

**A RECONNAISSANCE OF THE GENUS PSEUDOBAEOSPORA
IN EUROPE I**

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About 40 collections of *Pseudobaeospora* species from all over Europe have been studied. A key is presented to the 13 species recognised and two provisionally defined ones. Latin diagnoses of six new species, one new variety and one new forma are given.

Part one of this paper contains an introduction, a key to the taxa studied and Latin diagnoses of the new taxa. Part two will contain the description of the genus, full descriptions and figures of all taxa treated, and discussions.

After the surprising discovery (Bas, 1995) that the only two collections of *Pseudobaeospora* Singer available from the Netherlands differed considerably from each other and from the only two species of *Pseudobaeospora* known from Europe at that time, viz. *P. pillodii* (Quél.) Wasser and *P. oligophylla* (Singer) Singer, it became a matter of great interest to discover the real identity of *Pseudobaeospora* collections recorded in the literature. Requests to a number of colleagues for material resulted in a set of about 40 collections, mostly filed as *P. pillodii*, sometimes as *P. oligophylla*, *Pseudobaeospora* spec. or *Collybia* spec. All these collections have been thoroughly analysed and the outcome of these studies was rather surprising. It appeared to be possible to distinguish in Europe 13 to 15 different species. A number of characters that were rather neglected hitherto, such as structure of the pileipellis, colour reactions in KOH and the presence of very distinct cheilocystidia in several species, turned out to be a great help in clearing up the taxonomic situation in the genus.

NOTES ON SOME CHARACTERS

Macroscopic characters

As only two collections of European *Pseudobaeospora* species could be studied in fresh condition, nearly all the descriptions of macroscopic characters of the taxa in this paper are based on field notes (often incomplete) by the collectors, colour slides if available, and drawings. In some cases the size of the basidiocarps had to be estimated from the size of dried specimens. Defining the colours is a special problem, since hardly any references to colour codes are available, and notations like purplish, violaceous, and lilacinous seem to have been used rather indiscriminately. More precise colour notations are badly needed.

Spores

It is a generic character of *Pseudobaeospora* that the spores become thick-walled and dextrinoid. But it is insufficiently stressed in literature that this thickening of the spore wall takes place after the spores have been shed. This is the reason why one usually finds only a very limited amount of thick-walled spores among the thin-walled spores on a fragment of a lamella, often not more than 1–10% (although occasionally much higher). However, on the apex of the stipe and on the pileipellis only thick-walled spores are found. The author considers only these spores fully mature. Therefore the spore sizes given in this paper always refer to the thick-walled spores only. Notations like [40/4] indicate the number of spores measured and the number of collections from which these were taken.

Sclerified basidia

Thick-walled brownish basidia occur frequently, but in strongly varying numbers. Their absence or frequency seems to have little or no differentiating value.

Pileipellis structure

The pileipellis is usually a cutis. But often its cells are so strongly inflated that the pileipellis seems to be pseudoparenchymatic. Careful examination of radial sections and ‘scalps’ shows that in these cases the inflated cells are arranged in radial or, more rarely, irregularly disposed chains. In the newly described species *P. celluloderma*, however, the pileipellis consists of erect inflated cells, forming a somewhat irregular hymeniderm, which looks strictly round-celled when seen from above.

Sometimes the pileipellis is made up of two layers: the upper layer, the suprapellis, composed of relatively narrow hyphae; the lower layer, the subpellis, composed of chains of inflated cells. In some cases the suprapellis is very thin.

Caulocystidia

At least at the apex of the stipe, caulocystidia are always present, varying in shape from filiform to broadly clavate. They seem to have little diagnostic value.

KOH reactions

There is in *Pseudobaeospora* a surprising range of colour reactions when fragments are placed in a drop of 5% KOH. It has to be stressed here that except in *P. pyrifer*, only fragments of dried material have been tested. This means that in fresh material the colour change may be different. In fresh material of *P. pyrifer* the reaction was merely stronger (L. Kriegelsteiner, in litt.).

Because of the small basidiocarps and the often scanty collections, the KOH-test has usually been tried only on the pileipellis, although there are indications that the reaction may be different in other parts of the basidiocarps, as for example in the context of the stipe in *P. pyrifer* and *P. jamonii*. Fragments placed in KOH should be studied immediately, because in one species, *P. dichroa*, a deep red pigment in the pileipellis very soon starts to disappear in small clouds, after which the cells of the pileipellis become green.

Clamp-connections

Most species of *Pseudobaeospora* possess clamp-connections, which are usually easy to find in the various tissues. When they seem to be absent, it is necessary to check the base of the basidia, as in *P. frieslandica* Bas they appear to be restricted to the base of the basidia and the subhymenium.

KEY TO THE SPECIES OF PSEUDOBAEOSPORA IN EUROPE

Spore sizes refer to thick-walled spores only. KOH reactions have been tested on dried material.

1. Pileus whitish to greyish-whitish, pale buff or pale yellowish buff. (When pileus pale silvery brownish grey, see also *P. argentea* at 14.)
 2. Basidiocarps very small (pileus 2–8 mm; stipe 14–30 × 0.1–0.6(–1.0) mm. Pileipellis consisting of loosely arranged radial chains of (5–)10–32(–37) µm wide cells; suprapellis lacking *P. albidula* Bas, spec. nov.
 2. Basidiocarps usually somewhat larger and more sturdy (pileus 7–15 mm; stipe 0.5–2 mm wide). Pileipellis with a distinct suprapellis of narrower hyphae or pileus context with a transparent layer of narrow hyphae.
 3. Lamellae crowded ($L = \pm 30$), strongly intervenose and frequently anastomosing. Base of stipe with orange-yellow rhizoids. Lower part of pileus context transparent, made up of 2.5–6.0 µm wide, agglutinate hyphae. Suprapellis not or hardly differentiated *P. bavariae*, nom. prov.
 3. Lamellae moderately crowded ($L = 19–24$), not or weakly intervenose. Base of stipe with whitish rhizoids or merely whitish tomentose. No transparent layer in pileus context present. Suprapellis thin but distinct, consisting of 3.0–7.0 µm wide hyphae, over a subpellis of broader-celled hyphae up to 15(–18) µm wide *P. paulochroma* Bas, spec. nov.
1. Pileus purple-blue, violaceous, lilacinous, or brown, grey-brown or grey with or without such tinges.
 4. Pileipellis discolouring red, blue, green or yellow-green in 5% KOH.
 5. Pileipellis with a very conspicuous, rapidly dissolving, red pigment in KOH (at first forming clouds) and afterwards with yellow-green cell walls.
 6. Cheilocystidia absent or very rare
P. dichroa Bas, spec. nov., forma *dichroa*
 6. Cheilocystidia present and abundant
P. dichroa forma *cystidiata* Bas, f. nov.
 5. Pileipellis in KOH not emitting a deep red pigment.
 7. Pileipellis turning greenish blue in KOH. Cheilocystidia absent. Spores 4.4–6.4 × 3.3–4.4 µm *P. pallidifolia* Bas, Gennari & Robich
 7. Pileipellis turning blue-green to brownish green in KOH. Cheilocystidia abundant, predominantly broadly clavate. Spores 2.8–3.7 × 2.6–3.5 µm
P. pyrifer Bas & L.G. Krieglst.
 4. Pileipellis not discolouring or becoming pale yellowish, yellowish-brownish, reddish-brownish or greyish-greenish in KOH.

8. Cheilocystidia conspicuous and abundant.
9. Lamellae cream to pale brownish. Cheilocystidia mainly narrowly lageniform. Slender pileocystidia scattered to abundant, particularly at centre of pileus. In KOH with small reddish bodies on caulocystidia, often also on pileipellis.
10. Pileipellis with a thin suprapellis of 1.5–7.0(–10) μm wide hyphae
P. laguncularis Bas, spec. nov., var. *laguncularis*
10. Pileipellis without a suprapellis
P. laguncularis var. *denudata* Bas, var. nov.
9. Lamellae violaceous to lilacinous, later brownish pink. Cheilocystidia usually clavate. Slender pileocystidia absent, but sometimes suprapellis with some terminal clavate cells. In KOH no reddish bodies on caulocystidia.
11. Cheilocystidia mainly broadly clavate, 10–30 \times 4.0–13 μm . Pileipellis made up of loosely arranged chains of inflated cells, 10–35 \times 6.0–17 μm . Context of stipe in KOH reddish brown with greenish yellowish tinge *P. pyrifer* Bas & L.G. Krieglst.
11. Cheilocystidia mainly slenderly clavate, but also broadly cylindrical and versiform, 15–43 \times 4.0–9.5 μm . Pileipellis consisting of a suprapellis of 5.0–7.5 μm wide hyphae with some terminal clavate cells and a broad-celled subpellis with chains of up to 22 μm wide cells. Context of stipe green in KOH
P. jamonii Bas, Lalli & Lonati
8. Cheilocystidia absent or rare and inconspicuous.
12. Pileipellis intermediate between a hymeniderm and an irregular epithelium, strictly round-celled when seen from above. Basidiocarps very small; pileus 1–4.5 mm, purple to greyish-vinaceous
P. celluloderma Bas, spec. nov.
12. Pileipellis not a hymeniderm, nor an epithelium; if composed of inflated cells, then these in radial chains or irregularly disposed.
13. Clamp-connections present, but sometimes only at basidia and in subhymenium.
14. Pileipellis consisting of rather broad, more or less cylindrical hyphae of 5.5–12.5(–15) μm wide. Spores subglobose, 3.5–4.8 \times 3.1–4.5 μm , average $Q = 1.10\text{--}1.15$ *P. argentea* Bas
14. Pileipellis made up of broad-celled, 4.0–20 μm wide hyphae or of a suprapellis of narrow hyphae over a broad-celled subpellis.
15. Spores globose to subglobose, 3.6–4.5 \times 3.2–4.3 μm , $Q = 1.00\text{--}1.15$, average $Q = 1.10$. Basidiocarps very small; pileus 2–8 mm in diameter, rather pale, lilacinous or pinkish grey
P. subglobispora, nom. prov.
15. Spores broadly ellipsoid to ellipsoid, average $Q = 1.25\text{--}1.40$. Basidiocarps less small; pileus 8–16(–20) mm in diameter and usually darker violaceous to dark violaceous grey or violaceous brown.

16. Spores $3.5-3.9 \times 2.6-3.2 \mu\text{m}$, $Q = 1.20-1.40$, average $Q = 1.30$. Pileipellis consisting of a thin suprapellis of $2.0-4.5(-6.0) \mu\text{m}$ wide hyphae over a broad-celled subpellis. Lamellae crowded ($L = 26-32$), dark violaceous grey
P. frieslandica Bas
16. Spores up to 5 or $6.5 \mu\text{m}$ long. Pileipellis without a suprapellis of narrower hyphae. Lamellae less crowded ($L = 8-22$), violet or whitish to cream.
17. Lamellae violet. Spores $3.6-4.9(-6.2) \times 2.6-3.8 \mu\text{m}$; average $Q = 1.25-1.30$
P. ellipticospora Bas, spec. nov.
17. Lamellae whitish to pinkish cream. Spores $4.4-6.4 \times 3.3-4.4 \mu\text{m}$; average $Q = 1.30-1.40$
P. pallidifolia Bas, Gennari & Robich
13. Clamp-connections absent, also from basidia. Basidiocarps very small to small, very slender. Pileus purple or violaceous grey to lilac-brown, with usually broad paler to whitish margin. Lamellae and stipe \pm concolorous. Spores $3.4-4.5 \times 2.8-3.5 \mu\text{m}$, average $Q = 1.15-1.30$.
18. Pileipellis with abundant, cystidioid, repent to ascending, terminal elements *P. oligophylla* Singer
18. Pileipellis without abundant, cystidioid, repent to ascending, terminal elements *P. pillodii* (Quél.) Wasser

LATIN DESCRIPTIONS

***Pseudobaeospora albidula* Bas, spec. nov.**

Pileus 2–8 mm latus, initio hemisphericus, demum conico-convexus vel obtuse conicus, postremo expansus, albus vel griseo-albidus vel pallide bubalinus, centro aliquante fuscans, (sub)coactatus. Lamellae subdistantes ($L = 11-17$; $l = 0-1$), adnatae vel valde emarginatae, initio cremeo-albidus, postea pallide bubalinae vel pallide flavidae. Stipes 14–30 \times 0.1–0.6(–1.0) mm, initio albidus vel griseo-albidus, postea pallide ochraceo-bubalinus, flocculosus vel sericeus, apice granulo-flocculosus, basi demum brunneolus, sparse lanoso-substrigosus.

Sporae [60/6] $3.4-4.3(-4.5) \times (2.6-2.9-3.5(-3.7)) \mu\text{m}$, $Q = 1.05-1.35$, medium $Q = 1.15-1.20$, subglobosae vel ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia nulla. Pileipellis ope KOH 5% incolorata, ex catenis cellularum $10-65(-90) \times (5-10-32(-37)) \mu\text{m}$, radialibus composita, interdum cum cellulis apicalibus cystidioidis, attenuatis vel subutriformibus vel lageniformibus. Fibulae praesentes.

Holotypus hic designatus: 'England, Surrey, Mickleham Downs, 30.VII.1988, A. Henrici (K(M) 1031) (K).'

Etymology: albidulus = whitish.

Additional collections examined: England (3), Germany (1), The Netherlands (1).

***Pseudobaeospora celluloderma* Bas, spec. nov.**

Pileus 1–4.5 mm latus, primo convexus vel conico-convexus, demum plano-convexus, purpureus vel rubro-violaceus, interdum griseo-vinaceus, translucido-striatus, pallescens. Lamellae (sub)dis-

tantes ($L = 7-9(-11)$; $l = 0-1(-3)$), adnatae vel emarginatae, concoloratae. Stipes $11-35 \times 0.1-0.8$ mm, concolorus, apice albo-flocculosus, basi coactatus vel sublanatus.

Sporae [64/6] $(3.0-3.5-4.4 \times 2.6-3.5 \mu\text{m})$, $Q = (1.10-1.15-1.40(-1.55))$, medium $Q = (1.20-1.25-1.35)$, subgloboasae vel ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia nulla. Pileipellis hymenidermoidea, ex cellulis erectis, $(6-10-38 \times 6-29 \mu\text{m})$, (late) clavatis vel subglobosis constans, ope KOH 5% pallide brunnea vel pallide grisea. Fibulae praesentes.

Holotypus hic designatus: 'England, Surrey, Mickleham Downs, 19.VI.1991, A. Henrici (K(M) 17188) (K).'

Etymology: cellula = small cell; derma = skin.

Additional collections examined: England (2), Finland (1), Germany (2), Sweden (1).

Pseudobaespora dichroa* Bas, *spec. nov.*, forma *dichroa

Pileus $10-30$ mm latus, plano-conicus vel plano-convexus, interdum subumbonatus, purpureo-brunneus vel violaceo-tinctus griseo-brunneus, margine opacus vel leviter striatus, siccus, glabellus vel scabrosulus. Lamellae aliquantum confertae vel subdistantes ($L = 18-30$), adanatae vel fere liberae, purpureo-brunneae vel violaceae. Stipes $20-40 \times (0.8-1.5-2.0)$ mm, concoloratus, apice albo- vel brunneolo-flocculosus, basi albo-coactatus.

Sporae [45/4] $(3.0-3.9(-4.3) \times 2.7-3.5 \mu\text{m})$, $Q = 1.05-1.30(-1.55)$, medium $Q = 1.1$ YH1.20 (-1.25), subgloboasae vel late ellipsoideae, raro ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia nulla vel infrequentia. $10-45 \times 3.5-9.0 \mu\text{m}$, anguste clavata (margo lamellarum omnino vel largiter fertilis). Pileipellis ope KOH 5% primo rubra, mox viridis, ex catenis cellularum $34-80 \times 18-48 \mu\text{m}$, elongatarum, ellipsoidearum, vel globosarum, irregulariter dispositis composita; suprapellis tenuis, ex hyphis angustis interdum praesens. Fibulae praesentes.

Holotypus hic designatus: 'England, Hampshire, Butser Hill, Queen Elizabeth Country Park, 27.IX.1992, T. Læssøe 2906 (K(M)20450) (K).'

Etymology: di = two; -chrous = coloured (referring to the remarkable colour change of the pileipellis in KOH).

Additional collection examined: England (1).

Pseudobaespora dichroa* forma *cystidiata* Bas, *forma nov.

A typo differens cheilocystidiis $14-45 \times 4-10(-17) \mu\text{m}$, versiformibus, abundantibus.

Holotypus hic designatus: 'England, Lancashire, Silverdale, Waterslack Wood, 20.X.1984, L. Livermore 19/84K, (K(M) 8105) (K).'

Additional collection examined: England (1).

Pseudobaespora ellipticospora* Bas, *spec. nov.

Pileus plus minusve $8-15$ mm latus, obtuse conicus vel plano-conicus, demum plano-concavus et umbonatus, non-striatus, violaceus vel lilacinus, siccus, adpresso-coactus. Lamellae emarginatae vel liberae, distantes vel aliquante confertae, ($L = (6-8-17(-19))$; $l = 0-3$), concoloratae. Stipes plus minusve $32-42 \times 0.6-1.0$ mm, frequenter deorsum attenuatus, concoloratus, sed apice minute albido-flocculosus.

Sporae [38/2] $(3.6-4.9(-6.2) \times 2.6-3.8(-4.1) \mu\text{m})$, $Q = (1.10-1.15-1.50(-1.70))$, medium $Q = 1.25-1.30$, late ellipsoideae vel ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia nulla. Pileipellis ope KOH 5% pallide sordideque flava, ex catenis cellularum $14-87(-200) \times (4-18-34(-45)) \mu\text{m}$ composita; suprapellis tenuis, inconspicua, ex hyphis angustis sparsis praesens vel absens. Fibulae praesentes.

Holotypus hic designatus: 'Switzerland, Engadin, Schuls, Pradella, 30.VIII.1986, E. Horak 3341 (ZT).'

Etymology: ellipticus = ellipsoid; *spora* = spore (in contrast to the closely related *P. subglobispora* ined.).

Additional collection examined: Denmark (1).

Pseudobaeospora laguncularis* Bas, *spec. nov.*, var. *laguncularis

Pileus 3.5–8 mm latus, primo convexus vel late conicus, demum plano-convexus vel plano-conicus, interdum (sub)umbonatus, purpureo-brunneus vel lilacino-argillaceus vel argillaceus. Lamellae aliquantum confertae (L = 20–25; l = 1–3(–7)), valde emarginatae vel liberae, sordide cremeae vel pallide brunneae. Stipes 12–25 × 0.4–1.6 mm, pallide brunneus vel lilacino-griseo-brunneus, subfibrillosus, apice albido-focculosus vel pruinosis.

Sporae [40/4] (3.1–)3.3–4.0(–4.4) × 2.9–3.6(–4.3) μm, Q = 1.05–1.25(–1.30), medium Q = 1.10–1.15, subglobosae vel late ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia (12–)19–49 × 2.5–8 μm, vulgo anguste lageniformia, minus frequenter filiformia, subcylindracea vel versiformia. Pileipellis ope KOH 5% pallida, virido-brunnea vel flavo-brunna, raro flavo tincta rubro-brunnea; suprapellis tenuis, ex hyphis 1.5–7(–10) latis, repentibus constituta, cum pileocystidiis infrequentibus vel abundantibus, anguste lageniformibus vel subcylindricis; subpellis ex catenis cellularum 12–55 × 8–30 μm composita. Fibulae praesentes.

Holotypus hic designatus: 'England, Lancashire, Silverdale, Gait Barrows, 8.X.1991, J.C. Leedal (K(M)8107) (K).'

Etymology: *laguncula* = small bottle; *-aris* = provided with.

Additional collections examined: Germany (2), France (1), England (1).

Pseudobaeospora laguncularis* var. *denudata* Bas, *var. nov.

A typo differens suprapellis distituta.

Holotypus hic designatus: 'France, Billième, Savoie, 25.X.1998, P.A. Moreau (herb. Moreau PAM 98102501).'

Known only from the type locality in France.

Pseudobaeospora paulochroma* Bas, *spec. nov.

Pileus 6–10 mm latus, convexus vel conico-convexus, albidus, centro pallide bubalinus, sub lente leviter coactatus. Lamellae aliquante confertae (L = 19–24; l = 1–3), valde emarginatae vel liberae, cremeae, demum subventricosae. Stipes 11–15 × 0.7–1 mm, pallide brunneo-bubalinus, apice subfocculosus, basi coactatus.

Sporae [20/1] 3.8–4.5 × 2.9–3.5(–3.8) μm, Q = (1.10–)1.20–1.35, medium Q = 1.25, late ellipsoideae vel ellipsoideae, initio tenuiter tunicatae et inamyloideae, demum crasse tunicatae et dextrinoideae. Basidia 4-sporigera. Cheilocystidia nulla. Pileipellis ope KOH 5% pallide flavo-brunnea; suprapellis tenuis ex hyphis 3–7 μm latis constituta; subpellis ex cellulis catenulatis ad 15(–18) μm latis constans. Fibulae praesentes.

Holotypus hic designatus: 'Denmark, Jutland, Molsberg, 23.IX.1979, C. Bas 7516 (L).'

Etymology: *paulo* = somewhat; *-chromus* = coloured.

Known only from the type locality in Denmark.

INSUFFICIENTLY KNOWN TAXA

***Pseudobaeospora bavariae*, nom. prov.**

Based on one single basidiocarp with intervenose, anastomosing lamellae and a yellow base of the stipe. It may be abnormal.

***Pseudobaeospora subglobispora*, nom. prov.**

Three collections, two from Germany and one from England key out here, but there is insufficient and somewhat conflicting information, particularly about the colours of the basidiocarps.

REFERENCES TO ORIGINAL DESCRIPTIONS OF EUROPEAN TAXA
OF PSEUDOBAEOSPORA PUBLISHED ELSEWHERE

Pseudobaeospora argentea Bas, Fl. agar. neerl. 3 (1995) 133, fig. 134 (inval.); ex Bas, Persoonia 16 (1996) 255.

Pseudobaeospora frieslandica Bas, Fl. agar. neerl. 3 (1995) 134, fig. 135 (inval.); Persoonia 16 (1996) 225 (inval.); ex Bas, Persoonia 17 (1998) 140.

Pseudobaeospora jamonii Bas, Lalli & Lonati, Micol. Vegetat. Mediter. 17 (2002) (in print).

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*Pseudobaeospora pillodii*² (Quél.) Wasser, Fl. Fung. RSS Ucrainicae, Bas. Agar. (1980) 220. *Collybia pillodii* Quél., C. R. Ass. Franc. Av. Sci. (Champ. Jura Vosges, suppl. 17) 18 (1890) 509.

Pseudobaeospora pyrifera Bas & L. G. Krieglst., Z. Mykol. 64 (1998) 204, figs. 1–5.

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- 1) Type not seen. Interpretation in key based on Singer's diagnosis, in particular on his description of the pileipellis. (One collection from Switzerland analysed.)
- 2) Type probably not existing. The concept in the key is based on that of several European authors, e.g. Horak (1968) and Kühner in Kühner & Romagnesi (1954). (Material analysed from Germany, Russia (Siberia), and Switzerland.)