolds in Bibl. mycol. 90: 439. 1983.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Joss. apud Kühn. & Romagn., l.c.; Kits van Wav. in Persoonia 7: 48. 1972.

Cap campanulate, hemispherical or conical, 4–8 mm, striate, dark reddish brown to dirty brown, drying out to pale brown, alutaceous or coffee-colour, without pink. Veil arachnoid, fugacious, soon leaving only a few white fibrils and minute flocci near margin of cap and some fibrils on stem. Gills ascending, broadly adnate, dingy brown (Joss.: coffee-colour, then dirty grey); edge red underlined. Stem 15–25 x 1 mm (Joss.: 20–40 x 0.6 mm), cylindrical, flexuous, pale brown, with small bulb at base, covered with small white hairs, not rooting. Trama of 'washed' gill distinctly brown in basal 1/4.

Spores 11.5–12.5 x 6.5–7  $\mu\text{m}$  (mean values 12.4 x 6.9  $\mu\text{m}$ : 1 collection) ellipsoid, but



Figs. 104–107. *Psathyrella stercoraria*. — 104. Spores. — 105. Basidia. — 106. Pleurocystidiogram. — 107. Cheilocystidiogram.

adaxially flattened, in water red (Mu. 2.5 YR 3/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 3/4), in KOH 5% dark brown (Mu. 5 YR 3/3), not opaque, with large germ pore ( $\pm 1.8 \mu\text{m}$ ) and small hilar appendix. Basidia 20–22.5 x 12–13  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia 32.5–45 x 10–14  $\mu\text{m}$ , very scarce, fusoid with fairly short to moderately long cylindrical or subcylindrical narrow neck, passing abruptly or gradually into cell body, thin-walled, colourless. Marginal cells: lageniform pleurocystidia 45–75 x 10–12  $\mu\text{m}$ , scattered or in small or somewhat larger groups, mostly with remarkably long, narrow (2.5–4  $\mu\text{m}$ ) cylindrical neck, gradually passing into ventricose cell body, intermixed with a vast majority of spheropedunculate and clavate cells, 22.5–32.5 x 10–13  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. distinctly brown from membranal pigment, with yellowish hyphal septa and a few encrustations in basal half, much paler towards edge. Pileipellis cellular; cells 15–45  $\mu\text{m}$  diam., colourless.

**HABITAT & DISTRIBUTION.** — On dung. Very rare in the Netherlands. Recorded from France and from the British Isles (Watling & Jurand, 1971: 149).

**COLLECTION EXAMINED.** — THE NETHERLANDS, prov. Noord-Holland, 's-Graveland (hothouse), 8 April 1971.

The above description is abbreviated and compiled from the very elaborate descriptions separately given by Kühner and Josserand, l.c. From field notes provided by Mr. J. Daams who found the Dutch collection and gave us the exsiccatum: Moist cap 8 mm broad, dark brown, striate, drying out to greyish pink (this pink colour not mentioned by Kühner and Josserand); gills grey; gill edge red underlined; stem 27 x 1 mm, whitish to yellowish, hyaline. Curiously enough in this species the pleurocystidioid cheilocystidia do not resemble the pleurocystidia which are much larger, their necks very long. The pleurocystidia are very scarce, Kühner did not mention them at all in his description, Josserand called them rare, and we only found four on an entire gill.

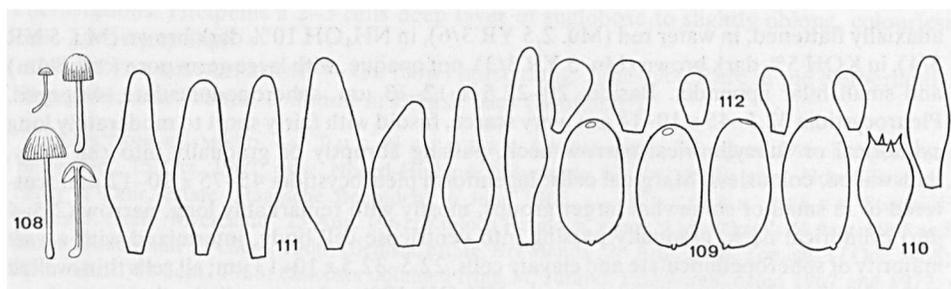
### ***Psathyrella coprophila* Watl. — Figs. 108–112**

*Psathyrella coprophila* Watl. apud Watl. & Jurand in Notes R. bot. Gdns Edinb. 31: 146. 1971.

*Psathyrella fimetaria* Watl. apud Watl. & Jurand in Notes R. bot. Gdns Edinb. 31: 143. 1971.

**DESCRIPTIONS & ILLUSTRATIONS.** — Watl., l.c.; Kits van Wav. in *Persoonia* 7: 49. 1972.

Cap 4–11(–18) mm, in both early and later stages hemispherical to paraboloid, sometimes slightly conical-paraboloid, in later stages striate up to 2/3 from margin, in early stages very dark red-brown (Mu. 5 YR 3/4) or very dark brown (Mu. 7.5 YR 3/2), dark brown (Mu. 7.5 YR 4/2, 4/4) only near margin, later dark reddish brown (Mu. 5 YR 3/4) only at centre and for the rest dark brown (Mu. 10 YR 3/3, 4/3), shining when moist, hygrophanous, drying out to pale brown (Mu. 10 YR 7/4, 6/4) without pink, neither micaceous nor rugulose. Veil white, on cap rather poorly developed but distinctly present, in very early stages its fibrils and bundles of fibrils reaching up to half way from margin, its fibrils fairly copious at margin itself, soon disappearing, in mature specimens leaving only isolated fibrils at margin, on stem sparse and scattered fibrils. Gills 2 mm broad, subdistant (16–20 large gills), rounded near margin of cap, then distinctly ascending, broadly adnate, in early stages distinctly brown (Mu. 10 YR 5/4) in narrow zone at base, towards edge greyish brown (Mu. 10 YR 5/2, 6/2) and near edge pale grey (Mu. 10 YR 6/1); later grey (Mu. 10 YR 5/1, 4/1) with narrow brown zone at base; edge white, not red underlined, minutely fimbriate. Stem 15–25 x 1–2 mm, cylindrical, at base gradually thickening but without bulb, hollow, not rooting, straight,



Figs. 108–112. *Psathyrella coprophila*. — 108. Carpophores (x 0.5). — 109. Spores. — 110. Basidia. — 111. Pleurocystidiogram. — 112. Cheilocystidiogram.

white but at extreme base isabelline or pale greyish brown; apex pruinose. Flesh of cap in centre 1 mm thick, dark red brown (Mu. 5 YR 3/3), very soon dark brown (Mu. 7.5 YR 3/2: 10 YR 3/3, 4/3), also in apex of stem alongside its cavity, in rest of stem white but pale brown alongside cavity. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens very pale brown, in very narrow zone along base distinctly ochre brown. Spore print purplish black.

Spores 11–13(–13.5) x 6.5–7  $\mu\text{m}$  (mean values 11.3–12.5 x 6.5–7  $\mu\text{m}$ : 5 collections), in face view ellipsoid (sometimes very slightly, in fact scarcely noticeable, elongate-hexagonal, best seen in upper 1/3), in profile ellipsoid, adaxially flattened, in water very dark red (Mu. 2.5 YR 3/4), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in  $\text{KOH}$  5% very dark brown (Mu. 7.5 YR 3/2), opaque to subopaque; germ pore distinctly eccentric on abaxial face and rather small (1–1.5  $\mu\text{m}$ ); small hilar appendix. Basidia 22.5–27.5 x 12–13  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia 30–47.5 x 10–17.5  $\mu\text{m}$ , scattered to fairly numerous, utriform, subutriform, subfusoid, sublageniform, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 25–45 x 7.5–17.5  $\mu\text{m}$ , scattered but sometimes locally rather crowded, intermixed with numerous (in some places even abundant) spheropedunculate cells, 12.5–22.5 x 6–10  $\mu\text{m}$ , all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale brown in basal half of gill from membranous pigment, with many yellowish hyphal septa and small encrustations at base, peripheral half practically colourless. Pileipellis cellular; cells 25–50  $\mu\text{m}$  diam. colourless.

**HABITAT & DISTRIBUTION.** — On horse dung. Aug.-Sept. Not reported from the Netherlands and France, known from the British Isles and Sweden.

**COLLECTIONS EXAMINED.** — **BRITISH ISLES:** Scotland: Kinloch Rannoch, estate 'Carmichael', 25 Aug. 1965; specimens from cultures No. 1 (Blackford Glen, Edinburgh, 1966), No. 51 (Perthshire, 1968), and No. 128 (from Sweden), received from Miss Jurand; Wales, Cardiff, St. Gwynno's Forest, 17 Sept. 1973.

The above description is based on our own copious collection, already found in 1965.

Simultaneously with *P. coprophila*, Watling (1971: 143) described yet another coprophilous species with subutriform cystidia, also belonging to section *Atomatae*: *P. fimetaria* Watling (1971: 149). Of the former species we had our own copious collection, already found in 1965 (but never published). Of the latter Watling very kindly sent us the type (Nr. 7355, 28 Aug. 1964) and 2 more collections (Nr. 7356, 25 Aug. 1964 and Nr. 7357, 26 Aug. 1964). We very carefully examined the microscopical features of all three collections and Watling's description (1971:

149), compared these with our collection of *P. coprophila* and concluded that the differences between the two taxa, as given by Watling (with whom we exchanged a lively correspondence about the matter) were not really valid and that therefore the two taxa were to be regarded as conspecific. We expounded the reasons for this conclusion at length in our earlier paper (1972: 50) to which the reader is referred.

### Section **Ammophila** (Morg.) Kits van Wav. emend.

*Deconica* [sect.] *Ammophilae* Morg. in J. Mycol. 13: 144. 1907 (illegitimate, no indication of rank). — *Psathyrella* sect. *Ammophilae* (Morg.) Kits van Wav.<sup>1</sup> in Persoonia 9: 200. 1977. — Type: *Deconica ammophila* (Dur. & Lév.) Morg.

Carpophores solitary in shifting coastal sand dunes, medium-sized; caps 15–40 mm, fleshy, not or scarcely striate, sordid brown, hygrophanous, without pink on drying; veil present but fugacious; gill edge not red underlined; stems not rooting but lower 1/2–1/3 sunk in the sand; basidia 4-spored; pleurocystidia scarce; hymenophoral trama pigmented.

Morgan's section is emended by excluding all the original species except the type.

### **Psathyrella ammophila** (Dur. & Lév.) P. D. Orton — Figs. 113–117

*Agaricus ammophilus* Dur. & Lév. in Expl. sc. Alg. 14: pl. 31 fig. 8. 1868. — *Psilocybe ammophila* (Dur. & Lév.) Gillet, Hyménom. Fr.: 587. 1878. — *Psathyra ammophila* (Dur. & Lév.) Quéf. in Bull. Soc. bot. Fr. 26: 52 ('1879') 1880. — *Drosophila fatua* var. *ammophila* (Dur. & Lév.) Quéf., Fl. mycol. Fr.: 62. 1888. — *Deconica ammophila* (Dur. & Lév.) Morgan in J. Mycol. 13: 145. 1907. — *Hypholoma ammophilum* (Dur. & Lév.) Big. & Guill., Fl. Champ. sup. Fr.: 345. 1909.

*Agaricus arenulinus* Peck in Rep. N.Y. State Mus. 30: 42. 1878. — *Psilocybe arenulina* (Peck) Sacc., Syll. Fung. 5: 1057. 1887. — *Psathyrella arenulina* (Peck) A. H. Smith in Mem. N.Y. bot. Gdn 24: 276. 1972.

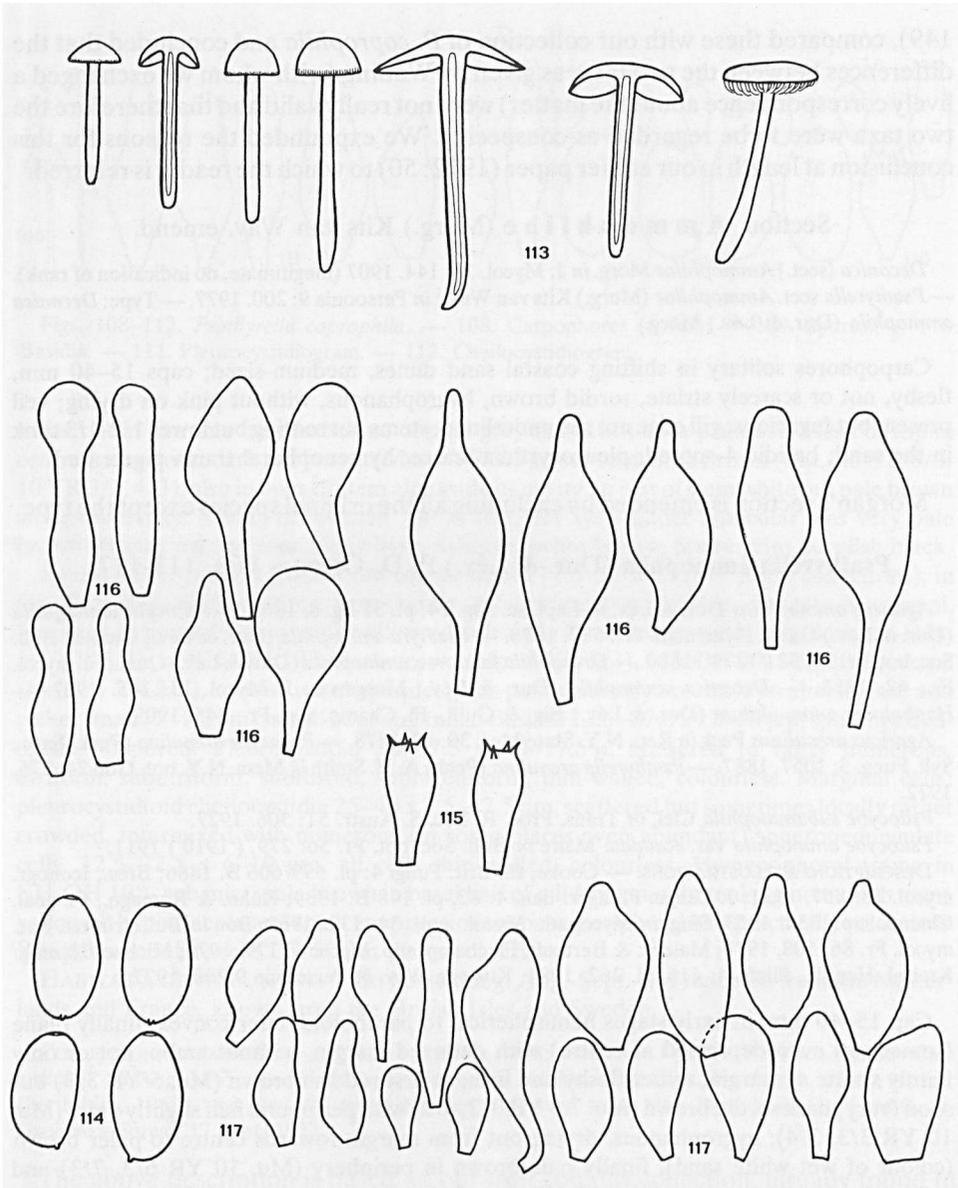
*Psilocybe subammophila* Clef. in Trans. Proc. R. Soc. S. Austr. 51: 306. 1927.

*Psilocybe ammophila* var. *ecaudata* Maire in Bull. Soc. bot. Fr. 56: 279. ('1910') 1911.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 599/606 B. 1886; Bres., Iconogr. mycol. 18: 857. 1931; J. Lange, Fl. agar. dan. 4: 82, pl. 148 B. 1939; Kühn. & Romagn., Fl. anal. Champ. sup.: 358. 1953; Sing. in Mycopath. Mycol. appl. 34: 132. 1968; Bon in Bull. trimest. Soc. mycol. Fr. 86: 108. 1970; Malenç. & Bertault, Fl. champ. sup. Maroc 1: 179. 1970; Michael/Hennig/Kreisel, Handb., Pilzfr. 4: 416, pl. 262. 1981; Kits van Wav. in Persoonia 9: 200. 1977.

Cap 15–40 mm, in early stages hemispherical to paraboloid, later convex, finally plane (sometimes even depressed at centre) with deflexed margin, without umbo, not or only faintly striate at margin, rather fleshy and firm, at first reddish brown (Mu. 5 YR 3/3) but soon (very) dark sordid brown (Mu. 7.5 YR 3/2, 4/2) with peripheral half slightly paler (Mu. 10 YR 3/3, 3/4), hygrophanous, drying out from margin towards centre to paler brown (colour of wet white sand), finally pale brown in periphery (Mu. 10 YR 6/3, 7/3) and yellowish brown at centre (Mu. 10 YR 7/4, 7/6) without pink, not micaceous, slightly rugulose. Veil in early stages forming a dense coating of minute white fibrils, isolated or in bundles or networks in a 2.5–5 mm broad marginal zone, rendering this zone whitish, rarely locally slightly appendiculate, fugacious, later leaving isolated fibrils or small networks near

<sup>1</sup> When we (Kits van Waveren, 1977: 200) published the new name *Psathyrella* sect. *Ammophilae*, we overlooked the existence of Morgan's infrageneric name with the same epithet and the same type. We correct this error in the present work. It should be stressed that the 'new combination' is not a true homonym of our earlier name because these two identical names have the same type.



Figs. 113–117. *Psathyrella ammophila*. — 113. Carpophores (x 0.5). — 114. Spores. — 115. Basidia. — 116. Pleurocystidiogram. — 117. Cheilocystidiogram.

margin and scattered fibrils on stem (in early stages sometimes a lanose velar layer on stem). Gills in early stages 2–3 mm broad, in peripheral half brownish grey (Mu. 10 YR 6/2), towards base slightly browner (Mu. 10 YR 5/2); later 4–6 mm broad, strongly ventricose and protruding under margin of cap, distinctly brown (10 YR 5/4) at base, greyer and more purplish-brownish grey (Mu. 5 YR 4/2, 3/2) towards the minutely fimbriate white edge. Stem 40–70 mm long, its upper 2/3–3/4 part 2–3 mm thick, cylindrical, hollow, sordid white

to pale yellowish brown, minutely fibrous-striate, with pruinose apex, its lower 1/4-1/3 part 3-5 mm thick, deeply sunk in the sand (not really rooting), seemingly clavate or fusiform as a result of adhering sand, with subobtuse end. Flesh of cap 2-4 mm thick in centre, dark brown (Mu. 10 YR 3/4), of stem whitish, taste and smell indistinctive. Trama of 'washed' gill, at base ochre brown (Mu. 7.5 YR 6/4, 6/6), similarly pigmented parallel tissue strands running from base up to  $\pm$  half-way edge, becoming paler towards edge. Spore print purplish black.

Spores (10-)11-13.5 x 6.5-7.5(-8)  $\mu\text{m}$  (mean values 10.8-12.6 x 6.6-7.4  $\mu\text{m}$ ; 10 collections), ellipsoid but adaxially flattened, in water dark reddish brown (Mu. 2.5 YR 3/4), in  $\text{NH}_4\text{OH}$  10% darker (Mu. 2.5 YR 3/2; 5 YR 3/2, 3/3), in  $\text{KOH}$  5% very dark greyish brown (Mu. 10 YR 3/2), opaque to subopaque, with subtruncate to truncate germ pore (1.5-2  $\mu\text{m}$ ) and fairly small hilar appendix. Basidia 22.5-37.5 x 10-12.5  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia (30-)40-70(-75) x (10-)12.5-22.5(-27.5)  $\mu\text{m}$ , normally very scarce and easily overlooked, versiform, subfusiform, ventricose-fusiform, ventricose-sublageniform, clavate, utriform, often with short or somewhat longer subcylindrical neck, sometimes distinctly pedicellate, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 25-55(-70) x 10-17.5(-20)  $\mu\text{m}$ , very few, rarely fairly numerous; spheropedunculate and clavate cells 20-37.5(-40) x 10-22.5(-30)  $\mu\text{m}$ , usually abundant and densely packed. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. sordid brownish at base, paler towards edge, with few yellowish hyphal septa and very few encrustations at base. Pileipellis a 2-4 cells deep layer of subglobose cells 20-48  $\mu\text{m}$  diam., colourless.

**HABITAT & DISTRIBUTION.** — Among or near grasses (particularly *Ammophila*) on shifting coastal foredunes. May-Oct. Common in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S**; prov. Friesland: isl. Schiermonnikoog, July 1956; isl. Ameland, 11 June 1958; isl. Terschelling, July 1955; prov. Noord-Holland, isl. Texel, 7 June 1965; prov. Zuid-Holland: Wassenaar, 10 Oct. 1965; isl. Voorne, Oostvoorne, 22 Oct. 1962; prov. Zeeland, isl. Zuid-Beveland, 29 April 1952. — **B R I T I S H I S L E S**: Devonshire, Minehead, 5 Sept. 1960; Lancashire, Ainsdale Sands near Formby, 7 Sept. 1965. — **F R A N C E**, Pas-de-Calais, Tardinghen, 15 Oct. 1972.

The above description is largely based on the very rich collection of some 20 specimens, including all stages, of 7 Sept. 1965. The gill edge of one young specimen from this collection was distinctly underlined with red. As for *P. arenulina*, Smith (1972: 276) based the assumed difference between this species and *P. ammophila* chiefly on the absence of pleurocystidia in *P. arenulina*. In five collections of *P. arenulina* sent to us by Smith we, however, found pleurocystidia, be it sometimes only very few (as in *P. ammophila*), reason why we regard *P. arenulina* and *P. ammophila* to be conspecific. Murrill (1923: 8) saw the type specimens of Peck's *Agaricus arenulinus* and noticed that Peck had written on the sheet: 'perhaps *ammophila*'.

### Section *Subatratae* (Romagn.) ex Sing.

*Agaricus (Psathyra) I. Conopili* Fr., Epicr.: 231. 1938 (illegitimate, rank not indicated). — Type: *Agaricus conopilus* Fr.

*Drosophila* sect. *Subatratae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 53. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Subatratae* (Romagn.) ex Sing. in Sydowia 15: 68. 1961. — Type: *Psathyrella subatrata* (Batsch ex Fr.) Quél. (= *P. conopilus*).

*Psathyrella* sect. *Pilosellae* Locq., Pet. Fl. Champ. Fr. 1: 284. 1956 (not val. publ., no latin). — Type: *Psathyrella subatrata* (= *P. conopilus*).

Carpophores solitary, often gregarious, large; caps 25–55(–65) mm, conical, dark reddish brown but very soon dark brown, hygrophanous, without pink on drying; veil absent; gill edge not underlined with red; stems 90–190 mm long, not rooting; basidia 4-spored; pleurocystidia absent; hymenophoral trama pigmented; pileipellis hymeniform and with numerous brown setae.

***Psathyrella conopilus*<sup>1</sup> (Fr.:Fr.) Pears. & Dennis — Figs. 118–122**

*Agaricus subatratus* Batsch, Elench. Fung. 2: 103. 1786; Fr. Epicr. 238. 1838. — *Psathyrella subatrata* (Batsch) Gillet, Hyménomyc.: 616. 1878. — *Psathyra subatrata* (Batsch) Quél. in Bull. Soc. Amis Sci. nat. Rouen, ser. II, 15: 161 ('1879') 1880. — *Drosophila subatrata* (Batsch) Quél., Enchir, Fung.: 117. 1886. — *Coprinarius subatratus* (Batsch) Coutinho, Eubasidiomyc. Lusitani: 87. 1919. — *Psathyra conopilus* var. *subatrata* (Batsch) J. Lange in Dansk bot. Ark. 9(1): 14. 1936.

*Agaricus conopilus* Fr., Syst. mycol. 1: 504. 1821 — *Psathyra conopilus* (Fr.) Kumm., Führ. Pilzk.: 70. 1871. — *Drosophila conopilus* (Fr.) Quél., Enchir. Fung.: 116. 1886. — *Coprinarius conopilus* (Fr. (J. Schroet. in Cohn, KryptogFl. Schles. 3(1): 564. 1889. — *Pratella conopilus* (Fr.) Coutinho, Eubasidiomyc. Lusitani: 92. 1919. — *Psathyrella conopilus* (Fr.) Pears. & Dennis in Trans. Brit. mycol. Soc. 31: 185. 1948. — *Drosophila subatrata* var. *conopilus* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 354. 1953 (not val. publ., basionym not mentioned).

*Agaricus superbus* Jungh. in Linnaea 5: 388. 1830. — *Psathyra conopilus* Fr. var. *superbus* (Jungh.) Cooke, Ill. Brit. Fungi: pl. 1158/1185. 1890.

*Agaricus arata* Berk., Outl. Brit. Fungol.: 176. 1860. — *Coprinus aratus* (Berk.) Berk. & Br. (Notices Brit. Fungi, no. 1956) in Ann. Mag. nat. Hist., ser. V, 9: 181. 1882. — *Psathyrella arata* (Berk.) W. G. Smith, Syn. Brit. Basidiomyc.: 200. 1908.

? *Agaricus graciloides* Schulz. in Verhandl. Kaiserl.-Königl. zööl.-bot. Ges. Wien 26: 415. 1877.

*Agaricus graciloides* Peck (non Schulz) in Rep. N.Y. State Mus. 30: 42. 1878. — *Psathyrella graciloides* (Peck) Sacc., Syll. Fung. 5: 1127. 1887.

*Psathyra elata* Mass., Brit. Fungus Fl. 1: 353. 1892.

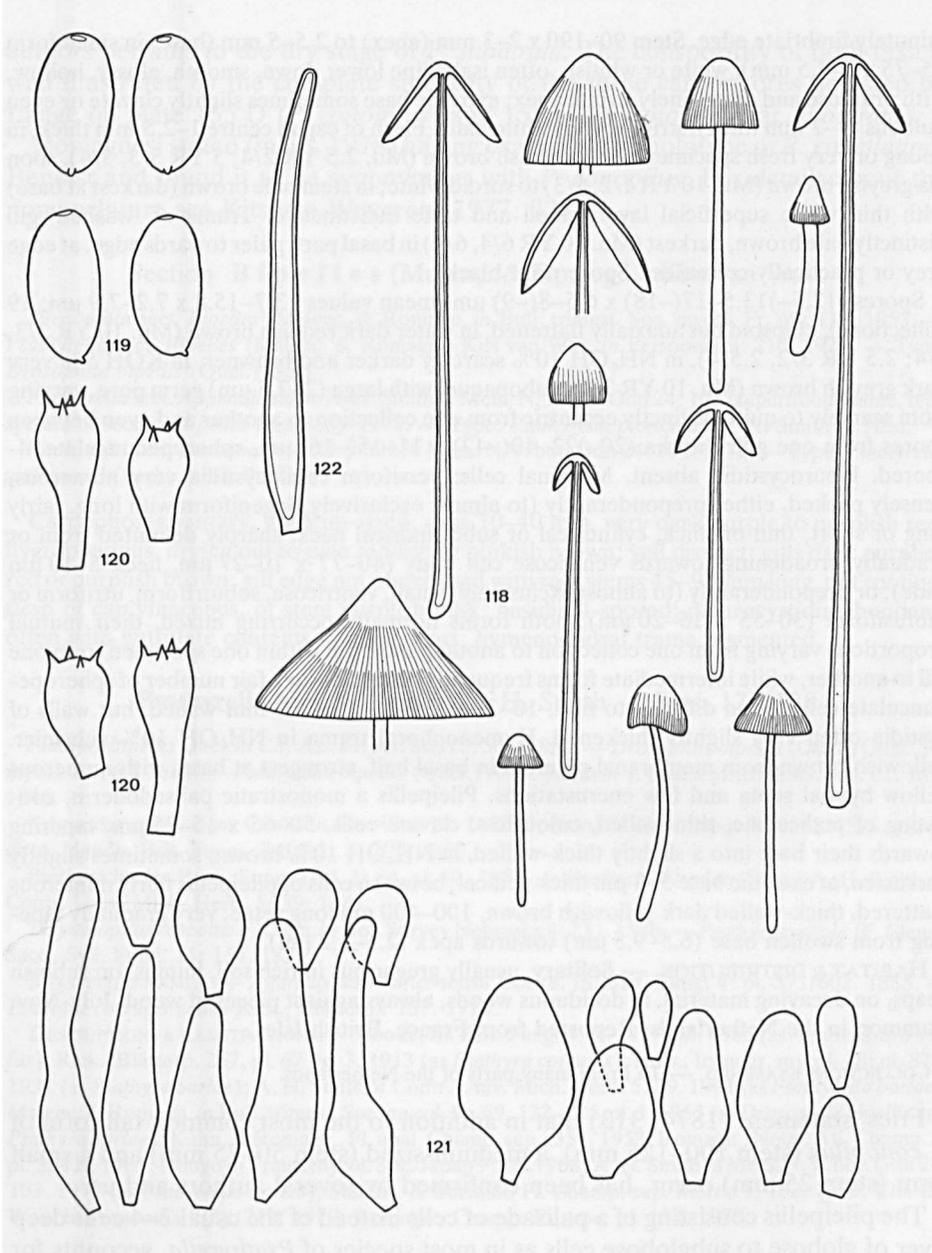
*Psathyrella circellatipes* Benoist in Bull. Soc. mycol. Fr. 15: 163. 1899.

*Psilocybe castaneicolor* Murrill in Mycologia 15: 19. 1923.

DESCRIPTIONS & ILLUSTRATIONS. — Fr., Icon. sel. Hyménomyc. 2: 38, pl. 139 fig. 1. 1879; Gillet, Tabl. anal. Hyménomyc. pl. 582, 590. 1884 (as *P. subatrata*); Cooke, Ill. Brit. Fungi 4: pl. 575/609. 1885 and 5: pl. 633/634 (as *A. subatratus*) and pl. 636/637 (as *A. aratus*). 1886 and 8 Suppl.: pl. 1158/1185. 1890 (as *A. conopilus* var. *superbus*), Rick., Blätterp.: 262, 264, pl. 68. 1913 (as *P. subatrata*); J. Lange, Fl. agar. dan. 4: 99, 100, pl. 155 D and E. 1939 (as *P. conopilus* var. *subatrata*); Kühn. & Romagn., Fl. anal. Champ. sup.: 354. 1953 (as *Drosophila subatrata*); Malenç. & Bertault, Fl. Champ. sup. Maroc 1: 195. 1970 (as *Drosophila subatrata*); A. H. Smith in Mem. N.Y. bot. Gdn 24: 273, 1972; Kits van Wav. in Persoonia 9: 223. 1977.

Cap in earliest stages (3–4 mm broad, 5–6 mm high) ellipsoid with margin adpressed to stem, very dark to dark reddish brown (Mu. 2.5 YR 2/4; 5 YR 3/3, 3/4), not striate, soon conical and striate, finally 25–55(–65) mm broad and 20–35 mm high (the small form: 10–25 mm broad, 8–15 mm high), conspicuously conical, at most paraboloid-conical in final stages only slightly spreading, conspicuously dark reddish brown (Mu. 5 YR 3/3, 3/4, 4/4) when very fresh but usually when found already lacking the red colour and merely dark warm brown (Mu. 7.5 YR 4/4), finely striate up to 1/2–2/3(–3/4) from margin, hygrophanous, process of drying setting in very soon, starting at the apex, drying out via yellowish brown (Mu. 7.5 YR 5/6, 6/6) or dark sordid brown (Mu. 10 YR 3/2, 3/3, 4/4) to in the end alutaceous, very pale yellowish or greyish brown (Mu. 10 YR 6/4, 7/3, 7/2, 8/4, 8/3) (at centre darker), without pink, sometimes slightly micaceous, often finely rugulose, with smooth, mat surface. Veil none. Gills 4–6 mm broad (in small form 3–4 mm), crowded,

<sup>1</sup> The epithet was written 'conopilus' by Fries in 1821 and should not be declined or corrected.



Figs. 118–122. *Psathyrella conopilus*. — 118. Carpophores (x 0.5). — 119. Spores. — 120. Basidia. — 121. Cheilocystidiogram. — 122. Setula.

ventricose near margin, then straight and strongly ascending, moderately broadly to rather narrowly adnate without tooth, in earliest stages pale brownish grey (Mu. 10 YR 6/2, 6/3) near edge, for the rest brown (Mu. 7.5 YR 5/2, 5/6, 6/6), at maturity tobacco colour or purplish brown (Mu. 5 YR 2/2, 3/2; 7.5 YR 3/2, 4/2; 10 YR 3/2, 3/3), with white and

minutely fimbriate edge. Stem 90–190 x 2–3 mm (apex) to 2.5–5 mm (base) in small form 45–75 x 2–3.5 mm), white or whitish, often isabelline lower down, smooth, glossy, hollow, with pruinose and often finely striate apex; extreme base sometimes slightly clavate or even bulbous (4–7 mm thick), strigose with white hairs. Flesh of cap in centre 1–2.5 mm thick, in young or very fresh specimens dark reddish brown (Mu. 2.5 YR 2/4; 5 YR 3/3, 3/4), soon via greyish brown (Mu. 10 YR 4/2, 4/3) to sordid white; in stem pale brown (darkest at base) with thin white superficial layer; smell and taste indistinctive. Trama of 'washed' gill distinctly pale brown, darkest (Mu. 10 YR 6/4, 6/3) in basal part, paler towards edge, at edge grey or practically colourless. Spore print black.

Spores (12.5–)13.5–17(–18) x 6.5–8(–9)  $\mu\text{m}$  (mean values 13.7–15.8 x 7.2–7.9  $\mu\text{m}$ : 19 collections), ellipsoid but adaxially flattened, in water dark reddish brown (Mu. 10 YR 3/3, 3/4; 2.5 YR 3/2, 2.5/4), in  $\text{NH}_4\text{OH}$  10% scarcely darker and browner, in  $\text{KOH}$  5% very dark greyish brown (Mu. 10 YR 3/2), subopaque, with large (2–2.5  $\mu\text{m}$ ) germ pore, varying from scarcely to quite distinctly eccentric from one collection to another and even between spores from one gill. Basidia (20–)22–40(–42) x 11–15(–16)  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia absent. Marginal cells: versiform cheilocystidia very numerous, densely packed, either preponderantly (to almost exclusively) lageniform with long, fairly long or short, thin or thick, cylindrical or subcylindrical neck, sharply delimited from or gradually broadening towards ventricose cell body (40–77 x 10–27  $\mu\text{m}$ , neck 5–10  $\mu\text{m}$  wide); or preponderantly (to almost exclusively) small, ventricose, subutriform, utriform or subfusiform (30–55 x 15–20  $\mu\text{m}$ ); both forms normally occurring mixed, their mutual proportions varying from one collection to another and even within one specimen from one gill to another, while intermediate forms frequently occur; few to a fair number of spheropedunculate cells, often difficult to find, 10–30 x 7.5–22.5  $\mu\text{m}$ ;  $\pm$  thin-walled, but walls of cystidia often very slightly thickened. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. yellowish brown from membranous pigment in basal half, strongest at base, with numerous yellow hyphal septa and few encrustations. Pileipellis a monostratic palisadoderm, consisting of pedicellate, thin-walled, colourless, clavate cells, 50–65 x 15–25  $\mu\text{m}$ , tapering towards their base into a slightly thick-walled, in  $\text{NH}_4\text{OH}$  10% brown, sometimes slightly encrusted, at extreme base 5–8  $\mu\text{m}$  thick pedicel; between cells of pileipellis fairly numerous scattered, thick-walled dark yellowish brown, 100–400  $\mu\text{m}$  long setae, very gradually tapering from swollen base (6.5–9.5  $\mu\text{m}$ ) towards apex (2.5–3.2  $\mu\text{m}$ ).

HABITAT & DISTRIBUTION. — Solitary, usually gregarious in rich soil, humus, on rubbish heaps, on decaying material, in deciduous woods, always against pieces of wood. July–Nov. Common in the Netherlands. Reported from France, British Isles.

COLLECTIONS EXAMINED. — 19 From many parts of the Netherlands.

Fries' statement (1874: 313) that in addition to the most common tall form of *P. conopilus* (stem 100–125 mm), a medium-sized (stem 50–75 mm) and a small form (stem 25 mm) occur, has been confirmed by several authors and us.

The pileipellis consisting of a palisade of cells instead of the usual 2–4 cells deep layer of globose to subglobose cells as in most species of *Psathyrella*, accounts for the matt appearance of the surface of the dry cap. The process of drying out of the caps of *P. conopilus* begins very early and proceeds very rapidly, so that quite often if not usually one only finds carpophores in the dry stage. From Fries's descriptions it is clear that his *Agaricus conopilus* merely represents the dry stage of his *Agaricus subatratus*. Quite a number of authors gave separate descriptions of *P. conopilus* and *P. subatratus*, but it is sufficiently clear that *P. conopilus* as interpreted by these

authors pertains to the dry stage of *P. subatrata*. The conspecificity of both taxa is well illustrated by the complete similarity of the three carpophores depicted by Lange on plate 155 D (*P. conopilus*) and 155 E (*P. conopilus* var. *subatrata*).

Romagnesi stated (in litt. 1978) having examined the holotype of *P. circellatipes* Benoist and found it to be synonymous with *P. conopilus*. For details about the nomenclature see Kits van Waveren (1977: 228).

### Section **Bipelles** (Malenç. & Romagn.) Kits van Wav.

*Drosophila* sect. *Bipelles*<sup>1</sup> Malenç. & Romagn. in Bull. trimest. Soc. mycol. Fr. 69: 117. 1953. — *Psathyrella* sect. *Bipelles* (Malenç. & Romagn.) Kits van Wav. in Persoonia 9: 210. 1977. — Type: *Drosophila bipellis* (Quél.) Quél.

*Psathyrella* sect. *Appendiculatae* A. H. Smith in Mem. N.Y. bot. Gdn 24: 102 (superfluous name, type species of section *Bipelles* included). 1972. — Type: *Psathyrella piceicola*<sup>2</sup> A. H. Smith & Hesl.

*Psathyrella* sect. *Umbonatae* A. H. Smith in Mem. N.Y. bot. Gdn 24: 291. 1972. — Type: *Psathyrella umbonata*<sup>2</sup> (Peck) A. H. Smith.

Carpophores solitary, medium-sized; caps 10–40 mm, very dark purple to purplish red, hygrophanous, drying out to pale reddish or pinkish brown; veil distinct; gills dark purplish red or purplish brown; gill edge not underlined with red; stems 45–95 mm long, not rooting; flesh of cap vinaceous, of stem purplish pink; basidia 4-spored; pleurocystidia abundant, often with guttulate contents in upper part; hymenophoral trama pigmented.

### **Psathyrella bipellis** (Quél.) A. H. Smith — Figs. 123–128

*Psathyra bipellis* Quél. in C.r. Ass. Fr. Av. Sci. 12: 501. 1884. — *Drosophila bipellis* (Quél.) Quél., Fl. mycol. Fr.: 62. 1888. — *Psathyrella bipellis* (Quél.) A. H. Smith in J. Elisha Mitchell sci. Soc. 62: 187. 1946.

? *Agaricus canofaciens* Cooke in Grevillea 14: 1. 1885; ditto, Ill. Brit. Fungi 4: pl. 621/595. 1886; ditto, Handb. Brit. Fungi, 2nd Ed., 2: 209. 1887.

*Psathyra barlae* Bres., Fung. Trid. 1: 84, pl. 91. 1887. — *Psathyrella barlae* (Bres.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 39. 1941.

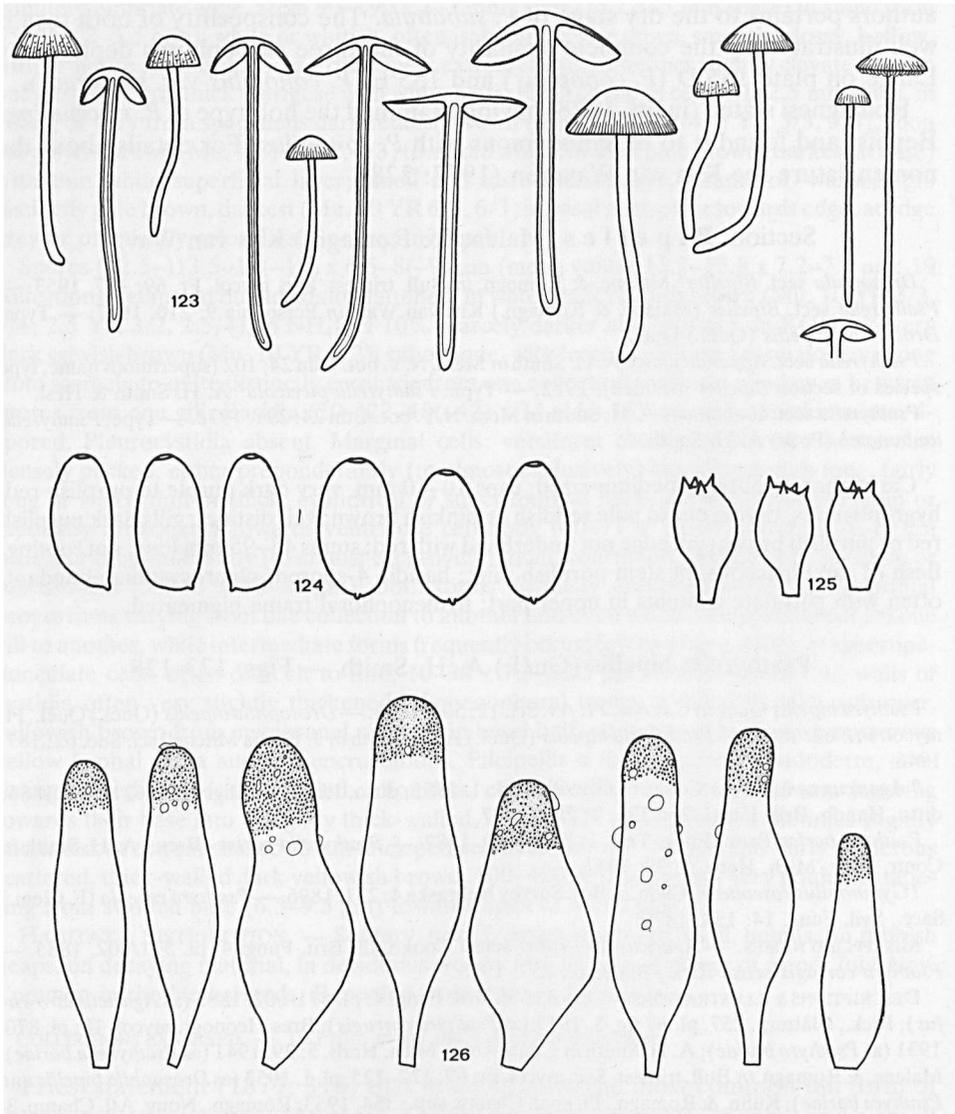
? *Gymnopilus roseolus* F. Clem. in Bot. Survey Nebraska 4: 231. 1896. — *Psathyra roseola* (F. Clem.) Sacc., Syll. Fung. 14: 154. 1879.

MISAPPLIED NAMES. — *Agaricus atro-rufus* sensu Cooke, Ill. Brit. Fungi 4: pl. 571/602. 1885. — *Psathyra corrugis* sensu Rick., Blätterp.: 257. 1913.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 571/602. 1885 (as *Agaricus atro-rufus*); Rick., Blätterp. 257, pl. 67 fig. 3. 1913 (as *Psathyra corrugis*); Bres., Iconogr. mycol. 18: pl. 870. 1931 (as *Psathyra barlae*); A. H. Smith in Contr. Univ. Mich. Herb. 5: 39. 1941 (as *Psathyrella barlae*); Malenç. & Romagn. in Bull. trimest. Soc. mycol. Fr. 69: 122–125, pl. 1. 1953 (as *Drosophila bipellis* and *Psathyra barlae*); Kühn. & Romagn., Fl. anal. Champ. sup.: 354. 1953; Romagn., Nouv. Atl. Champ. 3: pl. 204 B. 1961; Hongo in Trans. mycol. Soc. Japan 9: 18. 1968; A. H. Smith in Mem. N.Y. bot. Gdn 24: 103. 1972 (as *Psathyrella barlae*); Malenç. & Bertault, Fl. Champ. sup. Maroc 1: 182. 1970; Kits van Wav. in Persoonia 9(2): 210. 1977; Romagn., Champ. Europe: pl. 134. 1977.

<sup>1</sup> Earlier it has escaped our attention that this taxon was described as a section of *Drosophila* subgenus *Psathyrella*. As a result we unintentionally but correctly transferred the section to the genus *Psathyrella* in our publication of 1977 (p. 210).

<sup>2</sup> *Psathyrella piceicola* and *P. umbonata* we know only from the descriptions given by A. H. Smith (1972: 106. 296); both seem to us undoubtedly to belong to our section *Bipelles*.

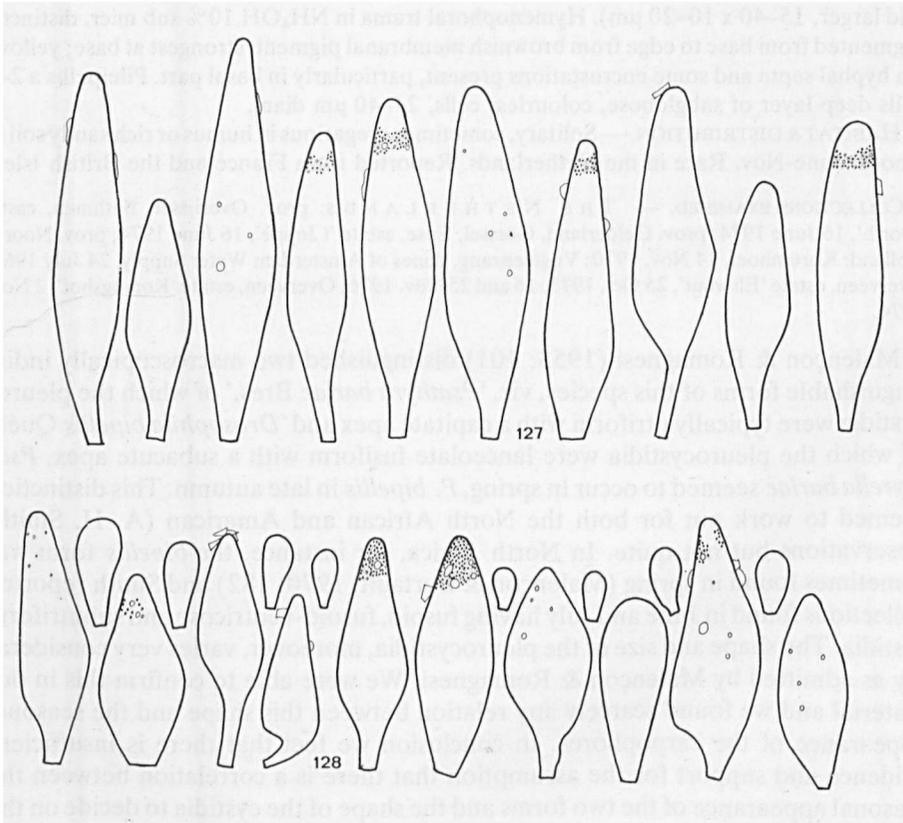


Figs. 123–126. *Psathyrella bipellis*. — 123. Carpophores (x 0.5). — 124. Spores. — 125. Basidia. — 126. Pleurocystidiogram.

Cap 10–40 mm, at first conico-paraboloid, soon conico-convex, finally almost plane with slightly deflexed margin, striate up to  $1/3$ – $1/2$  (– $3/4$ ) from margin, in earliest stages blackish, later purple to purplish red (Mu. 10 R 2.5/1, 2.5/2, 3/2, 2/2; 2.5 YR 2/2, 2/4, 2.5/2, 2.5/4, 3/2), in marginal area dusky red (Mu. 10 R 3/3), at margin itself often reddish (Mu. 10 R 4/4, 5/4) hygrophanous, drying out from centre via vinaceous red (Mu. 10 R 4/4; 2.5 YR 5/4) and reddish brown (Mu. 2.5 YR 4/4, 5/4) to pale reddish or pinkish brown (Mu. 5 YR 6/4), slightly micaceous, slightly to moderately rugulose. Veil distinct, forming small dense white networks, in young specimens densely covering marginal zone of cap, later still

numerous up to  $1/2-3/4$  from margin, in places even appendiculate, fugacious. Gills  $3-6$  mm broad, moderately crowded, ventricose and in mature specimens usually protruding under margin of cap, narrowly to moderately broadly adnate, dark purplish red or purplish brown (Mu. 10 R 3/3; 2.5 YR 3/2, 3/4, 2.5/4; 5 YR 3/2), towards edge and in older specimens purplish grey brown (Mu. 2.5 YR 4/2; 5 YR 4/2), with fimbriate white edge. Stem  $45-95 \times 1.5-5$  mm, cylindrical, hollow, whitish or sordid white with a slight to very distinct trace of pink, pinkish brown, purplish pink (Mu. 2.5 YR 6/2; 5 YR 6/3), or lilaceous pink flush particularly in upper half, glossy, pruinose at apex, at extreme base covered by a thin layer of greyish tissue and strigose with white hairs. Flesh of cap  $1.5-3$  mm thick in centre, dark vinaceous brown to reddish (Mu. 2.5 YR 2.5/2), particularly in thin layer under pileipellis and above gills, of stem pale purplish pink (Mu. 2.5 YR 6/4, 5 YR 6/3, 6/4) but in very thin superficial layer white. Sometimes with weak to strong fruit-like smell. Trama of 'washed' gill rather strongly pigmented, reddish brown (Mu. 5 YR 5/3) or just brown (Mu. 7.5 YR 4/4, 5/4) from base to half-way edge, then paler and via pale reddish brown or brown to very pale greyish brown (Mu. 10 YR 7/2) or brown (Mu. 10 YR 6/2) near edge; colour in KOH 5% distinctly different, greyish brown in basal parts, paler towards edge. Spore print black.

Spores  $(115-12.5-15.5(-16) \times 7-8(-9) \mu\text{m}$  (mean values  $13-15 \times 7.2-7.6 \mu\text{m}$ : 9 collections), ellipsoid, but adaxially flattened, in water dark red (Mu. 10 R 3/2, 3/3, 3/4), in  $\text{NH}_4\text{OH}$  10% darker (Mu. 10 R 3/1, 3/2, 2.5/1, 2.5/2), in KOH 5% very dark greyish brown



Figs. 127-128. *Psathyrella bipellis*. — 127. Pleurocystidiogram. — 128. Cheilocystidiogram.

(Mu. 10 YR 3/1, 3/2, 3/3), opaque to subopaque, with distinct (rarely less distinct), even truncate germ pore (1.5–2  $\mu\text{m}$ ), often in a number of spores slightly eccentric. Basidia 22–40 x 12.5–15(–16)  $\mu\text{m}$ , spheropedunculate, 4-, rarely 2-spored. Pleurocystidia 52.5–95 x 12.5–30  $\mu\text{m}$ , abundant, either preponderantly utriform with (very) obtuse apex ('forma *barlae*', see observations) or preponderantly lanceolate fusiform to subfusiform with subacute apex ('forma *bipellis*', see observations) or preponderantly intermediate forms (sublageniform, ellipsoid with very obtuse apex, subcylindrical), with short or somewhat longer pedicel, with walls almost always very slightly thickened (up to 0.5  $\mu\text{m}$ ) and in many or a number of utriform and subutriform cells distinctly thickened (up to 1–2  $\mu\text{m}$ ) at and particularly just below the apex, practically colourless or very slightly brown in  $\text{NH}_4\text{OH}$  10%, with content of their apical part either in almost all, or in many or in only a few cells entirely or partly consisting of amorphous material, staining slightly greenish in  $\text{NH}_4\text{OH}$  10% and containing a large to small number of minute droplets (a few of them, however, up to 1–5  $\mu\text{m}$ ); elsewhere in the otherwise hyaline cells a few scattered oily droplets and on surface of cells often a few mucoid droplets and/or thin elongate or subglobose deposits, not or scarcely staining green in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 35–75 x 10–25  $\mu\text{m}$ , densely packed, more often with amorphous material in their apical part (sometimes practically in all cells) and more mucoid deposits on their surface as compared with the pleurocystidia, intermixed with a small number of small and unobtrusive clavate cells, 10–27.5 x 6–14  $\mu\text{m}$  (sometimes and particularly near margin of cap more numerous and larger, 15–40 x 10–20  $\mu\text{m}$ ). Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pigmented from base to edge from brownish membranal pigment, strongest at base; yellowish hyphal septa and some encrustations present, particularly in basal part. Pileipellis a 2–3 cells deep layer of subglobose, colourless cells, 24–40  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — Solitary, sometimes gregarious in humus or rich sandy soil of woods. June–Nov. Rare in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Bathmen, castle 'Dorth', 16 June 1974; prov. Gelderland, Gorssel, Epse, estate 't Joppe', 16 June 1974; prov. Noord-Holland: Kortenhoef, 14 Nov. 1970; Vogelenzang, dunes of Amsterdam Water Supply, 24 July 1966; Overveen, estate 'Elswout', 25 Oct. 1975, 16 and 25 Nov. 1976; Overveen, estate 'Koningshof', 2 Nov. 1974.

Malençon & Romagnesi (1953: 101) distinguished two macroscopically indistinguishable forms of this species, viz. '*Psathyra barlae* Bres.' of which the pleurocystidia were typically utriform with a capitate apex and '*Drosophila bipellis* Quél.' of which the pleurocystidia were lanceolate fusiform with a subacute apex. *Psathyrella barlae* seemed to occur in spring, *P. bipellis* in late autumn. This distinction seemed to work out for both the North African and American (A. H. Smith) observations but not quite. In North Africa, for instance, the *bipellis* form was sometimes found in spring (Malençon & Bertault, 1970: 182) and Smith reported collections found in June and July having fusoid, fusoid-ventricose and subutriform cystidia. The shape and size of the pleurocystidia, moreover, varies very considerably as admitted by Malençon & Romagnesi. We were able to confirm this in our material and we found scarcely any relation between this shape and the seasonal appearance of the carpophores. In conclusion we feel that there is insufficient evidence and support for the assumption that there is a correlation between the seasonal appearance of the two forms and the shape of the cystidia to decide on the separation of two taxa on this basis.

Malençon & Romagnesi found the spores of '*Drosophila bipellis*' slightly larger than those of '*P. barlae*' but did not put this difference forward in distinguishing the two forms. In the 'Flore analytique' of Kühner & Romagnesi (1953: 354) for both 'forms' the same figures are given for the length of the spores, but the spores of *P. barlae* are said to be slightly broader in face view. We found the spores of two collections with distinctly fusiform pleurocystidia slightly longer (mean values 14.4–15 x 7.3–7.5  $\mu\text{m}$ ) than those of the collections with distinctly utriform cystidia (mean values 13.4–13.6 x 7.4–7.6  $\mu\text{m}$ ) but are not prepared to attach any importance to these differences in the light of the variability of spore sizes. The same goes for trivial differences in the size of the germ pore, the degree of pigmentation of the hymenophoral trama, and the size of the carpophores. We feel, that for the time being a separation of the two 'forms' is not warranted. For further details see Kits van Waveren (1977: 210), also for discussion of the nomenclature.

## Subgenus **PSATHYRA** (Fr.) Sing. ex Kits van Wav.

*Agaricus* tribus *Psathyra* Fr., Syst. mycol. 1: 295. 1821. — *Drosophila* subgen. *Psathyra* (Fr.) Quélet, Enchir. Fung.: 116. 1886. — *Psathyrella* subgen. *Psathyra* (Fr.) Sing., Agaricales mod. Taxon., Ed. 2: 510. 1962; ditto, Ed. 3: 503. 1975 (not val. publ., no basionym); ex Kits van Wav. on p. 280 of the present work. 1985. — Lectotype (Imai, 1938): *Agaricus fibrillosus* Pers.: Fr.<sup>1</sup>

*Drosophila* subgen. *Hypholoma* Quélet,<sup>2</sup> Enchir. Fung.: 114. 1886. — Lectotype (mihl): *Drosophila candolleana* (Fr.) Quélet.

*Drosophila* subgen. *Psathyra* Quélet,<sup>3</sup> Fl. mycol. Fr.: 58. 1888. — Lectotype (mihl): *Drosophila spadiceogrisea* (Schaeff.) Quélet.

*Stropharia* [subgen.] *Spintrigerae* J. Lange in Dansk bot. Ark. 4(4): 31. 1923 (illegitimate, no rank indicated). — Type: *Stropharia spintrigera* (Fr.) P. Karst.

*Psathyra* subgen. *Pannucia* (P. Karst.) J. Lange in Dansk bot. Ark. 9(1): 4. 1936. — *Drosophila* subgen. *Pannucia* (P. Karst.) Romagn. in Bull. mens. Soc. linn. Lyon 13: 52. 1944. — *Psathyrella* subgen. *Pannucia* (P. Karst.) Sing. in Lilloa 22: 468. 1951. — Lectotype (Donk, 1962): *Psathyra fibrillosa* (Pers.: Fr.) Kumm.<sup>4</sup>

*Drosophila* subgen. *Hypholoma* Romagn.<sup>4</sup> in Dull. mens. Soc. linn. Lyon 13: 51. 1944 (not val. publ., no latin). — *Psathyrella* subgen. *Hypholoma* (Romagn.) Sing. in Lilloa 22: 466. 1951 (not val. publ., no latin). — Lectotype (Sing., 1951): *Psathyrella candolleana* (Fr.) Maire.

*Agaricus* [sect.] *Homophron* Britz. in Ber. naturh. Ver. Augsburg 27: 174. 1883 (illegitimate, no rank indic.). — *Psathyrella* subgen. *Homophron* (Britz.) Sing. in Lilloa 22: 468. 1951. — Lectotype (Singer, 1951): *Psathyrella spadicea* (Schaeff.) Sing.

*Psathyrella* subgen. *Cystopsathyra* Sing. in Sydowia 15: 68. 1962. — Type: *Psathyrella kellermanii* (Peck) Sing.

*Hypholoma* [sect.] *Psathyroides* J. Lange in Dansk bot. Ark. 4(4): 38. 1923 (illegitimate, no rank indic.). — *Psathyrella* subgen. *Psathyroides* (J. Lange) A. H. Smith in Mem. N.Y. bot. Gdn 24: 42. 1972. — Lectotype (Singer, 1962, for *Psathyrella* sect. *Psathyroides*): *Psathyrella maculata* (Parker) Moser (= *H. melanthinum* sensu J. Lange).

*Psathyrella* subgen. *Pseudostropharia* A. H. Smith in Mem. N.Y. bot. Gdn 24: 61. 1972. — Type: *Psathyrella caput-medusae* (Fr.) Konr. & Maubl.

*Psathyrella* subgen. *Mycophila* A. H. Smith in Mem. N.Y. bot. Gdn 24: 60. 1972. — Type: *Psathyrella epimyces* (Peck) A. H. Smith.

<sup>1</sup> The lectotypification of (sub)genus *Psathyra* by *A. fibrillosa* Fr. is rather generally accepted (Donk, 1962; Singer, 1975). Unfortunately, as we have demonstrated (Kits van Waveren, 1977: 285), it is not known what Fries' name *A. fibrillosus* exactly stands for. As there is, however, no doubt that it is a species of *Psathyrella* subgenus *Psathyra* we do not think it necessary to indicate another lectotype and await its rediscovery.

<sup>2</sup> As Quélet excluded *Hypholoma fasciculare* (the lectotype of *Hypholoma* (Fr.) Kumm.), he is to be considered the author of a new subgenus.

<sup>3</sup> Quélet excluded *Drosophila fibrillosa*, the lectotype of *Psathyra* (Fr.) Kumm.

<sup>4</sup> Romagnesi's emendation of *Hypholoma* Fr. on subgenus level does not include the lectotype of Fries' taxon (*H. fasciculare*). Therefore Romagnesi is to be considered the author of this subgeneric name.

*Psathyrella* subgen. *Drosophila*<sup>1</sup> Sing. in Beih. Sydowia 7: 75. 1973 (not val. publ., no latin). — Type: *Psathyrella candolleana* (Fr.) Maire.

*Psathyrella* subgen. *Heterocystis* Sing. in Beih. Sydowia 7: 75. 1973 (not val. publ., no type); ex Sing., Agaricales mod. Taxon., Ed. 3: 503. 1975. — Type: *Psathyrella dactylocystis* Sing.

*Drosophila* subgen. *Pluteopsis* ('Fayod') Kühn. & Romagn., Fl. anal. Champ. sup.: 369. 1953 (not val. publ., no reference to basionym). — *Psathyrella* subgen. *Pluteopsis* Romagn.<sup>2</sup> in Bull. trimest. Soc. mycol. Fr. 98: 10. 1982. — Type: *Psathyrella caput-medusae* (Fr.) Konr. & Maubl.

Spores small, length not (rarely scarcely) exceeding 10  $\mu\text{m}$ , not (or very rarely) opaque, often purplish brown or brownish, often phaseoliform; basidia 10  $\mu\text{m}$  broad or less (rarely scarcely more), clavate; spore print purplish black but often purplish brown or brownish; veil present (but absent in some species of section *Spadiceae*), often very fugacious.

Included are *Psathyrella almerensis*, *P. tephrophylla*, *P. dicranii*, and the large-spored species of section *Spintrigerae* in spite of their spores being longer than 10  $\mu\text{m}$  and/or their basidia being broader than 10  $\mu\text{m}$  (see criteria of subgenus *Psathyrella*, p. 39).

### Section *Cystopsathyra* (Sing.) Kits van Wav.

*Psathyrella* subgen. *Cystopsathyra* Sing. in Sydowia 15: 67. 1962. — *Psathyrella* section *Cystopsathyra* (Sing.) Kits van Wav. on p. 280 of the present work. 1985. — Type: *Psathyrella kellermanii* (Peck) Sing.

Cap and stem covered by a mealy-pulverulent veil, consisting chiefly of spherocytes; pleurocystidia present.

We lowered *Cystopsathyra* to sectional rank because we consider the shortening of the velar cells to spherocytes a less fundamental character than the characters separating the subgenera *Psathyrella* and *Psathyra*.

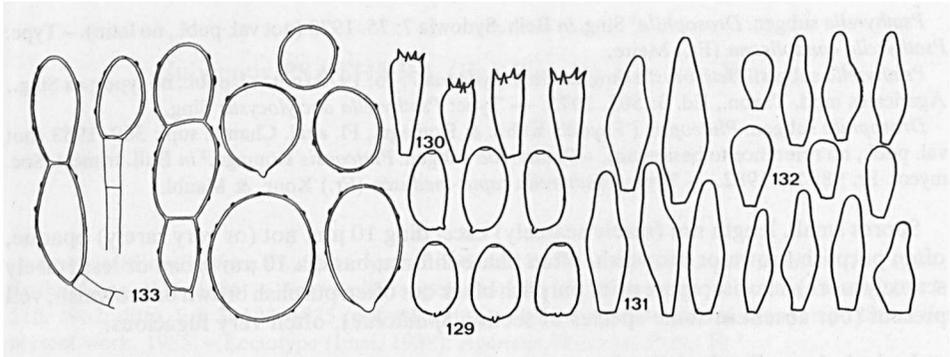
### *Psathyrella sphaerocystis* P. D. Orton — Figs. 129–133

*Psathyrella sphaerocystis* P. D. Orton in Notes R. bot. Gdn Edinb. 26: 64. 1964.

Cap 4–10 mm, conico-convex or convex, seemingly not expanding, pale ochraceous buff or clay-ochraceous, then darkening to clay-buff, with granular mealy-scaly or furfureous surface. Veil forming a homogenous furfureous layer on cap, at edge cortinate, joining edge with stem when young, on stem furfureous or flocculose, pale ochraceous buff. Gills fairly crowded, rather broadly adnate with tooth, whitish or pale clay, then pale clay-umber

<sup>1</sup> *Drosophila* Quél. being a superfluous and thus illegitimate name, Šinger is to be considered the author of the new name *Psathyrella* sect. *Drosophila*.

<sup>2</sup> *Romagnesi* refers to Fayod, but the genus *Pluteopsis* Fayod can only be typified by one of Fayod's original two species, viz. *Agaricus pellospermus* Bull. and *A. gunneri* Fr. The former species most likely represents a species of *Panaeolus* (Bulliard calls the surface of the gills mottled and the surface of the cap 'jamais velu ni squarreux'); the latter species is an unknown species, most likely not belonging to Romagnesi's subgenus *Pluteopsis* (cap densely covered with echinate warts, colour of spore print and spores not mentioned). Thus Romagnesi unintentionally excluded the type of Fayod's genus and is therefore to be considered the author of a new subgenus *Pluteopsis*. The I.C.B.N. (art. 10 as revised in 1981) does not allow typification of *Pluteopsis* Fayod by *Pluteopsis gunneri* sensu Fayod.



Figs. 129–133. *Psathyrella sphaerocystis*. — 129. Spores. — 130. Basidia. — 131. Pleurocystidiogram. — 132. Cheilocystidiogram. — 133. Cells of veil.

or with slight olivaceous-clay tinge, finally clay-umber; edge minutely white denticulate at first. Stem 15–24 x 0.5–1.5 mm, equal or slightly swollen at base, hollow, often hyaline at apex or in upper part, pale creamy yellowish or tinged ochraceous, sometimes becoming deeper ochraceous-cream with age, at first pale ochraceous-buff furfuraceous or floccose-scaly from veil, later more scattered appressedly fibrillose-scaly; apex white pruinose when fresh. Flesh ochraceous in cap, creamy-whitish or pale yellowish in stem, sometimes darker at base. Trama of 'washed' gill distinctly pigmented, pale brown (M. 10 YR 6/3), darker towards base. Spore print not recorded.

Spores 8–9 x 4.5–5  $\mu\text{m}$  (mean values 8.5 x 4.5  $\mu\text{m}$ : 1 collection), polymorph, in face view most spores ellipsoid, but many ellipsoid-ovoid, some even subtriangular of with snout-like upper part, in profile ellipsoid, adaxially flattened, subopaque, with large germ pore (1.8–2  $\mu\text{m}$ ) and small hilar appendix. Basidia 17.5–24 x 8–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 27.5–37.5 x 7.5–10  $\mu\text{m}$ , scattered, lageniform with broad short pedicel and subcylindrical neck, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 22.5–32.5 x 7.5–10  $\mu\text{m}$ , numerous, densely packed, intermixed with basidia and relatively few spheropedunculate and clavate cells, 10–15(–20) x 5–10  $\mu\text{m}$ ; all cells thin-walled, colourless. Pileipellis a 3–5 cells deep layer of globose, sometimes subglobose cells, pale to sometimes fairly strongly brown in  $\text{NH}_4\text{OH}$  10%, their walls slightly but distinctly irregularly thickened, also encrusted, veil (structure best studied on the appendiculate velar remnants; no sharp delimitation between veil and pileipellis) consisting of chains of inconspicuous cylindrical, subfusoid, ellipsoid or sausage-shaped, colourless to slightly pigmented, often encrusted cells, 10–50 x 3–10  $\mu\text{m}$ , but sometimes inflated, slightly constricted at septa; chains often terminating in either one or a few cells in a row of oblong to subglobose, thick-walled pale brown, sometimes very brown cells with encrustations, and often intermixed with many cells, identical with those of pileipellis, some provided with a very short, protuberance-like pedicel; many cells of both pileipellis and veil easily disarticulating, floating freely in medium of mount. Many velar hyphae in lower part of stem strongly pigmented and encrusted, intermixed with a few cells identical with cells of pileipellis. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly and towards base increasingly pigmented from brown membranous pigment with near and at base numerous yellow hyphal septa and encrustations.

HABITAT & DISTRIBUTION. — On old horse dung; known only from type locality.

COLLECTION EXAMINED. — SCOTLAND, Perthshire, Dall Wood, Rannoch, 24 Sept. 1960 (type K).

NOTE. — The description of the macroscopical characters is taken from Orton's description, the description of the microscopical characters is based on our own examination of type specimens.

### Section *Pseudostropharia* A. H. Smith

*Agaricus* [sect.] *Scobinacei* Fr., Monogr.: 418. 1857 (illegitimate, no rank indic.).

*Hypholoma* [sect.] *Psathyroides* J. Lange in Dansk bot. Ark. 4(4): 38. 1923 (illegitimate, no rank indic.). — *Psathyrella* sect. *Psathyroides* (J. Lange) Sing., Agaricales mod. Taxon. Ed. 2: 507; ditto, Ed. 3: 500. 1975 (both not val. publ., no full reference to basionym). — Lectotype (Singer, 1963): *Psathyrella maculata* (Parker) Mos. (= *Hypholoma melanthinum* sensu J. Lange).

*Psathyrella* sect. *Pseudostropharia* A. H. Smith in Mem. N.Y. bot. Gdn 24: 61. 1972. — Type: *Psathyrella caput-medusae* (Fr.) Konr. & Maubl.

*Psathyrella* sect. *Silvestres* Sing. in Beih. Sydowia 7: 75. 1973. — Type: *Psathyrella sylvestris* (Gillet) Mos. (sensu origin. = ? *P. cotonea* (Quél.) Konr. & Maubl.

Surface of cap innately fibrillose-squamulose from pigmented fibrils, arising from cells of pileipellis, obscuring cellular nature of the latter.

This is the group of species treated as '*Drosophila* subgenus *Pluteopsis* Fayod' by Kühner & Romagnesi (1953: 353, 369) and by Romagnesi (1982: 10). Unfortunately the name *Pluteopsis* Fayod is for nomenclatural reasons not available in *Psathyrella* (see foot-note on p. 113).

In our opinion the differences between section *Pseudostropharia* and the other sections of subgenus *Psathyra* are not sufficiently significant to warrant a position at subgeneric level. For those who wish to treat this taxon at subgeneric level the correct name is *Psathyrella* subgen. *Psathyroides* (J. Lange) A. H. Smith (1972) or *P.* subgen. *Pseudostropharia* A. H. Smith (1972) (see synonymy of subgenus *Psathyra*).

From the species of section *Pseudostropharia* we only examined fresh material (and quite a number of exsiccata) of *P. caput-medusae*, *P. cotonea* and *P. maculata*; of *P. populina* we studied two dried Dutch collections. Of the other species we were able to examine exsiccata in 1980 very kindly put at our disposal by Romagnesi together with his accessory full descriptions, which he allowed us to publish in the present work and which he later (1982) published himself.

There is considerable confusion with regard to the interpretation and nomenclature of the species of section *Pseudostropharia*, while often descriptions of one and the same species are at variance. Most species of this section are extremely rare, which undoubtedly contributed to the confusion and greatly hampers assessing the variability of their characters and distinguishing the species. Hence the presence of many synonyms, erroneous identifications and doubtful taxa (*Stropharia aculeata*, *Agaricus battaræ*, *Geophila versicolor*, *Hypholoma lepidotum*, *Agaricus scobinacea*, *Agaricus caryophyllaceus*, *Psathyra tigrina*, *P. hispida*, *P. hirtosquamulosa*). The absence of data about microscopical characters and the absence of type material of the older taxa of course plays a trick.

Fries (1838: 223), for instance, described *Agaricus storea* as 'solitarius nec hygrophanus' and did not mention a yellow colour of the flesh at the base of the

stem, whereas with Romagnesi (1982: 55) the stems of *P. storea* are 'fasciculé' (the two collections mentioned grew 'en touffé'), the umbo is hygrophanous and the flesh in the base of the stem is pale lemon yellow.

In many descriptions of *P. cotonea* the characteristic yellow colour of the flesh (and also surface) of the base of the stem is not mentioned, not even by its author, Quélet, while Romagnesi (in litt.) stated, that in several of his own collections of *P. cotonea* the base of the stem was reddish.

Of *P. maculata* its author Parker (1933: 205), Konrad & Maublanc (1929: pl. 41<sup>II</sup>), Lange (1939: 75), and Romagnesi (1982: 52) gave excellent descriptions and plates, all of these depicting and/or describing the characteristic mucronate cystidia and the small, rather pale spores (with Konrad & Maublanc the spores, however, are dark brown and measure 5–8 x 3–4 µm). But Konrad & Maublanc called the species *Hypholoma scobinaceum*, J. Lange *Hypholoma melanthinum*.

The perplexing state of the knowledge of the species in section *Pseudostropharia* is best illustrated by Smith's keys and species (1972). With him the species find themselves spread over two subgenera:

1. Subgenus *Psathyroides*: *P. hispida* (of which Smith never saw material, while we saw the type and found it identical with *P. populina*), *P. hirtosquamulosa* (see our observations on *P. populina*), *P. battarae* (Smith saw only one collection, see our observations on *P. populina*), *P. lepidota* (merely mentioned in his key, but not included in his work), *P. maculata*, *P. cotonea* (= *P. lacrymabunda* sensu Smith), *P. tigrina* (of which Smith only examined Patouillard's type material of which he stated that in the portion of the type studied by him all tissues revived so poorly that reliable data could not be obtained, adding that the species could be a *Coprinus*), finally eleven more species, including six new species (three of which based on one collection) and two species (also based on one collection) which had already been described by him earlier.

2. Subgenus *Pseudostropharia* (based on the presence of an annulus): *P. caput-medusae*, *P. sphagnicola* and nine more species (eight of them new, three of which based on 1 collection) and a few varieties. Smith did not mention *P. storea* and mentioned *P. populina* (= *P. sylvestris*) only in his observations on *P. lepidotoides* (one of his new species of which he stated that in many respect it fits the description of *Drosophila silvestris*).

See for more examples of the confusion in section *Pseudostropharia* our observations on the various species of this section, dealt with in the present work. For *P. scobinacea* – deleted by Romagnesi and us from section *Pseudostropharia* — see observations on *P. maculata*.

#### KEY TO THE SPECIES OF SECTION PSEUDOSTROPHARIA

1. Spores practically colourless sub micr.; pleurocystidia absent. . . . . *P. melanthina*, p. 117
1. Not as above.
  2. Spores strikingly elongate and with a conspicuous, large hilar appendix; annulus on stem; stem below annulus towards base increasingly squamose . . . . . *P. caput-medusae*, p. 118
  2. Not as above.
    3. Spores in face view conspicuously triangular or with rectangular base; surface of apices of pleurocystidia and pleurocystidioid cheilocystidia in fresh material with large exsudates,

- staining green in  $\text{NH}_4\text{OH}$  10%; cap often with olivaceous or green tinge. *P. populina*, p. 121
3. Not as above.
  4. Spores very small, 4.5–5.5  $\mu\text{m}$  long; germ pore practically absent. *P. maculata*, p. 124
  4. Not as above, spores 6.5–11  $\mu\text{m}$  long, germ pore present.
  5. Spores polymorphic, in profile most spores distinctly to strongly phaseoliform; germ pore  $\pm 1 \mu\text{m}$ . . . . . *P. cotonea*, p. 127
  5. Spores not polymorphic, in profile ellipsoid, adaxially flattened; germ pore 2–2.5  $\mu\text{m}$ . . . . . *P. storea*, p. 130

***Psathyrella melanthina* (Fr.) Kits van Wav. — Figs. 134–135**

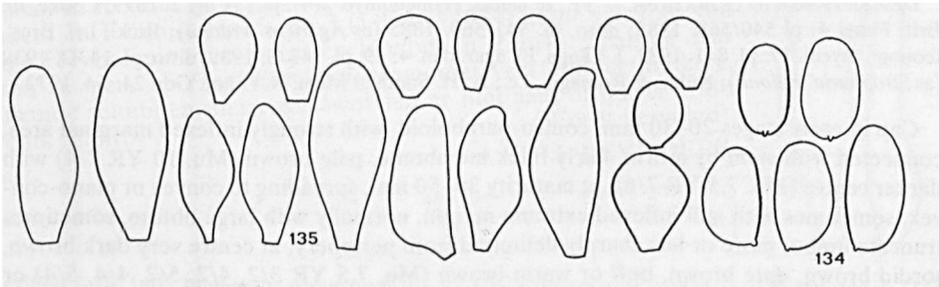
*Agaricus melanthinus* Fr. in Öfv. K. Vet.-Akad. Förh. 18: 49. 1851. — *Hypholoma melanthinum* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 500. 1879. — *Geophila melanthina* (Fr.) QuéL., Enchir. Fung.: 113. 1886. — *Drosophila melanthina* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 369. 1953 (not val. publ., basionym not mentioned). — *Psathyrella melanthina* (Fr.) Mos. in Gams, Kl. Kryptog.fl. 2, 1. Aufl.: 204. 1953 (and later editions; not val. publ., basionym not mentioned); Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 50. 1982 (not val. publ., basionym not mentioned); ex Kits van Wav. p. 281 of the present work. 1985.

*Hypholoma agaves* Maire in Bull. trimest. Soc. mycol. Fr. 44: 50. 1928. — *Psathyra agaves* (Maire) Sing. in Collect. bot. 1: 230. 1947. — *Psathyrella agaves* (Maire) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 128. 1948.

EXCLUDED. — *Hypholoma melanthinum* sensu Rick., Blätterp.: 245. 1912 (= ?). — *Hypholoma melanthinum* sensu Lange, Fl. agar. dan. 4: 75, pl. 146 D, D<sub>1</sub> (= *P. maculata*).

DESCRIPTIONS & ILLUSTRATIONS. — Fr., Icon. select. Hymenomyc. 1(2/3): pl. 134, fig. 2. 1879; Maire, l.c., pl. 5 (as *Hypholoma agaves*); Romagn., Nouv. Atl. Champ. 3: pl. 206 B. 1961; same specimens depicted in Champ. Europe 1: pl. 137 (1977), but – as stated by Romagnesi in litt. – erroneously with green in colours of caps and stems; Alessio in Micolog. Ital. 3 (2): 15, pl. 8. 1974; Bonin in Docum. mycol. 15: 21. 1974; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 50. 1982; Kühn. & Romagn., l.c.

Cap 25–53 mm, at first acorn-shaped (as a *Coprinus*), already marked at margin with coarse, tortuous wrinkles, next convex to broadly conical, finally spreading, with very large, obtuse, low umbo, with thin, soon torn or both torn and fringed margin, at first uniformly grey-brown, sometimes with darker centre, next white, pale brownish grey with dark brown greyish bistre centre, not or scarcely hygrophanous, covered with very delicate fibrils, some bistre or grey, others white or concolorous with underlying tissue, often forming small scales, speckling surface, at margin with a few remaining silky-fibrillose prolongations of universal veil. Velar fibrils scarce on stem. Gills 2.5–5 mm, at first crowded, later more distant, very thin, with three lengths of lamellulae, narrowly adnexed or almost free, straight or subventricose, sharp and narrower in front, very pale coffee colour, pinkish beige (pale colours raising



Figs. 134–135. *Psathyrella melanthina*. — 134. Spores. — 135. Cheilocystidiogram.

doubt whether one is dealing with a brown spored species); edge slightly eroded and paler. Stem 35–90 x 2.5–5.5 mm, not very fragile, cylindrical or slightly attenuated towards base, remarkably hollow, with thick cortex, inside watery and with wavy fibrillose bundles, white, satiny, delicately flocculose at apex, strongly floccose in the middle, lower down transversely striped from small, bistre, fugacious fibrils, with white mycelium at base. Flesh white, of cap thin, very fragile, of stem firmer. Trama of 'washed' gill very pale brown (Mu. 10 YR 7/3). Spore print not recorded.

Spores 10–11.5 x 5.5–6.5  $\mu\text{m}$  (mean values 10.5 x 5.8  $\mu\text{m}$ : 1 collection), ellipsoid but adaxially flattened, very pale yellow, practically colourless, thin-walled; germ pore absent; with small hilar appendix. Basidia 8.5–9  $\mu\text{m}$  broad, 4-spored (acc. to Romagnesi). Pleurocystidia absent. Marginal cells: cheilocystidia 30–45 x 12.5–17.5  $\mu\text{m}$  utriform, ellipsoid-pedicellate with very obtuse apex, subutriform, moderately numerous, intermixed with numerous spheropedunculate cells, 15–25 x 7.5–18  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% pale brownish yellow, without yellow hyphal septa or encrustations. Pileipellis a layer of subglobose cells, 36–60  $\mu\text{m}$  diam. under a layer, formed by cylindrical, 8.5–15  $\mu\text{m}$  broad, minutely encrusted velar hyphae, narrowing at septa.

HABITAT & DISTRIBUTION. — On stumps of trees. Sept. Recorded from France, not from the Netherlands and British Isles.

COLLECTIONS EXAMINED. — F R A N C E, dpt. Gironde, near Bordeaux, 18 Sept. 1959 (herb. Romagn. 752).

NOTE. — The macroscopical description is a translation of a full description received from Romagnesi. The microscopical description is based on our own examination of an exsiccatum, received from Romagnesi.

### *Psathyrella caput-medusae* (Fr.) Konr. & Maubl. — Figs. 136–140

*Agaricus caput-medusae* Fr., Epicr.: 216. 1838. — *Stropharia caput-medusae* (Fr.) P. Karst in Bidr. Känn. Finl. Nat. Folk 32: 493. 1879. — *Geophila caput-medusae* (Fr.) Quél., Enchir. Fung. 112: 1886. — *Hypholoma caput-medusae* (Fr.) Rick., Blätterp.: 243, pl. 64, fig. 2. 1912. — *Psathyrella caput-medusae* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 127. 1948. — *Drosophila caput-medusae* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 370. 1953 (not val. publ., incompl. reference to basionym).

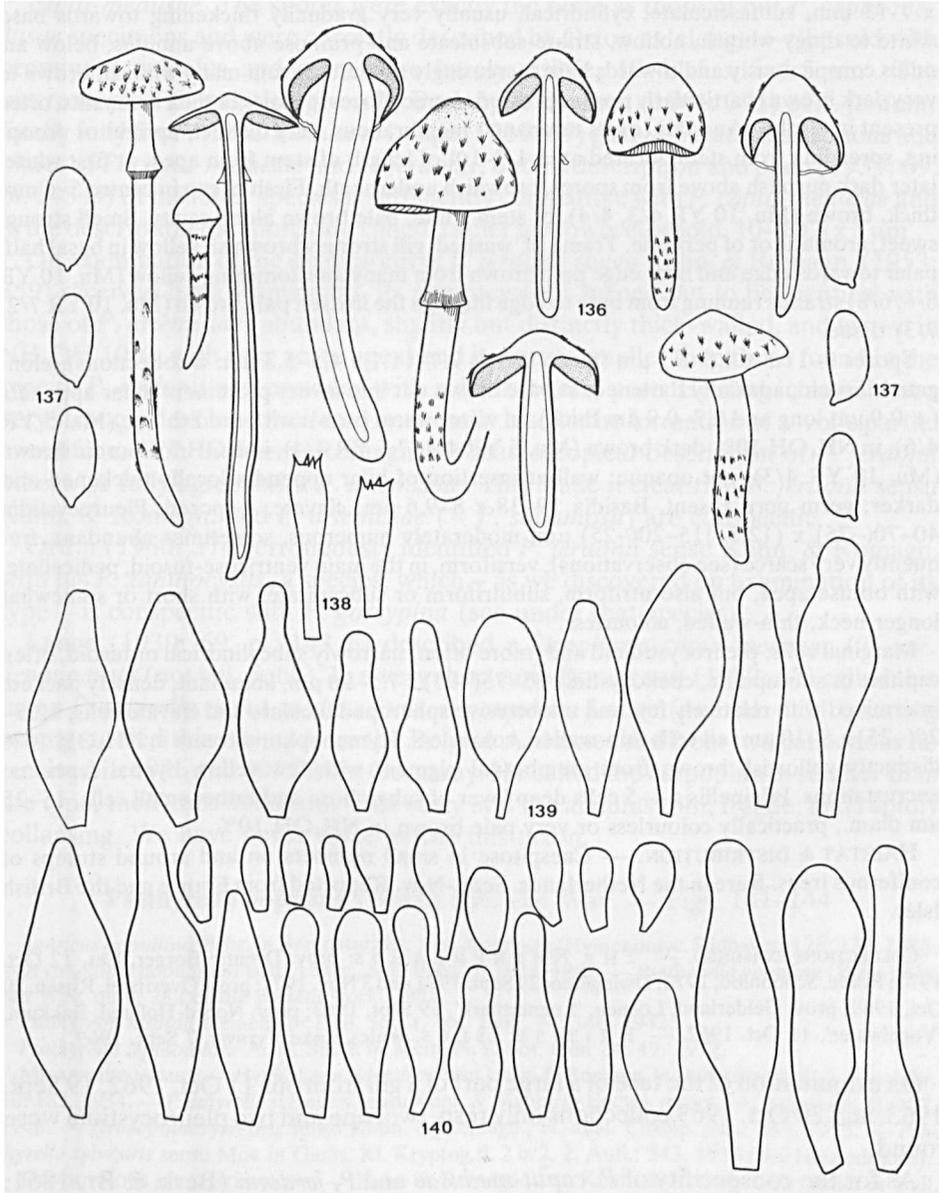
*Agaricus jerdonii* B. & Br. in Anns Mag. nat. Hist., ser. III, 7: 375. 1861. — *Stropharia jerdonii* (B. & Br.) Sacc., Syll. Fung. 5: 1025. 1887. — *Hypholoma jerdonii* (B. & Br.) Konr. & Maubl., Ic. select. Fung. 6: 88. 1937. — *Drosophila jerdonii* (B. & Br.) J. Favre in Ergebn. wiss. Unters. schweiz. NatPark. II 6(42): 553. 1960 (not val. publ., incompl. reference to basionym).

EXCLUDED. — *Drosophila jerdonii* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953 (= *P. artemisiae*)

DESCRIPTIONS & ILLUSTRATIONS. — Fr., Ic. select. Hymenomyc. 2(4): pl. 131 fig. 3. 1879; Cooke, Ill. Brit. Fungi 4: pl. 540/568. 1885; ditto, pl. 541/569. 1885 (as *Agaricus jerdonii*); Rick., l.c., Bres., Iconogr. mycol. 17: pl. 841. 1931, J. Lange, Fl. agar. dan. 4: 69, pl. 143 G. 1939; ditto, pl. 143D. 1939 (as *Stropharia jerdonii*); Kühn. & Romagn., l.c.; A. H. Smith in Mem. N.Y. bot. Gdn 24: 64. 1972.

Cap in early stages 20–30 mm, conico-paraboloid, with strongly inflexed marginal area, connected with stem by a firm, fairly thick membrane, pale brown (Mu. 10 YR 7/4) with darker centre (Mu. 7.5 YR 7/6); at maturity 30–50 mm, spreading to convex or plano-convex, sometimes with still inflexed extreme margin, normally with large obtuse, sometimes truncate umbo, more or less sharply delimited from periphery, at centre very dark brown, sordid brown, date brown, buff or warm brown (Mu. 7.5 YR 3/2, 4/2, 5/2, 4/4, 5/4) or reddish, chestnut brown (Mu. 5 YR 3/3, 4/3, 3/4, 4/4, 4/6), paler towards margin, in

marginal area pale to very pale brown (Mu. 10 YR 7/4, 7/6), substrate, hygrophanous, drying out to fairly pale brown (Mu. 10 YR 6/3, 6/4, 5/3), isabelline cream or pale pinkish brownish (Mu. 7.5 YR 6/4; 5 YR 6/3, 6/4), slightly darker at centre, not micaceous, at margin subsulcate, in earliest stages covered all over by a homogeneous, easily removable minutely lanose whitish to pale brown (Mu. 10 YR 7/4, 7/6) coating and this in peripheral



Figs. 136–140. *Psathyrella caput-medusae*. — 136. Carpophores (x 0.5). — 137. Spores. — 138. Basidia. — 139. Pleurocystidiogram. — 140. Cheilocystidiogram.

Een andere vermeldenswaardige paddestoel van de tentoonstelling in Hilversum is *Hypholoma melantinum* (Fr.) of *Hypholoma scobinaceum* (Fr.) (Konrad et Maublanc, pl. 41). Dit is een zeer mooie zwam: op een geelbruin fond liggen zwarte, aangedrukte, vezelige schubben. Ook de steel vertoont deze draederige schubben. De lamellen zijn donker, de sporen onder het microscoop ook (een *Hypholoma*!) en nogal klein, ik mat ze:  $4-5/3-4\mu$ . Aan de snede der lamellen komen groepen blazige cellen voor,  $10-14\mu$  breed, ik vond ze evenwel ook verspreid over de lamellen-vlakte, wat niet vermeld staat in Konrad et Maublanc. Soms zijn deze cellen in een punt uitgetrokken. In *Fungus*, Jrg. 5, no 3 (1 Febr. 1934) komt een foto van deze mooie *Hypholoma* voor in het cycloonbos in Ruurlo. Zoals ze daar staan lijken ze meer op *Hypholoma cotoneum* met veel minder donkere, meer afstaande schubben, maar we twijfelen er niet aan, of dat is in dit geval slechts schijn.

Amersfoort.

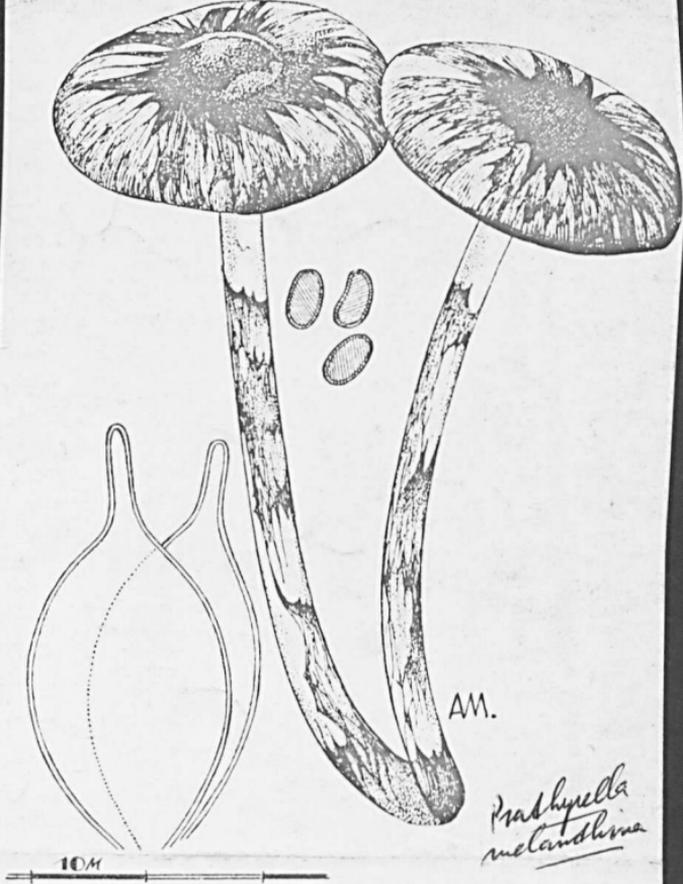


Fig. 3. *Hypholoma melantinum* (Fr.) met sporen en cystiden ( $\pm 1440 \times$ )

(Wordt vervolgd).

A. F. M. REYNDERS.

1/2-2/3 and from margin towards centre very soon breaking into numerous small white or whitish adpressed or recurved, easily detersile, fibrillose scales, their tips becoming brown to dark brown; centre of cap remaining smooth and darkening. Gills 3–6.5(–9) mm broad, ventricose, crowded, moderately broadly adnate to narrowly adnexed, tobacco brown (Mu. 7.5 YR 3/2, 4/2, 5/2), chocolate brown or greyish chocolate brown (Mu. 2.5 YR 4/4; 5 YR 6/4) or browner (Mu. 7.5 YR 4/4, 5/4; 10 YR 4/3), with white, fimbriate edge. Stem 45–120 x 7–13 mm, subfasciculate, cylindrical, usually very gradually thickening towards base, white to dingy whitish, hollow, striate-subsulcate and pruinose above annulus, below annulus conspicuously and towards base increasingly squamose from many whitish, brown to very dark brown (particularly tips) adpressed to erect floccose scales or their remnants, often present in girdles. Annulus (or its remnants) membranous, very distinct, upright or drooping, spreading from stem, located at  $\pm$  1/3-1/4 of length of stem from apex, at first white, later dark purplish above from spores, brownish underneath. Flesh of cap in centre 5–6 mm thick, brown (Mu. 10 YR 4/3, 4/4), of stem white, pale brown along cavity. Smell strong, sweet, aromatic or of perfume. Trama of 'washed' gill strongly brownish yellow in basal half, paler towards edge and near edge pale brown from many anastomosing yellow (Mu. 10 YR 6/6, 6/8) strands running from base to edge through the in itself pale brown (Mu. 10 YR 7/2, 7/3) tissue.

Spores 9–11.5 x 4.5–5.5  $\mu$ m (mean values 9.4–11.1 x 4.5–5.3  $\mu$ m: 8 collections), elongate-ellipsoid, adaxially flattened, at base drawn out into a very prominent, hilar appendix ( $\pm$  0.9  $\mu$ m long and 0.7–0.9  $\mu$ m thick), in water warm brown with reddish hue (Mu. 5 YR 4/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/4; 7.5 YR 4/4), in KOH 5% sordid brown (Mu. 10 YR 4/3), not opaque; wall at insertion of hilar appendix locally thickened and darker; germ pore absent. Basidia 19–38 x 8–9.6  $\mu$ m, clavate, 4-spored. Pleurocystidia 40–70(–75) x (12.5–)15–20(–25)  $\mu$ m, moderately numerous, sometimes abundant, frequently very scarce (see observations), versiform, in the main ventricose-fusoid, pedicellate, with obtuse apex, but also utriform, subutriform or subcapitate, with short or somewhat longer neck, thin-walled, colourless.

Marginal cells: pleurocystidioid and (more often) narrowly subcylindrical or fusoid, often capitate or subcapitate, cheilocystidia 35–75(–95) x 7.5–20  $\mu$ m, abundant, densely packed, intermixed with relatively few and unobtrusive spheropedunculate and clavate cells, 12.5–20(–25) x 5–10  $\mu$ m; all cells thin-walled, colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% distinctly yellowish brown from membranous pigment with few yellow hyphal septa, no encrustations. Pileipellis a 4–5 cells deep layer of subglobose and rather small cells, 15–25  $\mu$ m diam., practically colourless or very pale brown in NH<sub>4</sub>OH 10%.

HABITAT & DISTRIBUTION. — Caespitose in small numbers on and around stumps of coniferous trees. Rare in the Netherlands. Sept.-Nov. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Drente: Borger, Ees, 12 Oct. 1971; Rolde, Schoonloo, 1972; Dwingeloo, 29 Sept. 1971 and 3 Nov. 1971; prov. Overijssel, Rijsen, 20 Oct. 1969; prov. Gelderland, Loenen, 'Loenermark', 19 Sept. 1963; prov. Noord-Holland, Bakkum, 'Vogelwater', 11 Oct. 1962. — BRITISH ISLES, Wales, Lake Vyrnwy, 7 Sept. 1969.

On examination of the face of a large part of a gill from our 11 Oct. 1962, 19 Sept. 1963, and 20 Oct. 1969 collections only resp. two, one and two pleurocystidia were found.

As for the conspecificity of *P. caput-medusae* and *P. jerdonii* (Berk. & Br. 1861: 375): Contrary to Orton's statement (1960: 374) that in the type material of *P. jerdonii* pleurocystidia are 'apparently absent', we found on examination of a gill of

that type material, warmed for 24 hours in KOH 5% and then stained with Congo Red, ten unmistakable pleurocystidia, fully compatible with those present in our material of *P. caput-medusae*. We also found in a small area of a gill edge of the type quite a large number of large, capitate, densely packed cheilocystidia, fully agreeing with the pattern of the cellular lining of the gill edge in our collections of *P. caput-medusae*. The spores were exactly the same as those of our *P. caput-medusae* specimens and were correctly described by Orton as 'elongate-ellipsoid with prominent apiculus and germ pore barely visible, 10–11.5 x 5–5.5  $\mu\text{m}$ '. The macroscopical description given by Berkely & Broome (1861: 375) of *P. jerdonii* finally fully fits *P. caput-medusae*. Lange (1939: 69) gave separate descriptions and plates of *P. caput-medusae* and *P. jerdonii*, but his description and plate (1939: 69, pl. 143 D) of the latter species is sufficiently compatible with *P. caput-medusae* and in the description the spores are called 'rather narrowly ellipsoid, 10–10.5 x 5  $\mu\text{m}$ '.

On examination of the exsiccatum of *P. jerdonii* sensu Kühn. & Romagn. (1953: 359) received from Romagnesi, its pleurocystidia turned out to be identical with those of *P. artemisiae* (abundant, slightly but distinctly thick-walled, and brown in  $\text{NH}_4\text{OH}$  10%, with very acute apex) and its spores smaller than those found in the type of *P. jerdonii* and provided with a distinct germ pore. Bearing in mind that a very strongly developed veil may very easily lead to the formation of a 'voile partiel annuliforme' on the stem, Romagnesi's macroscopical description of *P. jerdonii* otherwise fully agrees with *P. artemisiae*. This made it clear that *P. jerdonii* sensu Kühn. & Romagn. and *P. artemisiae* (= *P. squamosa*) are conspecific.

Orton (1960: 374) erroneously identified *P. jerdonii* sensu Kühn. & Romagn. with his *P. xanthocystis*, a species, which – as we discovered on examination of its type – is conspecific with *P. gossypina* (see under that species).

Lange (1939: 69, pl. 143 F) described a *Stropharia caput-medusae* (?) var. *depauperata* (not val. publ.). In a very short note Romagnesi (1982: 67) called this taxon *Psathyrella caput-medusae* var. *depauperata* Lange (not val. publ.), stating having studied this variety from the Belgian Ardennes and from two collections he received in 1976 and 1977 from Germany. He called the carpophores smaller than the type, their caps and stems little scaly and the annulus thin, fragile, and rapidly collapsing. We have never come across this taxon.

### ***Psathyrella populina* (Britz.) Kits van Wav. — Figs. 141–144**

*Agaricus populinus* Britz. in Ber. naturhist. Ver. Augsburg (Hymenomyc. Südbayern) 28: 131. 1885. — *Hypholoma populinum* Britz.) Sacc., Syll. Fung. 5: 1034. 1887. — *Psathyrella populina* (Britz.) Kits van Wav. on p. 282 of the present work. 1985.

*Psathyrella hispida* Heinem. in Bull. Soc. r. bot. Belg. 74: 146. 1942.

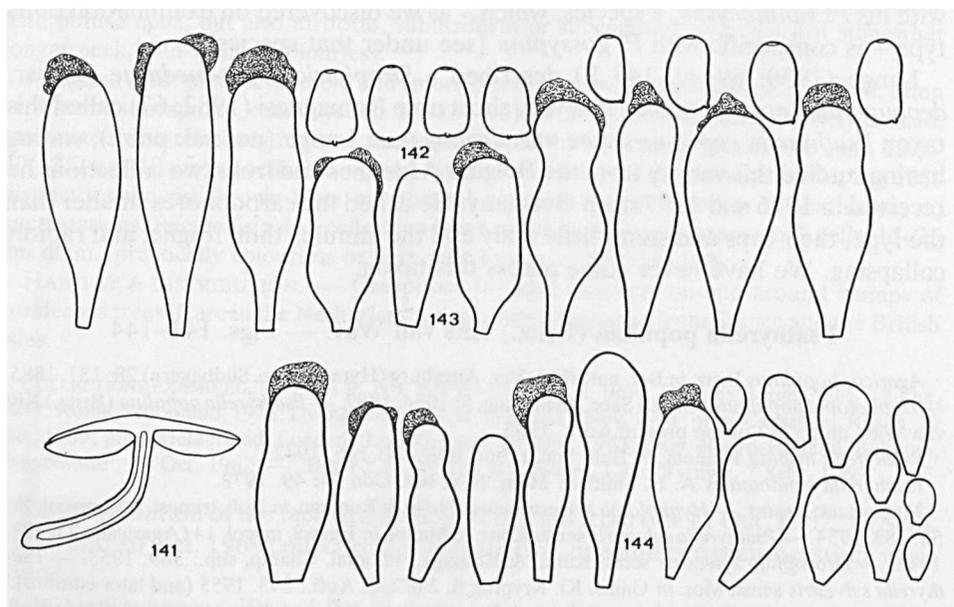
*Psathyrella lepidotooides* A. H. Smith in Mem. N.Y. bot. Gdn 24: 49. 1972.

MISAPPLIED NAMES. — *Hypholoma sylvestre* sensu Heim & Romagn. in Bull. trimest. Soc. mycol. Fr. 50: 183. 1934. — *Psathyrella sylvestris* sensu Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 127. 1948. — *Drosophila sylvestris* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 369. 1953. — *Psathyrella sylvestris* sensu Mos. in Gams, Kl. Kryptog. fl. 2 b/2, 2. Aufl.: 243. 1955 (and later editions).

DESCRIPTIONS & ILLUSTRATIONS. — Heim & Romagn., l.c.; Kühn. & Romagn., l.c.; Imler in Bull. trimest. Soc. mycol. Fr. 71: Atlas pl. 106. 1955; Svrček in Česká Mykol. 23: 262. 1969 (as *P. sylvestris*, Czech); Printz in Friesia 10: 335. 1974 (as *P. silvestris*); A. H. Smith, l.c. (as *P. lepidotooides*).

Cap 17–53 mm, at first hemispherical or paraboloid, then spreading to convex, finally plane, without umbo, rarely slightly umbonate or vaguely depressed, with rounded off, obtuse, slightly irregular or torn margin, whitish, pale greyish, brown, isabelline, olivaceous, at centre beige with ochreous hue, towards margin paler and greyer with faint violaceous hue, not hygrophanous, opaque, sprinkled with adpressed dark,  $\pm$  triangular, ochre, brown, brown-bistre or sepia, adpressed, very distinct small scales or bundles of fibrils, often fairly thinly spread (in places even absent) contrasting with paler or whitish ground colour, scanty towards centre, becoming fewer and much finer towards margin. Gills 2.5–6 mm broad, crowded to subdistant, roundly adnexed, segmentiform to subventricose, at first pale brown, then purplish, finally brown chocolate, with pruinose white edge. Stem 30–65 x 3–6.5 mm, usually short, cylindrical, sometimes slightly thicker towards base, straight or slightly curved, white, later towards base brownish or brownish ochre-olivaceous (always paler than cap) and very finely speckled from small brown or brown-olivaceous fibrils, remaining white at sulcate, pruinose, and satiny apex. Flesh in centre of cap fairly thick (up to 4 mm), thin at margin, not watery, very white or pinkish, in the end in stem faintly pale straw or cream coloured, smell indistinctive. Trama of 'washed' gill brownish yellow (Mu. 10 YR 6/4) or yellow (Mu. 10 YR 7/6), equally strong from base to edge. Spore print purplish brown.

Spores 6.5–8 x 4.5–5.5 (in profile), x 5–5.5 (in face view) (mean values 7.5–7.8 x 4.7–4.9 x 5.3  $\mu$ m: 3 collections), in face view subtriangular to almost square with rounded apex and rectangular or subrectangular base, sometimes with a small bulge on one side at or near base, in profile usually phaseoliform or subphaseoliform, in water orange brown (Mu. 5 YR 5/6, 4/8; 7.5 YR 5/6), in  $\text{NH}_4\text{OH}$  10% darker (Mu. 5 YR 4/6, 4/4) in  $\text{KOH}$  5% brown (Mu. 7.5 YR 4/4), not opaque, with small but distinct germ pore  $\pm$  1  $\mu$ m and very small hilar appendix. Basidia 17.5–24 x 8–9.5  $\mu$ m, clavate to subcylindrical, 4-spored. Pleurocystidia (35–)47.5–70 x 12.5–22.5  $\mu$ m, utriform-pedicellate (some ellipsoid-pedicellate with very



Figs. 141–144. *Psathyrella populina*. — 141. Carpophores (x 0.5). — 142. Spores. — 143. Pleurocystidiogram. — 144. Cheilocystidiogram.

broad apex), numerous to abundant, rarely scarce, thin-walled, colourless, some or many faintly amyloid in Melzer, apex covered by a mucoid mass (often large) staining green in  $\text{NH}_4\text{OH}$  10% in fresh material. Marginal cells: pleurocystidioid cheilocystidia 30–55 x 12.5–20  $\mu\text{m}$ , sometimes mixed with a motley of large and smaller ellipsoid and clavate cells (17.5–37.5 x 9–17.5  $\mu\text{m}$ ) and smaller spheropedunculate and clavate cells (17.5–20 x 7.5–10  $\mu\text{m}$ ), sometimes mixed with practically only the latter cells; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% distinctly yellowish brown from membranous pigment, without yellow septa or encrustations. Pileipellis a 3–5 cells deep layer of colourless to very pale brown, subglobose cells, 15–30  $\mu\text{m}$  diam., covered by a thick layer of cylindrical hyphae, 5–15  $\mu\text{m}$  broad, densely filled with dark brown, vacuolar pigment.

**HABITAT & DISTRIBUTION.** — On dead wood of *Populus* (according to Romagnesi also on *Fagus*). Very rare, found twice in the Netherlands (Oct., Nov.); reported from France (according to Romagnesi fairly common and occurring chiefly in May, but also in Oct., Nov.) and the British Isles (K).

**COLLECTIONS EXAMINED.** — THE NETHERLANDS; prov. Noord-Holland, Castricum, 27 Oct. 1955; prov. Zeeland, Aardenburg, 9 Nov. 1981. — FRANCE; dpt. Yonne, Sens, 25 May 1942, (herb. Romagn. 300).

The above description is chiefly based on our two Dutch collections supplemented with data from Romagnesi.

Kühner & Romagnesi (1953: 374, note 25) stated that '*Hypholoma Battarae* Fr. (= *Drosophila aculeata* Quél.) is very close to, but differs from *Drosophila sylvestris* by its stem covered with erect, bistre to olivaceous, fibrillose scales, which neither Romagnesi nor Kühner ever noticed in the numerous collections of the latter species studied by them'. But recently (1982: 63) Romagnesi called the stem of his *Drosophila sylvestris* (= *P. populina*) a little brownish or ochre brownish olivaceous (as indeed it was according to the collector of the specimens of our 1955 collection). Common to the three species described under the names *Agaricus battarae* Fr. (1821: 175), *Stropharia aculeatus* Quél. (1872: 256, pl. 22 fig. 4) and *Geophila versicolor* (With.) Quél. (1886: 112) are the distinctly olivaceous tinge in the colour of the cap (unique in genus *Psathyrella*), the fibrillose-scaly cap and stem and the association with *Populus*. On the strength of these characters the three species could be and have been (see Kühn. & Romagn., 1953: 374) associated with *P. populina*.

As for *A. battarae*, Fries in his first description placed it in the *Lentiscyphi*. The species of that group were stated to have a 'substantia carnosae coriacea', a 'rigidor' cap and 'subrufo' gills, characters not being applicable to *P. populina*. Later, moreover (1838: 217 and 1874: 289) Fries mentioned the presence of an annulus on the stem (absent in *P. populina*). Finally, in all his descriptions Fries referred to Battara's plate 28 fig. H (1755) which shows stems densely covered with erect pointed scales (never described for *P. populina*). Recently Smith (1972: 426) described *P. battarae* (Fr.) Konr. & Maubl. (annulus very distinct, even 'with dark scales on the under side') based on one collection, adding, however, that he regarded the use of the epithet 'battarae' tentative.

In conclusion we feel that *A. battarae* Fr. cannot be conspecific with *P. populina* and for the time being has to be regarded as a dubious and insufficiently known

species. As such *Stropharia aculeatus* Quél. and *Geophila versicolor* (With.) Quél. also have to be regarded. The former species was described as having a fleshy cap, a stem which is distinctly thickening towards the swollen base and a very distinct annulus, strongly spreading from the stem (see Quélet's plate 22 fig. 4) and described as 'anneau supérieure et suspendu à la marge en larges lambeaux'. The latter species was described as having a sulcate cap and an annulus.

We fully agree with Smith (1972: 50) that Gillet's original description (1878: 568) of *Hypholoma sylvestre* (the name up till very recently universally used for the species described above) reads more like a species related to either *P. maculata* or *P. cotonea*. With Gillet the caps are large (50–70 mm), covered with broad fibrillose brown or blackish scales, the stem thick (70–100 x 10 mm) and yellowish at base (as in *P. cotonea*!), while no olivaceous colour is mentioned and the species is said to be terrestrial.

To illustrate again the confusion around the interpretation of species of section *Pseudostropharia*: For *P. populina* Romagnesi (1982: 62) listed *Hypholoma melanthinum* sensu Ricken as a synonym, although Ricken did not mention olivaceous colours, called the spores cylindrical-elliptical, the pleurocystidia flask-shaped and scarce, the marginal cystidia 'blasig, 45–55 x 12–15 µm'. Romagnesi also listed *Hypholoma lepidotum* Bres. (1931: plate 850), but the plate bears no likeness with *P. populina*, the three spores depicted by Bresadola do not resemble the triangular spores of *P. populina* at all and in the text are merely called reniform, while Bresadola himself regarded his species as very similar to *P. melanthina*.

According to Kühner & Romagnesi (1953: 374, note 26) *P. hirtosquamulosa* (Peck) A. H. Smith scarcely differs from *P. populina*. In exsiccata, received from Smith, they had found characters analogous with those of *P. populina*, e.g. triangular spores and non-amyloid contents of the cystidia. But recently Romagnesi (1982: 62) stated that in *P. populina* some cystidia do have amyloid contents. Realising that Smith examined no less than 53 collections of *P. hirtosquamulosa*, it is noteworthy that he did not mention olivaceous colours on either cap or stem. With him the sizes of the carpophores of *P. hirtosquamulosa* are smaller (cap 10–35 mm, stem 20–40 x 1.5–2 mm) than those reported for *P. populina* (cap 17–53 mm, stem 30–65 x 1.5–6.5 mm) and the habitat is said to be particularly *Fraxinus* (for *P. populina* particularly *Populus*). For these reasons we provisionally regard *P. hirtosquamulosa* and *P. populina* as different species.

We examined the type specimens of *P. hispida* Heinemann and concluded that they represent small specimens of *P. populina*. Both 'species' have exactly the same spores and cheilocystidia and the velar hyphae of both contain large amounts of dark brown vacuolar pigment.

### ***Psathyrella maculata* (Parker) A. H. Smith — Figs. 145–149**

*Hypholoma maculata* Parker in Mycologia 25: 205. 1933. — *Drosophila maculata* (Peck, in error) Kühn. & Romagn., Fl. anal. Champ. sup.: 370. 1953 (not val. publ., basionym not mentioned). — *Psathyrella maculata* (Peck, in error) Mos. in Gams, Kl. Kryptog.fl. 2b, 2. Aufl.: 243. 1955 (not val. publ., basionym not ment.); *Psathyrella maculata* (Parker) Mos. in Gams, Kl. Kryptog.fl. 2b/2, 3. Aufl.: 219. 1967 (and later editions: not. val. publ., basionym not mentioned); *Psathyrella maculata* (Parker)

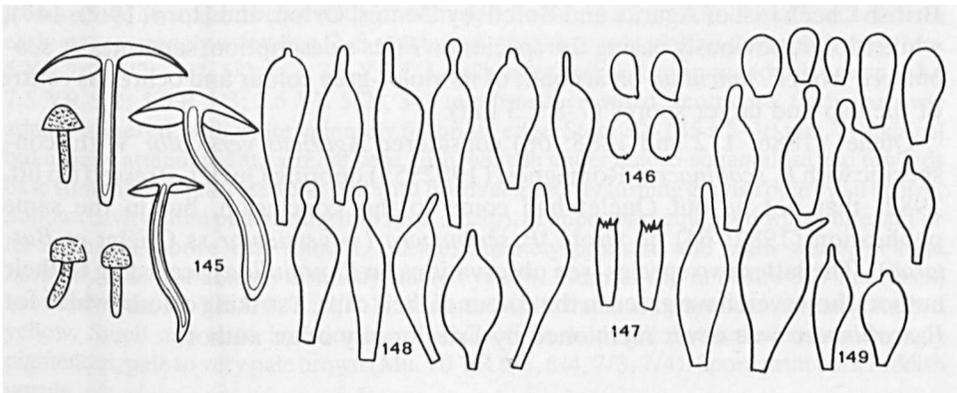
A. H. Smith in Mem. N.Y. bot. Gdn 24: 56. 1972.

MISAPPLIED NAMES. — *Hypholoma scobinaceum* sensu Konr. & Maubl., Ic. select. Fung. 1(5): pl. 41 fig. 2. 1929 (size and colour of spores excluded). — *Hypholoma melanthinum* sensu J. Lange, Fl. agar. dan. 4: 7, pl. 146 D and D, 1939.

DESCRIPTIONS & ILLUSTRATIONS. — Konr. & Maubl. l.c. (as *Hypholoma scobinaceum*); J. Lange, l.c. (as *H. melanthinum*); Romagn., Nouv. Atl. Champ. 3: pl. 206 A. 1961; Romagn., Champ. Europe 1: pl. 135. 1977; A. H. Smith in Mem. N.Y. bot. Gdn 24: 56. 1972; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 52. 1982; Kühn. & Romagn., Fl. anal. Champ. sup.: 370. 1952; Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 386, fig. 290. 1981.

Cap in earliest stages (10–15 mm) conico-paraboloid with slightly incurved marginal area, white due to the initially white but soon brown veil; at maturity spreading to 20–40 (–60) mm, convex or plane with deflexed marginal area, sometimes with vague umbo, fleshy, ground colour sordid white or pale brownish (Mu. 10 YR 6/3), covered with very dark brown, fuliginous (Mu. 7.5 YR 3/2; 10 YR 3/2), almost blackish velar fibrils forming a dense, united, coarsely tomentose pelt at centre but towards margin adpressed, disjointed broad bundles of fibrils and scales, exposing between them the sordid white flesh, with at margin scales paler to even whitish and appendiculate, hygrophanous, drying out to pale brownish grey (Mu. 10 YR 6/2), scales and bundles of fibrils shrinking and becoming blackish. Gills 2–5 mm broad, subventricose to almost straight, slightly ascending, narrowly adnate or emarginate, crowded, pale brown (as in *Inocybe*, Mu. 7.5 YR 6/2–6/4) when cap viewed from below, on face sordid brown (Mu. 7.5 YR 5/2), weak chocolate or reddish brown (Mu.  $\pm$  5 YR 3/3), with white, fimbriate edge. Stem 30–50 x 2.5–5 mm, cylindrical, often flexuous, with white ground colour, at base not yellow but sometimes black, fistulose, strongly and towards base increasingly and coarsely fibrillose-scaly from brown fibrils below annuliform zone or distinct annulus, sharply delimiting white pruinose sulcate apex from lower  $\pm$  2/3–3/4. Flesh of cap in centre 3–4 mm thick, dark greyish brown (Mu. 10 YR 4/2) but superficial layer whitish, of stem pale yellowish brown, outer layer white. Smell indistinctive. Trama of 'washed' gill strongly pigmented, brownish yellow (Mu. 10 YR 6/6). Spore print brownish purple.

Spores 4.5–5.5 x 2.5–3.5  $\mu$ m (mean values 4.6–5.2 x 3–3.4  $\mu$ m: 5 collections), in face view broadly ellipsoid to ellipsoid-ovoid, in profile ellipsoid, adaxially flattened, in water and NH<sub>4</sub>OH 10% pale brownish yellow (Mu. 10 YR 6/6, 7/6), in KOH 5% pale olive yellow ( $\pm$  Mu. 2.5 Y 6/4), not opaque; germ pore very indistinct, practically absent; hilar appendix



Figs. 145–149. *Psathyrella maculata*. — 145. Carpophores (x 0.5). — 146. Spores. — 147. Basidia. — 148. Pleurocystidiogram. — 149. Cheilocystidiogram.

distinct. Basidia 14.5–22.5 x 5–6.5  $\mu\text{m}$ , subcylindrical to subclavate. Pleurocystidia 22.5–35 x 10–15  $\mu\text{m}$ , (rostrum, 2–12.5 x 2–3.5  $\mu\text{m}$ , sometimes swollen up to 5  $\mu\text{m}$  at apex, excluded), clavate, rostrate, numerous, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 20–35(–4.5) x 7.5–15(–17.5)  $\mu\text{m}$ , abundant and densely packed, sometimes a few cells without rostrum, intermixed with few spheropedunculate and clavate cells, 10–22.5 x 5–10  $\mu\text{m}$ ; all cells thin-walled and colourless; rostra very thin-walled, not or scarcely staining in Congo Red. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% distinctly brownish yellow, without yellow hyphal septa or encrustations. Pileipellis a 3–4 cells deep layer of globose, subglobose, sometimes short ellipsoid, colourless cells, 15–30  $\mu\text{m}$  diam., under a thick layer of long, from brownish yellow membranous pigment strongly pigmented velar hyphae, 8–20  $\mu\text{m}$  thick.

HABITAT & DISTRIBUTION. — Caespitose, subcaespitose or solitary on stumps of coniferous and deciduous trees. Sept.-Nov. Rare in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S: prov. Overijssel; estate 'Singraven', 28 Oct. 1961; Delden, estate 'Twickel', area 'Breeriet', 5 Oct. 1976; prov. Gelderland, De Steeg, 9 Nov. 1962; prov. Noord-Brabant, Dorst, loam-pits, 10 Sept. 1963; prov. Limburg, Maastricht, 25 Oct. 1958.

Of all species of section *Pseudostropharia*, *P. maculata* is the only one of which a close relationship or conspecificity with *Agaricus scobinaceus* Fr. could be considered.

Romagnesi (1982: 52), rightly pointed out that with Fries that species is 'udus fragilis' and has a cap of which the limb is greyish-violaceous, a colour never seen or mentioned in the literature in *P. maculata*. Furthermore Fries called the cap 'gibbo, sulcatulo', in the centre 'livido lutescente' with 'squamulis confertis adpressi secudentibus nigricantibus' (features little corresponding with the blackish fuliginous adpressed coarsely fibrillose and broad bundles of fibrils and scales on the firm and fleshy cap of *P. maculata*) and the base of the stem 'incrassata attenuatus'. We follow Romagnesi (1982: 50) in deleting *P. scobinacea* from our list of accepted species of section *Pseudostropharia*, as neither he nor we ever came across specimens, answering Fries's descriptions.

The species is not dealt with by Smith (1972) either, but figures in the 'New British Check List of Agarics and Boleti' by Dennis, Orton, and Hora (1960: 147), while Moser, obviously basing the species on Fries's description, separates *P. scobinacea* from *P. maculata* on account of its violet-grey colour and ochreous centre of the cap and larger spores (7–8 x 3  $\mu\text{m}$ ).

Quélet (1886: 112 and 1888: 66) considered *Agaricus versicolor* With. conspecific with *P. scobinacea*. Romagnesi (1982: 55) quoting Quélet, stressed (in litt. 1982) that not he but Quélet had come to this conclusion, but in the same publication (1982: 64) he wrote '*P. scobinacea* (= *versicolor* ss Quélet et *Battaræ*)'. The latter two species (see observations on *P. populina*) according to their authors, however, have green in the colour of their caps, a striking colour, which for *P. scobinacea* was never mentioned by Fries or any other author.

***Psathyrella cotonea* (Quél.) Konr. & Maubl. — Figs. 150-154**

*Stropharia cotonea* Quél. in Bull. Soc. bot. Fr. 23: 328, pl. 2 fig. 5 ('1876') 1877. — *Agaricus cotoneus* (Quél.) Cooke & Quél., Clav. syn. Hymenomyc. eur.: 92. 1878. — *Geophila cotonea* (Quél.) Quél., Enchir. Fung. 112. 1886. — *Hypholoma cotonea* (Quél.) J. Lange in Dansk bot. Ark. 4(4): 41. 1923. — *Psathyrella cotonea* (Quél.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 126. 1948. — *Drosophila cotonea* (Quél.) Kühn. & Romagn., Fl. anal. Champ. sup.: 370. 1953 (not val. publ., basionym not mentioned).

*Agaricus hypoxanthus* Phill. & Plowr. in Grevillea 13: 48. 1884. — *Hypholoma hypoxanthum* (Phill. & Plowr.) Sacc., Syll. Fung. 5: 1037. 1887.

*Hypholoma aggregatum* Peck in Rep. N.Y. State Mus. 46: 106. 1893.

*Agaricus pseudostorea* W. G. Smith in J. Bot. 41: 386. 1903. — *Hypholoma pseudostorea* (W. G. Smith) Sacc., Syll. Fung. 17: 89. 1905.

*Agaricus storea* var. *caespitosus* Cooke, Handb. Brit. Fungi 4: 204. 1887. — *Hypholoma storea* var. *caespitosum* (Cooke) Killerm. in Denkschr. regensb. bot. Ges. 20: 64. 1936.

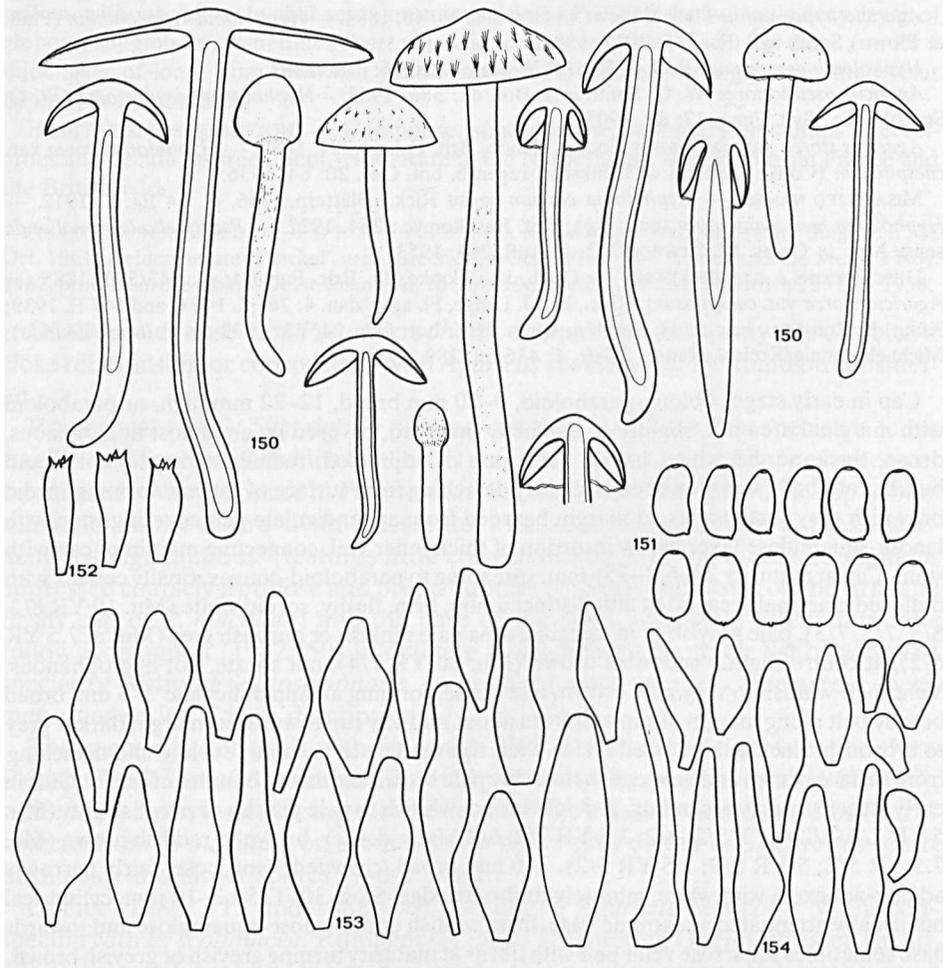
MISAPPLIED NAMES. — *Hypholoma cascum* sensu Rick., Blätterp.: 246, pl. 64 fig. 1. 1912. — *Hypholoma lacrymabundum* sensu Rea, Brit. Basidiomyc.: 264. 1922. — *Psathyrella lacrymabunda* sensu Mos. in Gams, Kl. Kryptog. fl. 2, 1. Aufl. 204. 1953.

DESCRIPTIONS & ILLUSTRATIONS. — Quél., l.c.; Cooke, Ill. Brit. Fungi 4: pl. 543/580. 1885 (as *Agaricus storea* var. *caespitosus*); Rick., l.c.; J. Lange, Fl. agar. dan. 4: 76, pl. 146 C and 147 E. 1939; Kühn. & Romagn., l.c.; A. H. Smith in Mem. N.Y. bot. Gdn 24: 53. 1972 (as *P. lacrymabunda*); Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 436, pl. 289. 1981.

Cap in early stages oblong-paraboloid, 9–20 mm broad, 12–22 mm high, or paraboloid with marginal area not, slightly or distinctly incurved, covered by an almost homogenous, dense, thick, sordid white, lanose velar pelt of adpressed, radially arranged fibrils and bundles of fibrils, their lower ends slightly detaching from surface of cap and forming sordid brownish grey small scales, at margin bearded from appendiculate pelt covering stem with lanose-squamulose layer below insertion of thick inner veil, connecting margin of cap with stem. Cap at maturity 20–65(–75) mm, spreading to paraboloid-convex, finally convex with deflexed marginal area, often with distinct umbo, firm, fleshy, sordid white (Mu. 10 YR 8/2, 8/3, 7/2, 7/3), pale greyish or in marginal area pale pinkish or purplish grey (Mu. ± 7.5 YR 6/2), at centre slightly yellowish brown (Mu. 10 YR 7/4), not striate, not hygrophanous. Velar pelt whitish to very pale brown, less dense, forming an appendiculate 2–5 mm broad bearded belt along margin of cap and from about midway cap towards its margin darker grey to brownish-blackish adpressed scales, their tips tending to become revolute and detaching from surface of cap, and between them many pale brown fibrils and bundles of fibrils. Gills in early stages strongly ascending, 2–3 mm broad, whitish to pale pinkish or purplish grey (Mu. 5 YR 7/2, 8/2, 1/2, 5/2, 4/2; 7.5 YR 7/2, 6/2), later darker, brown to reddish brown (Mu. 7.5 YR 5/2; 5 YR 5/3; 2.5 YR 5/2), 3–6 mm broad, crowded, ventricose, fairly narrowly adnate-adnexed, with white, minutely fimbriate edge. Stem 30–135 x 3–10 mm, cylindrical but usually attenuated at extreme base, firm, whitish under lanose-squamulose and towards base sometimes squarrose velar pelt with fibrils at maturity turning greyish or greyish brown, hollow (cavity often penetrating into flesh of cap), in upper part equipped with white cuff or its remnants, above cuff smooth, sulcate, minutely pruinose and snow white, at base normally (but not always) distinctly stained yellow. Flesh of cap in centre 3–7 mm thick, brownish (Mu. 10 YR 5/4; 7.5 YR 7/2) of stem white but in extreme base normally stained yellow. Smell and taste indistinctive. Trama of 'washed' gill distinctly but not strongly pigmented, pale to very pale brown (Mu. 10 YR 6/3, 6/4, 7/3, 7/4). Spore print dark reddish purple.

Spores (6–)6.5–8(–9) x 3.5–4.5 μm (mean values 6.8–7.9 x 3.9–4.4 μm: 17 collections), polymorphic (degree of polymorphism varying from one collection to another), in face view

ellipsoid but often subcylindrical to even cylindrical, often ellipsoid-ovoid or with subrectangular base, rarely subtriangular, sometimes constricted in the middle; in profile most spores slightly to distinctly or strongly phaseoliform and sometimes with small suprahilar depression or even sausage-shaped, in water and  $\text{NH}_4\text{OH}$  10% orange-brown (Mu. 5 YR 5/8), in KOH 5% sordid brown (Mu. 10 YR 5/4), not opaque; germ pore present ( $\pm 1 \mu\text{m}$ ) but indistinct; hilar appendix small. Basidia 17.5–25.5(–32)  $\times$  6.5–9  $\mu\text{m}$ , clavate, 4-spored.



Figs. 150–154. *Psathyrella cotonea*. — 150. Carpophores ( $\times 0.5$ ). — 151. Spores. — 152. Basidia. — 153. Pleurocystidiogram. — 154. Cheilocystidiogram.

Pleurocystidia (32.5–)35–50(–60)  $\times$  10–17.5  $\mu\text{m}$ , in the main utriform (sometimes even subcapitate) or fusoid-pedicellate with thick neck and very obtuse apex, (moderately) numerous to abundant, thin-walled, colourless. Marginal cells: cystidia quite different from pleurocystidia, 30–65  $\times$  (7.5–)10–15  $\mu\text{m}$ , very polymorphic, in the main lageniform with short (sometimes somewhat longer) pedicel and distinct cylindrical to subcylindrical neck (3–4  $\mu\text{m}$  thick), usually passing gradually but not infrequently abruptly into cell body; also

many fusoid cells with obtuse to subacute apex, and some utriform or clavate cells; intermixed with few spheropedunculate and clavate cells (12.5–22.5 x 7.5–12 µm); all cells thin-walled, colourless. Hymenophoral trama sub micr. in NH<sub>4</sub>OH 10% pale to very pale brown or yellowish brown from membranal pigment, without yellow hyphal septa or encrustations. Pileipellis a 3–4 cells deep layer of globose, subglobose and a few oblong colourless cells, 15–25 µm diam.

**HABITAT & DISTRIBUTION.** — Caespitose, subcaespitose, rarely solitary in coniferous and deciduous woods (*Fagus*, *Betula*), terrestrial or on and around stumps of trees. Uncommon in the Netherlands. (July-)Sept.-Nov. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Friesland, Appelscha, 4 Nov. 1973; prov. Drente, Anloo, Eekst, 7 Nov. 1970; prov. Overijssel: Ommen, estate 'Ada's Hoeve', 13 Oct. 1962; Denekamp, estate 'Singraven', 28 Oct. 1962; Oldenzaal, estate 'Roderveld', 12 Oct. 1973; Delden, estate 'Twickel', 27 Sept. 1969 and 24 Oct. 1973; prov. Gelderland: Wilp, estate 'De Lathmer', 27 Oct. 1974; Laag Keppel, 23 July 1965; Putten, 15 Nov. 1958; Hoenderloo, 22 Oct. 1960; Wolfsheze, 16 Oct. 1965; Wageningen, 9 Sept. 1967; prov. Utrecht: Leusden, estate 'De Treek', 13 Nov. 1960; Hollandse Rading, 17 Oct. 1965; Austerlitz, 22 Oct. 1968; Amerongen, 30 Sept. 1972; prov. Noord-Brabant, Eindhoven, estate 'De Wielewaal', 10 Oct. 1965.

In the descriptions of our 18 collections of *P. cotonea* the yellow colour at the base of the stem often was not mentioned and indeed was not seen in a few of our own finds. In the literature also this colour is frequently lacking in descriptions (Bigeard, 1898: 209; Gillot & Lucand, 1887: 358; Masee, 1902: 211; Maire, 1911: 442; Ricken, as *H. cascum*, 1915: 246; v. Schulmann 1960: 73; and even with the author of *P. cotonea* himself, Quélet, 1877), while Lange (1939: 76, pl. 146 C) did not depict this colour but stated in his description that the stems are 'springing from a sulphur-yellow mycelium'.

Although it is generally accepted and sometimes even stressed that the edges of the gills are not dripping, Maire (1911: 441) stated that they very rarely are, Rea (1922: 264) that they are 'often distilling drops in wet weather' and A. H. Smith (1972: 53) that they 'become beaded with droplets under some conditions'. In none of our 18 collections of *P. cotonea* droplets were seen on the edges of the gills.

The controversy whether the epithet '*lacrymabunda*' should be used for *P. cotonea* (Quélet) Konr. & Maubl. or for *Lacrymaria velutina* (Pers.: Fr.) Konr. & Maubl. was rather recently dug up again by A. H. Smith (1972: 53) who reinstated the former epithet for *P. cotonea*. He believed that Fries' descriptions of *Agaricus lacrymabundus* pertained to what nowadays is called *Psathyrella cotonea* and 'were clear enough for the times'. The absence in Fries' descriptions of a yellow colour at the base of the stem he explained away by the fact that the base of the stem is not always yellow, while according to Smith the gill edges of *P. cotonea* 'sometimes become beaded with droplets in humid weather' (see above). Dennis, Orton and Hora (1960: 194) rejected the name *Agaricus lacrymabundus* as a *nomen confusum*.

Recently Bas (1983: 103) argued that in trying to interpret *A. lacrymabundus* Bull.: Fr., one has to go by Fries' 1821 publication of that name (not his later ones) and to take into consideration Fries' description and all his references, particularly those to Bulliard's plates and descriptions. If one goes exclusively by Fries' 1821 description, the epithet becomes a dubious name as the description cannot be

identified for sure, because it contains elements (e.g. 'pileus junior albidus dein fuscus') which could pertain to another species 'of which it is impossible to decide which species that could have been'.

Bas next argued that although Fries in 1821 had seen specimens, described by him as *A. lacrymabundus* (testified by the abbreviation 'v.v.' in his description), he at the same time referred to two excellent plates (Bulliard, 1791: pl. 525, fig. 3, and Sowerby, 1796: pl. 41) and an unambiguous description (De Candolle, 1805: 146). Fries clearly fully accepted Bulliard's species, which he merely slightly emended by including material seen by himself. The core of the concept of *Agaricus lacrymabundus*, however, remained Bulliard's plates and description. Therefore Bas selected Bulliard's first plate (1785: pl. 194 — with latin name and description and thus validly published under the 1981 version of the I.C.B.N.) as lectotype, which makes *Lacrymaria lacrymabunda* (Bull.: Fr.) Pat. the correct name for *Lacrymaria velutina* sensu auct., sensu lato.

Some of Fries' later publications (1836: 223; 1857: 423; 1874: 293; 'Icones', 1879: 34, pl. 134, fig. 1) do contain elements which make it understandable that some authors (e.g. Coutinho, 1919: 96; Rea, 1922: 264; Damblon, 1956: 70; A. H. Smith, 1972: 53) interpreted *A. lacrymabundus* Bull.: Fr. as *P. cotonea*: 'pileo piloso-squamoso, squamis innatus obscurioribus' (1874: 293), 'pileus primo albi dein fuscescunt' (1838: 223), 'valde caespitosus' (1874: 293 and Icones), and Fries' statement that *A. lacrymabundus* connects *A. storea* with *A. pyrrhotrichus*. Moreover, in 1874 Fries only cited Bulliard's plate 525 fig. 3, while in 1874 and in Icones Bulliard's plate 194 was called doubtful, Hoffman's plate (1863: pl. 15 fig. 3) being cited instead and called representing a small form of *A. lacrymabundus* (the latter plate resembles much more *P. cotonea* than *A. lacrymabundus*). In 'Icones' finally Fries even stated that no satisfactory pictures of his *A. lacrymabundus* existed. The carpophores on his own plate 134, fig. 1, having pale brown squamulose caps, the habit of *Lacrymaria lacrymabunda* and (two) very distinct drops of moisture on a gill edge, probably represent *L. lacrymabunda* and not *P. cotonea* (as stated by Kühn. & Romagn. 1953: 370, and Romagnesi, 1982: 58).

The confusion culminated in both Fries ('Icones') and Quélet (1886: 112 and 1888: 66) calling each others species identical and referring to each others plates. Finally Plowright (1899: 45) stated that at the appearance of Fries' 'Icones' the British mycologists immediately recognised in plate 134, fig. 1, depicting *Hypopholoma lacrymabundum*, the densely caespitose species which they always had erroneously called *Agaricus storea* (regardless of the fact that *A. storea* is always solitary). In 1888 Plowright was even able to show specimens of their species of Fries himself, who — as Plowright put it — 'unhesitatingly pronounced them to be *Hypopholoma lacrymabundum*'.

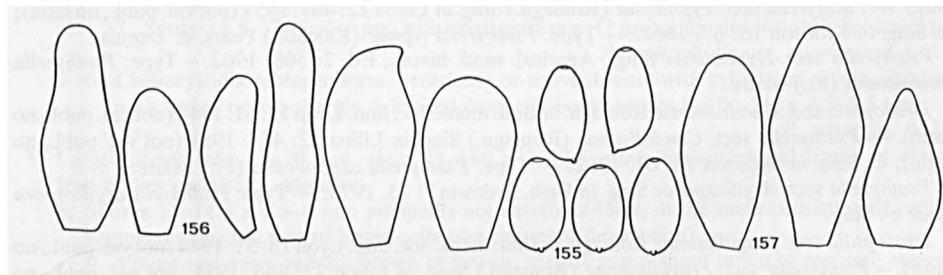
### ***Psathyrella storea* (Fr.) Bon — Figs. 155–157**

*Agaricus storea* Fr., Epicr.: 223. 1838. — *Hypopholoma storea* (Fr.) Sacc., Syll. Fung. 5: 1033. 1887. — *Drosophila storea* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 370. 1953 (not val. publ., basionym not mentioned). — *Psathyrella storea* (Fr.) Mos. in Gams., Kl. Kryptog. fl. 2, 1. Aufl.: 204. 1953 (and later editions); Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 55. 1982 (not val. publ., basionym not

mentioned). — *Psathyrella storea* (Fr.) Bon, Docum. mycol. 12 (48): 52. 1982.

DESCRIPTIONS. — Kühn. & Romagn., l.c.; Romagn., l.c.

Cap 16–40 mm, at first obtuse-conical, then truncate-conical but rapidly spreading and plane with obtuse, voluminous rounded umbo (in very early stages rarely only just present), with margin sometimes slightly wavy, thick and fleshy, not hygrophanous except for cream coloured yellowish-greyish umbo, contrasting with brown-grey but not dark, dull rest of cap under an abundant, very adpressed cover of very delicate, small, white fibrils causing a satiny, radially combed aspect, moreover and especially near margin surface covered with white, sometimes later totally disappearing, fibrillose specks, with bare, glossy umbo with metallic appearance from satiny surface, on artificial rehydration becoming dark, sordid chestnut brown, more ochre at umbo, substrate at margin. Veil white, in very young specimens appendiculate, sometimes leaving for a short while a vague fibrillose zone on stem, soon disappearing. Gills 3.5–4 mm broad, not very crowded, with lamellulae of 2–3 lengths, narrowly adnate, narrowing near stem, ventricose, at first white, then pale brown with pinkish hue, with somewhat paler edge. Stem 30–75 x 2.5–6 mm, fleshy, firm, fasciculate, attached to neighbouring stems by mycelial down, not strigose, subcylindrical, sometimes slightly flexuose, narrowly fistulose, pure white, becoming a little sordid, pruinose-flocculose at apex, lower down slightly fibrillose due to white (or slightly brown due to spores) fibrils (but see observations). Flesh of cap ochreous under umbo, elsewhere brownish grey, of stem white but in base pale brown-yellow. Smell none. Trama of 'washed' gill very pale brown (Mu. 10 YR 7/3) from base to edge. Spore print not recorded.



Figs. 155–157. *Psathyrella storea*. — 155. Spores. — 156. Pleurocystidiogram. — 157. Cheilocystidiogram.

Spores 9–11 x 5.5–6.5  $\mu\text{m}$  (mean values 10.0 x 5.7  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, in water strong brown (Mu. 5 YR 4/8; 7.5 YR 5/6), in  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5% sordid brown (Mu. 7.5 YR 5/4), with very distinct large germ pore (2–2.5  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 18–38 x 9–12  $\mu\text{m}$  (acc. to Romagnesi). Pleurocystidia 35–50 x 12.5–22.5  $\mu\text{m}$ , versiform, chiefly utriform but also subellipsoid, sublageniform, with short and broad pedicel, very scarce, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 35–50 x 12.5–22.5  $\mu\text{m}$ , abundant and densely packed, intermixed with fairly numerous medium-sized spheropedunculate cells (acc. to Romagnesi: 38–50 x 11–22  $\mu\text{m}$ ); all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very pale brown without yellow hyphal septa or encrustations. Pileipellis a layer of subglobose cells under a superficial layer of cylindrical, thin, crowded hyphae not or scarcely narrowing at the septa (acc. to Romagnesi).

HABITAT & DISTRIBUTION. — Caespitose on stump of *Salix* species, growing together with *Coprinus atramentarius*. Sept. Not recorded for the Netherlands and the British Isles, very rare in France (found twice).

COLLECTIONS EXAMINED. — F R A N C E, dpt. Yonne, Saint-Clément, 28 Sept. 1940 (herb. Romagn. 237).

According to Romagnesi this species has no brown scales of fibrils on the cap and — although not mentioned in Romagnesi's description, translated above — the flesh of the base of the stem and the outside of the base is yellow (Romagnesi in litt. (1982); Kühn. & Romagnesi, 1953: 370). The description of the microscopical characters is based on our own examination of an exsiccatum, received from Romagnesi.

### Section *Spintrigerae* (Fr.) Konr. & Maubl.

*Agaricus* [sect.] *Appendiculati* Fr., Hymenomyc. europ.: 295. 1874. — *Hypholoma* sect. *Appendiculata* (Fr.) P. Henn.<sup>1</sup> in Engl. Prantl., Natürl. Pflanzenfam., Ed. 1, I, 1: 237. 1900. — Type: *Agaricus appendiculatus* Bull. (= *Psathyrella candolleana* (Fr.) Maire).

*Agaricus* [sect.] *Spintrigeri*<sup>2</sup> Fr., Hymenomyc. eur.: 287. 1874 (illegitimate, no rank indic.). — *Geophila* [sect.] *Spintrigerae* (Fr.) Quél., Enchir. Fung.: 112. 1886 (illegitimate, no rank indic.). — *Psathyrella* sect. *Spintrigerae* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 27. 1948. — Type: *Agaricus spintriger* Fr.

*Stropharia* [sect.] *Hypholomatae* J. Lange in Dansk bot. Ark. 4(4): 31. 1923 (illegitimate, no rank indic.). — Lectotype (mihi): *Stropharia spintrigera* (Fr.) P. Karst.

*Drosophila* sect. *Typhicolae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 51. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Typhicolae* (Romagn.) Sing. in Lilloa 22: 467. 1951 (not val. publ., no latin); ex Sing. in Sydowia 15: 67. 1962. — Type: *Psathyrella typhae* (Kalchbr.) Pears. & Dennis.

*Psathyrella* sect. *Hypholoma* Sing., Agarical. mod. taxon., Ed. 2: 508. 1962. — Type: *Psathyrella candolleana* (Fr.) Maire.

*Drosophila* sect. *Candolleanae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 51. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Candolleanae* (Romagn.) Sing. in Lilloa 22: 467. 1951 (not val. publ., no latin); ex Sing. in Sydowia 15: 67. 1962. — Type: *Psathyrella candolleana* (Fr.) Maire.

*Psathyrella* sect. *Argillosporae* Sing. in Beih. Sydowia 7: 75. 1973. — Type: *Psathyrella argillospora* Rick ex Sing.

*Drosophila* sect. *Fragillissimae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 51. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Fragillissimae* (Romagn.) Sing. in Lilloa 22: 466. 1951 (not val. publ., no latin); ex Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 10. 1982. — Type: *Psathyrella marcescibilis* (Britz.) Sing.

This section is emended so as to bring together all species belonging to subgenus *Psathyra* in which pleurocystidia are absent. Four species of this section have spores that are distinctly longer than 10  $\mu\text{m}$ : *P. typhae* and its var. *bispora*, *P. badiophylla*, *P. marcescibilis* and *P. involuta*.

<sup>1</sup> This name, the oldest for this section, cannot be recombined in *Psathyrella* because of the already existing name *Psathyrella* sect. *Appendiculatae* A. H. Smith with type species *P. piceicola* A. H. Smith & Hesler (see synonymy of section *Bipelles*).

<sup>2</sup> In fact Fries combined here his two earlier 'sections' (1857: 418) '*Scobinacei*' and '*Inocyboidei*', and one of these epitheta should have been maintained for the resulting new 'section', for which he introduced however the new epithet '*Spintrigeri*' whereas '*Scobinacei*' would have been the most logical choice. At first *Agaricus* 'sect.' '*Spintrigeri*' Fr. looks therefore like being a superfluous name. However, formally it is not, because the epitheta '*Scobinacei*' and '*Inocyboidei*' were published without indication of rank and therefore are not operative in questions of priority (ICBN, art. 35.2) and so in 1874<sup>2</sup> there was no name that 'ought to have been adopted under the rules' (ICBN, art. 63.1) by Fries.

## KEY TO THE SPECIES OF SECTION SPINTRIGERAE

1. Very small to small species (cap 5–25 mm, stem 10–50 x 0.5–3 mm); gill trama of mature fruit-bodies distinctly be it not strongly pigmented.
  2. Very small species (cap 5–20 mm, stem 10–20 x 0.5–1.5 mm); spores very pale or pale brown sub micr.; on culms of tall marsh plants, partly immersed wood, just above water level (in or on edges of lakes, ponds, ditches).
  3. On live or dead (decaying) culms of different species of tall marsh plants (*Typha*, *Epilobium*, *Scirpus*, *Phragmites* etc.); spores very pale brown and without germ pore.
  4. Basidia 4-spored.
    5. Spores 9–11.5(–12.5) x (5–)5.7  $\mu\text{m}$ ; surface of cap smooth.  
*P. typhae* var. *typhae*, p. 134
    5. Spores 7.5–10 x 4–5  $\mu\text{m}$ ; surface of cap tubercular-sulcate.  
*P. typhae* var. *sulcata-tuberculosa*, p. 135
  4. Basidia 2-spored; spores (13.5–14.5–)15, –20 x 5.5–7 ; cap and gills very pale pinkish brown. .... *P. typhae* var. *bispora*, p. 136
  3. On dead wood just above water level (found on handle of brush standing in pot with water); spores 6.5–8 x 4–5  $\mu\text{m}$ , pale brown, with germ pore. .... *P. lacuum*, p. 136
2. Small species (cap 6–25 mm, stem 22–50 x 0.7–3 mm); spores distinctly coloured; terrestrial, in grass, moss, humus, sometimes against wood.
  6. Cheilocystidia chiefly utriform (some cylindrical with very obtuse apex).
    7. Spores 11. –13.5 x 6.5–7  $\mu\text{m}$  with large germ pore (2–2.5  $\mu\text{m}$ ), gills tobacco brown with reddish hue. .... *P. badiophylla* var. *badiophylla*, p. 137
    7. Spores 10–11.5 x 5.5–6.5, with medium sized germ pore (1.5–1.8  $\mu\text{m}$ ), gills dark tobacco brown. .... *P. badiophylla* var. *neglecta*, p. 138
    7. Spores (6.5–)7–8 x 4–5  $\mu\text{m}$ , with small germ pore (1  $\mu\text{m}$ ), gills conspicuously brownish red. .... *P. badiophylla* var. *microspora*, p. 139
  6. Cheilocystidia sublageniform, ventricose or subventricose with cylindrical or subcylindrical neck, more or less sharply delimited from cell body; spores 8–10(–11) x 4.5–5.5  $\mu\text{m}$ .  
*P. canoiceps*, p. 140
1. Large species (cap 15–70 mm, stem 25–160 x 2–13.5 mm); hymenophoral trama of mature fruit-bodies practically colourless.
  8. Spores 11–14.5 x 6.5–8  $\mu\text{m}$ ; pileipellis not strictly cellular, in the main consisting of radially arranged elongate, thin to broad cells (see pertinent description).
    9. Young cap warm reddish brown or brown; mature cap without umbo or revolute margin.  
*P. marcescibilis*, p. 141
    9. Young cap warm ochre; mature cap with broad umbo and slightly revolute margin.  
*P. involuta*, p. 144
  8. Spores less than 11  $\mu\text{m}$  long; pileipellis strictly cellular.
    10. Stem with cuff or ring; gills crowded, in early stages never pink.
      11. Cap whitish, alutaceous or very pale brown; gills at maturity predominantly dark grey with a trace of brown or purple; stem 70–160 x 5–12 mm; spores very dark, with rectangular base and often slightly phaseoliform; strongly caespitose.  
*P. leucotephra*, p. 145
      11. Cap rust-coloured or orange-brown; gills at maturity brown-violet; stem shaggy below cuff, 60–75 x 6.5–13.5 mm; spores not very dark, ellipsoid, not phaseoliform; solitary or subcaespitose.  
*P. spintrigera*, p. 147
    10. Stem without (very rarely with) cuff or ring (or with only traces of these).
      12. Spores 6.5–9 x 4–5  $\mu\text{m}$ ; cheilocystidia large, 30–70 x 9–17.5  $\mu\text{m}$ ; gills very crowded, in early stage conspicuously pink or lilaceous pink or pale greyish-lilaceous, greyish chocolate, at maturity dark purple chocolate brown; stem 30–90 x 2–6(–8) mm; usually caespitose but also solitary. .... *P. candolleana*, p. 149
      12. Spores 8–11 x 5–6.5  $\mu\text{m}$ ; cheilocystidia small, 20–35 x 9–11  $\mu\text{m}$ ; gills not very crowded, greyish or with slight violaceous tinge, finally pale umber; densely caespitose.  
*P. pseudogordonii*, p. 152

**Psathyrella typhae** (Kalchbr.) Pears. & Dennis

*Agaricus typhae* Kalchbr. in Mat. természettud. Közl. 2: 160. 1862. — *Psathyra typhae* (Kalchbr.) Sacc., Syll. Fung. 5: 1067. 1887. — *Drosophila typhae* (Kalchbr.) Romagn. in Rev. Mycol. 4: 124. 1939. — *Psathyrella typhae* (Kalchbr.) Pears. & Dennis in Trans. Brit. mycol. Soc. 31: 185. 1948.

*Naucoria scirpicola* Peck in Ann. Rep. N.Y. State Mus. 42: 19. 1889.

*Naucoria typhicola* P. Henn. in Verhandl. bot Ver. Brandenb. 33: 40. 1891.

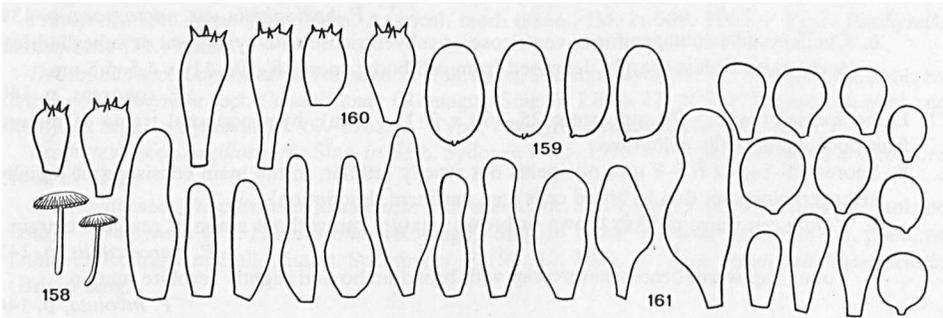
*Psathyrella typhae* var. *sulcato-tuberculosa* J. Favre (Assoc. fong. Hauts-marais jurass.) in Mater Fl. cryptog. suisse 10(3): 152, 215. 1948. — *Psathyrella sulcato-tuberculosa* (J. Favre) Einh. in Ber. bayer bot. Ges. 47: 123. 1976.

*Psathyrella typhae* var. *iridis* Boud. in Bull. Soc. mycol. Fr. 13: 13. 1897.

**var. typhae** — Figs. 158–161

DESCRIPTIONS & ILLUSTRATIONS. — Kalchbr. in Mat. természettud. Közl. 3: 206, pl. 1 fig. 1. 1865; Kunz in Z. Pilzk. 9: 134. 1930 (as *Naucoria typhicola*); F. Möller in Friesia 1: 84. 1933; Schweers in Meded. Ned. mycol. Ver. 25: 10. 1941; Kotlaba in Česká Mykol. 6: 169. 1952 (in Czech); Kühn. & Romagn., Fl. anal. Champ. sup.: 366. 1953; Kreissel in Westfäl. Pilzbr. 3: 2. 1961; A. H. Smith in Mem. N.Y. bot. Gdn 24: 183. 1972; Redhead in Fungi canad. no. 133. 1979.

Cap 5–20(–25) mm, at first conical or conico-paraboloid, soon spreading to paraboloid, convex or even plane and then usually umbonate, pinkish ochre-brown, at centre dark (date) brown, finely striate, slightly sulcate at margin, hygrophanous, drying out to pale flesh-coloured brown with slightly darker centre, without pink, not micaceous, rarely rugulose. Veil in early stages distinct, forming arachnoid fibrils on cap increasing in number towards



Figs. 158–161. *Psathyrella typhae* var. *typhae*. — 158. Carpophores (x 0.5). — 159. Spores. — 160. Basidia. — 161. Cheilocystidiogram.

margin, sometimes even forming minute flocci, fugacious on stem forming scattered fibrils, occasionally forming an annular zone on lower half of stem. Gills 1–2.5 mm broad, ventricose, adnexed, subdistant to rather crowded, at first whitish then pale brown, pinkish brown, beige or brown with a purplish hue, with whitish or concolorous edge. Stem 10–20 x 0.5–1.5 mm, cylindrical, whitish to pale brown or greyish lower down, hollow, with pruinose apex; base often slightly thickened, strigose and often springing from a whitish felty disc on substrate. Flesh of cap and stem very thin; colour not recorded. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens distinctly be it fairly pale yellowish brown (Mu. 10 YR 6/4, 7/4) in basal 1/4–1/3 of gill (sometimes darker in very narrow strip at base), paler (Mu. 10 YR 7/3, 7/2) towards edge. Spore print date brown with purplish hue.

Spores 9–11.5(–12.5) x (5–)5.5–7 μm (mean values: 9.9–11.3 x 5.7–6.4 μm: ♀ collections), ellipsoid, adaxially flattened, in water, NH<sub>4</sub>OH 10%, and in KOH 5% very pale

brown (Mu. 10 YR 7/4, 7/3), not opaque, without germ pore, with small hilar appendix. Basidia 17.5–35 x 10–12.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells: versiform, chiefly utriform but also fusoid, clavate, cylindrical or sublageniform cheilocystidia, 25–40(–50) x 7.5–15(–17.5)  $\mu\text{m}$ , few in number or even scarce, scattered, sometimes in small clusters, rarely moderately numerous, intermixed with abundant globose to subglobose, rarely clavate spheropedunculate cells, 10–25 x 7.5–15  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly but not strongly brownish yellow from membranal pigment, strongest in basal 1/4–1/3 part, much paler near edge with small number of yellowish hyphal septa and quite a number of minute encrustations. Pileipellis a 2–3 cells deep layer of subglobose cells, 15–30  $\mu\text{m}$  diam., very pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — On dead and live culms of *Typha latifolia*, *T. angustifolia*, *Epilobium hirsutum*, *Scirpus maritimus*, *Phragmites communis*, *Rumex hydrolapathum*, just above the water level. June–Sept. Uncommon in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Friesland: isl. Terschelling, Kroonpolders, 28 July 1958 (2 collect.) and 29 July 1958; Weststellingwerf, 3 Aug. 1975; prov. Noord-Holland: Naardermeer, 17 Sept. 1958 and 22 June 1960 (2 collect.); Vogelenzang, dunes of Amsterdam Water Supply, 8 Sept. 1979; prov. Zuid-Holland: Leiden, Hortus Botanicus, 8 July 1959 and 30 May 1960; Leiden, Roomburger Polder, 28 July 1958 and 1 July 1960; prov. Noord-Brabant, Dorst, loam-pits, 25 Sept. 1956.

Our description is based on the notes accompanying the eleven collections mentioned above. We never saw fresh material of *P. typhae*.

Hennigs' description (l.c.) of *Naucoria typhicola* fully corresponds with the description given above and with the descriptions of *P. typhae* in the literature, provided his description of the colour of the spores ('intensiuscule fulvo-rubiginosae') is taken to mean pale brown. We have not seen the type specimens.

A. H. Smith (1972: 183) examined the type specimens of Peck's *Naucoria scirpicola* and found it to be identical with *P. typhae*.

Boudier's description (l.c.) of *P. typhae* var. *iridis* fully agrees with *P. typhae*; his specimens grew on leaves of *Iris*, *Carex*, and *Sparganium*.

#### var. *sulcato-tuberculosa* J. Favre

*Psathyrella typhae* var. *sulcato-tuberculosa* J. Favre (Assoc. fong. Hauts-marais jurass.) in Mater. Fl. cryptog. suisse 10(3): 152, 215. 1948. — *Psathyrella sulcato-tuberculosa* (J. Favre) Einh. in Ber. bayer. bot. Ges. 47: 123. 1976.

This variety differs from var. *typhae* by its tubercular-sulcate cap and its smaller spores (7.5–10 x 4–5  $\mu\text{m}$ ). Einhellinger (1976: 123), who found three specimens growing on *Carex*, raised the variety to specific level, while pointing out that both in Favre's and his own specimens the caps were very small (9 mm or less) and the stems very thin (0.8 mm or less). We have neither examined Favre's nor Einhellinger's specimens.

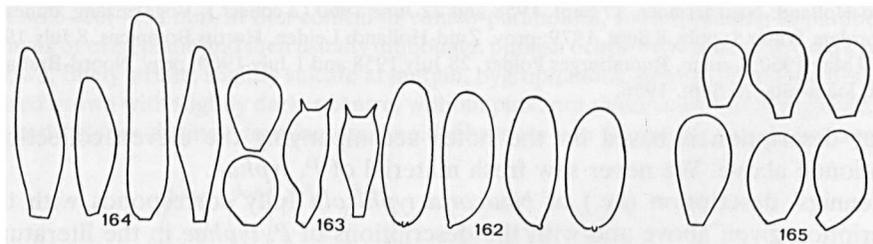
var. **bispora** Kits van Wav. — Figs. 162–164

*Psathyrella typhae* var. *bispora* Kits van Wav. on p. 282 of the present work. 1985.

This variety differs from the former two varieties by its basidia (20–25 x 10–11  $\mu\text{m}$ ) being 2-spored (some of them even 1-spored). Accordingly the spores, which are of exactly the same colour as those of *P. typhae* and also lack a germ pore, are much larger as also the range of their sizes: (13.5–14.5–)15.5–20 x 5.5–7  $\mu\text{m}$  (mean values 16.2 x 6.3  $\mu\text{m}$ : 1 collection). The cheilocystidia are fusiform, sublageniform, subcylindrical, 27.5–50 x 9–14  $\mu\text{m}$  and intermixed with numerous globose and subglobose spheropedunculate cells, 10–22.5 x 9–14  $\mu\text{m}$  as in *P. typhae*. Both caps and gills are paler than those in *P. typhae*, very pale pinkish brown; the caps often have a large umbo and at maturity a revolute margin.

HABITAT & DISTRIBUTION. — On culms of *Typha latifolia*. Known only from type locality.

COLLECTION EXAMINED. — THE NETHERLANDS: prov. Zuid-Holland, Leiden, 'Roomburger Polder', 29 Aug. 1959 (type; L).



Figs. 162–164. *Psathyrella typhae* var. *bispora*. — 162. Spores. — 163. Basidia. — 164. Cheilocystidiogram.

Fig. 165. *Psathyrella lacuum*. — Cheilocystidiogram.

***Psathyrella lacuum* Huijsman — Fig. 165**

*Psathyrella lacuum* Huijsman in *Fungus* 25: 39, figs. 8V–8IX. 1955.

Cap 4–10(–20) mm broad, plano-convex to applanate, pale pink to pinkish lilac from lamellae shining through, translucently striate up to disc, hygrophanous, drying out to white, cream to sordid yellow at centre, with crenulate edge. Veil on cap as scattered, white, arachnoid fibrils, sometimes also persisting on stem. Gills rather narrow, adnate, subventricose, crowded, at first white, later pale greyish lilac with pale edge. Stem 10–15 x 0.7–1.5 mm, cylindrical, slightly thicker at base, curved, hollow, hyaline-white, white-flocculose sub lens. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens yellowish (Mu. 10 YR 6/6–6/4) from base to edge. Spore print purplish brown.

Spores 6.3–8 x 4–5(–5.5)  $\mu\text{m}$  (mean values 7–7.2 x 4.5–4.7  $\mu\text{m}$ : 2 collections), ellipsoid, adaxially flattened, in water,  $\text{NH}_4\text{OH}$  10%, and  $\text{KOH}$  5% yellowish brown (Mu.  $\pm$  10 YR 5/4), not opaque, with distinct germ pore (1.8  $\mu\text{m}$ ), with very small hilar appendix. Basidia 11–14.5 x 6.5–8  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells: spheropedunculate and clavate cells 17.5–25 x 10–15  $\mu\text{m}$ , numerous; utriform cystidia very rare and of same size; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale to very pale brownish yellow from membranous pigment, without yellow hyphal septa or encrustations.

**HABITAT & DISTRIBUTION.** — Subcaespitose on wood partly immersed (wooden-handle of brush standing in water-filled pot). Known only from type locality.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Gelderland, Doetinchem, 29 June 1953 (type) and 27 June 1954.

The macroscopical description is taken from Huijsman's original description. This species differs from *P. typhae* by its distinctly smaller and darker spores, which moreover are equipped with a distinct germ pore, while utriform cheilocystidia are practically absent in the presence of numerous and rather large spheropedunculate cells. Both collections grew on the same wooden handle of a brush standing in a pot filled with water in a building.

### ***Psathyrella badiophylla* (Romagn.) Bon**

*Drosophila badiophylla* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952. — *Psathyrella badiophylla* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2b, 2. Aufl.: 238. 1955 (and in later editions; not val. publ., basionym not mentioned). — *Psathyrella badiophylla* (Romagn.) Bon in Docum. mycol. 13 (49): 53. 1983.

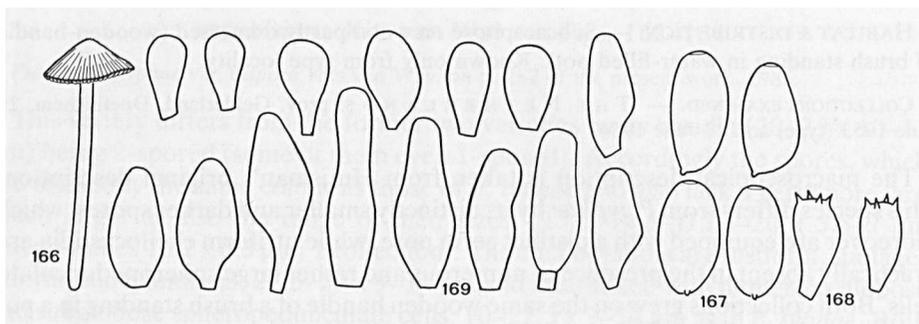
[*Psathyra gordonii* var., J. Lange in Dansk bot. Ark. 9(1): 8. 1936.]

#### **var. *badiophylla* — Figs. 166–169**

**DESCRIPTIONS & ILLUSTRATIONS.** — J. Lange, Fl. agar. dan. 4: 93, pl. 151 G. 1939 (as *Psathyra gordonii* var.). — Kühn. & Romagn., Fl. anal. Champ. sup.: 366. 1953. — Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 186. 1975.

Cap 6–25 mm broad, at first glandiform or obtusely conical, then conical, campanulate-conical or campanulate, gradually more or less spreading, at centre obtuse or obtusely umbonate, with margin slightly incurved and in the end slightly grooved or cleft; primordia fairly pale, ochraceous, reddish ochraceous, pale brown ochre during the short time in which cap still moist, then becoming sordid brownish (but see observations) and very vaguely translucently striate, hygrophanous, drying very quickly to pale cream-coloured, umbo cream-coloured, at limb becoming sordid and brownish on desiccation; surface sparsely micaceous when still slightly moist, later matt and in some places rugulose. Veil in primordia covering entire cap with delicate, coherent fleece, showing only at apex ochreous surface of cap, in young specimens leaving silky adpressed fibrils only perceptible sub lente, rapidly evanescent, remaining somewhat longer at margin, on stem forming white speckles. Gills 2–4 mm broad, moderately to fairly close, narrowly adnate, almost adnexed, ventricose, obtuse in front, brown from the start, later tobacco brown with a reddish or cinnamon hue with white pruinose edge. Stem 22–50 x 0.7–1.2(–2.2) mm, cylindrical at base slightly thickened or subcylindrical, slightly flexuous, at first narrowly fistulose, then tubular, fairly rigid, pale even in very young specimens, very pale straw colour, in late stages scarcely more coloured, becoming hyaline-greyish towards more or less strongly pruinose but scarcely grooved apex, elsewhere striate and watery, not strigose at base. Flesh of cap in centre 1.5 mm thick, brownish while moist, whitish when dry, fragile, in stem straw-coloured. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens distinctly yellowish brown from base to edge. Spore print blackish with a reddish brown reflection.

Spores 11.5–15.5 x 6.5–7 μm (mean values 12.1–14.3 x 6.7–7 μm: 3 collections), ellipsoid, adaxially flattened, in water dark reddish brown (Mu. 2.5 YR 3/4), in NH<sub>4</sub>OH 10% and KOH 5% sordid dark brown (Mu. 5 YR 3/3, 3/4), with large germ pore (2–2.5 μm) and



Figs. 166–169. *Psathyrella badiophylla* var. *badiophylla*. — 166. Carpophores (x 0.5). — 167. Spores. — 168. Basidia. — 169. Cheilocystidiogram.

relatively large hilar appendix, not opaque. Basidia 20–32 x 10–13  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia absent. Marginal cells: versiform but chiefly utriform (also some cylindrical) cheilocystidia, 25–47.5 x 10–17.5  $\mu\text{m}$ , numerous, intermixed with rather few spheropedunculate cells, 17.5–22.5 x 10–12.5  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly yellowish brown (Mu. 10 YR 5/4) from membranal pigment, with many yellow hyphal septa, without encrustations. Pileipellis (acc. to Romagnesi) seemingly a monostromatic, more or less disorganised, consisting of elliptical or claviform, colourless elements, 35–57 x 16–30  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — In grass, on mossy wood or adherent to vegetable matter. May–Oct. Very rare in the Netherlands. Recorded from France, not from the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Noord-Holland, Hilversum, Corversbos, 30 June 1974; prov. Noord-Brabant, Biesbos, polder De Dood, 13 Oct. 1980. — **F R A N C E,** dpt. Oise, Ovary-la-Ville, 17 May 1970 (herb. Romagn. 1067).

The description of the macroscopical characters is a translation of Romagnesi's description (l.c.), while the description of the microscopical characters is based on our own examination of the exsiccata of the French and Dutch collections. In the scanty notes on the June 1974 collection the colour of the fresh caps was described as dark chestnut brown, of the dry caps as beige brown.

#### var. *neglecta* (Romagn.) Kits van Wav.

*Drosophila badiophylla* var. *neglecta* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952.—*Psathyrella badiophylla* var. *neglecta* (Romagn.) Kits van Wav. on p. 280 of the present work, 1985.

**DESCRIPTION & ILLUSTRATIONS.** — Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 188. 1975.

Cap 4–10 mm broad, at first glandular, then campanulate, obtusely umbonate, margin slightly grooved, at first dark reddish brown (apex more ochre), hygrophanous, strongly paling to pale cream colour, in the end smooth, scarcely micaceous or rugulose when dry. Veil at first covering cap up to apex with small whitish very fugacious fibrils, at this stage not forming a continuous coating, disappearing at maturity; no remnants seen on stem. Gills 1–2.5 mm broad, relatively close, adnate but not unciniate, subventricose, at first very dark brown, later dark tobacco brown, with whitish edge. Stem 30–40 x 1.2–2 mm, cylindrical, slightly thickened at base, narrowly fistulose, whitish, not darkening, satiny-flamed, finely downy, soon becoming smooth and longitudinally silky-striate, pruinose at apex. Flesh of cap thin, fairly fragile, in early stages slightly brownish, reddish around cavity of stem. Trama

of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens distinctly brown (Mu. 7.5 YR 5/4). Spore print blackish with a cinnamon reflection.

Spores 10-11.5 x 5.5-6.5  $\mu\text{m}$  (mean values 10.6 x 6  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, in water and  $\text{NH}_4\text{OH}$  10% dark reddish brown (Mu. 2.5 YR 3/4), in KOH not recorded, with distinct germ pore (1.5-1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia (acc. to Romagn.) 21 x 10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells (acc. to Romagn.) 28-30 x 11.5-17  $\mu\text{m}$ , more or less identical with those of *P. badiophylla*. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very distinctly yellowish brown from membranal pigment, with many yellow hyphal septa and a small number of encrustations. Structure of pileipellis not recorded.

HABITAT & DISTRIBUTION. — According to Romagnesi usually in grass, outside woods. Not recorded from the Netherlands. Fairly common in France; not known from the British Isles.

COLLECTION EXAMINED. — FRANCE, dpt. Oise, La Chapelle-en-Serval, 18 May 1968 (herb. Romagn. 985).

The description of the macroscopical and microscopical characters is a translation of Romagnesi's description of this variety (l.c.), except for the spores and the pigmentation of the hymenophoral trama, which we were able to study on the minute fragment of an exsiccatum, received from Romagnesi.

Romagnesi stated (in litt.) that the distinction of var. *neglecta* from var. *badiophylla* is chiefly based on the smaller spores of var. *neglecta* and to a lesser extent on the stronger pigmentation of its gill trama, its smaller carpophores, and their caps being more convex. We indeed found the hymenophoral trama of var. *neglecta* browner (Mu. 7.5 YR 5/4 against 10 YR 5/4, 6/4 for the two collections of *P. badiophylla*) but in view of the only very few collections Romagnesi stated having seen and the variability of hymenophoral pigmentations we doubt, with Romagnesi, whether this difference is of any importance.

We found the germ pore in *P. badiophylla* large, 2-2.5  $\mu\text{m}$  ('très accusé' with Romagnesi), in var. *neglecta* smaller, 1.5-1.8  $\mu\text{m}$  (only 'bien net' with Romagnesi).

#### var. *microspora* Kits van Wav.

*Psathyrella badiophylla* var. *microspora* Kits van Wav. on p. 280 of the present work, 1985.

Cap 18 mm broad and only 6 mm high, translucently striate, dark purplish grey, hygrophanous, drying to alutaceous and at centre pale ochre. Minute velar flocci up to half-way from margin. Gills conspicuously brownish red, with white edge. Stem 25 x 1 mm, cylindrical, white, hollow. Flesh not recorded. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens very pale brown (Mu. 10 YR 7/3 and near edge 7/2). Spore print not recorded.

Spores 6.5-8 x 4-4.5(-5)  $\mu\text{m}$  (mean values 6.8-7.4 x 4.2-4.5  $\mu\text{m}$ : 3 collections), ellipsoid, adaxially flattened, in water,  $\text{NH}_4\text{OH}$  10%, and KOH 5%, conspicuously pale brown to brownish yellow (Mu. 7.5 YR 6/6) with small but distinct germ pore (1  $\mu\text{m}$ ) and small hilar appendix. Basidia 19.2-24 x 8-9.6  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells: utriform cheilocystidia, 25-42.5 x 10-20  $\mu\text{m}$ , abundant, intermixed with spheropedunculate and clavate cells 17.5-30 x 10-17.5  $\mu\text{m}$ ; all cells thin-walled. Hymen-

ophoral trama very pale yellowish brown, with few yellow hyphal septa, without encrustations. Pileipellis cellular; cells 16–24  $\mu\text{m}$  in diam., colourless.

**HABITAT & DISTRIBUTION.** — On stump of deciduous tree, but also terrestrial. May–Sept. Very rare and only known from the Netherlands.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel, Vorden, 7 Aug. 1959 (type, L.); prov. Gelderland, Arnhem, Openlucht museum, 27 Sept. 1984; prov. Zuid-Holland, Oostvoorne, coastal dunes, 10 May 1973.

***Psathyrella canocephs* (C. H. Kauffm.) A. H. Smith — Figs. 170–173**

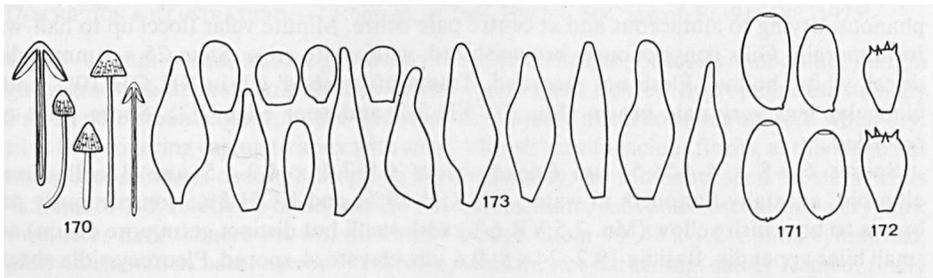
*Hypholoma canocephs* C. H. Kauffm. in Pap. Mich. Acad. Sc. 5: 132. 1926. — *Psathyrella canocephs* (C. H. Kauffm.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 43. 1941. — *Drosophila canocephs* (C. H. Kauffm.) Kühn. & Romagn., Fl. anal. Champ. sup.: 366. 1953 (not val. publ., basionym not mentioned).

*Psathyrella acutilamella* J. Favre (Assoc. fung. Hauts-marais jurass.) in Mater. Fl. cryptog. suisse 10(3): 150. 1948 (not val. publ., no latin).

**MISAPPLIED NAMES.** — *Psathyra pennata* sensu J. Lange, Fl. agar. dan. 4: 94. 1939.

**DESCRIPTIONS & ILLUSTRATIONS.** — J. Lange, l.c. (as *Psathyra pennata*); Kühn. & Romagn., l.c.; A. H. Smith in Mem. N.Y. bot. Gdn 24: 182. 1972; J. Favre, l.c. (as *Psathyrella acutilamella*; veil little developed).

Cap at maturity 6–20 mm broad (sometimes higher than broad), strikingly conical, sometimes conico-paraboloid, rarely with umbo, in very early stages with incurved margin, cinnamon, ochreous, greyish or sordid brown (Mu. 10 YR 4/2, 4/3, 5/3; or paler than 7.5 YR 5/4), browner at apex (colour usually masked by the veil), striate up to 1/2–2/3 from margin, hygrophanous, drying out to very pale brown (Mu. 10 YR 8/3, 7/3, 7/4), sordid yellowish grey or alutaceous (Mu. 10 YR 7/2), pale brown or ochre (Mu. 10 YR 7/4) at apex, without pink, not micaceous or rugulose. Veil white, covering entire cap, even at apex, with dense wickerwork (denser towards margin) of radially arranged fibrils and bundles of fibrils, sometimes at margin in places or even all around bearded appendiculate, covering stem with a fairly dense coating of small white fibrils. Gills 1–2 mm broad, fairly crowded, lanceolate, straight or only slightly ventricose, ascending, narrowly to fairly broadly adnexed (sometimes with tooth), dark reddish grey, chocolate (Mu. 5 YR 4/2) or dark greyish brown (Mu. 7.5 YR 4/2; 10 YR 5/3), in the end with purplish hue, with white, minutely fimbriate edge. Stem 20–50 x 1.5–3 mm, cylindrical, sometimes somewhat thickening towards base, white but lower 1/2–3/4 very pale brown (Mu. 10 YR 8/3), hollow, with rather strongly pruinose apex. Flesh of cap in centre 1–1.5 mm thick, greyish brown (Mu. 10 YR 6/4) of stem sordid white but at base pale brown. Smell indistinctive. Trama of ‘washed’ gill in  $\text{NH}_4\text{OH}$  10%



Figs. 170–173. *Psathyrella canocephs*. — 170. Carpophores (x 0.5). — 171. Spores. — 172. Basidia. — 173. Cheilocystidiogram.

under binocular lens distinctly, be it not strongly, pigmented, pale yellow-brown (Mu. 10 YR 6/3–7/4). Spore print purplish black.

Spores 8–10(–11) x 4.5–5.5  $\mu\text{m}$  (mean values 8.8–9.8 x 4.9–5.4  $\mu\text{m}$ : 5 collections), ellipsoid, adaxially flattened, in water brown with trace of red (Mu. 2.5 YR 4/4), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 5 YR 4/3), in KOH 5% sordid brown (Mu. 7.5 YR 4/2), not opaque, with distinct germ pore (1–1.5  $\mu\text{m}$ ) and small hilar appendix. Basidia 17.5–27 x 9.5–11  $\mu\text{m}$ , spheropedunculate, 4-spored. Pleurocystidia absent. Marginal cells: versiform, small cheilocystidia 25–40 x 9–15  $\mu\text{m}$ , numerous to scattered, sublageniform, ventricose to sub-ventricose with short pedicel, characteristically with neck more or less sharply delimited from cellbody but often passing gradually into it, intermixed with varying numbers of spheropedunculate cells, 10–25(–40) x 12.5–15  $\mu\text{m}$ ; all cells thin-walled, colourless. Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly yellowish brown from base to edge, strongest at base, with some yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of globose to subglobose, sometimes slightly elongated cells, 24–40  $\mu\text{m}$  diam., colourless.

**HABITAT & DISTRIBUTION.** — Usually solitary but sometimes subcaespitose, terrestrial or against piece of wood, in woods or grassy roadsides in deciduous woods. Aug.-Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel, Ommen, near castle 'Eerde', 24 Sept. 1970; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 18 Aug. 1959, 30 Sept. 1959, 16 Aug. 1962. — **B R I T I S H I S L E S,** Worcester, 'Shrawley Wood', 8 Sept. 1962.

Dennis, Orton & Hora (1960: 143) and Moser (1978: 271) mention *Drosophila plumulosa* Romagn. (nomen nudum, 1944) as a synonym of *P. canoiceps* but we were unable to trace the reference. Romagnesi (in litt.) stated that he regarded *D. plumulosa* as identical with *P. canoiceps* but that he could not remember having published this name, reason why we did not include it in the synonymy.

### *Psathyrella marcescibilis* (Britz.) Sing. — Figs. 173a–176

*Agaricus marcescibilis* Britz. in Bot. Zbl. 54: 69. 1893. — *Hypholoma marcescibilis* (Britz.) Sacc., Syll. Fung. 11: 71. 1895. — *Psathyrella marcescibilis* (Britz.) Sing. in Lilloa 22: 466 ('1949') 1951. — *Drosophila marcescibilis* (Britz.) Kühn. & Romagn., Fl. anal. Champ. sup.: 367. 1953 (not val. publ., basionym not mentioned).

*Psathyra fragilissima* J. Lange (non C. H. Kauffm.) in Dansk bot. Ark. 9(1): 6. 1936 (not val. publ., no latin); ex J. Lange, Fl. agar. dan. 5: VIII. 1940. — *Drosophila fragilissima* (J. Lange). Romagn. in Rev. Mycol. 2: 246. 1937.

*Psathyra lactea* J. Lange in Dansk bot. Ark. 9(1): 6. 1936 (not val. publ., no latin); ex J. Lange, Fl. agar. dan. 5: VII. 1940.

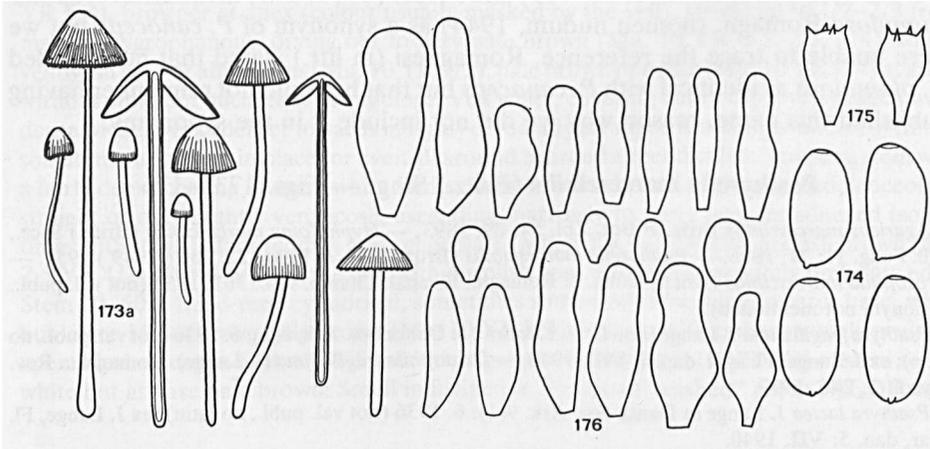
*Psathyra lactea* f. *virginea* J. Lange in Dansk bot. Ark. 9(1): 7. 1936 (not val. publ., no latin).

*Drosophila marcescibilis* f. *elata* Malenç. apud Malenç. & Bertault, Fl. Champ. Maroc 1: 214, pl. 8, fig. 40. 1970.

**DESCRIPTIONS & ILLUSTRATIONS.** — Kühn. & Romagn., Fl. anal. Champ. sup.: 367. 1953; J. Lange, Fl. agar. dan. 4: 92, pl. 151 F (as *Psathyra fragilissima*); ditto, 4: 92, pl. 150 A (as *P. lactea*); ditto, 4: 92, pl. 150 B (as *P. lactea* f. *virginea*); Malenç. & Bertault, l.c. (as f. *elata*).

Cap in early stages 5–10 mm, conico-paraboloid, warm reddish brown or brown (Mu. 5 YR 4/4; 7.5 YR 4/4) when moist, pale brown (Mu. 10 YR 7/3) with a pinkish hue when dry, not striate. Cap at maturity (10–)15–30(–35) mm, usually distinctly conical, sometimes paraboloid-conical, rarely paraboloid, predominantly dark greyish brown (Mu. 7.5 YR 4/2; 10 YR 4/2, 4/3, 4/4, 5/2, 5/3, 5/4; 2.5 Y 4/2, 5/2), brownest at centre, sometimes still with

slight pinkish hue, greyer towards margin, sometimes entire cap either brown or grey, finely striate up to 1/2–3/4 from margin, hygrophanous, rapidly drying out from centre to pale brown or greyish brown, greyish yellow, alutaceous (Mu. 10 YR 6/2, 6/3, 7/2, 7/3, 7/4, 8/2, 8/3, 8/4) or even whitish, with apex pale yellowish ochre; surface becoming very smooth and matt, without pink, rarely slightly micaceous or rugulose; desiccation usually halting for a while at short distance from margin, causing a characteristic feature: a 2–3 mm broad still greyish brown rim along margin, sharply contrasting with very pale rest of cap and carrying conspicuous white velar denticles and flocci. Veil in earliest stages forming a firm collar, connecting margin of cap with stem and in addition a layer of delicate, radially arranged fibrils reaching apex, soon only present in 1–2 mm broad zone along margin; next — while detaching itself from stem — collar forming a frayed appendiculate belt, soon splitting into triangular denticles or flocci while on surface of cap close to margin at regular intervals small velar flocci persist. Gills 2–5 mm broad, strongly ascending, faintly ventricose (rarely rounded at margin), fairly narrowly adnexed, in earliest stages white, at maturity predominantly dark grey (Mu. 10 YR 5/1, 4/1, 3/1), purplish grey (Mu. 5 YR 4/1, 4/2, 3/1, 3/2; 10 R 3/1) with a trace of brown at base, with white, minutely fimbriate edge. Stem 25–50 x 1.5–3 (apex) to 2–4 (near base) mm, but when growing in tall grass or humus 50–75(–90) x 3–4 to 4–6 mm, sometimes with thickened base (3–6 mm), white, flamed, glossy, hollow, very slightly rooting (pseudorrhiza 3–5 mm); apex pruinose. Flesh of cap 1–2.5 mm thick in centre, dark greyish brown or brown (Mu. 10 YR 4/3, 3/3), of stem white. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens practically colourless to very pale yellowish brown (Mu. 10 YR 7/2, 7/3; 7.5 YR 7/2). Spore print purplish black.



Figs. 173a–176. *Psathyrella marcescibilis*. — 173a. Carpophores (x 0.5). — 174. Spores. — 175. Basidia. — 176. Cheilocystidiogram.

Spores (11–)11.5–13.5(–14.5) x 6.5–7  $\mu$ m (mean values 11.6–12.8 x 6.5–7  $\mu$ m: 18 collections), ellipsoid, adaxially flattened, in water dark reddish brown (Mu. 10 R 3/6; 2.5 YR 3/6), in NH<sub>4</sub>OH 10% darker (Mu. 2.5 YR 3/4, 2.5/4), in KOH 5% dark brown (Mu. 7.5 YR 3/2), (immature spores merely warm brown), not opaque, with distinct germ pore (1.8–2  $\mu$ m) and distinct hilar appendix. Basidia 20–27.5 x 11–15  $\mu$ m, clavate but those near edge spheropedunculate, 4-spored. Pleurocystidia absent. Marginal cells: utriform cheilocystidia 25–47.5(–60) x 7.5–17.5 to (at apex) 5–12.5(–15)  $\mu$ m, abundant and densely packed, within one and the same collection rather uniform but varying a great deal both in

size and shape from one collection to another; spheropedunculate and clavate cells 10–20 x 5–10  $\mu\text{m}$ , small, unobtrusive and difficult to find; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub. micr. practically colourless, without yellow hyphal septa or encrustations. Pileipellis not strictly cellular, consisting of an only a few cells thick superficial layer of thin hyphae of elongate, (45–)60–80(–110)  $\mu\text{m}$  long cells on top of a much thicker layer of a more cellular structure, consisting in upper part of less elongate, broader, colourless, and criss-cross lying cells, 30–60 x 10–20  $\mu\text{m}$ , still lower down of broadly ellipsoid, subglobose or irregularly shaped cells, 20–40 x 22.5–30  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — In both clayey and sandy soil, in woods, also in humus, in grass. May–Oct. Fairly common in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S**, prov. Noord-Holland: Amsterdam, Amsterdam Wood, 29 May 1959, 23 June 1961, 12 July 1961, 19 July 1961, 25 July 1961, 9 Aug. 1961, 9 July 1963, 3 June 1973, 17 Aug. 1973; Santpoort, estate 'Duin en Kruidberg', 1 Dec. 1960, 5 May 1961, 28 Sept. 1962, 21 Sept. 1963, 20 Sept. 1974; Vogelenzang, estate 'Leyduin', 25 Oct. 1963, 22 Sept. 1963; prov. Limburg, Mook 17 Oct. 1964. — **S W I T Z E R L A N D**, Kant. Vaud, St. Cergue, 24 Sept. 1966.

A trace of flesh colour, pinkish, as mentioned in several descriptions in the literature is distinct in the pale brown colour of drying and dry caps of very young specimens. *Drosophila marcescibilis* f. *elata*, described by Malençon (l.c.), seems nothing more than a large form of *P. marcescibilis*, but may deserve higher rank because it seems rather constant, having been found in five different localities in North Africa. *Psathyra lactea* f. *lactea* and *P. lactea* f. *virginea* Lange obviously represent dry specimens of the present species, moreover the latter probably a sterile form.

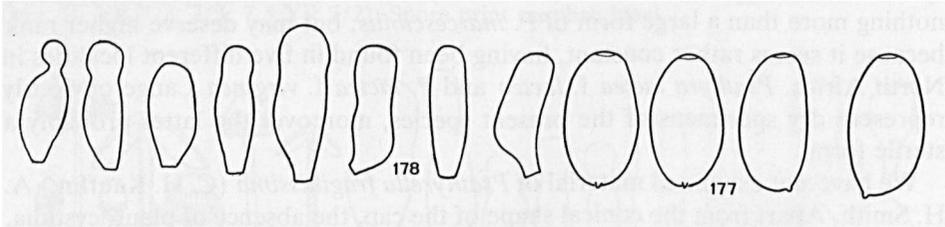
We have not examined material of *Psathyrella fragillissima* (C. H. Kauffm.) A. H. Smith. Apart from the conical shape of the cap, the absence of pleurocystidia, and the large spores, the three characteristic and diagnostic features of *P. marcescibilis* are the curious structure of the pileipellis, in the literature solely mentioned by Kühner & Romagnesi (1953: 367), Einhellinger (1969: 101), and Malençon & Bertault (1970: 215), the for a long time remaining, striking, coloured, narrow moist rim along the margin of the cap during the process of dehydration, and the white, persisting appending velar denticles. None of these three characteristics are mentioned by either Kauffman or Smith, reason why we, in accordance with Dennis & al. (1960: 146), decided not to regard Kauffman's species as conspecific with *P. marcescibilis* in spite of the fact that the habit of this species, as shown on Kauffman's plate (1926: 142, pl. XI), the conical cap, the absence of pleurocystidia, and the large spores plead to the contrary. A. H. Smith (1972: 94) published Kauffman's species, copying Kauffman's description of the macroscopical characters. He examined three collections (including Kauffman's type) and makes it quite clear that he too regards Kauffman's *Psathyra fragillissima* (1926) as not being conspecific with Lange's *Psathyra fragillissima* (1940) (= *Psathyrella marcescibilis* (Britz.) Sing.).

***Psathyrella involuta* (Romagn.) Mos. — Figs. 177–178**

*Drosophila involuta* Romagn. in Bull. mens. Soc. linn. Lyon 21: 156. 1952. — *Psathyrella involuta* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 217. 1967.

DESCRIPTIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 367. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 49. 1982.

Cap 22–37 mm, at first subglobose or ovoid with incurved margin, then spreading to conical with broad umbo and even with slightly revolute margin accentuating umbo, at first warm ochre, soon pale beige, not striate, hygrophanous, rapidly drying to pale cream, at centre ochraceous or concolore, often rugose and slightly micaceous. Veil fairly abundant, white, forming fluffs at margin and also somewhat higher up. Gills 3–4.5 mm broad, usually not crowded, ventricose (slightly broader near margin of cap), adnate without tooth, at first white, then pale brownish to violaceous grey-brown, finally purplish brown, with pruinose white edge. Stem 65–90 x 3.5–5 mm, flexuous, in lower part gradually thickening, going fairly deep into the ground, very hollow, with firm and thick cortex, rigid but nevertheless easily breaking, at first white but becoming sordid and slightly yellowish (straw colour) lower down, at first very shiny and watery from an adpressed silky layer, then becoming smooth, remaining shiny, with white mycellium at base and with subpruinose, obscurely or scarcely sulcate apex. Flesh rigid, thin, fragile, pale in cap, white in stem. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens very pale yellowish from base to edge. Spore print not recorded.



Figs. 177–178. *Psathyrella involuta*. — 177. Spores. — 178. Cheilocystidiogram.

Spores (11.5–)12.5–13.5(–14.5) x (6.5–)7–8(–9)  $\mu\text{m}$  (mean values 12.9 x 7.4  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, in water reddish brown (Mu.  $\pm$  2.5 YR 3/6), in NH<sub>4</sub>OH 10% and KOH 5% dark brown with scarcely a trace of red (Mu. 5 YR 4/3, 4/4) opaque to subopaque, with large germ pore (2–2.5  $\mu\text{m}$ ) and very distinct hilar appendix. Basidia  $\pm$  20 x 10–11  $\mu\text{m}$ , 4-spored (acc. to Romagn.). Pleurocystidia absent. Marginal cells: utriform cheilocystidia 30–37.5 x 10–12.5  $\mu\text{m}$ , abundant and densely packed, thin-walled, colourless; spheropedunculate cells absent. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. pale brownish yellow, with few yellow hyphal septa, without encrustations. Pileipellis a layer of narrow, cylindrical hyphae as in *P. marcescibilis* over a layer of up to 75  $\mu\text{m}$  long and 16–50  $\mu\text{m}$  broad cells.

HABITAT & DISTRIBUTION. — At a burnt place around old deciduous tree stump. Not reported from the Netherlands or the British Isles, very rare in France.

COLLECTION EXAMINED. — F R A N C E, dpt. Yvelines, Cerçay, 18 June 1942 (herb. Romagn. 307, type).

We have never seen fresh material of this species. The description of the macroscopical characters, the basidia, the pileipellis, and the habitat is a translation of a description, received from Romagnesi, which he later (1982: 49) published him-

self. In this description he stated that *P. involuta* is perhaps a more luxuriant variety of *P. marcescibilis*, the species being in comparison with *P. marcescibilis* robuster, in young stages its cap more ochre and having an incurved margin, while its mature cap has a broad umbo and a slightly recurved margin. Its sizes, however, lie well within the limits we found in our 18 collections of *P. marcescibilis* (see descriptions), while in very young stages of *P. marcescibilis* we found the margin of the cap also incurved. The difference in colour of the very young caps seems trivial (warm reddish brown or brown in *P. marcescibilis* versus more ochre in *P. involuta*), but in *P. marcescibilis* we never came across an outspoken umbo or a revolute margin of the cap. Romagnesi found the microscopical characters, including the curious structure of the pileipellis to be the same for both species. From the description by Kühner & Romagnesi (1953: 367), in which the not strictly cellular structure of the pileipellis of *P. marcescibilis* is printed in bold face, it misleadingly looks as if this structure is not the same in *P. involuta*.

***Psathyrella leucotephra* (B. & Br.) P. D. Orton — Figs. 179–181**

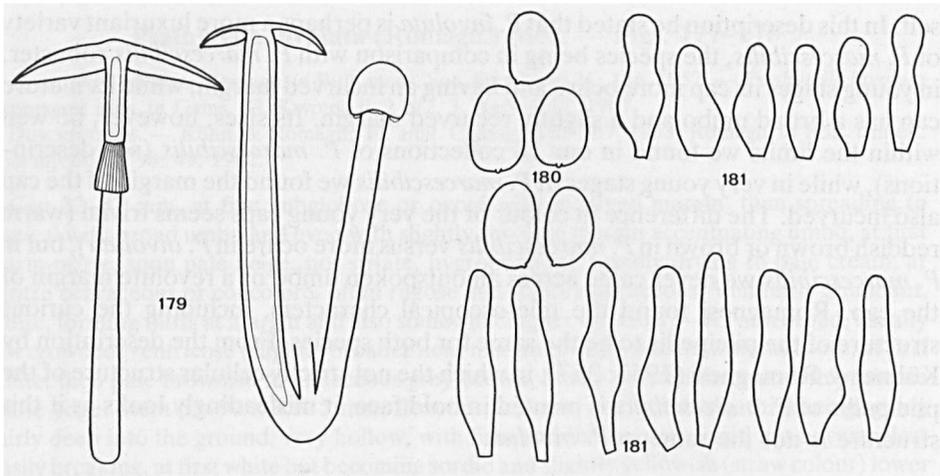
*Agaricus leucotephrus* B. & Br. in Ann. Mag. nat. Hist., ser. IV, 6: 468. 1870. — *Hypholoma leucotephrum* (B. & Br.) Sacc., Syll. Fung. 5: 1040. 1887. — *Psathyra leucotephra* (B. & Br.) Bertrand in Bull. trimest. Soc. mycol. Fr. 29: 187. 1913. — *Drosophila leucotephra* (B. & Br.) Romagn. in Rev. Mycol. 2: 247. 1937. — *Psathyrella leucotephra* (B. & Br.) P. D. Orton in Trans. Brit. mycol. Soc. 43: 180, 375. 1960.

*Hypholoma candolleianum* var. *annulatum* Quél. in Bull. Soc. bot. France 23: 328 ('1876') 1877.

MISAPPLIED NAMES. — *Agaricus hypsipus* sensu Fr., Ic. select. Hymenomyc. 2: pl. 132 fig. 2. 1879 (non *A. hypsipus* Fr., Epicr.: 218. 1828). — *Stropharia hypsipus* sensu J. Lange ('...podus'), Fl. agar. dan. 4: 70. 1939. — *Hypholoma appendiculatum* var. *hypsipus* sensu Big. & Guill. ('...podum'), Fl. Champ. sup. Fr. 2: 282. 1913.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 548/588. 1885 (striation of cap excluded); Fries, l.c., (as *Agaricus hypsipus*; striation of cap excluded); Kühn. & Romagn., Fl. anal. Champ. sup.: 367. 1953; J. Lange, Fl. agar. dan. 4: 70, pl. 144 D. 1939 (as *Stropharia 'hypsipoda'*); P. D. Orton in Trans. Brit. mycol. Soc. 43: 375. 1960; D. Reid in Col. Ic. rare interest. Fungi 3: 30, pl. 24. 1968.

Cap in earliest stages 10–25 mm, subglobose, with strongly incurved margin, a distinct velar membrane connecting margin with stem, pale brown, buff (Mu. 10 YR 7/4, 6/4), smooth, in later and mature stages, (20–)30–70(–80), semiglobose to paraboloid, with margin still incurved, becoming paler, very pale brown, cream-coloured, alutaceous or sordid whitish with slightly darker, pale ochreous or yellowish brown centre (Mu. ± 7.5 YR 6/6), finely radially rugulose, finally spreading to convex or plano-convex with vague, but sometimes distinct and large unbo, not striate, hygrophanous, drying out to whitish (Mu. 10 YR 8/2) with centre sordid ochreous-yellow (Mu. 10 YR 8/3, 8/4), without pink, not micaceous. Veil forming on surface of cap near margin fugacious arachnoid fibrils, isolated or in small bundles (in places sometimes even squamules), furthermore either appendiculate white denticles at margin or a conspicuous, up to 7 mm broad, pendulous, usually adpressed but sometimes spreading, often torn annulus (cuff) at about 1/3–1/4 of length of stem from apex, its upper surface striate-sulcate, its under surface arachnoid-felty; remnants of veil at maturity often scarce or even absent. Gills 2.5–5 mm broad, crowded, at first very pale brown (Mu. 10 YR 7/3), soon pale greyish, finally dark brownish grey to predominantly grey with a trace of purple (Mu. 7.5 YR 5/2), at first concave near margin and ventricose near stem, later ± straight, ascending, narrowly adnexed, with white fimbriate edge. Stem



Figs. 179–181. *Psathyrella leucotephra*. — 179. Carpophores (x 0.5). — 180. Spores. — 181. Cheilocystidiogram.

70–160 x 5–8–12 mm, cylindrical, white, hollow, striate above and smooth, silky below insertion of veil (annulus), springing with many other stems from a common very pale yellowish brown, fibrous-flocculose base. Flesh of cap in centre 1.5–4 mm thick, pale brown (Mu. 10 YR 6/3, 5/4), towards margin very pale brown. Smell and taste indistinctive. Trama of ‘washed’ gill in  $\text{NH}_4\text{OH}$  10% under binocular lens very pale brown only near base, gradually even paler towards edge. Spore print black.

Spores (7–)8–10 x 5–6  $\mu\text{m}$  (mean values 8.4–9.2 x 5.2–5.4  $\mu\text{m}$ : 5 collections), in face view ovate but with rectangular base, in profile often slightly phaseoliform, very dark, in water dark reddish brown (Mu. 10 R 3/4), in  $\text{NH}_4\text{OH}$  10% darker (Mu. 2.5 YR 3/2), in  $\text{KOH}$  5% dark brown (Mu. 7.5 YR 3/2), not opaque, without germ pore, with small hilar appendix. Basidia 21–29 x 9.5–11  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells: utriform cheilocystidia rather small, 25–40 x 7.5–12.5 to 6–8  $\mu\text{m}$ , abundant and densely packed, without accompanying spheropedunculate cells, thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless to very pale brown, without yellow hyphal septa or encrustations. Pileipellis a 3–4 cells deep layer of colourless cells, 25–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Caespitose in large clusters (10–30 specimens) in clayey soil around stumps of deciduous trees. Aug.–Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Gelderland, Hemmen, 16 Aug. 1970; prov. Utrecht: Bunnik, estate ‘Oud Amelisweerd’, 18 Oct. 1953; Linschoten, estate ‘Linschoter Bos’, 4 Sept. 1953; prov. Zuid-Holland, Oegstgeest, estate ‘Rhijnhof’, 10 Aug. 1980. — BRITISH ISLES, England, Sussex, Chichester, ‘Eartham Woods’, 3 Sept. 1967.

Fries (1838: 218) described *Agaricus hypsipus* and Saccardo (1887: 1025) incorrectly changed the substantive ‘...pus’ for the adjective ‘...poda’. Several authors (Masse, Konrad & Maublanc, J. Lange, and others) followed Saccardo’s example.

The present-day consensus is that *A. hypsipus* is to be regarded as a *nomen*

*dubium*, that this species is not the same as *A. leucotephrus* Berk. & Br., and that *Psathyrella leucotephra* is the name to be used for the species described above, as in Fries's publications *A. hypsipus* is described as a solitary growing species, having a membranous and substriate cap.

*Psathyrella leucotephra* is a strongly caespitose species with a rather fleshy and neither striate nor even substriate cap. The caps of the caespitose specimens described and depicted by Lange (l.c.) as *Stropharia hypsipus* ('...poda') are fleshy and do not show any striation. The same goes for the caespitose specimens described and depicted by Reid (l.c.) and by Cooke (l.c.). On the other hand it should be admitted that the specimens depicted by Fries (l.c., 1879) as *A. hypsipus* (quoted by Kühner & Romagn., l.c., for *P. leucotephra*), except for the marginal striation, represent typical specimens of *P. leucotephra*. Fries, however, in the end (1874) must have regarded *A. hypsipus* and *A. leucotephra* as two separate species as he described them both in his *Hymenomyc. eur.* (1874: 290 and 296).

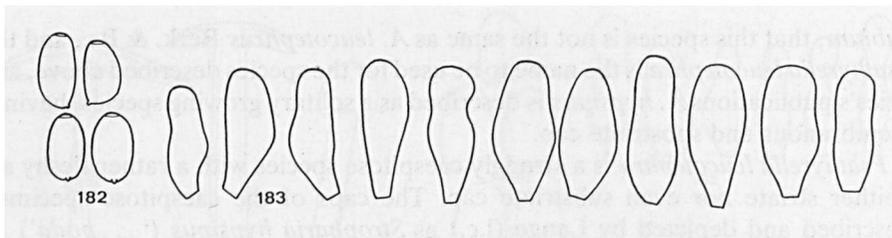
### ***Psathyrella spintrigera* (Fr.) Konr. & Maubl. — Figs. 182–183**

*Agaricus spintriger* Fr., *Epicr.*: 217. 1838. — *Stropharia spintrigera* (Fr.) Sacc., *Syll. Fung.* 5: 1025. 1887. — *Hypholoma spintrigerum* (Fr.) Konr. & Maubl., *l.c. select. Fung.* 6: 88. 1927. — *Drosophila spintrigera* (Fr.) Kühn. & Romagn., *Fl. anal. Champ. sup.*: 368. 1953 (not val. publ., basionym not mentioned). — *Drosophila appendiculata* var. *spintrigera* (Fr.) Quél., *Enchir. Fung.*: 116. 1886. *Psathyrella spintrigera* (Fr.) Konr. & Maubl. in *Encycl. mycol* 14 (*Agaricales* 1): 128. 1948.

*Stropharia spintrigera* var. *semivestita* J. Lange in *Dansk bot. Ark.* 4(4): 36. 1923.

DESCRIPTIONS & ILLUSTRATIONS. — Fr., *l.c. select. Hymenomyc.* 2: pl. 132 fig. 1. 1879 (caps too pale); Cooke, *Ill. Brit. Fungi* 4: pl. 542/570. 1885; J. Lange, *Fl. agar. dan.* 4: 70, pl. 143 A. 1939; ditto, pl. 143 B (as ... var. *semivestita*); Kühn. & Romagn., *l.c.*

Cap at first (primordia) ovoid, acorn-shaped, later semiglobose and sometimes with irregularly lobed, undulating margin, finally spreading, 60–95 mm when completely unfolded, subumbonate and cleft due to its fragility, vivid rust-coloured (Séguy 193, 192, 186 but less reddish, more ochre or orange-brown, towards 201), keeping this colour at margin; when moist with very smooth, but in places faintly rugulose surface, hygrophanous, drying out from centre, which becomes fairly warm brownish ochreous (Séguy 174 but less reddish) to finally brownish grey and multicoloured due to paler areas, with centre remaining more ochre, sometimes rugulose, not or scarcely micaceous. Universal veil in very early stages covering cap with a fine layer of white fibrils, but in some cases absent even in young specimens or only present in a few places, but mostly remaining, in still immature but fairly well-developed specimens merely as very dispersed flocci only visible under a lens, soon totally disappearing; at margin present longer as small white scales, with revolute or adpressed tips. Partial veil in the very young post-primordial stages reaching upper end of stem, forming a white, submembranous, downy-silky ring, at first coherent, then breaking radially into fairly firm bands or slabs often remaining on stem as an incomplete ring, at upper surface densely striate; at maturity fugacious traces of ring often occurring on bottom half of stem. Gills 5–6 mm broad, crowded, very unequal, with numerous lamellulae, very thin, very straight, not ventricose, sharp in front (in the beginning even slightly concave), broadly and rounded adnate without tooth, at first with reddish hue (translucency of flesh), then whitish-ochraceous to brownish and grey-brownish lilac (Séguy 693, 694, 133), finally brown-violet with paler and fimbriate edge. Stem 60–75 x 6.5–13.5 mm, slender to robust, straight, at base attenuated and strigose, very hollow, in young stages under insertion of ring



Figs. 182–183. *Psathyrella spintrigera*. — 182. Spores. — 183. Cheilocystidiogram.

silky, shiny, minutely flocculose, above insertion with distinctly sulcate, finely pruinose-to-mentose, downy sheath formed by partial veil, later densely covered, with white erect fluffs, very shaggy, particularly in area of ring, but at apex not shaggy and still sulcate; in older stages surface just white (very slightly yellow), in the middle with browning superficial fibrils, longitudinally striate and finely pruinose. Flesh of cap very thin, fragile, date brown, in cortex of stem whitish straw-coloured, darker around cavity, in the end with reddish hue at base. Smell and taste strong and pleasant. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens pale yellowish brown (Mu. 10 YR 6/4), paler towards edge. Spore print violet-brown.

Spores  $7\text{--}8 \times 4.5\text{--}(5) \mu\text{m}$  (mean values  $7.5 \times 4.5 \mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, in water warm orange-brown (Mu. 5 YR 4/8), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 7.5 YR 4/4; 5 YR 4/4), in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 5/4–4/3), not opaque; germ pore distinct ( $1.5\text{--}1.8 \mu\text{m}$ ), with small hilar appendix. Basidia  $23\text{--}26 \times 8\text{--}9 \mu\text{m}$ , clavate, 4-spored (acc. to Romagnesi). Pleurocystidia absent. Marginal cells:  $25\text{--}37.5 \times 10\text{--}15 \mu\text{m}$  (acc. to Romagnesi  $34\text{--}51 \times 11\text{--}16 \mu\text{m}$ ), abundant and densely packed, predominantly utriform but also clavate or subcylindrical, with very obtuse apex, thin-walled, colourless.

Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale brownish yellow in basal part, paler towards edge, without yellow septa or encrustations. Pileipellis (acc. to Romagnesi) composed of subglobose, elliptic or subclavate cells,  $55\text{--}60\text{--}(90) \times 20\text{--}50 \mu\text{m}$ .

HABITAT & DISTRIBUTION. — Solitary or gregarious in grass, sometimes subcaespitose. Not known from the Netherlands. Recorded from France and doubtfully from the British Isles.

COLLECTIONS EXAMINED. — F R A N C E, dpt. Yonne, 23 Aug. 1941 (herb. Romagnesi 273).

The description of the macroscopical characters and the habitat is a translation of a full description received from Romagnesi, the description of the microscopical characters and of the pigmentation of the gill trama is based on our own examination of an exsiccatum received from Romagnesi.

After amply weighing the pros and cons of saddling the nomenclature of this species with a new epithet, we have accepted Lange's and Romagnesi's interpretation of Fries's species although there are some differences between the descriptions and plate given by Fries and those given by Lange and Romagnesi.

Fries called the cap 'e fuscescenti l. incarnato albidus' (l.c., 1838), also 'e fuscescente argillaceus' (l.c., 1879), his plate (l.c., 1879) shows caps which are almost white (only yellowish in the middle, Mu. 10 YR 7/6) and without any velar remnants and he called the species 'admodum affinis *Ag. appendiculato*'.

Lange (1939: 70), however, called the cap 'dark date brown, dusky at the edge, alutaceous with a flush of fulvous at the disc when dry' and his plates 143 A and B

show dark reddish brown caps (paler when dry).

In Romagnesi's description cited above, the caps are 'vivid rust-coloured' and 'warm ochreous brown' and in that of Kühn. & Romagn. (l.c.) even 'beautifully date brown, not ochreous'. Going by the colour of cap and gills Fries's plate seemingly depicts *P. candolleana*. But because the absence of velar remnants both on the surface and at the margin of the cap, the presence of a distinct ring (very unusual in *P. candolleana*), the distinctly lobed cap and the either straight or even gills plead for *P. spintrigera* as interpreted by Romagnesi, who on the whole followed Lange, we have to assume then that Fries' plate depicts dry fruit-bodies.

### ***Psathyrella candolleana* (Fr.: Fr.) Maire. — Figs. 184–187**

*Agaricus appendiculatus* Bull., Herb. Fr. 9: pl. 392. 1789. — *Hypholoma appendiculatum* (Bull.) Quél. in Mém. Soc. Emul. Montbeliard, sér. II, 5: 146. 1872. — *Drosophila appendiculata* (Bull.) Quél., Enchir. Fung.: 116. 1886. — *Psathyrella appendiculata* (Bull.) Maire apud Maire & Werner in Mém. Soc. Sci. nat. Maroc 45: 112. 1937. — *Psathyra appendiculata* (Bull.) Sing. in Collect. bot. 1:230. 1947.

*Agaricus candolleanus* Fr., Observ. mycol. 2: 182. 1818 ('*candollianus*'). — *Agaricus candolleanus* Fr.: Fr., Syst. mycol. 1: 296. 1821 ('*candollianus*'). — *Hypholoma candolleianum* (Fr.: Fr.) Quél. in Mém. Soc. Emul., sér. II, 5: 146. 1872. — *Drosophila candolleana* (Fr.: Fr.) Quél., Enchir. Fung.: 115. 1886. — *Psathyra candolleana* (Fr.: Fr.) Bertrand in Bull. Soc. mycol. Fr. 17: 278. 1901. — *Psathyrella candolleana* (Fr.: Fr.) Maire apud Maire & Werner in Mém. Soc. Sci. nat. Maroc 45: 112. 1937.

*Agaricus egenulus* B. & Br. in Ann. Mag. nat. Hist., ser. III, 7: 375. 1861. — *Hypholoma egenulum* (B. & Br.) Sacc., Syll. Fung. 5: 1040. 1887. — *Psathyrella egenula* (B. & Br.) Mos. in Gams, Kl. Kryptog. fl. 2, 1. Aufl.: 206. 1953 (not val. publ., basionym not mentioned). — *Hypholoma appendiculatum* var. *egenulum* (B. & Br.) Petersen, Dansk Agaric.: 392. 1907.

*Agaricus coronatus* Fr., Hymenomyc. eur.: 295. 1874. — *Hypholoma coronatum* (Fr.) P. Karst., Bidr. Känn. Finl. Nat. Folk 32: 501. 1879. — *Psathyrella coronata* (Fr.) Mos. in Gams, Kl. Kryptog. fl. 2, 1. Aufl.: 206. 1953 (not val. publ., basionym not mentioned). — *Hypholoma appendiculatum* var. *coronatum* (Fr.) Big. & Guill., Fl. Champ. sup. Fr. 2: 282. 1913.

*Psathyrella microlepidota* P. D. Orton in Trans. Brit. mycol. Soc. 43: 375. 1960.

*Psathyrella elegans* Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 157. 1975 (incompatible race; see discussion).

*Psathyrella proxima* Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 149. 1975 (incompatible race; see discussion).

*Psathyrella scotospora* Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 155. 1975 (incompatible race; see discussion).

*Psathyrella candolleana* var. *solitaria* A. H. Smith in Mem. N.Y. bot. Gdn 24: 91. 1972.

For a more complete and annotated list of synonyms, varieties, and forms of *P. candolleana*, see Kits van Wav. in Trans. Brit. mycol. Soc. 75: 429–437. 1980. The following synonymous basionyms and names derived from them are treated there:

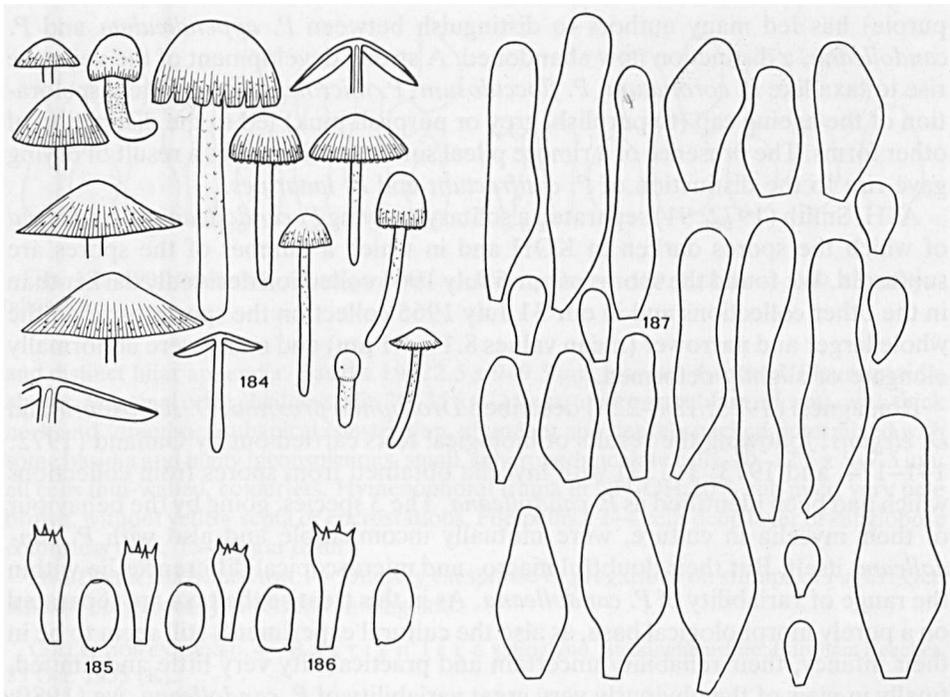
*Ag. mutabilis* O. F. Müll., 1782; *Ag. limbatus* Holmskj., 1799; *Ag. violaceo-lamellatus* DC., 1805; *Ag. violaceo-ater* Letell., 1829–1842; *Ag. vinosus* Corda, 1839; *Ag. coriarius* Panizzi, 1862; *Ag. lanaripes* Cooke, 1863; *Ag. felinus* Pass., 1872; *Ag. catarius* Fr., 1874; *Ag. incertus* Peck, 1895; *Hyph. flocculentum* McClatchie, 1897; *Hyph. cutifractum* Peck, 1895; *Hyph. flocculentum* McClatchie, 1897; *Stroph. irregularis* Peck, 1900; *Gymnochilus flocculosus* Earle, 1906; *Hyph. fragile* Peck, 1909; *Drosoph. jalapensis* Murrill, 1918; *Hyph. praecox* Velen., 1921; *Athylosp. striatula* Murrill, 1922; *Hyph. inocybeforme* C. H. Kauffm., 1930; *Hyph. cinereum* Parker, 1933; *Pslla pseudocandolleana* A. H. Smith, 1972; *Pslla rogueiana* A. H. Smith, 1972; *Pslla rupchandi* A. H. Smith, 1972; *Pslla singeri* A. H. Smith, 1972; *Pslla thiersii* A. H. Smith, 1972; *Ag. candoll.* var. *nigrescens* Lasch, 1828; *Hyph. append.* var. *lanatum* Berk. & Br., 1881; *Hyph. append.* var. *floccosum* Boud. 1911.

DESCRIPTIONS & ILLUSTRATIONS. — Fr., Ic. sel. Hymenomyc. 2: pl. 134, fig. 3. 1879 (as *Agaricus coronatus*); Cooke, Ill. Brit. Fungi 4: pl. 545/585. 1885 (as *A. lanaripes*); pl. 546/586. 1885; pl. 547/587. 1885 (as *A. appendiculatus*); pl. 592/612, 1886 (as *A. corrugis* var. *vinosus*); ditto, 8: pl. 1176/1180. 1891 (as *A. catarius*); Bull. Herb. Fr. 9: pl. 392. 1789 (as *A. appendiculatus*); Gillet, Tabl. anal. Hymenomyc.: pl. 352. 1884 (as *Hypholoma appendiculatum*); Pat., Tabl. anal. Fung. 1: 159, pl. 115. 1885 (as *H. appendiculatum* var. *floccosum*); Rick., Blätterp.: 246, pl. 64 fig. 4. 1912; Konr. & Maubl., Ic. select. Fung. 1 (2): pl. 43. 1926; Bres., Iconogr. mycol. 18: pl. 851 as *H. coronatum*, pl. 582, and pl. 853. 1931 (as *H. appendiculatum*); J. Lange, Fl. agar. dan. 4: 77, pl. 146 B and pl. 147 D (as *H. egenulum*); Wakef. & Denn., Comm. Brit. Fungi: pl. 77 fig. 1; Romagn., Nouv. Atl. Champ. 1: pl. 51 A. 1956; Romagn., Exotic Mushr.: pl. 51 A. 1961; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 141. 1975; Romagn., Champ. Eur. 1: pl. 131. 1977.

Early stages: Cap 6–15 mm, globose, hemispherical to paraboloid with incurved margin, or thimble-shaped, yellow-ochre to ochre-brown (Mu. 10 YR 6/4, 6/6, 5/4, 5/6), near margin paler (Mu. 10 YR 7/4), rarely darker brown (Mu. 7 YR 4/4), not striate, clad up to apex with white velar fibrils, bundles of fibrils and flocci; veil moreover forming a dense fleece, connecting margin of cap with stem and covering stem with a fine lanose coating of velar fibrils and very fine flocci; gills 1–2 mm broad, ascending, adnate, white; stem 10–25 x 2–5 mm, cylindrical, white.

At maturity: Caps 15–70(–80) mm, gradually expanding via paraboloid to convex or very broadly conical, sometimes campanulate, often vaguely umbonate, at first smooth, sometimes striate up to 1/3–1/2 from margin, later vaguely sulcate-rugulose, ochraceous yellow, gradually fading to pale yellowish ochre at centre, very pale sordid yellowish grey (Mu. 10 YR 8/3) between centre and white or sordid white marginal area, but usually almost entirely white except for the pale yellowish ochre centre, sometimes (particularly in young specimens) darker, greyish or ochreous brown at centre (Mu. 10 YR 4/2, 4/3, 4/4, 5/3, 5/4), yellowish brown in the middle and pale yellowish (Mu. 10 YR 7/3) in marginal area, in old and very old specimens sometimes with sordid purplish grey (Mu. 5 YR 5/2), dark grey (Mu. 10 YR 5/2, 6/2) or – particularly in peripheral half or only at margin – with purplish or purplish pink, hygrophanous, drying out to pale yellowish brown or cream (Mu. 2.5 Y 8/2) or slightly darker (Mu. 2.5 Y 8/4, 7/4, 6/4; 10 YR 8/3, 8/4, 8/6), for the rest sordid white, pale greyish or alutaceous, without pink, matt, micaceous and distinctly radially rugulose. Veil strongly developed, at maturity leaving a number of white but soon yellow-ochreous, concentrically arranged very small flocci on surface of peripheral half of cap (absent under unfavourable conditions), often with conspicuous and often even large, appendiculate, white denticles or an interrupted frayed appendiculate belt at margin (young specimens) and thin coating of small white fibrils on stem. Gills 2–4(–6) mm broad, very crowded, slightly ventricose, ascending, adnexed, usually in the beginning white but very soon conspicuously pink or lilaceous pink or very pale grey (Mu. 7.5 YR 7/2; 10 YR 7/2, 6/2), greyish chocolate (Mu. 5 YR 6/3, 5/2) or weak coffee-coloured (Mu. 7.5 YR 6/2, 6/3, 5/2), soon pale, later dark greyish purple-chocolate and finally dark purplish chocolate brown (Mu. 5 YR 3/2, 4/2), with white and rather coarsely fimbriate edge. Stems 30–90 x 2–6(–8) mm, cylindrical, straight, at base not or scarcely thickened, not rooting, strigose, white, very hollow, very fragile, with pruinose apex. Flesh of cap 1–3(–4) mm thick in centre, pale greyish-yellowish in centre with a thin yellowish ochre superficial layer, of stem white but very pale brown around cavity. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens very pale yellowish brown (Mu. 10 YR 8/3), practically colourless. Spore print brownish purple.

Spores 6.5–9 x (3.5–)4–5 μm (mean values 7.2–8.2 x 4.1–4.6 μm: 12 collections), ellipsoid, adaxially flattened or very slightly phaseoliform, opaque to subopaque, in water and NH<sub>4</sub> OH 10% reddish brown, orange-brown or yellowish brown (± Mu. 2.5 YR 3/4; 5 YR 4/6, 5/6; 7.5 YR 5/6), in KOH 5% sordid brown (Mu. 10 YR 5/3, 5/4), with distinct



Figs. 184–187. *Psathyrella candolleana*. — 184. Carpophores. — 185. Spores. — 186. Basidia. — 187. Cheilocystidiogram.

germ pore (1.5–1.8  $\mu\text{m}$ ) and small hilar appendix. Basidia 14.5–27  $\times$  7–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells 30–70  $\times$  9–17.5(–20) to 10–15 (apex)  $\mu\text{m}$ , abundant, chiefly utriform but many cylindrical or subcylindrical, some clavate, very variable in size on one and the same gill and from one collection to another, at their base a small number of unobtrusive spheropedunculate cells, 25–30  $\times$  15–20  $\mu\text{m}$ ; all cells with firm but fairly thin walls, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless, faintly yellowish at base, without yellow septa or encrustations. Pileipellis a 2–3 cells deep layer of globose, subglobose and obpyriform, colourless cells, 15–30  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Normally caespitose (often in large clusters of 10–40 specimens) but also subcaespitose and not infrequently solitary on or near tree stumps in woods, parks, gardens etc. May–Oct. Very common in the Netherlands, also in France and the British Isles.

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Overijssel, Denekamp, estate 'Singraven', 17 July 1965; prov. Gelderland, Vorden, 4 July 1959 and 18 July 1959; prov. Utrecht, Breukelen, estate 'Over Holland', 6 July 1961; prov. Noord-Holland: Hilversum, estate 'Gooilust', 31 July 1962; Amsterdam, Amsterdam Wood, 29 May 1960, 13 June 1961, 7 August 1962; Aerdenhout, 'Het Naaldenveld', 19 Oct. 1976; prov. Limburg, Mook, 31 July 1965. — **BRITISH ISLES,** Wales, Lake Vyrnwy, 27 Aug. 1962, 12 Sept. 1979.

In the past the great variability of the macroscopical characters of *P. candolleana* has led to a host of synonyms and a number of varieties and forms. The gills in early stages being either pink (or lilaceous pink) or pale greyish chocolate (or greyish

purple) has led many authors to distinguish between *P. appendiculata* and *P. candolleana*, a distinction now abandoned. A strong development of the veil gave rise to taxa like *P. coronatum*, *P. flocculosum*, *P. microlepidotum*. The discoloration of the ageing cap (to purplish, grey or purplish pink) led to the distinction of other forms. The presence of a rimose pileal surface of the cap as a result of drying gave rise to the distinction of *P. cutifractum* and *P. lanaripes*.

A. H. Smith (1972: 91) separated a solitary growing *P. candolleana* var. *solitaria* of which the spores darken in KOH and in which a number of the spores are subfusoid. We found the spores of our 6 July 1961 collection decidedly darker than in the other collections and in our 31 July 1965 collection the spores were on the whole larger and narrower (mean values  $8.1 \times 4.1 \mu\text{m}$ ) and many were abnormally elongate or slightly deformed.

Romagnesi (1975: 137–224) described *Drosophila proxima*, *D. scotospora* and *D. elegans*, following the results of biological tests carried out by Galland (1972: 141–174, and 1973: 1–132) with mycelia obtained from spores from collections which had been identified as *P. candolleana*. The 3 species, going by the behaviour of their mycelia in culture, were mutually incompatible and also with *P. candolleana* itself. But their doubtful macro- and microscopical differences lie within the range of variability of *P. candolleana*. As in this treatise the taxa are separated on a purely morphological base, as also the cultural experiments still seem to be in their infancy, their reliability uncertain and practicability very little and limited, finally in view of the obviously very great variability of *P. candolleana*, we (1980: 429) have – awaiting the results of future observations – brought all taxa, mentioned above under one denominator: *P. candolleana*.

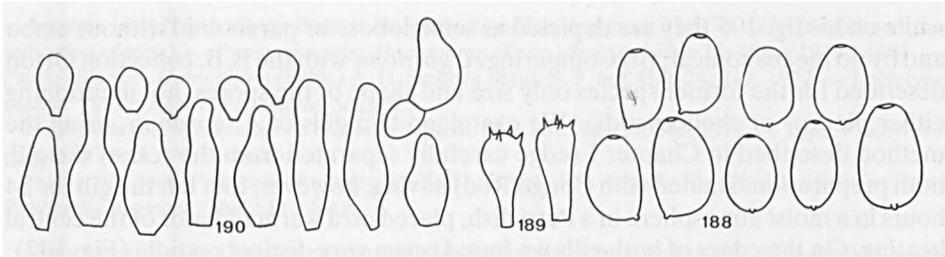
### ***Psathyrella pseudogordinii* Kits van Wav. — Figs. 188–190**

*Psathyrella pseudogordonii* Kits van Wav. on p. 282 of the present work, 1985.

MISAPPLIED NAME. – *Psathyrella gordonii* sensu P. D. Orton in Trans. Brit. mycol. Soc. 43:372. 1960 (non *Agaricus (Psathyra) gordonii* B. & Br. in Ann. Magaz. nat. Hist., ser. III, 7: 5, 1861 = ?).

Cap 20–45 mm, paraboloid, expanding to convex, sometimes slightly umbonate, livid grey or horn colour, often tinged sepia or date brown at centre, striate at margin, hygrophanous, drying out to whitish with pale ochraceous or sordid-brownish centre while becoming matt or with slight silky sheen. Veil white, in early stages forming scattered silky fibrillose patches on entire cap, copiously appendiculate at margin, later leaving cap with smooth centre and rather thick dentate scales or patches at or near margin, on stem floccose-scaly; flocci becoming larger and denser towards base, sometimes leaving ringlike traces about half-way down. Gills rather crowded, adnate, often rather narrow, lanceolate, not or slightly ventricose, greyish or with slight violaceous tinge, finally pallid umber, with white flocculose edge. Stem 35–70(–110)  $\times$  2–6(–8) mm, attenuated upwards, flexuose, pure white, then discolouring pale dirty brownish below, silky striate, hollow, fragile, with white pruinose-floccose apex and white tomentose base. Flesh concolorous in cap, horny over gills, white in stem, discolouring pale dirty ochraceous in lower stem. Trama of ‘washed’ gill very pale brown (Mu. 10 YR 7/3) from base to edge. Spore print violaceous umber.

Spores 8–11  $\times$  5–6.5  $\mu\text{m}$  (mean values  $9.4 \times 5.5 \mu\text{m}$ : 1 collection), size variable, ellipsoid or ellipsoid-ovoid, adaxially flattened, in water and  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 5 YR 4/6, 4/8), in KOH 5% sordid brown (Mu. 10 YR 5/3), not opaque, with small germ pore (1.5  $\mu\text{m}$ )



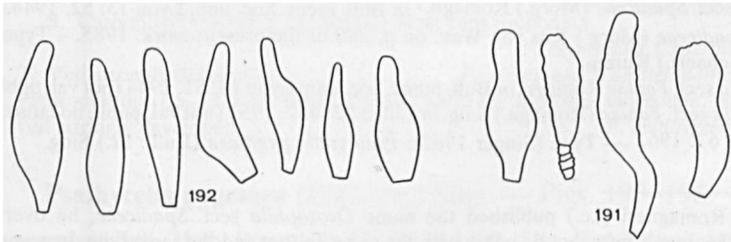
Figs. 188–190. *Psathyrella pseudogordonii*. — 188. Spores. — 189. Basidia. — 190. Cheilocystidiogram.

and distinct hilar appendix. Basidia 19–22.5 x 9–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia absent. Marginal cells: cheilocystidia 20–35 x 9–11  $\mu\text{m}$ , utriform (sublageniform), with thick neck and sometimes subapical constriction, abundant and densely packed, intermixed with some basidia and many inconspicuous, small, spheropedunculate cells, 10–12.5 x 5–7.5  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very pale brown, without yellow septa or encrustations. Pileipellis a 2–4 cells deep layer of subglobose colourless cells, 15–30  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Densely caespitose or gregarious on stumps of *Fagus*. Oct. Known only from type locality in England.

**COLLECTION EXAMINED.** — BRITISH ISLES, England, Buckinghamshire, Burnham Beeches, 23 Oct. 1955 (K).

We never saw fresh material of this species. The description of the macroscopical characters is taken from Orton (l.c.), the description of the microscopical characters is based on our examination of the Burnham Beeches (B.B.) specimens. Orton, who found the B.B. specimens, determined them as *P. gordonii* (Berk. & Br.) Pears. & Denn. as he regarded them as 'agreeing for the most part with the original diagnosis of *gordonii*'. He rightly added, however, that the original diagnosis of *A. gordonii* B. & Br. states that the cap is sulcate-striate, the gills are distant and the smell is faint, nauseous. These differences did not seem to him 'sufficiently marked to warrant rejection of the epithet *gordonii* for this collection'. But our examination of both the type material of *A. gordonii* and the B.B. collection learned that there are more and also more important differences between the two collections: (i) Both on the Berkeley & Broome's textfigure and Cooke's plate 580 A/620 (1885) all caps of *A. gordonii* are conspicuously conical, whereas Orton described the caps of the B.B. specimens as 'convex or slightly umbonate, soon expanded umbonate'



Figs. 191–192. *Psathyrella gordonii*, type. — 191. Pleurocystidiogram. — 192. Cheilocystidiogram.

while on his fig. 195 they are depicted as semiglobose or paraboloid without umbo and by no means conical; (ii) Comparing *A. gordonii* with the B.B. collection Orton described for the former species only size and shape of the spores, not mentioning either pleuro- or cheilocystidia. We examined two gills of *A. gordonii*, using the method described in Chapter I (edge carefully separated from the rest of the gill, both preparations stained with Congo Red) having, however, first left the gill for 24 hours in a moist atmosphere in a Petri dish, placed on a warm radiator of the central heating. On the edges of both gills we found seven very distinct cystidia (Fig. 192); they were lageniform, not utriform as in the B.B. specimens. On the face of one gill we found three shrivelled and one practically intact subutriform pleurocystidia (Fig. 191), whereas in the B.B. fruit-bodies pleurocystidia are absent (also according to Orton). (iii) On one slide we mounted in NH<sub>4</sub>OH 10% part of a gill of the type of *A. gordonii* and of a specimen of the B.B. collection in order to compare directly the spores of the two taxa. The spores of *A. gordonii* were distinctly darker (Mu. 5 YR 3/3, 3/4) than those of the B.B. collection and moreover opaque (some subopaque), whereas those of the B.B. collection were warm brown (Mu. 5 YR 4/6, 4/8) and not opaque.

In conclusion we regard the B.B. specimens as not to represent *A. gordonii*. Because of the absence of pleurocystidia the B.B. species belongs to section *Spintrigerae* and as it is not conspecific with any of the other species of that section we named it *P. pseudogordonii*, spec. nov.

We examined two more British collections which were named *P. gordonii*, present resp. in the herbaria of Kew and Edinburgh. The specimens from Edinburgh (White Down, 11 Aug. 1964) had densely packed large utriform cheilocystidia (32.5–50 x 10–17.5 µm, as for size and shape quite different from the lageniform cheilocystidia of *A. gordonii* and the small utriform cheilocystidia of *P. pseudogordonii*) and no pleurocystidia. The specimen from Bicester, 12 Oct. 1949 (K) recorded according to Orton (1960: 373) from an elm stump, had versiform, chiefly utriform, moderately numerous pleurocystidia and pleurocystidioid cheilocystidia, also quite different from those of *A. gordonii* and *P. pseudogordonii*. Unfortunately both collections lack a macroscopical description, so that an interpretation cannot be given.

### Section *Spadiceae* (Morg.) Kits van Wav. emend.

*Psilocybe* [sect.] *Spadiceae* Morg. in J. Mycol. 13: 246. 1907 (illegitimate, no indication of rank). — *Drosophila* sect. *Spadiceae* (Morg.) Romagn.<sup>1</sup> in Bull. mens. Soc. linn. Lyon 13: 52. 1944. — *Psathyrella* sect. *Spadiceae* (Morg.) Kits van Wav. on p. 280 of the present work. 1985. — Type: *Psilocybe spadiceae* (Schaeff.) Kumm.

*Drosophila* sect. *Fatuae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 51. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Fatuae* (Romagn.) Sing. in Lilloa 22: 467. 1951 (not val. publ., no latin); ex Sing. in Sydowia 15: 67. 1962 — Type (Singer 1962): *Psathyrella pygmaea* (Bull.: Fr.) Sing.

<sup>1</sup>) When Romagnesi (l.c.) published the name *Drosophila* sect. *Spadiceae*, he overlooked the existence of Morgan's infrageneric name with the same epithet and the same type. In accordance with Nicolson (1975: 462 and in lit.) we consider this a bibliographic error to be corrected.

*Agaricus* [sect.] *Homophron* Britz. in Ber. naturhist. Ver. Augsburg 27: 174. 1883 (illegitimate, no indication of rank). — *Psathyrella* subg. *Homophron* (Britz.) Sing. in Lilloa 22: 468. ('1949') 1951. — *Psathyrella* sect. *Homophron* (Britz.) A. H. Smith in Mem. N.Y. bot. Gdn 24: 237. 1972. — Lectotype (Singer 1951): *Agaricus spadiceus* Schaeff.

*Psathyrella* sect. *Cystidiosae* A. H. Smith in Mem. N.Y. bot. Gdn 24: 246. 1972. — Type: *Psathyrella cystidiosa* (Peck) A. H. Smith.

*Psathyrella* sect. *Pygmaeae* Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 10. 1982. — Type: *Psathyrella pygmaea* (Bull.: Fr.) Sing.

Pleurocystidia (and most pleurocystidioid cheilocystidia) muricate and thick-walled, walls at least 0.5  $\mu\text{m}$  thick, but almost always more, up to 2–3.6  $\mu\text{m}$  thick, either everywhere or only locally (apex, ventricular portion or/and in or near pedicel).

Emendated so as to bring the species with only slightly thick-walled (up to 0.5 or 1  $\mu\text{m}$  (but distinctly muricate cystidia in one section with the species of which the walls are thicker and the apex is (except in *P. spintrigeroides*) muricate).

#### KEY TO THE SPECIES OF SECTION SPADICEAE

1. Carpophores very small (cap 5–20 mm, stem 10–20 x 1–1.5 mm); cap strongly striate; base of stem bulbillate; carpophores usually (densely) gregarious, often growing together with *Coprinus disseminatus* on and around stumps of deciduous trees; veil rudimentary; spores 5.5–7 x 3.5–4.5  $\mu\text{m}$ ; cystidia utriform, strongly muricate. . . . . *P. pygmaea*, p. 155
1. Not as above; carpophores larger, firmer (cap (10–)20–50 mm, stem 25–70 x 2–7(–9) mm).
  2. Most pleurocystidia thick-walled, but a small number thin-walled; many pleurocystidioid cheilocystidia thin-walled; along margin of cap a 1 mm broad pruinose zone of minute erect hairs  
*P. variata*, p. 157
  2. Not as above.
  3. Veil absent.
    4. Cap drying to white, sordid white or sordid pale grey; spores distinctly pigmented; germ pore present; pleurocystidia few in number, utriform, with up to 0.5  $\mu\text{m}$  (rarely at apex 1  $\mu\text{m}$ ) thick wall . . . . . *P. cernua*, p. 159
    4. Cap drying to some shade of brown or pale brown; germ pore absent; pleurocystidia numerous, with ventricose fusoid cell body, tapering towards acute to subacute apex, with 0.5  $\mu\text{m}$  thick, but in upper  $\pm$  1/3 part up to 1.5–3(–4)  $\mu\text{m}$  thick wall.
      5. Spores sub micr. very pale pinkish yellow (Mu. 7.5 YR 7/4, 8/4); cap 20–100 mm; gills dark brown incarnate, chocolate brown or reddish brown . . . . . *P. spadicea*, p. 161
      5. Spores distinctly pigmented, brownish red or purplish sub micr.; cap 20–120 mm; gills incarnate finally dark sordid purplish brown . . . . . *P. sarcocephala*, p. 164
  3. Veil present.
    6. Pleurocystidia 10–25  $\mu\text{m}$  thick, ventricose-fusoid, subutriform, muricate.
      7. Veil rudimentary.
        8. Carpophores solitary (or subcaespitose); caps not umbonate.  
*P. olympiana* f. *olympiana*, p. 167
        8. Carpophores strongly caespitose; most caps umbonate.  
*P. olympiana* f. *caespitosa*, p. 170
      7. Veil strongly developed. . . . . *P. olympiana* f. *amstelodamensis*, p. 169
    6. Pleurocystidia 7.5–12.5  $\mu\text{m}$  thick, slender, narrowly fusiform, lanceolate, not muricate; veil strongly developed. . . . . *P. spintrigeroides*, p. 171

#### *Psathyrella pygmaea* (Bull.: Fr.) Sing. — Figs. 193–196

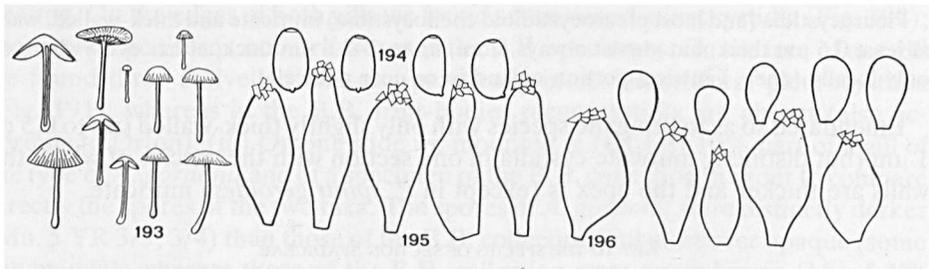
*Agaricus pygmaeus* Bull., Herb. France: Pl. 525 fig. 2. 1790; ditto, Hist. Champ.: 437. 1809. — *Agaricus pygmaeus* Bull.: Fr., Syst. mycol. 1: 263. 1821. — *Naucoria pygmaea* (Bull.: Fr.) Gillet,

Hyménomyc. France: 544. 1876. — *Psathyra pygmaea* (Bull.: Fr.) Quél. in C.R. Ass. Franç. Av. Sc. 9: 664. 1881. — *Drosophila pygmaea* (Bull.: Fr.) Quél., Enchir. Fung.: 117. 1886. — *Psathyrella pygmaea* (Bull.: Fr.) Sing. in Lilloa 22: 467. ('1949') 1951.

*Psathyrella consimilis* Bres. & Henn. apud P. Henn. in Verh. bot. Ver. Prov. Brandenb. 31: 178. 1889. — *Psathyra consimilis* (Bres. & P. Henn.) J. Lange in Dansk bot. Ark. 9(1): 10. 1936.

*Hypholoma minutellum* Höhn. in S.B. Akad. Wiss. Wien (Math.-naturw. Kl., Abt. 1) 116: 16. 1907.

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 96, pl. 151 B. 1939; Kühn. & Romagn., Fl. anal. Champ. sup.: 368. 1953.



Figs. 193–196. *Psathyrella pygmaea*. — 193. Carpophores (x 0.5). — 194. Spores. — 195. Pleurocystidiogram. — 196. Cheilocystidiogram.

Cap 5–17 mm, at first paraboloid, soon conico-paraboloid, spreading to convex with deflexed margin, finally convex or plane, sometimes even depressed with revolute flexuous margin, at first brown or yellowish brown (Mu. 10 YR 5/4, 5/6), with paler striae between ridges (Mu. 10 YR 7/4, 8/4), whitish at margin; later greyish brown (Mu. 10 YR 5/3, 5/2), at centre darker (Mu. 10 YR 4/3) or more ochreous (Mu. 10 YR 5/6), at maturity purplish brown or fairly dark reddish brown with purplish hue (Mu. 7.5 YR 5/2; 10 R 5/4, 4/4), strongly translucently striate almost up to centre, hygrophanous, drying out from centre, fading to pale grey, very pale brown to whitish, without pink, not micaceous or rugulose. Veil in very early stages forming a fairly dense network of fibrils and wicker-works of fibrils up to 3/4 from margin, not appendiculate, very fugacious, at maturity absent or present only as scattered fibrils at margin. Gills 1–1.5 mm broad, crowded, ventricose, fairly broadly to narrowly adnate, at first white, then pale pinkish grey (Mu. 7.5 YR 7/2, 6/2) then reddish brown (Mu. 5 YR 5/3, 4/2, 4/3) and finally fairly dark purplish brown or chocolate (Mu. 2.5 YR 5/4, 4/4, 3/4). Stem 10–20 x 1–1.5(–3) mm, cylindrical but with bulbous to subbulbous base (2 mm), hollow, white to very pale brown (Mu. 10 YR 8/2), pruinose almost along entire length but strongest at apex. Flesh of cap 0.5–1 mm thick in centre, brown (Mu 10 YR 5/3, 5/4), also in apex of stem alongside gills, in stem whitish to very pale brown (Mu 10 YR 8/2). Trama of ‘washed’ gill very pale to pale brown (Mu. 10 YR 7/2, 7/3, 6/3) from base to edge, often slightly mixed with brownish yellow (Mu. 10 YR 6/6), particularly near base. Spore print purplish brown.

Spores 5.5–7 x 3.5–4.5  $\mu\text{m}$  (mean values 5.7–6.2 x 3.6–4  $\mu\text{m}$ : 6 collections) ellipsoid, adaxially flattened, in water fairly pale brown ( $\pm$  Mu. 7.5 YR 6/6), in  $\text{NH}_4\text{OH}$  10% sordid yellowish brown (Mu. 10 YR 5/4), in  $\text{KOH}$  5% sordid greyish brown (Mu. 10 YR 5/3), with distinct and relatively large germ pore (1–1.5  $\mu\text{m}$ ) and distinct but small hilar appendix. Basidia 13–17.5 x 5–6.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 27.5–40 x 12.5–15(–17.5)  $\mu\text{m}$ , abundant, pedicellate-utriform sometimes subcylindrical or subfusoid with very obtuse apex, with thin or very slightly (sometimes locally or only near apex) thickened (up to 0.5  $\mu\text{m}$ ), colourless or in  $\text{NH}_4\text{OH}$  10% very pale brown wall, strongly muricate (very distinct crown of crystals – sometimes only a few isolated crystals – dissolving in  $\text{KOH}$ , not in

NH<sub>4</sub>OH 10%, and/or crystalline granular material). Marginal cells: pleurocystidioid muricate cheilocystidia 20–35 x 10–15(–17.5) μm, abundant, intermixed with a number of thin-walled, colourless, spheropedunculate and clavate cells, 10–25 x 7.5–15 μm. Pigmentation of hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. very pale (almost colourless) to distinctly yellowish brown from membranous pigment with very few to quite a number of yellow hyphal septa and sometimes a fair number of small encrustations. Pileipellis a 2–3 cells deep layer of colourless, subglobose cells, 15–25 μm diam.

HABITAT & DISTRIBUTION. — Gregarious, usually in large numbers and mixed with *Coprinus disseminatus* on stumps of deciduous trees. May–Sept. Uncommon in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Noord-Holland: 's Graveland, estate 'Boeckesteyn', 29 June 1973; Amsterdam, Amsterdam Wood, 13 July 1958, 30 May, 11 June and 26 Sept. 1959, 15 May and 17 July 1960, 19 Sept. 1961, 12 Aug. 1967; prov. Noord-Brabant; Dorst, 'Leemkuilen', 10 July 1956; Son, 19 Sept. 1968.

### *Psathyrella variata* A. H. Smith — Figs. 197–202

*Psathyrella variata* A. H. Smith in Mem. N.Y. bot. Gdn 24: 238. 1972.

Cap at maturity 20–45 mm broad, round or oblong (20 x 30 mm or 30 x 45 mm), fleshy and firm, plane with even slightly depressed centre and strongly deflexed marginal area, with incurved margin, dark reddish brown (Mu. 5 YR 3/2; 2.5 YR 3/2, but see observations), not striate, with very smooth and slightly uneven surface, white in a 1 mm broad zone along extreme margin due to dense pruinose coating of minute erect white hairs, hygrophanous, drying out from centre to pale pinkish brown (Mu. 7.5 YR 7/4). Veil absent. Gills 2.5 mm broad, straight, ascending, rounded near stem, fairly narrowly adnate, pale brown (Mu. 7.5 YR 6/4), later chocolate, with white fimbriate edge. Stem 30–40 x 8–10 (apex) to 10–15 (base), gradually thickening towards base, coarsely grooved, finely fibrillose striate, white but ridges between grooves in lower half pale brown, pruinose in upper 1/2-1/3, very hollow (cavity penetrating into flesh of cap). Flesh of cap in centre 2 mm thick, dark reddish brown, of stem pale brown, but superficial layer white. Trama of 'washed' gill pale brownish yellow, due to a very pale greyish brown (Mu. 10 YR 7/2, 7/3) ground colour the tissue permeated by many anastomosing, vague brownish yellow tissue strands running from base to edge; edge distinctly yellowish brown. Spore print not recorded, but probably reddish chocolate brown.

Spores 7.5–9 x 3.5–4.5 μm (mean values 8.3 x 4.5 μm: 1 collection), in face view ellipsoid, in profile ellipsoid, many phaseoliform, in water, NH<sub>4</sub>OH 10%, and KOH 5% very pale pinkish yellow (Mu. 7.5 YR 8/4, 7/4), not opaque; germ pore absent; with small hilar appendix. Basidia 30–37.5 x 7.5–9 μm, clavate, 4-spored. Pleurocystidia (50–)55–70(–75) x 15–20 μm, abundant, ventricose-fusoid or -sublageniform, pedicellate, with wall thickened (up to 2 μm) in upper 1/2-1/3 of cell, in extreme apex sometimes thicker (up to 4 μm, rarely up to 8 μm, in some cells centre wall slightly thickened), practically colourless, muricate, at apex covered with crystals and/or granular crystalline material dissolving in KOH 5%, not in NH<sub>4</sub>OH 10%; far and away most cells lamprocystidia, but a small number thin-walled leptocystidia. Marginal cells: pleurocystidioid cheilocystidia 55–70 x 12.5–20 μm, abundant and densely packed, mixed with a fairly large number of thin-walled, non-muricate, colourless, versiform (spheropedunculate, clavate, fusoid, utriform), often quite large cystidia, 17.5–65 x 10–17.5 μm. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. very pale brownish yellow from membranous pigment, without yellow hyphal septa or encrusta-

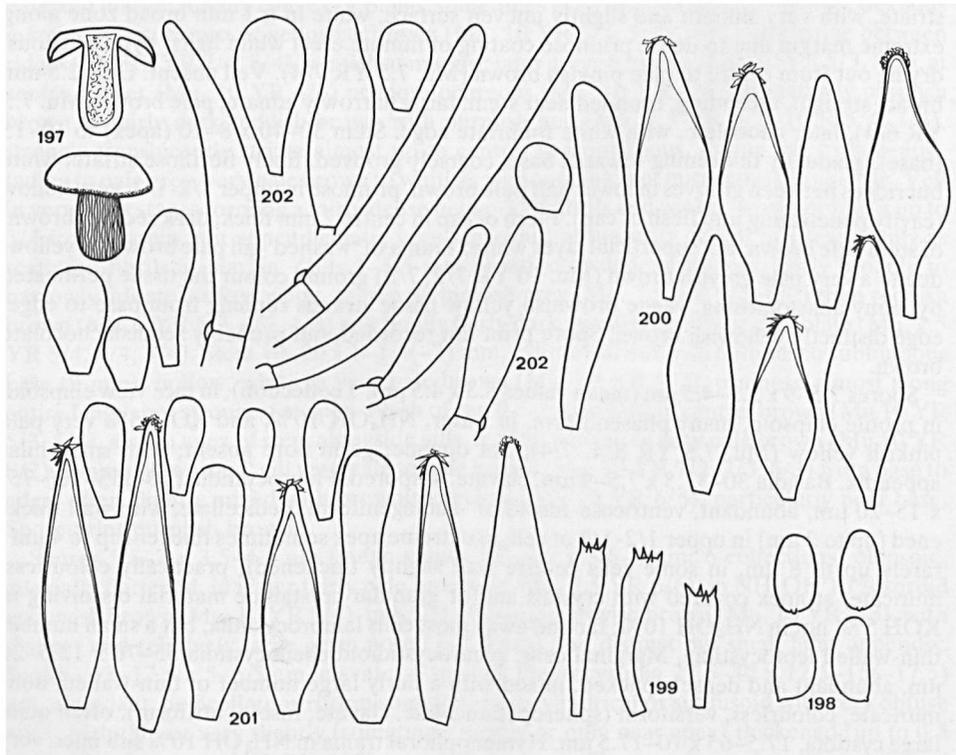
tions; a 15–20  $\mu\text{m}$  subhymenial zone under the marginal cells distinctly yellowish brown from membranal pigment, with many yellow hyphal septa but no encrustations. Pileipellis a 2–4 cells deep layer of globose, subglobose, oblong cells, 15–30  $\mu\text{m}$  diam.; pruinosity along margin of cap a mixture of long narrow hairs (60–130 x 7.5–10  $\mu\text{m}$ ) with swollen base and versiform, clavate and spheropedunculate cells (35–55 x 10–20  $\mu\text{m}$ ).

**HABITAT & DISTRIBUTION.** — Terrestrial in rich soil under *Fagus*. Oct. Only one record from the Netherlands. Not recorded from France or the British Isles nor from elsewhere in Europe.

**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S, prov. Overijssel, Delden, Bornesche weg, 20 Oct. 1975.

This species is very close to *P. spadicea*, with which it has in common the very pale spores, not changing colour in  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5%. It is characterised and distinguished from *P. spadicea* by the presence of both a great majority of thick-walled lamprocystidia and a minority of thin-walled leptocystidia and by the very striking dense coating of white minute hairs in a 1 mm broad zone along the margin of the cap (Smith: 'hoary pruinose').

Smith (1972: 237) divided subgenus *Homophron* into section *Homophron* (10 species, all having spores almost hyaline and not darkening on standing) and section *Cystidiosae* (15 species, all having spores soon cocoa-colour or darker in



Figs. 197–202. *Psathyrella variata*. — 197. Carpophores (x 0.5). — 198. Spores. — 199. Basidia. — 200. Pleurocystidiogram. — 201. Cheilocystidiogram. — 202. Hairs on margin of cap.

KOH). *Psathyrella spadicea* and *P. variata* belong to the former section and only *P. variata* and *P. populorum* (of both species Smith saw only one collection) are characterised by the presence of both lampro- and leptocystidia. For *P. populorum* Smith did not describe the presence of the pruinose zone along the margin of the cap and its spores were described as broader (x 5–6 µm), the gills as subdistant. For *P. variata* Smith gave larger spore sizes (8–11(–12) x 4–5(–6)) than we found in our collection. In spite of this difference in spore size we have – chiefly on account of the marginal pruinosity – identified our collection as *P. variata*. In the field our specimens were quite different from specimens of *P. spadicea*.

As for the colour of the cap, when we found our specimens the cap was dark reddish brown (Mu. 5 YR 3/2; 2.5 YR 3/2) only in a 4–5 mm broad zone along the margin of the cap. This zone was delimited by a fairly pale pinkish brown (Mu. 5 YR 5/4; 2.5 YR 5/4) 2 mm broad zone from the large centre of the cap which was pale pinkish brown (Mu. 7.5 YR 7/4). Our impression therefore was that the caps had already started drying. Hence our assumption (see the description) – also because the flesh was dark reddish brown – that when moist the entire cap must have been dark reddish. Smith's description approaches our observation very well in describing the colour of the cap as 'pallid to dingy cinnamon, developing a vinaceous tone and retaining a reddish cast on drying'. Obviously more observations are needed. We have let the two different kinds of cystidia and the pruinose margin of the cap prevail in the identification.

### *Psathyrella cernua* (Vahl: Fr.) Hirsch — Figs. 203–207

*Agaricus farinulentus* Schaeff., Fung., Bavar.: pl. 205. 1774. — *Psilocybe farinulenta* (Schaeff.) Sacc., Fl. ital. cryptog. 1(15): 829. 1916. — *Psilocybe cernua* var. *farinulenta* (Schaeff.) Killerm. in Denkschr. regensb. bot. Ges. 6(20): 74. 1936.

*Agaricus membranaceus* Bolt., Hist. Fung. Halifax 1: 11, pl. 11. 1788. — *Agaricus papyraceus* Pers., Syn. meth. Fung. 2: 425. 1801 (illegitimate, superfluous change of name). — *Agaricus papyraceus* Pers.: Fr., Syst. mycol. 1: 305. 1821. — *Prunulus papyraceus* (Pers.: Fr.) S. F. Gray, Nat. Arrangm. Brit. Plants: 631. 1821. — *Coprinarius papyraceus* (Pers.: Fr.) Kumm., Führ. Pilzk.: 68. 1871. — *Psilocybe papyracea* (Pers.: Fr.) J. Lange in Dansk bot. Ark. 9(1): 32. 1936. — *Psathyrella papyracea* (Pers.: Fr.) Mos. in Gams, Kl. Kryptog. fl. 2: 208. 1953 (not val. publ., basionym not mentioned).

*Agaricus cernuus* Vahl. in Fl. dan. 6(17): pl. 1008 fig. 1. 1790. — *Agaricus cernuus* Vahl: Fr., Syst. mycol. 1: 298. 1821. — *Psathyra cernua* (Vahl.: Fr.) Kumm., Führ. Pilzk.: 70. 1871. — *Psilocybe cernua* (Vahl.: Fr.) Quél. in Mém. Soc. Emul. Montbél., sér. II, 5: 147. 1872. — *Drosophila cernua* (Vahl.: Fr.) Quél., Enchir. Fung.: 117. 1886. — *Atylospora cernua* (Vahl.: Fr.) Fay. in Ann. sc. nat., sér. VII, 9: 377, pl. 6 fig. 6. 1889. — *Pratella cernua* (Vahl.: Fr.) Kirchner & Eichler in Jh. Ver. vaterl. Naturk. Württemb. 50: 448. 1894. — *Psathyrella cernua* (Vahl.: Fr.) Mos. in Gams, Kl. Kryptog. fl. 2, 1. Aufl.: 209. 1953 (not val. publ., basionym not mentioned). — *Psathyrella cernua* (Vahl.: Fr.) Hirsch in Wiss. Z. Fr. Schiller-Univ. Jena 33: 815. 1984.

*Agaricus alneti* Schum., Enum. Plant. 2: 280. 1803.

*Hypophyllum bicolor* Paul., Iconogr. Champ.: pl. 110 fig. 3. 1805–1835.

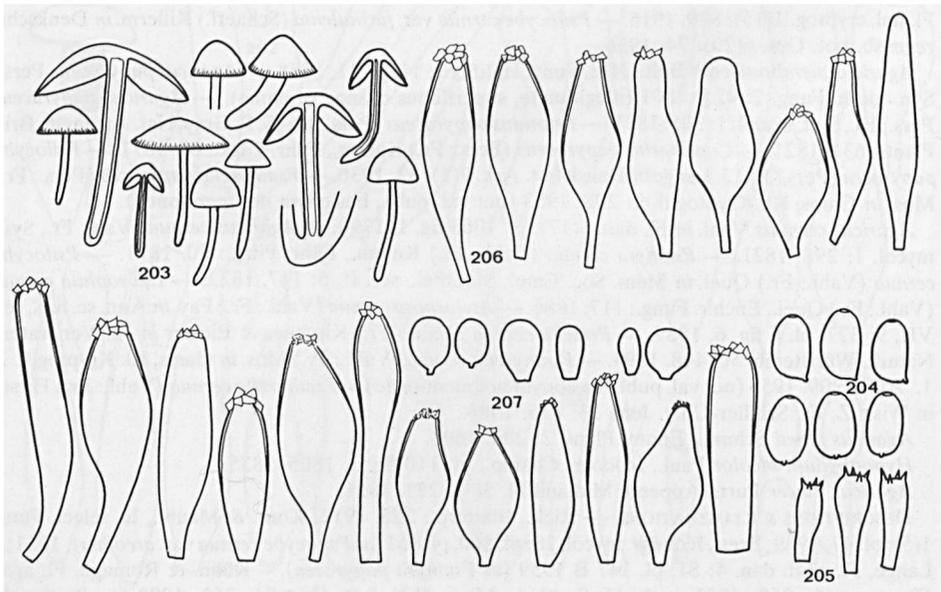
*Agaricus macer* Purt., Append. Midland Fl. 3(1): 221. 1821.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., Blätterp.: 255. 1912; Konr. & Maubl., Ic. select. Fung. 1(5): pl. 47. 1929; Bres., Iconogr. mycol. 18: pl. 860, pl. 861 (as *Psilocybe cernua* var. *areolata*). 1931; J. Lange, Fl. anal. dan. 4: 81, pl. 147 B 1939 (as *Psathyra papyracea*). — Kühn. & Romagn. Fl. agar. Champ. sup.: 368. 1953. — A. H. Smith in Mem. N.Y. bot. Gdn 24: 253. 1972 (as *Psathyrella polycephala*).

MISAPPLIED NAME. — *Psathyrella polycephala* sensu A. H. Smith in Mem. N.Y. bot. Gdn 24: 253 1972.

Cap in primordia 2–3 mm (stem 10 x 1 mm), at apex dark reddish brown (Mu. 5 YR 3/4), towards margin brown (Mu. 7.5 YR 5/6), at margin yellowish (Mu. 10 YR 7/6), at maturity paraboloid, then conico-paraboloid (10–20 mm), finally spreading to convex (20–45 mm), in early stages with incurved margin, sordid brown or greyish brown (Mu. 10 YR 5/2, 5/3, 6/2, 6/3), in marginal area sometimes with purplish pink hue and with whitish extreme margin, firm, fleshy, striate only at margin over a distance of 2–3 mm (rarely much further up), hygrophanous, soon and rapidly drying out to remarkably white, sordid white (Mu. 10 YR 8/2, 8/3; 2.5 Y 8/2), alutaceous, cream-coloured or very pale greyish brown (Mu. 10 YR 7/2, 7/3), pale sordid yellowish ochre at centre (Mu. 10 YR 8/6, 8/4, 7/6, 7/4), with smooth, matt, often cracking, sometimes slightly micaceous, rugulose surface. Veil absent, gills 3–6 mm broad, crowded, moderately to distinctly ventricose, rarely straight and ascending, normally broadly, rarely narrowly adnate, at first white, then weak chocolate (Mu. 5 YR 5/3) or brown (Mu. 7.5 YR 4/4), finally dark reddish to purplish brown (Mu. 5 YR 4/4, 3/4, 3/3; 2.5 YR 2.5/4), with white, minutely fimbriate edge. Stem 15–40 x 2–9 mm (but up to 80–90 mm long when emerging from cavities in tree stumps), firm but very hollow, cylindrical, white, whitish or lower down isabelline, longitudinally fibrillose-striate; apex pruinose over 10–15 mm; base covered with white down. Flesh in cap 2–5 mm thick, brown (Mu. 10 YR 6/3, 7/3, 7/4), in stem white. Trama of 'washed' gill distinctly pigmented; ground colour pale brown (10 YR 6/3) mixed with brownish yellow (Mu. 10 YR 6/6, 5/6, 5/8) from many usually distinct, parallel, anastomosing tissue strands running from base to edge, merging in basal areas. Spore print purplish black.

Spores 6.5–7(–8) x 4–4.5  $\mu\text{m}$  (mean values 6.5–7.6 x 4.2–4.5  $\mu\text{m}$ : 8 collections), ellipsoid, adaxially flattened, in water reddish yellow (Mu. 5 YR 5/8, 4/8), in  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 7.5 YR 4/4), in KOH 5% sordid greyish brown (Mu. 10 YR 5/3, 4/3, 3/3), not opaque, with small ( $\pm 1 \mu\text{m}$ ), fairly distinct germ pore and relatively large hilar appendix. Basidia 17.5–27.5 x 6.5–9  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 30–55(–57.5) x 7.5–15(–



Figs. 203–207. *Psathyrella cernua*. — 203. Carpophores (x 0.5). — 204. Spores. — 205. Basidia. — 206. Pleurocystidiogram. — 207. Cheilocystidiogram.

17.5)  $\mu\text{m}$ , few to moderately numerous, versiform, usually utriform-pedicellate, sometimes fusoid-subcylindric-sublageniform-pedicellate with obtuse apex, with wall very slightly thickened up to 0.5  $\mu\text{m}$ , rarely 1  $\mu\text{m}$  at the very apex, usually very pale brown in  $\text{NH}_4\text{OH}$  10%, at apex normally carrying a granular crystalline substance or/and distinct crystals, dissolving in  $\text{KOH}$ , but not in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 20-60 x 10-20  $\mu\text{m}$ , normally thicker than the pleurocystidia, abundant and very densely packed, at their base with a small number of difficult to find, small spheropedunculate and clavate cells, 7.5-15 x 5-10  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale yellowish brown from membranous pigment, without yellow hyphal septa or encrustations. Pileipellis a 3-4 cells deep layer of versiform, globose-pedicellate, subglobose, obpyriform, and subcylindric colourless cells, 25-40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — On dead treestumps, mostly of *Fagus*, also *Populus*; caespitose or subcaespitose, also densely gregarious. Sept.-Nov. Uncommon in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel: Denekamp, estate 'Singraven', 13 Oct. 1963 and 20 Oct. 1967; Delden, estate 'Twinckel', 18 Oct. 1968 and 22 Oct. 1975; prov. Noord-Holland: Castricum, dunes of County Water Supply, 31 Oct. 1970; Santpoort, estate 'Duin & Kruidberg', 14 Nov. 1959; prov. Limburg, St. Odiliënberg, estate 'Munniksborch', 11 Nov. 1964.

Although many authors gave descriptions of *Agaricus* (or *Psilocybe*) *areolatus* Klotzsch, this species is regarded as doubtful, as already indicated by Dennis, Orton and Hora (1960: 172). It is characterised by the whitish surface of the cap cracking (no doubt due to desiccation) into many somewhat coloured patches. Because of its other features it could very well be a form of *P. cernua* if it were not for the fact that Klotzsch (1836: 112) and many authors copying his description, clearly indicated the presence of a veil ('minute fibrillae'). Bresadola depicted (not at all well) on his plate 860 and described *P. cernua* as having no veil and depicted on plate 861 (a much better picture of *P. cernua*) '*P. cernua* var. *areolata*', not mentioning a veil.

### ***Psathyrella spadicea* (Schaeff.) Sing. — Figs. 208-212**

*Agaricus spadeceus* Schaeff., Fung. Bavar. 1: pl. 60. 1762. — *Psilocybe spadicea* (Schaeff.) Kumm., Führ. Pilzk.: 71. 1871. — *Drosophila spadicea* (Schaeff.) Quél., Enchir. Fung.: 116. 1886. — *Pratella spadicea* (Schaeff.) J. Schroet. in Cohn, Kryptog.-Fl. Schlesien: 568. 1889. — *Psathyra spadicea* (Schaeff.) Sing. in Anns mycol. 34: 33. 1936. — *Psathyrella spadicea* (Schaeff.) Sing. in Lilloa 22: 468. 1951.

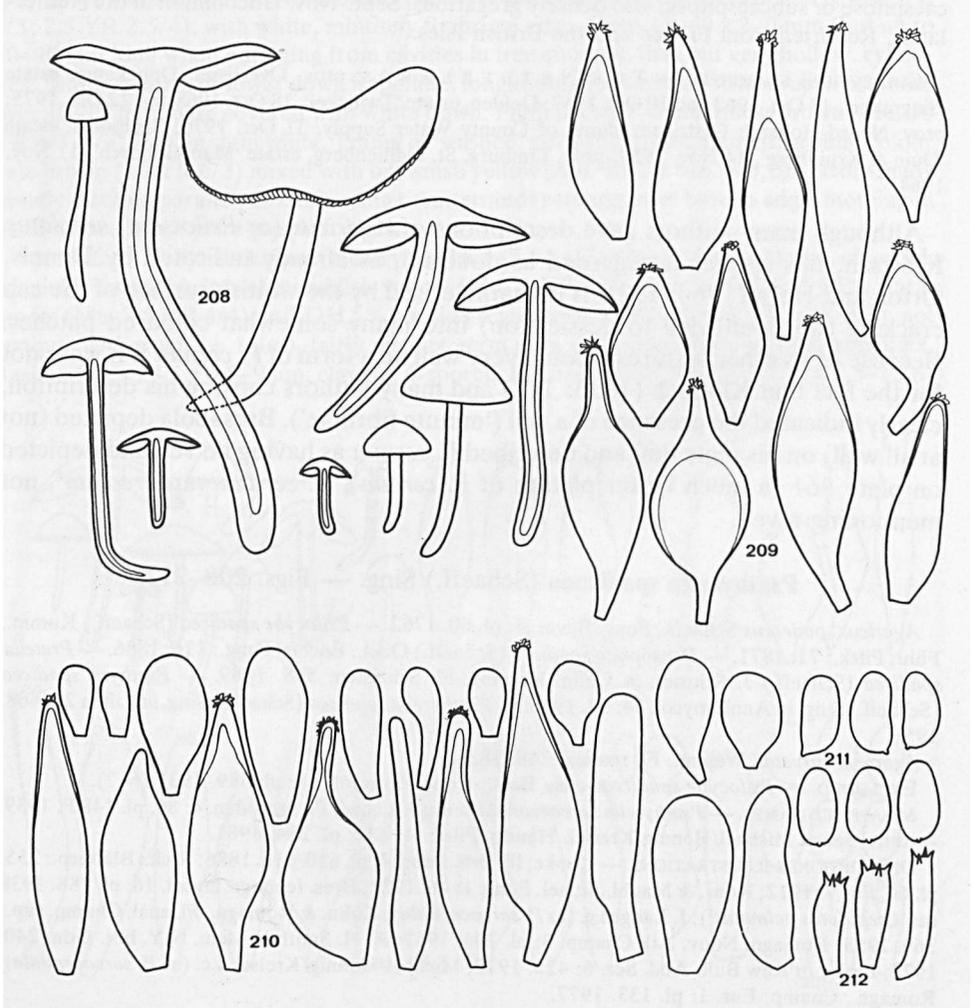
*Agaricus curvatus* Weinm., Fl. rossica: 248. 1836.

EXCLUDED. — *Psilocybe spadicea* sensu Bres., Iconogr. mycol. 18: pl. 589. 1931 (= ?).

MISAPPLIED NAMES. — *Psathyrella sarcocephala* sensu J. Lange, Fl. agar. dan. 4: 80, pl. 148 F. 1939. — ditto, sensu Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 432, pl. 284. 1981.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 610/616. 1886; Rick., Blätterp.: 255, pl. 66, Fig. 7. 1912; Konr. & Maubl., Ic. sel. Fung. 1: 46. 1928; Bres. Iconogr. mycol. 16: pl. 788. 1930 (as '*Crepidotus palmatus*'); J. Lange l.c. (as *P. sarcocephala*); Kühn. & Romagn., Fl. anal. Champ. sup.: 369. 1953; Romagn. Nouv. Atl. Champ. 3: pl. 204. 1961; A. H. Smith in Mem. N.Y. bot. Gdn: 240. 1972; Pegler in Kew Bull. Add. Ser. 6: 425. 1977; Michael/Hennig/Kreisel, l.c. (as *P. sarcocephala*); Romagn., Champ. Eur. 1: pl. 133. 1977.

Cap 20–100 mm broad, in early stages paraboloid, then conico-paraboloid with incurved margin, soon spreading to convex with deflexed marginal area, finally plane, often with revolute and/or flexuous marginal area, sometimes vaguely umbonate or with depressed centre, fleshy, firm, at first very dark reddish brown (Mu. 2.5 YR 3/2, 2.5/4), at maturity dark reddish incarnate-brown (Mu. 5 YR 4/3, 3/3, 4/4, 4/3), slightly paler near margin (Mu. 5 YR 5/2, 5/3, 5/4), not striate or only substriate at margin over 2–5 mm, with greasy, smooth, hygrophanous surface, drying out from centre to sordid greyish yellow (Mu. 7.5 YR 7/4; 10 YR 6/4, 7/3, 7/4, 8/3) sometimes with pinkish hue, pale ochre at centre, not micaceous or rugulose. Veil absent. Gills 4–10 mm broad, crowded,  $\pm$  horizontal but strongly rounded close to stem and then narrowly adnate (rarely broadly), at first brown (Mu. 7.5 YR 5/4), at maturity brown-incarnate, brown-chocolate, reddish brown (Mu. 5 YR 4/4, 3/4, 5/3, 5/4) or warm brown (Mu. 7.5 YR 5/4), with white or concolorous fimbriate



Figs. 208–212. *Psathyrella spadicea*. — 208. Carpophores (x 0.5). — 209. Pleurocystidiogram. — 210. Cheilocystidiogram. — 211. Spores. — 212. Basidia.

edge. Stem 20–70 x 3–4 mm, but when springing from cavity of hollow tree stump up to 80–140 x 10–15 mm, cylindrical, often flexuous, at extreme base often attenuated, hollow, white, whitish, isabelline or very pale brown, distinctly and sometimes even coarsely fibrillose striate to (in upper part) subsulcate. Flesh of cap concolorous, 3–5(–7) mm thick in centre, in stem fibrous, whitish to pale brown. Trama of ‘washed’ gill rather strongly pigmented, brownish yellow; pale brown (Mu. 10 YR 7/3), darker from edge to base (via Mu. 10 YR 6/3 to 5/3), but mixed with brownish yellow (Mu. 10 YR 6/6) from numerous, anastomosing strands running from base to edge. Spore print reddish chocolate brown.

Spores 7–10 x 4–5.5  $\mu\text{m}$  (mean values 8–9.1 x 4.2–5  $\mu\text{m}$ : 9 collections), in face view ellipsoid or ellipsoid-ovoid, in profile ellipsoid but many spores distinctly phaseoliform, conspicuously pale, in water pale yellowish pink (Mu. 7.5 YR 7/4, 8/4, 8/6, in  $\text{NH}_4\text{OH}$  10% pale brown (Mu. 7.5 YR 6/4), in  $\text{KOH}$  5% very pale sordid brown, not opaque; germ pore absent; hilar appendix distinct. Basidia 20–30 x 6.5–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 35–65(–70) x 12.5–22.5(–25)  $\mu\text{m}$ , numerous, near edge abundant, ventricose-fusoid with short or somewhat longer pedicel and gradually tapering towards acute or subacute (subobtuse) apex, with wall  $\pm$  0.5  $\mu\text{m}$  thick, almost always thickening in upper  $\pm$  1/3 of cell or with a local thickening just below apex, at very apex 1.5–3(–4)  $\mu\text{m}$  thick, practically colourless or very pale brown in  $\text{NH}_4\text{OH}$  10%; thick-walled upper part strongly colouring red in Congo Red. Apex of cells usually covered with a granular crystalline substance or conspicuous crystals, both dissolving in  $\text{KOH}$ , not in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 35–75 x 15–25  $\mu\text{m}$ , abundant and densely packed, sizes and shapes very variable, intermixed with few to sometimes moderately numerous, usually large, spheropedunculate and clavate, rarely utriform, thin-walled cells, 17.5–47.5 x 10–27.5  $\mu\text{m}$  and transitions between pleurocystidioid cheilocystidia and spheropedunculate cells. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly yellowish brown from membranal pigment, particularly the subhymenium in which however few yellow hyphal septa, no encrustations present. Pileipellis a 2–4 cells deep layer of versiform, subglobose and oblong colourless cells 15–30  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Caespitose, rarely solitary, on treestumps, usually of *Fagus*, also found at foot of live trees (*Castanea*, *Betula*). Oct.–Nov. Uncommon in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel, Delden, estate ‘Twickel’, 18 Oct. 1968, 8 Oct. 1976, and 26 Sept. 1981; prov. Noord-Holland: Castricum, dunes of County Water Supply, 7 Nov. 1964; Santpoort, estate ‘Duin en Kruidberg’, 16 Nov. 1960; prov. Noord-Brabant, Eindhoven, estate ‘De Wielewaal’, 10 Oct. 1965. — **B R I T I S H I S L E S,** Hampshire, New Forest, Great Huntley Bank, 23 Sept. 1971.

For a comparison with *P. sarcocephala* see p. 165. *Psathyrella spadicea* as depicted on Bresadola’s plate 859 can at most represent small specimens of this species, but far more likely represents another species as the depicted cystidia do not resemble the cystidia of *P. spadicea* at all, while the description mentions the presence of a veil and a rooting stem (both not depicted). Bresadola’s plate 788, however, (as *Crepidotus palmatus*) depicts the species exceedingly well.

*Agaricus amaurus* B. & Br. (1871: 555) was included by Pegler (1977: 425) in the synonymy of *P. spadiceus*. We were enabled to examine the type specimens consisting of 4 very small capophores (dry caps 14 mm diam, stems 12–15 x 1 mm) and found abundant fusiform-pedicellate pleurocystidia, (55–)65–80 x 15–20  $\mu\text{m}$  of which the walls were thickened (1–2  $\mu\text{m}$ ) along the entire length of the cells,

which were distinctly brown in  $\text{NH}_4\text{OH}$  10%. The sordid pale brown spores measured 8–9 x 5.5  $\mu\text{m}$  and many were slightly phaseoliform. Berkeley & Broome moreover described the cap as 'deeply sulcato-striate'. All this rules out *P. spadicea*.

*Agaricus canobrunneus* Fr. (1821: 294) was described as a species with a stem 'radicato squamuloso', growing on burnt places. Although seemingly related to *P. spadicea*, it is to be regarded as a doubtful species as already indicated by Dennis, Orton & Hora (1960: 177).

*Agaricus curvatus* Weinm. (1836: 248) was quoted by Fries (1838: 225) as a synonym of *Agaricus hydrophilus*, but Weinmann did not mention the presence of a veil, called the cap 'carnosomembranaceus, subfirmus, 2–2.5 unc. latus, incarnato-fuscescens' and the stem 6.5–9 mm thick and striate, so that *P. spadicea* is a more likely interpretation.

*Agaricus spadiceus* var. *hydrophilus* Fr. (1838: 225) was described as having a stem '4–6 unc. longus, subfusiformi-radicato' and gills 'emarginatis, longe lineatum decurrentibus' and is therefore to be regarded as a doubtful taxon as already indicated by Dennis, Orton & Hora (1960: 192).

Pegler (1977: 425) included *Psathyra reticulata* Petch (Ann. Roy. bot. Gdns Peradeniya 6: 322. 1925) in the synonymy of *P. spadicea*. We did not see or examine the type specimens, but Pegler did and very kindly sent us his drawings of spores and cystidia. He described the spores as pale red-brown and depicted a distinct germ pore, the pleurocystidia as fusoid-pedicellate not tapering towards an acute apex (as typical of *P. spadicea*) and with walls, thickened along the entire length of the cells. This rules out *P. spadicea* and brings this species very close to *P. olympiana* of which it might well be a synonym.

Fries (1838: 225) described a variety '*polycephalus*' of *A. spadiceus*, characterised by being 'densissima stipatus; stipite tenuiore, flexuoso; lamellis fusco umbrinus'. This makes us suspect that this variety represents the densely gregarious to caespitose, rather slender form of *P. olympiana* (our forma *caespitosa*) of which we have two collections, one of which having been named 'cf. *spadicea*' by the collector. Smith (1972: 253) used this varietal name as basionym for his *Psathyrella polycephala* (Fr.) A. H. Smith, stating, however, that 'this name is used tentatively since in Europe it is usually referred to *P. cernua* as a synonym'. Of the latter species Smith only examined 1 collection (of his *P. polycephala* 21). From his descriptions of both species it is clear that they are very close, if not identical. Smith regards them as variants, adding that he cannot resolve the problem of their identity. All in all we agree with Dennis, Orton & Hora (1960: 207) that *A. spadiceus* var. *polycephalus* is a doubtful taxon.

### ***Psathyrella sarcocephalus* (Fr.) Sing.**

*Agaricus sarcocephalus* Fr., Obs. mycol. 1: 51. 1815. — *Agaricus compactus*  $\gamma$  *sarcocephalus* Fr.: Fr., Syst. mycol. 1: 290. 1821. — *Agaricus sarcocephalus* (Fr.) Fr., Epicr.: 228. 1838. — *Psilocybe sarcocephala* (Fr.) Gillet, Hyménomyc.: 586. 1878. — *Drosophila sarcocephala* (Fr.) Quél., Enchir. Fung.: 116. 1878. — *Psathyra sarcocephala* (Fr.) Bertrand in Bull. Soc. mycol. Fr. 17: 277. 1901. — *Coprinarius sarcocephalus* (Fr.) P. Cout., Eubasidiom. Lusit. Herb. Univ. Olisip. 88. 1919. — *Psa-*

*thyrella sarcocephala* (Fr.) Sing. in Lilloa 22: 468. ('1949') 1951.

MISAPPLIED NAME. — *Psilocybe spadicea* sensu J. Lange, Fl. agar. dan. 4: 80, pl. 148 E. 1939.

DESCRIPTIONS & ILLUSTRATIONS. — Fr., Ic. select. Hymenomyc. 2: pl. 135 fig. 1. 1879; Cooke, Ill. Brit. Fungi 4: pl. 567/590 and 620/591, respect. 1885 and 1886; Konr. & Maubl., Ic. select. Fung. 1. (4): pl. 45. 1928; Bres., Iconogr. mycol. 18: pl. 855. 1931; J. Lange, l.c. (as *Psilocybe spadicea*).

Cap 20–120 mm, paraboloid, later convex-paraboloid, not fleshy (but according to Fries — 1874: 297 resp. 302 — caps 'carnoso' in *Agaricus sarcocephala* resp. *spadicea*), pale brown and only slightly pinkish brown at centre (Mu. 7.5 YR 6/4, 7/4; 5 YR 6/4), in peripheral half much paler (Mu. 7.5 YR 8/4; 5 YR 8/4), not striate. Veil absent. Gills 4–6 mm broad, ventricose, adnexed, at first whitish, then incarnate, finally dark sordid purplish brown (Mu.  $\pm$  5 YR 4/3). Stem 30–70 x 7–10 mm, cylindrical, at extreme base attenuated, hollow, white or pale brown at base, with fibrillose surface and pruinose apex. Flesh of cap firm but thin, 1–2 mm thick in centre, white when dry. Spore print brown-purple.

Spores 7–9 x 3.5–5  $\mu$ m, ellipsoid, adaxially flattened (but also often phaseoliform, see observations Weholt), brownish red (but on Konrad & Maublanc plate 45 purple, Mu. 2.5 YR 5/2). Pleurocystidia and pleurocystidioid cheilocystidia 30–50 x 10–16  $\mu$ m, ventricose fusoid, thick-walled, colourless, muricate.

HABITAT & DISTRIBUTION. — Caespitose on stumps of deciduous trees. Autumn. Very rare. Not recorded from the Netherlands, but recorded from France and the British Isles (Dennis & al., 1960: 147).

In the literature opinions differ considerably about the taxonomic relationship between *P. spadicea* and *P. sarcocephala*. Most authors regarded, described, and some (Fries, Cooke, Bresadola, Konrad & Maublanc) depicted the two as separate species. Ricken (1912: 255), however, stated that a larger form of *P. spadicea* (apparently *P. sarcocephala* in our conception), characterised by its red spore print could scarcely be recognised as a separate form. Romagnesi stated in the 'Flore analytique' having seen only one specimen, answering Lange's (1939: 80) description of *P. sarcocephala* (erroneously called *P. spadicea* by Lange). Malençon & Bertault (1970: 216) regard the two taxa as conspecific. Lange (1936: 31 and 1939. 4: 80) contributed to the confusion by interchanging the epithets '*sarcocephala*' and '*spadicea*' in his descriptions and plates (1939: pl. 138 E and F) and Heim (1957: 477) interchanged the colours. Quite a number of plates have been published (Fries l.c.; Leveillé 1855. pl. 106 fig. 1–6; Cooke l.c.; Britzelmayer 1893 pl. 328 fig. 241, 242; Bresadola l.c.; Lange l.c.) depicting *P. sarcocephala* and *P. spadicea*, but they do not clearly elucidate the difference between the two taxa.

The present day concept of *P. spadicea* is in full agreement with Fries' descriptions of *Agaricus spadiceus* (1838: 225; 1857: 435; 1874: 302). The colours as described by him for the cap are 'spadiceo-umbrinus', for the gills 'e albido carneo-fuscis', also 'demum nunc cinnamomeae nunc umbrinae' and 'e albido carneis dein fuscus'. The colours as given by Fries for the cap of *Agaricus sarcocephalus* are 'e gilvo-sordide flavescens' and 'albidus 1 ferrugineo-pallens' and for the gills 'cinero-fuligineis nigricantibus' and 'incarnato-cinereus dein subfuliginosae'.

From these descriptions *P. spadicea* emerges as having a darker cap and paler gills than *P. sarcocephala*. The size of both species does not give much of a hold in

trying to distinguish between the two taxa as Fries distinguished a large (cap 75–100 mm) and a small (cap 50–75 mm) form of *P. sarcocephalus*, both sizes falling within the range of variability of *P. spadicea*. From the post-Friesian literature *P. sarcocephala* emerges as a species, which, in the main, is larger than *P. spadicea*, has a brown, be it paler cap and a reddish spore print (due to reddish brown spores sub micr.).

We have adopted Konrad & Maublanc's interpretation of *P. sarcocephala*. They studied a collection, found near Geneva and identified by Patouillard, and were the first authors to give detailed descriptions and plates of both *P. sarcocephala* and *P. spadicea*, including descriptions and pictures of spores and cystidia. Of *P. sarcocephala* they obviously depicted only young specimens (caps up to 30 mm and almost all of them with still incurved margin, whereas in the description the caps are said to measure up to 80 mm). Most important of all, the spores were said to be 'brun rouge sub micr.' (on their plate 45 purple, Mu. 2.5 YR 5/2), accounting for the reddish spore print and (as compared with *P. spadicea*) the darker gills. In contrast they called the spores of *P. spadicea* 'très pales, presque incolore' as indeed they are.

Bresadola (1931, pl. 855) also depicted distinctly reddish brown spores (Mu. 5 YR 5/3, 6/4) for *P. sarcocephala*, accordingly calling them 'umbrine fulve' and sharply in contrast with the yellow spores (Mu. 2.5 Y 7/6) of *P. spadicea*, which he accordingly called 'flavidae' and depicted on his plate 788. Monti's (1978: 45) description (in Italian) of a recent find (4 April 1977) near Pisa (Italy), identified as representing *P. sarcocephala*, also corresponds with the one given above (cap 25–40 mm, 'spadiceo umbrino o rosso-bruno' but fading into a greyish colour at the centre, in the end paler or whitish, gills in the end 'fusco purpuree', spores 7–9.4  $\mu\text{m}$ , reddish brown).

Finally Weholt (Norway) made an important contribution to our knowledge of *P. sarcocephala* by sending us exsiccata of two collections from resp. Telemark and Ostfold, Norway, which he correctly had identified as resp. *P. spadicea* and *P. sarcocephala*. They were accompanied with excellent drawings of several carpophores and ample descriptions in which unfortunately the colour of the caps, (already having dried out) could not be adequately assessed. The caps of *P. sarcocephala* were much larger (50–107 mm) than those of the accompanying collection of *P. spadicea* (30–40 mm), the gills darker (as judged from the exsiccata) and the spores differed distinctly from those of *P. spadicea* by being, mounted in water, conspicuously pale brown (Mu. 7.5 YR 6/4) against the typically pale yellowish pink (Mu. 7.5 YR 7/4, 8/4, 8/6) of the spores of *P. spadicea* while they also were larger, 9.5–10 x 5–5.5  $\mu\text{m}$ , mean values 9.9 x 5.3  $\mu\text{m}$  (cf. *P. spadicea*). They also were less often and to a lesser degree phaseoliform. Pleuro- and cheilocystidia were fully identical with those of *P. spadicea*.

We have never seen this species; the above description is taken from Konrad & Maublanc. Study of more collections is urgently needed.

***Psathyrella olympiana* A. H. Smith**

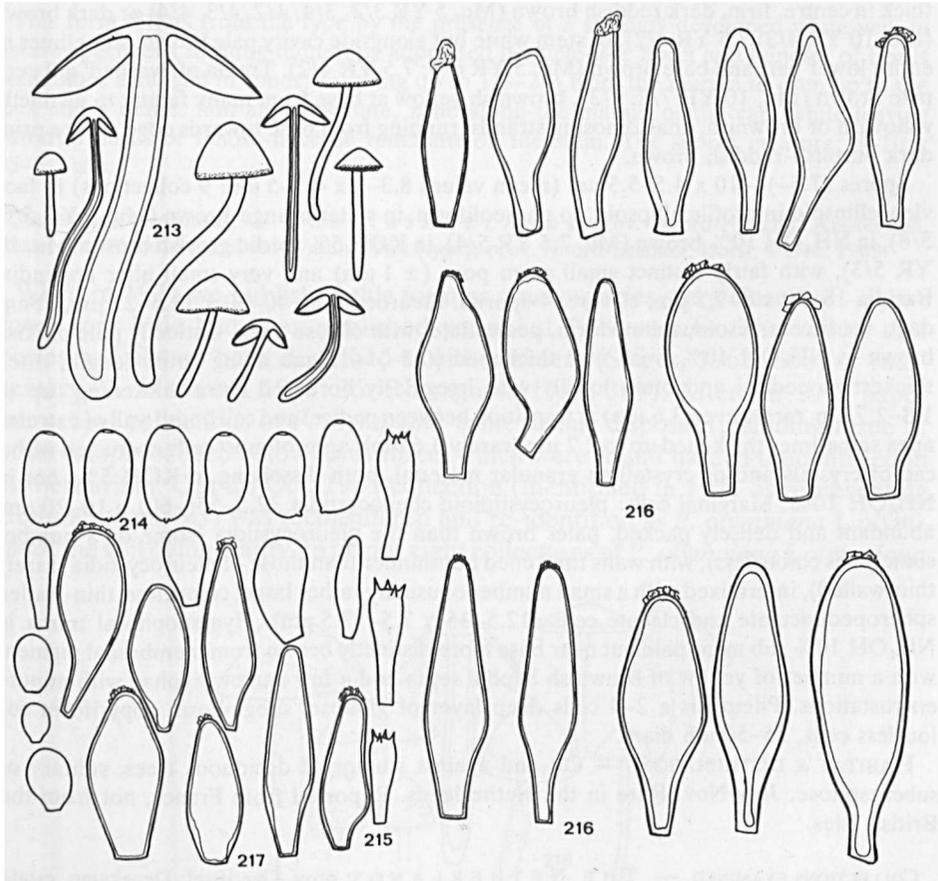
*Psathyrella olympiana* A. H. Smith in Contr. Univ. Mich. Herb. 5: 36. 1941. — *Drosophila olympiana* (A. H. Smith) Kühn. & Romagn., Fl. anal. Champ. sup.: 369. 1953 (not val. publ., basionym not mentioned).

*Psathyrella cloverae* A. H. Smith in Mem. N.Y. bot. Gdn 24: 248. 1972 (see p. 170).

**forma *olympiana* — Figs. 213–217**

DESCRIPTIONS & ILLUSTRATIONS. — A. H. Smith in Mem. N.Y. bot. Gdn. 24: 256. 1972; Kühn. & Romagn., l.c.; Derbsch in Z. Pilzk. 43: 184, 1977.

Shape, size and firmness of mature carpophores varying considerably. Cap 10–45 (–60) mm, at first paraboloid with slightly incurved margin, then conico-paraboloid, conical, finally convex with deflexed margin or with flattened (truncate) or even small depressed centre, dark reddish brown (Mu. 10 R 3/2, 3/3, 3/4; 2.5 YR 3/2, 3/4, 4/2; 5 YR 3/2, 3/3, 3/4, 4/4) or dark purplish brown (Mu. 2.5 YR 2.5/2; 5 YR 4/2), to very dark brown (Mu. 7.5



Figs. 213–217. *Psathyrella olympiana* f. *olympiana*. — 213. Carpophores (x 0.5). — 214. Spores. — 215. Basidia. — 216. Pleurocystidiogram. — 217. Cheilocystidiogram.

YR 3/2), towards margin and (somewhat later all over) dark warm brown (Mu. 7.5 YR 4/2, 4/4, 5/4, 5/6), at margin brown (Mu. 10 YR 5/3), not striate (rarely substriate only at margin over 2–5 mm), but often slightly though distinctly rugulose when still moist, hygrophanous, drying out from centre via ochre-brown, warm brown (Mu. 7.5 YR 4/4) and yellowish brown (Mu. 10 YR 5/4) to finally pale brown (Mu. 10 YR 7/4, 7/3) with ochreous centre, without pink, not micaceous, often rugulose. Veil in primordia reaching half way from margin, in early and often in mature specimens present at extreme margin of cap as a 1–1.5 mm broad band (dense network) of fine, radially arranged white fibrils, rarely with small appendiculate rags, on stem varying from a fairly dense lanose coating of fibrils to a few scattered fibrils. Gills 2–4(–9!) mm broad, crowded, slightly to distinctly ventricose, narrowly (rarely broadly) adnate, in early stages pale brown (Mu. 10 YR 6/4) or ochreous brown (Mu. 7.5 YR 5/4), finally via pale chocolate (Mu. 5 YR 5/3) to dark reddish brown, dark chocolate (Mu. 5 YR 3/3) or dark brown (Mu. 7.5 YR 5/4, 4/4, 4/2), with white, fimbriate edge. Stem 25–80(–100) x 2–6(–10) mm, cylindrical, white, lower down isabelline or pale brown (Mu. 10 YR 7/3, 8/3), sometimes at base brown (Mu. 7.5 YR 6/4; 10 YR 6/2, 6/4), hollow (wide cavity), finely longitudinally fibrillose striate, with sub-sulcate striate apex; base covered by whitish down and strigose; apex distinctly pruinose over 10–15 mm. Flesh of cap 1–3 mm thick in centre, firm, dark reddish brown (Mu. 5 YR 3/3, 3/4, 4/2, 4/3, 4/4) or dark brown (Mu. 10 YR 4/3; 7.5 YR 4/2), of stem white but alongside cavity pale brown, sometimes in entire lower part and base brown (Mu. 5 YR 6/4; 7.5 YR 4/2). Trama of 'washed' gill very pale brown (Mu. 10 YR 7/2, 7/3), brownish yellow at base from many faintly to distinctly yellowish or brownish, anastomosing strands, running from base towards edge. Spore print dark purplish-reddish brown.

Spores (7.5–)8–10 x 4.5–5.5  $\mu\text{m}$  (mean values 8.3–9 x 4.5–5  $\mu\text{m}$ : 9 collections) in face view ellipsoid in profile ellipsoid, to phaseoliform, in water orange-brown (Mu. 5 YR 5/6, 5/8), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 7.5 YR 5/4), in  $\text{KOH}$  5% sordid greyish brown (Mu. 10 YR 5/3), with fairly distinct small germ pore ( $\pm 1 \mu\text{m}$ ) and very small hilar appendix. Basidia 16–30 x 8–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40–60 x 12.5–22  $\mu\text{m}$ , abundant, ventricose-fusoid, subutriform, pedicellate, with obtuse apex, distinctly pale pinkish brown in  $\text{NH}_4\text{OH}$  10%, with wall thickened (0.5–)1–1.8  $\mu\text{m}$  along entire length, often thickest in pedicel and often locally with irregularly bordered extra thickening (up to 1.8–2.7  $\mu\text{m}$ , rarely even 3.6  $\mu\text{m}$ ) at transition between pedicel and cell body; wall of extreme apex sometimes thickened up to 2.7  $\mu\text{m}$  (rarely 3.6  $\mu\text{m}$ ); apex of most cells encrusted with a cap of crystals and/or crystalline granular material, both dissolving in  $\text{KOH}$  5%, not in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 32.5–55(–60) x 10–20  $\mu\text{m}$ , abundant and densely packed, paler brown than the pleurocystidia (some or a number sometimes colourless), with walls thickened but thinner than those of pleurocystidia (rarely thin-walled), intermixed with a small number of usually rather large, colourless, thin-walled spheropedunculate and clavate cells (12.5–35 x 7.5–17.5  $\mu\text{m}$ ). Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale but near base more distinctly brown from membranous pigment with a number of yellow or brownish hyphal septa and a few narrow hyphae with minute encrustations. Pileipellis a 2–4 cells deep layer of globose, subglobose, obpyriform colourless cells, 25–50  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — On and against stumps of deciduous trees, solitary or subcaespitose. July–Nov. Rare in the Netherlands. Reported from France, not from the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel: Denekamp, estate 'Singraven', 28 Oct. 1961; Delden, along road to Borne, 15 Oct. 1973; prov. IJsselmeerpolders, Oostelijk Flevoland, Roggebotzand, 1 July 1977; prov. Gelderland, Vorden, estate 'Wilmerink', 15

July 1961; Doetinchem, 24 July 1977. — FRANCE, V. d'Or: Bellefontaine, 5 June 1971 (herb. Romagn. 1103); Luzarches, 5 June 1971 and 8 Aug. 1971 (herb. Romagn. 1104 and 1107).

Smith (1972: 256) called the walls of the pleurocystidia 'usually thickened to 1–1.5  $\mu\text{m}$ ', but in many cystidia we found them thicker, up to 1.8  $\mu\text{m}$ . His fig. 494 shows markedly thickened cell walls, becoming considerably thinner in the pedicel. The picture of these cells in the 'Flore analatique' (Kühn. & Romagn., 1953: fig. 369) also shows thinner cell walls in the pedicel. In our own material the walls almost invariably are equally thick in the pedicel as in the cell body, often even thicker.

forma **amstelodamensis** (Kits van Wav.) Kits van Wav. — Fig. 218

*Psathyrella amstelodamensis* Kits van Wav. in *Persoonia* 6: 299. 1971. — *Psathyrella olympiana* f. *amstelodamensis* (Kits van Wav.) Kits van Wav. on p. 281 of the present work. 1985.

*Psathyrella cloverae* A. H. Smith in *Mem. N.Y. bot. Gdn* 24: 248. 1972.

DESCRIPTIONS & ILLUSTRATIONS. — Kits van Wav. in *Persoonia* 6: 299, figs. 1–12, pl. 9. 1971.

This form differs from the type by the presence of a strongly developed white veil, in mature specimens forming numerous adpressed denticle-like flocci and bundles of fibrils (sometimes arranged in zones) reaching up to 1/3–2/3 from the margin to even up to the apex and a dense, non-appendiculate, zone along the margin of the cap, while leaving scattered fibrils or lanose-floccose remnants on the stem. The spores measure: 8–10  $\times$  4.5–5.5  $\mu\text{m}$ .

COLLECTION EXAMINED. — THE NETHERLANDS: prov. Noord-Holland, Amsterdam, Amsterdam Wood, 9 June and 27 July 1960 (type); prov. Noord-Brabant, Dorst, 1 Dec. 1963.

When in 1971 we published this form as a new species, very close to *P. olympiana*, very little had been published yet about *P. olympiana*. The veil of that species had always been described as either absent (Singer, 1962: 508) or rudimentary (A. H. Smith, 1941: 36; Romagnesi, 1953: 369). After our 1971 paper four recent collections of *P. olympiana* came at our disposal (including three of forma *caespitosa*, see below) plus three, which were found hidden unidentified in our herbarium. Our 28 Oct. 1961 collection (mentioned in 1971 as representing *P. amstelodamensis*) was reconsidered and re-identified as *P. olympiana* f. *olympiana*, the veil being scanty. In all our eight collections of *P. olympiana* f. *olympiana*

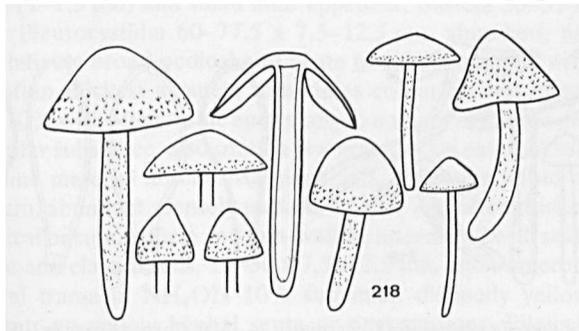


Fig. 218. *Psathyrella olympiana* f. *amstelodamensis*. — Carpophores ( $\times 0.5$ ).

and *f. caespitosa* the veil was rudimentary and sharply contrasting with the veil in form *amstelodamensis*. In all other respects this form is identical with *P. olympiana*.

Smith (1972: 237) subdivided the species of his subgenus *Homophron* in those with almost colourless spores (section *Homophron* with nine species, all very closely related, including *P. spadicea* and *P. variata*) and those with pigmented spores (section *Cystidiosae* with 15 species, including *P. olympiana* and *P. cernua*, many of these species very closely related; *P. pygmaea* not mentioned).

The species of section *Cystidiosae* were subdivided by Smith in those with 'wall of pleurocystidia frequently or regularly 2  $\mu\text{m}$  thick or more, at least in the neck near the apex (*P. cystidiosa*, *P. hesleri* and *P. cloverae*) and 12 species (among them *P. olympiana* and *P. cernua*) with 'wall of pleurocystidia thinner (up to 1.5  $\mu\text{m}$  approximately)'.

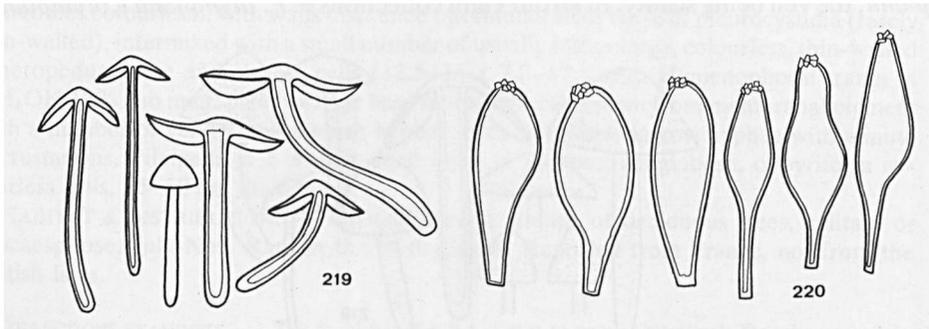
We have learned from our own material that a subdivision, based on the overall thickness of the cystidial wall (in *P. olympiana* very often over 1.5  $\mu\text{m}$  and up to 1.8  $\mu\text{m}$ ) is not serviceable. This thickness varies considerably and also locally in the cells (see our description of *P. olympiana*). Smith's new species, *P. cloverae* ('pleurocystidia 50–90  $\times$  8–22  $\mu\text{m}$ , essentially fusoid but variable as to shape, with walls up to 3  $\mu\text{m}$  thick; outer veil copious, leaving fibrillose squamules over entire pileus at first'), of which he saw only one collection fully agrees with our *P. olympiana* forma *amstelodamensis*, with which it has the strong velar development in common.

#### forma *caespitosa* Kits van Wav. — Figs. 219–220

*Psathyrella olympiana* f. *caespitosa* Kits van Wav. on p. 282 of present work, 1985.

This form differs from the type by its densely caespitose growth (20–40 specimens), the caps being somewhat smaller and more or less (but in most specimens distinctly) umbonate and drying out from the margin instead of from the centre.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Noord-Holland, Amsterdam, Amsterdam Wood, 25 Oct. 1976 and 20 Aug. 1977; prov. Zuid-Holland, Leiden, Leiden Wood, 27 Sept. 1944 (type).

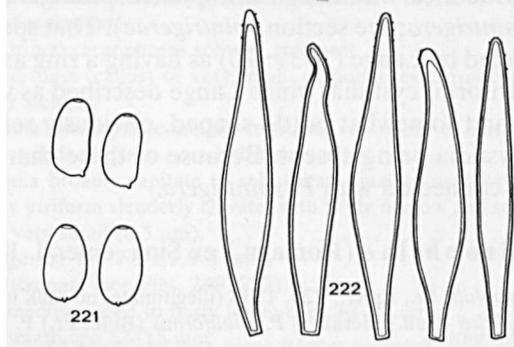


Figs. 219–220. *Psathyrella olympiana* f. *caespitosa*. — 219. Carpophores ( $\times 0.5$ ). — 220. Pleurocystidiogram.

***Psathyrella spintrigeroides* P. D. Orton — Figs. 221–222***Psathyrella spintrigeroides* P. D. Orton in Trans. Brit. mycol. Soc. 43: 377. 1960.

DESCRIPTION &amp; ILLUSTRATIONS. — P. D. Orton, l.c.

Cap 20–50 mm, convex or conico-convex, then expanded, sometimes obtusely umbonate, bay or deep date brown, not striate or striate at margin only when moist, hygrophanous, drying out to ochraceous or pale buff, sometimes with slight tawny tinge especially at centre. Veil white, on cap copious, forming appendiculate rather thick dentate scales (sometimes striate beneath) at margin and scattered white fibrils or adpressed fibrillose scales on outer part; on stem striate-floccose or fibrillose-scaly remnants, sometimes forming a fugacious ring-zone. Gills  $\pm$  ventricose, subcrowded, adnate, sometimes with tooth, greyish clay or pale clay-brownish, then pale clay-umber or pale purplish brown, finally umber, with white flocculose edge under lens when fresh. Stem 25–60 x (3–)4–7 mm,  $\pm$  cylindrical, sometimes flexuose, hollow, rather firm at first, pure white at first, soon discoloured pale dirty brownish or yellowish brown from base; apex markedly striate from base of gills and white pruinose or pubescent. Flesh of cap concolorous, drying dirty yellowish or whitish in centre, sometimes sepia-horny over gills or in apex of stem; smell faint pleasant, fungussy. Trama of ‘washed’ gill brownish yellow ( $\pm$  Mu. 10 YR 7/6), towards edge paler. Spore print not recorded.



Figs. 221–222. *Psathyrella spintrigeroides*. — 221. Spores. — 222. Pleurocystidiogram.

Spores 7–8(–9) x 4–4.5  $\mu$ m (mean values 8 x 4.5  $\mu$ m: 1 collection), in face view ellipsoid or ellipsoid-ovoid, in profile ellipsoid, adaxially flattened or mostly slightly phaseoliform, in water fairly pale yellowish brown with reddish hue (Mu. 5 YR 6/6, 5/6), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 7.5 YR 5/4), in KOH 5% sordid brown (Mu. 10 YR 5/3), not opaque, with distinct germ pore (1–1.5  $\mu$ m) and small hilar appendix. Basidia 20–35 x 7–8  $\mu$ m (acc. to Orton), 4-spored. Pleurocystidia 60–77.5 x 7.5–12.5  $\mu$ m, abundant, narrowly fusiform, lanceolate with relatively broad pedicel and acute to subacute apex, with thickened wall, 0.5–1.8(–2)  $\mu$ m, often thickest at apex, sometimes colourless but mostly distinctly pale brown in  $\text{NH}_4\text{OH}$  10% with often inside apex many to numerous minute granules embedded in a minutely granular substance, also often a few granules on external surface of apex, but crystals or crystalline material absent. Marginal cells: pleurocystidioid cheilocystidia 45–60(–65) x 10–15  $\mu$ m, abundant, densely packed, smaller and often thicker than pleurocystidia, a few cylindrical or subutriform and thin-walled, intermixed with scattered thin-walled spheropedunculate and clavate cells, 15–30 x 7.5–12.5  $\mu$ m, and numerous immature basidia. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly yellowish brown from membranal pigment; no yellow hyphal septa or encrustations. Pileipellis cellular; cells 20–40  $\mu$ m diam. (acc. to Orton).

**HABITAT & DISTRIBUTION.** — On twigs and logs and among leaves of *Fagus*. Oct.-Nov. (acc. to Orton). Very rare in the British Isles (two records), not reported from the Netherlands and France.

**COLLECTIONS EXAMINED.** — B R I T I S H I S L E S, Surrey, East Horsley, Mountain Wood, 5 Nov. 1955 (type, K).

We have never seen this species fresh. Our macroscopical description is taken from Orton; the description of the microscopical characters is based on our own examination of exsiccata of the type material. Because of its abundant, thick-walled, in  $\text{NH}_4\text{OH}$  10% brown pleurocystidia and its spores being of the same shape, size and colour as those of *P. olympiana*, this species clearly belongs to section *Spadicaceae*, in which it is very close to *P. olympiana*, in fact so close, that in the future it might just as well turn out to be an infraspecific taxon of that species. It differs from *P. olympiana* by its slender and less thick-walled cystidia of which the apex is not truly muricate but merely covered with granules. Orton in his description neither mentioned nor depicted the germ pore of the spores and believed that *P. spintrigeroides* is identical with Lange's *Stropharia spintrigera* var. *semivestita* (in our opinion = *P. spintrigera*; see section *Spintrigerae*). That species, however, was described and depicted by Lange (1939: 70) as having a ring around the stem and totally different (utriform) cystidia, which Lange described as vesiculose, obovate or balloon-shaped and somewhat bottle-shaped, obviously referring to the marginal cells, pleurocystidia being absent. Because of these characters *P. spintrigeroides* is in no way connected with *P. spintrigera*.

### Section *Hydrophilae* (Romagn.) ex Sing. emend. Kits van Wav.

*Agaricus* [sect.] *Hygrophili* Fr., Epicr.: 223. 1838 (illegitimate, no rank indicated). — Lectotype (mihi): *Agaricus hydrophilus* (Bull.) Mérat (= *P. piluliformis* (Bull.: Fr.) P. D. Orton).

*Drosophila* sect. *Hydrophilae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 52. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Hydrophilae* (Romagn.) Sing. in Lilloa 22: 467. ('1949') 1951 (not val. publ., no latin); ex Sing. in Sydowia 15: 68. ('1961') 1962. — Type: *Psathyrella hydrophila* (Bull.) Maire (= *P. piluliformis* (Bull.: Fr.) P. D. Orton).

*Agaricus* [sect.] *Obtusati* Fr., Epicr.: 232. 1838 (illegitimate, no rank indicated). — *Psathyrella* sect. *Obtusatae* (Fr.) Sing., *Agaricus* mod. Taxon., Ed. 2: 509. 1962. — Type: *Agaricus obtusatus* Pers.: Fr.

*Drosophila* subsect. *Frustulentae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 52. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Frustulentae* (Romagn.) Sing. in Lilloa 22: 468. 1951 (not val. publ., no latin); ex Sing. in Sydowia 15: 68 ('1961') 1962. — Type: *Psathyrella frustulenta* (Fr.) A. H. Smith.

*Psathyrella* sect. *Pseudo-Hypholoma* Konr. & Maubl. in Encycl. mycol. 14, (Agaricales 1): 125. 1948 (not val. publ., no latin). — Lectotype (mihi): *Psathyrella hydrophila* (Bull.) Maire (= *P. piluliformis* (Bull.: Fr.) P. D. Orton).

*Psathyrella* sect. *Fibrillosae* Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 10. 1982. — Type: *Psathyrella obtusata* (Pers.: Fr.) A. H. Smith.

Carpophores solitary, caespitose or subcaespitose, sometimes gregarious, often lignicolous, small to medium sized; caps 10–40(–70) mm, reddish brown or some other shade of brown, hygrophanous, never pink on drying; veil present, varying from rudimentary to strongly developed; gills usually crowded, narrowly (never very broadly) adnate or adnexed, brown, reddish brown or purplish brown, edge never red underlined; stems up to 100 cm long, never rooting; spore print some shade of brown. Spores small, average length rarely

exceeding 7.5  $\mu\text{m}$  (only in *P. obtusata* often 7.8–7.9 and in *P. mucrocystis* 7.1–7.7), almost always less, usually pale, often phaseoliform; pleurocystidia present, never muricate, never with mucoid deposits staining bluish green in  $\text{NH}_4\text{OH}$  10% on their surface; pleuro- and cheilocystidia and cells of pileipellis often pale brown in  $\text{NH}_4\text{OH}$  10% ; hymenophoral trama strongly to moderately pigmented.

The small, brown, often pale spores in combination with the brownish colour of the gills and the usually striking reddish brown, warm brown, or ochreous brown colour of the cap are the essential features of the species of this section.

## KEY TO THE SPECIES OF SECTION HYDROPHILAE

1. Spores very small, average size 5.3-6.1 x 3.4-3.6  $\mu\text{m}$ .
2. Pleurocystidia mucronate (see Figs. 226, 229).
  3. Pleurocystidia 32.5–45  $\mu\text{m}$  long, with rostra 2.5–6  $\mu\text{m}$  x 2.5–5  $\mu\text{m}$  ,  $\pm$  plumpy, not sharply delimited from cell body (rarely narrower or longer, up to 10  $\mu\text{m}$ ); pleurocystidioid cheilocystidia very scarce; cap smooth ..... *P. laevissima*, p. 174
  3. Pleurocystidia 40–70  $\mu\text{m}$  long, with narrow rostra, 2–10  $\mu\text{m}$  x 1.5–2.5(–3)  $\mu\text{m}$ , sharply delimited from cell body, often curved or irregularly shaped; pleurocystidioid cheilocystidia numerous; cap at centre minutely granular sub lente ..... *P. subpapillata*, p. 176
2. Pleurocystidia not mucronate.
  4. Germ pore distinct; carpophores solitary, thick-set ..... *P. hydrophiloides*, p. 179
  4. Germ pore indistinct (callus) or very small; carpophores caespitose, subcaespitose, rarely solitary, rather slender.
    5. Pleurocystidia non-capitate, mainly fusiform, ventricose or clavate, some utriform, with broad, short pedicel; germ pore indistinct (callus). ..... *P. piluliformis*, p. 180
    5. Pleurocystidia broadly capitate to subcapitate, mainly narrowly to broadly ventricose, more rarely utriform slenderly clavate, with fairly narrow and somewhat longer pedicel, germ pore very small (0.5  $\mu\text{m}$ ). ..... *P. fragans*, p. 184
1. Spores larger, average size 6.8-7.9 x 3.9-5  $\mu\text{m}$ .
6. Pleurocystidia mucronate (see Figs. 249, 257).
  7. Carpophores medium-sized to fairly large; caps 30–70 mm ..... *P. mucrocystis*, p. 185
  7. Carpophores small; cap 12–15 mm ..... *P. umbrina* var. *umbrina*, p. 187
6. Pleurocystidia not mucronate.
  8. Germ pore indistinct (callus) or absent (compare also *P. senex* p. 269).
    9. Cap up to 15 mm, conical; pleurocystidia utriform; spores not phaseoliform, in water fairly ochraceous yellow with trace of red (Mu. 7.5 YR 6/6). *P. umbrina* var. *utriformis*, p. 189
    9. Cap up to 30–45 mm, paraboloid; pleurocystidia not utriform.
      10. Spores phaseoliform, in water pale brownish yellow (Mu. 10 YR 5/6); pleurocystidia fusiform; gills reddish rust brown ..... *P. frustulenta*, p. 189
      10. Spores not phaseoliform, in water dark brown (Mu. 5 YR 4/6); pleurocystidia fusoid-lageniform; gills dark brown with purplish hue ..... *P. rannochii*, p. 195
  8. Germ pore present (but minute in *P. obtusata*).
    11. Pleurocystidioid cheilocystidia very to moderately numerous.
      12. Many pleurocystidia with short to fairly long, (sub)cylindrical, often subcapitate apical elongation (see Fig. 267); spores distinctly phaseoliform.
        - P. chondroderma*, p. 191
      12. Pleurocystidia not as above, in their upper part covered with mucoid substance staining red in Neutral Red ..... *P. pseudocasca*, p. 194
    11. Pleurocystidioid cheilocystidia very scarce; spheropedunculate cells abundant.
      13. Pleurocystidia fusiform. .... *P. obtusata*, p. 197
      13. Pleurocystidia utriform ..... *P. obtusata* var. *utriformis*, p. 200

***Psathyrella laevisissima* (Romagn.) Sing. — Figs. 223–227**

*Drosophila laevisissima* Romagn. in Bull. Soc. linn. Lyon 21: 155. 1952. — *Psathyrella laevisissima* (Romagn.) Sing. in Beih. Nova Hedwigia 29: 197. 1969.

MISAPPLIED NAME. — *Psathyrella piluliformis* sensu P. D. Orton in Notes R. bot. Gdn Edinb. 29: 116. 1969.

DESCRIPTIONS & ILLUSTRATIONS. — J. Favre in Schweiz. Z. Pilzk. 33: 70. 1958; P. D. Orton, l.c. (as *P. piluliformis*); Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 84. 1975; Kits van Wav. in Persoonia 11: 490. 1982.

Cap 15–35(–45, rarely –50) mm, rather fleshy, broadly conico-convex to convex or convex-subumbonate, delicately striate up to 1/2 from margin, smooth, in later stages rugulose, dark brown, date brown or reddish brown (Mu. 5 YR 3/4; 7.5 YR 4/4, 4/2), hygrophanous, drying from centre to pale brown or alutaceous with a trace of ochre at centre, without pink, micaceous. Veil white, fugacious, only distinct in very young stages and then only at margin of cap, sometimes still connecting margin with stem. Gills 2.5–3 mm broad, very crowded, moderately ventricose, fairly broadly adnexed, not uncinatate, at margin of cap acute and very narrow, at first pale brown, later conspicuously dark purplish red-brown (Mu.  $\pm$  5 YR 4/2, 4/3); edge minutely fimbriate, concolorous or whitish. Stem 15–40 x 1.5–3 mm, hollow, not rooting, cylindrical or slightly thickened at base, minutely longitudinally fibrillose striate, at apex and upper 1/3 whitish, at lower 2/3 pale yellowish brown; apex pruinose. Flesh of cap 1.5–2 mm thick in centre, dark greyish brown, of stem pale yellowish brown, taste and smell indistinctive. Trama of ‘washed’ gill strong yellow-brown (Mu. 7.5 YR 5/6), almost equably strong from base to edge, with slightly stronger pigmented anastomosing strands, running from base to edge; edge minutely dark brown punctate. Spore print purplish black.

Spores 5.5–6 x 3–3.5  $\mu$ m (mean values 5.5–5.6 x 3.4–3.5  $\mu$ m; 9 collections), in face view ellipsoid to ovoid, in profile ellipsoid, adaxially flattened, rarely slightly phaseoliform, with small ( $\pm$  1  $\mu$ m) but distinct germ pore and small hilar appendix, in water and NH<sub>4</sub>OH 10% bright brown (Mu. 7.5 YR 5/6), in KOH 5% sordid brown (Mu. 7.5 YR 5/4), not opaque. Basidia 15–17.5 x 5–6  $\mu$ m, subcylindrical to subclavate, 4-spored. Pleurocystidia 32.5–45 x 10–15 (–17.5)  $\mu$ m (including rostra), moderately numerous, fusoid-ventricose with acute to subacute, infrequently obtuse, often mucronate, apex, slightly, thick-walled, pale brown in NH<sub>4</sub>OH 10% , apex very often drawn out into a short (2.5–6  $\mu$ m) subcylindrical, thin-walled, colourless extension or rostrum, 2.5–5  $\mu$ m thick (rarely thinner). Marginal cells: spheropedunculate cells in very large numbers, densely packed, 10–20 x 7.5–17.5  $\mu$ m, a small number larger, 20–30 x 15–20  $\mu$ m, the latter usually in clusters and with slightly thickened walls and, as also some of the smaller cells, very (to distinctly) pale, some even conspicuously brown in NH<sub>4</sub>OH 10% ; intermixed with very few pleurocystidioid cheilocystidia (15–)20–35(–40) x 7.5–15  $\mu$ m with short and rather broad pedicel and subobtuse to subacute, rarely mucronate apex. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr.: mediostratum consisting of conspicuously broad hyphae (10–40  $\mu$ m), the thin subhymenium of narrow (4.5–9  $\mu$ m) hyphae, both distinctly brown in NH<sub>4</sub>OH 10% from membranal pigment; with some yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of subglobose cells, 15–50  $\mu$ m diam., distinctly brown in NH<sub>4</sub>OH 10% .

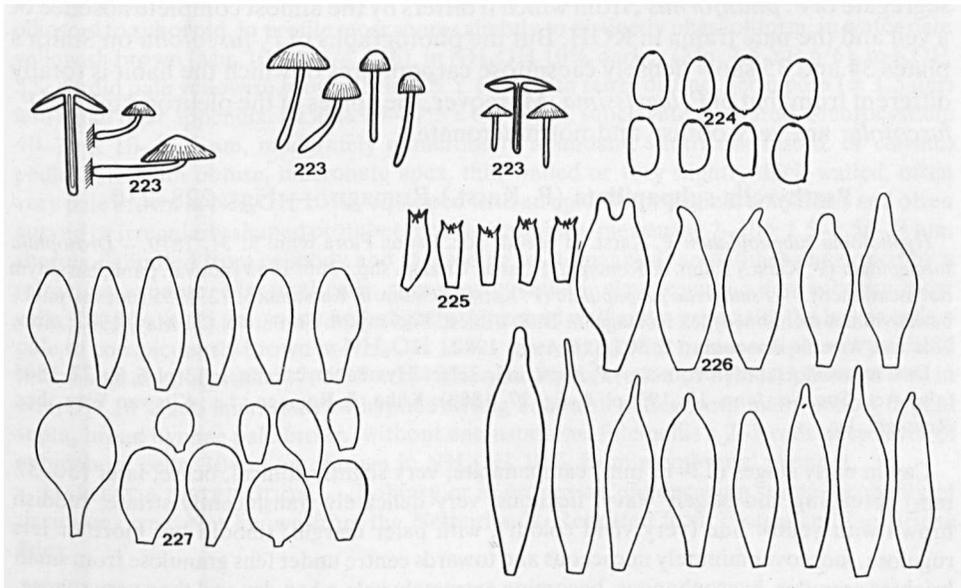
HABITAT & DISTRIBUTION. — On and around stumps of deciduous trees, sometimes densely gregarious. Aug.–Nov. Not recorded from the Netherlands, fairly common in France (Romagnesi, 1975: 184), common in the British Isles.

COLLECTIONS EXAMINED. — B R I T I S H I S L E S: Devonshire, Quantock Hills, 15 Sept. 1960; Powys (Wales), Lake Vyrnwy, 30 Aug. 1962; Hampshire, Slindon Park, 2 Sept. 1967; Surrey, Goms-

hall, 27 Aug. 1967 (E); Surrey, East Horsley, Mountain Wood, 28 Oct. 1967 (E); Somerset, Selworthy 31 Aug. 1967 (E); Perthshire (Scotland) Dall, 9 Nov. 1967 (E) and 12 Nov. 1967; Aros Wood (Scotland) 11 Sept. 1968 (E).

The above description is chiefly based on our very copious Lake Vyrnwy find. The sizes of the pleurocystidia varied; in the two collections from Dall they were larger than the figures given above, 35–57 x 10–15  $\mu\text{m}$  resp. 40–60 x 15–20  $\mu\text{m}$ . The pleurocystidioid cheilocystidia were rarely mucronate, always fusoid-ventricose, except in the Dall collection of 9 Nov. in which most of these cells were narrow (x 7.5–10  $\mu\text{m}$ ) and subcylindrical (a few cells of this type sometimes occurred in the other collections). The number of pleurocystidia having at their apex either a short subcylindrical extension or a rostrum, varied. In some collections this number was small, while in the Selworthy and the Aros Wood collection several pleurocystidia had two rostra.

In a previous publication (Kits van Waveren, 1982: 493) we described extensively the rather conspicuous pigmentation of various elements of the tissues of *P. laevissima*. In all our collections the hymenophoral trama of the 'washed' gills is strongly yellow-brown in  $\text{NH}_4\text{OH}$  10% and stronger so towards base. Microscopically the hyphae of the hymenophoral trama are distinctly brown in *P. laevissima*, but without encrustations. As in *P. piluliformis* the pleurocystidia are pale brown in  $\text{NH}_4\text{OH}$  10% and so are a number of the marginal spheropedunculate cells; a number of the latter are even distinctly brown and these often find themselves in clusters. This results in the edges macroscopically not really being white, but  $\pm$  concolorous. The cells of the pileipellis in *P. laevissima* also are distinctly brown in  $\text{NH}_4\text{OH}$  10%, more so than in *P. piluliformis*.



Figs. 223–227. *Psathyrella laevissima*. — 223. Carpophores (x 0.5). — 224. Spores. — 225. Basidia. — 226. Pleurocystidiogram. — 227. Cheilocystidiogram.

*Psathyrella laevisissima* resembles *P. piluliformis* because of the colour of its cap and gills (both variable in both species and therefore of little value as a means of distinguishing between the two species) and because of the small size and pale colour of the spores. It is sharply distinguished from *P. piluliformis* because of its quite different habit (smaller caps and much smaller stems), its caps in the early stages not being globose but convex almost right from the start, its gregarious and non-caespitose growth, its veil being rudimentary, its pleurocystidia very often being mucronate, its spores having a distinct germ pore, and its gill edge being lined with very large numbers of spheropedunculate cells and only a few pleurocystidioid cells.

Favre (1958: 70) reported three collections from Switzerland; Bona (1978: 70) reported the species from Spain; Moser (1978: 277) ranks the species under the rare and still little known species. Not having done much collecting in the British Isles we nevertheless found the species in Devonshire, Hampshire and Wales.

*Psathyrella piluliformis* (Bull.) P. D. Orton is a misapplication to the present species, based on a misinterpretation of Bulliard's *Agaricus piluliformis*, which Bulliard himself already recognised as a very early stage of his *P. hydrophila*. For details see Kits van Waveren (1982: 493).

Singer (1969: 197) described (without giving pictures) a var. *nothofagi* of this species from Chili, neither making clear, nor stating, however, by which characters it differs from *P. laevisissima* (the spores are described as slightly larger, 6–7 x 4–4.5  $\mu\text{m}$ ).

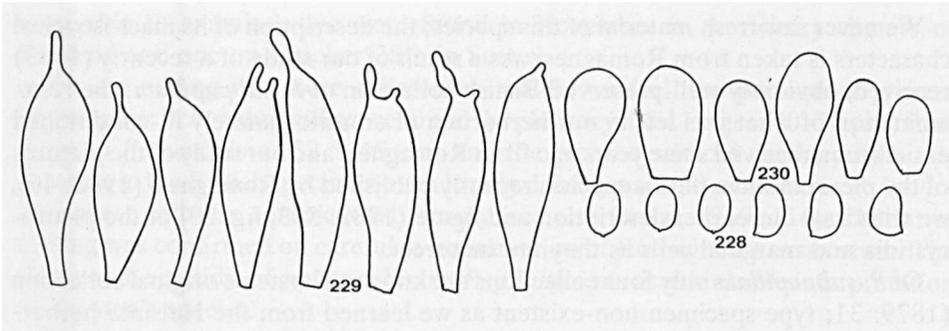
Smith (1972: 363) suggested the possibility that *P. fuscofolia* (Peck) A. H. Smith might be conspecific with *P. laevisissima* as he regards the former species as a segregate of *P. piluliformis*, from which it differs by the almost complete absence of a veil and the pale trama in KOH. But the photographs of *P. fuscofolia* on Smith's plates 34 and 35 show densely caespitose carpophores of which the habit is totally different from that of *P. laevisissima*. Moreover, the apices of the pleurocystidia of *P. fuscofolia* are very obtuse and not mucronate.

### ***Psathyrella subpapillata* (P. Karst.) Romagn. — Figs. 228–230**

*Hypholoma subpapillatum* P. Karst. in Medd. Soc. Fauna Flora fenn. 5: 31. 1879. — *Drosophila subpapillata* (P. Karst.) Kühn. & Romagn., Fl. anal. Champ. sup.: 366. 1953 (not val. publ., basionym not mentioned). — *Psathyrella subpapillata* (P. Karst.) Schulm. in Karstenia 3: 72. 1955 (not val. publ., basionym not mentioned); ex Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 46. (31 May) 1982; ditto, Kits van Wav. in Persoonia 11: 503. (16 Aug.) 1982.

DESCRIPTIONS & ILLUSTRATIONS. — P. Karst. in Ic. select. Hymenomyc. Fenn. 1: 13, pl. 6, fig. 27. 1885 (also Acta Soc. Sci. fenn. 15: 193, pl. 6, fig. 27, 1888); Kühn. & Romagn.; l.c.; Kits van Wav., l.c.; Romagn., l.c.

Cap in early stages (12–15 mm) campanulate, very slightly conical, ochre, later (30–32 mm) spreading and largely wavy, flexuous, very delicately translucently striate, reddish brown with yellow hue (very vivid colour), with paler margin, smooth but more or less rugulose, moreover minutely micaceous and towards centre under lens granulose from small brighter granules, hygrophanous, becoming extremely pale when dry and then very rugose. Veil forming in early stages some very fugacious arachnoid filaments on cap. Gills 2–3 mm broad, crowded, unequal, adnexed, fairly pointed in front, subventricose, at first pale



Figs. 228–230. *Psathyrella subpapillata*. — 228. Spores. — 229. Pleurocystidiogram. — 230. Cheilocystidiogram.

brownish yellow, then brown-yellow, finally brown with slightly pruinose and sometimes — particularly in front — dark brown punctate edge. Stem 20–30 mm, rather firm although fistulose (particularly at base), more or less flexuous, springing from a remarkable tuft of rigid white hairs, at first white and shiny-silky, then pale brownish under a covering of delicate longitudinal silky fibrils producing a silvery aspect, later gradually darkening, at base sometimes taking colour of cap; with flocculose apex. Flesh of cap in centre fairly thick (3 mm) hygrophanous, when moist dark reddish brown with a yellow hue, in cortex of stem brown yellowish, paler when dry, fragile, with strong, sweet (fungoid) smell when fresh and slightly raphanoid taste. Trama of ‘washed’ gill equably strong yellow-brown from base to edge from numerous brownish yellow (Mu. 10 YR 5/6) anastomosing tissue strands, running from base to edge through the in itself pale brown (Mu. 10 YR 6/3, 6/4) tissue. Spore print purplish brown.

Spores 5.5–6.5 x 3–3.5  $\mu\text{m}$  (mean values 5.5–5.9 x 3.5  $\mu\text{m}$ : 2 collections), in face view ellipsoid to subovoid, in profile most spores slightly to distinctly phaseoliform, in water pale yellowish brown (Mu. 10 YR 6/4, 7/6), in  $\text{NH}_4\text{OH}$  10% darker (Mu. 7.5 YR 6/6), in KOH 5% sordid pale yellowish brown (Mu. 2.5 Y 6/4), with fairly distinct germ pore ( $\pm 1.5 \mu\text{m}$ ) and small hilar appendix. Basidia 19–22.5 x 6.5–8  $\mu\text{m}$ , subclavate, 4-spored. Pleurocystidia 40–70 x 10–17.5  $\mu\text{m}$ , moderately numerous to abundant, ventricose-fusoid, or clavate, pedicellate, with obtuse, mucronate apex, thin-walled or very slightly thick-walled, often very pale brown in  $\text{NH}_4\text{OH}$  10%, equipped with an apical thin-walled, colourless and often curved or irregularly shaped protuberance (mucronate), measuring 2–10 x 1.5–2.5(–3)  $\mu\text{m}$ , sharply delimited from cellbody and (according to Romagnesi) sometimes enveloped by a refractive exudate. Marginal cells: spheropedunculate, clavate, and a few subcylindrical cells, 20–30 x 8–15  $\mu\text{m}$ , many with slightly thickened wall and — especially the larger cells — pale to conspicuously brown in  $\text{NH}_4\text{OH}$  10%, intermixed with numerous pleurocystidioid mucronate cheilocystidia 47–57.5 x 15–22.5  $\mu\text{m}$ . Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: narrow hyphae strong brownish yellow with many yellow hyphal septa, broad hyphae pale brown, without encrustations. Pileipellis a 2–3 cells deep layer of subglobose cells, 30–50  $\mu\text{m}$ , brown in  $\text{NH}_4\text{OH}$  10% from membranal pigment.

HABITAT & DISTRIBUTION. — Solitary or in groups on old decaying stump, probably of deciduous tree. Not known from the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — FRANCE, dpt. Yonne, Sens, 2 Febr. 1938 (herb. Romagn. 152). — BRITISH ISLES, Bedfordshire, Hanger Wood, 20 July 1964 (K).

We never saw fresh material of this species; the description of its macroscopical characters is taken from Romagnesi. As a result of our study of a recently (1983) received, obviously well-preserved British collection of *P. subpapillata*, the re-examination of what was left in our herbarium of an unfortunately ill-conditioned exsiccatum, received some years ago from Romagnesi and our study of the pictures of the pleurocystidia of this species, recently published by Romagnesi (1982: 46), we withdraw our earlier description and figure (1982: 503, fig. 20) of the pleurocystidia and marginal cells as they are incorrect.

Of *P. subpapillata* only four collections are known: Karsten's original collection (1879: 31; type specimen non-existent as we learned from the Helsinki herbarium); Romagnesi's collection, which served Kühner & Romagnesi (1953: 366) for their description of *Drosophila subpapillata* and which was found growing 'solitaire ou groupé' on 2 February 1938 and 13 October 1939 in the same locality; the British collection (K), correctly identified when it was found in 1964, but unaccompanied by a macroscopical description, the only field note stating that the cap measured nearly 30 mm; and finally Von Schulmann's collection (1960: 72) of which the author gave a short, incomplete description. So as not to saddle the literature with a new name, we (1982: 593) adopted Kühner & Romagnesi's interpretation of Karsten's species, although Karsten, while stressing the granular surface of the cap ('papillis minutissimus subscaber'), did not mention the pale colour of the small spores (with him  $5-6 \times 2.5-3 \mu\text{m}$ ), called the species caespitose, the cap 50–60 mm broad, the stem 40–60 mm long, the veil appendiculate. Romagnesi recently (1982: 46) gave a full description and excellent pictures of the pleurocystidia of *P. subpapillata*, unfortunately not mentioning the important ratio between the pleurocystidioid cheilocystidia and the spheropedunculate cells. The former are numerous in *P. subpapillata* (as we discovered in the British collection and also on rechecking Romagnesi's collection) but very scarce in the closely related *P. laevisissima*.

*Psathyrella subpapillata* differs from *P. laevisissima* in several respects. For Romagnesi the minutely granular surface of the centre of the cap is the prime feature by which *P. subpapillata* differs from *P. laevisissima* (hence the name of the latter species) and not the brown punctate edge of the gills (although this feature is printed bold-faced with Kühn. & Romagn. (1953: 366), but not mentioned by Karsten). Karsten's plate 6 fig. 27 merely shows a matt surface. The phenomenon is no doubt due to a somewhat coarsely cellular structure of the pileipellis as is sometimes also seen in species of *Pluteus*, *Panaeolus* and some species of *Psathyrella* (Romagnesi described the surface of his *P. chondrodermoides* (= *P. mucrocystis*) as 'un peu grênelée-chagrinée au milieu s.l.'). Although not wishing to question this character, we feel that in the field it might be easily overlooked.

Recently Romagnesi (1982: 46) added three more features by which *P. subpapillata* differs from *P. laevisissima*: narrower (thinner) rostra of the cystidia, non-caespitose growth and wintry occurrence. We fully subscribe the presence of the narrower, less plumpy rostra, which usually are sharply delimited from the cell body (see our Figs. for both species). But *P. laevisissima* also is a solitary, gregarious and non-caespitose species and out of the nine collections of *P. laevisissima* which we

were able to examine, two were found in November in the wintry climate of Scotland and one on October 28th in Surrey.

We are adding two more differences, which, we feel, are perhaps of greater importance: in *P. subpapillata* we found the pleurocystidia longer (40–70  $\mu\text{m}$ ) than those in *P. laevis* (32.5–45  $\mu\text{m}$ ) and the pleurocystidioid cheilocystidia numerous (in the British specimen even locally densely packed), whereas in *P. laevis* these cells are conspicuously scanty (see also Orton, 1969: 116). The latter finding was confirmed on careful re-examination of Romagnesi's *exsiccatum*. The shape of the cystidia of course rules out *P. piluliformis* as a thinkable interpretation of Karsten's species.

Recently Romagnesi (1982: 46) rightly dropped the importance of the dark punctate gill edge. This phenomenon is caused by pigmentation (yellowish brown membranal pigment), sometimes quite strongly, of numerous and often thick-walled spheropedunculate cells, particularly the larger ones and those in clusters. These cells were abundant in Romagnesi's collection and to a much lesser extent present in the British material, rendering the gill edge of the 'washed' gill punctate in the former and slightly brown in the latter.

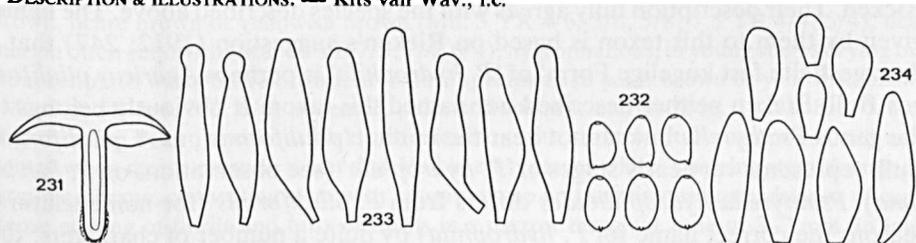
This species needs refinding and further investigation.

### *Psathyrella hydrophiloides* Kits van Wav. — Figs. 231–234

*Psathyrella hydrophiloides* Kits van Wav. in *Persoonia* 11: 488, 1982.

MISAPPLIED NAME. — *Drosophila appendiculata* sensu Kühn. & Romagn., *Fl. anal. Champ. sup.*: 365, 1953.

DESCRIPTION & ILLUSTRATIONS. — Kits van Wav., l.c.



Figs. 231–234. *Psathyrella hydrophiloides*. — 231. Carpophores (x 0.5). — 232. Spores. — 233. Pleurocystidiogram. — 234. Cheilocystidiogram.

Cap at maturity up to 45 mm, convex with depressed centre, fleshy and firm, not striate, with slightly wavy and indented margin, dark reddish brown (Mu. 2.5 YR 3/2), hygrophanous, drying out to fairly dark yellow (Mu. 10 YR 8/6, 7/6, but slightly more sordid greyish), darker at centre. Veil scanty, forming white velar fibrils along margin of cap and garland-like distinct remnants half-way on stem. Gills 6 mm broad, not crowded, slightly ventricose in the middle, strongly ascending near stem, narrowly adnexed, dark reddish brown (Mu. 5 YR 3/3) with  $\pm$  concolorous, minutely fimbriate edge. Stem 30 x 6 mm (at base 7), cylindrical, not rooting, very pale brown, base covered by dense, downy, whitish mycelial layer but not strigose, hollow (cavity 3 mm wide); surface very delicately fibrillose, at apex distinctly sulcate. Flesh of cap firm, relatively thick (2.5 mm in centre) dark greyish brown, in stem very pale brown, taste and smell indistinctive. Trama of 'washed' gill dark yellowish brown from brownish yellow (10 YR 6/4, 6/6, 5/6), anastomosing strands, running from base to

edge through the in itself pale brown (Mu. 10 YR 6/3, 7/2) tissue, near edge pale brown. Spore print very dark purplish brown.

Spores 5–6.5 x 3–3.5  $\mu\text{m}$  (mean values 5.9 x 3.5  $\mu\text{m}$ : 1 collection), in face view ellipsoid to slightly ovoid, in profile ellipsoid, adaxially flattened, rarely slightly phaseoliform, in water and  $\text{NH}_4\text{OH}$  10% brownish yellow (Mu. 10 YR 6/6), in KOH 5% sordid yellowish brown (Mu. 10 YR 5/6), subopaque, with conspicuous subtruncate germ pore (1–1.5  $\mu\text{m}$ ) and small hilar appendix. Basidia 14.5–17.5 x 5–5.5  $\mu\text{m}$ , subcylindrical, 4-spored. Pleurocystidia 37.5–47.5 x 7.5–12.5  $\mu\text{m}$ , not numerous, utriform, only a few fusoid-ellipsoid, with narrow and distinct pedicel, thin-walled, very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: fusoid-ellipsoid, rarely utriform cheilocystidia 22.5–30(–35) x 7.5–11  $\mu\text{m}$ , fairly numerous, nowhere densely packed, with short and broad pedicel, many very pale brown in  $\text{NH}_4\text{OH}$  10% (some distinctly brown), intermixed with numerous small spheropedunculate cells, 12.5–25 x 6–10  $\mu\text{m}$  (rarely larger, up to 27.5 x 15  $\mu\text{m}$ ), several of which pale brown in  $\text{NH}_4\text{OH}$  10%. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: narrow hyphae of subhymenium in a 15  $\mu\text{m}$  broad zone along edge very brown and broad hyphae pale brown from membranous pigment; yellow hyphal septa present, encrustations absent. Pileipellis a 2–3 cells deep layer of subglobose thick-walled cells, 25–55  $\mu\text{m}$  diam., distinctly pale brown in  $\text{NH}_4\text{OH}$  10%.

HABITAT & DISTRIBUTION. — Found terrestrial under *Fagus*, solitary. Very rare in the Netherlands. Reported from France, not from the British Isles.

COLLECTION EXAMINED. — THE NETHERLANDS, prov. Overijssel, Denekamp, estate 'Singraven', 22 May 1961 (type).

Kühner & Romagnesi (1953: 365) depicted (fig. 494) and briefly described a taxon, which they named *Drosophila appendiculata* var. *pilulaeformis* sensu Ricken. Their description fully agrees with the species described above. The name, given by them to this taxon is based on Ricken's suggestion (1912: 247) that a 'kurzgestielte fast kugelige Form' of '*P. hydrophila*' is perhaps *Agaricus piluliformis* Bull. Ricken neither described nor named this taxon. It obviously belongs to the genus *Psathyrella* but cannot bear the epithet '*piluliformis*', as *A. piluliformis* Bull. represents very early stages of '*P. hydrophila*' (see observations on *P. laevis-sima*). *Psathyrella hydrophiloides* differs from *P. piluliformis* (for nomenclatural reasons the correct name for *P. hydrophila*) by quite a number of characters: the carpophores are robust, thick-set, the cap is darker and the veil scanty, the gills are not crowded, the apex of the stem is conspicuously sulcate, the spores are slightly darker and above all have a very distinct germ pore. The above description is based on the only specimen we ever saw, at the same time the only one recorded from the Netherlands. According to Kühner & Romagnesi (1953: 365) the species is fairly common in France.

### *Psathyrella piluliformis*<sup>1</sup> (Bull.: Fr.) P. D. Orton — Figs. 235–239

*Agaricus piluliformis* Bull., Herb. France: pl. 112. 1783. — *Agaricus piluliformis* Bull.: Fr., Syst. mycol. 3 (Index): 35. 1832. — *Hypholoma piluliforme* (Bull.: Fr.) Gillet, Hyménomycètes: 571. 1878.

<sup>1</sup> We deeply regret that the epithet '*hydrophila*', which has struck root since it was given to this species by Bulliard (1971) and has been universally used ever since, for nomenclatural reasons has to give way to the epithet '*piluliformis*' (Bulliard, 1783).

— *Drosophila piluliformis* (Bull.: Fr.) Quél.; Enchir. Fung.: 116. 1886. — *Psathyrella piluliformis* (Bull.: Fr.) P. D. Orton in Notes R. bot. Gdn Edinb. 29: 116. 1969 (misapplied to *P. laevis*).

*Agaricus hydrophilus* Bull., Herb. France: pl. 511. 1791 (not. val. publ., no description); ex Bull., Hist. Champ. France 2: 440. 1792/93 (illegitimate, superfluous name). — *Agaricus stipatus* (var.)  $\beta$ . *A. hydrophilus* (Bull.): Fr., Syst. mycol. 1: 296. 1821. — *Hypholoma hydrophila* (Bull.) Quél. (Champ. Jura Vosges 1.) in Mém. Soc. Emul. Montbéliard, sér. II, 5: 146. 1872. — *Bolbitius hydrophilus* (Bull.) Fr., Hymenomyc. eur.: 333. 1874. — *Drosophila* (Bull.) Quél., Enchir. Fung.: 116. 1886. — *Psathyra hydrophila* (Bull.) Bertrand in Bull. Soc. mycol. Fr. 17: 279. 1901. — *Psathyrella hydrophila* (Bull.) Maire apud Maire & Werner in Mém. Soc. Sc. nat. Maroc 45: 113. 1937.

*Agaricus spadiceus* [var.]\* *A. hydrophilus* Fr. [*'hygrophitus'* in errore], Epicr.: 225. 1838 (superfluous name for *A. stipatus* [var.]  $\beta$ . *A. hydrophilus* (Bull.): Fr., 1821).

*Hypholoma californicum* Earle in Bull. N.Y. bot. Gdn 2: 304. 1902. — *Drosophila californica* (Earle) Murr. in Mycologia 4: 304. 1912.

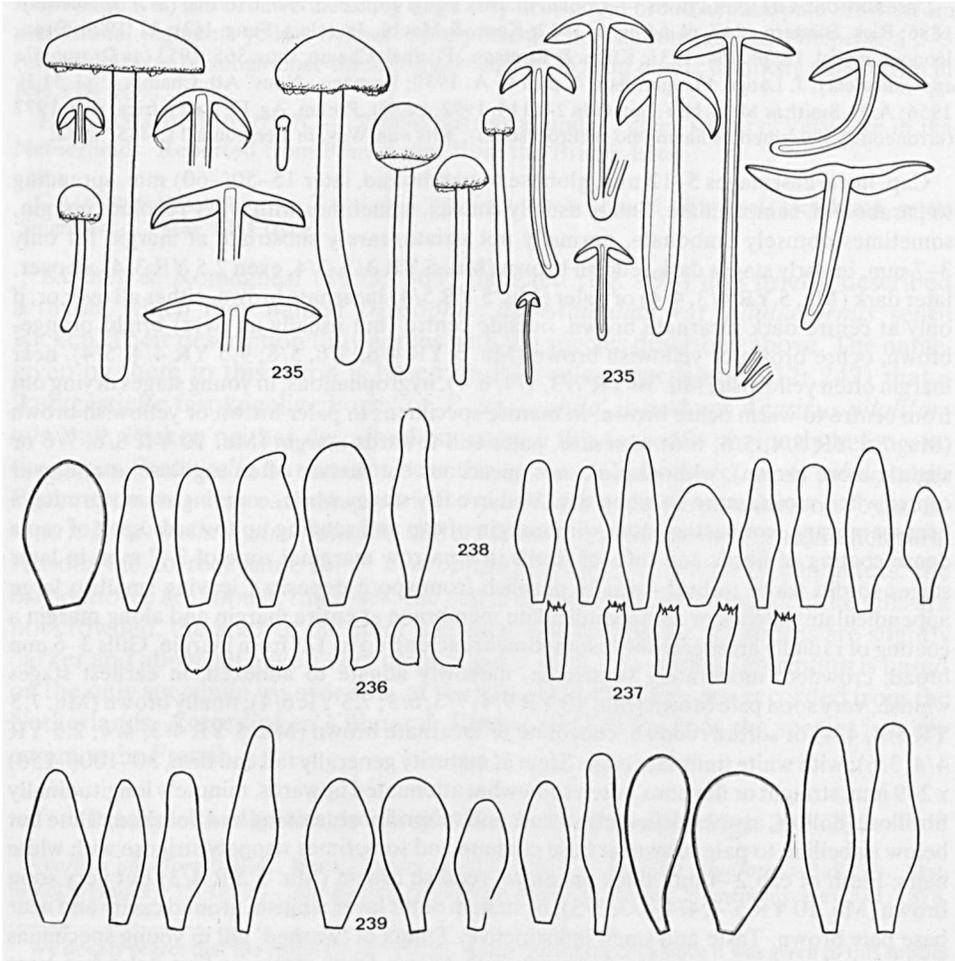
MISAPPLIED NAME. — *Drosophila appendiculata* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 365. 1953.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 605/589, 610/606 (as *A. spadiceus*). 1886; Rick. Blätterp.: 247, pl. 64 fig. 6. 1912; Konr. & Maubl., Ic. select. Fung. 1(2): 42. 1926; Bres., Iconogr. mycol. 18: pl. 854. 1931; Kühn. & Romagn., Fl. anal. Champ. sup.: 365. 1953 (as *Drosophila appendiculata*); J. Lange, Fl. agar. dan. 4: pl. 146 A. 1939; Romagn., Nouv. Atl. Champ. 1: pl. 51 B. 1956; A. H. Smith in Mem. N.Y. bot. Gdn 24: 114. 1972; Pegler, Prelim. Ag. Fl. East Africa: 429. 1977 (erroneously described as having no pleurocystidia); Kits van Wav. in Persoonia 11: 485. 1982.

Cap, in earliest stages 5–12 mm, globose to paraboloid, later 15–50(–60) mm, spreading to paraboloid, campanulate, finally usually convex, sometimes with wavy revolute margin, sometimes obtusely umbonate, normally not striate, rarely substriate at margin for only 3–7 mm, in early stages dark reddish brown (Mu. 5 YR 3/3, 3/4, even 2.5 YR 3/4) all over, later dark (Mu. 5 YR 4/3, 4/4) or paler (Mu. 5 YR 5/4) incarnate brown, either all over or, if only at centre dark incarnate brown, outside centre (but usually all over) bright orange-brown, ochre brown or yellowish brown (Mu. 5 YR 4/6, 5/6, 5/8; 7.5 YR 4/4, 5/4), near margin often yellowish (Mu. 10 YR 7/3, 7/4, 6/4), hygrophanous, in young stages drying out from centre to warm ochre brown, in mature specimens to paler brown or yellowish brown (Mu. 7.5 YR 5/4, 5/6, 6/6) at centre, paler still towards margin (Mu. 10 YR 8/6, 7/6 or slightly more brown), without pink, not micaceous but surface often rugulose at and near centre when moist, more so when dry. Veil in early stages white, covering stem, forming a firm membrane, connecting stem with margin of cap and sending up towards apex of cap a dense coating of fibrils and tufts of fibrils in a narrow marginal zone of 3–7 mm, in later stages sordid white to buff (usually purplish from spore deposits), leaving small to large appendiculate patches or an appendiculate membrane at entire margin and along margin a coating of radially arranged fibrils sometimes reaching up to 1/3 from margin. Gills 3–6 mm broad, crowded, moderately ventricose, narrowly adnate to adnexed, in earliest stages whitish, very soon pale brown (Mu. 10 YR 7/4, 7/3, 6/3; 7.5 YR 6/4), finally brown (Mu. 7.5 YR 5/4, 4/4) or sordid reddish, chocolate or incarnate brown (Mu. 5 YR 4/3, 4/4; 2.5 YR 4/4, 3/6); with white fimbriate edge. Stem at maturity generally tall and firm, 30–100(–150) x 2–9 mm, straight or flexuous, often somewhat attenuated upwards, minutely longitudinally fibrillose, hollow, at apex delicately sulcate and subpruinose, shining and polished, white but below isabelline to pale brown, at base connate and sometimes strongly strigose with white hairs. Flesh of cap 2–4 mm thick in centre, reddish brown (Mu. 5 YR 4/3) but very soon brown (Mu. 10 YR 5/4, 4/4, 4/3, 3/3), of stem in outer layer whitish, around cavity and near base pale brown. Taste and smell indistinctive. Trama of 'washed' gill in young specimens fairly pale brown, at maturity dark yellowish brown from many, at first paler but later conspicuously brownish yellow (Mu. 10 YR 6/4, 6/6, 5/6) anastomosing strands running

from base to edge (and darkest near base) through the in itself pale brown (Mu. 10 YR 6/3, 7/2, 7/3; 7.5 YR 6/2; 5 YR 6/2) tissue, pale brown at edge. Spore print dark purplish brown to dark reddish brown.

Spores 5–6.5 x 3–3.5  $\mu\text{m}$  (mean values 5.3–6.1 x 3.4–3.5  $\mu\text{m}$ : 10 collections), in face view ellipsoid to slightly ovoid, in profile ellipsoid to often slightly phaseoliform, in water and  $\text{NH}_4\text{OH}$  10% pale yellowish brown (Mu. 10 YR 6/4; 7.5 YR 6/4; 5 YR 6/4), in KOH 5% darkening to sordid yellowish brown (Mu. 10 YR 5/4), not opaque, with inconspicuous germ pore ('callus') and minute hilar appendix. Basidia 14.5–21 x (5–)5.5–7.5(–8)  $\mu\text{m}$ , clavate or subcylindrical, 4-spored. Pleurocystidia 30–52.5 x 8–17.5  $\mu\text{m}$ , moderately numerous to abundant, very versiform (often even on one gill), usually broadly fusiform, ventricose or clavate, sometimes utriform, always non-capitate, with (very) obtuse apex and short pedicel, scarcely thick-walled, rarely with walls slightly thicker and then refringent, almost always (and sometimes distinctly) brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 20–45 x 7.5–15  $\mu\text{m}$ , numerous, locally often either densely packed or



Figs. 235–239. *Psathyrella piluliformis*. — 235. Carpophores (x 0.5). — 236. Spores. — 237. Basidia. — 238, 239. Pleurocystidiogram.

more or less dispersed and so are the numerous spheropedunculate and clavate cells, 7.5–35 x 5–12.5 (–15)  $\mu\text{m}$ ; many cells of both kinds slightly thick-walled and pale brown in  $\text{NH}_4\text{OH}$  10%; some of the latter cells with a somewhat thicker, refringent wall and brown. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: narrow hyphae of subhymenium ( $\pm$  15–20  $\mu\text{m}$  broad zone) at edge very brown from membranal pigment; broad hyphae pale brown; yellow hyphal septa present; encrustations absent. Pileipellis a 2–4 cells deep layer of subglobose, fairly thick-walled cells, 25–50(–55)  $\mu\text{m}$  diam., practically colourless, some very pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Caespitose on and around stumps of deciduous trees, especially *Fagus*, but also *Quercus*, rarely solitary or terrestrial or on coniferous stumps. Aug.–Oct. Very common in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel: Denekamp, estate 'Singraven', 5 Aug. 1961; Oldenzaal, estate 'Egheria', 12 Oct. 1960; Oldenzaal, estate 'Roderveld', 29 Sept. 1979; Delden, estate 'Twickel', 12 Oct. 1968, 22 Oct. 1973, 2 Oct. 1979, 6 Oct. 1979, 8 Oct. 1979; prov. Noord-Brabant, Drunen, 'Drunense duinen', 22 April 1977; prov. Limburg, Mook, 11 Oct. 1965.

**NOMENCLATURE NOTE.** — The here introduced change of name for this well-known species up till now usually called *Psathyrella hydrophila* is rather unfortunate, but cannot be avoided. Under the present code of botanical nomenclature (Sydney 1981) there are three reasons why the name *P. hydrophila* (Bull.) Maire has to be rejected in favour of the name *P. piluliformis* (Bull.) P. D. Orton: (i) Since the later starting points for fungus names have been abolished, *Agaricus piluliformis* Bull. is the oldest validly published name (1783) for the present species, in fact being 9 or 10 years older than *A. hydrophilus* Bull. (1792/93). (ii) *Agaricus hydrophilus* is a superfluous name (and thus illegitimate), because in his validating description of *A. hydrophilus*, Bulliard explicitly declared his earlier *A. piluliformis* con-specific (representing young fruit-bodies of *A. hydrophilus* of which expanding had been arrested by drought). (iii) Fries (1821: 296) sanctioned the epithet '*hydrophilus*' only on varietal level, but the epithet '*piluliformis*' on specific level (1832: 35).

The facts that Bulliard described and depicted only young fruit-bodies of the present species when he introduced the name *A. piluliformis* and that Orton misapplied the new combination *Psathyrella piluliformis* to *P. laevissima* cannot affect the nomenclatural re-introduction of the name *P. piluliformis* for the former '*P. hydrophila*'.

As in all species of *Psathyrella*, here too the macroscopical characters vary. The perceptibility of the germ pore and the degree by which the spores are phaseoliform (also the number of phaseoliform spores) vary slightly. The size and above all shape of the pleurocystidia greatly vary (see Figs.). With regard to this variability we have no faith in the specificity of the following three new species, described by A. H. Smith (1972), each based on only one collection: *P. alaskaensis* is said to differ from *P. hydrophila* only by the refractive walls of the cystidia as revived in KOH and the more versiform caulocystidia, *P. ogemawensis* only by a wedge-shaped form of the spores in face view, and *P. deceptiva* only by the scarcely larger spores and a more copious veil.

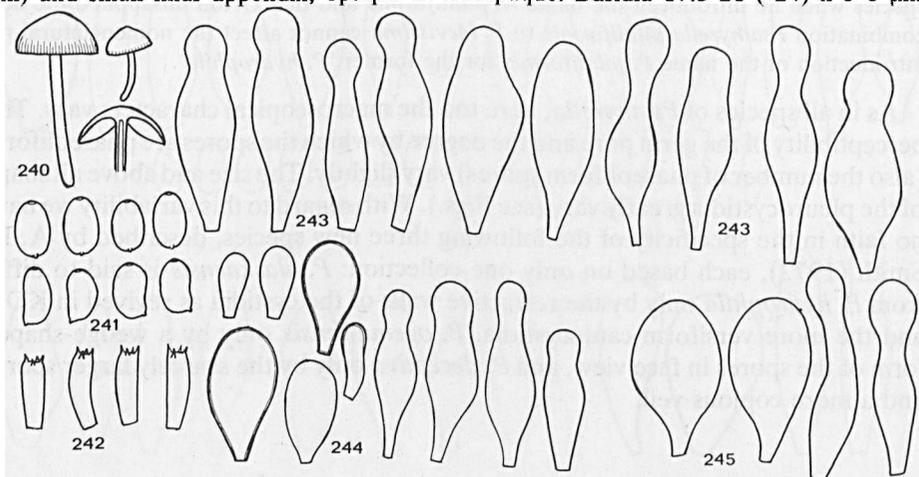
***Psathyrella fragrans* A. H. Smith – Figs. 240-245**

*Psathyrella fragrans* A. H. Smith in Mem. N.Y. bot. Gdn 24: 372. 1972.

DESCRIPTIONS & ILLUSTRATIONS. – A. H. Smith, l.c.; Kits van Wav. in *Persoonia* 11: 481. 1982.

Cap in early stages 10-15 mm, conico-paraboloid with deflexed marginal area, substrate at margin over 1 mm, very dark purple reddish brown (Mu. 5 YR 3/2), near edge dark reddish brown (Mu. 5 YR 3/3), at edge brown (Mu. 7.5 YR 4/4), later (cap 20-25 mm) paraboloid, striate over 3-4 mm, rugulose, very dark reddish brown but with brown (Mu. 7.5 YR 4/4) 3 mm broad marginal zone, finally (cap 30-45 mm) convex to almost plane and only marginal zone slightly deflexed, striate up to half-way from margin, at centre still dark reddish brown (Mu. 5 YR 3/4), outside centre brown (Mu. 7.5 YR 4/4), entirely or only at centre rugose, hygrophamous, drying out to yellowish brown (Mu. 10 YR 6/4-5/4) with a trace of ochre, without pink, not micaceous and then also rather strongly rugose. Veil scanty, in earliest stages only as very delicate, radial, white fibrils on surface of cap, sometimes forming small tufts in a  $\pm$  2 mm broad zone along margin, not appendiculate, very fugacious, absent in final stages. Gills 3-5 mm broad, fairly crowded, slightly ventricose, fairly narrowly adnexed, at first pale brown, soon ochre brown (Mu. 7.5 YR 4/4) or yellowish brown (Mu. 10 YR 5/6) but more ochreous, finally dark reddish brown (Mu. 5 YR 3/4), slightly veined, with paler or whitish edge. Stem 30-45 x 2.5-4 mm, relatively short (carpophores rather delicate as compared with *P. piluliformis* cylindrical, not rooting, hollow, white or sordid white from a very thin silvery white superficial longitudinally fibrillose layer, underneath which stem pale brown above and darker downwards, brown at base; apex pruinose. Flesh of cap in centre 2-4 mm thick, dark purplish-reddish brown (Mu. 5 YR 3/2, 3/3), in stem distinctly brown. Smell distinct and sweet. Trama of 'washed' gill distinctly yellow-brown (Mu. 10 YR 5/4) from many anastomosing yellowish brown (Mu. 10 YR 5/4) strands running from base to edge through the in itself pale brown (Mu. 10 YR 6/3) tissue. Spore print not recorded but very likely some shade of brown.

Spores 5.5-6.5 x 3-3.5  $\mu$ m (mean values 6 x 3.5  $\mu$ m: 1 collection), in face view ellipsoid-ovoid, in profile ellipsoid to distinctly phaseoliform, in water, NH<sub>4</sub>OH 10%, and KOH 5% distinctly brown (Mu. 7.5 YR 5/4) with a trace of reddish, with very small germ pore (0.5  $\mu$ m) and small hilar appendix, opaque to subopaque. Basidia 17.5-21 (-24) x 5-6  $\mu$ m,



Figs. 240-245. *Psathyrella fragrans*. — 240. Carpophores (x0.5). — 241. Spores. — 242. Basidia. — 243. Pleurocystidiogram. — 244. Cheilocystidiogram. — 245. Caulocystidiogram.

subcylindrical, 4-spored. Pleurocystidia 40-52 x 10-17.5  $\mu\text{m}$ , abundant, chiefly narrowly to broadly ventricose and broadly capitate, only few utriform or clavate; walls very slightly thickened; contents pale greyish with a distinct trace of brown or only very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia 30-40 x 10-15  $\mu\text{m}$ , numerous and rather densely packed; spheropedunculate and clavate cells 15-20 x 5-11  $\mu\text{m}$ , also numerous, a few larger ones, 20-30 x 12.5-15  $\mu\text{m}$ , with walls often slightly thickened and pale brown. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: narrow hyphae strongly and broad hyphae faintly pigmented from membranal pigment, with many yellow hyphal septa, without encrustations. Pileipellis a 2-3 cells deep layer of fairly thick-walled subglobose cells, 25-50  $\mu\text{m}$  diam., very pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Subcaespitose on coniferous tree stump. In the Netherlands found only once. Not recorded from France or the British Isles.

**COLLECTION EXAMINED.** — THE NETHERLANDS, prov. Overijssel, Denekamp, estate 'Singraven', 17 Oct. 1963.

We fully agree with Smith (1972: 372) that *P. fragrans* 'has the appearance of *P. piluliformis* but grows on a conifer substrate, has a fragrant odor and differently shaped spores among other features'. Of the latter he could have added from his own description the 'nine-pin-shaped pleurocystidia with the apex capitate', furthermore the scantiness of the veil (its presence or absence on the cap is not mentioned by Smith), the striation of the cap and the presence of a distinct, be it small, germ pore. *Psathyrella fragrans* and *P. piluliformis* obviously are closely related, both are typical members of section *Hydrophilae*. In spite of this close relationship *P. fragrans* finds itself with Smith in the subgenus *Psathyrella* ('veil thin to rudimentary'), whereas *P. piluliformis* is placed in subgenus *Pannucia* ('veil more or less well developed').

### ***Psathyrella mucrocystis* A. H. Smith — Figs. 246–253**

*Psathyrella mucrocystis* A. H. Smith in Mem. N.Y. bot. Gdn 24: 373. 1972.

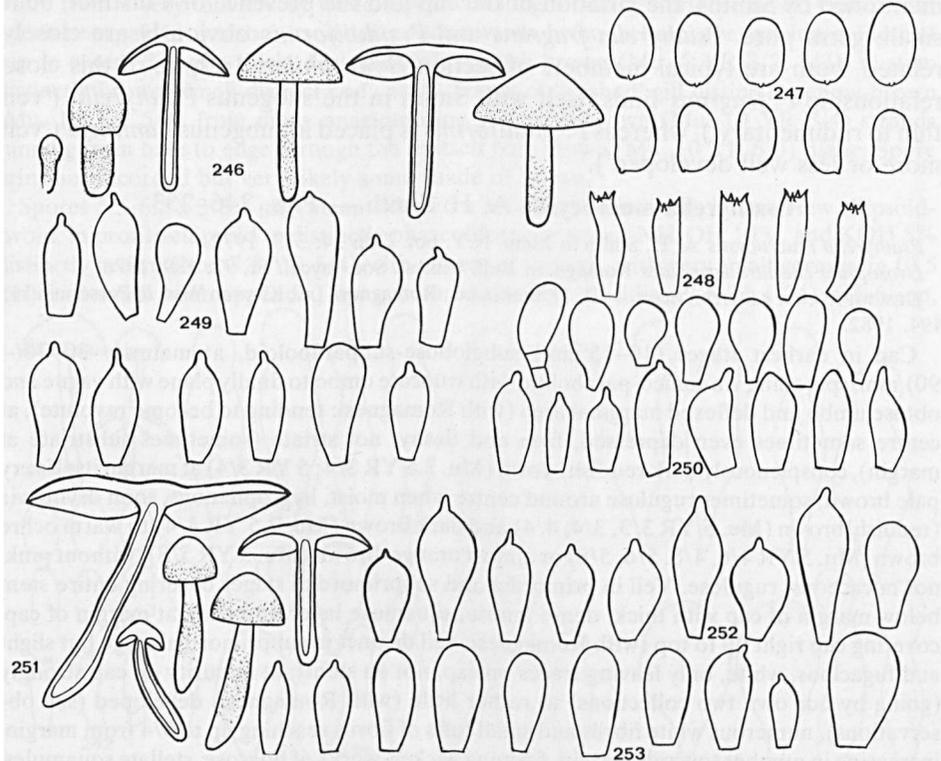
*Drosophila chondrodermoides* Romagn. in Bull. trimest. Soc. mycol. Fr. 92: 189. 1976.

**DESCRIPTIONS & ILLUSTRATIONS.** — A. H. Smith, l.c.; Romagnesi, l.c.; Kits van Wav. in Persoonia 11: 494. 1982.

Cap in earliest stages (10–15 mm) subglobose-subparaboloid, at maturity 30–70(–90) mm, spreading via conico-paraboloid with truncate umbo to finally plane with vague and obtuse umbo and deflexed marginal area (with Romagnesi: tending to become revolute), at centre sometimes even depressed, firm and fleshy, not striate (sometimes substriate at margin), conspicuously dark reddish brown (Mu. 2.5 YR 3/4; 5 YR 3/4) at margin itself very pale brown, sometimes rugulose around centre when moist, hygrophanous, soon drying via (reddish) brown (Mu. 5 YR 3/3, 3/4, 4/4) and dark brown (Mu. 7.5 YR 4/4) to warm ochre brown (Mu. 5 YR 4/6, 4/8, 5/6, 5/8) or almost orange-brown (Mu. 5 YR 5/8), without pink, not micaceous, rugulose. Veil in primordia and subprimordial stages covering entire stem below margin of cap with thick, dense lanose, squamose layer, inserting at margin of cap, covering cap right up to top (with Romagnesi: veil distinct in subprimordial stage but slight and fugacious, white, only leaving traces on cap, not on stem); at maturity on cap strongly (going by our own two collections) to rather little (with Romagnesi) developed (see observations), numerous white fibrils and small tufts of fibrils reaching up to 3/4 from margin, increasing in number towards margin, forming wicker-works of floccose, stellate squamules, with tips at maturity distinctly pale ochre-brown, appendiculate, on lower 2/3–1/2 of stem forming a dense lanose-fibrillose, sometimes squamulose coating with sometimes an annuliform zone. Gills 4–6 mm broad, fairly crowded, slightly ventricose, broadly adnate, in

earliest stages pale brown (Mu. 10 YR 6/4) then brown (Mu. 7.5 YR 5/4, 4/4), at maturity reddish brown (Mu. 5 YR 5/4, 4/4), contrasting with dark cap and pale brown stem, with white, later whitish minutely fimbriate edge. Stem 30–60 x 4–8 mm (Romagnesi: 40–90 x 6–13 mm), its length about equalling diameter of cap, relatively thick, firm, cylindrical, sometimes attenuated near apex or at base or at both, upper 1/3 whitish, lower 2/3 pale sordid brown, darker at sometimes swollen base, very hollow, not rooting, distinctly pruinose at striate apex. Flesh of cap in centre 3–4 mm thick, at first reddish brown (Mu. 5 YR 3/3, 3/4), later dark greyish brown (Mu. 7.5 YR 4/2); of stem whitish to pale yellowish brown, lower down darker and brownish grey, along cavity pale brown. Striking sweet smell of anise or almond. Trama of 'washed' gill strong yellowish brown (Mu. 10 YR 5/6) from many anastomosing brownish yellow (Mu. 10 YR 6/6) strands, running from base to edge (darker and merging in basal 1/3 of gill) through the in itself pale brown (Mu. 10 YR 6/3) tissue, pale brown at edge. Spore print dark brown with purplish hue.

Spores 7–8 x 4–4.5  $\mu\text{m}$  (mean values 7.1–7.5 x 4.5  $\mu\text{m}$ : 4 collections), in face view ellipsoid to slightly ovoid, in profile ellipsoid, adaxially flattened, some very slightly phaeoliform, in water,  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5% brownish yellow ( $\pm$  Mu. 10 YR 6/6; 7.5 YR 6/6), not opaque, without germ pore or callus, with small hilar appendix. Basidia 22.5–27.5 x 6–7.5  $\mu\text{m}$ , subcylindrical, 4-spored. Pleurocystidia 20–27.5 x 7.5–11 (–12.5)  $\mu\text{m}$  (22 Oct. 1962) or 22.5–32.5 x 10–15  $\mu\text{m}$  (22 Aug. 1965) (with Smith: 28–37 x 8–14  $\mu\text{m}$ , and with Romagnesi 25–50 x 9–13.5  $\mu\text{m}$ ), very scarce to moderately numerous,



Figs. 246–253. *Psathyrella mucrocystis*. — 246. Carpophores (x 0.5). — 247. Spores. — 248. Basidia. — 249. Pleurocystidiogram. — 250. Cheilocystidiogram. — 251. Carpophores (x 0.5). — 252. Pleurocystidiogram. — 253. Cheilocystidiogram.

clavate with at apex a narrow (1–2  $\mu\text{m}$ ) cylindrical, 1–4  $\mu\text{m}$  long thin-walled colourless protuberance (mucro); cell body usually very pale brown in  $\text{NH}_4\text{OH}$  10% (particularly in larger cells). Marginal cells: spheropedunculate and clavate cells 15–25(–27.5)  $\times$  7.5–15 (–17.5)  $\mu\text{m}$ , very numerous, some with slightly thickened wall and some larger cells distinctly pale brown in  $\text{NH}_4\text{OH}$  10%; intermixed with very few to a fair number of scattered colourless, mucronate pleurocystidioid cheilocystidia, 20–30  $\times$  7.5–11  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brownish yellow, with scattered yellow hyphal septa, without encrustations. Pileipellis a 2–4 cells deep layer of subglobose, thick-walled, distinctly pale brown cells, 15–35  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — Caespitose and solitary on stumps of coniferous or deciduous trees. June–Oct. Very rare. Reported from France and British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS, prov. Overijssel, Denekamp, estate 'Singraven', 20 Oct. 1962. — BRITISH ISLES, Scotland, county Angus, Glenisla, estate 'Brewlands', 22 Aug. 1965. — FRANCE, dpt. Oise, Chapelle-en-Serval, 2 June 1973 (herb. Romagn. D 1130, type of *Drosophila chondrodermoides*). — U.S.A., Idaho, Cascade Lake McCall-Valley Co., 14 July 1962 (Smith 65384, type, MICH).

The mucronate cystidia are far and away the most outstanding feature of this extremely rare species, in combination with the habit, the medium to large size of the firm carpophores, the red-brown colour of cap and gills, the brown spore print and the fairly (not very) pale spores, which have no germ pore. The specimens from our own two collections (20 Oct. 1962, 22 Aug. 1965), the one collection, published by Smith and the four collections from Romagnesi (published as *Drosophila chondrodermoides*) obviously represent one and the same species in spite of the variability of several characters. Romagnesi stressed its vernal appearance (although one of his collections was found on 2 August), Smith found his specimens in July and our two collections were found resp. on 22 August and 20 October. The species has been found on coniferous as well as deciduous wood. The veil, according to Romagnesi 'légère et vite disparue', was strongly developed in our own collections and with Smith the development was intermediate between these two extremes. The sizes and also the number of the pleurocystidia varied considerably (see the figures mentioned above) and Smith found in one and the same collection the pleurocystidia 'scattered to abundant'. (For further details see Kits van Waveren, 1982: 494).

Romagnesi (1976: 189) pointed out that his *Drosophila chondrodermoides* differed from *P. chondroderma* — which has the same macroscopical appearance — by its vernal appearance, its growth on stumps of deciduous trees and its paler spores, but omitted to mention the mucronate pleurocystidia and the absence of a germ pore.

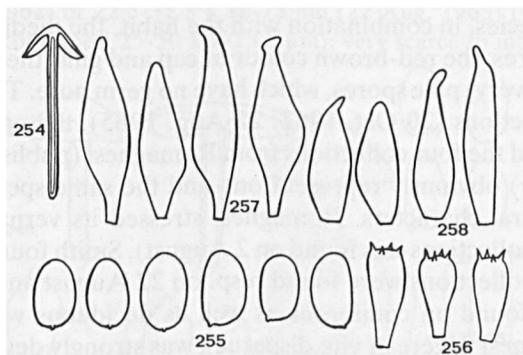
### ***Psathyrella umbrina* Kits van Wav.**

*Psathyrella umbrina* Kits van Wav. in *Persoonia* 11: 506. 1982.

var. **umbrina** — Figs. 254–258

DESCRIPTIONS & ILLUSTRATIONS. — Kits van Wav., l.c.

Cap 12–15 mm, conical, sometimes with small umbo, at extreme margin sometimes slightly revolute, striate up to 2/3 from margin or even up to umbo, reddish brown (Mu. 5 YR 4/3), hygrophanous, soon drying from margin via brown (Mu. 7.5 YR 5/4; 10 YR 5/4) to pale yellowish brown (Mu. 10 YR 6/4, 6/3, 7/4, 7/3), yellower (Mu. 10 YR 7/6) at centre, without pink, neither micaceous nor rugulose. Veil quite strongly developed, forming on cap a fairly dense wicker-work of radially arranged white fibrils, reaching up to 1/3–2/3 from margin, sometimes even to apex, densest at margin where fibrils form a united, rather dense velar zone, not appendiculate; on stem many fibrils and very small, in some places woolly tufts. Gills 2–3 mm broad, ventricose near margin of cap, then straight and ascending, narrowly to fairly broadly adnate, pale cocoa colour when viewed from underneath but conspicuously brown (Mu. 7.5 YR 5/4) in face view, with white edge. Stem 35–65 x 1.5 mm, straight, cylindrical, hollow, not rooting, pruinose at apex, shiny from a very thin, white, minutely longitudinally striate fibrillose layer through which at base brown colour of context of stem penetrates. Flesh of cap in centre 1–2 mm thick, reddish brown (Mu. 5 YR 4/3), but very soon brown (Mu. 10 YR 4/3, 4/4), of stem white but in lower half pale brown, at base brown. Hymenophoral trama of 'washed' gill from base to edge distinctly pigmented, pale greyish brown (Mu. 10 YR 6/2, 7/2, 7/3), at base yellowish brown (Mu. 10 YR 6/4). Spore print distinctly brown to slightly purplish brown.



Figs. 254–258. *Psathyrella umbrina* var. *umbrina*. — 254. Carpophore (x 0.5) — 255. Spores. — 256. Basidia. — 257. Pleurocystidiogram. — 258. Cheilocystidiogram.

Spores (6.5–)7–8 x 4.5–5  $\mu\text{m}$  (mean values 6.9–7.3 x 4.6–4.8  $\mu\text{m}$ : 2 collections), ellipsoid, adaxially flattened, not phaseoliform, fairly pale, in water ochreous yellow with a trace of red (Mu. 7.5 YR 6/6, 7/8), in  $\text{NH}_4\text{OH}$  10% scarcely darker, in  $\text{KOH}$  5% pale yellowish brown (Mu. 10 YR 6/4; 2.5 Y 6/4), without germ pore, with distinct hilar appendix, not opaque. Basidia 17.5–22.5 x 7.5–8.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 35–52.5 x 9–12.5  $\mu\text{m}$ , fairly numerous, fusoid-pedicellate with subacute, often mucronate apex (with short, curved apical appendix), thin-walled, colourless, with top part sometimes covered by a very thin greyish mucoid film. Marginal cells: edge heteromorphous, pleurocystidioid cheilocystidia 25–37.5(–40) x 7.5–12.5  $\mu\text{m}$ , abundant, densely packed, intermixed with unobtrusive spheropedunculate and clavate cells, 15–25 x 9–15  $\mu\text{m}$  and some basidia. Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: in basal half narrow hyphae distinctly brown and broad hyphae very pale brown from membranal pigment, with many yellowish hyphal septa and a fair number of minute encrustations, for the rest pale brown. Pileipellis a 2–3 cells deep layer of subglobose, very pale brown cells, 25–50  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial in moss (not on wood) in borders of footpaths in deciduous woods. Sept.-Oct. Very rare in the Netherlands and the British Isles, not recorded from France.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS, prov. Noord-Brabant, Eindhoven, estate 'De Wielewaal', 10 Oct. 1965. — BRITISH ISLES, Scotland, Invernesshire, Tomich, 5 Sept. 1968 (type).

On the strength of its small and pale spores and its brown cap and gills this species is a typical member of section *Hydrophilae*. Since we published this taxon as a new species, basing it on only one but — because of its small size, conical brown cap, brown gills, conspicuous veil, pale ochreous-yellow small spores without a germ pore, mucronate cystidia and solitary growth in moss — very characteristic specimen found in 1968 in Scotland, we discovered while studying our as yet unidentified species in our herbarium, that we had already found this species (also growing solitary in moss) in 1965 in Eindhoven. Basically both specimens were fully identical. Above a redescription is given.

**var. *utriformis* Kits van Wav.**

*Psathyrella umbrina* var. *utriformis* Kits van Wav. on p. 283 of the present work, 1985.

This variety solely differs from *P. umbrina* var. *umbrina* by its pleurocystidia (35–60 x 9–17.5 µm) and pleurocystidioid cheilocystidia (27.5–40 x 9–15 µm) being conspicuously utriform and not mucronate, the former and less frequently also the latter cells rather often even being slightly constricted above the middle.

**COLLECTION EXAMINED.** — THE NETHERLANDS, prov. Noord-Brabant, Eindhoven, estate 'De Wielewaal', 10 Oct. 1965 (type; 3 fruit-bodies a few meters away from 1 fruit-body of var. *umbrina*).

***Psathyrella frustulenta* (Fr.) A. H. Smith — Figs. 259–263**

*Agaricus frustulentus* Fr., Epicr.: 209. 1838. — *Pannucia* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 513. 1897. — *Psathyra frustulenta* (Fr.) P. Karst. in Meddn. Soc. Fauna Flora fenn. 5: 18. 1879. — *Drosophila frustulenta* (Fr.) Quéll., Enchir. Fung.: 117. 1886. — *Psathyrella frustulenta* (Fr.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 45. 1941.

*Psathyrella cortinarioides* P. D. Orton in Trans. Brit. mycol. Soc. 43: 369. 1960.

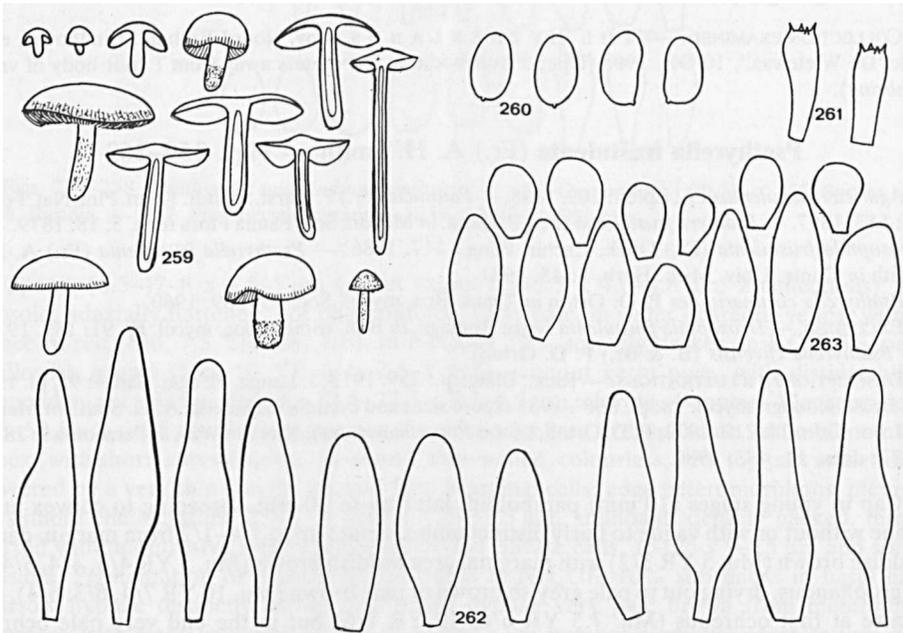
**EXCLUDED.** — *Drosophila frustulenta* sensu Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 189. 1975 (= *Psathyrella clivensis* (B. & Br.) P. D. Orton).

**DESCRIPTIONS & ILLUSTRATIONS.** — Rick., Blätterp.: 259. 1913; J. Lange, Fl. agar. dan. 4: 95, pl. 151 D; Bres., Iconogr. mycol. 18: pl. 866<sup>2</sup>. 1931 (spore sizes and cystidia excluded); A. H. Smith in Mem. N.J. bot. Gdn. 24: 217. 1972; P. D. Orton, l.c. (as *P. cortinarioides*); Kits van Wav. in Persoonia 9: 289. 1977; ditto, 11: 483. 1982.

Cap in young stages (10 mm) paraboloid, later up to 30 mm, spreading to convex and plane without or with vague to fairly distinct umbo, striate up to 1/4–1/2 from margin, dark reddish brown (Mu. 5 YR 3/2) with marginal area reddish brown (Mu. 5 YR 4/3, 4/4, 5/4), hygrophanous, drying out to pale greyish brown or pale brown (Mu. 10 YR 7/4, 6/3, 6/4), at centre at first ochreous (Mu. 7.5 YR 6/6, 10 YR 7/6) but in the end very pale ochre, rugulose, slightly micaceous, without pink. Veil white, strongly developed, in young specimens covering cap to even its centre with dense coating of fibrils, networks, patches and adpressed flocci, rendering the surface in some places completely white, in places sometimes

appendiculate, also covering stem with thick velar coating; in mature specimens still many very distinct radial velar fibrils and networks up to 3–5 mm from margin of cap, lower 1/3 of stem showing many bundles of fibrils and usually also some flocci which may feign an annular zone. Gills 3–5(–7) mm broad, at first whitish to exceedingly pale brown (Mu. 10 YR 8/3), at maturity strikingly reddish rust brown (Mu. 5 YR 4/4; 7.5 YR 5/4), somewhat paler towards edge, ventricose, ascending, narrowly to fairly broadly adnate, somewhat crowded, with white and minutely fimbriate edge. Stem 25–50 x 2–3.5(–5) mm, cylindrical but very slightly thickening towards base, straight, not rooting, hollow, minutely longitudinally striate, white, with slightly pruinose apex. Flesh of cap 2–3 mm thick in centre, dark reddish brown (Mu. 7.5 YR 4/2), later dark brown (Mu. 10 YR 3/3), of stem pale brown with thin white superficial layer, smell indistinctive. Trama of ‘washed’ gill, conspicuously pigmented but degree and hue variable; either equably golden yellowish brown from base to edge (Mu. 10 YR 5/4 or paler) or dark yellowish brown (Mu. 10 YR 5/6) in basal 1/3, yellowish brown (Mu. 10 YR 6/3, 7/4) towards edge (brown colour of gills chiefly due to pigmentation of trama in combination with pale colour of spores). Spore print pale reddish brown (Mu. 5 YR 5/3).

Spores 6.5–8 x 3.5–4.5  $\mu\text{m}$  (mean values 6.9–7.6 x 3.9–4.5  $\mu\text{m}$ : 13 collections), in face view ellipsoid, in profile distinctly phaseoliform, in water and  $\text{NH}_4\text{OH}$  10% strikingly pale brownish yellow with a reddish hue (Mu. 7.5 YR 6/6), in KOH 5% pale yellowish brown (slightly paler than Mu. 10 YR 5/6), not opaque, with indistinct, practically absent germ pore (callus) and small hilar appendix. Basidia 17.5–29 x 7.5–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40–70 x 10–16  $\mu\text{m}$ , very numerous, fusiform to sublageniform, with distinct pedicel and subacute to obtuse apex, thin- or very slightly thick-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia (15–)22–47(–55) x 7.5–17.5  $\mu\text{m}$ , numerous, the vast



Figs. 259–263. *Psathyrella frustulenta*. — 259. Carpophores (x 0.5). — 260. Spores. — 261. Basidia — 262. Pleurocystidiogram. — 263. Cheilocystidiogram.

majority more thick-set and with broader and shorter pedicel than pleurocystidia, intermixed with fairly large but locally sometimes smaller numbers of spheropedunculate cells 12.5–30 x 7.5–17.5  $\mu\text{m}$ , very few with slightly thickened wall; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brown from membranal pigment throughout entire gill but colour becoming fainter towards edge, with quite a number of yellow hyphal septa, with very few very small encrustations. Pileipellis a 2–3 cells deep layer of colourless, globose or subglobose cells, 24–48  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary, terrestrial against small pieces of wood, in woods. Aug.–Oct. Fairly common in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Drente, Zeien, 9 Oct. 1978; Hooghalen, 18 Oct. 1974, 16 Oct. 1976, 9 Oct. 1979; prov. Overijssel: Denekamp, estate 'Singraven', 18 Oct. 1970, 9 Oct. 1979; Oldenzaal, estate 'Roderveld', 11 Oct. 1976, 27 Sept. 1980; Delden, estate 'Twickel', 18 Oct. 1970, 13 Oct. 1976, 1 Oct. 1979; prov. Noord-Brabant, Vlijmen, 27 March 1977. — **BRITISH ISLES,** Wales, Powys, Lake Vyrnwy, 31 Aug. 1977, 1 Sept. 1979.

In only two of our 13 collections of *P. frustulenta* the average length of the spores was 7.6  $\mu\text{m}$  and in one collection it was 7.5  $\mu\text{m}$ ; in all other collections the average length varied between 6.9–7.3  $\mu\text{m}$ .

The reddish brown colour of the cap, the reddish rust brown colour of the gills, the rather strongly developed veil and the pale reddish brown sporeprint (all in full agreement with Fries's original description), furthermore the small, pale brown, phaseoliform spores with their very indistinct germ pore (callus) and the abundant pleurocystidia are diagnostic for this species. Romagnesi (1975: 189) published a different interpretation of *Agaricus frustulentus* Fr. On comparison of exsiccata we received from Romagnesi with exsiccata of *P. clivensis* (B. & Br.) P. D. Orton, it was found (and conceded by Romagnesi) that *P. frustulenta* sensu Romagn. is identical with *P. clivensis*. For details see Kits van Waveren (1977: 291, observations on *P. frustulenta*).

***Psathyrella chondroderma* (B. & Br.) A. H. Smith — Figs. 264–269.**

*Agaricus chondrodermus* B. & Br. in Ann. Mag. nat. Hist., ser. IV, 7: 132. 1876. — *Psilocybe chondroderma* (B. & Br.) Sacc., Syll. Fung. 5: 1048. 1887. — *Hypholoma chondrodermum* (B. & Br.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 48: 241. 1889. — *Psathyrella chondroderma* (B. & Br.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 43. 1941. — *Drosophila chondroderma* (B. & Br.) Kühn. & Romagn., Fl. anal. Champ. sup.: 365. 1953 (not val. publ., basionym not mentioned).

*Hypholoma sublentum* P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 233. 1882.

**MISAPPLIED NAMES.** — *Hypholoma pertinax* sensu Rick., Blätterp.: 461. 1915 (non *Agaricus pertinax* Fr. in Öfv. K. Vet.-Akad. Förh. 8: 50. 1851 = ?).

*Agaricus instratus* sensu Cooke in Grevillea 18: 53. 1887. — *Hypholoma instratum* sensu Mass., Brit. Fung. Fl. 1: 384. 1892 (non *Agaricus instratus* Britz. in Ber. naturk. Ver. Augsburg 27: 67. 1883 = ?).

**DESCRIPTIONS & ILLUSTRATIONS.** — Cooke, Ill. Brit. Fungi 4: pl. 606A/599A. 1886; ditto, 8 (Suppl.): pl. 1157/1181. 1890 (as *A. instratus*); Rick., Blätterp.: 461. 1915 (as *H. pertinax*); J. Lange in Dansk bot. Ark. 4(4): 43. 1923 (as *H. instratum*); ditto, Fl. agar. dan. 4: 78, pl. 147 C. 1939; A. H. Smith, l.c.: pl. 17. 1941; Kühn. & Romagn., l.c.; J. Favre in Schweiz. Z. Pilzk. 35: 212. 1957; Kits van Wav. in Persoonia 11: 477. 1982.

Cap up to 30 (in litt. 50) mm, at first broadly paraboloid, later conico-convex, rather firm, warm red-brown at centre (slightly more reddish than Mu. 5 YR 3/4) to warm ochreous brown towards margin (Mu. 5 YR 4/4, tending to Mu. 7.5 YR 4/4–5/6), not translucent, not

or little striate when moist, glabrous, locally radially wrinkled at maturity. Veil in young specimens on cap white, rather thick, felted-subarachnoid, at maturity buff (Mu. 10 YR 7/4), forming patches in 3 mm broad marginal zone, on stem a very vague subannular fibrillose zone at about 1/4 from apex with lower down sublanose-subsquamosule pale to distinctly brown remnants, later merely brown fibrillose. Gills up to 4 mm broad, fairly crowded, narrowly adnate to narrowly adnate-adnexed, slightly ventricose, moderately dark clayey brown (Mu. 7.5 YR 4/4) to slightly more reddish (Mu. 5 YR 4/4–3/4); with whitish, minutely fimbriate edge, particularly in young specimens. Stem up to 45 x 5 mm, slightly thickening towards base, sometimes subclavate, sometimes connate at base, not rooting, hollow (narrow cavity,  $\pm 1.5$  mm), from pale whitish at apex to pale buff at base. Flesh of cap glossy brown, drying pale buff, smell indistinctive. Trama of 'washed' gill, strong yellow-brown (strongest in basal 1/3) from many anastomosing brownish yellow (Mu. 10 YR 5/6) strands, running from base to edge through the in itself pale brown (Mu. 10 YR 6/3, 6/4) tissue, pale brown at edge. Spore print not recorded.

Spores 6.5–8 x 3.5–4.5 (–5)  $\mu\text{m}$  (mean values 7.2–7.4 3.9–4.4  $\mu\text{m}$ : 3 collections), in face view ellipsoid, in profile ellipsoid to usually distinctly phaseoliform, in water,  $\text{NH}_4\text{OH}$  10%, and  $\text{KOH}$  5% brown with a trace of red (Mu. 7.5 YR 5/6; 5 YR 5/6), with fairly distinct germ pore and distinct hilar appendix. Basidia 16–22.5 x 6.5–7  $\mu\text{m}$ , subclavate, 4-spored. Pleurocystidia 40–57.5 (–62.5) x 12.5–17.5  $\mu\text{m}$ , abundant, fusiform-ellipsoid, very slightly thick-walled, in  $\text{NH}_4\text{OH}$  10% very pale brown, with broad and fairly short pedicel and often with a narrower cylindrical to subcylindrical, often subcapitate thin-walled, colourless, sometimes rather long (7.5–20x4–5  $\mu\text{m}$ ) apical elongation more or less sharply delimited from cell body. Marginal cells: pleurocystidioid cheilocystidia 30–55 x (9–)10–15 (–17.5)  $\mu\text{m}$ , numerous, locally sometimes even densely packed, versiform as to both size and shape; spheropedunculate and clavate cells 17.5–30 x 7.5–12.5 (–15)  $\mu\text{m}$ , numerous, some of the larger cells often slightly thick-walled and pale brown in  $\text{NH}_4\text{OH}$  10% Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr.: hyphae distinctly brown from membranal pigment, with many yellow hyphal septa and very few encrustations. Pileipellis a 2–4 cells deep layer of subglobose, rather thick-walled cells, 15–40  $\mu\text{m}$  diam., very distinctly brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** Caespitose in small fascicles or solitary on coniferous stumps. Aug.-Nov. Very rare in the Netherlands. Reported from France and the British Isles.

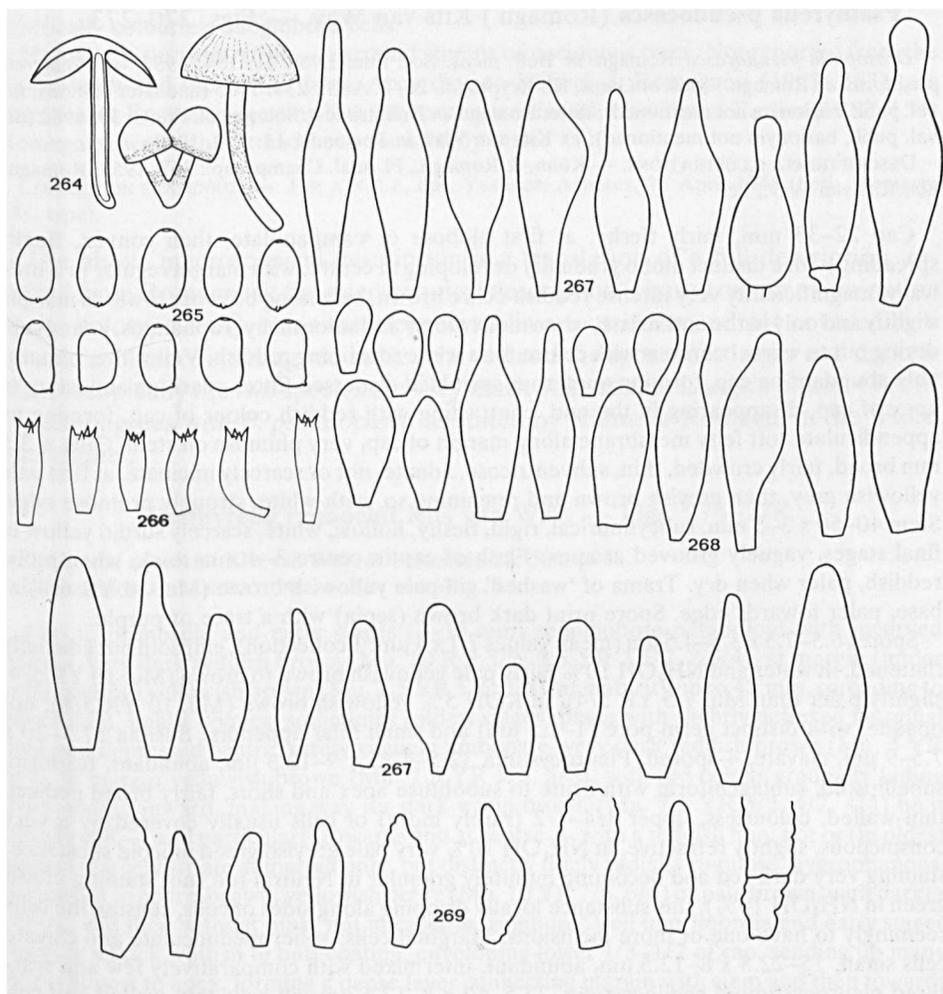
**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S, prov. Gelderland, Renkum, 'Oranje Nassau's Oord', 6 Nov. 1979. — B R I T I S H I S L E S, Scotland, Glamis, without date (type, K). — S W I T Z E R L A N D, Alps (precise locality not recorded), 31 Aug. 1970 (herb. Romagn. 1093).

The above description is based on the Renkum collection. The species was described from the Glamis area in Scotland by Berkeley & Broome (1876: 132) and according to Stevenson (1886: 326) it was found in Glamis again at different places in 1875 and 1877. Reid & Austwick (1963: 294) reported it also from Glamis. Ricken (*Hypholoma pertinax*, 1915: 461) and Kühner & Romagnesi (1953: 365) called it rare, Lange (1939: 78) 'rather rare', Favre (1957: 121) recorded four collections from Switzerland. In the Netherlands until the Renkum find it had never been found before.

Fries's description of *Agaricus pertinax* (1851: 50; 1857: 429; 1874: 297) and his plate 135<sup>2</sup> (1879) agree with *P. chondroderma* except for the absence of the veil and was accordingly ranked by Fries in the subgenus *Psilocybe* ('velum nullum'). As no veilless species is known resembling *A. pertinax*, Dennis, Orton & Hora

(1960: 206) regarded the name as a *nomen dubium*. Kühn. & Romagn. (1953: 365) rightly, however, regarded *Hypholoma pertinax* sensu Rick. (erroneously quoted as *Psilocybe pertinax* sensu Rick.) as identical with *P. chondroderma* (strongly developed veil).

Britzelmayer's (1883: 67) description and plate 310 fig. 110 of *Agaricus (Hypholoma) instratus* Britz. (regarded by Dennis, Orton & Hora 1960: 193 as a doubtful species) correspond rather well with *P. bipellis* (purple cap and gills, but no veil) but because of these colours and absence of a veil not with *P. chondroderma*. *Agaricus (Hypholoma) instratus* as described (1887: 53) and depicted by Cooke (plate 1157/1181), however, fully agrees with *P. chondroderma*, also in the opinion of J. E. Lange (1923: 43). Masee (1892: 384) extended Cooke's description a little and called the species *Hypholoma instratum* (Britz.) Masee. Of



Figs. 264-268. *Psathyrella chondroderma*. — 264. Carpophores ( $\times 0.5$ ). — 265. Spores. — 266. Basidia. — 267. Pleurocystidiogram. — 268. Cheilocystidiogram. — 269. Pleurocystidiogram of type.

*Hypholoma sublentum* P. Karst. the author himself later (1889: 241) stated that this species was the same as *Hypholoma chondrodermum*.

Orton (1960: 374) stated that the type of *P. chondroderma* has no pleurocystidia, but our examination of the type material irrefutably revealed their presence, as in our Renkum collection and the material received from Romagnesi (Kits van Wav., 1982: 477).

As for Smith's recently (1972: 128) described *P. velibrunnescens* (of which he saw no less than 49 collections): it seems best to regard this taxon as an American subspecies of *P. chondroderma* (which is not mentioned by Smith as a species in its own right), growing on rotting wood of frondose trees and having very slightly larger spores (for details see Kits van Waveren, 1982: 477).

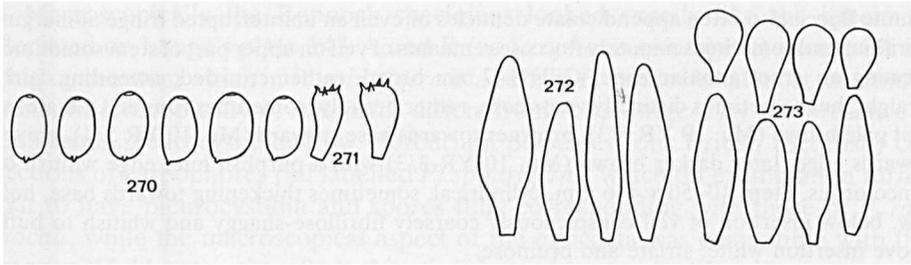
### ***Psathyrella pseudocasca* (Romagn.) Kits van Wav. — Figs. 270–273**

*Drosophila pseudocasca* Romagn. in Bull. mens. Soc. linn. Lyon 21: 154. 1952. — *Psathyrella pseudocasca* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2b, 2. Aufl.: 239. 1955 (and later editions; not val. publ., basionym not mentioned); ditto, Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 39. 1982 (not val. publ., basionym not mentioned); ex Kits van Wav. in Persoonia 11: 500. 1982.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 363. 1953; Romagn., l.c.; Kits van Wav., l.c.

Cap 22–33 mm, fairly fleshy, at first globose or campanulate, then convex, finally spreading with a distinct umbo gradually developing at centre, with margin regular or a little wavy, magnificently very intense reddish ochre brown, becoming browner towards margin, slightly and only in the end striate, when moist glossy and smooth, hygrophanous, young caps drying out to warm ochreous with centre for a while remaining reddish. Veil white, remarkably abundant on cap, forming numerous sprinkled dispersed flocci, reaching almost up to apex of cap, disappearing in the end, contrasting with reddish colour of cap, forming an appendiculate soft felty membrane along margin of cap, very plumose on stem. Gills  $\pm$  3.5 mm broad, fairly crowded, thin, subventricose, adnate, not or scarcely uncinatate, at first pale yellowish grey, then greyish brown and remaining so, with white, strongly pruinose edge. Stem 40–50 x 3–5 mm, subcylindrical, rigid, fleshy, hollow, white, scarcely sordid yellow in final stages, vaguely grooved at apex. Flesh of cap in centre 3–4 mm thick, when moist reddish, paler when dry. Trama of 'washed' gill pale yellowish brown (Mu. 10 YR 6/4) at base, paler towards edge. Spore print dark brown (sepia) with a trace of purple.

Spores 6.5–7.5 x 3.5–4.5  $\mu$ m (mean values 7.1 x 4  $\mu$ m: 1 collection), ellipsoid but adaxially flattened, in water and NH<sub>4</sub>OH 10% fairly pale yellowish brown to brown (Mu. 10 YR 5/4, slightly paler than Mu. 7.5 YR 5/4), in KOH 5% yellowish brown (Mu. 10 YR 5/6), not opaque, with distinct germ pore (1–1.5  $\mu$ m) and small hilar appendix. Basidia 17.5–20 x 7.5–9  $\mu$ m, clavate, 4-spored. Pleurocystidia 32.5–47.5 x 9–12.5  $\mu$ m, abundant, fusiform, subellipsoid, sublageniform with acute to subobtuse apex and short, fairly broad pedicel, thin-walled, colourless, upper 1/4–1/2 (rarely more) of cells usually covered by a very conspicuous, slightly refractive, in NH<sub>4</sub>OH 10% very pale greyish green mucoid substance, staining very dark red and becoming minutely granular in Neutral red (not staining bluish green in NH<sub>4</sub>OH 10%), this substance locally dripping along sides of cells, causing the cells seemingly to have one or more inclusions. Marginal cells: spheropedunculate and clavate cells small, 15–22.5 x 8–12.5  $\mu$ m, abundant, intermixed with comparatively few and scattered pleurocystidioid cheilocystidia, 27.5–40 x 8–12.5  $\mu$ m; all cells thin-walled and colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr.: hyphae very pale yellowish brown,



Figs. 270–273. *Psathyrella pseudocasca*. — 270. Spores. — 271. Basidia. — 272. Pleurocystidiogram. — 273. Cheilocystidiogram.

with few yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of practically colourless subglobose cells.

**HABITAT & DISTRIBUTION.** — Around stumps of deciduous trees. Not reported from the Netherlands and the British Isles. According to Kühner & Romagnesi (1953: 363) 'pas commun' in France, suggesting that the species was found a few times. Earlier (1952: 154) Romagnesi wrote that it had been found only once.

**COLLECTION EXAMINED.** — F R A N C E, dpt. Yvelines, Achères, 23 April 1948 (herb. Romagn. 581, type).

The above macroscopical description is a translation of a full description, received from Romagnesi; the microscopical description is based on our examination of the holotype. In *P. casca* the pleurocystidia are utriform and not covered by a mucoid substance staining red in Neutral red and the spores are larger and darker. Macroscopically the two species are very much alike so that Lange's plate 147 A of *P. casca* agrees with *P. pseudocasca* as stated by Kühn. & Romagn. in the 'Flore analytique'.

### ***Psathyrella rannochii* Kits van Wav. — Figs. 274–278.**

*Psathyrella rannochii* Kits van Wav. in *Persoonia* 11: 501. 1982.

**DESCRIPTION & ILLUSTRATIONS.** — Kits van Wav., l.c.

Cap in primordia and early stages (4–13 mm) semiglobose-paraboloid with incurved margin, very dark reddish brown (Mu. 10 R 2.5/2; 2.5 YR 2.5/2, 2.5/4), at margin (under velar coating) yellowish brown (Mu. 7.5 YR 5/6, 5/8), at maturity up to 45 mm, spreading to paraboloid, finally convex, sometimes (oldest stages) plane with slightly deflexed marginal area and depressed centre, rarely vaguely umbonate, very dark reddish brown (Mu. 5 YR 3/4), at margin yellowish brown (Mu. 7.5 YR 5/6, 5/8), with red colour gradually fading from margin inward, making way for dark warm brown (Mu. 7.5 YR 3/2, 4/2, 4/4) be it usually still — and particularly towards and at centre — with a reddish hue; not or (in oldest stages) scarcely striate at margin only, but distinctly finely radially rugulose, hygrophanous, drying out to ochre-brown, yellowish ochre (Mu. 10 YR 7/6, 6/6) or pale brown, with darker centre, and then without pink, not micaceous, rugulose. Veil in primordia and early stages forming a thick whitish to buff coating, enveloping lower 1/3–1/2 of cap, sending up many fibrils almost to apex, forming a dense layer connecting margin with stem and then towards base passing into a fibrillose-shaggy layer, at maturity forming on cap a rather dense network, denser towards margin, of radially arranged fibrils, bundles of fibrils and often

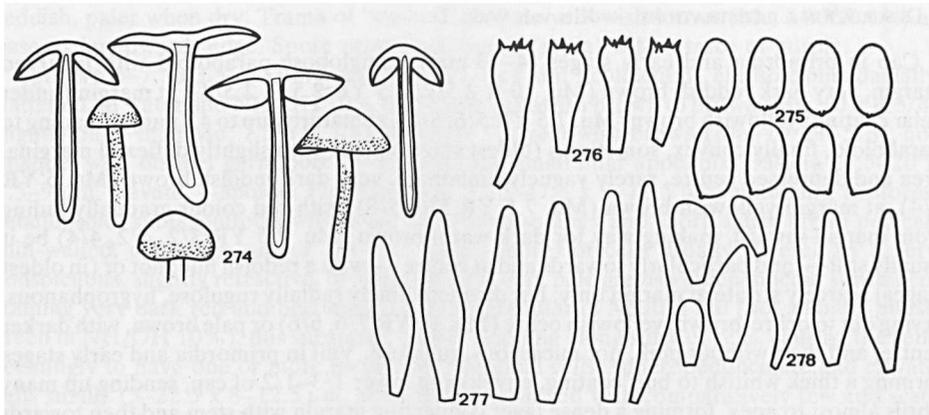
minute flocci, also often appendiculate denticles or even an uninterrupted fringe at margin; fibrillous and sometimes minutely floccose remnants of veil on upper part of stem sometimes forming an erect annular zone. Gills 4–7 mm broad, rather crowded, ascending fairly straight, but sometimes distinctly ventricose, rather broadly, sometimes rounded adnate, at first pale brown (Mu. 10 YR 6/3), browner towards base (towards Mu. 10 YR 5/4), greyer towards edge, later darker brown (Mu. 10 YR 3/3) with a purplish hue; edge whitish or concolorous. Stem 40–50 x 4–6 mm, cylindrical, sometimes thickening towards base, hollow, below insertion of veil conspicuously coarsely fibrillose-shaggy and whitish to buff, above insertion white, striate and pruinose.

Flesh of cap 2–3 mm thick in centre, dark reddish brown (Mu. 5 YR 4/2) or dark brown (Mu. 7.5 YR 3/2, 4/2; 10 YR 5/4), of stem pale brown. Smell and taste indistinctive. Trama of 'washed' gill distinctly yellowish brown from base to edge, at base (Mu. 10 YR 5/4), for the rest only slightly paler (Mu. 10 YR 6/4). Spore print dark brown with a purplish hue.

Spores 6.5–8 x 4–4.5  $\mu$ m (mean values 6.8–7.2 x 4.2–4.4  $\mu$ m; 2 collections) in face view ellipsoid to ovoid, in profile ellipsoid and adaxially flattened, in water warm brown (Mu. 5 YR 4/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/3), in KOH 5% sordid brown (Mu. 10 YR 4/3), not opaque, with indistinct germ pore (callus) and small hilar appendix. Basidia 26–35 x 7.5–9  $\mu$ m, clavate, 4-spored. Pleurocystidia (32.5–)35–55(–60) x 8–12.5  $\mu$ m, numerous, rather narrowly fusoid to sublageniform, pedicellate, with acute to subacute apex, thin-walled, distinctly very pale brown in NH<sub>4</sub>OH 10%. Marginal cells: pleurocystidioid cheilocystidia, (25–)27.5–45(–50) x 7.5–10(–12)  $\mu$ m, abundant, intermixed with very few spheropedunculate cells, 15–20 x 7.5–8  $\mu$ m and some basidia; all cells thin-walled. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. distinctly brown-yellow, without yellow hyphal septa or encrustations. Pileipellis a 2–3 cells deep layer of colourless subglobose cells, 25–50  $\mu$ m diam.

**HABITAT & DISTRIBUTION.** — Solitary or subgregarious, terrestrial, usually on or near sawdust in areas with conifers. Known for certain only from type locality in Scotland (see observations). Not reported from the Netherlands or France, found in Norway (Weholt).

**COLLECTIONS EXAMINED.** — BRITISH ISLES, Scotland: Perthshire, Kinloch Rannoch, near sawdust area close to Rannoch School, 30 Aug. 1965 (type) and 31 Aug. 1970; Wester Ross, Loch Maree, on sawdust, 12 Sept. 1963.



Figs. 274–278. *Psathyrella rannochii*. — 274. Carpophores (x 0.5). — 275. Spores. — 276. Basidia. — 277. Pleurocystidiogram. — 278. Cheilocystidiogram.

Macroscopically the Rannoch specimens looked exactly like the specimens depicted on Lange's plate 143 A and B (as *Stropharia spintrigera*) except for the ring on the stem which in *P. spintrigera* is a cuff, in *P. rannochii* at most an annular zone. Microscopically *P. rannochii* differs from *P. spintrigera* by the presence of numerous pleurocystidia. Kew Herbarium possesses four British (Scottish) collections of carpophores (all labelled *P. spintrigera*), which on examination turned out to have pleurocystidia and spores fully corresponding with those of *P. rannochii*, while the macroscopical aspect of the exsiccata was compatible with that species. Field notes virtually lacking it is hazardous to identify with certainty the specimens of these collections as *P. rannochii*, which they, however, probably are: (i) Rannoch, 4 Sept. 1963 (no notes but found at same site as our 1965 and 1970 collections); (ii) Invernessshire, Aviemore, 31 Aug. 1953 (sole notes: 'pileus dark brown, appendiculate with veil'); (iii) Sutherland, Borgie Bridge, 13 Sept. 1954 (no notes); (iv) Dipton (sole note: 'on saw dust').

### *Psathyrella obtusata* (Pers.: Fr.) A. H. Smith

*Agaricus obtusatus* Pers., Syn. Meth. Fung.: 428. 1801. — *Agaricus obtusatus* Pers.: Fr., Syst. mycol. 1: 293. 1821. — *Psilocybe obtusata* (Pers.: Fr.) Kumm., Führ. Pilzk.: 71. 1871. — *Psathyra obtusata* (Pers.: Fr.) Gillet, Hyménomycetes: 591. 1874. — *Drosophila obtusata* (Pers.: Fr.) Quél., Fl. mycol.: 59. 1888. — *Psathyrella obtusata* (Pers.: Fr.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 55. 1941. — *Psathyra spadiceo-grisea* var. *obtusata* (Pers.: Fr.) Quél., Enchir. Fung.: 117. 1886.

? *Psathyra rufescens* Petch in Ann. R. bot. Gdns Peradeniya 9: 126. 1924.

EXCLUDED. — *Psathyra obtusata* sensu Rick., Blätterp.: 261. 1913 (= *Psathyrella* spec.). — *Drosophila obtusata* sensu Romagn. in Rev. Mycol. 2: 246. 1937 (= *Psathyrella* spec.).

#### var. *obtusata* — Figs. 279–283

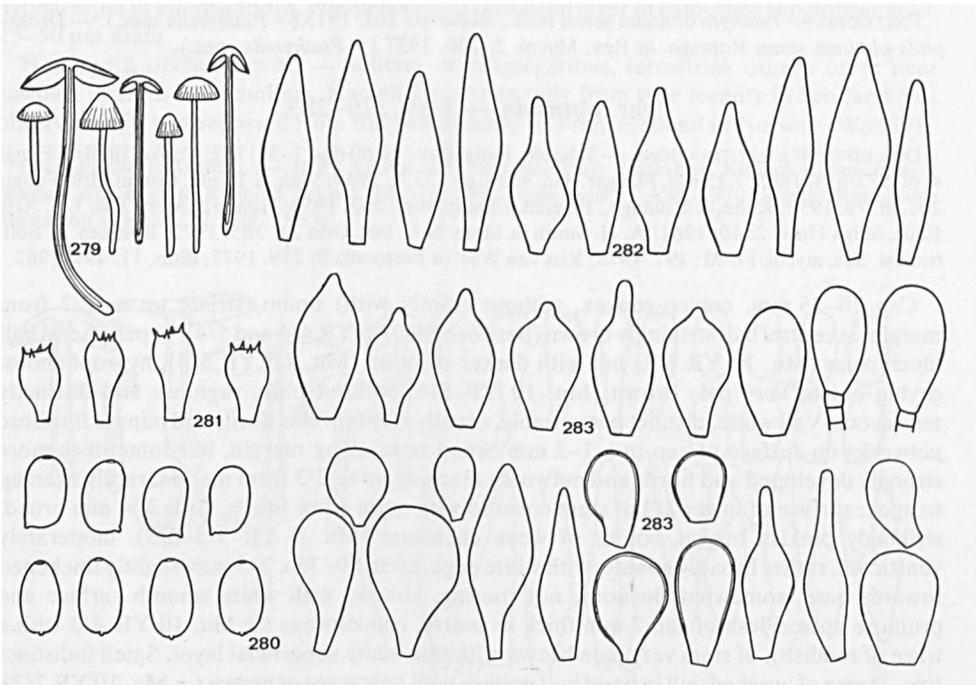
DESCRIPTIONS & ILLUSTRATIONS. — Schaeff., Fung. Bav.: pl. 60 figs. 1–3. 1762; Cooke, Ill. Brit. Fungi 4: pl. 573/615. 1885; J. Lange, Fl. agar. dan. 4: 98, pl. 152 A. 1939; Wak. & Denn., Comm. Brit. Fungi: 201, pl. 79. 1950; Kühn. & Romagn., Fl. anal. Champ. sup.: 363. 1953; Hongo in Mem. Fac. Lib. Arts Educ. Shiga Univ. 2: 40. 1961; A. H. Smith in Mem. N.Y. bot. Gdn 24: 385. 1972; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 197. 1975; Kits van Wav. in Persoonia 9: 299. 1977; ditto, 11: 499. 1982.

Cap 20–25 mm, conico-convex, without (rarely with) umbo, striate up to 2/3 from margin, at central half strikingly brown (between Mu. 7.5 YR 4/4 and 5/4), at peripheral half much paler (Mu. 10 YR 6/4) but with darker striation (Mu. 7.5 YR 5/4), hygrophanous, drying out to very pale brown (Mu. 10 YR 8/4) without pink, rugulose and distinctly micaceous. Veil white, distinct but variable, usually scanty; velar fibrils and minute fibrillose networks on surface of cap in a 1–2 mm broad zone along margin, but sometimes more strongly developed and fibrils and networks reaching up to 2/3 from margin, rarely even up to apex; surface of lower 2/3 of stem covered with quite a few fibrils. Gills 3–4 mm broad, strikingly pinkish brown, colour of weak chocolate (Mu. 5 YR 5/3–6/3), moderately ventricose, rather broadly adnate, with white edge. Stem 60–75 x 2–3 mm, slightly thickened towards base, somewhat flexuous, not rooting, hollow, with white smooth surface and pruinose apex. Flesh of cap 2 mm thick in centre, concolorous ( $\pm$  Mu. 10 YR 4/3 with a trace of reddish), of stem very pale brown with thin white superficial layer. Smell indistinctive. Trama of 'washed' gill in basal half greyish with only trace of brown ( $\pm$  Mu. 10 YR 7/2), brown (Mu. 10 YR 5/3) only in very narrow strip at very base, in peripheral half almost concolorous. Spore print brown with a purplish hue.

Spores 7–8 x 4.5–5.5  $\mu\text{m}$  (mean values 7–7.9 x 4.5–5  $\mu\text{m}$ : 7 collections), in face view ellipsoid or ellipsoid-ovoid, in profile ellipsoid adaxially flattened, often subphaseoliform, sometimes even distinctly phaseoliform, in water and  $\text{NH}_4\text{OH}$  10% pale yellowish brown (Mu. 7.5 YR 5/6, 5/8; YR 5/6, 5/8) usually with a trace of reddish, in KOH 5% greyish brown (Mu. 10 YR 5/3), not opaque, with small and rather indistinct germ pore and small hilar appendix. Basidia 17.5–22 x (9–)10  $\mu\text{m}$ , spheropedunculate to clavate, 4-spored. Pleurocystidia 35–50 x 9–15  $\mu\text{m}$ , abundant, fusiform with short and fairly broad pedicel and subacute to subobtuse apex, thin-walled, very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: spheropedunculate and clavate cells often large, 20–35 x 10–20  $\mu\text{m}$ , abundant and very densely packed, a few with thickened walls, intermixed with rather few to very few pleurocystidioid cheilocystidia or spheropedunculate cells equipped at their apex with a (fairly) short subcylindrical neck, 30–45 x 12.5–17  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brown from membranous pigment in basal half (very faintly brown in peripheral half) with a fair number of yellowish hyphal septa and very few small encrustations. Pileipellis a 2–4 cells deep layer of globose and subglobose cells, 24–48  $\mu\text{m}$  diam., very pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Solitary, terrestrial in deciduous woods. Sept.-Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Overijssel, Denekamp, estate 'Singraven', 17 and 20 Oct. 1962, 15 Oct. 1967; prov. Noord-Holland, estate 'Elswout', 21 Oct. 1975; prov. Limburg, Wittem, 2 Oct. 1964 (2 collections). — **BRITISH ISLES,** Oxford, estate 'Wychwood Forest', 13 Sept. 1969.



Figs. 279–283. *Psathyrella obtusata* var. *obtusata*. — 279. Carpophores (x 0.5). — 280. Spores. — 281. Basidia. — 282. Pleurocystidiogram. — 283. Cheilocystidiogram.

The three most recent and full descriptions of *P. obtusata*, published before our description of 1977, are those by Lange (1939: 98, pl. 152 A), A. H. Smith (1972: 385) and Romagnesi (1975: 197). All three authors referred the species to Fries's descriptions of *Agaricus obtusatus*, although Fries emphasized the absence of a veil. As, however, the veil in *P. obtusata* of recent authors is rudimentary and very evanescent, this should not stand in the way of regarding Fries's *A. obtusatus* as conspecific with *Psathyrella obtusata* as described by Lange, Smith, Romagnesi and us (for details see Kits van Waveren, 1977: 299). In these four descriptions there are, however, discrepancies.

On restudying Smith's descriptions of 1941 and 1972, we have come to the conclusion, contrary to what we wrote in our 1977 paper, that in both descriptions Smith must have had the same species in mind. This is in spite of the fact that in 1941 he called the spores 6–7 x 3.5–4  $\mu\text{m}$  and the colour of the gills 'drab grey' — for Romagnesi (1975: 197) reason to believe that Smith's interpretation was different from the European species — while in 1972 he called the spores 7–9 x 4–4.5  $\mu\text{m}$  and the gills 'pallid brownish, becoming dark reddish brown to purplish brown'. The other elements in Smith's 1941 description of his (then sole) collection of 1939, however, as Smith rightly stated 'agreed remarkably veil with Lange's account of *P. obtusata*' (except for the veil, which is not mentioned in Lange's description, but see above).

Lange (1939: 98, pl. 152 A) gave an excellent description and plate of the species, calling the spores small (7.2–7.7 x 4.7  $\mu\text{m}$ ) and giving a very clear description of the characteristic pattern of the cellular lining of the gill edge, which fully agrees with the pattern in the specimens of our own collections of this species. Romagnesi (1975: 197 and 1953: 363) adopted Lange's interpretation of *P. obtusata*, but gave — as Smith in 1972 (not in 1941) — larger sizes for the spores: 7.7–10 x 4.7–5.7  $\mu\text{m}$ . The lengths reported by the few other authors who gave spores sizes all go up to 9  $\mu\text{m}$  (mean values were never given). We also adopted Lange's interpretation of *P. obtusata*, taking as chief criteria for the diagnosis: (i) gill edge set with large quantities of often large spheropedunculate and clavate cells, intermixed with only few pleurocystidioid cheilocystidia or spheropedunculate cells, equipped with a short subcylindrical neck; (ii) small spores, 7–8 x 4.5–5.5  $\mu\text{m}$ ; (iii) overall brown colour of cap and gills.

Five of the collections mentioned above, did not strictly answer one of the criteria set for the species of section *Hydrophilae*, i.e. mean length of spores not exceeding 7.5  $\mu\text{m}$ , in that the mean length was 7.6–7.9. Both macro- and microscopically the specimens of these collections, however, typically belong to the species of section *Hydrophilae* because of their strikingly brown cap and gills, their pale spores, their pale brown pleurocystidia and cells of the pileipellis, and their distinctly pigmented hymenophoral trama. Moreover they fully agreed with *P. obtusata* as described above. In our key to the sections of *Psathyrella* we have allowed for the deviating spore-size of *P. obtusata*. In our collection of *P. obtusata* var. *utriformis*, the mean length of the spores is 7.8  $\mu\text{m}$ .

*Psathyra obtusata* as described by Ricken (1913: 261) has the same macroscopical characters as described above, but ellipsoid non-phaseoliform spo-

res and the pattern of the cellular lining of the gill edge is quite different. *Psathyrella obtusata* as described by Einhellinger (1969: 101) also must be a different species as the author described the pleurocystidia as lageniform-capitate and scattered, the cheilocystidia as clavate (size and number not mentioned) and the spores as measuring 8.5–11 x 5–5.5  $\mu\text{m}$ .

var. **utriformis** Kits van Wav. — Fig. 284

*Psathyrella obtusata* var. *utriformis* Kits van Wav. in *Persoonia* 11: 499. 1982

DESCRIPTIONS . — Kits van Wav., l.c.

This variety differs from the type by its pleurocystidia and pleurocystidioid cheilocystidia being utriform, the former (as in the type) abundant, the latter very scarce.

COLLECTION EXAMINED. — T H E N E T H E R L A N D S: prov. Overijssel, Denekamp, estate 'Singraven, 15 Oct. 1967.

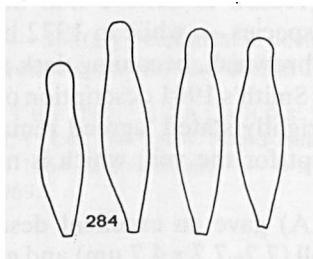


Fig. 284. *Psathyrella obtusata* var. *utriformis*. — Pleurocystidiogram of Denekamp collection.

Section **Spadiceogriseae** Kits van Wav.

*Stropharia* sect. *Psathyroides*<sup>1</sup> J. Lange in *Dansk bot. Ark.* 4(4): 31. 1923. — Type: *Stropharia psathyroides* J. Lange (= *Psathyrella sphagnicola* (Maire) J. Favre).

*Psathyrella* sect. *Fatuae* Romagn. in *Bull. trimest. Soc. mycol. Fr.* 98: 10. 1982 (illegitimate, later homonym of *P.* sect. *Fatuae* (Romagn.) ex Sing., 1962, with *P. pygmaea* as type). — Type: *Psathyrella spadiogrisea* (Fr.) Maire.

*Psathyrella* sect. *Spadiceogriseae* Kits van Wav. on p. 280 of the present work. 1985. — Type: *Psathyrella spadiceogrisea* (Fr.) Maire.

Pleurocystidia and pleurocystidioid cheilocystidia utriform, thin-walled, not muricate; average length of spores 7.6  $\mu\text{m}$  or more; veil present and not consisting of sphaerocytes; surface of cap not innate fibrillose-squamose.

Subsection **Lutenses** Kits van Wav.

*Psathyrella* subsect. *Lutenses* Kits van Wav. on p. 280 of the present work. 1985. — Type: *Psathyrella lutensis* (Romagn.) Bon.

<sup>1</sup> J. Lange introduced the sectional epithet *Psathyroides* twice, viz. once in *Hypholoma* (type: *Psathyrella maculata*) and once in *Stropharia* (type: *Psathyrella sphagnicola*). The former is the basionym of *Psathyrella* subgen. *Psathyroides* (J. Lange) A. H. Smith and therefore the latter cannot be transferred to *Psathyrella* on sectional level, because the I.C.B.N. (art. 64.3) does not allow two subdivisions of one genus with identical epithets based on different types, even when these subdivisions have different rank.

Gill edge lined with spheropedunculate and clavate cells (not necessarily large) and many to numerous utriform cheilocystidia.

## KEY TO THE SPECIES OF SUBSECTION LUTENSES

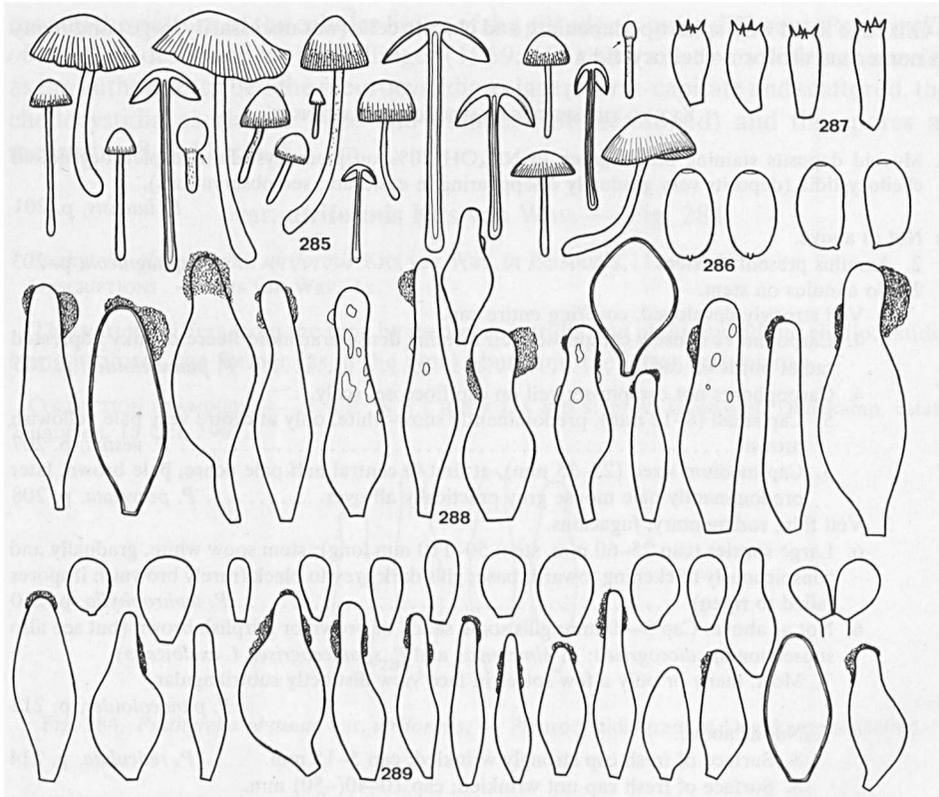
1. Mucoïd deposits staining bluish green in NH<sub>4</sub>OH 10% on pleurocystidia and pleurocystidioid cheilocystidia (deposits very gradually disappearing in exsiccata; see observations).  
*P. lutensis*, p. 201
1. Not as above.
  2. Annulus present on stem ..... *P. sphagnicola* p. 203
  2. No annulus on stem.
    3. Veil strongly developed, covering entire cap.
      4. Carpophores densely caespitose; veil forming dense arachnoid fleece of silky adpressed radial fibrils on cap ..... *P. pannucioïdes*, p. 205
      4. Carpophores not caespitose; veil on cap floccose, scaly.
        5. Cap small (8–12 mm), predominantly snow-white, only at centre very pale yellowish brown ..... *P. vestita*, p. 207
        5. Cap medium sized (25–35 mm), at first in central half pale ochre, pale brown, later predominantly pale mouse grey practically all over ..... *P. pervelata*, p. 208
    3. Veil thin, rudimentary, fugacious.
      6. Large species (cap 25–60 mm, stem 50–110 mm long); stem snow white, gradually and conspicuously thickening towards base; gills dark grey to black (rarely brownish if spores failed to ripen) ..... *P. tephrophylla*, p. 210
      6. Not as above. Cap 5–40 mm; gills some shade of brown or purplish brown (but see also subsection *Spadiceogrisea*: *P. almerensis* and *P. spadiceogrisea* f. *exalbicans*).
        7. Most, many or only a few spores in face view distinctly subtriangular  
*P. panaeoloides*, p. 212
    7. Not as above.
      8. Surface of fresh cap strongly wrinkled; cap 5–15 mm. .... *P. reticulata*, p. 214
      8. Surface of fresh cap not wrinkled; cap 10–40(–50) mm.
        9. Stems relatively short (15–55 mm) as compared with diam. of cap (10–40 mm); in marshy areas, muddy borders of ponds with thick bed of decaying leaves, boggy beds of ditches ..... *P. noli-tangere*, p. 215
        9. Stems relatively tall (50–90 mm) as compared with diam. of cap (15–50 mm); terrestrial or attached to pieces of wood in beech-woods ... *P. fusca*, p. 218

***Psathyrella lutensis* (Romagn.) Bon — Figs. 285–289**

*Drosophila lutensis* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952 — *Psathyrella lutensis* (Romagn.), Mos. in Gams, Kl. Kryptog. fl., 2b, 2. Aufl.: 241. 1955 (and later editions; not val. publ., basionym not mentioned); ex Bon in Docum. mycol. 12 (48): 52. 1982.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 191. 1975.

Cap in primordial stages (5–7 mm) subglobose, dark reddish brown (Mu. 2.5 YR 3/4; 5 YR 3/3, 3/4), not striate, in young stages (9–15 mm) paraboloid or conico-paraboloid, dark reddish brown (Mu. 2.5 YR 4/2; 5 YR 4/2, 3/4) to warm brown (Mu. 5 YR 4/4, 4/6, 4/8), at margin yellowish brown (Mu. 7.5 YR 5/6; 10 YR 6/6), substriate, at maturity 10–30(–40) mm, conical, conico-paraboloid or semi-globose, spreading to convex, sometimes with wavy or coarsely sulcate marginal area, via yellowish brown (Mu. 10 YR 4/4, 5/4, 5/6) finally to sordid dark brown or greyish brown (Mu. 7.5 YR 3/2) or still reddish brown (Mu. 5 YR 3/4, 4/6), striate up to 1/2 to 2/3 from margin, hygrophanous, drying out to very pale brown (Mu. 10 YR 6/3, 6/4, 7/3, 7/4, 8/3) or alutaceous, at centre darker (Mu. 10 YR 6/6, 7/6, 8/6),



Figs. 285–289. *Psathyrella lutensis*. — 285. Carpophores (x 0.5). — 286. Spores. — 287. Basidia. — 288. Pleurocystidiogram. — 289. Cheilocystidiogram.

slightly micaceous, rugulose, without pink. Veil fairly strongly developed but fugacious, in primordia covering entire stem and connecting it with margin of cap, running up to 2/3 from margin or even up to apex, in young stages covering only lower half of cap with fibrils and fascicles of fibrils, often appendiculate from margin, at maturity leaving many fibrils and groups of fibrils, sometimes even small flocci along margin, or appendiculate, sometimes (early stages) forming lanose-fibrillose remnants on stem. Gills at first conspicuously brown (Mu. 7.5 YR 5/4, 6/4; 10 YR 7/4) or in places with purplish hue (Mu. 5 YR 4/2), at maturity 2–4(–6) mm broad, ventricose, broadly adnate, dark reddish brown (Mu. 5 YR 3/2, 2.5/2), dark tobacco colour (Mu. 7.5 YR 4/2, 3/2), or greyish brown (Mu. 10 YR 4/3, 5/2, 5/3, 5/4, 6/2) with purplish hue, with white or whitish, pruinose edge. Stem 25–65 x 1.5–3.5(5) mm, cylindrical or slightly thickening towards base, hollow, with pruinose apex and thickened base (up to 5–9 mm), with white, longitudinally striate, thin, superficial not compact layer, consisting of slightly disjointed white fibrils, easily detersile, exposing between them pale brown flesh of stem, rendering it in its lower part and at base isabelline or sordid pale brown, often with a reddish hue. Flesh of cap in centre 1–2.5 mm thick, brown (Mu. 10 YR 3/3, 4/3) or in fresh or young caps with a reddish hue or even dark reddish brown (Mu. 5 YR 3/4), of stem paler brown (Mu. 10 YR 6/3, 5/3, 5/4), in base brown (Mu. 10 YR 4/3). Trama of ‘washed’ gill distinctly, be it pale, yellowish brown (Mu. 10 YR 6/4, 6/3), paler and greyer towards edge. Spore print purplish black.

Spores (8.5–)9–10(–11) x 4.5–5.5  $\mu\text{m}$  (mean values 9.2–10 x 5–5.4  $\mu\text{m}$ : 10 collections), ellipsoid, adaxially flattened, sub-opaque, fairly dark, in water warm brown (Mu. 5 YR 4/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/4), in  $\text{KOH}$  5% dark sordid brown (Mu. 10 YR 3/3–3/4), with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 17.5–25 x 8–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia (30–)45–70(–80) x 10–20(–25)  $\mu\text{m}$ , usually few in number, sometimes moderately numerous, chiefly utriform some with cylindrical broad neck and then often subcapitate, but versiform from one collection to another, thin-walled (rarely very slightly thick-walled), colourless, at and around apex usually covered with mucoid droplets or granular deposits, very variable in number and size (sometimes up to 10–25  $\mu\text{m}$ !) and shape, staining bluish green in  $\text{NH}_4\text{OH}$  10% when (still fairly) fresh. Marginal cells: pleurocystidioid cheilocystidia 25–50(–65) x 7.5–17.5(–20)  $\mu\text{m}$ , numerous, versiform as to shape and size, chiefly utriform, with numerous mucoid deposits staining bluish green in  $\text{NH}_4\text{OH}$  10% at apices of the cells; intermixed with fairly few to numerous spheropedunculate and clavate cells, 10–22.5(–27.5) x 7.5–12.5  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly yellowish brown, with very few yellowish hyphal septa, without encrustations. Pileipellis a 2–4 cells deep layer of subglobose colourless cells, 15–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial, roadsides in deciduous woods, in muddy cart tracks, saw dust areas, solitary or more usually gregarious, sometimes in large numbers. Aug.-Oct. Not uncommon in the Netherlands. Reported from France and from two places in the British Isles (see collections examined).

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Overijssel: Denekamp, estate 'Singraven', 14 Oct. 1961; Denekamp, estate 'De Borg', 11 & 15 Oct. 1961; Tilgte, 21 Oct. 1967; Delden, estate 'Twickel', 17 Oct. 1970 (2 collections) & 19 Oct. 1970. — **BRITISH ISLES:** Wales, Powys, Cuddy near Lake Vyrnwy, 4 Sept. 1969 & 13 Sept. 1976; Scotland, Loch Garven, 9 Sept. 1963.

Romagnesi stated (in litt., 1980) that the presence of deposits on the cystidia is not a constant character and that in their absence he identifies the species on the 'concordance of all characters', particularly the satiny-flexuous stem and the white, satiny, fibrillose superficial layer covering the pale reddish brown actual surface of the stem (as described above). In those cases and also in exsiccata in which these macroscopical characters are no more perceptible while also the deposits in 2–3 years time (sometimes longer) very gradually disappear, in our experience the cellular lining of the gill edge may serve as a useful and reliable character to go by in attempts to identify this species: numerous fairly small pleurocystidioid cheilocystidia, in the main utriform but very versiform as to shape and size, intermixed with variable numbers of spheropedunculate and clavate cells. If thoroughly searched for (several gills may be needed) often, however, in old exsiccata a few bluish green deposits may still be found.

### *Psathyrella sphagnicola* (Maire) J. Favre

Figs. 290–294

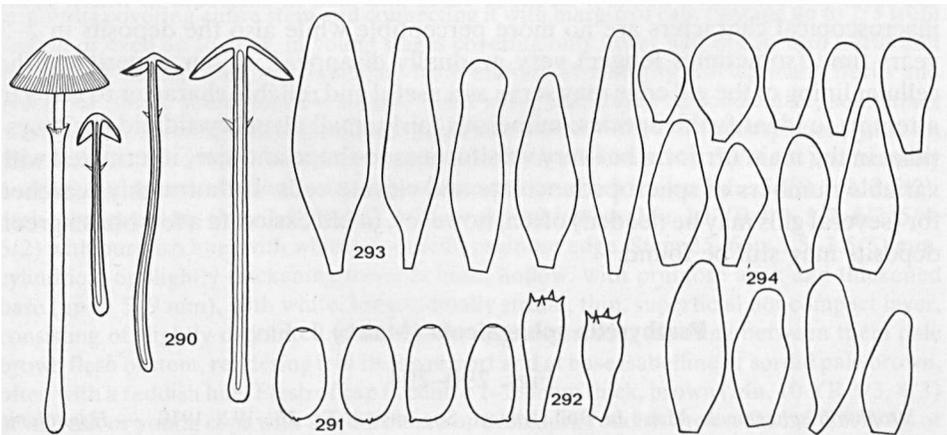
*Stropharia sphagnicola* Maire in Bull. trimest. Soc. mycol. Fr. 26: 192. 1910. — *Hypholoma sphagnicola* (Maire) Konr. & Maubl., Ic. sel. Fung. 6: 88. 1928. — *Psathyrella sphagnicola* (Maire) J. Favre in Bull. trimest. Soc. mycol. Fr. 53: 282. 1937. — *Drosophila sphagnicola* (Maire) Kühn. & Romagn., Fl. anal. Champ. sup.: 361. 1953 (not val. publ., basionym not mentioned).

*Stropharia psathyroides* J. Lange in Dansk bot. Ark. 4: 36. 1972.

DESCRIPTIONS & ILLUSTRATIONS. — J. Favre, l.c.; Kühn. & Romagn., l.c.; J. Lange, Fl. agar. dan. 4: 71, pl. 144 A. 1939 (as *Stropharia psathyroides*); A. H. Smith in Mem. N.Y. bot. Gdn 24: 66. 1972.

Cap 10–30 mm, conical to conico-paraboloid, without umbo, strongly striate up to 3/4 from margin, at centre dark brown (Mu. 10 YR 3/3, 4/3, 4/4) or brown with a reddish hue (Mu. 5 YR 3/3, 3/4, 5/3, 4/3), in mid portion warm brown (Mu. 7.5 YR 4/4, 5/4; 10 YR 4/4), in marginal area slightly paler (Mu. 10 YR 5/4), hygrophane, drying out to pale brown (Mu. 10 YR 7/4, 7/3), at centre brownish yellow (Mu. 10 YR 7/6; 7.5 YR 5/8) without pink, sometimes micaceous, not or slightly rugulose. Veil white, forming an annulus on stem and fugacious, small, scattered fibrils or fascicles of fibrils near margin of cap and on lower 2/3 of stem. Gills 2.5–4 mm broad, ascending, straight or slightly to distinctly ventricose, sometimes protruding below margin of cap, broadly adnate, at first pale brown (Mu. 10 YR 6/4), later at base brown (Mu. 7.5 YR 4/4; 10 YR 4/4, 5/6) towards edge greyish brown to greyish (Mu. 10 YR 5/2); edge white, fimbriate. Stem 40–95 x 1.5–3 (apex) to 3–4 (base) mm, very gradually thickening towards sometimes slightly thickened (4–5 mm) base, hollow, white above and pale brown (Mu. 10 YR 6/4, 7/3, 8/3) below cuff, very finely longitudinally striate, pruinose at apex, at about 1/3–1/4 of its length from apex equipped with a conspicuous flaring and either (often) upright, horizontal, or drooping membranous cuff-like annulus, its upper surface striate-sulcate, in older specimens often obliterating to an (adpressed) annular zone. Flesh of cap in centre 1.5–2.5 mm thick, dark brown (Mu. 10 YR 3/4, 4/4), of stem very pale yellowish brown (Mu. 10 YR 7/3) or whitish. Trama of 'washed' gill distinctly pigmented, in basal half yellowish brown (Mu. 10 YR 6/4), in peripheral half very pale brown (Mu. 10 YR 7/2). Spore print purplish black.

Spores 8–10 x 4.5–5.5(–6)  $\mu\text{m}$  (mean values 8.6–9.6 x 4.6–5.4  $\mu\text{m}$ : 4 collections), ellipsoid, adaxially flattened, very few spores subphaseoliform, in water warm brown with reddish hue, orange-brown (Mu. 5 YR 4/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/4), in KOH 5% sordid brown (Mu. 10 YR 4/3), not opaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 19–30.5 x 9.5–11  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 45–67.5 x 12.5–17.5  $\mu\text{m}$ , moderately numerous to abundant, utriform or ventricose-fusoid with very obtuse to obtuse apex, fairly short pedicel and very slightly thickened cell wall, very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: Pleurocystidioid cheilocystidia 27.5–50 x



Figs. 290–294. *Psathyrella sphagnicola*. — 290. Carpophores (x 0.5). — 291. Spores. — 292. Basidia. — 293. Pleurocystidiogram. — 294. Cheilocystidiogram.

10–17.5  $\mu\text{m}$ , moderately numerous to numerous, intermixed with numerous spheropedunculate and clavate cells, 15–25 x 10–17.5  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pale brown, particularly in basal half, with few yellow hyphal septa, without encrustations. Pileipellis a 2–4 cells deep layer of subglobose cells, 25–50  $\mu\text{m}$  diam., practically colourless in  $\text{NH}_4\text{OH}$  10% .

HABITAT & DISTRIBUTION. — In *Sphagnum*, but also found in very wet and tall other mosses, solitary. Sept. Not recorded from the Netherlands. Rare in France and the British Isles.

COLLECTIONS EXAMINED. — BRITISH ISLES: Scotland, Braemar, Mar estate, along road to Linn of Dee, 3 Sept. 1961; Strathpeffer, Loch Contin, 8 Sept. 1963; Loch Rannoch, 8 Sept. 1966; Wales, Lake Vyrnwy, 13 Sept. 1977.

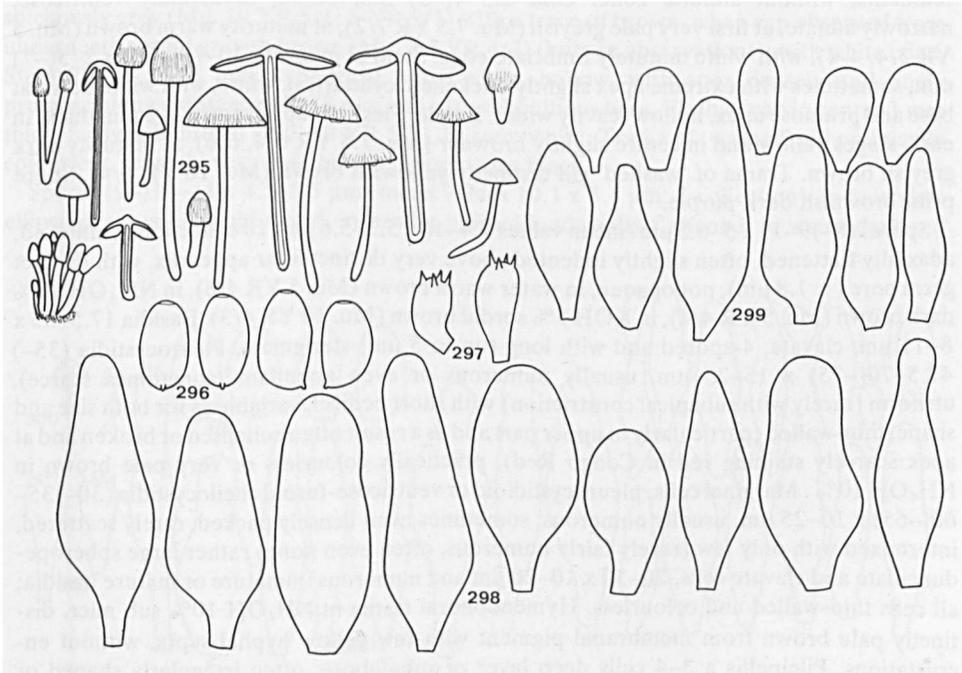
In rare cases the annulus is absent and finds itself as conspicuous appending denticles along margin of cap.

***Psathyrella pannucioides* (J. Lange) Mos. — Figs. 295–299**

*Hypholoma pannucioides* J. Lange, Fl. agar. dan. 5: iv, 104, pl. 200 H. 1940. — *Drosophila pannucioides* (J. Lange) Kühn. & Romagn., Fl. anal. Champ. sup.: 362. 1953 (not val. publ., basionym not mentioned). *Psathyrella pannucioides* (J. Lange) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 220. 1967.

EXCLUDED. — *Psathyrella pannucioides* sensu A. H. Smith in Mem. N.Y. bot. Gdn 24: 131. 1972 (= differing American species).

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, l.c.; Kühn. & Romagn., l.c.



Figs. 295–299. *Psathyrella pannucioides*. — 295. Carpophores (x 0.5). — 296. Spores. — 297. Basidia. — 298. Pleurocystidiogram. — 299. Cheilocystidiogram.

Cap in primordia and very early stages 2–4 mm broad and 3–8 mm high, ellipsoid or paraboloid with incurved margin adpressed against stem, in the main conspicuously pale yellowish brown, at apex ochreous brown (Mu. 7.5 YR 6/6), towards margin paler and yellower (Mu. 10 YR 6/6, 7/6), in marginal area pale yellow (Mu. 10 YR 8/4), in slightly older stages (6–12 mm broad, 7–12 mm high) expanding to conical or conico-paraboloid with deflexed and slightly incurved marginal zone, browner, at apex pale ochreous, yellowish or reddish brown (Mu. 10 YR 5/4; 7.5 YR 6/4; 5 YR 5/3), towards margin paler or yellower (Mu. 10 YR 6/6), at maturity 15–35(–50) mm spreading to conical, conico-convex and convex, rarely with revolute marginal zone, often with distinct obtuse umbo, moderately dark reddish brown (Mu. 5 YR 5/4, 4/4), darkest at centre, paler (Mu. 7.5 YR 6/4) and greyer towards margin, sometimes sordid brown (Mu. 10 YR 4/3, 5/4) not or only finely or indistinctly striate at margin but sometimes up to half way from margin, hygrophanous, rapidly drying out from centre, rendering centre smooth, greasy and pale ochreous, butter-coloured (Mu. 7.5 YR 7/6; 10 YR 7/6), in the beginning contrasting with still pale reddish brown area elsewhere, in the end alutaceous or very pale brown (Mu. 10 YR 7/2, 7/3, 8/3, 8/4) with yellowish centre, without pink, not micaceous, not or slightly rugulose, sometimes subsulcate at margin. Veil white, conspicuous and characteristic: in primordia and early stages covering entire cap with a dense arachnoid thin fleece of silky radially arranged adpressed fibrils, denser towards margin, causing colour of marginal area to be white, connecting cap with stem, the surface of the latter coated with a dense white fibrillose layer, at maturity still present as numerous fibrils on cap, particularly in marginal area and causing a very fine radially fibrillose striation of cap (lens!) from apex to margin, often forming appendiculate denticles at cap margin and on stem many fine fibrillose flocculose velar remnants, without annular zone. Gills 2.5–4(–5) mm broad, moderately ventricose, narrowly adnate, at first very pale greyish (Mu. 7.5 YR 7/2), at maturity warm brown (Mu. 5 YR 3/4, 4/4), with white minutely fimbriate edge. Stem at maturity 30–70(–90) x 2–5(–7) mm, sometimes with extreme apex slightly thickened, cylindrical, white, with white down at base and pruinose apex, hollow (cavity wide), fragile. Flesh of cap in centre 1–2 mm thick, in early stages yellow and in centre slightly browner (Mu. 7.5 YR 6/4, 6/6), at maturity dark greyish brown. Trama of 'washed' gill distinctly yellowish brown (Mu. 10 YR 6/4). Spore print brownish dark purple.

Spores (8–)9–11 x 5–6.5  $\mu\text{m}$  (mean values 9.4–10 x 5.3–5.6  $\mu\text{m}$ : 10 collections), ellipsoid, adaxially flattened, often slightly indented above very distinct hilar appendix, with distinct germ pore ( $\pm 1.8 \mu\text{m}$ ), not opaque, in water warm brown (Mu. 5 YR 4/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/4), in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 4/3). Basidia 17.5–35 x 8–11  $\mu\text{m}$ , clavate, 4-spored and with long (up to 5  $\mu\text{m}$ ) sterigmata. Pleurocystidia (35–)47.5–70(–75) x 15–25  $\mu\text{m}$ , usually numerous or even abundant (sometimes scarce), utriform (rarely with subapical constriction) with short pedicel, variable as for both size and shape, thin-walled (particularly in upper part and as a result often collapsed or broken and at apex scarcely staining red in Congo Red), practically colourless or very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid or ventricose-fusoid cheilocystidia (30–)35–60(–65) x 10–25  $\mu\text{m}$ , usually numerous, sometimes even densely packed, rarely scattered, intermixed with only few (rarely fairly numerous, often even none) rather large spheropedunculate and clavate cells, 20–30 x 10–20  $\mu\text{m}$  and numerous immature or mature basidia; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pale brown from membranous pigment with few yellow hyphal septa, without encrustations. Pileipellis a 3–4 cells deep layer of subglobose, often irregularly shaped or ellipsoid, colourless cells, 15–50 x 15–25  $\mu\text{m}$ , lying criss-cross under a thin (15–30  $\mu\text{m}$ ) layer of radially arranged velar hyphae (their cells 25–50 x 5–10  $\mu\text{m}$ ) on surface of cap.

**HABITAT & DISTRIBUTION.** — Densely caespitose (up to  $\pm 150$  carpophores) to sub-caespitose on and around stumps of deciduous trees. July-Dec. Very rare in the Netherlands (only two localities known). Uncommon in France, very rare in the British Isles (found twice; see collections examined).

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Noord-Holland, Amsterdam, Amsterdam Wood, 27 Dec. 1959; 21 July, 20 Oct. and 27 Dec. 1960; 29 Oct. 1963; 6 Nov. 1971; prov. IJsselmeerpolders, Oostelijk Flevoland, 12 Nov. 1983. — BRITISH ISLES: Worcestershire, Pedmore, 4 Jan. 1984; Wales, Llwydiarth near Lake Vyrnwy, 27 Aug. 1962.

Our own copious finds in the Amsterdam Wood initiated our study of the genus *Psathyrella*.

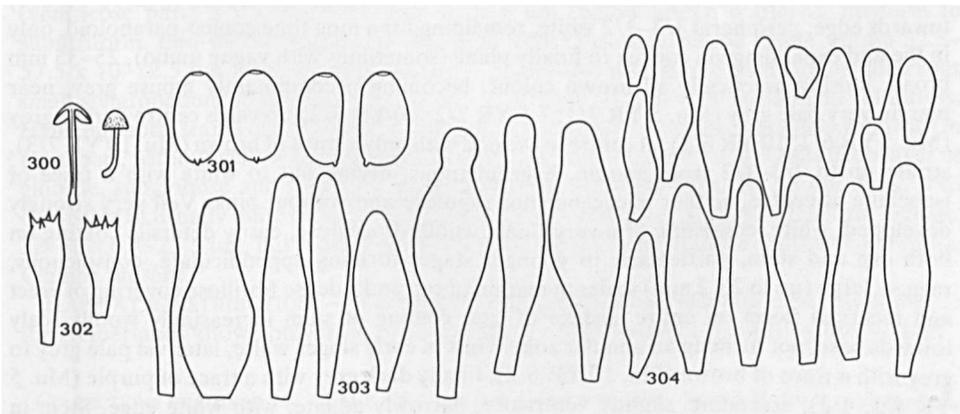
### *Psathyrella vestita* (Peck) A. H. Smith — Figs. 300–304

*Psathyrella vestita* Peck in Bull. N.Y. State Mus. 105: 28. 1906. — *Atylospora vestita* (Peck) Murr. in Mycologia 14: 265. 1922. — *Psathyrella vestita* (Peck) A. H. Smith in Contrib. Univ. Mich. Herb. 5: 58. 1941.

**DESCRIPTION & ILLUSTRATIONS.** — A. H. Smith in Mem. N.Y. bot. Gdn 24: 214. 1972.

Cap 8–12 mm (acc. to Smith 8–16 mm) broad, 6–9 mm high, conico-paraboloid, snow-white but at centre very pale yellowish brown (Mu. 10 YR 8/4), not striate, probably hygrophanous (see observations). Veil white, strongly developed, forming from margin to right up to top a thick coating, densest at margin, of numerous small fluffs, many recurved or erect, particularly near margin, forming scattered minute fibrillose remnants on stem. Gills 2 mm broad, rounded near margin, then ascending and straight, broadly adnate, conspicuously grey (Mu. 10 YR 5/1; 5 YR 5/1) with a trace of brown, when cap observed from underneath sordid greyish brown (Mu. 7.5 YR 4/2) (but see observations), with white edge. Stem 20–25 x 1.5 mm, cylindrical, snow-white, hollow, with apex densely and finely pruinose along a distance of 6–8 mm and with subbulbous base. Flesh of cap in centre 1 mm thick, fairly pale brown (Mu. 10 YR 5/3), of stem white. Trama of 'washed' gill practically colourless, scarcely very pale brown. Spore print black.

Spores (9–)10–11 x 4.5–5.5  $\mu\text{m}$  (mean values 10.1 x 5.4  $\mu\text{m}$ : 1 collection), in face view ellipsoid, some ellipsoid-ovoid, in profile ellipsoid, adaxially flattened, in water dark red



Figs. 300–304. *Psathyrella vestita*. — 300. Carpophores (x 0.5). — 301. Spores. — 302. Basidia. — 303. Pleurocystidiogram. — 304. Cheilocystidiogram.

(Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in  $\text{KOH}$  5% dark sordid brown (Mu. 7.5 YR 4/2), not opaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 22.5–30 x 8–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 50–70 x 10–20  $\mu\text{m}$ , rather numerous and versiform, in the main utriform or subutriform, but some fusoid ventricose with obtuse apex and broad pedicel thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 35–50 x 8–12.5  $\mu\text{m}$ , numerous, densely packed, intermixed with many spheropedunculate and clavate cells, 10–20 x 5–9  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless to very pale brown, without yellow hyphal septa, without encrustations. Pileipellis a 3–4 cells deep layer of chiefly globose cells, 25–50  $\mu\text{m}$ , and a small number of subglobose or fairly narrowly ellipsoid cells; all cells thin-walled and colourless.

**HABITAT & DISTRIBUTION.** — In clayey soil in deciduous wood plantation. Very rare in the Netherlands. Not recorded from France or the British Isles.

**COLLECTION EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Noord-Holland, Amsterdam, Amsterdam Wood, 16 June 1974.

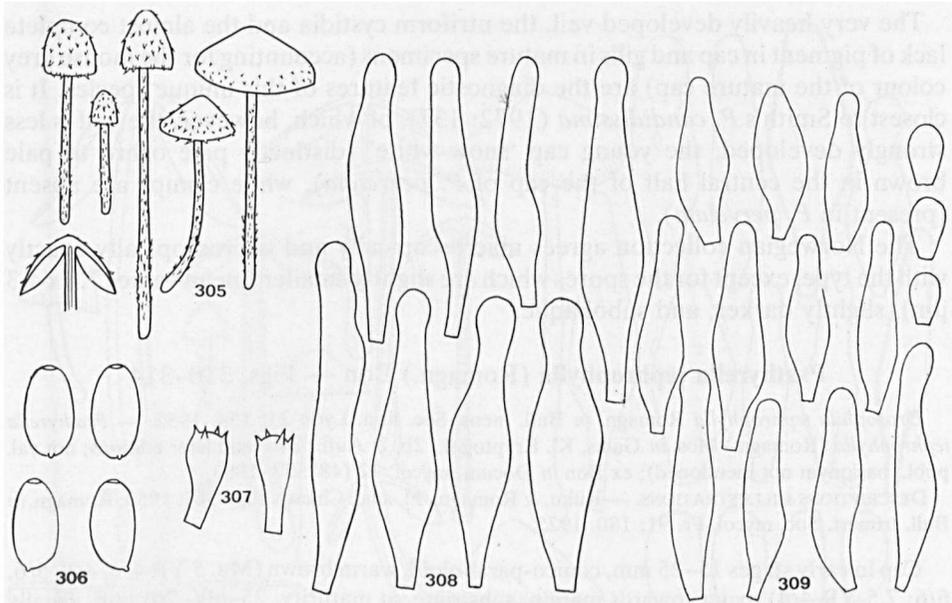
The above description is based on two connate, because of their striking pure whiteness and abundant veil very striking specimens. Our impression was that they were both fairly young and quite fresh. Smith (1972: 214) reported having examined four collections, including Peck's type specimens; the major part of his description, however, is adopted from Peck's description (1906: 28). Both authors described the gills as 'becoming blackish brown' and the cap as 'usually with a rufescent tint, soon paler or white (Smith placed this species in his stirps *Pallida* of section *Pannucia*). Contrary to our observations Smith called the pleuro- and cheilocystidia scattered, but their shape and size correspond with our findings.

### ***Psathyrella pervelata* Kits van Wav. — Figs. 305–309**

*Psathyrella pervelata* Kits van Wav. in *Persoonia* 6: 309, pl. 10, 11. 1971

**DESCRIPTION & ILLUSTRATIONS.** — Kits van Wav., l.c.

Cap in early stages conico-paraboloid, 8–14 mm broad, 10–20 mm high, not striate, pale ochre (Mu. 7.5 YR 6/6) to pale brown (Mu. 10 YR 7/4) at centre, still paler (Mu. 10 YR 8/4) towards edge, peripheral 1/3–1/2 white, remaining for a long time conico-paraboloid, only in the end expanding via convex to finally plane (sometimes with vague umbo), 25–35 mm broad, loosing practically all brown colour, becoming predominantly mouse grey, near margin very pale grey (Mu. 5 YR 7/1; 7.5 YR 7/2; 10 YR 7/2), towards centre darker grey (Mu. 5 YR 6/1, 10 YR 6/2), at centre in the end with only a trace of brown (Mu. 10 YR 7/3), striate up to 1/3–1/2 from margin, hygrophanous, drying out to white with a trace of isabelline at centre, neither micaceous nor rugulose and without pink. Veil very strongly developed, white, consisting of a very thick, woolly-flocculose, easily detersile coating on both cap and stem, particularly in younger stages forming appendiculate, conspicuous, ragged, large (up to 2 x 2 mm) scales at margin of cap and a dense fibrillose covering of erect and recurved flocci on entire surface of cap; coating of stem increasingly woolly-scaly towards base, not forming an annular zone. Gills in early stages white, later via pale grey to grey with a trace of brown (Mu. 10 YR 6/2), finally dark grey with a trace of purple (Mu. 5 YR 4/1, 4/2), ascending, slightly ventricose, narrowly adnate, with white edge. Stem in mature specimens 50–75 x 2–4 mm, cylindrical, or very slightly gradually thickening towards base, very fragile, shining in upper part, not rooting, hollow, with pruinose apex. Flesh of cap



Figs. 305–309. *Psathyrella pervelata*. — 305. Carpophores. — 306. Spores. — 307. Basidia. — 308. Pleurocystidiogram. — 309. Cheilocystidiogram.

in centre 1–2 mm thick, very pale grey with a trace of isabelline, of stem white. Smell indistinctive or fragrant. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% under binocular lens in basal part very pale yellowish grey (Mu. 5 YR 7/3), for the rest practically colourless. Spore print purplish black.

Spores (8–)9–10(–11) x 4.5–5.5  $\mu\text{m}$  (mean values 9.2–9.7 x 4.8–5.2  $\mu\text{m}$ : 2 collections), ellipsoid, adaxially flattened, in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/4, 4/4), in  $\text{KOH}$  5% dark sordid brown (Mu. 7.5 YR 4/2); not opaque to subopaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and small hilar appendix.

Basidia 21–25 x 9.5–10.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 60–80 x 10–17.5 (ventricose part) x 7.5–10  $\mu\text{m}$  (apex) to 6–8  $\mu\text{m}$  (below apex), scattered, utriform to subutriform, thin-walled, colourless. Marginal cells: Pleurocystidioid cheilocystidia 32.5–57.5 x 10–12.5  $\mu\text{m}$  (ventricose part), fairly numerous, intermixed with rather numerous small spheropedunculate cells, 12.5–15 x 7.5–10  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. practically colourless, very pale yellowish in basal part, without yellow hyphal septa or encrustations. Pileipellis a 2–3 cells deep layer of globose, subglobose and rather irregularly shaped colourless cells, 16–56  $\mu\text{m}$  diam. Veil consisting of usually quite broad, sometimes narrow, cylindrical or slightly fusiform hyphae, 32–80 x 6.5–25.5  $\mu\text{m}$ , but most of them 40–64 x 14.5–19  $\mu\text{m}$ ; hyphae constricted at septa. Clamps present.

**HABITAT & DISTRIBUTION.** — Terrestrial in deciduous wood plantation on clayey soil. In the Netherlands known only from two localities. In 1981 found in Norway by Mr. Weholt.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Noord-Holland, Amsterdam, Amsterdam Wood, 30 Sept. 1961 (type); prov. Zuid-Holland, Rotterdam, 'Kralingse Bos', 31 Oct. 1984. — NORWAY, Telemark, Bamble, Gjømle, 1 Aug. 1981.

The very heavily developed veil, the utriform cystidia and the almost complete lack of pigment in cap and gills in mature specimens (accounting for the mouse grey colour of the mature cap) are the diagnostic features of this unique species. It is closest to Smith's *P. candidissima* (1972: 137), of which, however, the veil is less strongly developed, the young cap 'snow-white' (distinctly pale ochre to pale brown in the central half of the cap of *P. pervelata*), while clamps are absent (present in *P. pervelata*).

The Norwegian collection agrees macroscopically and microscopically exactly with the type, except for the spores which are slightly smaller (mean values  $7.8 \times 4.3 \mu\text{m}$ ), slightly darker, and subopaque.

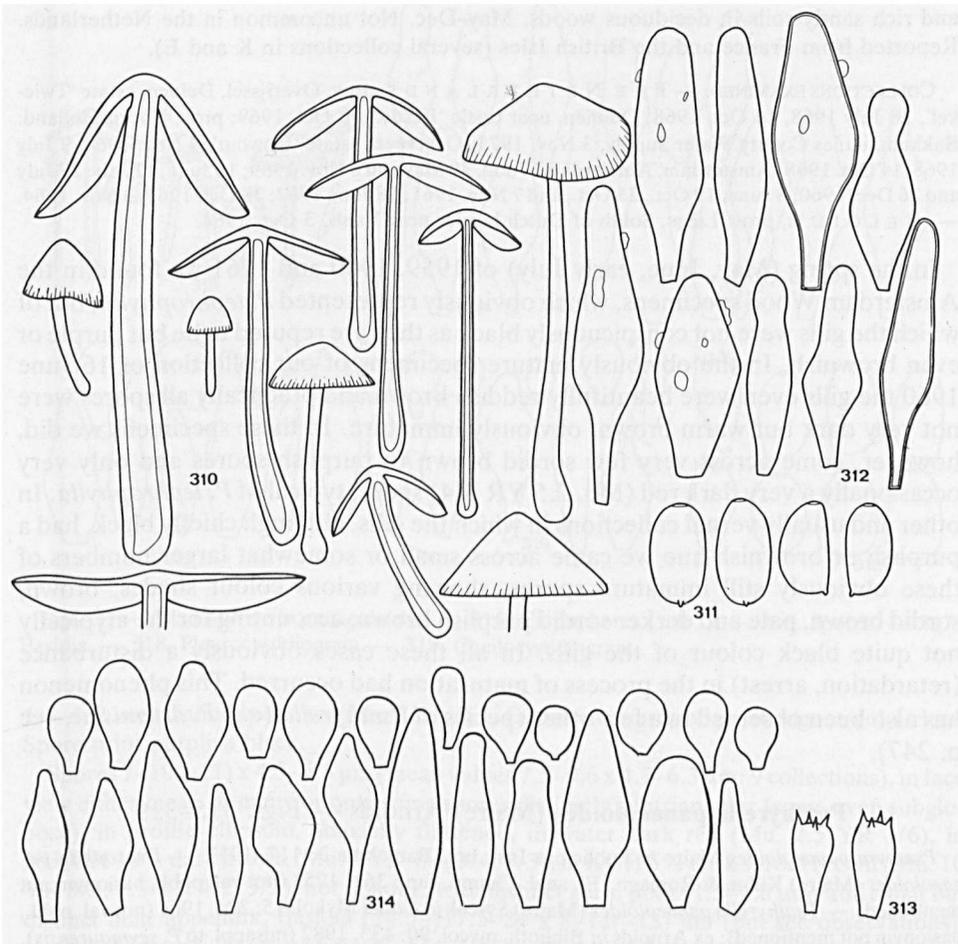
### ***Psathyrella tephrophylla* (Romagn.) Bon — Figs. 310–314**

*Drosophila tephrophylla* Romagn. in Bull. mens. Soc. linn. Lyon 21: 154. 1952. — *Psathyrella tephrophylla* (Romagn.) Mos. in Gams, Kl. Kryptog.fl., 2b, 2. Aufl.: 240 (and later editions; not val. publ., basionym not mentioned); ex Bon in Docum. mycol. 12 (48): 52. 1983.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 361. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 180. 1975.

Cap in early stages 15–25 mm, conico-paraboloid, warm brown (Mu. 5 YR 4/6, 4/8, 5/6, 6/6; 7.5 YR 4/4), paler towards margin, substriate, at maturity, 25–60(–70) mm, usually remaining for a long time conspicuously conical in spite of spreading (pyramid-shaped), finally convex or even plane rarely subumbonate, brown (Mu. 7.5 YR 4/4; 10 YR 4/4), becoming sordid greyish brown (Mu. 10 YR 5/4, 4/3, 3/3) with browner glassy centre, finally dark greyish brown (Mu. 10 YR 5/2) or blackish brown, fragile, striate up to  $1/2$ – $3/4$  from margin, hygrophanous, rapidly drying out to very pale sordid greyish yellow or brown (Mu. 10 YR 7/2, 7/3, 7/4, 8/3, 8/2; 2.5 Y 7/2) or alutaceous, at centre little darker (yellowish ochre). Veil in earliest stages leaving distinct minute flocci on margin of cap, later only a few minute fibrils or fascicles of fibrils, very fugacious, very often seemingly absent. Gills 3–6(–8) mm broad, crowded, usually a little but sometimes distinctly ventricose, broadly, sometimes moderately broadly or even narrowly adnate, in earliest stages very pale brown or greyish brown (Mu. 10 YR 5/2, towards base 10 YR 5/3, 5/4), very soon conspicuously grey (Mu. 5 YR 5/1; 7.5 YR 5/0; 10 YR 5/1, 5/2; 2.5 Y 5/0), later dark grey to black (Mu. 5 YR 4/1; 10 YR 4/1, 3/1, 3/2) with or without a trace of purple (but see observations), with white pruinose edge. Stem 50–110 x 3–6 (apex) to 5–15 (base) mm, very gradually but conspicuously thickening towards non-bulbous base, covered by white down, snow-white, flamed, polished, very hollow, cavity penetrating for a short distance into flesh of cap, causing cap very easily to break from stem, fragile; with apex pruinose fairly far down stem, but often only sparsely. Flesh of cap in centre 1.5–3 mm thick, dark brown (Mu. 10 YR 4/4, 4/3, 3/3), of stem white, alongside cavity in base pale brown. Trama of 'washed' gill in young specimens distinctly be it pale brown (Mu. 10 YR 6/4, 7/4), near edge greyer, at maturity almost colourless, pale grey (Mu. 5 YR 6/1), only in basal half with trace of brown. KOH 5% producing on surface of cap of exsiccata a dark vinaceous colour. Spore print black to purplish black (more purplish or even browner when many or most spores are immature).

Spores 9–11.5(–12.5) x (4.5–)5–6.5  $\mu\text{m}$  (mean values 9.6–10.9 x 5.3–6  $\mu\text{m}$ : 20 collections), ellipsoid, adaxially flattened, very dark, in water dark red (Mu. 2.5 YR 3/6, 3/4), in  $\text{NH}_4\text{OH}$  10% very dark red (Mu. 2.5 YR 3/4, 2.5/4), in KOH 5% dark brown (Mu. 5 YR 3/3) (but see observations), not opaque to subopaque, with distinct germ pore (1.8–2  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 17.5–24(–30) x (9–)9.5–11  $\mu\text{m}$ , clavate to sub-sphero-



Figs. 310–314. *Psathyrella tephrophylla*. — 310. Carpophores (x 0.5). — 311. Spores. — 312. Pleurocystidiogram. — 313. Basidia. — 314. Cheilocystidiogram.

pedunculate, 4-spored. Pleurocystidia (35–)47.5–65(–75) x 12.5–17.5(–20)  $\mu\text{m}$ , numerous, utriform with distinct subcapital constriction, some cells fusoid with very obtuse apex, thin-walled (sometimes very slightly thick-walled and wall refractive), colourless, often with mucoid droplets (not staining in  $\text{NH}_4\text{OH}$  10%) on surface. Marginal cells: pleurocystidioid cheilocystidia 30–55 x (7.5–)10–17.5  $\mu\text{m}$ , versiform (subutriform, subfusoid, sublageniform), abundant and densely packed, usually with mucoid droplets on their surface (sometimes as large as 15–20  $\mu\text{m}$ ) not staining in  $\text{NH}_4\text{OH}$  10%, intermixed with unobtrusive small spheropedunculate and clavate cells, 12.5–20 x 7.5–12.5  $\mu\text{m}$ , few in number (rarely numerous); all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. in young specimens distinctly brown, particularly near base, without yellow hyphal septa or encrustations, at maturity pale to very pale brown. Pileipellis a 2–4 cells deep layer of subglobose to versiform colourless cells, 30–50  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial, solitary, sometimes in small groups, in clayey

and rich sandy soils in deciduous woods. May-Dec. Not uncommon in the Netherlands. Reported from France and the British Isles (several collections in K and E).

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S: prov. Overijssel, Delden, estate 'Twickel', 28 July 1968, 14 Oct. 1968; Ommen, near castle 'Eerde', 18 Oct. 1969; prov. Noord-Holland: Bakkum, dunes County Water Supply, 3 Nov. 1973; Overveen, estate 'Elswout', 3 Nov. 1964, 9 July 1968, 14 Oct. 1968; Amsterdam, Amsterdam Wood, 29 May and 6 Nov. 1959; 16 June, 17 July, 27 July and 26 Dec. 1960; 8 June, 19 Oct., 25 Oct., and 7 Nov. 1961; 28 June 1962; 28 Oct. 1963; 3 Nov. 1964. — B E L G I U M, prov. Liège, South of Dutch border near Vaals, 3 Oct. 1964.

In the spring (May, June, early July) of 1959, 1960 and 1961 we found in the Amsterdam Wood specimens, which obviously represented *P. tephrophylla*, but of which the gills were not conspicuously black as they are reputed to be but purple or even brownish. In the obviously mature specimens of our collection of 16 June 1960 the gills even were beautifully reddish brown and practically all spores were not very dark but warm brown, obviously immature. In these specimens we did, however, come across very few sordid brown to purplish spores and only very occasionally a very dark red (Mu. 2.5 YR 3/4) spore, typical of *P. tephrophylla*. In other and usually vernal collections in which the gills, although chiefly black, had a purplish or brownish hue we came across small or somewhat larger numbers of these obviously still immature spores, showing various colour shades, brown, sordid brown, pale and darker sordid purplish brown, accounting for the atypically not quite black colour of the gills. In all these cases obviously a disturbance (retardation, arrest) in the process of maturation had occurred. This phenomenon has also been observed in a few other species of *Psathyrella* (e.g. *P. artemisiae*, see p. 247).

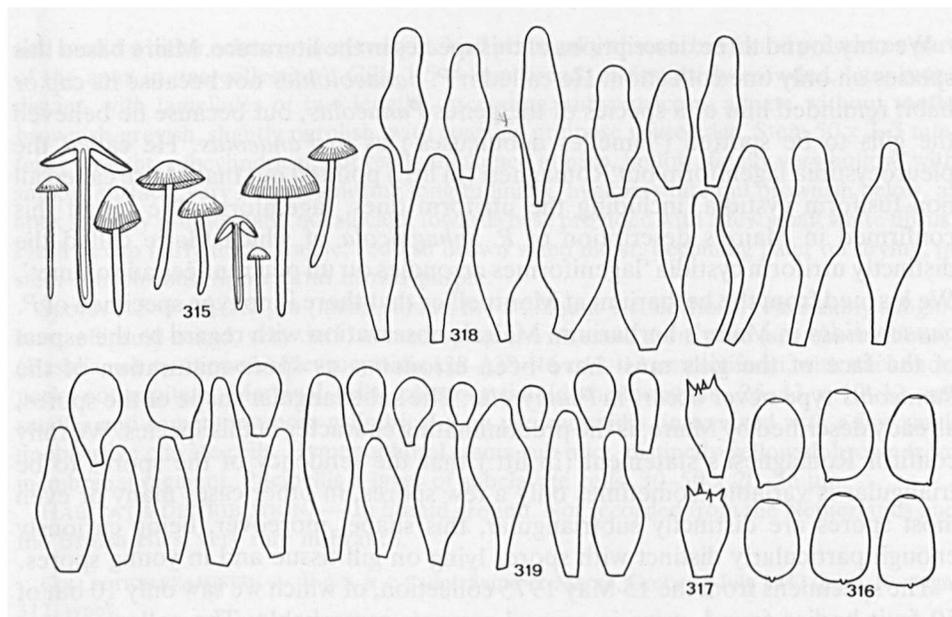
### *Psathyrella panaeoloides* (Maire) Arnolds — Figs. 315–319

*Psathyra panaeoloides* Maire in *Publicions Inst. bot. Barcelona* 3: 117. 1937. — *Drosophila panaeoloides* (Maire) Kühn. & Romagn., *Fl. anal. Champ. sup.*: 361. 1953 (not val. publ., basionym not mentioned). — *Psathyrella panaeoloides* (Maire) Svrček in *Česká Mykol.* 15: 204. 1961 (not val. publ., basionym not mentioned); ex Arnolds in *Biblioth. mycol.* 90: 433. 1982 (misappl. to *P. seymourensis*).

*Psathyrella ovatispora* A. H. Smith in *Mem. N.Y. bot. Gdn* 24: 347. 1972.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., l.c.; Svrček, l.c.; A. H. Smith, l.c. (as *P. ovatispora*); Arnolds, l.c.: 433 (as *P. ovatispora*).

Cap 7–20(–25) mm, paraboloid, conico-paraboloid, spreading to conico-convex, rarely with vague umbo, dark reddish brown (Mu. 5 YR 4/2, 4/3), soon loosing reddish colour and becoming date brown or sordid greyish brown (Mu. 10 YR 5/3, 6/3), sometimes with slight pinkish hue, usually striate or substriate (if not then resembling *Panaeolous foenicicii*), hygrophonous, drying out to very pale brown (Mu. 10 YR 7/4) or alutaceous, at centre darker (Mu. 10 YR 6/4), without pink, micaceous, distinctly rugulose. Veil white, in early stages leaving fibrils on cap up to half-way from margin, very fugacious, at maturity few scattered fibrils and fascicles of fibrils along margin of cap and on lower half of stem. Gills 2–4 mm broad, ventricose, ascending, broadly adnate, dark purple (Mu. 2.5 YR 2.5/2) or purplish or dark greyish brown, with white minutely fimbriate edge. Stem 20–40(–45) x 1–4(–5) mm, cylindrical, rarely slightly thickening towards rarely thickened base, white, near base isabelline, hollow, with pruinose apex. Flesh of cap 1 mm thick in centre, dark brown (Mu. 10 YR 3/3), of stem white, at base pale brown. Trama of 'washed' gill in basal



Figs. 315–319. *Psathyrella panaeoloides*. — 315. Carpophores (x 0.5). — 316. Spores. — 317. Basidia. — 318. Pleurocystidiogram. — 319. Cheilocystidiogram.

1/3–1/2 very distinctly brown (Mu. 7.5 YR 5/4), paler towards edge, at edge  $\pm$  colourless. Spore print purplish black.

Spores 7–10(–11) x 4.5–6.5  $\mu$ m (mean values 7.5–9.6 x 4.7–6.3  $\mu$ m; 9 collections), in face view either most, or many or only some spores distinctly subtriangular (some even subglobose), in profile ellipsoid, adaxially flattened, in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/4, 3/4, 3/3), in  $\text{KOH}$  5% dark sordid brown (Mu. 10 YR 3/3; 7.5 YR 4/2, 3/2), not opaque, with distinct germ pore (1.5–1.8  $\mu$ m) and small but distinct hilar appendix. Basidia (14.5–)17.5–24 x 8–11(–13)  $\mu$ m (but see observations), clavate, 4-spored. Pleurocystidia 30–55(–57.5) x 10–15(–17.5)  $\mu$ m, moderately numerous, utriform, thin-walled, colourless. Marginal cells: Pleurocystidioid cheilocystidia (20–) 25–45 x 7.5–15  $\mu$ m, abundant, densely packed, intermixed with many unobtrusive small spheropedunculate and clavate cells, 12.5–20(–27.5) x 10(–15)  $\mu$ m, all cells thin-walled and colourless; apices of pleurocystidioid cheilocystidia often carrying granules or small mucoid deposits. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very distinctly brown from membranous pigment with many to numerous yellow hyphal septa and numerous very small encrustations, especially in basal half. Pileipellis a 2–4 cells deep layer of subglobose cells, 15–40  $\mu$ m diam.

**HABITAT & DISTRIBUTION.** — Solitary or gregarious in clayey soil or grassland, also found in manured humus of hothouse and in sandy soil. March–Oct. Rare in the Netherlands. Reported from France and the British Isles (mat. in K and E).

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Drente, Dwingeloo, 6 May 1977; prov. Utrecht: Vleuten, in hothouse, 31 March 1973; prov. Noord-Holland: Nederhorst den Berg, 'Blijkpolder', 15 May 1975; Amsterdam, Amsterdam Wood, 15 May 1960, 19 July 1962; 26 May 1973; prov. Zuid-Holland, Leiden, Rooseveltstraat, 26 Oct. 1971. — **F R A N C E:** herb. Romagn. 198 (16 April 1939) and 463 (10 Sept. 1945).

We only found three descriptions of this species in the literature. Maire based this species on only one collection. He called it *P. panaeoloides* not because its cap or habit reminded him of a species of the genus *Panaeolus*, but because he believed the gills to be spotted ('lamelles nébuleuses') as in *Panaeolus*. He called the pleurocystidia lageniform but Romagnesi (in litt.) pointed out that Maire called all non-fusiform cystidia, including the utriform ones, lageniform. We found this confirmed in Maire's description of *P. sphagnicola* of which Maire called the distinctly utriform cystidia 'lageniformes arrondies ou un peu renflées au sommet'. We learned from the herbarium at Montpellier that there is no type specimen of *P. panaeoloides* in Maire's herbarium. Maire's observation with regard to the aspect of the face of the gills must have been erroneous as spore-maturation of the *Panaeolus* type never occurs in *Psathyrella*. The subtriangular shape of the spores, already described by Maire, is the predominating character of this species. We fully confirm Romagnesi's statement (in litt.) that the tendency of the spores to be triangular is variable; sometimes only a few spores, in other cases many or even most spores are distinctly subtriangular, this shape, moreover, being curiously enough particularly distinct with spores lying on gill tissue and in young spores.

The specimens from the 15 May 1975 collection, of which we saw only 10 out of 50 fruit-bodies found, were in several respects remarkable. The collection was found on fairly recently deposited rich sandy soil with an overgrowth of *Salix* and *Carex* species. The spores, as for shape and colour typical of *P. panaeoloides*, were large (mean sizes  $9.6 \times 6.3 \mu\text{m}$ ), the basidia were  $11.2\text{--}12.8 \mu\text{m}$  broad and the pleurocystidia varied from one specimen to another from very distinctly utriform (with or without subcapital constriction) to lageniform (fairly thick neck with obtuse apex).

The figures given for the spore sizes by Kühn. & Romagn. (1953: 361) also are very divergent.

### *Psathyrella reticulata* (Romagn.) Sing. — Fig. 320

*Drosophila reticulata* Romagn. in Bull. mens. Soc. linn. Lyon 21: 154. 1952. — *Psathyrella reticulata* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2 b/2, 3. Aufl.: 223. 1967 (not val. publ., basionym not mentioned); ex Sing. in Beih. Nova Hedwigia 29 (Mycofl. austr.): 196. 1969 (non *Psathyra reticulata* Petch in Ann. R. bot. Gdns Peradeniya 6: 322. 1917 (= species of sect. *Spadiceae*).

DESCRIPTIONS & ILLUSTRATIONS. — Sing., l.c.; Kühn. & Romagn., Fl. anal. Champ. sup.: 363. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 42. 1982.

Cap 5–15 mm, at first campanulate-umbonate, then campanulate or glandiform, fairly fleshy and thick, obtuse, its margin more or less warped or lobed, provided with a few vertical folds giving cap a sulcate and sometimes almost crenate aspect, while fresh with strongly wrinkled surface (except for centre), not striate, vivid ochre-yellow, browner at centre, paler

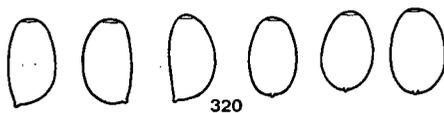


Fig. 320. *Psathyrella reticulata*. — Spores.

and sordid whitish ochraceous at margin. Veil practically absent (but found present on part of the apex in one collection). Gills 1.5–4 mm broad, at first fairly crowded, later more distant, with lamellules of two lengths, ascending, subventricose, adnate without tooth, brownish-greyish, slightly purplish, with coarsely pruinose white edge. Stem 50 x 2–3 mm, fairly straight, subcylindrical, not really thickened at base, hollow, finally very hollow, with smooth surface, very fragile, splitting longitudinally, hyaline-white but brownish below, at apex scarcely pruinose and not sulcate, towards base provided with a few small white fibrils. Flesh in cap fairly thick, fragile, reddish brown when moist, becoming paler on drying, in stem concolorous. Spore print brown-purple.

Spores 7.5–9 x 5–5.5  $\mu\text{m}$  (mean values: 8.7 x 5.2  $\mu\text{m}$ : 1 collection), remarkably subglobose, ellipsoid-ovoid, very dark, almost opaque, with small germ pore (see observations). (Basidia not mentioned.) Pleurocystidia (28–)38–46 x 12–14  $\mu\text{m}$ , utriform, with thick short neck, not capitate. Marginal cells: pleurocystidioid cheilocystidia, 25–43 x 10–12  $\mu\text{m}$ , smaller and sometimes more cylindrical than pleurocystidia, intermixed with a few small unobtrusive clavate cells. Hymenophoral trama sub micr. distinctly yellowish brown from membranal pigment. Pileipellis a layer of subclavate cells, 30–50 x 20–56  $\mu\text{m}$ .

HABITAT & DISTRIBUTION. — In humid ground. Not recorded from the Netherlands and the British Isles, very rare in France.

COLLECTION EXAMINED. — F R A N C E, dpt. Seine-et-Marne, Gretz, 15 July 1942 (herb. Romagn. 312, type).

We never saw fresh material of this species and in the minute fragment of the exsiccatum of the type received on loan we only found spores. Hence the entire above description is a translation from a full description received from Romagnesi, supplemented with a few data from Romagnesi's recent description (1982: 42) and from our observations on the type. As Romagnesi we found the spores ellipsoid-ovoid, dark reddish brown, with distinct germ pre (1.5–2  $\mu\text{m}$ ), while we found practically the same figures for their size: 8–9 x 4.5–5.5 (mean values 8.7 x 5.2  $\mu\text{m}$ ).

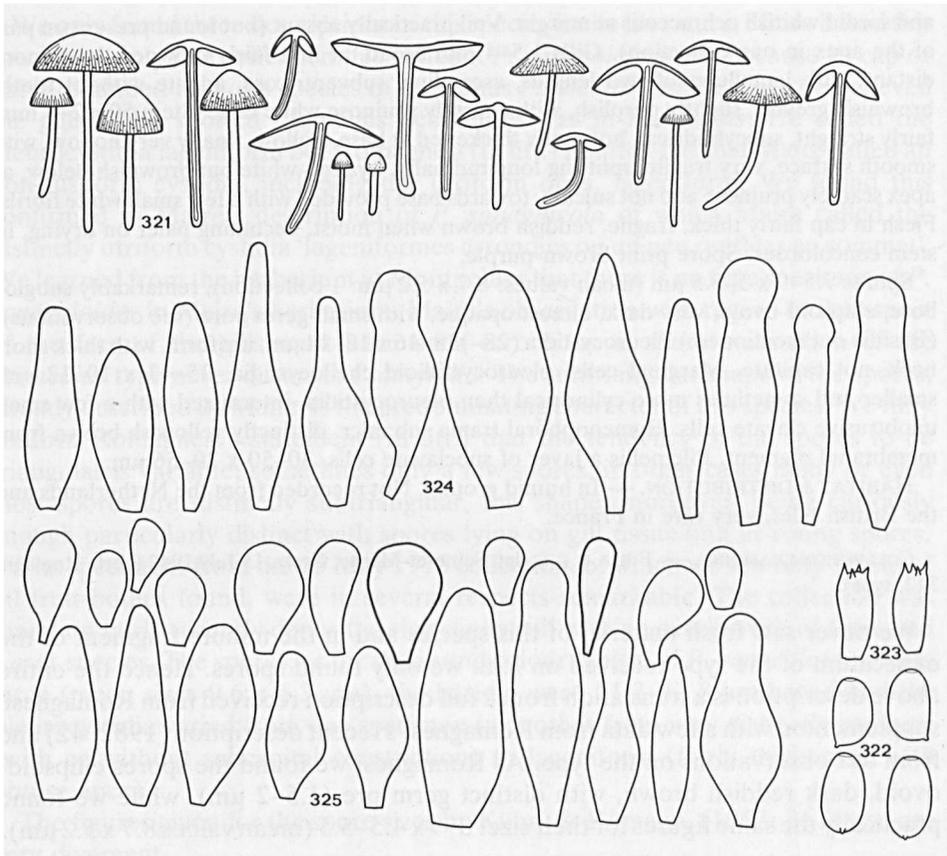
### *Psathyrella noli-tangere* (Fr.) Pears. & Denn. — Figs. 321–325

*Agaricus noli-tangere* Fr., Epicr.: 234. 1838. — *Psathyra noli-tangere* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 150. 1872. — *Pannucia noli-tangere* (Fr.) P. Karst in Bidr. Känn. Finl. Nat. Folk 32: 515. 1879. — *Drosophila noli-tangere* (Fr.) Quél., Enchir. Fung.: 118. 1886. — *Psilocybe noli-tangere* (Fr.) P. Cout., Eubasidiomyc. lusit. Herb. Univ. Olisiponensis: 93. 1919. — *Psathyrella noli-tangere* (Fr.) Pears. & Denn. in Trans. Brit. mycol. Soc. 31: 184. 1948.

*Psathyrella noli-tangere* var. *minor* J. Favre in Mat. Fl. cryptog. Suisse 10 (3) (Ass. fung. Hauts-marais jurassiens): 151. 1948.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., Blätterp.: 259. 1913; J. Favre, l.c.; J. Lange, Fl. agar. dan. 4: 95, pl. 152 E. 1939; Nathorst-Windahl in Friesia 6: 298. 1961; Kühn. & Romagn., Fl. anal. Champ. sup.: 363. 1953; A. H. Smith in Mem. N.Y. bot. Gdn 24: 218. 1972; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 178. 1975.

Cap in early and fresh stages (5–8 mm) paraboloid to conico-paraboloid, dark reddish brown (Mu. 10 YR 3/2; 2.5 YR 3/2; 5 YR 3/2, 3/3, 3/4) all over, but red colour rapidly disappearing from margin towards apex, in marginal area becoming yellowish brown (Mu. 5 YR 6/6), in area in the middle warm brown (Mu. 7.5 YR 5/6), substrate, at maturity (7–)10–40(–50) mm, fragile, conico-paraboloid, then paraboloid, spreading to convex, rarely vaguely umbonate or plane with depressed centre, at first still dark reddish brown (Mu. 5 YR 3/3, 3/4, 4/4) at centre, but very soon entirely brown, at centre dark brown (Mu. 7.5 YR 4/4, 5/4; 10 YR 4/4), around centre warm brown (Mu. 7.5 YR 5/6; 10 YR 5/4, 5/6),



Figs. 321–325. *Psathyrella noli-tangere*. — 321. Carpophores (x 0.5). — 322. Spores. — 323. Basidia. — 324. Pleurocystidiogram. — 325. Cheilocystidiogram.

towards margin paler (Mu. 10 YR 6/4, 7/4), at margin pale brown (Mu. 10 YR 7/3), in final fresh stages often centre still dark brown (Mu. 7.5 YR 4/4) and glassy but for the rest dark to very dark sordid brown (Mu. 7.5 YR 4/2, 3/2; 10 YR 3/2, 3/3, 4/2, 4/3) often with purplish hue (see observations), striate up to 1/2–3/4 from margin, hygrophanous, drying out to very pale brown (Mu. 10 YR 7/2, 7/3, 8/4, 8/3) or alutaceous with yellowish ochre centre (Mu. 10 YR 7/4, 7/6, 7/8, 8/6; 7.5 YR 7/4, 7/6), without pink, sometimes micaceous, usually rugulose. Veil in early stages reaching up to half way from margin, sometimes even up to apex, forming white fibrils, small networks of fibrils, and a dense wicker-work at margin, rendering it white, sometimes even appendiculate along entire margin, at maturity leaving distinct white fibrils and many small networks of fibrils at margin, sometimes up to 1/2 or 2/3 from margin, rarely up to apex, at margin often bundled into small flocci, fairly persistent, forming scattered fibrils on lower part of stem. Gills at first whitish near edge, for the rest pale brown (Mu. 10 YR 6/3, 6/4, 8/2, 8/3, 8/4 or in the presence of some spores Mu. 7.5 YR 6/2), at maturity 2.5–6 mm broad, sometimes crowded, ventricose, ascending, broadly (rarely narrowly) adnate, warm brown or tobacco brown (Mu. 5 YR 3/3, 3/4, 4/4; 7.5 YR 4/4, 5/4 or towards 7.5 YR 4/2, 5/2) with whitish minutely fimbriate edge. Stem 15–55 x

(1-)1.5-4 mm, relatively short as compared with diameter of cap (but see observations), fragile, cylindrical, snow-white or whitish (Mu. 2.5 YR 8/2), below often isabelline or pale brown (particularly at base), polished, very finely longitudinally striate, hollow, with pruinose apex, at base often slightly thickened, strigose and covered by whitish down. Flesh of cap 1-2 mm thick in centre, dark greyish brown (Mu. 10 YR 3/3, 4/3, 4/4, 5/4), of stem white but distinctly pale brown alongside cavity and in base. Trama of gill distinctly brown (Mu. 10 YR 6/3, 6/4, 7/4) from base to edge, pale at edge. Spore print dark purplish to brownish purple.

Spores (6.5-)7-8 x 4-5(-5.5)  $\mu\text{m}$  (mean values 7.3-7.9 x 4.1-4.5  $\mu\text{m}$ : 19 collections), ellipsoid, adaxially flattened, the larger ones often phaseoliform, in water orange-brown (Mu. 5 YR 4/6, 5/6), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 7.5 YR 5/4), in KOH 5% sordid brown (Mu. 10 YR 5/3), not opaque, with distinct germ pore (1.5-1.8  $\mu\text{m}$ ) and small hilar appendix. Basidia 13.5-24 x 8-9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia (37.5-)40-70 x 10-20  $\mu\text{m}$ , numerous to abundant, utriform, normally with subapical constriction, sometimes fusoid with very obtuse apex (see observations), thin-walled (wall between apex and pedicel rarely very slightly thickened and refractive), colourless or very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: Pleurocystidioid cheilocystidia (22.5-)27.5-60 x (7.5-)10-20  $\mu\text{m}$ , numerous, often densely packed, few to many often very pale brown in  $\text{NH}_4\text{OH}$  10%, intermixed with numerous spheropedunculate and clavate cells, (10-)15-35 x 7.5-17.5(-20)  $\mu\text{m}$ , the larger ones (often present in rather large numbers) usually slightly thick-walled and brown in  $\text{NH}_4\text{OH}$  10%, their subhymenium also pale brown from membranous pigment. Hymenophoral trama distinctly pale yellowish brown with few yellow hyphal septa, without encrustations. Pileipellis a 2-3 cells deep layer of subglobose cells, 24-48(-56)  $\mu\text{m}$  diam.; superficial cells colourless; cells in deeper layer very pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Solitary or gregarious in marshy areas, particularly in muddy borders of ponds, with thick bed of decaying leaves (particularly of *Fagus*), in boggy beds of dry ditches. July-Oct. Fairly common in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Overijssel: Denekamp, estate 'Sterrenbosch', 12 Oct. 1961, 22 Sept. 1962, 14 Oct. 1966, 26 Sept. 1966; Denekamp, Borgbos, 14 Oct. 1961; Delden, estate 'Twickel', 19 and 20 Sept. 1969, 15 and 27 Oct. 1971, 18 Oct. 1972, 23 Oct. 1975, 1 Oct. 1979; Delden, estate 'Twickel', area 'Het Loofriet', 21 Sept. 1969, 20 Oct. 1970, 14 Oct. 1973; prov. Gelderland, Vorden, Dennendijk, 7 July, 7 Aug. and 17 Oct. 1959; prov. Utrecht, estate 'De Treck', 4 Nov. 1961.

Sometimes a collection exclusively exists of young or mature carpophores which are seemingly moist and fresh but in which the process of drying has already started, the colour of the caps in these cases being ochreous-yellowish, date-brown or greyish brown (Mu. 10 YR 4/4, 5/3, 6/3, 6/4, 7/4, 7/6; 7.5 YR 6/4, 5/6), the apex at most pale reddish brown.

Although in mature specimens the stem normally is relatively short as compared with the diameter of the cap, one may come across relatively tall stems (40-70 x 2-3 mm). Favre (1948: 151) described and depicted a var. *minor* of *P. noli-tangere* (caps 7-17 mm), but in a few of our collections we came across mature specimens of the same size among others measuring up to 35-42 mm.

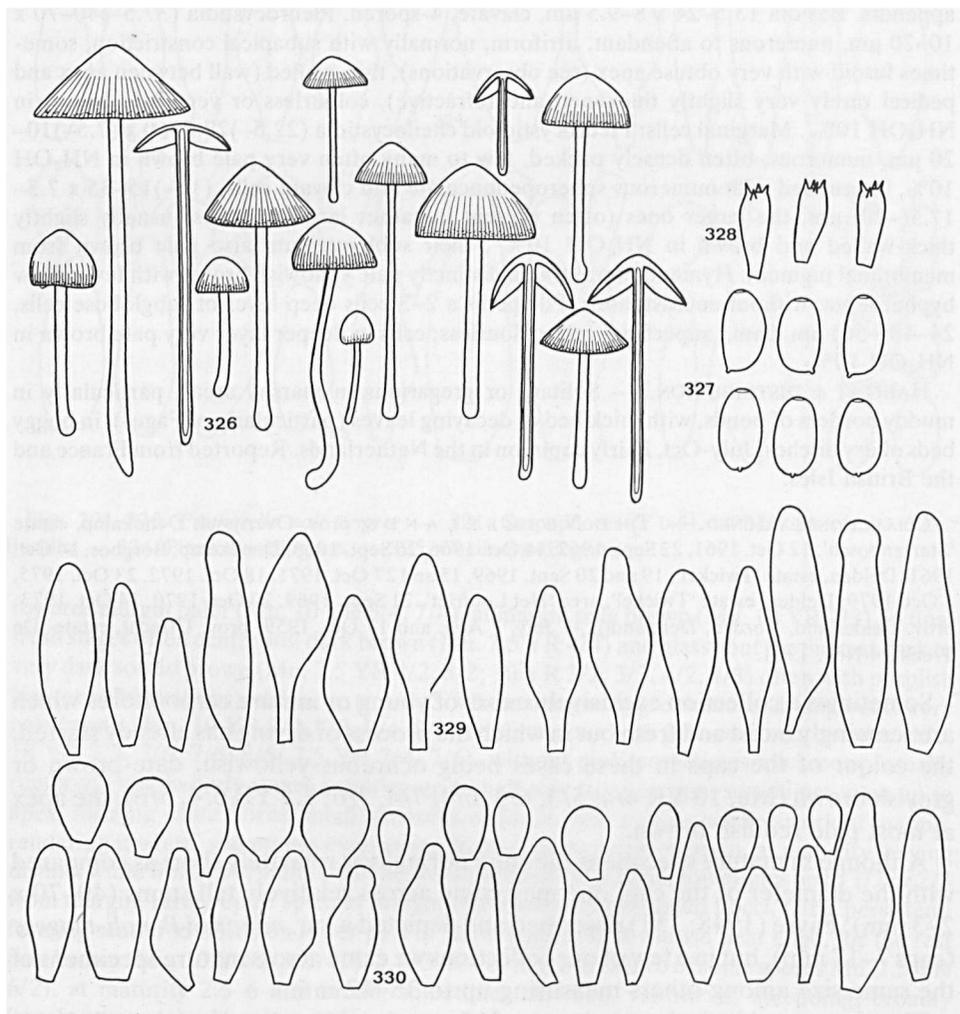
The pleurocystidia in the specimens of 15 out of our 19 collections were distinctly utriform with a distinct subapical constriction. In the other four collections most

pleurocystidia were fusoid with very broad apices without such a constriction, this constriction in those cases, however, being present in most pleurocystidioid cheilocystidia.

***Psathyrella fusca* (Schum.) A. Pears. — Figs. 326–330**

*Agaricus fuscus* Schum. in Enum. Plant. saell. 2: 280. 1803. — *Psathyrella fusca* (Schum.) J. Lange in Dansk bot. Ark. 9(1): 12. 1936. — *Psathyrella fusca* (Schum.) A. Pears. in Trans. Brit. mycol. Soc. 35: 120. 1952. — *Drosophila fusca* (Schum) Kühn. & Romagn., Fl. anal. Champ. sup.: 362. 1953 (not val. publ., basionym not mentioned; misapplied to *P. phegophila*).

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 97, pl. 154 C. 1939; A. H. Smith in Mem. N.Y. bot. Gdn 24: 355. 1972.



Figs. 326–330. *Psathyrella fusca*. — 326. Carpophores (x 0.5). — 327. Spores. — 328. Basidia. — 329. Pleurocystidiogram. — 330. Cheilocystidiogram.

Cap 15–50 mm broad, conical or conicó-paraboloid, later conico-convex, with margin in young stages not or only slightly incurved, very dark brown (Mu. 7.5 YR 3/2, 4/2; 10 YR 4/3), bronze brown or (usually) warm ochre brown (Mu. 7.5 YR 4/4; 10 YR 4/4), paler and often somewhat greyer towards margin, striate up to 3/4 from margin, hygrophanous, drying out to pale or very pale brown (Mu. 10 YR 6/3, 7/3), alutaceous or even whitish (Mu. 2.5 Y 8/2), often distinctly or only very slightly mixed with pink, at centre ochre or yellowish, usually slightly micaceous and more or less rugulose. Veil under favourable circumstances distinct but fugacious, forming on cap many to numerous isolated very small arachnoid, stellate wicker-works or bundles of fibrils in a 3–5 mm broad zone along margin, rarely stronger developed and even appendiculate, on stem scattered fibrils and sometimes minute flocci. Gills 3–6 mm broad, somewhat ventricose or straight, ascending, not crowded, broadly adnate, in young stages purplish grey (Mu. 5 YR 4/1), at maturity overall colour dark greyish brown-purple, near edge purplish grey (Mu. 5 YR 4/1, 5/2), towards base greyish brown (Mu. 10 YR 5/2, 4/2, 3/2; 7.5 YR 3/2) with purplish (violaceous) hue (5 YR 4/2), near base slightly browner; with whitish or concolorous edge. Stem (30–)50–90 x 2–4 (apex) to 4–7 (extreme base), cylindrical but sometimes slightly thickening towards base, snow-white, polished, flamed, rarely slightly isabelline below, hollow, with pruinose apex and non-rooting sometimes subbulbous and distinctly strigose base. Flesh in cap 1–3 mm thick, dark brown (Mu. 10 YR 4/4, 4/3, 3/3), in stem white or whitish, sometimes very pale brown below. Trama of 'washed' gill pale brown or greyish brown (Mu. 10 YR 6/2, 6/3, 7/3), near base with a trace of yellow (Mu. 10 YR 7/4); edge sometimes brown (see below). Spore print purplish black.

Spores 7–9 x 4–5  $\mu\text{m}$  (mean values 7.5–8.4 x 4.5–4.7  $\mu\text{m}$ : 8 collections); ellipsoid, adaxially flattened, in water dark orange-brown (Mu. 5 YR 4/4, 4/6, 4/8) in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 7.5 YR 4/4), in KOH 5% dark sordid brown (Mu. 10 YR 4/3, 3/3), not opaque, with distinct germ pore ( $\pm 1.5 \mu\text{m}$ ) and small hilar appendix. Basidia 14–20 x 7.5–9  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 30–50(–55) x 10–15(–17.5)  $\mu\text{m}$ , moderately numerous (rarely very scarce or very numerous), utriform to subutriform, pedicellate, with obtuse apex, practically colourless (or very pale brown in  $\text{NH}_4\text{OH}$  10%). Marginal cells: Pleurocystidioid cheilocystidia 20–35 x 7.5–12.5(–15)  $\mu\text{m}$ , moderately numerous to abundant, intermixed with sometimes few, but usually numerous small spheropedunculate and clavate cells, 10–20 x 7.5–12.5  $\mu\text{m}$  and a few larger and often slightly thick-walled spheropedunculate cells, 15–30 x 12.5–20  $\mu\text{m}$ , often some or many more or less distinctly brown in  $\text{NH}_4\text{OH}$  10% and in such cases the subhymenial cells at edge also yellowish brown. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very to distinctly pale brown from membranous pigment, with few yellow hyphal septa, sometimes with numerous minute encrustations. Pileipellis a 2–4 cells deep layer of colourless cells, 25–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial or attached to pieces of wood in the ground; under *Fagus*. Aug.-Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **THE NETHERLANDS:** prov. Drente: Rolde, Schoonloo, Schoonlooer Strubben, 29 Sept. 1977; Ruinen, Kraloo, 6 Oct. 1964; prov. Overijssel: Denekamp, along road to Oldenzaal, 18 and 20 Oct. 1967; Delden, estate 'Twickel', 13 Oct. 1968; prov. Gelderland, Apeldoorn, along road near 'Echoput', 20 Oct. 1963; prov. Utrecht, Breukelen, estate 'Over-Holland', 19 Aug. 1967; prov. Noord-Holland; Hilversum, estate 'Gooilust', 3 Oct. 1961.

Our eight collections of *P. fusca* sufficiently agree with Schumacher's description (1803: 280) and fully answer the descriptions and plates of that species given by J. Lange (1939: 97, pl. 154 C) and A. H. Smith (1972: 355, pl. 82, 83, 84a).

In the literature the data about *P. fusca* and *P. murcida* are often confusing and very conflicting. Ricken (1913: 261, pl. 67 fig. 5) published a description of *P. murcida*, not mentioning *P. fusca*. Lange (1939: 97), Malençon & Bertault (1970: 208) and A. H. Smith (1972: 355) gave descriptions of *P. fusca*, not mentioning *P. murcida*. Dennis, Orton & Hora (1960: 157) regarded *P. murcida* to be synonymous with *P. fusca*. Kühner & Romagnesi (1953: 362) gave a description of both species, but for *P. fusca* they described the presence of a strongly developed veil, quoting *Hypholoma appendiculatum* sensu Rick. (a species with very strongly developed veil) while referring on the other hand to Lange's plate 154 C on which velar remnants are hardly visible.

Romagnesi, on comparing exsiccata and pleurocystidiograms of our collections of *P. fusca* sensu J. Lange with the material that he had described as *Drosophila fusca* in the 'Flore analytique' (Kühn. & Romagn. 1953: 362), discovered that two clearly differing taxa were involved. He sent us four exsiccata and a full description of his material and this co-operation resulted in the discovery that *P. fusca* sensu Kühn. & Romagn. differs from *P. fusca* sensu J. Lange not only by its strongly developed veil and its dark and slightly broader spores (4.5–5.5  $\mu\text{m}$ ), but also by its gill edge being characteristically lined with very large numbers of conspicuous and rather large spheropedunculate and clavate cells, intermixed with only very few scattered utriform cheilocystidia (as in *P. spadiceo-grisea*). It was hereupon decided that *Drosophila fusca* sensu Kühn. & Romagn. was to be described by Romagnesi in this monograph as a new species in subsection *Spadiceogriseae*: *P. phegophila*.

*Psathyrella murcida* differs from both *P. fusca* and *P. phegophila* by its very broad gills, its larger spores and longer (40–80  $\mu\text{m}$ ) and differently shaped pleurocystidia. Hence there are three beech wood species having large carpophores, *P. murcida*, *P. fusca* and *P. phegophila*.

For differences of *P. fusca* with *P. spadiceogrisea* and *P. subnuda*, see our notes on the latter species in the chapter on doubtful taxa (p. 278).

#### Subsection *Spadiceogriseae* (Romagn.) ex Kits van Wav.

*Drosophila* subsect. *Spadiceogriseae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 52. 1944 (not val. publ., no latin). — *Psathyrella* subsect. *Spadiceogriseae* (Romagn.) ex Kits van Wav. on p. 280 of the present work. 1985. — Type: *Psathyrella spadiceogrisea* (Fr.) Maire.

Edge of gill lined with large numbers of predominantly or almost exclusively spheropedunculate and clavate, (usually large) cells and few to very few scattered utriform cheilocystidia.

#### KEY TO THE SPECIES OF SUBSECTION SPADICEOGRISEAE

1. Carpophores growing on (remnants of) culms of *Typha*, *Phragmites*, and *Cirsium*.  
*P. almerensis*, p. 221
1. Not as above.
  2. Carpophores often caespitose or subcaespitose, rarely solitary or gregarious; species close to *P. spadiceogrisea*, but smaller; cap in early stages red-brown, at maturity brown, scarcely grey.  
*P. fatua*, p. 223

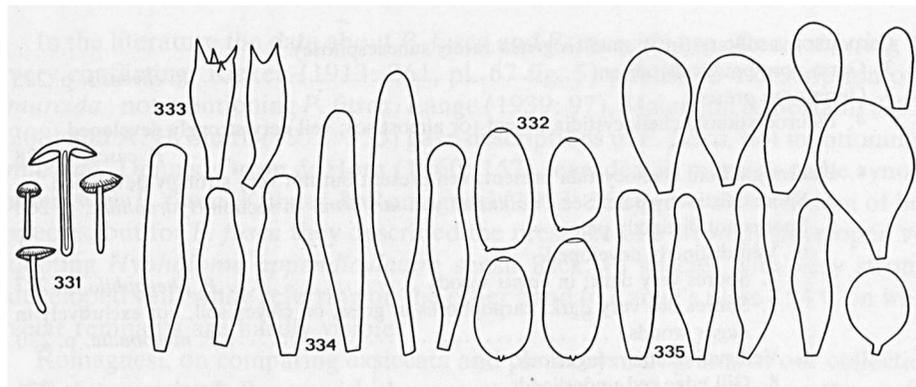
2. Carpophores solitary (in *P. spadiceogrisea* rarely subcaespitose).
3. Germ pore practically absent ..... *P. clivensis*, p. 225
3. Germ pore present.
  4. Pleurocystidioid cheilocystidia absent (or almost so); veil very strongly developed.
    - ..... *P. casca*, p. 228
  4. Pleurocystidioid cheilocystidia present; veil present but not very strongly developed.
  5. Spores distinctly pale. See *P. obtusata* var. *utriformis* in section *Hydrophila*, p. 200
  5. Spores not distinctly pale.
    6. Veil distinctly developed.
      7. Spores very dark; in *Fagus* woods ..... *P. phegophila*, p. 227
      7. Spores not very dark; carpophores in grass, on clayey soil, not exclusively in *Fagus* woods ..... *P. niveobadia*, p. 230
    6. Veil rudimentary, fugacious.
      8. Gill edge red underlined ..... *P. pseudocorrugis*, p. 231
      8. Gill edge not red underlined.
        9. Carpophores fairly large, either tall or thick-set; cap 20–60(–75) mm; stem either tall or relatively short, 35–90–120 mm long; dry cap slightly micaceous.
          10. Carpophores fairly large and tall; cap 20–60(–75) mm, stem 40–90 (–120) mm long; not exclusively vernal.
            11. Gills at maturity dark chocolate; cap not umbonate.
              - ..... *P. spadiceogrisea* f. *spadiceogrisea*, p. 234
            11. Gills at maturity either tobacco-coloured or cap umbonate.
              12. Gill at maturity tobacco-coloured; cap not umbonate.
                - ..... *P. spadiceogrisea* f. *phaeophylla*, p. 237
              12. Gills at maturity dark chocolate; cap umbonate.
                - ..... *P. spadiceogrisea* f. *mammifera*, p. 238
            10. Carpophores thick-set; cap 25–45 mm; stem relatively short 35–60 mm; surface of dry cap matt, polished; exclusively vernal
              - ..... *P. spadiceogrisea* f. *vernalis*, p. 237
          9. Carpophores dwarf size; cap 11–30 mm; stem 15–35 x 1.5–3.5(–5) mm; not vernal.
            13. Spores 7–9 x 4–4.5  $\mu$ m, slightly if at all phaseoliform (utriform cheilocystidia sometimes moderately numerous).
              - ..... *P. spadiceogrisea* f. *exalbicans*, p. 239
            13. Spores 8–10 x 5.5–6  $\mu$ m, conspicuously phaseoliform.
              - ..... *P. phaseolispora*, p. 233

### *Psathyrella almerensis* Kits van Wav. — Figs. 331–335

*Psathyrella almerensis* Kits van Wav. on p. 280 of the present work. 1985.

Cap 8–25 mm, paraboloid-convex, spreading to convex with deflexed margin, conspicuously sulcate up to 1/2–2/3 from margin, in early stages warm brown, later beige brown, greyish beige, drab to dark grey, hygrophanous, drying out to greyish white with cream-coloured centre. Veil white, in earliest stages densely covering both cap and stem, later leaving only fibrils on cap, particularly at margin. Gills 2 mm broad, distant, slightly ventricose, broadly adnate, pale to dark beige or grey, with white edge. Stem 12–30 x 1–3 mm, cylindrical, hollow, white, with fibrillose surface and pruinose apex. Flesh not recorded. Trama of 'washed' gill very pale brownish grey (Mu. 10 YR 7/2), permeated by vague yellowish (Mu. 10 YR 7/3, 7/4) strands up to half way edge. Spore print purplish black.

Spores 9–11.5 x 4.5–6.5  $\mu$ m (mean values 9.3–10.8 x 5.2–6.1  $\mu$ m; 3 collections), ellipsoid, many cells ellipsoid-ovoid, adaxially flattened, dark, in water dark brown or warm brown with a trace of red (Mu. 5 YR 4/4–4/6), in NH<sub>4</sub>OH 10% darker brown (Mu. 5 YR 4/3), in



Figs. 331–335. *Psathyrella almerensis*. — 331. Carpophores (x 0.5). — 332. Spores. — 333. Basidia — 334. Pleurocystidiogram. — 335. Cheilocystidiogram.

KOH 5% sordid greyish brown (Mu. 10 YR 5/2, 5/3), with shallow germ pore (1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 22.5–30 x 9–10  $\mu\text{m}$ , clavate, 4- and rarely 2-spored (very rarely 1-spored). Pleurocystidia 55–65 x 10–14  $\mu\text{m}$ , moderately numerous to scarce, utriform, with fairly broad pedicel, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells large, mainly 17.5–30 x 7.5–15  $\mu\text{m}$  but a fair number 20–40 x 15–27.5  $\mu\text{m}$  and very few large ellipsoid cells, 45–50 x 20–25  $\mu\text{m}$ , abundant and densely packed, intermixed with few scattered to moderately numerous utriform cheilocystidia, 37.5–45 x 9–15  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. in basal part distinctly pale brown from membranous pigment with a fair number of yellow hyphal septa and numerous small encrustations. Pileipellis a 2–3 cells deep layer of subglobose, rather large cells, practically colourless to very pale brown in  $\text{NH}_4\text{OH}$  10%, 25–60  $\mu\text{m}$  diam.

HABITAT & j distribution. — On remnants of culms of *Typha*, *Phragmites*, and *Cirsium*. Oct.–Nov. Very rare in the Netherlands. Not recorded from France or the British Isles.

COLLECTIONS EXAMINED. — T H E N E T H E R L A N D S, prov. IJsselmeerpolders, Zuidelijk Flevoland, slope of dike near Almere (many thousands of specimens) 31 Oct. 1976, 23 Nov. 1976 (type L); prov. Gelderland, Pannerden, 5 Nov. 1983.

The macroscopical description is taken from the notes and good drawings by the collectors; the microscopical description is based on our own examination of the exsiccata.

The shape of the pleurocystidia was rather variable in the examined collections. Many cells had a ventricose cell body with a broad cylindrical or subcylindrical neck with a very obtuse apex, while other cells were sublageniform, also with an obtuse apex. But quite a few cells were distinctly utriform with a subapical constriction. The pleurocystidioid cheilocystidia were distinctly utriform in the 23 Nov. 1976 and 5 Nov. 1983 collection, sublageniform with very obtuse apex in the 31 Oct. 1976 collection.

The habit of both the pleurocystidia-possessing species *P. almerensis* and *P. basii* is the same as that of *P. typhae*, which however has no pleurocystidia. *Psathyrella almerensis* is a good deal larger than *P. basii*, its caps are deeply sulcate, its spores larger and its pleurocystidia utriform against lageniform in *P. basii*.

In the 31 Oct. 1976 collection of *P. almerensis*, found in exactly the same area as the 23 Nov. 1976 collection, we only came across 4-spored basidia and accordingly the spores were smaller (9–10 x 5.5  $\mu\text{m}$ ), while in the other two collections shape and size of the spores were variable.

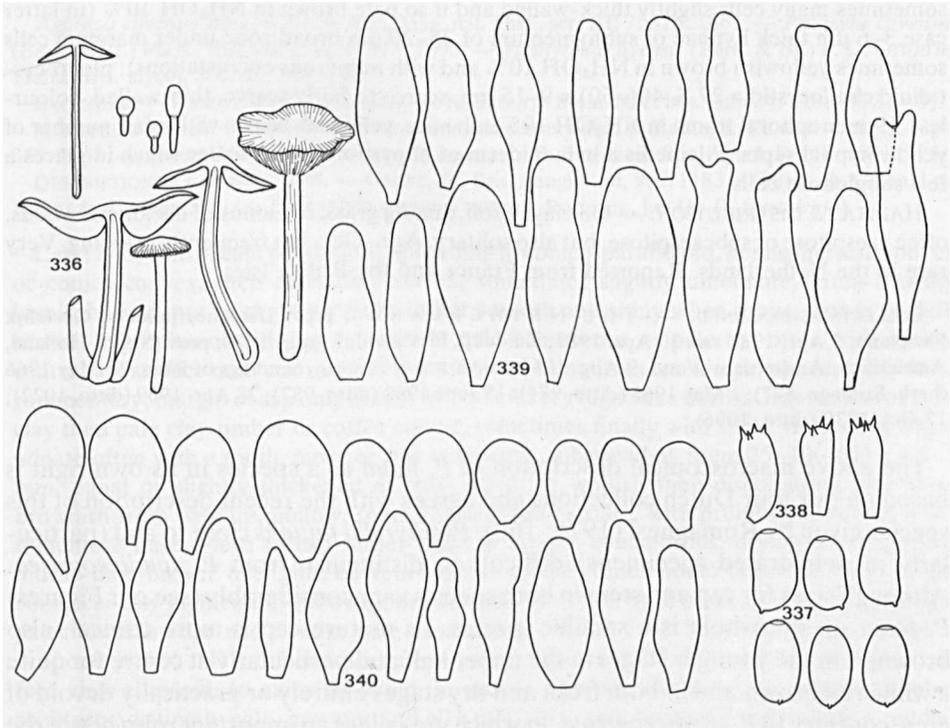
***Psathyrella fatua* (Fr.) Konr. & Maubl. — Figs. 336–340**

*Agaricus stipatus*  $\gamma$  *fatuus* Fr., Syst. mycol. 1: 296. 1821. — *Agaricus fatuus* (Fr.) Fr. Epicr.: 233. 1838. — *Psathyra fatua* (Fr.) Kumm., Führ. Pilzk.: 70. 1871. — *Pannucia fatua* (Fr.) P. Karst. in Bidr. Känn. Finl. Folk 32: 512. 1879. — *Drosophila fatua* (Fr.) Quél., Enchir. Fung.: 117. 1886. — *Hypholoma fatuum* (Fr.) Big. & Guill., Fl. Champ. sup. Fr.: 347. 1909. — *Psathyrella fatua* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 125. 1948.

EXCLUDED. — *Psathyra fatua* sensu Rick., Blätterp.: 256. 1912 (= ?).

DESCRIPTIONS & ILLUSTRATIONS. — A. Pears. in Trans. Brit. mycol. Soc. 35: 119. 1952; Bres. Iconogr. mycol. 18: pl. 869. 1931; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 169. 1975; J. Lange, Fl. agar. dan. 4: 97, pl. 154 D. 1939.

Cap in primordia and early stages acorn-shaped, very dark red-brown, smooth, with bottom half enveloped in white veil connecting cap with stem, at maturity 15–50 mm, conico-paraboloid, conico-convex, often umbonate, rarely paraboloid, warm dark ochre brown (Mu. 7.5 YR 4/4, 5/6, 10 YR 4/4), but in upper half or only at centre reddish brown (Mu. 5 YR 3/4, 4/3, 4/4), striate up to 2/3 from margin, hygrophanous, drying out to



Figs. 336–340. *Psathyrella fatua*. — 336. Carpophores (x 0.5). — 337. Spores. — 338. Basidia. — 339. Pleurocystidiogram. — 340. Cheilocystidiogram.

ochreous (Mu. 7.5 YR 6/6, 10 YR 5/4) at centre and pale ochre (Mu. 10 YR 7/4) or alutaceous without grey or pink in periphery, slightly micaceous and rugulose. Veil forming numerous but fugacious fibrils in a  $\pm 3$  mm broad marginal zone and sometimes a few appendiculate rags at margin and scattered fibrils on stem. Gills 3–4 mm broad, rather crowded, ventricose, fairly narrowly adnate, at first pale (Mu. 7.5 YR 5/2), later dark greyish brown (Mu. 7.5 YR 4/2), finally dark purplish brown or chocolate (Mu. 5 YR 3/2, 4/2; 7.5 YR 3/2), with white edge. Stem 40–50 x 2–4.5 mm, cylindrical with thickened and strigose base, white, isabelline lower down, surface longitudinally fibrillose-striate. Flesh in cap in centre 2 mm thick, dark reddish brown (Mu. 5 YR 4/2), in stem whitish but pale brown in lower half, brown at base. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens yellowish brown (Mu. 10 YR 6/4), near edge paler (Mu. 10 YR 7/4), at base brownish yellow (Mu. 10 YR 6/6), at edge itself sometimes distinctly brown. Spore print very dark purplish black with a reddish hue.

Spores 7–9 x 4.5–5  $\mu$ m (mean values 7.6–8.3 x 4.5–4.6  $\mu$ m: 9 collections), in face view ellipsoid, often ellipsoid-ovoid, in profile ellipsoid, adaxially flattened, many slightly phaeoliform, in water warm orange-brown (Mu. 5 YR 4/4, 4/6, 4/8), in NH<sub>4</sub>OH 10% darker (Mu. 5 YR 3/3, 4/3; 7.5 YR 4/4), in KOH 5% sordid greyish brown (Mu. 10 YR 4/2, 4/3), not opaque; germ pore 1–1.8  $\mu$ m, fairly distinct; with small hilar appendix. Basidia 19–24 x 7–9.5  $\mu$ m, clavate, 4-spored. Pleurocystidia 32.5–55(–62.5) x 9–15(–17.5)  $\mu$ m, numerous or moderately numerous, utriform but very versiform, sometimes with forked apex, thin-walled, in NH<sub>4</sub>OH 10% colourless to very pale brown. Marginal cells: spheropedunculate and clavate cells 15–30(–40) x 7.5–22.5  $\mu$ m, abundant and very densely packed, some or sometimes many cells slightly thick-walled and if so pale brown in NH<sub>4</sub>OH 10% (in latter case 3–6  $\mu$ m thick hyphae of subhymenium of 25–20  $\mu$ m broad zone under marginal cells sometimes yellowish brown in NH<sub>4</sub>OH 10% and with numerous encrustations); pleurocystidioid cheilocystidia 27.5–40(–60) x 9–15  $\mu$ m, scarce to fairly scarce, thin-walled, colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. yellowish brown with a fair number of yellow hyphal septa. Pileipellis a hymeniderm of obpyriform cells, under which in places a few subglobose cells.

**HABITAT & DISTRIBUTION.** — On clayey soil, among grass, in humus of deciduous woods, often caespitose or subcaespitose, but also solitary. Apr.-Oct., but frequently in spring. Very rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. IJsselmeerpolders; Oostelijk Flevoland, 3 Apr. 1981 and 30 Apr. 1983; Zuidelijk Flevoland, 9 April 1979; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 9 Aug. 1961. — **F R A N C E,** surroundings of Paris, 28 May 1966 (herb. Romagn. 877); 1 May 1968 (ditto, 974); 19 June 1968 (ditto, 987); 28 Apr. 1969 (ditto, 1022); 17 Oct. 1970 (ditto, 1096).

The above macroscopical description of *P. fatua* as a species in its own right is based on our four Dutch collections and agrees with the recent description of this species given by Romagnesi (1975: 169). *Psathyrella fatua* is close to and (particularly in dehydrated specimens) difficult to distinguish from *P. spadiceogrisea*. Although sizes for cap and stem in both species vary considerably (see our Figures) *P. fatua* on the whole is a smaller species. Its mature cap is more conical, also browner, in the younger stages in the upper half and particularly at centre for quite a while red brown and in both fresh and dry stages entirely or practically devoid of grey, contrary to *P. spadiceogrisea*, in which grey plays an important role (hence the name). Next *P. fatua* essentially is a caespitose or subcaespitose species, although

occasionally occurring solitary, sometimes gregarious. Fries (1838: 233; 1863: 441; 1874: 1166), Quélet (1872: 149), Bresadola (1931: pl. 869), Lange (1939: 97, pl. 154 D), Konrad & Maublanc (1948: 125), Pearson (152: 119), and v. Schulmann (1960: 72) all mentioned the caespitose growth of *P. fatua*. Finally independently from each other Romagnesi (1975: 169) and we found the pileipellis to be monostratic or almost so, consisting of obpyriform or clavate cells, whereas Romagnesi (1975: 163) reported that the pileipellis of *P. spadiceogrisea* 'seemed to be polystratic, at least in the centre'. We confirmed his observation.

Romagnesi discussed the nomenclature of *P. fatua* only in relation to Quélet's descriptions (1972: 149; 1886: 117; 1886: 61), ignoring Fries's descriptions. He rightly stated that from these descriptions (in which Quélet quoted Fries as the author) it is clear that Quélet may well have mixed up *P. fatua* and *P. spadiceogrisea*. From Fries's descriptions it is sufficiently clear that he had the species, described above as *P. fatua*, in mind. Mainly through Bresadola (1931: pl. 869), Lange (1939, 4: 97, pl. 154 D), who described *Psathyra fatua* Fr. sensu Bresadola, Konrad & Maublanc (1948: 125) who quoted both Bresadola and Lange, finally through Romagnesi (1975: 169) the more precise interpretation of the species, described above as representing *Agaricus fatuus* Fr. has gradually developed.

#### ***Psathyrella clivensis* (Berk. & Br.) P. D. Orton — Figs. 341–344**

*Agaricus clivensis* Berk. & Br. in Ann. Mag. nat. Hist., ser. III, 7: 376. 1861. — *Psilocybe clivensis* (Berk. & Br.) Mass., Brit. Fung. Fl. 1: 378. 1892. — *Psathyrella clivensis* (Berk. & Br.) P. D. Orton in Trans. Brit. mycol. Soc. 43: 369. 1960.

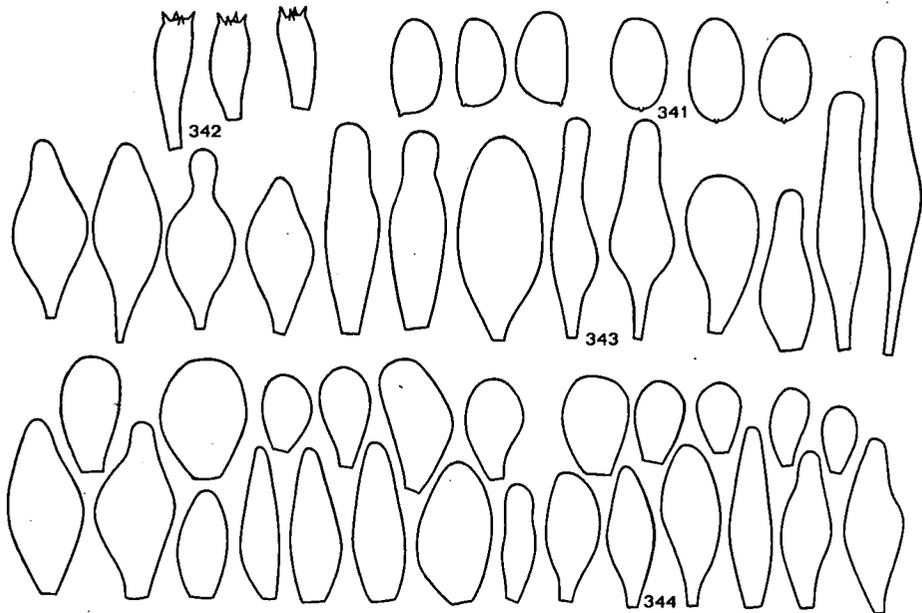
EXCLUDED. — *Psathyrella clivensis* sensu A. H. Smith in Mem. N.Y. bot. Gdn 24: 318. 1972 (= ?).

MISAPPLIED NAMES. — *Drosophila empyreumatica* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 363. 1953. — *Drosophila frustulenta* sensu Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 189. 1975.

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 8: pl. 969/1183. 1888; P. D. Orton, l.c.; Kühn. & Romagn., l.c. (as *Drosophila empyreumatica*); Romagn., l.c. (as *D. frustulenta*).

Cap 12–30 mm broad, paraboloid, spreading to conico-paraboloid, hemispherical, convex or conico-convex, then expanded-convex, sometimes slightly umbonate, often broadly hemispherical, not or slightly striate, rather smooth and shiny when moist, amber or date brown, hygrophanous, drying to whitish, pale ochraceous or pale tan often with darker centre; dry surface matt and more or less atomate, sometimes cracking in places. Veil white, rudimentary; margin of cap only at first with a few very fugacious fibrils. Gills whitish or pale clay then pale clay-umber or coffee colour, sometimes finally with slight violaceous tinge, adnate often with a tooth, more or less ventricose, subcrowded. Stem 25–40(–65) x 1.5–3 mm, equal or slightly thickened at base, white or whitish then discolouring pale dirty brownish from base up, hollow, sparsely white silky striate, with pruinose apex and white tomentose base. Flesh of cap rather thick in centre, concolorous, drying whitish, often 'horny-date-brown' over gills, of stem hyaline-whitish. Smell none. Trama of 'washed' gill conspicuously pigmented, yellowish brown (Mu. 10 YR 5/6) in basal 1/2 or 2/3, gradually paler towards edge and at edge pale brown (Mu. 10 YR 7/4). Spore print dark brown.

Spores 8–10(–11) x 5.5–6.5  $\mu$ m (mean values 8.4–9.7 x 5.5–5.7  $\mu$ m: 10 collections), in face view ellipsoid, to ellipsoid-ovoid, in profile adaxially flattened, sometimes subphaeoliform, distinctly pale, in water and NH<sub>4</sub>OH 10%, pale brownish yellow with a reddish hue (Mu. 7.5 YR 6/6) in KOH 5% pale yellowish brown (Mu. 10 YR 5/6), not opaque, with very indistinct, practically absent germ pore (callus) and very small hilar appendix. Basidia



Figs. 341–344. *Psathyrella clivensis*. — 341. Spores. — 342. Basidia. — 343. Pleurocystidiogram. — 344. Cheilocystidiogram.

20–30 x 7.5–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 37.5–60(–75) x 10–17.5  $\mu\text{m}$ , moderately numerous, in the main utriform, but shape variable, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells 17.5–32 x 7.5–22  $\mu\text{m}$ , abundant and almost exclusively forming cellular lining of gill edge; pleurocystidioid cheilocystidia 30–50 x 9–20  $\mu\text{m}$ , scarce (sometimes even seemingly absent), subutriform or fusiform with obtuse apex or sometimes sublageniform; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very distinctly brown from membranous pigment, strongest at base, gradually less towards edge, with few yellow hyphal septa and very few small encrustations. Pileipellis a 2–3 cells deep layer of globose to subglobose colourless cells, 16–32  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary or in small groups in chalk grassland. Apr.–Nov. Very rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S.**, prov. Utrecht, Fortress Rhijnauwen, 9 Nov. 1975 (WBS); prov. Zeeland, Reimerswaal, Yerseke Moer, 15 Oct. 1984. — **B R I T I S H I S L E S:** Warwickshire: Draycote Meadow, 3 May 1983; Haybury Spoil Bank, 15 May 1983; Surrey: Epsom Downs, 10 Nov. 1958 (E); Juniper Hill, Mickleham, 23 June 1956 (E). — **F R A N C E:** dpt. Oise, Mont de Hermes, Forêt de Hej, 18 Aug. 1968 (herb. Romagn. 1004); dpt. Val-d'Oise: Chaumontel, 19 Apr. 1959 (herb. Romagn. 719); Bellefonsacre, 12 May 1968 (herb. Romagn. 980); dpt. Côte-d'Or, Dijon, Parc municipal, 10 Oct. 1929 (herb. Romagn. 219).

With the insertion of only a few data from the Dutch and British collections (paraboloid shape and striation of cap – also mentioned in Romagnesi's description – size of stem and colour of spore print) the description of the macroscopical characters is taken from Orton (1960: 369), that of the microscopical characters and the pigmentation of the hymenophoral trama is based on our examination of the exsiccata of the collections mentioned above.

Romagnesi's description of *P. frustulenta* (1975: 189) fully corresponds with the above description. Moreover, the microscopical characters found in the four exsiccata bearing this name and received by us from Romagnesi fully tally with those of the British and Dutch collections. Romagnesi (l.c.) included *P. clivensis* in the synonymy of his *P. frustulenta*. (For our concept of that Friesian species see p. 189 of this work.) Most spores of the Warwickshire collection had, when mounted in  $\text{NH}_4\text{OH}$  10%, a minute (up to 1  $\mu\text{m}$  wide) bulging 'germ pore' (projecting as a hyaline bubble).

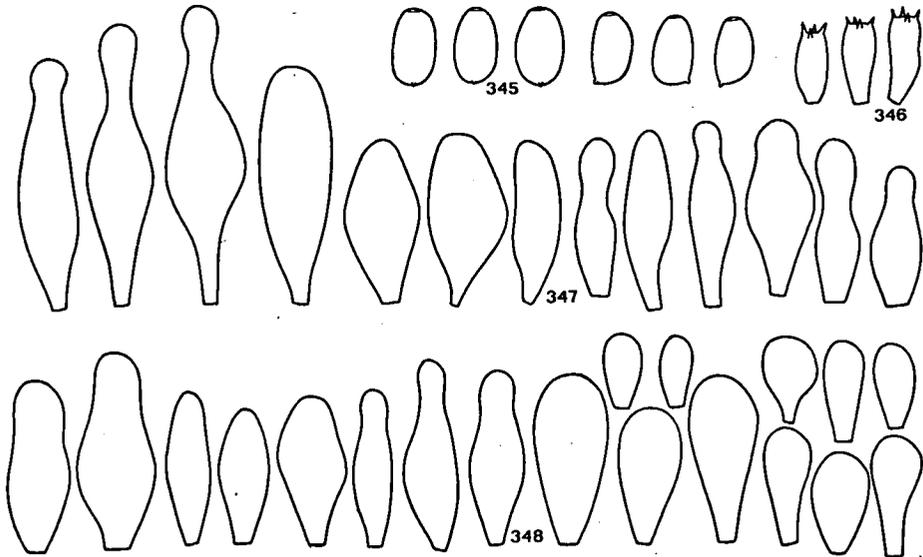
***Psathyrella phegophila* Romagn. — Figs. 345–348**

*Psathyrella phegophila* Romagn. on p. 282 of the present work. 1985.

MISAPPLIED NAMES. — *Hypholoma appendiculatum* sensu Rick., Blätterp.: 247. 1912. — *Drosophila fusca* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 362. 1953; sensu Malenç. & Bertault, Fl. Champ. sup. Maroc 1: 209. 1970.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., l.c. (as *H. appendiculatum*); Kühn. & Romagn., l.c. (as *D. fusca*); Malenç. & Bertault, l.c. (as *D. fusca*).

Cap at first conical, soon spreading, (23–)40–60 mm, fragile, sometimes subumbonate (umbo only developing when centre slightly depressed), with margin at first incurved, later regular, finally sometimes more or less lobed and wavy, in early stages warm ochreous, then greyish ochre, finally grey dark ochreous brown, little striate, hygrophanous, becoming sordid brownish cream, more or less rugulose. Veil when still intact almost annular around margin of cap, with sulcate surface, white, very fragile and fugacious and therefore rarely intact, leaving scattered flocci and denticles at margin of cap but often no trace at all. Gills 4–6.5 mm broad, at first close, later more distant, sometimes a little flexuous, fairly broadly adnate, at first a little ventricose, later rather sickle-shaped or almost straight, at first



Figs. 345–348. *Psathyrella phegophila*. — 345. Spores. — 346. Basidia. — 347. Pleurocystidiogram. — 348. Cheilocystidiogram.

brownish, brownish grey, finally becoming much darker up to dark purple-brown, with white pruinose edge. Stem 42–92 x 3.5–5.5 mm, thickening towards base (up to 7.5 mm) and there sometimes narrowing into a pseudorrhiza, white but in the end a little brownish or yellowish brown, hollow sometimes with marrow in basal part, with thick firm cortex; apex pruinose and sulcate; base covered with white mycelial tomentum and a few brownish fibrils. Flesh of cap thin and fragile near margin, thicker in centre, ochre-grey, of stem whitish. Smell indistinctive. Trama of ‘washed’ gill distinctly although not strongly brown or brownish yellow from base to edge, strongest at base (Mu. 10 YR 6/6), paler near edge (Mu. 10 YR 8/2). Spore print purple sepia brown.

Spores (7–)7.5–9 x 4.5–5.5  $\mu\text{m}$  (mean values 7.8–8.6 x 5–5.3  $\mu\text{m}$ : 4 collections) ellipsoid, adaxially flattened, dark, in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in KOH 5% dark sordid brown ( $\pm$  7.5 YR 4/2), not opaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and small but distinct hilar appendix. Basidia 17.5–22.5 x 8–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 30–45(–60 . . . 70) x 10–17(–20)  $\mu\text{m}$ , usually rather few or moderately numerous, rarely abundant, utriform and almost always with a subapical constriction, but sometimes ellipsoid or clavate with very obtuse apex, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells, 15–40(–70) x 7.5–20(–25)  $\mu\text{m}$ , in very large numbers and densely packed, intermixed with only very few and scattered utriform cheilocystidia, 32.5–47.5 x 10–20  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. brownish yellow from membranal pigment, with a number of yellowish hyphal septa, without encrustations. Pileipellis (according to Romagnesi) cellular, consisting of colourless subglobose cells, 15–50  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — In *Fagus* woods. Aug.–Oct. Not reported from the Netherlands and the British Isles. Very rare in France.

COLLECTIONS EXAMINED. — F R A N C E, dpt. Oise, Villiers-Saint-Frambourg, Forêt d’Halatte, 3 Oct. 1963 (herb. Romagn. 840); dpt. Seine-et-Marne, Forêt de Fontainebleau, No. 1936 (ditto, s.n.); 28 Aug. 1941 (ditto, 279; type); 28 Aug. 1941 (ditto, 280).

We never saw fresh material of this species. The above description of the macroscopical characters is a translation of Romagnesi’s manuscript. The description of the microscopical characters is based on our examination of four exsiccata received from Romagnesi. For further observations, nomenclature and differences with *P. fusca* and *P. murcida*, see observations on *P. fusca*.

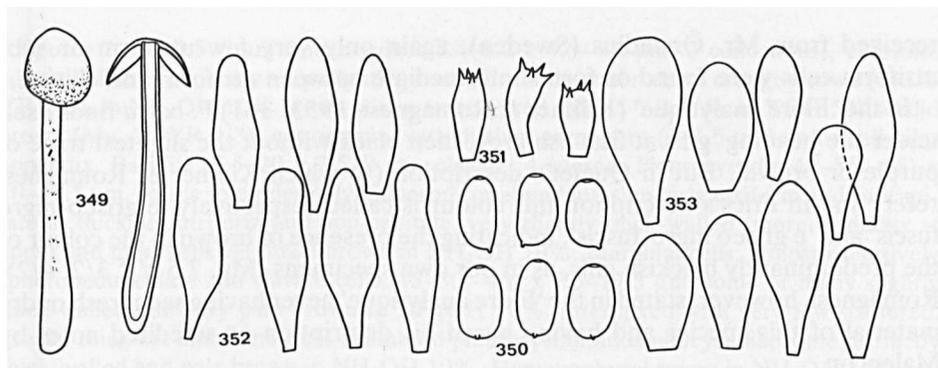
### *Psathyrella casca* (Fr.) Konr. & Maubl. — Figs. 349–353

*Agaricus cascus* Fr., Epicr.: 224. 1838. — *Hypoloma cascum* (Fr.) Quél. in Mem. Soc. Emul. Montbéliard, sér. II, 5 (Champ. Jura Vosges 1): 145. 1872. — *Drosophila casca* (Fr.) Quél., Enchir. Fung.: 115. 1886. — *Psathyra casca* (Fr.) Sing. in Anns mycol. 34: 339. 1936. — *Psathyrella casca* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 127. 1948.

EXCLUDED. — *Hypoloma cascum* sensu Rick., Blätterp.: 246, pl. 64 fig. 1. 1912 (= *P. cotonea*).

DESCRIPTIONS & ILLUSTRATIONS. — Quél., l.c.; Cooke, Ill. Brit. Fungi 4: pl. 544/584. 1885, Britz. in Bot. Centralbl. 14: 69, pl. 324 fig. 208. 1893; J. Lange, Fl. agar. dan. 4: 77, pl. 147 A. 1939; Kühn. & Romagn., Fl. anal. Champ. sup.: 361. 1953; Malenç. & Bertault, Fl. Champ. sup. Maroc 1: 200. 1970.

Cap 20–30 mm, at first paraboloid or hemispherical, then spreading to convex, dark reddish brown (Mu. 5 YR 3/4), rapidly changing into dark warm brown (Mu. 5 YR 4/4), not striate but finely rugulose, hygrophanous, drying out to very pale brown (Mu. 10 YR 7/4) at centre, still paler (Mu. 10 YR 8/3) elsewhere, without pink, not micaceous but regulose in peripheral 2/3. Veil very strongly developed, white, in early stages forming a thick velar



Figs. 349–353. *Psathyrella casca*. — 349. Carpophores (x 0.5). — 350. Spores. — 351. Basidia. — 352. Pleurocystidiogram. — 353. Cheilocystidiogram.

pelt of radially arranged fibrils and fascicles of fibrils up to 10 mm from margin, in places also forming a 1 mm broad appendiculate belt along margin, at maturity leaving dense wickerworks of fibrils on marginal zone and on stem many scattered fibrils. Gills 3–5 mm broad, ventricose, broadly adnate, at first very pale brown (Mu. 10 YR 7/3), towards edge paler (Mu. 10 YR 7/2), at maturity dark sordid brown (Mu. 7.5 YR 3/2, 4/2), with purplish hue, with white fimbriate edge. Stem tall and very hollow (cavity 3–5 mm wide, penetrating into flesh of cap), 70–75 x 3–4 (apex) . . . 5–7 (near base), not rooting, firm, snow-white, cream coloured below, in upper half finely longitudinally striate with apex very finely pruinose, in lower half finely fibrillose, at base covered by whitish down. Flesh of cap 1–2 mm thick in centre, dark reddish brown ( $\pm$  Mu. 5 YR 3/2), of stem white, cream alongside cavity. Trama of ‘washed’ gill at base very pale brown (Mu. 10 YR 7/4), paler towards edge. Spore print purplish black.

Spores 7–8 x 4.5–5  $\mu$ m (mean values 7.7 x 4.5  $\mu$ m: 1 collection), shape variable, most spores in face view ellipsoid, but some ellipsoid-ovoid, in profile usually ellipsoid, adaxially flattened, but some slightly phaseoliform, in water warm brown with reddish hue (Mu. 5 YR 4/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/4), in KOH 5% dark sordid brown (Mu. 10 YR 4/2), not opaque, with fairly distinct germ pore ( $\pm$  1  $\mu$ m) and small hilar appendix. Basidia 17.5–24 x 8–9.5  $\mu$ m, clavate, 4-spored. Pleurocystidia 35–45(–55) x 10–12  $\mu$ m, fairly numerous, utriform-pedicellate, thin-walled, colourless. Marginal cells: exclusively rather large spheropedunculate and clavate cells, mostly 15–30 x 9–15  $\mu$ m but a fair number even 30–40 x 15–17.5(–20)  $\mu$ m; pleurocystidioid cheilocystidia practically absent (see observations); all cells thin-walled and colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. very pale yellowish brown from membranous pigment, without yellow septa or encrustations. Pileipellis a 2–3 cells deep layer of colourless subglobose cells, 25–40  $\mu$ m diam.

**HABITAT & DISTRIBUTION.** — Terrestrial against piece of wood in clayey soil of deciduous wood. Aug. Very rare in the Netherlands. Reported from France, not from the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS, prov. Noord-Holland, Amsterdam, Amsterdam Wood, 1 Aug. 1974. — SWEDEN, Skåne, Kjugekull,  $\pm$  15 km. E. of Kristianstad.

The tall stem, the rather strongly developed veil, and the great scarcity of pleurocystidioid cheilocystidia are diagnostic of this very rare species. During a thorough examination of two gills only two broadly fusoid-subutriform cheilocystidia were found, later, on re-examination and on examination of the exsiccatum

received from Mr. Örstadius (Sweden), again only very few utriform or sub-utriform cells were found or forms intermediate between utriform and clavate.

In the 'Flore analytique' (Kühner & Romagnesi, 1953: 361) *P. casca* finds itself under the heading 'gills at first ash grey, then black without the slightest trace of purple or brown'. But in Quélet's description (to which Kühner & Romagnesi refer) and in Fries's description this colour is called respectively 'e griseo-nigro fuscis' and 'e griseo nigro-fuscis', indicating the presence of brown in the colour of the predominantly blackish gills, as in our own specimens (Mu. 7.5 YR 3/2, 4/2). Romagnesi, however, stated in the 'Flore analytique' never having seen fresh or dry material of this species and having based his description on unedited notes by Malençon.

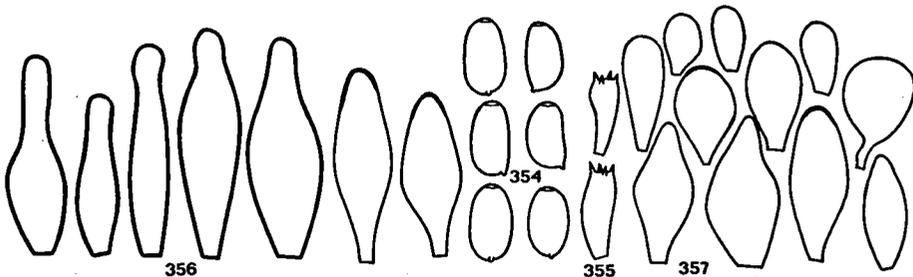
In the Swedish material the spores were slightly smaller: 6.5–7(–8) x 3.5–4 µm (mean values 7.1 x 3.9 µm).

***Psathyrella niveobadia* (Romagn.) Mos. — Figs. 354–357**

*Drosophila niveobadia* Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 173. 1975. — *Psathyrella niveobadia* (Romagn.) Mos. in Gams, Kl. Kryptog.fl., 2 b/2, 3. Aufl.: 276. 1978.

DESCRIPTION & ILLUSTRATIONS. — Romagn., l.c.

Cap 17–50 mm, rather fleshy, at first obtusely conical to paraboloid, then hemispherical, finally spreading to entirely plane, sometimes more or less umbonate, with marginal area fairly thick and at first incurved, entire or cleft, in the end revolute, irregularly cleft and lobate, not striate, in early stages magnificently dark date brown, at centre more ochre and at margin more red, moist surface smooth and almost glossy, later radially wrinkled at centre and sometimes wrinkled-sulcate at margin, hygrophanous, drying out to drab-cream-coloured with a touch of ochre at centre. Veil very distinct, forming an encircling snow-white fibrillous band exclusively along margin of cap and sharply contrasting with dark colour of cap. Gills 3–5 mm broad, close to moderately close, adnexed, slightly ventricose, greyish brown, in the end more or less dark tobacco brown, with pruinose white edge. Stem 50–90 x 3.5–6 mm, rather robust, cylindrical, hollow, with extreme base sometimes bent and attenuated, subrooting, snow-white, later slightly sordid brownish, satiny, striate in its upper part, pruinose at apex, with thick and rigid cortex. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens yellowish brown (Mu. 10 YR 6/4) from many vague anastomosing brownish yellow (Mu. 10 YR 6/6) strands running from base to edge, through in itself pale brown (Mu. 10 YR 6/3) tissue. Spore print sepia with a reddish hue.



Figs. 354–357. *Psathyrella niveobadia*. — 354. Spores. — 355. Basidia. — 356. Pleurocystidiogram. — 357. Cheilocystidiogram.

Spores 7–9 x 4.5–5  $\mu\text{m}$  (mean values 7.4–8.2 x 4.5–4.6  $\mu\text{m}$ : 3 collections), ellipsoid, adaxially flattened, many very slightly phaseoliform, in water warm orange-brown (Mu. 5 YR 4/8), in  $\text{NH}_4\text{OH}$  10% brown with a trace of red (Mu. 5 YR 4/4), in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 4/3), not opaque, with distinct germ pore (1–1.5  $\mu\text{m}$ ) and small hilar appendix. Basidia 17.5–20 x 7.5–9  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40–55(–65) x 10–17.5  $\mu\text{m}$ , scarce to moderately numerous or abundant, slenderly utriform and subcapitate to thick-set utriform and non-capitate, very slightly thick-walled (more distinctly at apex) and most cells very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: almost exclusively spheropedunculate and clavate cells, 15–30(–40) x 7.5–17.5  $\mu\text{m}$ , some or many slightly thick-walled and very pale brown in  $\text{NH}_4\text{OH}$  10%, intermixed with very few scattered, usually thick-set and sometimes rhomboid pleurocystidioid cheilocystidia, some distinctly thick-walled and pale brown in  $\text{NH}_4\text{OH}$  10%. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. brownish yellow from membranous pigment with numerous yellow hyphal septa but without encrustations. Pileipellis (according to Romagn.) cellular, several cells deep; cells 45–100 x 20–50  $\mu\text{m}$ .

**HABITAT & DISTRIBUTION.** — In grass and clayey soil against small pieces of wood. May–July. Not reported from the Netherlands or the British Isles; very rare in France.

**COLLECTIONS EXAMINED.** — FRANCE: dpt. Oise, Lamorlaye, 1 May 1968 (herb. Romagn. 975); dpt. Val-d'Oise, Viarmes, 1 May 1968 (ditto, 977); Fontaines-Longponts, 26 July 1970 (ditto, 1077).

The description of the macroscopical characters is a translation of the description, given by Romagnesi (1975: 173), that of the microscopical characters and the pigmentation of the gill trama is based on our examination of exsiccata received from Romagnesi.

This species is chiefly distinguished from *P. spadiceogrisea* by the conspicuous brown colour of its non-striate cap, its more strongly developed veil, and its robuster habit. From *P. fatua* it is distinguished by its robuster habit, more fleshy and non-striate cap, its thicker stem, its more strongly developed veil and its pileipellis not being a hymeniderm but a layer of several cells deep.

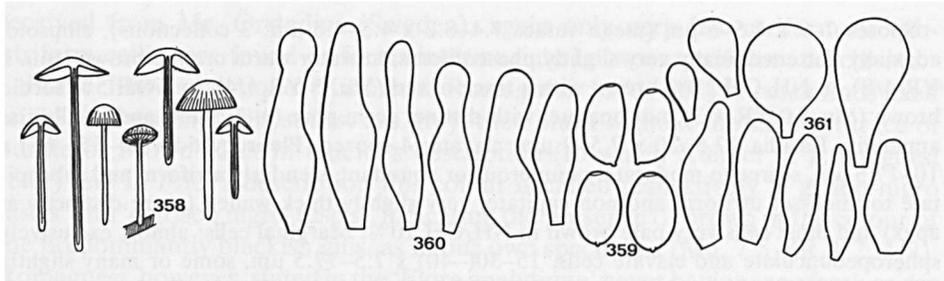
In collection 1077 the pleurocystidia were abundant and quite different (thick-set, utriform) from the capitate-utriform cells of the specimens of the collections 975 and 977 (both found on the same day but at quite different places). All three collections were (according to Romagnesi) found to be interfertile.

### *Psathyrella pseudocorrugis* (Romagn.) Bon — Figs. 358–361

*Drosophila pseudocorrugis* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952. — *Psathyrella pseudocorrugis* (Romagn.) Galland in Rev. Mycol. 36: 155. 1972 (not val. publ., basionym not mentioned); ex Bon in Docum. mycol. 12(48): 52. 1982.

**DESCRIPTIONS & ILLUSTRATIONS.** — Kühn. & Romagn., Fl. anal. Champ. sup.: 361. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 34. 1982.

Cap 10–22 mm (but see observations), paraboloid, spreading to convex, when expanded sometimes subumbonate, fragile, at first reddish brown (Mu. 5 YR 3/3, 4/3, 5/3) or reddish grey (Mu. 5 YR 4/2, 5/2), rapidly turning yellowish brown (Mu. 10 YR 5/6, 6/6) at centre, elsewhere dark or greyish brown (Mu. 7.5 YR 3/2), striate up to half way from margin, hygrophanous, drying out to very pale brown (Mu. 10 YR 8/2, 8/3, 8/4, 7/2, 7/3) or alutaceous, usually (sometimes only scarcely) distinctly pink in peripheral half, contrasting with pale yellowish ochre (Mu. 10 YR 8/3, 8/4), centre, micaceous, rugulose. Veil white,



Figs. 358–361. *Psathyrella pseudocorrugis*. — 358. Carpophores (x 0.5). — 359. Spores. — 360. Pleurocystidiogram. — 361. Cheilocystidiogram.

very fugacious, leaving few very small fibrils along margin, perceptible only in early stages; also scattered fibrils on lower 3/4 of stem. Gills 2–3 mm broad, subventricose or ascending, straight, broadly adnate, sometimes with distinct tooth, sometimes fairly crowded, in earliest stages pale grey (Mu. 5 YR 6/2), at maturity dark chocolate (Mu. 5 YR 5/2, 4/2, 4/3, 3/2; 2.5 YR 3/2) or tobacco colour (Mu. 7.5 YR 5/2), with purple; edge white, in mature specimens distinctly underlined with red (sometimes microscopical examination needed). Stem 30–45 x 1–2 mm (but see observations), cylindrical, usually very slightly thickening towards base, hollow, white, pale brown below, with pruinose apex and strigose base. Flesh of cap 1–1.5 mm thick in centre, dark brown (Mu. 10 YR 3/3), of stem white, pale brown below. Trama of ‘washed’ gill very pale to pale brown (Mu. 10 YR 7/2, 7/3, 7/4) or almost colourless. Spore print purplish black.

Spores 7–8.5 x 4–5.5  $\mu\text{m}$  (mean values 7.6–8.2 x 4.5–4.9  $\mu\text{m}$ : 4 collections), ellipsoid, adaxially flattened, dark, in water dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown, in  $\text{KOH}$  5% dark sordid brown (Mu. 7.5 YR 4/2); with distinct germ pore ( $\pm 1.5 \mu\text{m}$ ) and small hilar appendix. Basidia 17.5–25.6 x 8–9.6  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 32–50 x 10–12.5(–15)  $\mu\text{m}$ , few in number to moderately numerous, utriform, sometimes with forked (lobed) apex, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells 25–37.5(–45) x 10–20  $\mu\text{m}$ , abundant, densely packed, sometimes with rather long pedicel, some of the larger cells often slightly thick-walled and pale brown in  $\text{NH}_4\text{OH}$  10%, intermixed with scarce (sometimes in small areas of edge fairly numerous) and scattered, utriform cheilocystidia, 25–37.5(–45) x 10–15  $\mu\text{m}$ , thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very pale brown from membranous pigment, at base slightly darker and sometimes with many yellow hyphal septa and a fair number of encrustations. Pileipellis a 3–4 cells deep layer of subglobose, colourless cells, 15–35  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial, solitary or in very small groups, in grassy road verges in deciduous woods, also found on burnt ground. June–Oct. Very rare in the Netherlands. Reported from France and found in the British Isles (see below).

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel, Ommen, estate ‘Ada’s Hoeve’, 7 Oct. 1967; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 8 and 19 June 1961. — BRITISH ISLES: Oxford, Tubney Woods, 11 Sept. 1969.

This species, as we got to know it, is characterized by the combination of pink in the colour of the drying cap, red underlining of the gill edge, utriform pleurocystidia, the pattern of the cellular lining of the gill edge, and curiously enough the small size. Romagnesi in the original (1952: 154) and following descriptions (1953: 361, 1982: 34) reported considerably larger sizes (cap 20–70, stem 35–105 x 2.5–8 mm), the species according to him (in litt.) approaching *P. murcida* because of its

habit and red underlining of the gill edge which sometimes occurs in the latter species. Nevertheless we are convinced that our small-sized specimens are conspecific with the large-sized specimens of the type and other collections of Romagnesi.

***Psathyrella phaseolispora* Arnolds — Figs. 362–365**

*Psathyrella phaseolispora* Arnolds in Biblioth. mycol. 90: 435. 1982.

DESCRIPTION & ILLUSTRATIONS. — Arnolds, l.c.

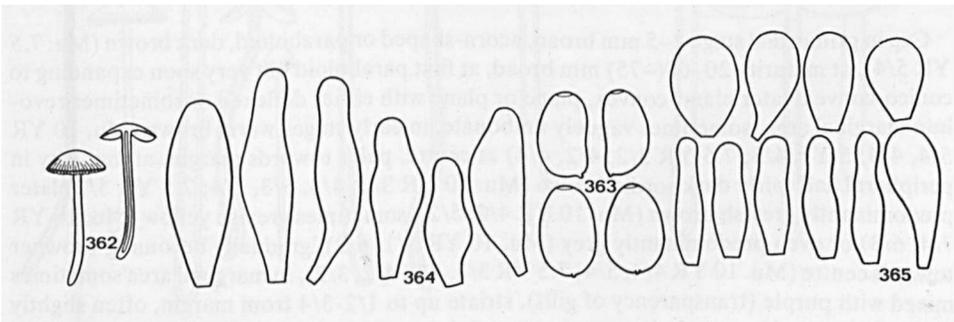
Cap 18 mm, obtusely conico-convex, sordid ochre brown, towards margin brown, with violaceous flush, striate up to half way from margin, hygrophanous, drying out to cream-coloured with ochre centre, micaceous, without pink. Veil not seen. Gills ventricose, fairly narrowly adnate, rather crowded, violaceous brown, with white edge. Stem 28 x 2–5 mm, cylindrical, white, with smooth surface. Trama of 'washed' gill pale brown (Mu. 10 YR 6/4), paler towards edge. Spore print not recorded.

Spores 8–10 x 5–6  $\mu\text{m}$  (mean values 9 x 5.5  $\mu\text{m}$ : 1 collection) in face view ellipsoid or often distinctly ovoid, in profile conspicuously phaseoliform, in water orange-brown (Mu. 5 YR 5/6, 5/8), in  $\text{NH}_4\text{OH}$  10% and  $\text{KOH}$  5% warm brown (Mu. 5 YR 4/6), not opaque, with fairly distinct germ pore ( $\pm 1.5 \mu\text{m}$ ) and very small hilar appendix. Basidia 6–7.5  $\mu\text{m}$  broad (according to Arnolds). Pleurocystidia 30–50 x 10–12.5 (–20)  $\mu\text{m}$ , scarce, utriform, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells 17.5–35 x 10–22.5  $\mu\text{m}$ , abundant and dominating picture of cellular lining of sterile gill edge, intermixed with scarce and scattered utriform pleurocystidioid cheilocystidia, 27–35 x 7.5–10(–12)  $\mu\text{m}$ , sometimes in groups of 2–4 cells; all cells colourless and thin-walled. Pigmentation of hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale yellowish brown from membranous pigment, without yellow hyphal septa or encrustations. Pileipellis cellular, cells 10–32  $\mu\text{m}$  diam., colourless.

HABITAT & DISTRIBUTION. — In manured grass-land (*Poa-Lolietum*). Known only from type locality.

COLLECTION EXAMINED. — THE NETHERLANDS, prov. Drente, Anderen, nature reserve 'Eexterveld', 19 Nov. 1975 (WBS).

We never saw fresh material of this species; the macroscopical data are taken from Arnolds' description, the microscopical description is based on our own examination of the exsiccatum. In the course of his mycological-ecological ob-



Figs. 362–365. *Psathyrella phaseolispora*. — 362. Carpophores (x 0.5). — 363. Spores. — 364. Pleurocystidiogram. — 365. Cheilocystidiogram.

servations the author of this species came across only one delapidated 'old specimen, spoiled by rain' (according to his own notes), so that at first we advised against describing it as a new species. But he rightly put forward that on account of its utriform cystidia and the pattern of the cellular lining of the gill edge, the species obviously belongs to our subsection *Spadiceogriseae*, in which it would figure as the only species with conspicuously phaseoliform spores. Of necessity (condition of the specimen) it was impossible to measure the length of the basidia and to state whether the pileipellis was mono- or polystratic, while it had also been impossible to produce a spore print. Because of its size the species is close to *P. spadiceogrisea* f. *exalbicans* from which it differs by its larger and more strongly phaseoliform spores.

### ***Psathyrella spadiceogrisea* (Schaeff.) Maire**

*Agaricus spadiceogriseus* Schaeff., Fung. Bavar., Index: 59. 1774. — *Psathyra spadiceogrisea* (Schaeff.) Kumm., Führ. Pilzk.: 70. 1871. — *Hypholoma spadiceogriseum* (Schaeff.) Kumm., Führ. Pilzk., 2. Aufl.: 95. 1882 ('*Ps. spadiceogriseum*' by mistake). — *Drosophila spadiceogrisea* (Schaeff.) Quéf., Enchir. Fung.: 117. 1886. — *Pratella spadiceogrisea* (Schaeff.) Kirchner & Eichler in Jahresh. Ver. vaterl. Naturk. Württemb. 50: 448. 1894. — *Psilocybe spadiceogrisea* (Schaeff.) Boud., Ic. mycol. 4: 68. 1911. — *Psathyrella spadiceogrisea* (Schaeff.) Maire apud Maire & Werner in Mém. Soc. Sci. nat. Maroc 45: 112. 1937.

*Drosophila exalbicans* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952. — *Psathyrella exalbicans* (JRomagn.) Mos. in Gams, Kl. Kryptog.fl., 2 b/2 2. Aufl.: 240. 1955 (and later editions; not val. publ., basionym not mentioned). — *Psathyrella exalbicans* (Romagn.) Bon in Docum. mycol. 12 (48): 52. 1982.

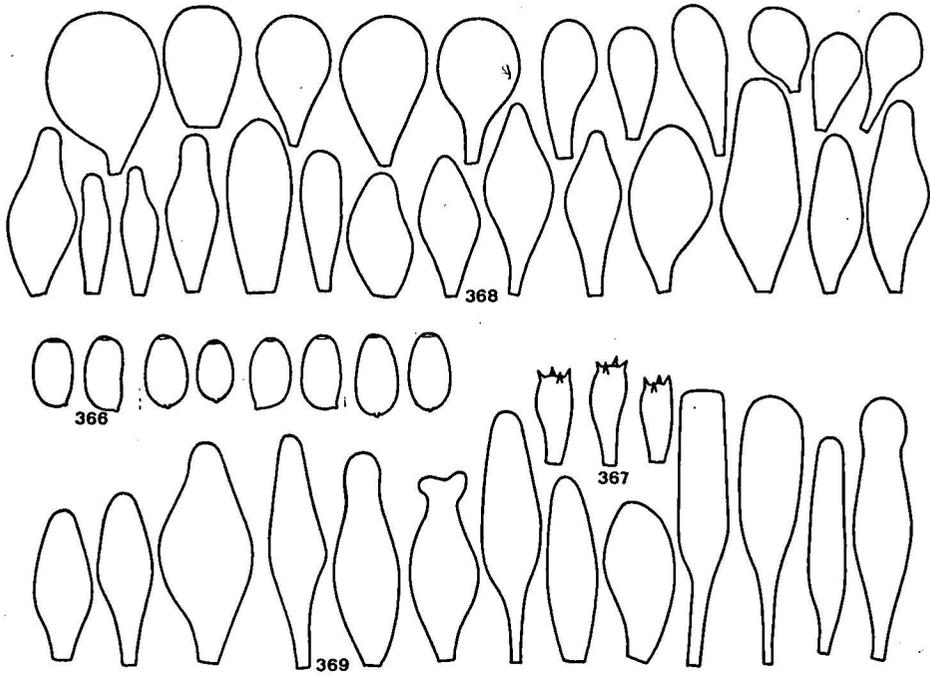
*Psathyra obtusata* var. *vernalis* J. Lange, Fl. agar. dan. 5. VII. 1940. — *Drosophila vernalis* (J. Lange) Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953 (not val. publ., basionym not mentioned). — *Psathyrella vernalis* (J. Lange) Mos. in Gams, Kl. Kryptog.fl. 2b/2, 3. Aufl.: 223. 1967 (later homonym of *Psathyrella vernalis* Velen., Novit. mycol. nov.: 85. 1947 = ?).

*Drosophila mammifera* Romagn. in Bull. trimest. Soc. mycol. Fr. 92: 194. 1976.

### **forma *spadiceogrisea* — Figs. 366–370**

DESCRIPTIONS & ILLUSTRATIONS. — Boud., l.c.; Konr. & Maubl., Ic. select. Fung. 1(2): 40. 1929; Bres., Iconogr. mycol. 18: pl. 868. 1931; J. Lange, Fl. agar. dan. 4: 97, pl. 154 C. 1939; Wak. & Denn., Comm. Brit. Fungi: pl. 79 fig. 3. 1950; Rick., Blätterp.: 261, pl. 67 fig. 6. 1913; Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953; A. H. Smith in Mem. N.Y. bot. Gdn 24: 354. 1972; Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 432. 1981; Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 163, 1975.

Cap in primordial stage 2–5 mm broad, acorn-shaped or paraboloid, dark brown (Mu. 7.5 YR 5/4), at maturity 20–60(–75) mm broad, at first paraboloid but very soon expanding to conico-convex, later plano-convex, plane or plane with either deflexed or sometimes revolute marginal area, sometimes vaguely umbonate, in early stages warm brown (Mu. 10 YR 5/4, 4/4; 5 YR 4/3; 7.5 YR 3/2, 4/2, 4/4) at centre, paler towards margin, at maturity in peripheral half fairly dark sordid brown (Mu. 10 YR 3/3, 4/3, 5/3, 5/4; 7.5 YR 5/2) later predominantly greyish brown (Mu. 10 YR 4/2, 5/2), sometimes greyish yellow (Mu. 10 YR 7/4, 6/3) or even predominantly grey (Mu. 10 YR 5/1, 6/2), gradually becoming browner towards centre (Mu. 10 YR 4/4, 5/4; 7.5 YR 5/4, 4/4, 4/2, 3/2), in marginal area sometimes mixed with purple (transparency of gills), striate up to 1/2–3/4 from margin, often slightly rugulose, hygrophanous, drying out to very pale brown greyish, whitish, alutaceous (Mu. 10 YR 8/2, 8/3, 8/4, 7K/2, 7/3), ochreous to yellow (Mu. 10 YR 7/6, 7/4, 6/4; 7.5 YR 7/4) at



Figs. 366–369. *Psathyrella spadiceogrisea* f. *spadiceogrisea*. — 366. Spores. — 367. Basidia. — 368. Cheilocystidium. — 369. Pleurocystidium.

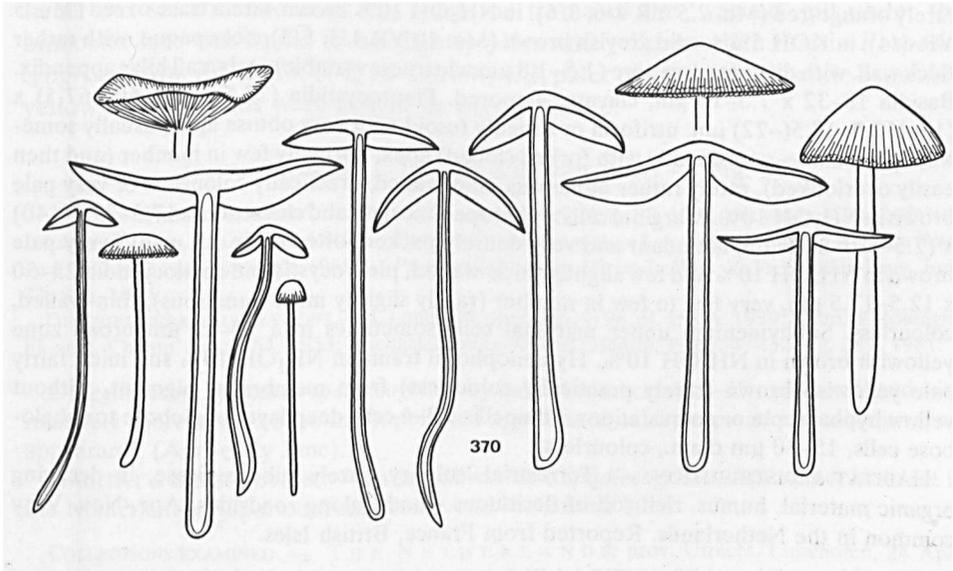


Fig. 370. *Psathyrella spadiceogrisea* f. *spadiceogrisea*. — Carpophores (x 0.5).

centre, without pink, usually slightly micaceous and slightly to distinctly rugulose. Veil in early stages forming numerous white fibrils reaching up to half-way from margin, at maturity leaving very small fibrils and bundles of fibrils lying irregularly dispersed on a 2–5 mm broad zone along margin of cap, often bundled into small strings (1–8 mm long, 1–2 mm broad) parallel and very close to margin or forming distinct flocci, sometimes forming appendiculate denticles, fugacious, on stem few to many scattered fibrils on lower part. Gills 3–6(–8) mm broad, fairly crowded, sometimes subdistant, slightly to distinctly ventricose, sometimes straight and ascending, rarely horizontal, broadly adnate, at first grey (Mu. 5 YR 5/1; 10 YR 5/1) to brownish grey (Mu. 5 YR 6/2; 7.5 YR 6/2; 10 YR 6/2, 5/2), browner towards base (Mu. 10 YR 6/3, 5/3, 5/4), later pale chocolate (Mu. 5 YR 4/2, 5/2, 5/3) or darker (Mu. 2.5 YR 2.5/2, 3/2; 5 YR 3/2, 3/3) or brownish chocolate (Mu. 5 YR 4/3; 7.5 YR 4/2, 5/2, 3/2), with white, fimbriate edge. Stem 40–90(–120) x 2–5 (apex) . . . 3–7–9 (base) mm, usually gradually thickening towards base but often cylindrical, white, in lower half sordid white or isabelline, hollow, with finely longitudinally striate surface, at extreme base often attenuated over a short distance of up to 15 mm (pseudorrhiza-like) rarely distinctly rooting, at apex pruinose and sulcate-striate, at base strigose with white hairs and usually covered by whitish down. Flesh of cap in centre 1.5–3(–5) mm thick, brown (Mu. 10 YR 3/3, 4/3, 5/3), of stem white in upper part, pale brown below particularly alongside cavity. Trama of 'washed' gill in NH<sub>4</sub>OH 10% under binocular lens usually distinctly pigmented from brownish yellow (Mu. 10 YR 6/6) anastomosing tissue strands (sometimes vague or absent), running from base to edge through in itself pale brownish grey (Mu. 10 YR 7/2) tissue. Spore print purplish black.

Spores 7–10 x 4–5.5 μm (mean values 7.4–9 x 4.5–5 μm: 20 collections), ellipsoid, adaxially flattened, but size and shape variable, often some or many ellipsoid-ovoid, in face view sometimes even with rectangular base, normally quite a few phaseoliform or subphaseoliform and often many distinctly phaseoliform, in some specimens or collections sizes, shapes and colours greatly varying (e.g. elongate, abnormally large or narrow, curved, deformed or indented above hilar appendix), in colour varying from one collection to another (see observations), normally in water orange-brown (Mu. 5 YR 5/6, 5/8, 4/8), rarely orange-red (Mu. 2.5 YR 4/6, 3/6), in NH<sub>4</sub>OH 10% brown with a trace of red (Mu. 5 YR 4/4), in KOH 5% sordid greyish brown (Mu. 10 YR 4/3, 5/3), not opaque, with rather thick wall, with distinct germ pore (1.5–1.8 μm; clearness variable) and small hilar appendix. Basidia 18–32 x 7.5–10 μm, clavate, 4-spored. Pleurocystidia (27.5–)32.5–60(–67.5) x (10–)12.5–17.5(–22) μm, utriform or broadly fusoid with very obtuse apex, usually somewhat pedicellate, occasionally with forked (lobed) apex, normally few in number (and then easily overlooked), rarely rather numerous, thin-walled, practically colourless or very pale brown in NH<sub>4</sub>OH 10%. Marginal cells: spheropedunculate and clavate cells 17.5–37.5(–40) x (7.5–)10–22.5 μm, abundant and very densely packed, often some (or many) very pale brown in NH<sub>4</sub>OH 10% and few slightly thick-walled; pleurocystidioid cheilocystidia 25–50 x 12.5–17.5 μm, very few to few in number (rarely slightly more numerous), thin-walled, colourless. Subhymenium under marginal cells sometimes in a 10–15 μm broad zone yellowish brown in NH<sub>4</sub>OH 10%. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. fairly pale yellowish brown (rarely practically colourless) from membranal pigment, without yellow hyphal septa or encrustations. Pileipellis a 2–4 cells deep layer of globose to subglobose cells, 15–30 μm diam., colourless.

**HABITAT & DISTRIBUTION.** — Terrestrial, solitary, rarely subcaespitose, in decaying organic material, humus, rich soil of deciduous woods, along roadsides. Apr.–Nov. Very common in the Netherlands. Reported from France, British Isles.

**COLLECTIONS EXAMINED.** — 31 Collections from various parts of the Netherlands.

In the field this macroscopically variable species is easily recognised by its rather large size, tall habit, fragile stem, conico-convex and rather large, greyish cap brown only at centre; microscopically by its normally few, utriform pleurocystidia and the gill edge being almost exclusively lined with spheropedunculate and clavate cells. In several of our collections we came across the same great variability in size, shape and colour of the spores as previously described by Romagnesi (1975: 163), who reported that such specimens had always been found to be interfertile with the type.

For differences with *P. fusca* and *P. subnuda*, see the discussion on the latter taxon in the chapter on doubtful taxa.

#### forma *phaeophylla* Kühn. & Romagn. ex Kits van Wav.

*Drosophila spadiceogrisea* 'form' *phaeophylla* Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953 (not val. publ., no latin). — *Psathyrella spadiceogrisea* f. *phaeophylla* (Kühn. & Romagn.) ex Kits van Wav. on p. 282 of the present work. 1985.

Differing from typical form of *P. spadiceogrisea* only by the tobacco brown colour of the gills.

HABITAT & DISTRIBUTION. — Same habitats as *P. spadiceogrisea*. June–Nov. Not rare in the Netherlands. Reported from France, not from the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Overijssel, Delden, estate 'Twickel', 19 Sept. 1964; prov. Utrecht, Breukelen, estate 'Over-Holland', 1 Aug. 1964; prov. Noord-Holland: Amsterdam, Amsterdam Wood, 25 July 1961, 19 July 1962, 3 Nov. 1973; Overveen, estate 'Koningshof', 14 June 1974 (type).

This form in every macroscopical and microscopical respect is identical with *P. spadiceogrisea* except for the very striking dark tobacco (cigar) colour of the gills. In all our six collections of this form the trama of the 'washed' gill under the binocular lens was found to be slightly paler and yellower than that in *P. spadiceogrisea* (Mu. 2.5 Y 7/4, 6/4; 10 YR 7/4, 6/3, paler towards edge), while brownish yellow tissue strands were absent or hardly visible.

#### forma *vernalis* (J. Lange) Kits van Wav. — Fig. 371

*Psathyra obtusata* var. *vernalis* J. Lange in Dansk bot. Ark. 9(6): 92. 1938 (not val. publ., no latin); ex J. Lange, Fl. agar. dan. 5: VII. 1940. — *Psathyrella spadiceogrisea* f. *vernalis* (J. Lange) Kits van Wav. on p. 282 of the present work. 1985. — *Psathyrella groegeri* Hirsch in Wiss. Z. Fr. Schiller-Univ. Jena 33: 816. 1984.

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 98, pl. 153 A. 1939; Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953; Michael/Hennig/Kreisel, Handb. Pilzfr. 4: 432, fig. 287. 1981.

Differing from typical *P. spadiceogrisea* by habit, broad cap (25–45 mm) combined with relatively short stem (30–60 mm), polished appearance of dry cap and exclusively vernal appearance (Apr.–early June).

HABITAT & DISTRIBUTION. — Same habitats as f. *spadiceogrisea*. Apr.–June. Not rare in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Utrecht, Linschoten, 24 April 1976; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 16 Apr., 23 Apr., 30 Apr., 5 May 1961, 5 June 1962, 30 Apr. 1965; Santpoort, estate 'Duin en Kruidberg', 2 June 1962.

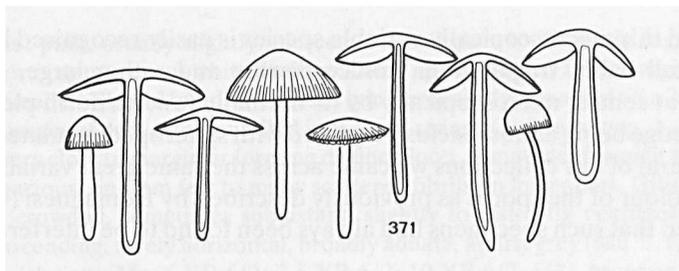


Fig. 371. *Psathyrella spadiceogrisea* f. *vernalis*. — Carpophores (x 0.5).

Lange (1938: 92) described this taxon as a form of *P. obtusata* with 'a more expanded, shining, slightly viscid and – when dry – not micaceous cap' (the latter character, according to Lange, due to solubility of the cells of the pileipellis at an early stage).

According to Kühner & Romagnesi (1953: 364) the polished (*Agrocybe praecox*-like) appearance of the dry cap is due to thick and refractive walls of the cells of the pileipellis. They added to their description of this taxon that the middle portion of the stem tended to become yellow and that the gills were of a special beige colour (both characters not mentioned by Lange).

We identified eight collections of *P. spadiceogrisea* as its form *vernalis* chiefly because of its vernal appearance, habit (beautifully depicted in Lange's plate 153 A) and polished (not micaceous) appearance of the dry cap. In our material the yellow colour of the middle portion of the stem was only present in one collection (5 May 1961). In several collections of *P. spadiceogrisea* we came across the same beige colour of the gills as attributed to its form *vernalis*. This is not surprising in the light of the variability of the pigmentation of the hymenophoral trama and the presence of varying numbers of pale (immature) spores.

All this led to our decision to regard the taxon '*P. vernalis*' as a vernal form of *P. spadiceogrisea*.

We were unable to ascertain the difference between the thickness of the walls of the cells in the pileipellis in exsiccata of *P. spadiceogrisea* and of those in its form *vernalis*, but in fresh material a thickening was indeed observed in forma *vernalis*.

#### forma **mammifera** (Romagn.) Kits van Wav. — Fig. 372

*Drosophila spadiceogrisea* 'form' *mammifera* Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953 (not val. publ., no latin). — *Drosophila mammifera* Romagn. in Bull. trimest. Soc. mycol. Fr. 92: 194. 1976. — *Psathyrella spadiceogrisea* f. *mammifera* (Romagn.) Kits van Wav. on p. 282 of the present work. 1985.

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: pl. 153 D (the 3 large specimens). 1939; Romagn., l.c.

Differing from typical form of *P. spadiceogrisea* by presence of distinct umbo retaining its brown or ochreous brown colour for some time during process of drying; periphery drying out more quickly, this process resulting in contrasting colours of centre and margin.

HABITAT & DISTRIBUTION. — Same habitat as f. *spadiceogrisea*. Apr.-Nov. Rare in the Netherlands. Reported from France, not from the British Isles.

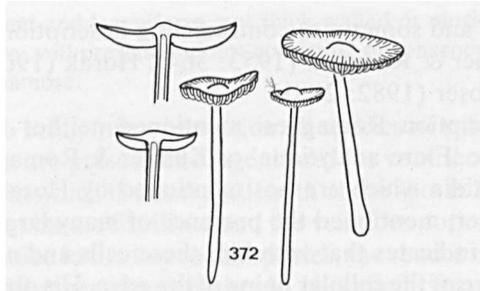


Fig. 372. *Psathyrella spadiceogrisea* f. *mammifera*. — Carpophores (x 0.5).

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Utrecht, Breukelen, estate 'Over-Holland', 8 Nov. 1962; prov. Noord-Holland, Amsterdam, Amsterdam Wood, 30 Apr. 1961, 19 July 1962.

The separation of this form is rather dubious. In his description Romagnesi stated that the umbo sometimes, be it rarely, is less evident and in our description of *P. spadiceogrisea* we had to call the cap sometimes vaguely umbonate. Also, as an additional character Romagnesi stated that the gills of his *P. mammifera* are more crowded ('plus serrées') than in *P. spadiceogrisea*. But in our experience the degree of crowding of the gills in *P. spadiceogrisea* varies. In his recent description of *P. spadiceogrisea* (1975: 163) Romagnesi himself called the gills 'serrées à moyennement serrées'.

forma *exalbicans* (Romagn.) Kits van Wav. — Fig. 373

*Drosophila exalbicans* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952. *Psathyrella spadiceogrisea* f. *exalbicans* (Romagn.) Kits van Wav. on p. 282 of the present work. 1985.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953; Romagn. in Bull. trimest. Soc. mycol. Fr.: 98. 44. 1982.

Differing from typical *P. spadiceogrisea* only by small size and often thick-set habit (cap 11–29 mm and stem 15–35 x 1.5–3 mm).

HABITAT & DISTRIBUTION. — Same habitats as forma *spadiceogrisea*. Rare in the Netherlands. Reported from France and the British Isles (see collections examined).

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Noord-Holland: Castricum, dunes of County Water Supply, 17 Oct. 1980; Amsterdam, Amsterdam Wood, 21 June 1961, 19 July 1962, 14 July 1968, 4 Aug. 1976; 's Graveland, hothouse of estate 'Boekesteijn', 1 Nov. 1968. — BRITISH ISLES, North Yorkshire, Smaledale near Keld, 7 May 1983. — FRANCE, dpt. Saone-et-Marne, Sucy-en-Brie, 23 July 1939 (herb. Romagn. 206, holotype).

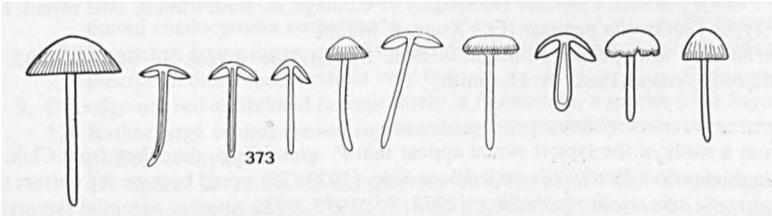


Fig. 373. *Psathyrella spadiceogrisea* f. *exalbicans*. — Carpophores (x 0.5).

Short, incomplete and sometimes contradicting descriptions of this taxon have been given by Kühner & Romagn. (1953: 364), Horak (1963: 93), Einhellinger (1969: 101) and Moser (1982: 278).

In his 1952 description Romagnesi mentioned neither the pleuro- nor the cheilocystidia. In the 'Flore analytique' of Kühner & Romagnesi nothing is said about the cheilocystidia which are not mentioned by Horak and Moser either. Einhellinger, however, mentioned the presence of many large vesiculose cells on the gill edge, which indicates that with him these cells and not the utriform cells dominated the picture of the cellular lining of the edge. His observation fully tallies with our observations in our seven collections of this taxon, of which the specimens always turned out to have abundant and in the main rather large spheropedunculate and clavate cheilocystidia with only here and there a utriform cell — the typical pattern of *P. spadiceogrisea*. Only in our collection of 17 Oct. 1980 we found a fair number of the latter cells and in the French collection they were fairly numerous. Romagnesi (1982: 44) while solely mentioning the holotype in his description of *P. exalbicans*, called its utriform cheilocystidia numerous and accompanied by some clavate or spheropedunculate cells, however without clearly indicating the numeric relation between the two types of cells. In the light of the above data we have not hesitated placing this taxon in subsection *Spadiceogrisea* and lowering it to the status of forma of *P. spadiceogrisea*.

Except for the small size of the carpophores, the macro- and microscopical features agreed with *P. spadiceogrisea*. We even found the same striking variability in size and shape of the spores as in *P. spadiceogrisea*.

Romagnesi (in litt. 1977) contributed to our decision to regard this taxon as a dwarf form of *P. spadiceogrisea* by writing that the taxon is so close to *P. spadiceogrisea* that he had found himself unable to distinguish it from that species with certainty and that Galland's culture experiments had been necessary to show the difference. But recently Romagnesi (1982: 44) expressed a quite different view: the taxon might be a small form of *P. fatua*. In case culture experiments would prove this, he listed a number of characters by which the taxon would differ from *P. fatua*. In the light of so much uncertainty and the data mentioned above (and our monograph being written purely on the basis of morphological characters) we decided to reduce *P. exalbicans* to the rank of form of *P. spadiceogrisea*.

### Section *Pennatae*<sup>1</sup> Romagn. emend. Kits van Wav.

*Drosophila* sect. *Pennatae* Romagn. in Bull. mens. Soc. linn. Lyon 13: 53. 1944 (not val. publ., no latin). — *Psathyrella* sect. *Pennatae* (Romagn.) ex Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 11. 1982 — Type: *Psathyrella pennata* (Fr.) Konr. & Maubl.

*Psathyrella* sect. *Multipedata* Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 11. 1982. — Type: *Psathyrella multipedata* (Peck) A. H. Smith.

<sup>1</sup> If from a study of the type it would appear that *P. apora* Sing., described from Chili, has to be included in this section, *Psathyrella* sect. *Apora* Sing. (1973: 75) would become the correct name. The name *Psathyrella* sect. *Heterocystis* Sing. (1973: 75; 1975: 503), another potential synonym, with *P. dactylocystis* Sing. from S. America as type, has never been validly published.

Pleurocystidia present and lageniform, not thick-walled or muricate; average length of spores 7.6  $\mu\text{m}$  or more; veil present and not consisting of spherocytes; surface of cap not innately fibrillose-squamose.

Emended so as to bring into one section all species of subgenus *Psathyrella*, in which pleurocystidia are present and lageniform (or ventricose-fusoid), not thick-walled or muricate, in which the average length of the spores is 7.6  $\mu\text{m}$  or more, the surface of the cap not innate fibrillose and the veil does not consist of spherocytes.

As for the first choice in the key to the species, the reader may sometimes find it difficult to decide whether the veil should be called 'very strongly to strongly developed' or 'rudimentary or thin, only rarely moderately strongly' developed. Fortunately each of the first five species in the key have characteristic features, the absence of which indicating that the species one is dealing with, is to be found lower down in the key.

## KEY TO THE SPECIES OF SECTION PENNATAE

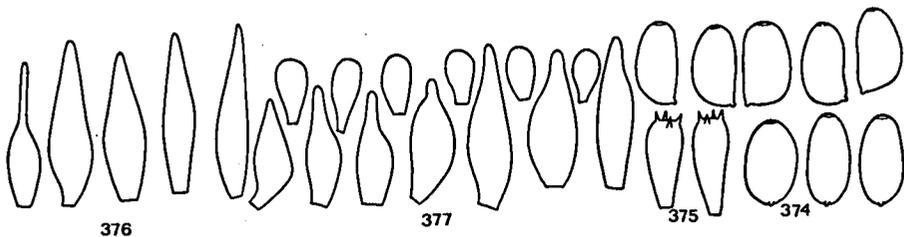
1. Veil very strongly to strongly developed (no red underlining of gill edge; cystidia without oily inclusions).
  2. In coastal sand dunes, behind fore dunes, amongst *Ammophila*, *Carex* and *Festuca* (cf. 10.).  
*P. flexispora*, p. 242
  2. Not as above.
    3. Pleurocystidia ventricose-fusoid, tapering to a subacute or very acute apex, slightly thick-walled and refractive, distinctly (pale) brown in  $\text{NH}_4\text{OH}$  10%.
      4. On burnt ground; pleurocystidia 22.5–40 x 7.5–12.5  $\mu\text{m}$ , with very acute, sharply pointed apex; spores 6.5–8 x 3.5–4.5  $\mu\text{m}$ , without germ pore ..... *P. pennata*, p. 243
      4. Not on burnt ground, terrestrial; pleurocystidia 40–80 x 8–17.5  $\mu\text{m}$ , with acute to subacute apex; spores with germ pore.
        5. Spores 8–10 x 4.5–5  $\mu\text{m}$  ..... *P. artemisiae* var. *artemisiae*, p. 245
        5. Spores 6.5–7(–8) x 4–4.5  $\mu\text{m}$  ..... *P. artemisiae* var. *microspora*, p. 248
    3. Pleurocystidia ventricose-fusoid with obtuse to subobtuse (subacute) apex, thin-walled and not refractive, not distinctly brown in  $\text{NH}_4\text{OH}$  10%.
      6. Distinctly pink in drying cap ..... *P. impexa*, p. 248
      6. No pink in drying cap ..... *P. friesii*, p. 250
1. Veil rudimentary or thin, only rarely moderately developed.
  7. Pleurocystidia and pleurocystidioid cheilocystidia with one large oily inclusion and/or a few smaller ones ..... *P. gossypina*, p. 251
  7. Cystidia without oily inclusions.
    8. Carpophores on culms of *Phragmites* and *Scirpus maritimus*, just above waterlevel (see also *P. almerensis*, p. 221). ..... *P. basii*, p. 253
    8. Not as above.
      9. Gill edge red underlined; spheropedunculate and clavate cheilocystidia large (12.5–35 x 7.5–25  $\mu\text{m}$ ) and abundant.
        10. Pink in drying cap; spores ellipsoid with small,  $\pm 1$   $\mu\text{m}$  wide germ pore; pleurocystidioid cheilocystidia numerous ..... *P. dunensis*, p. 254
        10. No pink in drying cap; spores distinctly ovoid, with distinct,  $\pm 1.8$   $\mu\text{m}$  wide germ pore; pleurocystidioid cheilocystidia very few ..... *P. dunarum*, p. 256
      9. Gill edge not red underlined (except rarely in *P. murcida*, a species from *Fagus* woods).
        11. Rather large central area of cap becoming conspicuously warm ochre brown during process of drying.
          12. Spores 10–11.5 x 5.5–6.5  $\mu\text{m}$ , very dark, opaque; basidia subspheropedunculate; pleurocystidia 47.5–72.5(–75) x 10–17.5  $\mu\text{m}$ , lageniform with long narrow neck.  
*P. dicrani*, p. 257

- 12. Spores smaller, 7–10 x 4–4.5 μm, dark, subopaque or not opaque; basidia clavate; pleurocystidia ± equally long or shorter.
- 13. Pleurocystidia 55–75(–88) x (8–)10–12–15 μm, narrowly fusoid or lageniform ..... *P. fulvescens* var. *fulvescens*, p. 258
- 13. Pleurocystidia 35–55(–60) x (8–)10–15(–17.5) μm, fusoid or sublageniform ..... *P. fulvescens* var. *brevicystis*, p. 260
- 11. Central area of cap not conspicuously browning during process of drying.
- 14. Carpophores densely caespitose, with long stem and relatively small cap.  
*P. multipedata*, p. 263
- 14. Not as above.
- 15. Fairly large species from *Fagus* woods; cap 15–35 mm; stem 50–110 x 2–6 mm; spores 9–11 x 5.5–6.5 μm ..... *P. murcida*, p. 264
- 15. Small species; cap 9–25 mm; stem 17–50 x 1.5–3 mm; spores 7–10 x 3.5–5.5 μm.
- 16. Terrestrial, in grass or moss, on sandy or clayey soil. (If spores in water or NH<sub>4</sub>OH 10% yellowish brown instead of dark red or red-brown, see *P. obtusata*, p. 197).
- 17. Pleurocystidia 35–50 x 9–15 μm, lageniform with fairly long, narrow, subcylindrical neck, passing ± abruptly into cellbody, with acute apex; spores ellipsoid-ovoid (mean values 7.8–8.2 x 4.7–4.9 μm) ..... *P. seymourensis*, p. 266
- 17. Pleurocystidia 25–57.5 x 9–12.5(–15), broadly to narrowly fusoid, tapering to subobtuse or obtuse apex; spores elongate (mean values 7.7–9.3 x 3.9–4.7 μm). ..... *P. ocellata*, p. 268
- 16. On wood of deciduous trees ..... *P. senex*, p. 269

**Psathyrella flexispora** Wallace & Orton — Figs. 374–377

*Psathyrella flexispora* Wallace & Orton apud P. D. Orton in Trans. Brit. mycol. Soc. 43: 371. 1960. DESCRIPTIONS & ILLUSTRATIONS. — Wallace & Orton, l.c.

Cap 10–25 mm, hardly expanding, sometimes slightly conico-convex or obtusely umbonate, chocolate umber or date brown, striate up to half-way, hygrophanous, drying yellowish buff or dirty yellowish from centre, sometimes tinged ochraceous or tawny at centre, often bicoloured with darker marginal zone when drying, opaque and atomate when dry. Veil white, at first copious and lacerate-appendiculate at margin and sometimes a few scales just inside margin of cap, at first forming fibrillose scales on stem. Gills subdistant, very broadly adnate, sometimes with slight tooth, often broad and almost plane, sometimes ventricose, clay-whitish then clay-umber to blackish umber; edge under lens paler or whitish, minutely flocculose-denticulate. Stem 18–33 x 1–3 mm, cylindrical or slightly swollen at base, whitish then tinged with cap colour from base upwards, at apex more



Figs. 374–377. *Psathyrella flexispora*. — 374. Spores. — 375. Basidia. — 376. Pleurocystidiogram — 377. Cheilocystidiogram. —

persistently paler, with surface soon white silky striate or almost smooth, stuffed then narrowly hollow. Flesh of cap pallid reddish brown, drying ochraceous or whitish, of stem dirty buff or ochraceous-date-brown, often tinged amber or chocolate at apex and base. Smell indistinctive. Trama of 'washed' gill distinctly pigmented, slightly paler than Mu. 7.5 YR 5/4, gradually paler towards edge, via Mu. 7.5 YR 6/4 to pale brown (Mu. 10 YR 6/3) in peripheral 1/3. Spore print blackish brown.

Spores 9–10(–11) x 4.5–5  $\mu$ m (mean values 9 x 5  $\mu$ m: 1 collection), ellipsoid, adaxially flattened, sometimes slightly phaseoliform, rarely faintly depressed just above hilar appendix, dark, in water very dark brown (Mu. 2.5 YR 3/4), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 3/3), in KOH 5% dark sordid brown (Mu. 10 YR 4/2–4/3), subopaque, with distinct germ pore ( $\pm$  1.5  $\mu$ m) and small hilar appendix. Basidia 19–22.5 x 8–9  $\mu$ m, clavate, 4-spored. Pleurocystidia 35–47.5 x 8–10  $\mu$ m, fairly numerous, lageniform with moderately long neck, gradually tapering towards acute to subacute apex, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 25–35 x 8–9  $\mu$ m, more ventricose than pleurocystidia and with relatively shorter and sometimes very short neck, numerous and densely packed, intermixed with numerous spheropedunculate and clavate cells, 12.5–20 x 7.5–12.5  $\mu$ m, and a few basidia. Hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. distinctly brown from membranal pigment with few yellow hyphal septa but without encrustations.

HABITAT & DISTRIBUTION. — In sand dunes, mostly behind the foredunes, amongst *Ammophila*, *Carex arenaria* and *Festuca*. Oct.–Nov. Known only from type locality.

COLLECTION EXAMINED. — BRITISH ISLES: Dorset, Studland, 25 Nov. 1951 (type K).

We never saw this species fresh. The macroscopical description is taken from Orton (1960: 371), the description of the microscopical characters is based on our own examination of exsiccata of the type specimens. The spores were described by Wallace & Orton as 'ellipsoid, curved at the apiculate end'. We have little faith in the significance of this curvature (from which character the species derives its name) as only very few spores showed this shape and even then only very faintly. Occasionally (be it very rarely), moreover, we noticed this curvature (resulting from a suprahilar depression) in a few spores of other species e.g. *P. cotonea*, *P. pannucioides*. We have therefore keyed *P. flexispora* out on the other feature called characteristic of this species, that is to say the habitat, although that is rather risky with a species known from only one locality.

### *Psathyrella pennata* (Fr.) Konr. & Maubl. — Figs. 378–382

*Agaricus pennatus* Fr., Syst. mycol. 1: 297. 1821. — *Psathyra* (Fr.) P. Karst. in Meddn Soc. Fauna Flora fenn. 5: 32. 1879. — *Psilocybe pennata* (Fr.) J. Schroet. in Krypt.-Fl. Schlesien 3: 569. 1889. — *Psathyrella pennata* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 125. 1948. — *Drosophila pennata* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 360. 1953.

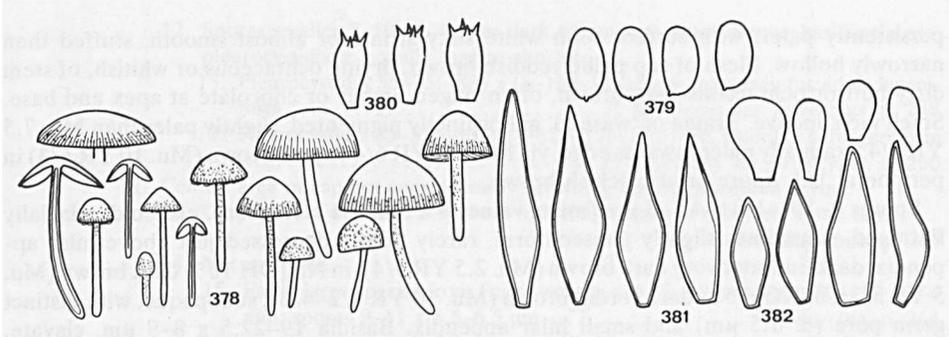
*Psathyrella carbonicola* A. H. Smith in Contr. Univ. Mich. Herb. 5: 3. 1941.

*Psathyra pennata* f. *annulata* A. Pears. in Trans. Brit. mycol. Soc. 26: 49. 1943.

EXCLUDED. — *Psathyra pennata* sensu J. Lange, Fl. agar. dan. 4: 94, pl. 151 C (= *P. canocephs*).

DESCRIPTIONS & ILLUSTRATIONS. — Cooke, Ill. Brit. Fungi 4: pl. 580 B/620 B. 1885; Rick., Blätterp.: 259, pl. 67 fig. 7. 1913; A. Pears., l.c.; Bres. Iconogr. mycol. 18: pl. 872. 1931; Kühn. & Romagn., l.c.; A. H. Smith in Mem. N.Y. bot. Gdn 24: 220, pl. 42b, 62. 1972 (as *P. carbonicola*).

Cap in earliest stages 4–7 mm, globose to paraboloid with margin adpressed against stem, dark purplish red brown (Mu. 5 YR 3/2) under the dense white velar pelt, at maturity 7–35(–45) mm, at first paraboloid or conico-paraboloid, spreading to convex with deflexed



Figs. 378–382. *Psathyrella pennata*. — 378. Carpophores (x 0.5). — 379. Spores. — 380. Basidia. — 381. Pleurocystidiogram. — 382. Cheilocystidiogram.

marginal area, rarely with vague umbo, dark purplish or reddish brown (Mu. 2.5 YR 3/2; 5 YR 3/2, 3/3; 7.5 YR 3/2), soon from margin towards centre loosing purplish and reddish colours, at margin becoming warm brown or ochre brown (Mu. 7.5 YR 4/4, 5/6), in the middle dark purplish grey, greyish brown or sordid brown (Mu. 7.5 YR 4/2; 10 YR 5/3, 4/4), only in final stages (while at centre still dark purplish or reddish brown) usually striate up to 1/2–2/3 from margin but sometimes merely substriate or subsulcate at margin, hygrophanous, rapidly drying out to pale greyish brown or alutaceous (Mu. 7.5 YR 6/2, 6/3, 6/4, 7/4) all over with ochraceous yellow (Mu. 7.5 YR 5/6; 10 YR 6/6, 7/6) centre, sometimes micaceous and rugulose, without pink. Veil strongly developed, in early and semimature stages forming a dense coating of fibrils, adpressed and erect fascicles of fibrils, flocci and scales on cap reaching up to apex, density increasing towards margin and there forming a lanose coating with appendiculate fibrils, fascicles and denticles, in later stages gradually disappearing, in final stages only present in marginal zone, on stem forming a lanose-flocculose coating up to insertion of veil in early stages and there sometimes forming an annular zone. Gills 2–5 mm broad, subventricose, ascending, broadly adnate, greyish brown (Mu. 10 YR 4/2, 5/2, 4/3), greyer near edge, browner near base, sometimes tobacco colour (Mu. 7.5 YR 4/2), or very dark brown (Mu. 7.5 YR 3/2), with purplish hue; edge white, fimbriate. Stem 20–40 x 1–4 mm, cylindrical, sometimes with slightly thickened base, white, towards base pale brown, hollow, at apex coarsely pruinose over quite some length. Flesh of cap 1–2 mm thick in centre, dark reddish brown (Mu. 5 YR 3/2, 3/3) when very fresh but very soon dark greyish brown (Mu. 10 YR 4/3, 3/3), of stem whitish to pale brown with white superficial layer, darker brown towards base. Trama of ‘washed’ gill pale greyish-yellowish brown (Mu. 10 YR 6/3, 6/4), somewhat darker towards base and often merely pale greyish near edge. Spore print purplish black.

Spores 6.5–8 x 3.5–4.5  $\mu\text{m}$  (mean values 6.8–7.5 x 3.6–4.1  $\mu\text{m}$ : 10 collections), narrowly ellipsoid, adaxially flattened, sometimes slightly phaseoliform, dark, in water dark brown (Mu. 5 YR 4/3), in  $\text{NH}_4\text{OH}$  10% darker brown (Mu. 5 YR 3/3), in  $\text{KOH}$  5% dark sordid brown (Mu. 10 YR 3/3); germ pore absent or practically so (callus); hilar appendix distinct. Basidia 14.5–19 x 6.5–9  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia (22.5–)35–50 x 10–15  $\mu\text{m}$ , numerous, fusoid-ventricose with short pedicel drawn out into a neck, tapering to an acute, usually even very acute (pointed) apex, in  $\text{NH}_4\text{OH}$  10% very pale brown or sometimes distinctly brown except for extreme colourless apical part, with refractive and very slightly thickened (0.3–0.5  $\mu\text{m}$ , rarely up to 0.7  $\mu\text{m}$ ) rarely locally thickened (up to 1  $\mu\text{m}$ ) wall, extreme apical part very thin-walled and as a result sometimes collapsed. Marginal cells: pleurocystidioid cheilocystidia 22.5–40 x 7.5–12.5(–15)  $\mu\text{m}$ , numerous to abundant, col-

ourless (sometimes a few very pale brown in  $\text{NH}_4\text{OH}$  10%), with walls thinner than those of pleurocystidia, intermixed with numerous (sometimes rather few) small, unobtrusive, colourless, spheropedunculate and clavate cells (10–)12.5–17.5(–25)  $\times$  7.5–10  $\mu\text{m}$ . Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale brown from membranous pigment, paler towards edge, in basal area with few yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of colourless subglobose cells, 20–40  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — On burnt ground, solitary but usually gregarious. Aug.-Dec. Fairly common in the Netherlands, also in France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Delden, estate 'Twickel', 24 Sept. 1969, 18 Oct. 1970; prov. Gelderland: Gorssel, estate 'Het Joppe', 8 Oct. 1966; 't Harde, Nov. 1972; Lunteren, 8 Dec. 1973; prov. Utrecht: Leusden, estate 'De Treek', 12 Aug. 1960; Amerongen, Amerongse Berg, 16 Oct. 1960; prov. Noord-Brabant, Liesel near Eindhoven, 9 Oct. 1965. — BRITISH ISLES, Scotland: Perthshire, Kinloch Rannoch, estate 'Dunalastair', 31 Aug. 1966; Dumbarton, Luss, estate 'Rossdhu', 29 Aug. 1963.

This species macroscopically strongly resembles the much more common *P. artemisiae*. It differs from it by its habitat, its smaller, less numerous, less brown, thinner-walled pleurocystidia, which have a very acute to sharply pointed apex, and finally by its smaller and darker spores without germ pore.

### *Psathyrella artemisiae* (Pass.) Konr. & Maubl.

*Agaricus artemisiae* Pass. in Nuovo G. bot. ital. 4: 82. 1872. — *Hypholoma artemisiae* (Pass.) Mass., Eur. Fung. Fl. Agaricaceae: 215. 1902. — *Psathyrella artemisiae* (Pass.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 127. 1948.

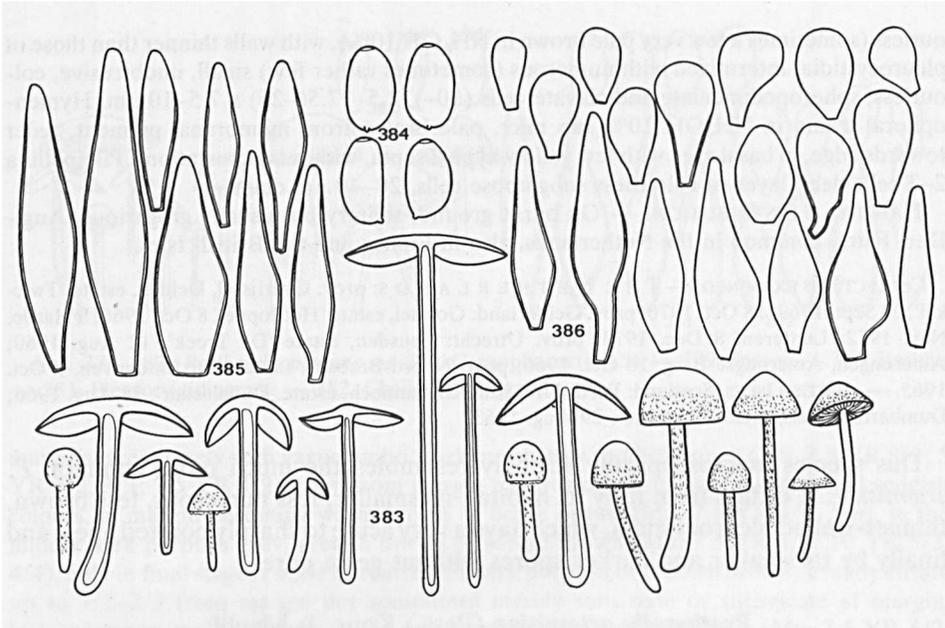
MISAPPLIED NAMES. — *Drosophila squamosa* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953. — *Psathyrella squamosa* sensu Mos. in Gams, Kl. Kryptog. fl. 2 b, 2. Aufl.: 237. 1955 (and later editions); sensu A. H. Smith in Mem. N. Y. bot. Gdn 24: 220. 1972. — *Psathyra pennata* sensu Quéll. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 150. 1872. — *Drosophila gossypina* var. *pennata* sensu Quéll., Enchir. Fung.: 118. 1886. — *Psathyra gossypina* sensu Gillet, Hyménomycètes: 590. 1887; sensu Rick., Blätterp.: 260. 1913. — *Drosophila jerdonii* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953.

### var. *artemisiae* — Figs. 383–386

*Drosophila squamosa* var. *ochrospora* Romagn. in Bull. mens. Soc. linn. Lyon 13: 153. 1944.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., Blätterp.: 260, pl. 7 fig. 8. 1913 (as *Psathyra gossypina*); J. Lange, Fl. agar. dan. 4: 76, pl. 145 C. 1939; Kühn. & Romagn., l.c. (as *Drosophila squamosa*); A. H. Smith, l.c. (as *Psathyrella squamosa*).

Cap in early stages 6–15 mm, globose to paraboloid, under thick white velar pelt dark reddish to purplish reddish brown (Mu. 2.5 YR 3/2, 3/3, 3/4, 4/2; 5 YR 3/2, 4/2, 4/3), browner (Mu. 5 YR 3/4) towards margin, very soon losing the red hue and becoming warm dark brown (Mu. 5 YR 4/4; 7.5 YR 4/4, 5/4, 5/6) at centre, paler or ochreous brown (Mu. 7.5 YR 6/6, 6/4; 10 YR 4/3, 6/4) or sordid brown (Mu. 10 YR 4/3) towards margin, not striate, at maturity 15–35(–45) mm, paraboloid, conico-paraboloid, finally conico-convex or convex with deflexed marginal area, rarely subumbonate; when quite fresh dark reddish or purplish reddish brown all over or only at centre as in early stages, for the rest sordid or dark greyish brown (Mu. 10 YR 3/3, 4/3, 5/2, 6/4) or greyish mixed with purple (Mu. 5 YR 4/2), not (rarely a little) striate, sometimes sulcate at margin, hygrophanous, rapidly drying out to pale or very pale brown, yellowish brown or alutaceous (Mu. 10 YR 7/2, 7/3, 7/4, 8/3, 8/4), at centre to yellowish ochre (Mu. 10 YR 7/6), early stages drying out to somewhat



Figs. 383–386. *Psathyrella artemisiae* var. *artemisiae*. — 383. Carpophores (x 0.5). — 384. Spores. — 385. Pleurocystidiogram. — 386. Cheilocystidiogram.

darker shades, not micaceous, sometimes rugulose, without pink. Veil strongly developed, in earliest and early stages consisting of a dense (denser towards margin of cap) lanose-flocculose pelt of numerous radially arranged white fibrils, fascicles of fibrils and either adpressed or erect flocci, covering entire cap, at margin forming either a 1–3 mm broad appendiculate belt or isolated denticles, at maturity gradually disappearing from centre towards margin, in final stages still leaving many fibrils and fascicles of fibrils, usually also flocci in a 5–10 mm broad marginal zone, on stem forming a lanose-flocculose pelt to a point 10–15 mm from apex, where it may form an annular zone. Gills 2.5–6(–7) mm broad, ventricose, broadly adnate, sometimes fairly crowded, at first very pale brown (Mu. 10 YR 8/3, 7/3, 6/3), at maturity fairly dark sordid greyish brown (Mu. 7.5 YR 5/2, 4/2, 3/2), browner (Mu. 10 YR 5/3, 5/4) towards base, near edge often with a purplish hue; edge white, fimbriate. Stem (15–)25–50(–70 . . . 90) x 1.5–4(–5–6) mm, cylindrical, sometimes slightly thickening near base, white or isabelline in lower half, very hollow, fragile; base often thickened, sometimes covered by whitish down; apex coarsely pruinose. Flesh of cap in centre 1–3 mm thick, dark greyish brown (Mu. 10 YR 3/3, 4/3, 4/4, 5/4), when very fresh with a reddish hue, of stem white in superficial layer, pale brown elsewhere, especially alongside cavity and in base. Trama of ‘washed’ gill distinctly pale yellowish brown (Mu. 10 YR 6/3, 6/4) often darker at base, sometimes near edge merely pale grey. Spore print purplish black.

Spores (7–)8–10 x 4.5–5.5  $\mu$ m (mean values 8.1–9 x 4.6–4.9  $\mu$ m: 16 collections), ellipsoid, adaxially flattened, in water dark reddish orange-brown (Mu. 2.5 YR 3/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 4/3), in KOH 5% dark sordid brown (Mu. 10 YR 4/3), not opaque, with distinct germ pore ( $\pm$  1.5  $\mu$ m) and hilar appendix. Basidia (16–)17.5–25 (–32) x 8–9.5  $\mu$ m, clavate, 4-spored. Pleurocystidia 40–80 x 8–17.5  $\mu$ m, abundant, fusoid-ventricose with fairly short pedicel, drawn out into a long neck, tapering to subacute or acute rarely subobtuse apex, in NH<sub>4</sub>OH 10% distinctly brown to (very) pale brown, except for the

colourless extreme apical part (and sometimes extreme base), with refractive and slightly to distinctly thickened (0.3–1  $\mu\text{m}$ ) wall except in very thin-walled and as a result sometimes collapsed extreme apical part. Marginal cells: pleurocystidioid cheilocystidia 30–65 x (7.5–)10–17.5  $\mu\text{m}$ , numerous, sometimes densely packed, many or most cells in  $\text{NH}_4\text{OH}$  10% colourless, others pale brown, usually thinner-walled than pleurocystidia, intermixed with numerous colourless, thin-walled, sometimes slightly thick-walled, spheropedunculate and clavate cells, 15–30(–40) x (7.5–)10–15(–17.5)  $\mu\text{m}$ , often with relatively long (5–15  $\mu\text{m}$ ) pedicel with wall sometimes slightly thickened. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly pale but sometimes rather dark brown from membranal pigment, particularly in basal part, with a number of yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 16–48  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial in deciduous and coniferous woods, in humus, solitary or subgregarious, usually against pieces of wood or on wood. July–Nov. Common in the Netherlands, France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Drente, Beilen, 24 Sept. 1960; prov. Overijssel: Denekamp, estate 'Singraven', 30 July 1960, 21 Sept. 1962; 23 Oct. 1973; Delden, estate 'Twickel', 12 Aug. 1966, 11 Oct. 1966, 15 Oct. 1971; Oldenzaal, nature reserve 'Roderveld', 6 Oct. 1977, 29 Sept. 1980; prov. Gelderland: Vaassen, 12 Aug. 1961; Apeldoorn, estate 'Het Loo', 24 Sept. 1964; prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 14 Nov. 1959. — **B R I T - I S H I S L E S:** Scotland, Deeside, Braemar, 25 Aug. 1961; Wales, Powys, Lake Vyrnwy, Aug. 1960; England, Hampshire, New Forest, 'Mark Ash Wood', 22 Sept. 1971.

We are greatly indebted to Mr. Jacobsson (Göteborg, Sweden) who, while studying exsiccata in the Helsinki herbarium, discovered that the type material of *Psathyra pennata* var. *squamosa*, published by Karsten in 1879, later (1893) as *Psathyra squamosa*, did not correspond at all with the present-day concept of *Psathyrella squamosa*. He very kindly informed us about his findings and asked Dr. Harmaja to send us this material. On examination we found very few (only 7) small pleurocystidia, 30–37.5 x 8–12.5  $\mu\text{m}$ , lageniform with subacute apex, thin-walled, colourless, and with non-refractive walls. The spores were small, 6.5–7 x 4–5.5  $\mu\text{m}$  (mean values 6.9 x 4.2  $\mu\text{m}$ ). This ruled out *Psathyrella squamosa* in its usual sense so that we reverted to the younger epithet '*artemisiae*'. Karsten, moreover, described the species as strongly caespitose, this feature being quite clear from the exsiccatum. We were unable to identify this collection, which certainly does not represent *P. artemisiae*.

According to Romagnesi (in litt.) his *Drosophila squamosa* var. *ochrospora* differs from *P. squamosa* (sensu Romagn., = *P. artemisiae*) exclusively by its spores being paler. Having learned from our findings in *P. tephrophylla*, where we came across large specimens and even whole collections in which all or practically all spores obviously were immature (brown or pale brown instead of dark red, due to some disturbance or arrest in the process of maturation), we decided that an analogous disturbance must have resulted in the carpophores of *D. squamosa* var. *ochrospora*. In some specimens of other species we came across the same phenomenon, be it to a lesser extent.

The veil very rarely forms a distinct annulus. Kühner & Romagnesi (1953: 359) described '*Drosophila jerdonii* sensu J. Lange' as having a stem with a 'voile partiel annuliforme' and large, slightly thick-walled and in KOH yellowish cystidia. On

examination of an exsiccatum of this taxon received from Romagnesi, we discovered that it represented *P. artemisiae*. On examination of the type of the true *Agaricus jerdonii* Berk. & Br. we found it to represent *P. caput-medusae*.

In Oct. 1983 we received for identification an exsiccatum of a species of *Psathyrella* of which the stem had a small but very distinct woolly, upright annulus just below the level of the margin of the cap. In trying to identify his specimen the collector had searched in vain Smith's (1972: 31, 61) subgenus *Pseudostropharia* ('stipe typically furnished with a membranous to floccose annulus') for his species, unfortunately overlooking the pleurocystidia which were typical of *P. artemisiae*.

var. **microspora** Kits van Wav.

*Psathyrella artemisiae* var. *microspora* Kits van Wav. on p. 282 of the present work. 1985.

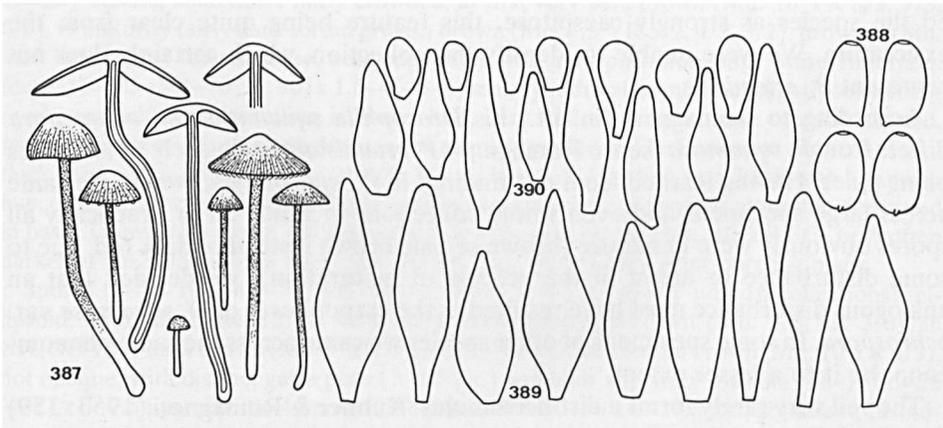
COLLECTION EXAMINED. — B R I T I S H I S L E S, Wales, Lake Vyrnwy, 15 Sept. 1967 (type, L).

Of this variety we found only one specimen which differed from *P. artemisiae* by its conspicuously small spores, only measuring 6.5–7(–8) x 4–4.5  $\mu\text{m}$  (mean values 7 x 4.3  $\mu\text{m}$ ) and the abundant very small spheropedunculate and clavate cells, measuring 7.5–10(–15) x 5–7.5(–10)  $\mu\text{m}$ . The specimen was also very striking because of the large size of its cap (45 mm diam.) and the somewhat revolute marginal area of the cap. ang. etc.

***Psathyrella impexa* (Romagn.) Bon — Figs. 387–390**

*Drosophila impexa* Romagn. in Bull. mens. Soc. linn. Lyon 21: 153. 1952. — *Psathyrella impexa* (Romagn.) Galland in Rev. Mycol. 36: 153. 1972 (not val. publ., basionym not mentioned); *Psathyrella impexa* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2b/2, 4. Aufl.: 275. 1978 (not val. publ., no full reference to basionym); *Psathyrella impexa* (Romagn.) Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 29. 1982 (not val. publ., basionym not mentioned); *Psathyrella impexa* (Romagn.) Bon in Docum. mycol. 12(48): 52. 1982.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 360. 1953; Romagn., l.c., 1982.



Figs. 387–390. *Psathyrella impexa*. — 387. Carpophores (x 0.5). — 388. Spores. — 389. Pleurocystidiogram. — 390. Cheilocystidiogram.

Cap in earliest stages 4–7 mm, conico-paraboloid, warm reddish brown (Mu. 5 YR 3/4) but very soon warm brown (Mu. 7.5 YR 4/4), then rapidly fairly dark greyish brown (Mu. 10 YR 4/2), centre remaining browner, ochre brown, at maturity 15–35 mm, spreading via paraboloid to convex, dark greyish brown (Mu. 10 YR 3/2, 3/3, 4/3), greyer towards margin (Mu. 10 YR 4/2, 5/2), striate up to 1/2–3/4 from margin, hygrophanous, young caps drying out to pale yellowish brown (Mu. 10 YR 7/4), mature caps to pale greyish brown (Mu. 10 YR 6/3) with a conspicuous pink to pinkish vinaceous colour, resulting in a rosy or flesh colour (Mu. 5 YR 6/2, 6/3, 5/2, 5/3, 8/2, 7/3) of  $\pm 2/3$  of cap, contrasting sharply with pale brown or yellowish ochre (Mu. 10 YR 7/4, 7/6, 6/4, 8/3, 8/4, 8/6) centre, distinctly micaceous and rugulose or sulcate. Veil strongly developed, in young stages on cap forming a lanose coating, covering entire cap with adpressed fibrils, flocci and small scales with at margin appendiculate fibrils and fascicles of fibrils, on stem forming a lanose coating, at maturity still many fibrils and fascicles, sometimes also flocci in marginal zone of cap and on stem. Gills 3–5 mm broad, rounded near margin, then ascending, straight or subventricose, broadly adnate, often with decurrent tooth, dark greyish (Mu. 10 YR 5/1) to greyish brown, near edge with a trace of purple (Mu. 10 YR 5/2; 7.5 YR 6/2), darker (Mu. 10 YR 4/1, 4/2) towards base, with white edge. Stem 30–55(–75) x 2–3 mm, cylindrical, sometimes distinctly flexuous, fragile, hollow, white but isabelline below, with pruinose apex. Flesh of cap in centre 1–2 mm thick, dark greyish brown (Mu. 10 YR 3/2, 3/3), of stem white. Trama of 'washed' gill near base very pale brown (Mu. 10 YR 7/4, 7/3), paler and greyer towards edge, very pale near edge, in early stages yellowish brown (Mu. 10 YR 6/4, 6/6) near base. Spore print purplish black.

Spores 8–10 x (4–)4.5–5.5  $\mu\text{m}$  (mean values 8.3–9.3 x 4.7–5.3  $\mu\text{m}$ : 4 collections), ellipsoid, adaxially flattened, dark, in water dark red (Mu. 10 R 3/4; 2.5 YR 3/4), in  $\text{NH}_4\text{OH}$  10% dark reddish brown (Mu. 2.5 YR 2.5/4), in KOH 5% dark sordid brown (Mu. 10 YR 3/2; 7.5 YR 3/2), with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 16–25.5 x 8–9.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 35–55(–60) x 10–17.5  $\mu\text{m}$ , moderately to fairly numerous, fusoid, sometimes drawn out into a short neck, tapering towards obtuse to subacute apex, with fairly short pedicel, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 20–45 x 7.5–15  $\mu\text{m}$ , numerous to abundant, often without distinct pedicel, intermixed with variable quantities but usually numerous unobtrusive small spheropedunculate and clavate cells, 10–20 x 7.5–10  $\mu\text{m}$ ; all cells thin-walled, but sometimes larger spheropedunculate cells slightly thick-walled, and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. in basal area pale brown from membranous pigment with a few yellow hyphal septa, towards edge much paler, without encrustations. Pileipellis a 3–4 cells deep layer of subglobose cells, 25–50  $\mu\text{m}$  diam., very pale brown in  $\text{NH}_4\text{OH}$  10%.

HABITAT & DISTRIBUTION. — Terrestrial, solitary or gregarious, on verges of roads in *Quercus* and *Fagus* woods. July–Oct. Very rare in the Netherlands. Reported from France, not from the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Ommen, near castle 'Eerde', 13 Oct. 1962, 13 July 1963, 17 Oct. 1969; prov. Gelderland, Apeldoorn, near 'Echoput', 12 Oct. 1969.

Hitherto the sole records from the Netherlands are those mentioned above. The find of 13 Oct. 1962 consisted of some 200 specimens. The specimens of the 17 Oct. 1969 collection had strikingly flexuous and long (up to 75 mm) stems (as mentioned in Romagnesi's original description) and going by their paler brown colour, all spores were immature.

***Psathyrella friesii* Kits van Wav. — Figs. 391–395**

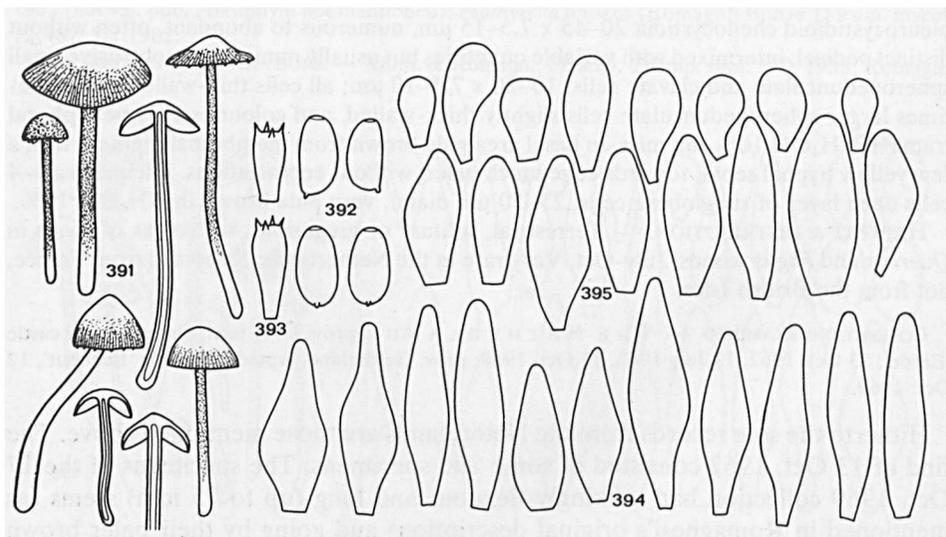
*Psathyrella langei* Sing. in Coll. bot. Barcinone 1: 244. 1947 (not val. publ., new name for *Psathyra fibrillosa* sensu J. Lange).

*Psathyrella friesii* Kits van Wav. in Persoonia 9: 282. 1977.

MISAPPLIED NAMES. — *Agaricus fibrillosus* sensu Lambotte, Fl. mycol. belge 1: 216. 1880. — *Psathyra fibrillosa* sensu J. Lange in Dansk bot. Ark. 9(1): 9. 1936. — *Psathyrella fibrillosa* sensu Maire in Mém. Soc. Sci. nat. Maroc 45: 113. 1937; sensu A. H. Smith in Mem. N.Y. bot Gdn 24: 233, pl. 64b and 69b. 1972. — *Drosophila fibrillosa* sensu Romagn. in Bull. trimest. Soc. mycol. Fr. 92: 192. 1976.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., Blätterp.: pl. 67 fig. 1. 1913 (descr. on p. 258 excluded; as *Psathyrella fibrillosa*); J. Lange, Fl. agar. dan. 4: 94, pl. 152 D. 1939 (as *Psathyra fibrillosa*); A. H. Smith, l.c. (as *Psathyra fibrillosa*); Kits van Wav., l.c.; Romagn., l.c.

Cap 15–25 mm, paraboloid, later more convex, with small and vague or fairly distinct umbo, dark reddish brown (Mu. 5 YR 3/2, 3/4), in marginal area dark brown (Mu. 7.5 YR 4/4), soon brown all over (Mu. 10 YR 3/4, 4/4, 5/4); striate up to 2/3 from margin, hygrophanous, drying out to pale brown (Mu. 10 YR 7/4, 8/4), at centre at first ochre (Mu. 7.5 YR 5/4), finally pale ochre (Mu. 7.5 YR 7/6, 10 YR 8/6), without pink; dry surface rugulose, slightly micaceous. Veil white, strongly developed, leaving many small networks and patches of bundled fibrils reaching up to half-way from margin, or even up to umbo, often distinctly appendiculate, in young specimens rendering entire margin bearded, forming denticles and flocci at margin even in mature specimens, contrasting sharply with brown colour of cap; surface of stem covered along its entire length — except for apex — with loose, small velar fibrils and bundles of fibrils (no scales). Gills 3–4 mm broad, ventricose, ascending, broadly adnate, greyish brown (Mu. 10 YR 4/2, 4/3, 5/2), browner towards base (Mu. 10 YR 5/3, 5/4), colours mixed with a trace of purple, with white, minutely fimbriate edges. Stem 40–75 x 1.5–3 (apex) to 2–4 (just above base) mm, cylindrical or gradually thickening towards slightly swollen base (up to 5 mm), straight, not rooting, hollow, white, minutely longitudinally striate, with shiny surface and pruinose apex. Flesh of cap 2–3 mm thick in centre, dark brown (Mu. 10 YR 3/3) with some reddish tinge (Mu. 5 YR 4/2), of



Figs. 391–395. *Psathyrella friesii*. — 391. Carpophores (x 0.5). — 392. Spores. — 393. Basidia. — 394. Pleurocystidiogram. — 395. Cheilocystidiogram.

stem pale brown, darkening towards base, at base brown (Mu. 7.5 YR 5/4) but with thin, superficial, white layer. Trama of 'washed' gill in  $\text{NH}_4\text{OH}$  10% brown (Mu. 10 YR 5/4) in a fairly narrow zone along base, elsewhere pale brown (Mu. 10 YR 6/3, 7/3) and very pale brown near and at edge. Spore print in thin layer dark reddish purple, in thick layer purplish black.

Spores (7-)7.5-10 x 4-5.5  $\mu\text{m}$  (mean values 8-9.5 x 4.5-5.4  $\mu\text{m}$ : 5 collections), ellipsoid, adaxially flattened, in water and  $\text{NH}_4\text{OH}$  10% fairly dark reddish brown (Mu. 2.5 YR 3/6), in KOH 5% dark brownish grey (Mu.  $\pm$  10 YR 4/2), not opaque, with small ( $\pm$  1.5  $\mu\text{m}$ ) but distinct germ pore and small hilar appendix. Basidia 20-22 x 8-9  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40-55(-70) x 10-14(-20)  $\mu\text{m}$ , numerous to abundant, fusoid-ventricose (sublageniform), with fairly short and usually rather broad pedicel and obtuse to subobtuse apex, strikingly uniform on one and the same gill, but variable from one collection to another, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 27-60(-70) x 11-18  $\mu\text{m}$ , numerous to moderately numerous, rarely scattered, rather thick-set, intermixed with many spheropedunculate and clavate cells, 17.5-30 x 8-12.5  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly brown from membranal pigment, paler towards edge, very pale near and at edge, with yellow hyphal septa but without encrustations. Pileipellis a 1-2 mm cells deep layer of colourless globose to subglobose cells, 16-40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary, terrestrial in grass in coniferous and deciduous woods. Sept.-Oct. Rather rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Overijssel, Oldenzaal, nature reserve 'Het Roderveld', 12 Oct. 1976 (holotype, L) and 29 Sept. 1980; Delden, Bornscheweg, 4 Oct. 1979; prov. Gelderland, Leersum, 29 Sept. 1962; prov. Brabant, Alphen, estate 'Ooievaarsnest', 14 Sept. 1980.

On keying out this species one arrives both with Lange (1939: 94) and A. H. Smith (1972: 233) at *P. fibrillosus*, their descriptions corresponding sufficiently with the one given above. In the literature this species is always referred to under the epithet '*fibrillosa* (Pers.: Fr.)' but there are distinct differences between Fries's species and the one described by Lange, Smith, and above, reason why we gave this taxon a new name, *P. friesii* (for more details see Kits van Waveren, 1977: 282). Earlier Singer (1947: 244), also realising these differences, proposed the new name *P. langei*, but this name has not been validly published.

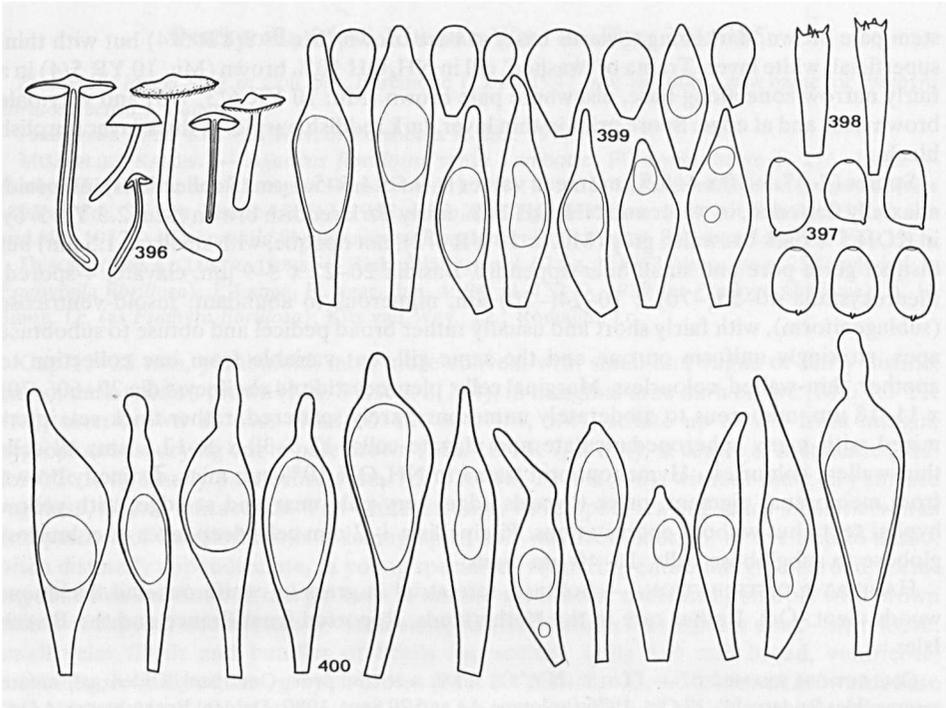
### *Psathyrella gossypina* (Bull.: Fr.) Pears. & Denn. — Figs. 396-400

*Agaricus gossypinus* Bull., Herb. France: pl. 425 fig. 2. 1789; ditto, Hist. Champ. France 2(1): 419. 1792/93. — *Agaricus gossypinus* Bull.: Fr., Syst. mycol. 1: 310. 1821. — *Psathyra gossypina* (Bull.: Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5 (Champ. Jura Vosges 3): 439. 1875. — *Pannucia gossypina* (Bull.: Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 515. 1879. — *Drosophila gossypina* (Bull.: Fr.) Quél., Enchir. Fung.: 118. 1886. — *Psilocybe gossypina* (Bull.: Fr.) Kirchner & Eichler in Jh. Ver. Vaterl. Naturk. Württemb. 50: 449. 1894. — *Hypholoma gossypinum* (Bull.: Fr.) Big. & Guill., Fl. Champ. France 2: 345. 1909. — *Psathyrella gossypina* (Bull.: Fr.) Pears. & Denn. in Trans. Brit. mycol. Soc. 31: 184. 1948.

*Psathyrella xanthocystis* P. D. Orton in Trans. Brit. mycol. Soc. 43: 379. 1960.

EXCLUDED. — *Psathyra gossypina* sensu Rick., Blätterp.: 260. 1913 (= *P. artemisiae*).

DESCRIPTIONS & ILLUSTRATIONS. — Bull., l.c.; Cooke, Ill. Brit. Fungi 4: pl. 612 A/621 A. 1886; Konr. & Maubl., Ic. sel. Fung. 1(4): pl. 41. 1929; J. Lange, Fl. agar. dan. 4: 94, pl. 152 G. 1939; Kühn. & Romagn., Fl. anal. Champ. sup.: 362. 1953; P. D. Orton, l.c. (as *P. xanthocystis*).



Figs. 396–400. *Psathyrella gossypina*. — 396. Carpophores (x 0.5). — 397. Spores. — 398. Basidia — 399. Cheilocystidiogram. — 400. Pleurocystidiogram.

Cap 9–30 mm, conical, conico-convex, spreading to convex or plane, normally with conspicuous obtuse umbo, firm, dark brown (Mu. 7.5 YR 3/2), more dark reddish brown (Mu. 5 YR 3/2) towards and at centre, not or only little (rarely up to half-way) striate, hygrophanous, rapidly drying out, characteristically to fairly pale ochreous brown (Mu. 7.5 YR 5/6, 5/8, 6/6; 10 YR 5/6, 5/8) at centre, elsewhere paler,  $\pm$  yellowish brown (Mu. 7.5 YR 7/6; 10 YR 7/4, 7/6, 6/4), sometimes with indentations at margin, without pink, rugulose. Veil little, moderately or fairly strongly developed, white, on cap in marginal area few to many fibrils or fascicles of fibrils (sometimes up to half-way from margin), sometimes even flocculi, not infrequently appendiculate (rarely shaggy), on stem not infrequently forming a floccose, fibrillose or even lanose coating. Gills 2–4 mm broad, ventricose, broadly adnate, sometimes with decurrent tooth, at first pale brown (Mu. 7.5 YR 6/4), later dark brown (Mu. 5 YR 3/4), dark tobacco brown (Mu. 5 YR 4/2, 3/2) or warm brown (Mu. 7.5 YR 5/4), with white, fimbriate edge. Stem 25–45 x 2.5–4 mm, cylindrical or slightly thickening towards sometimes up to 5 mm thick base, white, hollow, with pruinose apex. Flesh of cap 2–2.5 mm thick in centre, dark greyish brown, of stem white. Trama of 'washed' gill distinctly brownish yellow (Mu. 10 YR 7/4, 7/6), the yellow colour of vague tissue strands dominating. Spore print purplish black.

Spores 7–9 x 4.5–5.5  $\mu\text{m}$  (mean values 7.4–8.8 x 4.6–5.2  $\mu\text{m}$ : 8 collections) in face view ellipsoid but many spores distinctly ovoid, in profile ellipsoid, adaxially flattened, in water warm brown with reddish hue (Mu. 5 YR 4/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 4/4) in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 4/3, 3/3), not opaque, with small germ pore ( $\pm 1 \mu\text{m}$ ) and very distinct hilar appendix. Basidia large, 22–40 x 8–10(–13)  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40–85 x 10–20  $\mu\text{m}$ , abundant, ventricose-fusoid (some cells clavate) with

rather large, conspicuously broad pedicel and apex drawn out into a short (5  $\mu\text{m}$ ) to long (20–25  $\mu\text{m}$ ) narrow (2.5–5  $\mu\text{m}$ ) neck (the long necks often curved, irregularly shaped or subcapitate), very pale brown in  $\text{NH}_4\text{OH}$  10%, thin-, sometimes very slightly thick-walled, almost all (both pleuro- and pleurocystidioid cheilocystidia) comprising a globose, ellipsoid or irregularly shaped small to very large (10–35  $\mu\text{m}$ ) oily drop, slightly refractive in  $\text{NH}_4\text{OH}$  10%, very dark red in Congo Red. Marginal cells: pleurocystidioid cheilocystidia 27.5–65 x 10–17.5  $\mu\text{m}$ , numerous and densely packed, intermixed with few to many spheropedunculate and clavate cells, 12.5–32.5 x 7.5–17.5  $\mu\text{m}$  and mature and immature basidia; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale brownish yellow from membranal pigment with few yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of colourless subglobose cells 15–50  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Terrestrial, solitary or subcaespitose against wood or on stumps of deciduous trees. July–Oct. Rare in the Netherlands. Reported from France and the British Isles.

**COLLECTIONS EXAMINED.** — **T H E N E T H E R L A N D S:** prov. Drente: Schoonlooër Strubben, 29 Sept. 1977; Gees, 28 Sept. 1975; prov. Overijssel: Denekamp, estate 'Singraven', 23 Sept. 1961; Delden, estate 'Twickel', area 'Het Loofriet', 30 Sept. 1979; prov. Gelderland, Vorden, near castle 'Vorden', 2 Oct. 1961. — **B R I T I S H I S L E S:** Scotland, Invernesshire, Badger Falls, Glen Affric, 6 Sept. 1957 (E; isotype of *P. xanthocystis*); England, Wiltshire (exact locality not recorded), July 1941 (K; labelled *P. chondroderma*); Wales, Lake Vyrnwy, 10 Sept. 1979.

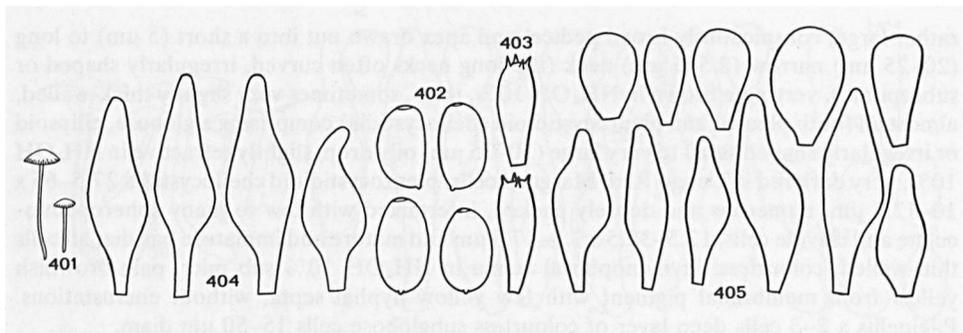
We examined the type specimens of *P. xanthocystis* and found the microscopical characters fully identical with those of *P. gossypina*. Orton, while studying these specimens obviously overlooked the very characteristic oily inclusions in the cell body of the cystidia (depicted by both J. E. Lange and Kühner & Romagnesi for *P. gossypina*). Orton's macroscopical description fully agrees with *P. gossypina* but his specimens were large (caps 40–70 mm, stems 55–80 mm) while their veil was very strongly developed, appendiculate and even forming an annulus on the stem. During our mycological forays in Scotland we noticed for several common agarics (e.g. *Stropharia semiglobata*), that the carpophores were conspicuously larger than those found in the Netherlands. In some of our collections of *P. gossypina* the veil also was conspicuously developed (flocculi on cap and appendiculate). Konrad & Maublanc (1929: pl. 41) pointed out that sometimes the veil is very fugacious and may be absent. Caespitose growth of this species was reported by several authors.

The striking fairly pale ochreous brown colour of the dry cap, the well-developed veil, the presence of an umbo and above all the very characteristic cystidia are diagnostic of this species.

### ***Psathyrella basii* Kits van Wav. — Figs. 401–405**

*Psathyrella basii* Kits van Wav. on p. 280 of the present work. 1985.

Cap 2.5–10 mm, conico-convex, pale brown to pale greyish brown, translucently striate, hygrophanous, drying out to pale ochre, slightly greyish at margin. Veil on cap forming adpressed radial silvery fibrils both in very young to fairly old specimens, on stem adpressed fine fibrils. Gills 1 mm broad at first pale beige, later sordid purplish grey, slightly ventricose, adnate with tooth, with white edge. Stem up to 30 x 1 mm, cylindrical, white, hollow, with white mycelium at pale brown base. Flesh not recorded. Trama of 'washed' gill pale yellowish (Mu. 10 YR 7/2–7/4) from base to edge. Spore print dark purple.



Figs. 401–405. *Psathyrella basii*. — 401. Carpophores (x 0.5). — 402. Spores. — 403. Basidia. — 404. Pleurocystidiogram. — 405. Cheilocystidiogram.

Spores 8–10 x 5.5–6  $\mu\text{m}$  (mean values 9.2 x 5.5  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, in water dark brown or warm brown with a trace of red (Mu. 5 YR 4/4–4/6), in  $\text{NH}_4\text{OH}$  10% darker brown (Mu. 5 YR 4/3), in  $\text{KOH}$  5% sordid greyish brown (Mu. 10 YR 5/2–5/3), not opaque, with distinct germ pore (1.8  $\mu\text{m}$ ) and hilar appendix. Basidia 22.5–25 x 9–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 37.5–52.5 x 10–15  $\mu\text{m}$ , rather few in number, ventricose-lageniform, with short and rather broad pedicel and obtuse apex, thin-walled, colourless. Marginal cells: pleurocystidioid but versiform cheilocystidia, 35–50 x 11–15  $\mu\text{m}$ , moderately numerous, intermixed with abundant spheropedunculate and clavate cells, 20–25 x 10–17.5  $\mu\text{m}$ ; all cells thin-walled, colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale to very pale brown from membranous pigment, without yellow hyphal septa or encrustations. Pileipellis a 2–3 cells deep layer of subglobose, colourless cells, 15–30  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — On culms of *Phragmites* and *Scirpus maritimus* just above waterlevel of pond in dunes. Known only from type locality.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS, prov. Friesland, Isl. Terschelling, Kroonpolders, 29 July 1958.

The macroscopical description is from the collector, dr. C. Bas; the microscopical description is the result of author's examination of the exsiccata.

This species, as *P. almerensis* also growing on culms of *Phragmites* and *Scirpus* and very much resembling that species, is distinguished from the latter by the smaller size of carpophores and spores and the ventricose-lageniform (non-utriform) cystidia.

**ETYMOLOGY:** Named in honour of the Leiden mycologist.

### ***Psathyrella dunensis* Kits van Wav. — Figs. 406–410**

*Psathyrella dunensis* Kits van Wav. on p. 281 of the present work. 1985.

Cap 12–20 mm, conico-paraboloid, sordid dark greyish brown, mud-colour (Mu. 10 YR 4/2, 4/3, 3/3), striate up to 3/4 from margin, hygrophanous, drying out to pale brownish grey, alutaceous (Mu. 10 YR 6/2, 6/3) with a distinct trace of pink in the periphery and very pale ochreous brown (Mu. 10 YR 7/3) at centre, subsulcate up to half-way from margin. Veil fugacious, leaving minute fibrils along margin of cap. Gills 4–5 mm $\bar{w}$  broad, ventricose, strongly rounded at and protruding below margin of cap, ascending, very broadly adnate, at

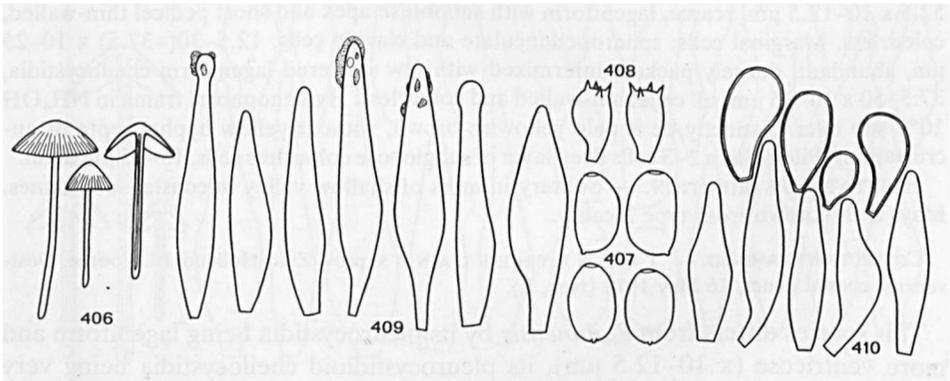
first pale brown, later very dark greyish brown (Mu. 7.5 YR 3/2; 10 YR 4/3, 3/3, 3/4) with a purplish hue; edge white with very distinct red underlining. Stem 25–40 x 1.5–2 mm, cylindrical, white only at apex, elsewhere very pale yellowish brown, isabelline, hollow, with slightly pruinose apex. Flesh of cap in centre 1 mm thick, dark greyish brown, of stem whitish. Trama of 'washed' gill distinctly pigmented, at base fairly dark yellow (Mu. 10 YR 7/6), towards edge much paler and mixed with very pale brown (Mu. 10 YR 7/3). Spore print purplish black.

Spores 7–9 x 4.5–5.5  $\mu\text{m}$  (mean values 8.1 x 4.6  $\mu\text{m}$ : 1 collection), ellipsoid, adaxially flattened, dark, in aater dark red (Mu. 2.5 YR 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/4), in KOH 5% dark sordid brown (Mu. 7.5 YR 4/2), subopaque, with small germ pore ( $\pm 1 \mu\text{m}$ ) and small hilar appendix. Basidia 19–24 x 8–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 47.5–55 x 18–11  $\mu\text{m}$ , scarce to moderately numerous, fusiform, many subcapitate, with fairly short pedicel, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells 20–35 x 7.5–15  $\mu\text{m}$ , abundant and densely packed, with slightly thickened and refractive walls, very pale brown in  $\text{NH}_4\text{OH}$  10%, intermixed with quite a number (but neither numerous nor scarce) of colourless thin-walled pleurocystidioid cheilocystidia, 30–45 x 9–12.5  $\mu\text{m}$ , with apices sometimes covered by a thin mucoid deposit. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. yellowish brown from membranal pigment, without yellow hyphal septa and encrustations, with very distinct yellowish brown narrow subhymenial zone under marginal cells (= red underlining of gill edge). Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 24–48(–56)  $\mu\text{m}$  diam.

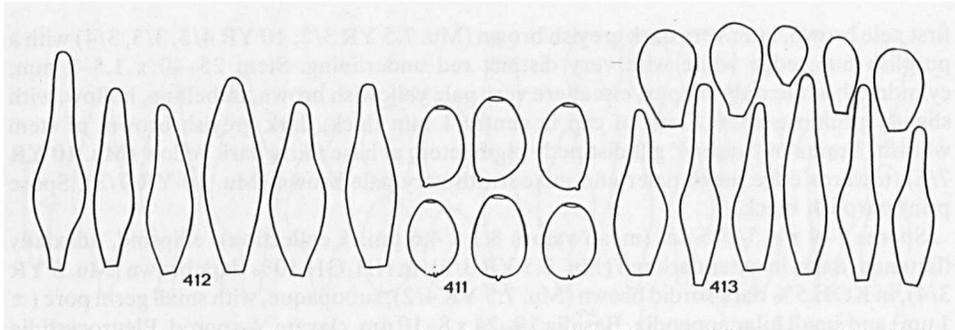
**HABITAT & DISTRIBUTION.** — Solitary on grassy verge of path through sand-dunes. Known only from type locality.

**COLLECTION EXAMINED.** — THE NETHERLANDS: prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 2 June 1962 (type, L).

This species resembles *P. pseudocorrugis* because of its size, pink in the drying cap, red underlining of the gill edge, and abundant and rather large spheropedunculate and clavate marginal cells. It differs from *P. pseudocorrugis* by its not utriform but sublageniform to subfusoid, often subcapitate pleurocystidia, only 10–11  $\mu\text{m}$  wide, its pleurocystidioid cheilocystidia not being particularly scarce, and its spores not having a large but a small germ pore ( $\pm 1 \mu\text{m}$ ).



Figs. 406–410. *Psathyrella dunensis*. — 406. Carpophores (x 0.5). — 407. Spores. — 408. Basidia. — 409. Pleurocystidiogram. — 410. Cheilocystidiogram.



Figs. 411–413. *Psathyrella dunarum*. — 411. Spores. — 412. Pleurocystidiogram. — 413. Cheilocystidiogram.

***Psathyrella dunarum* Kits van Wav. — Figs. 411–413**

*Psathyrella dunarum* Kits van Wav. on p. 281 of the present work. 1985.

Cap 15–23 mm, conico-paraboloid, spreading to convex, often with fairly distinct umbo, strongly striate, at marginal area subsulcate, greyish brown, at umbo browner, hygrophalous, drying out to pale ochre with isabelline centre, without pink, distinctly micaceous, not rugulose. Veil white, fugacious, on cap in early stages very distinct, forming a fairly dense layer of fibrils at margin and appendiculate bearded fibrillose fascicles, some of them reaching stem, forming isolated fibrils on stem. Gills 2–3 mm broad, ventricose, broadly adnate with tooth, at first greyish, finally dark purplish brown; edge white, with unmistakable red underlining (microscopical examination may be needed). Stem 20–30 x 1–2 mm, cylindrical, with slightly thickened base, white, hollow, with pruinose apex. Colour of flesh of cap and stem not recorded. Trama of 'washed' gill pale yellowish brown (Mu. 10 YR 7/4), slightly paler and greyer towards edge. Spore print purplish black.

Spores 8–9 x 4.5–5.5  $\mu\text{m}$  (mean values 8.7 x 5.4  $\mu\text{m}$ : 1 collection), in face view many spores distinctly ovoid, more rarely ellipsoid, in profile ellipsoid, adaxially flattened, in water orange-brown (Mu. 5 YR 5/8, 4/8), in  $\text{NH}_4\text{OH}$  10% brown (Mu. 5 YR 5/6), in  $\text{KOH}$  5% sordid brown (Mu. 10 YR 5/3, 4/3), not opaque, with distinct germ pore ( $\pm 1.8 \mu\text{m}$ ) and small hilar appendix. Basidia 17.5–22.5 x 8–10  $\mu\text{m}$  clavate, 4-spored. Pleurocystidia 40–52.5 x 10–12.5  $\mu\text{m}$ , scarce, lageniform with subobtusely apical apex and short pedicel thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells, 12.5–30(–37.5) x 10–25  $\mu\text{m}$ , abundant, densely packed, intermixed with few scattered lageniform cheilocystidia, 37.5–50 x 10–15  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. distinctly be it pale yellowish brown, without yellow hyphal septa or encrustations. Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 15–25  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — Solitary in moss of shallow valley in coastal sand dunes. May. Only known from type locality.

**COLLECTION EXAMINED.** — THE NETHERLANDS: prov. Zuid-Holland, Isl. Voorne, Oostvoorne, coastal dunes, 16 May 1973 (type, L).

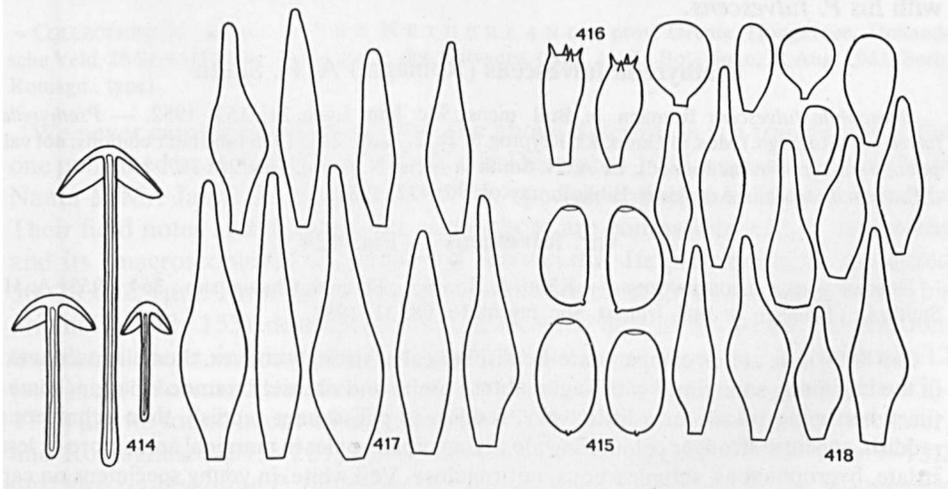
This species differs from *P. dunensis* by its pleurocystidia being lageniform and more ventricose (x 10–12.5  $\mu\text{m}$ ), its pleurocystidioid cheilocystidia being very scarce, and its spores being ovoid, paler and having a larger germ pore (= 1.8  $\mu\text{m}$ ).

***Psathyrella dicrani* (A. E. Jansen) Kits van Wav. — Figs. 414–418**

*Psathyrella fulvescens* var. *dicrani* A. E. Jansen, Veget. Macrofungi acid Oakwoods (Thesis). 1981.  
 — *Psathyrella dicrani* (A. E. Jansen) Kits van Wav. on p. 281 of the present work. 1985.  
 DESCRIPTIONS & ILLUSTRATIONS. — A. E. Jansen, l.c.; Arnolds in Biblioth. mycol. 90: 429, 1982.

Cap (10–)18–30(–40) mm, at first paraboloid or conico-paraboloid, then conico-convex to convex, sometimes vaguely umbonate, dark reddish brown (Mu. 5 YR 3/3, 4/3, 4/4) to warm brown (Mu. 4 YR 4/6, 4/8; 7.5 YR 4/4), slightly paler towards margin (Mu. 5 YR 5/3; 7.5 YR 5/4, 5/6), striate up to 1/2–3/4 from margin, hygrophanous, drying out to conspicuously warm ochre brown (Mu. 7.5 YR 5/6, 5/8, 6/6, 6/8, 7/8) at centre, for the rest pale to very pale brown, greyish brown, alutaceous (Mu. 10 YR 5/2, 6/2, 6/3, 7/3, 7/4, 8/4), sometimes with a trace of pink, with centre slightly darker, often rugulose and slightly micaceous. Veil in early stages leaving many fibrils and networks of fibrils up to half-way from margin, later wicker-works and isolated fibrils in a 2–3 mm broad zone along margin of cap and scattered fibrils on stem. Gills 3–5.5 mm broad, ventricose or only rounded at margin of cap, then straight and ascending, broadly adnate, somewhat distant, at first pale brown (Mu. 10 YR 6/3), later dark brown to greyish brown (Mu. 10 YR 5/2, 5/3, 4/2, 4/3, 3/3; 7.5 YR 3/2) or reddish to purplish brown (Mu. 5 YR 5/2; 2.5 YR 3/2), edge white, often near margin of cap concolorous or slightly brown, minutely fimbriate. Stem 30–75 x 2–5 mm, cylindrical, sometimes slightly thickening (3–7 mm) towards base, white but sometimes isabelline below, hollow, polished-glossy and finely longitudinally striate, pruinose at apex. Flesh of cap 1.5–3 mm thick in centre, reddish brown (Mu. 5 YR 4/3, 4/4), in stem white, pale brown alongside cavity. Trama of 'washed' gill distinctly brown (Mu. 10 YR 6/4, 5/4) but in mature specimens pale brown (Mu. 10 YR 7/3). Spore print purplish black.

Spores (9–)10–11.5 x 5.5–6.5  $\mu\text{m}$  (mean values 10.4–11.3 x 5.5–6  $\mu\text{m}$ : 8 collections), ellipsoid, adaxially flattened, very dark, in water dark red (Mu. 10 R 3/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3), in  $\text{KOH}$  5% dark sordid brown ( $\pm$  Mu. 7.5 YR 4/2), opaque to subopaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and small but distinct hilar appendix. Basidia 18–25 x (9–)10–12.5  $\mu\text{m}$ , subspheropedunculate, 4-spored. Pleurocystidia 47.5–



Figs. 414–418. *Psathyrella dicrani*. — 414. Carpophores (x 0.5). — 415. Spores. — 416. Basidia. — 417. Pleurocystidiogram. — 418. Cheilocystidiogram.

72.5 x 10–17.5(–19)  $\mu\text{m}$ , numerous to moderately numerous, lageniform with short and rather broad pedicel, long and narrow (2.5–6  $\mu\text{m}$ ) neck and acute to subacute, sometimes curved apex, thin-walled, colourless or very pale brown in  $\text{NH}_4\text{OH}$  10%. Marginal cells: pleurocystidioid cheilocystidia (27.5–)32.5–50(–60) x 7.5–12.5  $\mu\text{m}$ , numerous (sometimes densely packed) to scattered, intermixed with many inconspicuous small to fairly large spheropedunculate and clavate cells, 15–25(–30) x 8–15  $\mu\text{m}$ , some slightly thick-walled and pale brown in  $\text{NH}_4\text{OH}$  10%, and also mature and immature basidia. Hymenophoral trama in young specimens distinctly brown from membranal pigment with many yellow hyphal septa and a few minute encrustations (in mature specimens very much less brown). Pileipellis a 2–4 cells deep layer of subglobose cells, 30–50(–60)  $\mu\text{m}$  diam., very pale brown or colourless in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Terrestrial in deciduous woods (particularly *Dicrano-Quercetum*) on poor sandy soil, often against small pieces of wood. May–Oct. Not uncommon in the Netherlands. Not recorded from France or the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Drente: Beilen, Zuid-Hijkerzand, 11 May 1975, 26 July 1978 (WBS, type), 9 Aug. 1978 (WBS); Westerbork, Mantingerzand, 4 May and 22 Oct. 1975 (WBS); Dwingelo, near Spier, 8 May 1977, 10 Oct. 1978 (WBS); prov. Overijssel, Delden, estate 'Twickel', 16 May 1970.

The description of the macroscopical characters is based on the description by dr. A. E. Jansen (1981: 120), who examined fresh material of 18 collections and our own description of the Delden find (1970). *Psathyrella dicrani* having the very same characteristic warm ochre yellowish brown discoloration at the centre of the cap in the early stages of drying as *P. fulvescens*, this taxon was originally described as a variety of that species. The shape of the large pleurocystidia (lageniform with rather long neck) but above all the larger, darker and opaque spores and the subspheropedunculate basidia (both making this taxon to be intermediate between the subgenera *Psathyrella* and *Psathyra*) made us raise this taxon to specific rank. Romagnesi, to whom we sent an exsiccatum of *P. dicrani* confirmed the difference with his *P. fulvescens*.

### *Psathyrella fulvescens* (Romagn.) A. H. Smith

*Drosophila fulvescens* Romagn. in Bull. mens. Soc. linn. Lyon 21: 153. 1952. — *Psathyrella fulvescens* (Romagn.) Mos. in Gams, Kl. Kryptog. fl. 2b, 2. Aufl.: 241. 1955 (and later editions; not val. publ., basionym not mentioned); ex A. H. Smith in Mem. N.Y. bot. Gdn 24: 387. 1972.

*Psathyrella trivialis* Arnolds in Biblioth. mycol. 90: 437. 1982.

#### var. *fulvescens* — Fig. 424

**DESCRIPTIONS & ILLUSTRATIONS.** — Kühn. & Romagn., Fl. anal. Champ. sup.: 364. 1953; A. H. Smith, l.c.; Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 31. 1982.

Cap 8–30 mm, at first campanulate-hemispherical or strongly convex, then plano-convex, in the beginning sometimes with vague obtuse umbo and obtusely rounded margin, sometimes becoming sulcate or a little wavy, reddish to palissander reddish, then ochraceous reddish, at centre stronger coloured while drying, finally paler in marginal area, more or less striate, hygrophanous, submicaceous, not rugulose. Veil white, in young specimens on cap fairly abundant and speckling surface particularly at margin, but soon disappearing; on stem leaving short-lived fluffs at insertion of veil. Gills (2–)3–4(–5) mm broad, little crowded, at

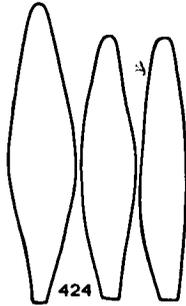


Fig. 424. *Psathyrella fulvescens* var. *fulvescens*. — Pleurocystidiogram.

first ventricose, then subsegmentiform, adnate, not uncinata, at first straw-coloured or pale brownish grey, finally brown (Séguy 702–703 =  $\pm$  Mu. 5 YR 4/2, 5/2), with strongly pruinose white and sometimes slightly yellowish edge. Stem (20–)34–40(–45) x 1–3 mm, subcylindrical, sometimes subflexuous, hollow, rather fragile, white, shiny, satiny due to longitudinal striation from white fibrils, in the end straw-coloured or slightly brownish, at apex minutely pruinose, with mycelial down at base. Flesh of cap fragile, concolorous, of stem yellowish brown or reddish.

Spores (8–)9.5–10(–10.5) x 4–4.5(–5)  $\mu$ m (a certain number narrowly ellipsoid), brown, subopaque, with small germ pore. Pleurocystidia 52–88 x 9–13(–15)  $\mu$ m, narrowly fusoid, with obtuse apex. Marginal cells: pleurocystidioid cheilocystidia 26–34 x 8–13  $\mu$ m, spheropedunculate and clavate cells 20–30 x 8–13  $\mu$ m, sometimes coloured by membranal pigment. Trama: fundamental hyphae 30–75 x 10–20  $\mu$ m, in cap distinctly coloured from yellowish rust brown membranal pigment, paler in mediostratum of gills. Cells of pileipellis 25–65 x 16–45  $\mu$ m, slightly yellowish.

HABITAT & DISTRIBUTION. — Found on stump of *Fraxinus*, also on litter from *Quercus*. Aug.–Nov. Very rare in the Netherlands, hitherto collected only once. According to Romagnesi fairly common in France; not recorded from the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS, prov. Drente, Hoogeveen, Hollandse Veld, 28 Sept 1983. — FRANCE, dpt. Calvados, Caen, Jardin Botanique, 21 Aug. 1941 (herb. Romagn., type)

We never came across this species. The above description is a translation of the one published by Romagnesi (1982: 31). In December 1983 we received from Miss Nauta & Mr. Jalink an exsiccatum of this species, collected in the Netherlands. Their field notes and drawing of a carpophore are compatible with *P. fulvescens* and its (macroscopically identical) var. *brevicystis*. Its pleurocystidia measured 50–70 x 12.5  $\mu$ m. These sizes correspond well with those given by Romagnesi in his original (1952: 153) description of *P. fulvescens* and in his recent description, translated above, in which the pleurocystidia are stated to measure 52–88 x 9–13(–15)  $\mu$ m, in contradistinction with the smaller sizes, 35–55(–60) x (8–)10–15(–17.5)  $\mu$ m we found in our 47 collections of *P. fulvescens* var. *brevicystis* (see later) and Romagnesi (1975: 201) for his '*Drosophila* cf. *fulvescens*' (35–45 x 9–13.2  $\mu$ m) also representing *P. fulvescens* var. *brevicystis*. The spores of the Hoogeveen collection were dark, subopaque and measured (8–)9–10 x (4.5–)5–5.5  $\mu$ m (mean values 9.1 x 5.3  $\mu$ m) which is sufficiently in accordance with Romagnesi's (1982:

31) figures, given above. They therefore were slightly larger than the spores in our 47 collections of *P. fulvescens* var. *brevicystis*, which measured 7–9(–10) x 4–5  $\mu\text{m}$ , (mean values 7.4–8.6 x 4.3–4.8  $\mu\text{m}$ ) and also than the spores of Romagnesi's *Drosophila* cf. *fulvescens*' (= *P. fulvescens* var. *brevicystis*), which measured 7–8.5(–9.5) x 4.2–4.7 x 4.7–5.7  $\mu\text{m}$ . We examined the type material of *P. fulvescens*, received from Romagnesi and found the pleurocystidia to measure 50–57.5 x 10–12  $\mu\text{m}$ , but almost all cells were shrivelled.

See for further comments our observations on *P. fulvescens* var. *brevicystis*.

var. *brevicystis* Kits van Wav. — Figs. 419–423

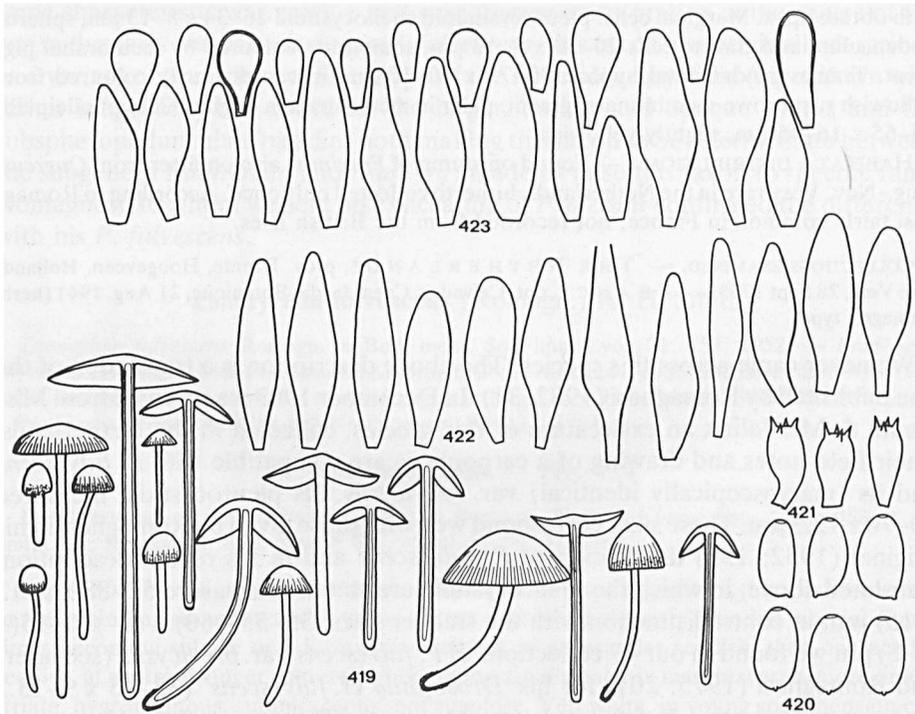
*Psathyrella trivialis* Arnolds in Biblioth. mycol. 90. 437. 1982.

*Psathyrella fulvescens* var. *brevicystis* Kits van Wav. on p. 281 of the present work. 1985.

(*Drosophila* cf. *fulvescens*, Romagn. in Bull. trimest. Soc. mycol. Fr. 91: 201. 1975.)

DESCRIPTIONS & ILLUSTRATIONS. — Romagn., l.c. (as *D. cf. fulvescens*); Arnolds, l.c. (as *P. trivialis*).

Cap 10–35(–45) mm, at first paraboloid, then conico-paraboloid, finally convex or plane with deflexed marginal area, rarely with revolute margin or vague umbo, fragile, when fresh at first very dark to dark purplish-reddish brown (Mu. 2.5 YR 3/2, 4/2; 5 YR 3/2, 3/3, 3/4, 4/2, 4/4), soon towards margin loosing reddish tinge, becoming dark brown (Mu. 7.5 YR 3/2, 4/2, 4/4; 10 YR 5/4, 4/3, 3/3, 5/3, 5/4) or dull greyish brown (Mu. 7.5 YR 5/2; 10 YR



Figs. 419–423. *Psathyrella fulvescens* var. *brevicystis*. — 419. Carpophores (x 5). — 420. Spores — 421. Basidia. — 422. Pleurocystidiogram. — 423. Cheilocystidiogram.

4/3, 4/2, 5/2) often with whitish extreme margin, striate up to 1/2-3/4 from margin, sometimes at marginal area striate-sulcate, hygrophanous, during process of drying a rather large very characteristic, conspicuously warm ochre brown (Mu. 7.5 YR 5/6, 5/8, 6/6, 6/8, 7/8) or ochre yellow (Mu. 10 YR 7/6, 6/6) central area developing, in the end overall colour pale brown, greyish brown or alutaceous (Mu. 7.5 YR 6/4; 10 YR 6/4, 6/3, 6/2, 7/3, 7/4, 8/3, 8/4; 2.5 YR 7/2), slightly darker at centre, sometimes with a trace of pink, usually rugulose and micaceous. Veil fairly strongly developed, white, in primordia forming numerous fibrils or networks of fibrils covering entire cap or reaching up to 1/2-3/4 from margin and connecting margin with stem, in young stages sometimes forming a dense belt of fibrils along margin, at maturity leaving many, rather persisting small fibrils and networks (rarely a few flocci or appendiculate fibrils) in a 1-3(-5) mm broad marginal zone and normally a few to many fugacious fibrils on stem. Gills 2-6(-7) mm broad, ventricose or rounded only at margin of cap, then ascending straight, broadly adnate, often with tooth, fairly crowded but sometimes distinctly distant, at first pale brown (Mu. 10 YR 6/3), later tobacco brown or dark brown to greyish brown (Mu. 7.5 YR 3/2, 4/2, 5/2; 10 YR 3/3, 4/3, 4/4, 5/3, 5/4), near edge sometimes greyish (Mu. 10 YR 4/1, 4/2, 5/1, 5/2, 6/2; 5 YR 5/1), browner towards base and often mixed with purple (Mu. 5 YR 3/2, 4/2, 5/2; 2.5 YR 3/2); edge white but near margin of cap often concolorous or brownish. Stem 30-70 (up to 90 when growing in tall grass) x 2-4 mm, cylindrical or slightly thickening towards base, fragile, straight, snow-white and flamed, polished, often isabelline below, hollow, finely longitudinally striate, at base sometimes subbulbous (3-6 mm) and often covered with whitish or pale grey down and strigose, at apex pruinose. Flesh of cap 1.5-3 mm thick in centre, reddish brown (Mu. 5 YR 3/2, 3/3, 3/4, 4/2, 4/3) or dark brown (Mu. 10 YR 3/3, 4/3, 4/4), of stem white but pale brown alongside cavity, darker towards base and in base often brown. Trama of 'washed' gills distinctly brown (Mu. 10 YR 6/4, 5/4), at maturity in basal 1/2-2/3 pale greyish brown (Mu. 10 YR 7/3, 7/4, 6/3). Spore print purplish black.

Spores 7-9(-10) x 4-5  $\mu$ m (mean values 7.4-8.6 x 4.3-4.8  $\mu$ m, in most cases 7.8-8.1 x 4.5  $\mu$ m: 47 collections), ellipsoid, adaxially flattened, sometimes somewhat elongate, dark, in water dark red (Mu. 2.5 YR 3/4, 3/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 3/3, 4/4), in KOH 5% dark sordid brown (Mu. 10 YR 3/3, 4/3), not opaque; germ pore distinct to fairly distinct (1.5-1.8  $\mu$ m); hilar appendix fairly small. Basidia 15-27(-30) x 7.5-10  $\mu$ m, clavate, 4-spored. Pleurocystidia 35-55(-60) x (8-)10-15(-17.5)  $\mu$ m, numerous, sometimes scarce and scattered, fusoid-pedicellate, or sublageniform, with obtuse apex, often narrow and slender, thin-walled, colourless or very pale brown in NH<sub>4</sub>OH 10%. Marginal cells: pleurocystidioid cheilocystidia 25-45 x 7.5-12.5(-15)  $\mu$ m, usually numerous, sometimes even densely packed, but not infrequently moderately numerous to scattered, intermixed with many spheropedunculate and clavate cells, 10-27.5(-30), many of them (particularly larger cells) slightly thick-walled and pale brown in NH<sub>4</sub>OH 10%, particularly those near margin of cap (where very often subhymenial cells also pale brown in NH<sub>4</sub>OH 10%). Hymenophoral trama in NH<sub>4</sub>OH 10% submicr. usually distinctly brown, but in mature specimens less brown, from membranal pigment with many yellow hyphal septa and few minute encrustations. Pileipellis a 2-4 cells deep layer of subglobose cells, 30-50(-60)  $\mu$ m diam, very pale brown or practically colourless in NH<sub>4</sub>OH 10%.

**HABITAT & DISTRIBUTION.** — Terrestrial in deciduous woods, solitary to subgregarious (sometimes gregarious in groups of 20-40 specimens). July-Nov. Very common in the Netherlands. Reported from France and the British Isles (see collections examined).

**COLLECTIONS EXAMINED.** — 43 Collections from many parts of the Netherlands. — **B R I T I S H I S L E S**, Wales, Lake Vyrnwy, 11 and 13 Sept. 1967 and 3 Sept. 1977 (2 collections).

Macroscopically the characteristic warm ochre, yellowish brown discoloration in a rather large area at the centre of the cap in the early stages of drying (hence the epithet '*fulvescens*') in combination with the snow-white flamed and glossy stem and microscopically the versiform pleurocystidioid cheilocystidia, intermixed with many spheropedunculate and clavate cells, many of which with slightly thickened walls and pale brown in  $\text{NH}_4\text{OH}$  10%, are diagnostic of both *P. fulvescens* and its variety *brevicystis*.

For the sizes of the pleurocystidia of *P. fulvescens* Romagnesi in his latin description (1952: 153) gave conspicuously divergent figures, 37–70(–88) x 10–17(–20)  $\mu\text{m}$ , and shapes (narrow and obtuse fusoid, or sublageniform, not infrequently very long but sometimes very short). He did not state in so many words that the form with long and sublageniform cystidia was to be regarded as the type but added that he had often found forms with shorter cystidia, which indicates that the form with long cystidia stood for the type. This was confirmed by the facts that Kühner & Romagnesi (1953: 364) only gave the large figures, 55–88 x 10–13(–15)  $\mu\text{m}$ , that the largest cell depicted by Kühner & Romagnesi in fig. 490 is a slender lageniform cell, that later (1975: 201) Romagnesi described the form with short cystidia (30–45 x 9–13.5  $\mu\text{m}$ ) as 'cf. *P. fulvescens*' and that in the written description we received from Romagnesi some years ago he called the pleurocystidia 'longuement fusiformes ou lageniformes, 55–75(–88)  $\mu\text{m}$ '.

Some years ago Romagnesi already stated (in litt.) that he had realised having assembled in 1952 in a collective description under the epithet '*fulvescens*' two taxa, which differed by the size and shape of the pleurocystidia, the sizes, given in 1952 covering both taxa. Recently (1982: 31) he gave a somewhat different description of spores and pleurocystidia and also different figures for *P. fulvescens* (see observations on *P. fulvescens*), while (in litt., also in 1982) he stated that the taxon with small pleurocystidia merely could be regarded as a variety.

The data, mentioned above, justify the conclusion that – although there is no sharp dividing line between the large and small cells and that intermediate shapes between fusoid, sublageniform and even lageniform cells occur – a taxon with small and chiefly fusoid–pedicellate pleurocystidia can be distinguished from typical *P. fulvescens* with long and chiefly sublageniform or lageniform pleurocystidia (see Smith 1972: 521, fig. 814). We decided to name the former taxon *P. fulvescens* var. *brevicystis*.

The figures given by Romagnesi for the marginal cells of *P. fulvescens* also are larger than those we found in our 47 collections of its var. *brevicystis*. It is noteworthy that we never came across specimens of the typical variant, against no less than 47 collections of var. *brevicystis*, which in itself is an argument for separating the two taxa.

Smith (1972: 387) who examined 36 collections of *P. fulvescens* obviously brought together under the epithet '*fulvescens*' the taxon with long and the taxon with short cystidia, his figures for the length of the pleurocystidia being (38–)45–58(–68)  $\mu\text{m}$ . His figure 84 depicts only lageniform cystidia with long cylindrical neck and he described these cells as fusoid–ventricose with long often flexuose

necks. His picture and description both agree with Romagnesi's *P. fulvescens*. The macroscopical features of *P. fulvescens* and its var. *brevicystis* are fully identical.

***Psathyrella multipedata* (Peck.) A. H. Smith — Figs. 425–428**

*Psathyra multipedata* Peck. in Bull. Torrey bot. Club 32: 77–81. 1905. — *Atylospora multipedata* (Peck.) Murrill in Mycologia 14: 265. 1922. — *Psathyrella multipedata* (Peck.) A. H. Smith in Contr. Univ. Mich. Herb. 5: 33. 1941. — *Drosophila multipedata* (Peck.) Kühn. & Romagn., Fl. anal. Champ. sup.: 360. 1953 (not val. publ., basionym not mentioned).

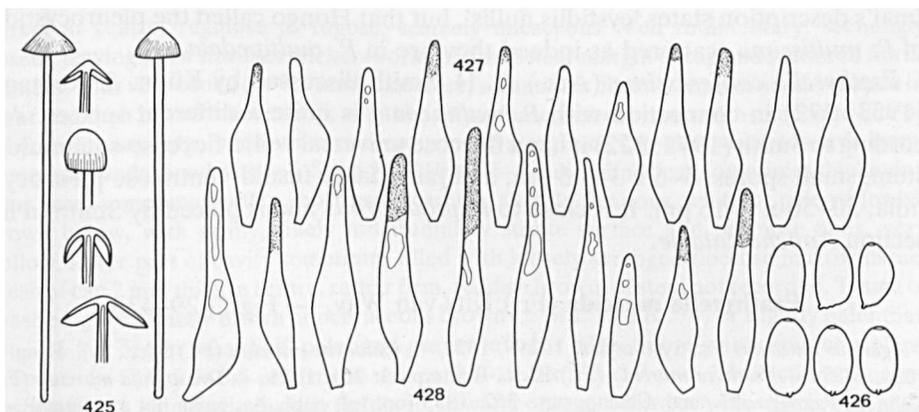
*Psathyra stipatissima* J. Lange in Meddr Svampekundsk. Fremme 4: 1,4. 1926.

*Psathyra multissima* Imai in J. Fac. Agric. Hokkaido Univ. 43: 293. 1938.

*Psathyra fasciculata* Velen., Novit. mycol. 1: 156. 1939.

DESCRIPTIONS & ILLUSTRATIONS. — J. Lange, Fl. agar. dan. 4: 96, pl. 153 E. 1939 (as *Psathyra stipatissima*); Kühn. & Romagn., l.c.; A. H. Smith in Mem. N.Y. bot. Gdn 24: 374. 1972.

Cap 7.5–40 mm, in primordia and subprimordial stages paraboloid, warm brown (Mu. 7.5 YR 5/6; 5 YR 5/6), later spreading to conical, finally to conico-convex, sometimes with vague umbo, sordid brown or greyish brown (Mu. 7.5 YR 5/2, 4/2; 10 YR 4/2, 5/2, 5/3; 2.5 YR 5/2) mixed with a purplish or faintly reddish hue, at glassy centre very soon browner (at first Mu. 10 YR 5/4, 4/4, later 5/6, 5/8), finely striate up to 1/3–1/2 from margin, hygrophanous, drying out to very pale brown, alutaceous (Mu. 10 YR 7/4, 7/3, 7/2), at centre pale ochraceous or yellowish brown (Mu. 10 YR 7/4, 7/6, 8/6), without pink, not micaceous, sometimes slightly rugulose. Veil only perceptible in primordial stages, consisting of fine arachnoid-fibrillose layer connecting margin of cap with stem. Gills 2–4 mm broad, crowded, ventricose, narrowly adnate, at first very pale greyish brown, soon browner (Mu. 10 YR 6/3, 5/3), finally dark purplish brown (Mu. 7.5 YR 5/2, 4/2, 3/2; 5 YR 5/3, 4/3, 3/4), with white minutely fimbriate edge. Stem 40–140 x 1.5–3(–4) mm, straight cylindrical or slightly thickening towards base, snow-white, hollow (cavity wide), at upper 1/2–1/3 pruinose, at base tomentose or fibrillose or slightly strigose; many stems springing from a common pseudorrhiza and several pseudorrhizas connate, resulting in a densely fasciculate growth of the carpophores (up to  $\pm$  80 specimens). Flesh of cap in centre 1–2 mm thick, greyish brown, of stem white. Trama of 'washed' gills almost colourless, pale sordid grey (Mu. 10 YR 7/2) in peripheral half, in basal half with a pale brown (Mu. 10 YR 7/3) tinge. Spore print brownish black.



Figs. 425–428. *Psathyrella multipedata*. — 425. Carpophores (x 0.5). — 426. Spores. — 427 Pleurocystidiogram. — 428. Cheilocystidiogram.

Spores (6.5–)7–8(–9) x 3.5–4.5  $\mu\text{m}$  (mean values 7.2–8.0 x 4.1–4.5  $\mu\text{m}$ : 9 collections), ellipsoid, adaxially flattened, in water and  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 5 YR 4/6, 4/8), in KOH 5% sordid brown (Mu. 10 YR 4/2), not opaque, with small germ pore ( $\pm 1 \mu\text{m}$ ) and small hilar appendix. Basidia 16–21 x 6–8  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 32.5–60(–70) x 8–12  $\mu\text{m}$ , scarce, lageniform with fairly short pedicel, rather long narrow (2.5–5  $\mu\text{m}$ ) neck, and acute apex, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 30–70(–80) x 7.5–12.5  $\mu\text{m}$ , overall often, or only the largest ones larger than pleurocystidia, abundant, densely packed, with longer, often flexuous necks, usually many (rarely only a few) cells with at their apex and along their sides mucoid droplets and deposits, staining bluish or bluish-green in  $\text{NH}_4\text{OH}$  10% in fresh material and in not too old exsiccata, intermixed with few spheropedunculate and clavate cells (12.5–15 x 9–10  $\mu\text{m}$ ) and many (young) basidia. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. very pale brown, without yellow hyphal septa or encrustations. Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 25–35  $\mu\text{m}$  diam.

HABITAT & DISTRIBUTION. — In parks, mossy-grassy places in deciduous woods or ruderal areas preferably on clay or loam. Sept.–Nov. Uncommon in the Netherlands. Reported from France and the British Isles.

COLLECTIONS EXAMINED. — THE NETHERLANDS: prov. Overijssel, Denekamp, estate 'Singraven', 14 Oct. 1961, 17 Oct. 1962; prov. Gelderland, Winterswijk, Huininkmaat, 19 Sept. 1953; prov. Utrecht, Breukelen, estate 'Over-Holland', 8 Nov. 1962; prov. Zeeland, Isl. Zuid-Beveland, Kloetinge, Abbekindersche Bos, 12 Jan. 1984; prov. Noord-Brabant, Cuijk, 17 Oct. 1965; prov. Limburg, Wijre, 28 Oct. 1979. — BRITISH ISLES, England, Aston, park of University, 15 Oct. 1981.

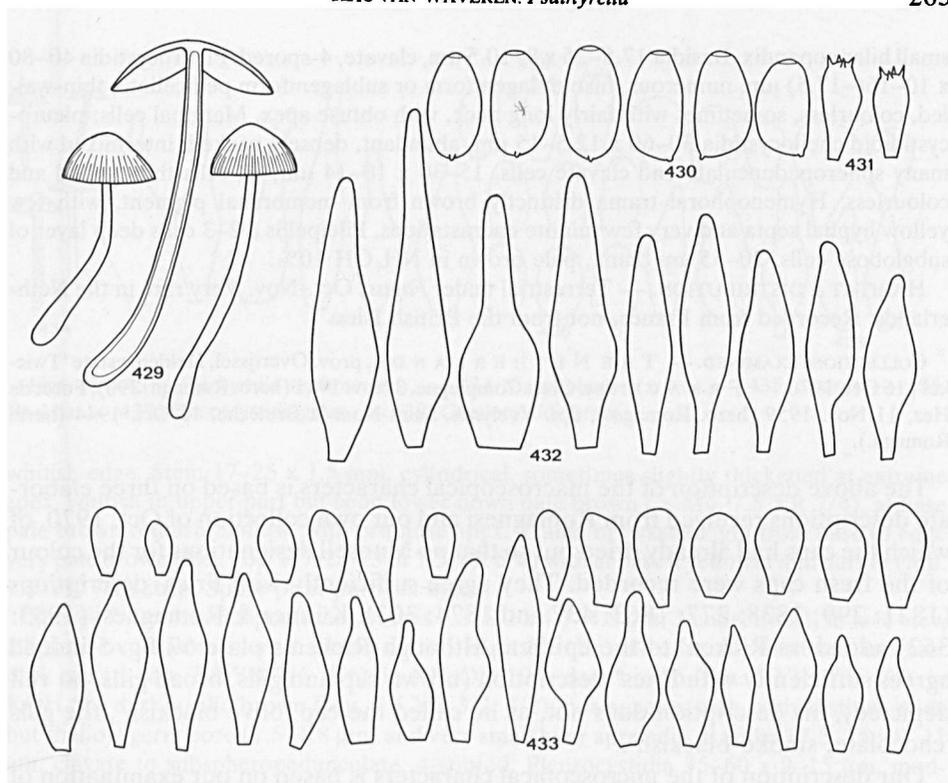
Imai (1938: 293) stated that his *P. multissima* somewhat resembles *P. stipatissima* Lange (= *P. multipedata*), from which species he stated it to differ only by the larger cap, 20–50 mm broad, and larger spores, 7–9 x 3.5–5  $\mu\text{m}$ . Hongo (1966: 167) also mentioning the close resemblance to *P. multipedata*, mentioned the larger spores (7.5–8.5 x 4–4.5  $\mu\text{m}$ ) as the only difference with *P. multipedata*. As we found the spores of *P. multipedata* to measure 7–8 x 3.5–4.5  $\mu\text{m}$ , we venture to conclude that *P. multissima* is conspecific with *P. multipedata* although we have not examined the type specimens of the former species. In this respect it is striking that Imai's description states 'cystidiis nullis', but that Hongo called the pleurocystidia of *P. multissima* scattered as indeed they are in *P. multipedata*.

*Psathyrella confertissima* (Atk.) A. H. Smith discussed by Kühn. & Romagn. (1953: 372) in connection with *P. multipedata* is quite a different species. According to Smith (1972: 122) it has a floccose universal veil, a floccose-squamulose stem, small spores, 5–6 x 3–3.6  $\mu\text{m}$ , and fairly large fusoid-ventricose pleurocystidia, 30–56 x 9–16  $\mu\text{m}$ . It is close to *P. piluliformis* and is placed by Smith in his section *Appendiculatae*.

### ***Psathyrella murcida* (Fr.) Kits van Wav. — Figs. 429–433**

*Agaricus murcida* Fr., Syst. mycol. 1: 299. 1821. — *Psilocybe murcida* (Fr.) Sacc., Syll. Fung. 5: 1054. 1887. — *Psathyra murcida* (Fr.) Rick., Blätterp.: 1: 261. 1913. — *Drosophila murcida* (Fr.) Kühn. & Romagn., Fl. anal. Champ. sup.: 362. 1953 (not val. publ., basionym not mentioned). — *Psathyrella murcida* (Fr.) Mos. in Gams, Kl. Kryptog.fl., 2, 1. Aufl.: 209. 1953 (and later editions: not val. publ., basionym not mentioned); ex Kits van Wav. on p. 281 of the present work. 1985.

DESCRIPTIONS & ILLUSTRATIONS. — Rick., l.c.; (only plate 67 fig. 5); Kühn. & Romagn., l.c.



Figs. 429–433. *Psathyrella murcida*. — 429. Carpophores (x 0.5). — 430. Spores. — 431. Basidia — 432. Pleurocystidiogram. — 433. Cheilocystidiogram.

Cap 15–35 mm, at first semiglobose, paraboloid or conico-paraboloid, later convex, not umbonate, sometimes fissured, rather firm, with smooth surface, dark reddish brown, warm ochre brown or date brown, striate up to half-way from margin, hygrophanous, drying out from centre via ochre (Mu. 7.5 YR 5/6, 5/8) to beige-ochre, cinnamon buff or alutaceous, darker at centre, rugulose to rugose, scarcely micaceous. Veil rudimentary, seemingly absent, leaving a few fibrils or wicker-works of fibrils near margin of cap and scattered fibrils on stem. Gills very broad (6–7.5 mm), not close, sometimes distant, blunt or sickle-shaped in front and then broader near stem, very broadly adnate, warm brown with chocolate hue or tobacco brown; edge white or concolorous near margin of cap and white towards stem, sometimes underlined with red. Stem 55–110 x 3.5–6 mm, cylindrical, sometimes thickening near base, sometimes with a short pseudorrhiza, slightly flexuous, white or pale yellowish brown below, with satiny, finely longitudinally striate surface and pruinose apex, very hollow, lower part of cavity sometimes filled with loosely arranged floccose narrow tissue. Flesh of cap 2 mm thick in centre, rather firm, reddish brown, of stem not recorded. Trama of 'washed' gill distinctly brown or ochraceous brown ( $\pm$  Mu. 10 YR 5/4) or slightly paler than Mu. 7.5 YR 5/4 in basal half, paler and greyer towards edge. Spore print sepia-chocolate.

Spores 9–11 x 5.5–6.5  $\mu$ m (mean values 9.6–10.5 x 5.5–5.7  $\mu$ m: 3 collections, but see observations), ellipsoid, adaxially flattened, in water orange-brown or yellowish brown (Mu. 5 YR 4/8, 5/8) with red hue, in  $\text{NH}_4\text{OH}$  10% warm brown (Mu. 5 YR 4/4, 4/6), in KOH 5% sordid brown (Mu. 10 YR 4/3), not opaque, with very distinct germ pore (1.8–2  $\mu$ m) and

small hilar appendix. Basidia 17.5–25 x 8–10.5  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 40–80 x 10–16(–17.5)  $\mu\text{m}$ , numerous, fusoid, lageniform or sublageniform pedicellate, thin-walled, colourless, sometimes with fairly long neck, with obtuse apex. Marginal cells: pleurocystidioid cheilocystidia 30–60 x 12.5–15  $\mu\text{m}$ , abundant, densely packed, intermixed with many spheropedunculate and clavate cells, 15–30 x 10–14  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama distinctly brown from membranous pigment, with few yellow hyphal septa and very few minute encrustations. Pileipellis a 2–3 cells deep layer of subglobose cells, 20–55  $\mu\text{m}$  diam., pale brown in  $\text{NH}_4\text{OH}$  10%.

**HABITAT & DISTRIBUTION.** — Terrestrial under *Fagus*, Oct.–Nov. Very rare in the Netherlands. Recorded from France, not from the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS, prov. Overijssel, Delden, estate 'Twickel', 16 Oct. 1970. — FRANCE: dpt. Oise: Compiègne, 3 Nov. 1941 (herb. Romagn. 290); Forêt de Hez, 11 Nov. 1959 (herb. Romagn.); dpt. Yvelines, Saint-Nom-la Bretèche, 12 Oct. 1944 (herb. Romagn.).

The above description of the macroscopical characters is based on three elaborate descriptions received from Romagnesi and our own collection of Oct. 1970, of which the caps had already dried out so that no Munsell designations for the colour of the fresh caps were recorded. They agree sufficiently with Fries' descriptions (1821: 299; 1838: 277; 1863: 437 and 1874: 303). Kühner & Romagnesi (1953: 362) added 'ss Ricken' to the epithet. Although Ricken's plate 67 fig. 5 indeed agrees sufficiently with Fries' description (brown cap and gills, broad gills, no veil depicted), his description does not, as he called the cap 'olive blackish', the gills 'chocolate, smoke-blackish'.

Our description of the microscopical characters is based on our examination of the four collections mentioned above. In calculating the mean spore size we did not include the Dutch collection (spores 9–12.5 x 5.5–6.5  $\mu\text{m}$ , mean values 10.6 x 5.8  $\mu\text{m}$ ) as in this collection we came across 2-spored basidia, accounting for the larger size of the spores. *Psathyrella murcida* differs from *P. fusca* chiefly by its very broad and warm to tobacco brown gills (dark greyish brown purple in *P. fusca*), its larger spores and larger, differently shaped (see Figs.) pleurocystidia. For nomenclature see our observations on *P. fusca*.

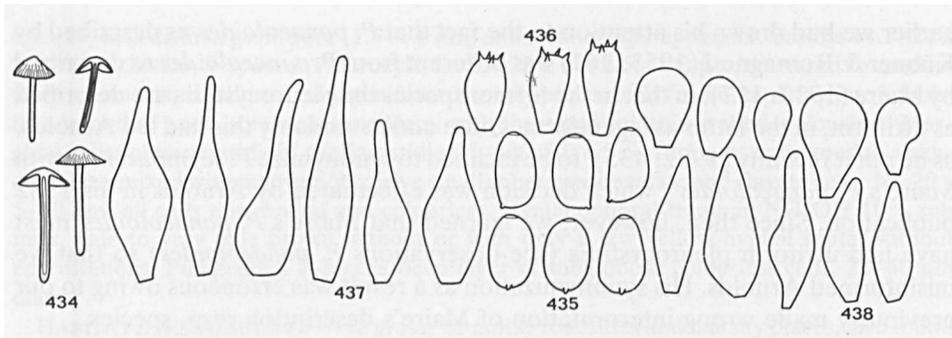
### ***Psathyrella seymourensis* A. H. Smith — Figs. 434–438**

*Psathyrella seymourensis* A. H. Smith in Mem. N.Y. bot. Gdn 24: 412. 1972.

**MISAPPLIED NAMES.** — *Psathyrella panaeoloides* sensu Arnolds in Biblioth. mycol. 90: 433. 1982.

**DESCRIPTIONS & ILLUSTRATIONS.** — A. H. Smith, l.c.; Arnolds, l.c. (as *P. panaeoloides*).

Cap 9–14 mm, paraboloid, conico-paraboloid to conico-convex, with or without obtuse umbo, at centre dark chestnut brown (slightly paler and redder than Mu. 5 YR 3/4), elsewhere paler brown (Mu. 5 YR 4/4), greyish or sordid brown (Mu. 10 YR 5/2, 5/3), striate up to 3/4 from margin, hygrophanous, drying out to pale greyish brown, rarely with pink hue. Veil fugacious, varying from scattered fibrils near margin of cap and on stem to (in young, fresh stages) many fibrils up to 3/4 from margin of cap (some even appendiculate) and a fibrillose coating on stem. Gills conspicuously broad, 2–2.5 mm, subdistant to even distant, horizontal or only slightly ascending, very broadly adnate (sometimes with tooth), almost triangular, purplish grey near edge, browner (Mu. 10 YR 5/2, 5/3) towards base, with



Figs. 434–438. *Psathyrella seymourensis*. — 434. Carpophores (x 0.5). — 435. Spores. — 436. Basidia. — 437. Pleurocystidiogram. — 438. Cheilocystidiogram.

whitish edge. Stem 17–25 x 1.5 mm, cylindrical, sometimes slightly thickened at extreme apex, whitish in upper part but soon lower down pale brown ( $\pm$  Mu. 7.5 YR 7/4), at base pale brown reddish, hollow, with pruinose apex. Trama of ‘washed’ gill from base to edge very pale brown (Mu. 10 YR 7/2, 7/3 or 7.5 YR 6/4) with at base a yellower and darker (Mu. 7.5 YR 7/6) strip. Spore print purplish black.

Spores 7–9 x 4.5–5.5  $\mu$ m (mean values 7.8–8.2 x 4.7–4.9  $\mu$ m: 3 collections), in face view ellipsoid-ovoid (some very distinctly ovoid), in profile ellipsoid adaxially flattened, in water dark red ( $\pm$  Mu. 2.5 YR 3/6, 4/6), in NH<sub>4</sub>OH 10% dark brown (Mu. 5 YR 3/3, 4/4), in KOH 5% dark sordid brown (Mu. 7.5 YR 3/2, 4/2), not opaque, with fairly distinct, wide but shallow germ pore (1.5–1.8  $\mu$ m) and very small hilar appendix. Basidia 17.5–25 x 9–11  $\mu$ m, clavate to subspheropedunculate, 4-spored. Pleurocystidia 35–60 x 9–15  $\mu$ m, moderately numerous, lageniform, usually with fairly long and narrow (3–5  $\mu$ m) neck, passing more or less abruptly or gradually into ventricose part, with acute to subacute apex, thin-walled, colourless. Marginal cells: spheropedunculate and clavate cells 12.5–27.5 x 7.5–17.5  $\mu$ m, numerous, intermixed with rather scanty pleurocystidioid cheilocystidia, 30–45 x 7.5–15  $\mu$ m; all cells thin-walled and colourless. Pigmentation of hymenophoral trama in NH<sub>4</sub>OH 10% sub micr. at base distinctly brown with many yellow hyphal septa and many minute encrustations.

**HABITAT & DISTRIBUTION.** — Terrestrial on sandy or clayey soil (in dunes, in hayfields). Oct.–Nov. Very rare in the Netherlands. Not recorded from France and the British Isles.

**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Drente, Vries, east of Taarlo, 10 Nov. 1976 (WBS); Havelte, Havelter Berg, 10 Oct. 1974 (WBS); prov. Noord-Holland, Santpoort, estate ‘Duin en Kruidberg’, 13 Nov. 1962.

The keys in Smith’s monograph led both dr. Arnolds, who found and described the WBS collections, and us quite smoothly to the identification of the three finds as *P. seymourensis*.

The above description agrees very well with the one, given by Smith (1972: 412). Smith stressed the presence of broadly adnate gills (as in our collections) and the habitat (‘sandy waste land near scrub oak’), which was the same as in two of our collections. *Psathyrella seymourensis* is a dull and banal species, devoid of any characteristic feature or characteristic combination of features to go by in the process of identification.

In his observations on this species Arnolds (1982: 435) correctly stated that

earlier we had drawn his attention to the fact that *P. panaeoloides* as described by Kühner & Romagnesi (1953: 361) was different from *P. panaeoloides* as described by Maire (1937: 117), in that in the former species the pleurocystidia are described as utriform, in the latter as lageniform. Quite understandably this had led Arnolds, as he put it recently (1982: 435) 'to be inclined to synonymize *P. seymourensis* with Maire's *P. panaeoloides*', which decision was effectuated by Arnolds in his 1982 publication. Since then, however, we learned that Maire's *P. panaeoloides* must have had utriform pleurocystidia (see observations *P. panaeoloides*) so that we misinformed Arnolds. His synonymization as a result was erroneous owing to our previously made wrong interpretation of Maire's description resp. species.

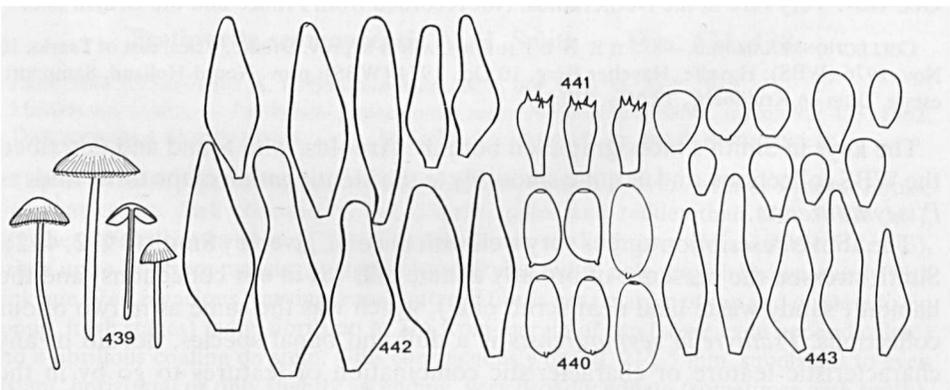
***Psathyrella ocellata* (Romagn.) Mos. — Figs. 439–443**

*Drosophila ocellata* Romagn. in Bull. mens. Soc. linn. Lyon 21: 154. 1952. — *Psathyrella ocellata* (Romagn.) Mos. in Gams, Kl. Kryptog.fl. 2b/2, 3. Aufl.: 222. 1967.

DESCRIPTIONS & ILLUSTRATIONS. — Kühn. & Romagn., Fl. anal. Champ. sup.: 361. 1953. — Romagn. in Bull. trimest. Soc. mycol. Fr. 98: 37. 1982.

Cap 8–25 mm, at first paraboloid, then spreading to convex-paraboloid, finally to more or less plano-convex, sometimes vaguely umbonate, very dark brown, date brown, dark greyish brown or dark greyish, mud colour, striate, hygrophanous, drying out via sordid hazel brown to very pale grey, pale ochraceous or sordid white, at centre darker, without pink, rugulose, distinctly micaceous. Veil white, fugacious, at first forming some fibrils and fascicles of fibrils on cap near margin, in the end leaving only a few fibrils at margin and more on lower half of stem. Gills 2–4 mm broad, ventricose, broadly adnate, at first pale purplish grey, finally dark purplish brown, with white edge. Stem 30–50 x 2–3 mm, cylindrical, sometimes slightly thickened at base, white, sometimes pale brown below, hollow, fragile, with pruinose apex. Flesh of cap in centre 1–1.5 mm thick, dark greyish brown, of stem white. Trama of 'washed' gill pale to very pale brown (Mu. 10 YR 7/2, 7/3), slightly darker (Mu. 10 YR 6/4) near base. Spore print purplish black.

Spores 7–10 x 3.5–5.5  $\mu\text{m}$  (mean values 7.7–9.5 x 3.9–4.7  $\mu\text{m}$ : 5 collections), elongate-ellipsoid, adaxially flattened, in water dark red (Mu. 2.5 YR 3/6, 4/6), in  $\text{NH}_4\text{OH}$  10% dark brown (Mu. 5 YR 3/3, 3/4, 4/4), in KOH 5% dark sordid brown (Mu. 10 YR 3/3, 4/3), not



Figs. 439–443. *Psathyrella ocellata*. — 439. Carpophores (x 0.5). — 440. Spores. — 441. Basidia. — 442. Pleurocystidiogram. — 443. Cheilocystidiogram.

opaque, with distinct germ pore (1.5–1.8  $\mu\text{m}$ ) and distinct hilar appendix. Basidia 14.5–21 x 8–10  $\mu\text{m}$ , clavate, 4-spored. Pleurocystidia 25–58 x 9–12.5(–15)  $\mu\text{m}$ , scattered to moderately numerous, versiform, sublageniform, broadly to narrowly fusoid, tapering into subobtuse to obtuse apex, sometimes utriform, with short pedicel, thin-walled, colourless. Marginal cells: pleurocystidioid cheilocystidia 27–40(–50) x 7.5–12.5  $\mu\text{m}$ , numerous to abundant, intermixed with many unobtrusive small spheropedunculate and clavate cells, 10–20 x 5–10  $\mu\text{m}$ ; all cells thin-walled and colourless. Hymenophoral trama in  $\text{NH}_4\text{OH}$  10% sub micr. pale to very pale brown without or with only a few yellow hyphal septa, without encrustations. Pileipellis a 2–3 cells deep layer of subglobose colourless cells, 25–40  $\mu\text{m}$  diam.

**HABITAT & DISTRIBUTION.** — In grassy or mossy roadsides and marshy places, also found on manured soil of a hothouse. Apr.–Oct. Very rare in the Netherlands. Reported from France, not from the British Isles.

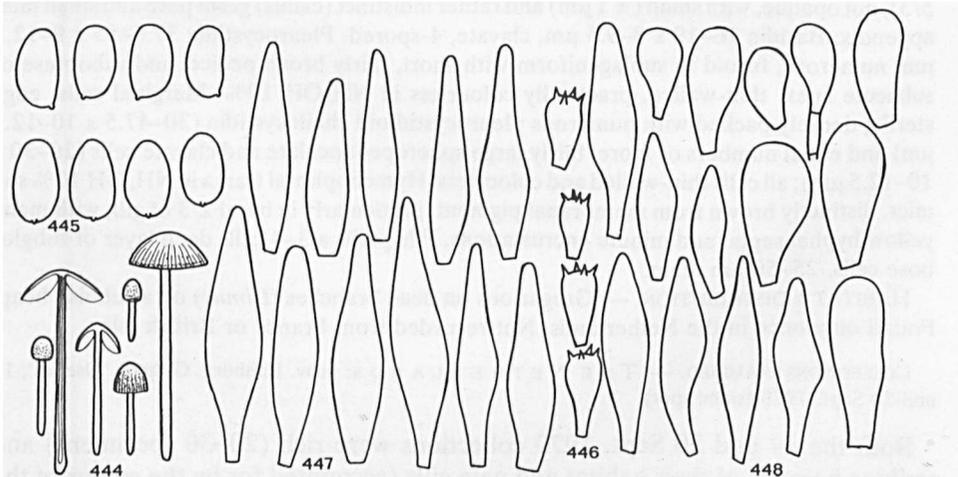
**COLLECTIONS EXAMINED.** — THE NETHERLANDS: prov. Utrecht, Amerongen, Amerongse Berg, 16 Oct. 1960; prov. Noord-Holland, Kortenhoeft (hothouse), 3 Apr. 1971; prov. Noord-Brabant, Goudbergven, 27 Aug. 1961. — FRANCE: dpt. Hauts-de-Seine, 28 July 1942 (herb. Romagn. D 323; holotype); Paris, Saint-Cloud, 23 June 1968 (herb. Romagn. D 992).

Of this species we received a full description from Romagnesi, from which we inserted a few data in our own description of our 1960 collection given above.

### *Psathyrella senex* (Peck.) A.H. Smith — Figs. 444–448

*Psilocybe senex* Peck in Rep. N.Y. State Mus. nat. Hist. 41: 70. 1888. — *Psathyrella senex* (Peck) A. H. Smith in Mem. N.Y. bot. Gdn 24: 230. 1972.

Cap in earliest stages 4–6 mm, conico-paraboloid with incurved margin, non-striate, reddish brown (Mu. 5 YR 3/4), in early stages 6–11 mm, conico-paraboloid, strongly striate up to 3/4 from margin, with smooth centre and striation warm brown (Mu. 7.5 YR 4/4, 5/6) but ridges between striae paler, sordid brownish yellow (Mu. 10 YR 6/4, 6/6), towards



Figs. 444–448. *Psathyrella senex*. — 444. Carpophores (x 0.5). — 445. Spores. — 446. Basidia. — 447. Pleurocystidiogram. — 448. Cheilocystidiogram.

margin still paler (Mu. 10 YR 7/6, 7/4), at margin almost white (Mu. 10 YR 8/4); overall impression of colour warm brown at centre, elsewhere rather yellowish brown, later at centre brown (Mu. 10 YR 4/3) and striae yellowish brown (Mu. 10 YR 6/4), paler towards margin, at maturity 10–25(–32) mm, spreading to paraboloid-convex (not plane), without umbo, with centre and strong striation sordid brown (Mu. 10 YR 4/3, 5/4) but ridges between striae paler and yellowish brown (Mu. 10 YR 6/4), near margin very pale brown (Mu. 10 YR 7/2), at margin itself white, hygrophanous, slowly drying out to pale brown (Mu. 10 YR 7/4, 6/4) at apex ochreous brown, without pink, rugulose, not or little micaceous. Veil distinctly developed but fugacious, in earliest stages forming appendiculate beardy belt along entire margin and many flocculi and loose fibrils on entire cap, somewhat later a very dense wicker-work of fibrils in a 1 mm broad zone along margin of cap, appendiculate only in a few places and many wicker-works and loose fibrils up to half way apex, sometimes even at apex, at maturity only minute fibrils at margin, in very early stages with numerous loose fibrils forming on entire stem a woolly covering, soon disappearing, leaving a few scattered fibrils in upper part. Gills at first 2 mm broad, ascending, slightly ventricose, fairly narrowly adnate, very pale pinkish grey (Mu. 7.5 YR 7/2), along base distinctly pale brown (Mu. 10 YR 5/4), at maturity 3–5 mm broad, ventricose, fairly broadly adnate, pale, in the beginning pale chocolate colour (Mu. 5 YR 6/2; 7.5 YR 6/2), browner (Mu. 10 YR 5/4) near base, in the end darker (Mu. 5 YR 5/2; 7.5 YR 5/2), with white edge. Stem 20–60 x 1.5–2.5 mm, cylindrical, sometimes gradually thickening near base or only with thickened base (3 mm), in upper 1/2–3/4 covered by a dense, minutely fibrillose white layer, lower down pale reddish brown, darkest at base (Mu. 5 YR 5/3; 7.5 YR 5/4), not rooting, hollow, pruinose at apex, at base strongly strigose with white hairs fixing stem to substrate (dead branches). Trama of 'washed' gill distinctly pigmented, from base to edge very pale brown (Mu. 10 YR 7/3), in basal 2/3 of gill sometimes vaguely and towards base increasingly spotted yellowish brown (Mu. 10 YR 6/4, 6/6). Spore print dark purplish brown (Mu. 2.5 YR 4/2; 5 YR 4/2).

Spores 7–8 x 4.5–5.5  $\mu$ m (mean values 7.6–7.7 x 4.7–4.8  $\mu$ m: 2 collections), in face view ellipsoid to ellipsoid-ovoid, in profile ellipsoid adaxially flattened to often slightly phaseoliform, variously shaped, slightly pale, in water yellow with a trace of red (Mu. 5 YR 5/8; 7.5 YR 5/8), in NH<sub>4</sub>OH 10% brown (Mu. 7.5 YR 5/4), in KOH 5% sordid brown (Mu. 10 YR 5/3), not opaque, with small ( $\pm$  1  $\mu$ m) and rather indistinct (callus) germ pore and small hilar appendix. Basidia 16–19 x 8–9.5  $\mu$ m, clavate, 4-spored. Pleurocystidia 37.5–55 x 9–12.5  $\mu$ m, numerous, fusoid to sublageniform with short, fairly broad pedicel and subobtuse or subacute apex, thin-walled, practically colourless in NH<sub>4</sub>OH 10%. Marginal cells: edge sterile, densely packed with numerous pleurocystidioid cheilocystidia (30–47.5 x 10–12.5  $\mu$ m) and equal numbers or more, fairly large spheropedunculate and clavate cells (20–30 x 10–12.5  $\mu$ m); all cells thin-walled and colourless. Hymenophoral trama in NH<sub>4</sub>OH 10% submicr. distinctly brown from membranal pigment, particularly in basal 2/3 of gill, with many yellow hyphal septa, and minute encrustations. Pileipellis a 3–4 cells deep layer of subglobose cells, 25–50  $\mu$ m diam.

**HABITAT & DISTRIBUTION.** — Gregarious on dead branches (*Ulmus*) on a rubbish heap. Found only once in the Netherlands. Not recorded from France or British Isles.

**COLLECTIONS EXAMINED.** — T H E N E T H E R L A N D S: prov. Limburg, Gulpen, 'Osebos', 14 and 20 Sept. 1970 (same spot).

Both the 14 and 20 Sept. 1970 collections were rich (20–30 specimens) and striking because of their habitat and pale gills (accounted for by the colour of the spores in combination with the pigmentation of the hymenophoral trama). Although Smith with his description gives the impression that the veil is very scanty,

he rightly ranked this species with those of his subgenus *Pannucia* ('outer veil and/or partial veil more or less well-developed') as in the earliest stages the veil in our specimens proved to be copious.

The mean values for the spore size is just above the limit set for the species of section *Hydrophilae* and the colour of the gills is not nearly sufficiently brown to rank the species with that section.

This species apparently being quite common in America (Smith examined 49 collections, among which 43 from the Michigan area and Peck's type specimen), it is not at all surprising that it now has also been found in Europe.

## INSUFFICIENTLY KNOWN TAXA

In this chapter are treated merely the insufficiently known taxa described from Europe or discussed in connection with species dealt with in the present work.

**aculeata.** — *Stropharia aculeatus* Quél. in *Mém. Soc. Emul. Montbéliard*, sér. II, 5: 256, pl. 22 fig. 4. 1872. — *Geophila battarrae* var. *aculeata* (Quél.) Quél., *Enchir. Fung.*: 112. 1886.

Doubtful. See observations *P. populina*.

**amaurus.** — *Agaricus amaurus* Berk. & Br. in *J. linn. Soc. (Bot.)* 11: 555. 1871.

Doubtful. See observations *P. spadicea*.

**amblycephalus.** — *Agaricus amblycephalus* Lasch in *Linnaea* 4: 550. 1829.

Doubtful.

**areolatus.** — *Agaricus areolatus* Klotzsch apud Berk. in *J. E. Smith, Engl. Fl.* 5(2): 112, or in *Hooker, Brit. Fl.* 2(2): 112. 1836. — *Psilocybe areolata* (Klotzsch) Sac., *Syll. Fung.* 5: 1047. 1887.

Doubtful. See observations *P. cernua*.

**arrosus.** — *Agaricus arrosus* S. Schulz. in *Verh. zool.-bot. Ges. Wien* 26: 418. 1876.

Doubtful.

**atomata.** — *Agaricus atomatus* Fr., *Syst. mycol.* 1: 298. 1821. — *Psathyra atomata* (Fr.) Kumm., *Führ. Pilzk.*: 70. 1871. — *Psathyrella atomata* (Fr.) Quél. in *Mém. Soc. Emul. Montbéliard*, sér. II, 5: 153. 1872. — *Panaeolus atomatus* (Fr.) Quél., *Fl. mycol.*: 55. 1888. — *Coprinarius atomatus* (Fr.) Lindau, *Höh. Pilze (Basidiomyc.)*: 126. 1917. — *Drosophila atomata* (Fr.) Romagn. in *Rev. Mycol.* 2: 245. 1937.

In an earlier publication (Kits van Waveren, 1972: 35) we argued that, although *Agaricus atomatus* Fr. (1821) probably is closely related to or even possibly conspecific with *A. pronus* Fr. (1838), we have very little definite knowledge of *A. atomatus*, whereas we are sufficiently informed about *A. pronus*, particularly

through the illustration in Fries' 'Icones'. We therefore consider *A. atomatus* Fr. a nomen dubium. For *Psathyrella atomata* sensu Bres., J. Lange, and Romagn., see *P. prona* f. *cana*.

**atro-rufus.** — *Agaricus atro-rufus* sensu Cooke, Handb. Brit. Fungi: 211. 1887; Ill. Brit. Fungi: pl. 571/602. 1885.

Doubtful, but could be identical with *P. bipellis*.

**battarae.** — *Agaricus battarae* Fr., Syst. mycol. 1: 175. 1821. — *Geophila battarae* (Fr.) Quél., Enchir. Fung.: 112. 1886. — *Hypholoma battarae* (Fr.) Rick., Blätterp.: 244. 1912. — *Psathyrella battarae* (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 128. 1948.

Doubtful. See observations *P. populinum* and *P. maculata*.

**canobrunneus.** — *Agaricus canobrunneus* Fr., Syst. mycol.: 294. 1821. — *Psilocybe canobrunnea* (Fr.) Kumm., Führ. Pilzk.: 71. 1871. — *Geophila canobrunnea* (Fr.) Quél., Enchir. Fung.: 115. 1886 — *Drosophila canobrunnea* (Fr.) Quél., Fl. mycol.: 58. 1888.

Doubtful. See observations *P. spadicea*.

**canofaciens.** — *Agaricus canofaciens* Cooke in Grevillea 14: 1. 1885; Ill. Brit. Fungi: pl. 621/595. 1886; Handb. Brit. Fungi, 2nd Ed.: 209. 1887.

Doubtfully synonymous with *P. bipellis* (see Kits van Waveren, 1977a: 221).

**carbonaria.** — *Psathyra carbonaria* Velen. in Novit. mycol.: 156. 1939.

Doubtful. The species is described as not having a veil and growing in burnt places. In (Novit. mycol. noviss.: 86) 1947 also doubtful as it is described as having very large spores (13–17 x 10 µm) and no veil.

**caryophyllaceus.** — *Agaricus caryophyllaceus* Britz. in Bot. Centralbl. 77: 401. fig. 266. 1899.

Doubtful. According to Britzelmayer this taxon is close to *P. caput-medusae*.

**cookei.** — *Psilocybe cookei* Sacc., Syll. Fung. 5: 1043. 1887 (= *A. sarcocephalus* sensu Cooke, Ill. Brit. Fungi: pl. 620/591. 1886).

Doubtful. Could be *P. sarcocephala*, but spores too large (10–11 x 4–5 µm).

**digitaliformis.** — *Agaricus digitaliformis* Bull., Herb. France 1: pl. 22. 1781.

Bulliard's plate obviously depicts *Coprinus disseminatus*. See below: *gyroflexus*.

**distans.** — *Agaricus distans* Pers., Tent. Dispos. Meth.: 23. 1794.

Doubtful. Could be *P. artemisiae*. No authentic material in Persoon's herbarium (L).

**empyreumaticus.** — *Agaricus empyreumaticus* Berk. & Br. in Ann. Mag. nat. Hist., ser. IV, 6: 469. 1870.

Doubtful. Orton (1960: 371) stated that the type specimens have ellipsoid, very dark brown spores measuring 14–16 x 8–10  $\mu\text{m}$  and having a conspicuous germ pore, suggesting a *Coprinus* species. This seems unlikely as in the original description the gills are called reddish, distant and adnate with a decurrent tooth.

**expolitus.** — *Agaricus atomatus* var. *expolitus* Fr., Epicr.: 239. 1838. — *Agaricus expolitus* (Fr.) Britz. in Ber. naturhist. Ver. Augsburg 27: 180. 1883. — *Psathyrella expolita* (Fr.) Sacc., Syll. Fung. 5: 1132. 1887.

This variety was described by Fries as differing from *A. atomatus* by its smaller size and conical cap. In the light of the great variability of macroscopical characters in species of *Psathyrella*, particularly in the *prona*-group, this taxon is to be regarded as yet another form of *P. prona*. Britzelmayer (1883, l.c.) raised this variety to specific rank and later (Ber. naturw. Ver. Schwaben 31: 169. 1894), contrary to Fries, called the cap of this species greyish brown and the gills even reddish grey, brown greyish black (= *P. prona*).

**fibrillosa.** — *Agaricus fibrillosus* Fr., Observ. mycol. 1: 1981. 1815; Syst. mycol. 1: 297. 1821; Epicr.: 233. 1838; Hymenomyc. europ.: 308. 1874. — *Psathyra fibrillosa* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5 (Champ. Jura Vosges 1): 150. 1872. — *Drosophila fibrillosa* Quél., Enchir. Fung.: 117. 1886. — *Hypholoma fibrillosa* (Fr.) Big. & Guill., Fl. Champ. sup. France: 345. 1909. — *Psathyrella fibrillosa* (Fr.) Maire apud Maire & Werner in Mém. Soc. Sc. nat. Maroc 45: 113. 1937.

Doubtful. With Lange (1939: 94), A. H. Smith (1972: 233), and most other authors brown or even reddish brown plays a distinct (sometimes even major) role in the colour of cap and gills of the species which they described under the epithet '*fibrillosa*'. But Fries in all his descriptions never mentioned brown for the colour of the cap or gills of his *Agaricus fibrillosus*, which he called resp. very pale greyish and purplish black. Singer (1947: 244) realising this contradistinction therefore named the species as described by J. Lange (and later by A. H. Smith) and many other authors *P. langei* (not val. publ.). Kühner & Romagnesi (1953: 372) omitted *P. fibrillosa* from their descriptive key and Dennis, Orton & Hora (1960: 186) excluded *P. fibrillosa* from their list, 'pending clearer definition'. We named *P. fibrillosa* sensu J. Lange *P. friesii*. For details see Kits van Waveren (1977: 282).

**flavo-griseus.** — *Agaricus flavo-griseus* Berk. in Hook. J. Bot. 2: 110. 1850. — *Psathyra flavo-grisea* (Berk.) Sacc., Syll. Fung. 5: 1063. 1887. ♣

Doubtful. According to Berkeley close to *A. gyroflexus*.

**gordonii.** — *Agaricus gordonii* Berk. & Br. in Ann. Mag. nat. Hist., ser. III, 7: 377. 1861.

Doubtful. See observations *P. pseudogordonii*.

**gunneri.** — *Agaricus gunneri* Fr., Syst. mycol. 1: 285. 1821, name change for *A. echinatus* Gunner in Fl. norveg. 2: 125, pl. 7 fig. 6–10. 1772. — *Pluteopsis gunneri* (Fr.) Fayod, Prodr. Hist. nat. Agar.: 377. 1889.

Doubtful. Fayod stated that this species has a cellular pileipellis and spores which in face view are triangular and in profile phaseoliform. This would strongly suggest *P. populina*, the more so as on Gunner's plate (on which Fries based his description without having seen material) the entire cap is echinate (as in *Pholiota squarrosa*). But neither Fries, nor Gunner nor Fayod mentioned the colour of the gills and spores.

**gyroflexus.** — *Agaricus gyroflexus* Fr., Epicr.: 232. 1838; Monogr. Hymenomyc.: 440. 1863; Hymenomyc. europ.: 305. 1874.

Doubtful. Of this controversial species we found in the literature no less than 53 either short or somewhat longer descriptions (of which only 20 from after 1900), some rather at variance, many mere copies of Fries's descriptions. We are dealing with *P. gyroflexa* more amply as in recent years several descriptions have been published under that epithet: Ricken (1913: 262); J. Lange (1939: 99, pl. 152 B); Busch (1952: 272); Favre (1960: 550); Dähncke (1968: 108); von Schulmann (1960: 72) and Moser (1978: 278).

Fries (1838: l.c.) stated that *Agaricus gyroflexus* almost has the habit of *Coprinus disseminatus*. In 1874 (: 306) he quoted (i) *Agaricus pallescens* Schaeffer (1774: 48; 1763: pl. 211), most likely representing a *Coprinus* and quoted by Konrad & Maublanc (1937: 79) as conspecific with *P. gyroflexa* (cap sulcate and with crenate margin); (ii) *Agaricus digitaliformis* Bull. (1780–1781: pl. 22), the plate beyond doubt depicting *Coprinus disseminatus*; and finally (iii) Secretan's description (1833, 1: 392) of *Agaricus pallescens* (small species, growing in dense groups; cap 10–12.5 mm, thimble-shaped) most likely applicable to *Coprinus disseminatus*. Although Secretan stated that this species should be distinguished from *C. disseminatus*, he quoted Bulliard's plate 22.

Cooke's plate (1888: pl. 970/1184) of *A. gyroflexus* also beyond doubt depicts a *Coprinus* (deeply sulcate caps).

*Agaricus gyroflexus* Fr. therefore having to be regarded as a *Coprinus* none of the species described in recent years as *Psathyrella gyroflexa* is entitled to that epithet.

Going by its microscopical features *P. gyroflexa* sensu J. Lange, a species not mentioned by A. H. Smith (1972) and unknown to Romagnesi (1953: 373, note 21) and us, would belong to our subsection *Spadiceogriseae*.

**hygrophilus.** — *Agaricus spadiceus* var. *hygrophilus* ('hygrophitus' in errore) Fr., Epicr.: 225. 1838.

In fact a superfluous new name for *A. stipitatus* var. *hydrophilus* (Bull.): Fr., 1821: 296, and therefore a synonym of *A. hydrophilus* Bull.. However, the fungus described by Fries under this name in 1838 is a doubtful taxon, not *P. hydrophila* (= *P. piluliformis*). See observations *P. spadicea*.

**hypsipus.** — *Agaricus hypsipus* Fr., Epicr.: 218. 1838. — *Stropharia hypsipus* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 32: 494. 1879. — *Psathyrella hypsipus* ['*hypsipoda*'] (Fr.) Konr. & Maubl. in Encycl. mycol. 14 (Agaricales 1): 128. 1948. — *Drosophila candolleana* var. *hypsipus* (Fr.) Quél., Enchir. Fung.: 115. 1886. — *Hypholoma appendiculatum* var. *hypsipus* ['*hypsipoda*'] (Fr.) Big. & Guill., Fl. Champ. sup. Fr. 2: 282. 1913.

Doubtful in its original sense, but frequently misapplied to *P. leucotephra* (see observations on that species).

**instratus.** — *Agaricus instratus*. Britz. in Ber. naturhist. Ver. Augsburg 27: 67. 1883.

Doubtful. See observations *P. chondroderma*.

**laureata.** — *Psathyra laureata* Quél. in Bull. Soc. bot. Fr. 25: 288 ('1878') 1879. — *Drosophila nolitangere* var. *laureata* (Quél.) Quél., Enchir. Fung.: 118. 1886.

Doubtful. Perhaps *P. artemisiae*.

**lepidotum.** — *Hypholoma lepidotum* Bres., Fungi trident. 2: 54. 1898.

Doubtful. See observations *P. populina*.

**mastiger.** — *Agaricus mastiger* Berk. & Br. in Ann. Mag. nat. Hist., ser. III, 7: 1861.

The authors, while giving a picture of this species, stated that it is allied to *A. conopilus*, but differed in many respects, not stating, however, which, except for the dark colour and mammiform apex. The 'species' is to be regarded as an aberrant form of *P. conopilus*.

**pellospermus.** — *Agaricus pellospermus* Bull., Hist. Champ. France: 126. 1791; Herb. France: pl. 561 fig. 1. 1792.

Doubtful.

**pertinax.** — *Agaricus pertinax* Fr. in Öfvers. K. Vetensk. Akad. Förh. 8: 50. 1852. — *Psilocybe pertinax* (Fr.) Sacc., Syll. Fung. 5: 1044. 1887.

Doubtful. See observations *P. chondroderma*.

**polycephala.** — *Agaricus spadiceus* [var.] \**A. polycephalus* Fr., Epicr.: 226. 1838; Hymenomyc. eur.: 302. 1874.

Doubtful. See observations *P. spadicea*.

**reticulata.** — *Psathyra reticulata* Petch in Ann. R. bot. Gdns Peradeniya 6: 322. 1925.

Doubtful. See observations *P. spadicea*.

**roseolus.** — *Gymnochilus roseolus* F. Clem. in Bot. Surv. Nebraska 4: 23. 1896. — *Psathyra roseola* (F. Clem.) Sacc. & Syd., Syll. Fung. 14: 154. 1899.

A. H. Smith (1941: 40) hesitatingly (as he had not seen authentic material) mentioned this taxon as a possible intermediate between *P. barlae* and *P. bipellis*. In his monograph of 1972 he omitted the taxon. It could well be *P. bipellis*.

**scobinacea.** — *Agaricus scobinaceus* Fr., Epicr.: 27. 1838.

Doubtful. See observations *P. maculata*. Neither Romagnesi (1982: 50) nor A. H. Smith (1972: 42) reckoned this species among the known members of resp. their subgenus *Pluteopsis* and *Psathyroides* where one would look for it. Going by Fries's description it must belong to section *Pseudostropharia*.

**squamosa.** — *Psathyra pennata* var. *squamosa* P. Karst. in Meddn Soc. Fauna Flora fenn. 5: 32. 1879. — *Psathyra squamosa* (P. Karst.) P. Karst. in Hedwigia 32: 59. 1893. — *Drosophila squamosa* (P. Karst.) Kühn. & Romagn., Fl. anal. Champ. sup.: 359. 1953 (not val. publ., basionym not mentioned). — *Psathyrella squamosa* (P. Karst.) Mos. in Gams, Kl. Kryptog.fl. 2b, 2. Aufl.: 237. 1955 (and later editions; not val. publ., basionym not mentioned).

Doubtful. See observations *P. artemisiae*.

**strictus.** — *Agaricus strictus* Trog in Flora, Jena, 15: 550. 1832. — *Psathyra stricta* (Trog) Sacc., Syll. Fung. 5: 1062. 1887.

Doubtful.

**subcernua.** — *Agaricus subcernuus* S. Schulz. in Verh. zool.-bot. Ges. Wien 26: 427. 1876. — *Psathyra subcernua* (S. Schulz.) Höhn. in Sber. Ak. Wiss. Wien, Mathem.-naturwiss. Klasse, 66 (1): 99. 1907. — *Psathyrella subcernua* (S. Schulz.) Sing. in Lilloa 22: 468. ('1949') 1951.

Doubtful. *Agaricus subcernuus* S. Schulz. was ranked by Konrad & Maublanc (1924: 81) under the heading doubtful or little known species. Moser (1953: 208; 1955: 242; 1967: 216; 1978: 270; 1983: 270) gave the species full specific status, since 1978 with the addition 'sensu v. Höhn.', and placed it near *P. spadicea* and *P. olympiana*. Kühner & Romagnesi (1953: 373) mentioned '*Drosophila subcernua*' as a species to search for and added '(= *conissans* Peck)'. We never came across any material that could be identified with *A. subcernua* in any sense.

A. H. Smith (1972: 243) studied the type of *Clitopilus conissans* Peck and as a result transferred the taxon concerned to *Psathyrella*, simultaneously not accepting its supposed identity with *A. subcernuus*, however, without giving his reasons. Going by Smith's description, *P. conissans* is very close to if not identical with *P. spadicea*.

**subnuda.** — *Psathyra subnuda* P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 234. 1882.

We are unable to furnish a clear-cut interpretation of this species.

Kühner & Romagnesi (1953: 364) merely mentioned it in connection with *P. spadiceogrisea*. We agree with Romagnesi, who stated (in litt.) that to him the species is extremely doubtful. J. Lange (1939) and A. H. Smith (1972) described apart from *P. spadiceogrisea* and *P. fusca* also a *P. subnuda* as a third closely related species.

*Psathyrella spadiceogrisea* differs from *P. fusca* by its cap which, although paraboloid or conico-convex and brown in the beginning, in later stages spreads to plano-convex and plane and becomes greyer (hence the name). Because of the scarcity of its utriform cheilocystidia it belongs to subsection *Spadiceogriseae*.

*Psathyrella fusca* on the other hand remains more conico-paraboloid and brown throughout (only slightly greyish near the margin) and because of its numerous to abundant utriform cheilocystidia it belongs to subsection *Lutenses*.

With Karsten the cap of his *Psathyra subnuda* measures 40–60 mm (Lange distinguishes the species from the other two on account of its smaller size, cap rarely over 30 mm) and it is said to spread from conico-convex to plane. The colours as mentioned by Karsten suggest that he dealt with specimens already in the act of drying ('subargillaceous-pallidus, pallescens vel lividus') and the dry cap is said to be whitish, often becoming a little pink. Neither brown nor grey is mentioned, while the pink shade points to *P. fusca*. Neither pleurocystidia nor the marginal cells being mentioned and neither J. Lange nor A. H. Smith mentioning the ratio between the utriform cheilocystidia and the spheropedunculate cells at the margin of the gills, no interpretation of *P. subnuda* can be given.

*Psathyrella subnuda* sensu A. H. Smith (1972: 138) is an American species (of which Smith saw 36 collections) of the same stature as *P. spadiceogrisea* and *P. fusca*, characterised by what Smith described as 'in face view strongly to somewhat ovate spores' for which he correspondingly gave three dimensional sizes: (7–)8–10 x 4.5–5.5 x 5–6.5  $\mu\text{m}$ .

**tigrina.** — *Psathyra tigrina* Pat. in Bull. Soc. mycol. Fr. 15: 197. 1899.

Doubtful. See observations preceding the key to section *Pseudostropharia*.

**torpens.** — *Agaricus torpens* Fr., Syst. mycol. 1: 299. 182.; Epicr.: 231. 1838; Monogr. Hymenomyc. 1: 439. (?) 1857; Hymenomyc. europ.: 305. 1874; Ic. sel. Hymenomyc. 2: 37, pl. 138 fig. 1. 1879 (as *A. torpens* var. *leuðophaeus*). —

*Psathyrella torpens* (Fr.) Konr. & Maubl. in *Encycl. mycol.* 14 (Agaricales 1): 125. 1948.

Doubtful. Perhaps dry specimens of a form of *P. prona* (habit, habitat in grass; cap 'siccus haud striatus, argillaceus- vel incarnato-pallescent').

**vernalis.** — *Psathyrella vernalis* Velen., *Novit. mycol. noviss.* 2: 4. 1947.

Doubtful. Possibly a species of section *Atomatae*: Cap 5–10 mm, 'udus obscure argillaceus, siccus sordide albus, tinctu flavido, sine velo; stipus basi gossypinus; lamellae cinerae, dein nigrae, acie albae, postice liberae; spora 10–12  $\mu\text{m}$ ; cystidiae copiosa, columniformia, obtuse, septate, 25–35  $\mu\text{m}$ '.

**versicolor.** — *Agaricus versicolor* With., *Arrangm. Brit. Pl.*, Ed. 6, 4: 213. 1818.  
— *Geophila versicolor* (With.) Quél., *Enchir. Fung.*: 112. 1888.

Doubtful. See observations *P. populina*.

## NEW NAMES AND NEW TAXA

**Psathyrella** subgen. **Psathyra** (Fr.) Sing. ex Kits van Wav., *comb. nov.* — *Agaricus* tribus *Psathyra* Fr., Syst. mycol. 1: 295. 1821 (basionym). — *Drosophila* subgen. *Psathyra* (Fr.) Quél., Enchir. Fung.: 116. 1886. — *Psathyrella* subgen. *Psathyra* (Fr.) Sing., Agaricales mod. Taxon., Ed. 2: 510. 1962 (not val. publ.).

**Psathyrella** sect. **Cystopsathyra** (Sing.) Kits van Wav., *stat. nov.* — *Psathyrella* subgen. *Cystopsathyra* Sing. in Sydowia 15: 67. 1962 (basionym).

**Psathyrella** sect. **Spadiceae** (Morg.) Kits van Wav., *comb. nov.* — *Psilocybe* [sect.] *Spadiceae* Morg. in J. Mycol. 13: 246. 1907 (illegitimate, no indication of rank; basionym).

**Psathyrella** sect. **Spadiceogriseae** Kits van Wav., *sect. nov.*

Pleurocystidia et cheilocystidia pleurocystidioidea utriformia, tenuitunicata, non-muricata. Media longitudo sporae >7.6  $\mu\text{m}$ . Velum praesens, sine sphaerocystis. Pileus haud innate fibrilloso squamosus. Typus: *Psathyrella spadiceogrisea* (Fr.) Maire.

**Psathyrella** subsect. **Lutenses** Kits. van Wav., *subsect. nov.*

Lamellae margine cellulis sphaeropedunculatis atque clavatis et cheilocystidiis utriformibus numerosis interdum eximie numerosis praeditae. Typus: *Psathyrella lutensis* (Romagn.) Bon.

**Psathyrella** subsect. **Spadiceogriseae** (Romagn.) ex Kits van Wav., *subsect. nov.*

Lamellae margine praecipue cellulis sphaeropedunculatis atque clavatis copiosis et plerumque magnis munitae, cheilocystidia utriformia tamen rara. Typus: *Psathyrella spadiceogrisea* (Fr.) Maire.

**Psathyrella almerensis** Kits van Wav., *spec. nov.*

Pileus 8–25 mm latus, paraboloido-convexus, expansus vel convexus sed margine deflexa, conspicue sulcatus, initio brunneus, deinde flavocinereus vel obscure cinereus, hygrophanus. Velum album, initio pileum stipitemque obvolvens, demum fibrillosum, margine obvium. Lamellae 2 mm latae, distantes paulum ventricosae, late adnatae, pallide vel obscure flavocinereae, vel cinereae, acie albae. Stipes 12–30 x 1–3 mm, albus, cylindraceus, fibrillosus. Sporae in cumulo purpureonigrae. Sporae 9–11.7 x 4.5–6.3  $\mu\text{m}$ , ellipsoideae, obscure brunneae, poro germinativo instructae. Basidia 22.5–30 x 9–10  $\mu\text{m}$ , clavata, 4-sporigera, raro 2-sporigeris immixta. Pleurocystidia 55–65 x 10–14  $\mu\text{m}$ , modice numerosa vel rara, utriformia vel subutriformia. Cheilocystidia sphaeropedunculata et clavata 17.5–40(–50) x 7.5–27.5  $\mu\text{m}$ , abundantia, cheilocystidia utriformia et subutriformia 37.5–45 x 9–15  $\mu\text{m}$ , sparsa vel modice numerosa. Habitat: Ad ramenta graminea et herbacea (e.g. *Typha*, *Phragmites*, *Cirsium*). Typus: 'The Netherlands, prov. IJsselmerpolders, Zuidelijk Flevoland, Almere, 23 Nov. 1976, J. Daams' (L).

**Psathyrella badiophylla** var. **neglecta** (Romagn.) Kits van Wav., *comb. nov.* — *Drosophila badiophylla* var. *neglecta* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952 (basionym).

**Psathyrella badiophylla** var. **microspora** Kits van Wav., *var. nov.*

Differt a varietate typica sporis minoribus (7.2–8.1 x 4.1–5  $\mu\text{m}$ ), pallidioribus, poro germanitavo parvo. Typus: 'The Netherlands, prov. Gelderland, Vorden, 7 Aug. 1959, E. Kits van Waveren' (L).

**Psathyrella basii** Kits van Wav., *spec. nov.*

Pileus 2.5–10 mm, conico-convexus, pallide brunneus vel pallide cinereo-brunneus, pellucidostriatus, hygrophanus. Velum e fibrillis adpressis argenteo-albis constans, pileum stipitemque ob-

volvens. Lamellae 1 mm latae, initio flavocinereae, deinde purpureocinereae, paulum ventricosae, acie albae. Stipes 30 x 1 mm, cylindraceus, albus, basi pallide brunneus, mycelio albo obtectus. Sporae in cumulo obscure purpureae. Sporae 8.1–9.9 x 5.4(–5.9)  $\mu\text{m}$ , ellipsoideae, obscure brunneae, poro germinativo distincto munitae. Basidia 22.5–25 x 9–10  $\mu\text{m}$ , clavata, 4-sporigera. Pleurocystidia 37.5–52.5 x 10–15  $\mu\text{m}$ , sparsa, ventricoso-sublageniformia (subutriformia), apicibus obtusis. Cheilocystidia pleurocystidioidea 35–50 x 11–15  $\mu\text{m}$ , modice numerosa, cellulis sphaeropedunculatis et clavatis 20–25 x 10–17.5  $\mu\text{m}$ , abundantibus immixta. Habitat: Ad caules *Phragmitis* et *Scirpi*. Typus: 'The Netherlands, prov. Friesland, Isl. Terschelling, Kroonpolders, 29 July 1958, C. Bas 1504' (L).

***Psathyrella dunarum* Kits van Wav., spec. nov.**

Pileus 15–23 mm latus, conico-parabolicus, deinde expansus, saepe plus minusve umbonatus, striatus, cinereo-brunneus, centro brunneus, hygrophanus, in sicco pallide ochraceus, centro isabellinus, colore roseo destitutus. Velum album fugax, pilei margine tamen initio distincte appendiculatus. Lamellae 2–3 mm latae, ventricosae, late adnatae, primo cinereae, demum obscure purpureobrunneae, acie alba ab infimo rubella. Stipes 20–30 x 1–2 mm, albus, cylindraceus. Sporae in cumulo purpureo-atrae, 8.1–9 x 5–5.4  $\mu\text{m}$ , ovoideae, aurantiacobrunneae, non opacis, poro germinativo distincto (1.8  $\mu\text{m}$ ). Basidia 17.5–22.5 x 8–10  $\mu\text{m}$ , 4-sporigera. Pleurocystidia 40–52.5 x 10–12.5  $\mu\text{m}$ , rara, lageniformia, apice subobtusata. Cellulae sphaeropedunculatae et clavatae 12.5–30(–37.5) x 10–25  $\mu\text{m}$ , abundantes, confertissimae, cheilocystidiis lageniformibus raris, 37.5–50 x 10–15  $\mu\text{m}$  immixtae. Trama hymenii pigmento praedita. Pileipellis e cellulis formata. Habitat: inter muscos dunenses maritimos. Typus: 'The Netherlands, prov. Zuid-Holland, Isl. Voorne, Oostvoorne, 16 May 1973, G. Tjallingii-Beukers' (L).

***Psathyrella dunensis* Kits van Wav., spec. nov.**

Pileus 12–20 mm latus, conico-parabolicus, sordide obscureque cinereo-brunneus, striatus, hygrophanus, in sicco pallide brunneo-griseus, manifeste roseotinctus. Velum album, fugax. Lamellae 4–5 mm latae, ventricosae, latissime adnatae, primo pallide brunneae, deinde obscure griseo-brunneae purpureotinctae, acie alba ab infima manifeste rubella. Stipes 25–40 x 1.5–2 mm, cylindraceus. Sporae in cumulo purpureo-atrae, 7.2–9 x 4.5–5.4  $\mu\text{m}$ , ellipsoideae, obscure rufulo-brunneae, subopacae, poro germinativo parvo ( $\pm 1 \mu\text{m}$ ). Basidia 19.2–24 x 8–10  $\mu\text{m}$ , 4-sporigera. Pleurocystidia 47.5–55 x 10–11  $\mu\text{m}$ , rara vel subnumerosa, sublageniformia-subfusiformia, saepe subcapitata. Cellulae sphaeropedunculatae et clavatae 20–35 x 7.5–15  $\mu\text{m}$ , abundantes, confertissimae, paucis cheilocystidiis pleurocystidioideis 30–45 x 9–15  $\mu\text{m}$  immixtae. Trama hymenii distincte pigmento praedita. Pileipellis e cellulis formata. Habitat: in terram sabulosam graminosam. Typus: 'The Netherlands, prov. Noord-Holland, Santpoort, estate Duin en Kruidberg, 2 June 1962, E. Kits van Waveren' (L).

***Psathyrella dicrani* (A. E. Jansen) Kits van Wav., comb. nov.** — *Psathyrella fulvescens* var. *dicrani* A. E. Jansen, Veget. Macrofungi acid Oakwoods (Thesis): 120. 1981 (basionym).

***Psathyrella fulvescens* var. *brevicystis* Kits van Wav., var. nov.**

A forma typica differt pleurocystidiis brevibus, 35–55(–60) x (8–)10–15(–17.5)  $\mu\text{m}$ . Typus: 'The Netherlands, prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 4 May 1961, E. Kits van Waveren' (L).

***Psathyrella melanthina* (Fr.) Kits van Wav., comb. nov.** — *Agaricus melanthinus* Fr. in Öfv. K. Vet.-Akad. Förh. 18: 49. 1851 (basionym).

***Psathyrella microrrhiza* f. *pumila* Kits van Wav., forma nov.**

A forma typica differt statura minima (pileus 7–25 mm, stipes 20–40(–45) x 1–2 mm) et velo tenui. Typus: 'The Netherlands, prov. Noord-Holland, 's Graveland, estate 'Boekesteyn', 3 Oct. 1968, J. Daams' (L).

***Psathyrella murcida* (Fr.) Kits van Wav., comb. nov.** — *Agaricus murcidus* Fr., Syst. mycol. 1: 299. 1821 (basionym).

***Psathyrella olympiana* f. *amstelodamensis* (Kits van Wav.) Kits van Wav., stat. nov.** — *Psathyrella amstelodamensis* Kits van Wav. in Persoonia 6: 299. 1971 (basionym).

**Psathyrella olympiana f. caespitosa** Kits van Wav., *forma nov.*

A forma typica differt carpophoris caespitosis, pileis saepius distincte umbonatis, e margine exarescentibus. Typus: 'The Netherlands, prov. Zuid-Holland, Leiden, 'Leidse Hout', 27 Sept. 1944, R. A. Maas Geesteranus 3095' (L).

**Psathyrella phegophila** Romagn., *spec. nov.*

Pileus primum conicus dein applanatus, (23-)40-60 mm latus, hygrophanus, udo ochraceus vel brunneo-ochraceus, sicco pallescente. Velum primum annulare, sulcatum, sed fragillissimum ac mox caducum. Lamellis substipatis, angustis (4-6.5 mm), adnatis, subsegmentiformibus, brunneolis, dein magis minusve e purpureo-brunneis, acie alba. Stipes paulum imus incrassatus, cavis, rigidus, albidus. Sporae (7.2-)7.7-9 x 4.5-5 µm ellipsoideae, in aqua observata castanea, fere opacae. Basidia 17.6-34 x 8-9.6 µm, 4-sporigera. Pleurocystidia 30-45(60-70) x 10-17(-20) µm, numerosis, utriforbibus. Cellulae marginales spheropedunculatae vel clavatae 15-40(-70) x 7.5-20(-25) µm, abundantes, confertae, cystidiis utriforbibus 32.5-47.5 x 10-20 µm sparsa. Trama in lamellis pallida, paulum in pileo colorata. Pileipellis e cellulis hyalinis, 35-60 x 15-50 µm. In fagetis, media aestate usque autumnum haud rara. Typus: 'France, dépt. Seine-et-Marne, Forêt de Fontainebleau, 28 Aug. 1941 (herb. Romagnesi 279)'.

**Psathyrella populina** (Britz.) Kits van Wav., *comb. nov.* — *Agaricus populinus* Britz. in Ber. naturhist. Ver. Augsburg 28: 131. 1885 (basionym).

**Psathyrella prona f. orbitarum** (Romagn.) Kits van Wav., *comb. nov., stat. nov.* — *Drosophila orbitarum* Romagn. in Bull. mens. Soc. linn. Lyon 21: 152. 1952 (basionym).

**Psathyrella pseudogordonii** Kits van Wav., *spec. nov.*

Pileus 20-45 mm latus parabolicus dein convexus vel umbonato-applanatus, hygrophanus, udo lividus vel brunneus, striatus, sicco pallescente. Velum album, sericeo-fibrillosum vel floccosum, initio pileum stipitemque squamulis ornatum, efficiens marginem pilei copiose appendiculatum, dein centro pilei evanescens. Lamellae adnatae, subconfertae, primo griseolae vel leviter violaceae, dein pallide umbrinae. Stipes 35-70(-110) x 2-6(-8) mm, cavus, albus flexuosus, striatulus, fragilis. Sporae in cumulo violaceo-umbrinae. Sporae 8-10.5 x 5-6 µm, ellipsoideae, in aqua brunneae, non-opacae, poro germinativo angusto (1.5 µm) instructae. Basidia 19-22.5 x 8.8-9.6 µm, 4-sporigera. Pleurocystidia nulla. Cheilocystidia utriformia, 20-35 x 9-11 µm, conferta, cellulis spheropedunculatis parvis, 10-12.5 x 5-7.5 µm, abundantibus immixta. Habitat: caespitosus vel gregarius ad truncos *Fagi*. Typus: 'British Isles, England, Buckinghamshire, Burnham Beeches, 23 Oct. 1955, P. D. Orton' (K).

**Psathyrella spadiceogrisea f. exalbicans** (Romagn.) Kits van Wav., *comb. nov., stat. nov.* — *Drosophila exalbicans* Romagn. in Bull. mens. Soc. linn. Lyon 21: 155. 1952 (basionym).

**Psathyrella spadiceogrisea f. mammifera** (Romagn.) Kits van Wav., *comb. nov., stat. nov.* — *Drosophila mammifera* Romagn. in Bull. trimest. Soc. mycol. Fr. 92: 194. 1976 (basionym).

**Psathyrella spadiceogrisea f. phaeophylla** Kits van Wav., *forma nov.*

A forma typica solum differt lamellarum colore tabacino. Typus: 'The Netherlands, prov. Noord-Holland, Overveen, estate 'Koningshof', 14 June 1974, E. Kits van Waveren' (L).

**Psathyrella spadiceogrisea f. vernalis** (J. Lange) Kits van Wav., *comb. nov., stat. nov.* — *Psathyra obtusata* var. *vernalis* J. Lange, Fl. agar. dan. 5: VII. 1940 (basionym).

**Psathyrella artemisiae** var. *microspora* Kits van Wav., *var. nov.*

A forma typica differt sporis parvis, 6.3-7.2(-8.1) x 4.1-4.5 µm et cellulis spheropedunculatis et clavatis marginalibus lamellarum parvulis et numerosissimis, 7.5-10(-15) x 5-7.5(-10) µm. Typus: 'British Isles, Wales, Lake Vyrnwy, 15 Sept. 1967, E. Kits van Waveren' (L).

**Psathyrella typhae** var. *bispora* Kits van Wav., *var. nov.*

A forma typica differt basidiis (20-25 x 10-11 µm), bisporigeris, rarius 1-sporigeris. Sporae (13.5-14.4-)15.3-19.8 x 5.4-7.2 µm, pallidissime brunnae et poro germinativo destitutae sicut in f. typhae. Pileus lamellaeque pallidiores quam in f. typhae, dilutissime roseo-brunnei; pileus plerumque umbone

magno instructus, maturitate margine revolutus. Typus: 'The Netherlands, Leiden, Roomburger Polder, 29 Aug. 1959, C. Bas 1740' (L).

*Psathyrella umbrina* var. *utriformis* Kits van Wav., var. nov.

A forma typica differt pleurocystidia utriformibus. Typus: 'The Netherlands, prov. Noord-Brabant, Eindhoven, 10 Oct. 1965, *Kits van Waveren*' (L).

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## ABOUT THE AUTHOR

Dr. Emile Kits van Waveren was born on the 20th of March 1906 at Haarlem where he passed his primary and finished his secondary school in June 1922. Guided by Miss. C. Cool, the then head of the mycological department of the Rijksherbarium at Leiden, he was a young but keen mycologist, who between 1917 and 1922, recorded many rare and new species for the Netherlands. While being in England at Bedales School, Petersfield, Hampshire from September 1922 – July 1923 he continued his hobby and corresponded with and sent agarics to the late Mr. Carleton Rea.

On entering the University of Amsterdam as a medical student in September 1923 he gave up mycology altogether, except for his writing a monograph on the Dutch species of *Geastrum*, *Myriostoma*, and *Astraeus* which was published in 1926 in the 'Mededeelingen van de Nederlandsche Mycologische Vereeniging'. In February 1932 he qualified, whereupon he started working in the pathology department on his thesis. From October 1933 to March 1937 he worked in the department of internal medicine of Prof. Dr. P. Ruitinga as a house-physician, which in 1937 got him the qualification of physician. During this time he completed his thesis on 'The anatomy and histological diagnosis of glomerulonephritis' on which in October 1935 he received his M.D. degree.

From March 1937 till 1954 Dr. Kits van Waveren was consulting physician to the Netherlands' Cancer Institute and in 1937 he also started private practice, in 1954 also panel practice. Having been enlisted in the army in his student days, he was mobilised as Army Medical Officer from September 1939 – June 1940, serving with the 1st Cavalry Regiment. During the 2nd World War he joined the military resistance and became member of H.Q. military resistance as chief of the medical section and liaison officer, involved in espionage. Immediately after World War II he was promoted to the rank of Lt.-Colonel and served as chairman of the military medical denazification board. In 1947 the Dutch Government sent him in his capacity of chairman of the Dutch Central Medical War Committee on a medical tour of inspection through the former Dutch East Indies.

Already since 1938, but particularly after 1970, when he gradually began giving up his practice, he became increasingly interested and involved in life assurance medicine, in 1984 finding himself chief medical officer to the Dutch settlements of a large British, Swiss, French and Belgian life assurance company and two smaller Dutch companies. For a period of 10 years he acted as president of the Netherlands Society of Life Assurance Medicine.

In October 1958 he took up mycology again and very soon discovered that the



(Photo Ruth van Crevel)

DR. E. KITS VAN WAVEREN

clayey soil of the man-made Amsterdam Wood, quite close to his house produced many interesting species of Agaricales, above all many species of the genus *Psathyrella*.

After several years of collecting and studying a wide range of agarics in the Netherlands and in Great Britain, the mycologists at Leiden urged him to specialize on one larger genus or a group of related small genera. When he mentioned however his intention to enter upon monographic studies of *Psathyrella*, he was strongly advised against this, as *Psathyrella* was considered too large and its taxonomical problems too complicated for even a good amateur. This was just the encouragement Kits van Waveren needed to concentrate on *Psathyrella* from then onwards.

Before starting to publish, however, on *Psathyrella*, he did exercises in smaller groups of other agarics resulting in two precious papers, viz. 'The *Stercorarius* group of the genus *Coprinus*' (1968) and 'The genus *Conocybe* subgenus *Pholiotina*: The European annulate species' (1970), both published in *Persoonia*. These two papers already bear the marks of Kits van Waveren's great attention for the variability of macroscopical and microscopical characters in his descriptions as well as in his illustrations; the same attention that eventually would lead to the re-evaluation of many taxa and their characters in *Psathyrella*.

In 1970 he was appointed honorary member of the staff of the Rijksherbarium in recognition of the high quality of his mycological work and his highly appreciated co-operation with the mycological staff of this institute.

From 1971–1982 he published his series of eight 'Notes on the genus *Psathyrella*' witnessing his continuously deepening involvement in the taxonomy of *Psathyrella*.

In September 1981 he founded the 'Stichting Rijksherbariumfonds Dr. E. Kits van Waveren' for the promotion of taxonomic studies on agarics at, or under supervision of, the Rijksherbarium at Leiden. The first important deed of this foundation was subsidizing the publication of the present work.

Recently Kits van Waveren donated his mycological herbarium of about 5000 numbers to the Rijksherbarium at Leiden. It contains mainly very well-preserved agarics and derives its value particularly from the fact that the great majority of the collections are extensively annotated.

v  
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