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PSEUDOBAEOSPORA CALCAREA, A NEW SPECIES OF AGARICOID HYMENOMYCETES

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Pseudobaeospora calcarea (Tricholomatales, Basidiomycetes) is a new whitish species with very acrid taste growing on mosses in a rather dry *Pinus sylvestris* forest in the Rhone valley in Switzerland.

In 1942 Singer proposed the genus *Pseudobaeospora* to accommodate small, white-spored agarics with small spores showing rather thick, non-layered, strongly dextrinoid, non-metachromatic, smooth walls lacking a germ pore, and a pileipellis consisting of repent, radially arranged hyphae with rare or lacking clamp-connections. This generic concept has been emended by Bas (2002, 2003) to include species with pseudoparenchymatous or irregularly hymeniform pileipelles. This author also noted that clamp-connections may be present at the base of the basidia and in the subhymenium, and that the spore wall may be metachromatic.

The thorough taxonomic treatment of the European species of *Pseudobaeospora* by Bas (2002, 2003) allowed critical evaluation of hitherto unidentifiable collections belonging to that genus, and some new species were described (Adamcík & Bas, 2002; Arnolds et al., 2004; Desjardin, 2004). Despite this new information, our collections of a whitish species belonging to the Albidula group as circumscribed by Bas (2003) still resisted identification. After consulting Dr. C. Bas, who confirmed our opinion, we decided to propose a new species to accommodate our fungus.

This new species was discovered by one of us (FA) during a research project on the deterioration of *Pinus sylvestris* stands conducted by the Swiss Federal Institute for Snow and Avalanche Research WSL.

Pseudobaeospora calcarea Clémençon & Ayer, *spec. nov.* — Figs. 1–10

Pileus 7–20 mm latus, initio convexus, demum plano-convexus vel plano-concavus; siccus, opacus, subrugosus, albo-calcareus vel pallide griseo-bubalinus; ope KOH 5% incoloratus; margine opacus, non-striatus. Lamellae aliquantum confertae vel subdistantes (L = 16–28); albo-cremeae, postea pallide griseo-cremeae; leviter emarginatae vel adnatae; acies concolora. Stipes 15–35 × 1–4 mm, cylindricus, subfistulosus, pallide griseo-bubalinus vel griseo-ochraceus, albo-floccosus, sublanatus, basi aliquantum obscurus, basaliter albidostrigosus. Caro sordide albida vel pallide griseo-bubalina, inodora, valde acris; ope KOH 5% incolorata.

Sporae 3.1–4.8 × 2.5–3.4 μm, Q = 1.15–1.55; uninucleatae; breviter ellipsoideae vel ovoideae, crasse tunicatae, dextrinoideae, cyanophilae, haud metachromaticae, leves; in cumulo albae. Basidia 4-sporigera, rare 2- vel 3-sporigera; sclerobasidia nulla. Cystidia nulla. Fibulae rare vel praesentes.

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Pileipellis fere 100–150 μm crassa, haud gelatinosa, ex catenis cellularis vel hyphis 7–30 μm, confuse radialibus composita; suprapellis tenuis, ex hyphis angustis praesens.

Habitat inter muscos majores in pinetis.

Holotypus hic designatus: Helvetia, Valais, Pfynwald; F. Ayer 05-49-5869 (LAU), 17.VIII.2005.

Etymology: calcarea = chalky; for the dry, whitish, unpolished, chalk-like appearance of the pileus surface easily damaged with the forceps.

Pileus 7–20 mm wide, at first broadly convex with slightly incurved margin, later more or less irregularly flattened and often with undulating margin; surface chalky matt whitish and opaque, minutely granular and finely fissured when old, very delicate

Fig. 1. *Pseudobaeospora calcarea*. Type collection Ayer 05-49-5869; stipe from collection HC 04/013 (LAU).

Fig. 2. *Pseudobaeospora calcarea*. Chalky, delicate surface of the pileus with depression marks made by the forceps used to handle the caps.

and easily damaged when touched; beneath the surface the pileus colour is pale greyish brown (Mu. c. 10 YR 5/3 and paler); not hygrophanous, margin not striate. Gills moderately crowded to almost distant, L = 16–28, l = 3 between two adjacent gills, ivory coloured to pale greyish brown, slightly emarginate to narrowly adnate; edge same colour as the sides, entire, then minutely crenulate in full maturity; strongly intervenose but not anastomosing when old. Stipe 15–35 × 1–4 mm, cylindrical, narrowly hollow; pale greyish brown similar to the ground colour of the pileus, becoming darker brown towards the base when old, entirely covered with white, irregularly disposed fibres and finely powdery tomentose in the upper part. Base strongly strigose with well-developed, white hyphal cords up to 40 mm long, agglomerating old moss plants and soil particles. No rhizomorphs. Context at first whitish, then pale greyish ochre;

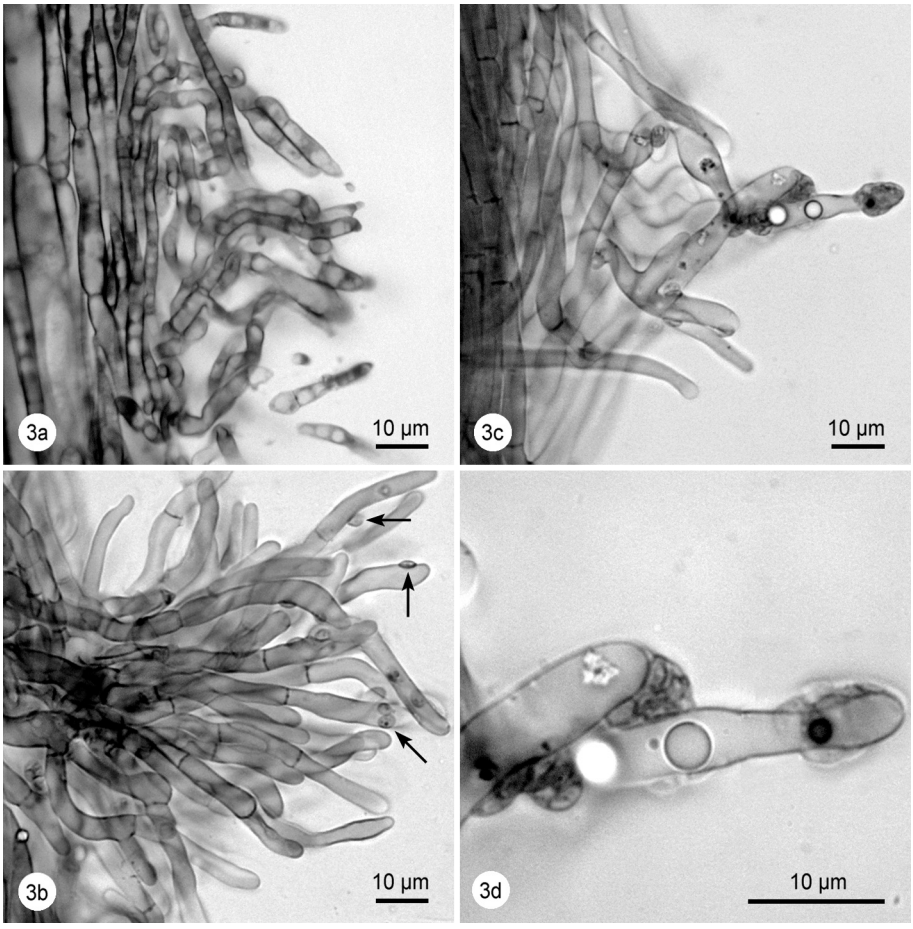
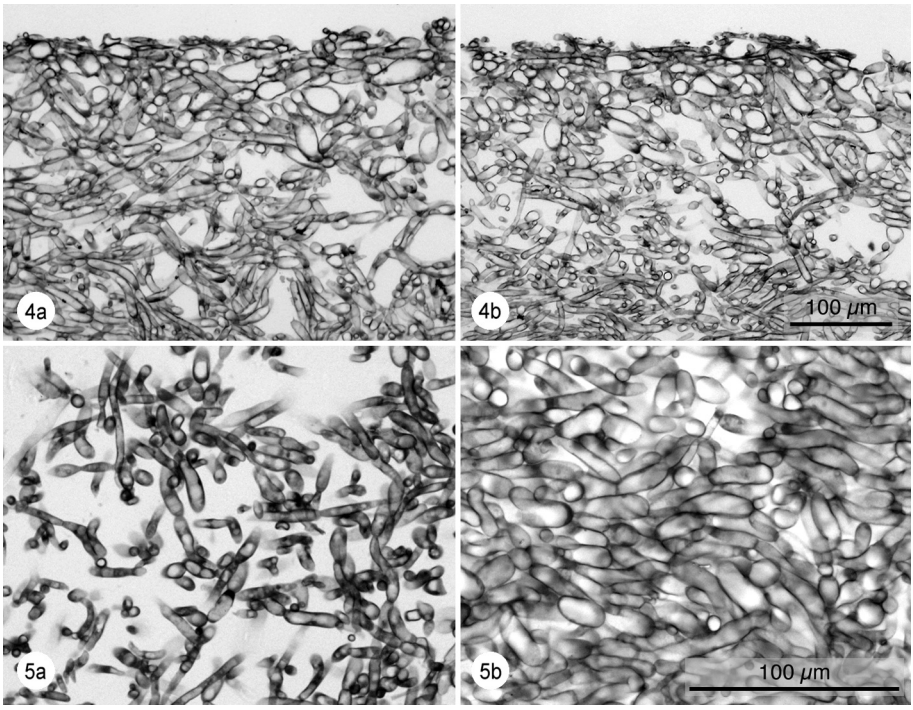


Fig. 3. *Pseudobaeospora calcarea*; covering of the stipe. a. Longitudinal microtome section stained with aluminium-zirconium haematoxylin; b. squash mount from the apical part of the stipe, stained with Congo red. Some spores (arrows) stick to the hyphae; c & d. hyphal end cells bearing sticky masses; two different focal planes.

taste strongly acrid-peppery, reminiscent of very acrid *Russula* species, persisting in dry basidiomes; odour indistinctive.

Potassium hydroxide and sodium hydroxide (5%) without any colour reaction on the pileus and on the context (fresh and dry basidiomes tested). Spore print white.

Spores 3.1–4.8 × 2.5–3.4 µm, Q = 1.15–1.55 (Melzer, thick-walled spores only, N = 60; 95% population limits), uninucleate; short ellipsoidal to ovoidal, sometimes with slightly narrowed base, transverse section circular, with prominent apiculus; wall thickened (about 1/5 to 1/4 µm thick), homogeneous, without germ pore, smooth, moderately to strongly dextrinoid, strongly cyanophilous (cotton blue in lactic acid, no heating), not coloured by toluidine blue (i.e. neither ortho- nor metachromatic), well stained in Congo red after about 10 minutes, strongly stained by iron-acetocarmine; apiculus not stained by the various dyes. Basidia 20–26 by 4–5 µm, mostly with four, rarely with two or three sterigmata, frequently with a basal pseudoclamp, rarely with basal clamp-connection, without siderophilous granulation. Sclerified basidia lacking. Cystidia absent. Pileus context composed of subregularly radially arranged, thin-walled, cylindrical to moderately inflated, 3–8 µm wide hyphae without clamp-connections;



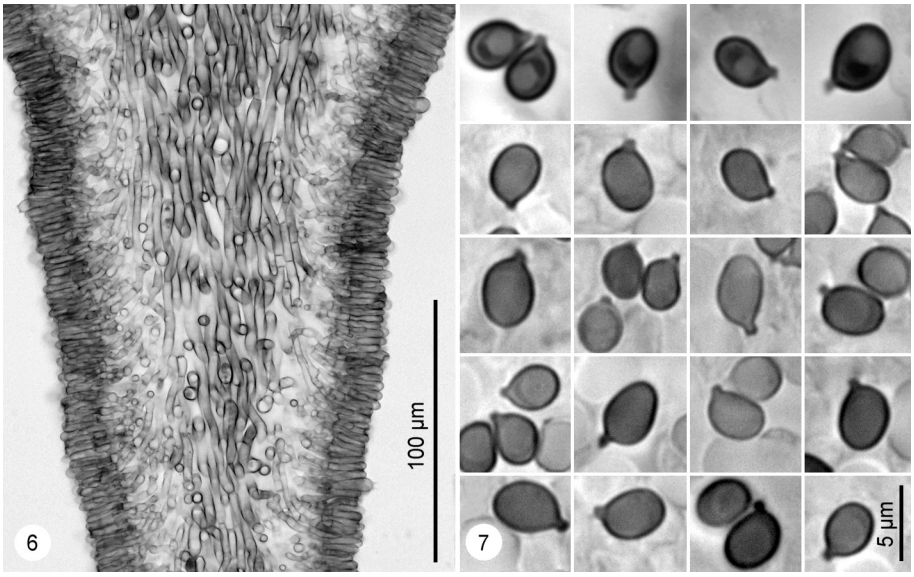
Figs. 4, 5. *Pseudobaeospora calcarea*; pileipellis and suprapellis; microtome sections stained with Azur A. — 4a, b: Radial sections through the pileus showing the pileus trama woven from thin, irregular hyphae, the irregular pileipellis made from irregularly arranged hyphae with variously inflated cells, and the very thin suprapellis made from very thin hyphae. The large air spaces are no artefacts. The centre of the pileus is at right, far outside the photographs. — 5a, b: Tangential sections of a pileus showing the very loose suprapellis (5a) and the dense pileipellis (5b). The centre of the pileus is at right, far outside the photographs, the radius in both photographs is horizontal, from right to left.

with many air spaces, not gelatinous. Pileipellis about 100–150 μm thick, not sharply delimited from the pileus context, with some air spaces; hyphae more or less radially arranged or irregular at places, thin-walled, rarely cylindrical, mostly strongly inflated or vesicular, 7–30 μm wide, with several nuclei (e.g. 6–8 nuclei per hyphal cell); not gelatinous. Suprapellis of very loosely arranged, cylindrical to moderately swollen, thin-walled, 1.5–6.5 μm wide hyphae running in all directions occupying only the uppermost 5–10 μm without forming a continuous layer. Gill trama subregular with bidirectional hyphae; subhymenium loosely ramified, thin, not gelatinous. Hyphae cylindrical or moderately inflated, 3–8 μm wide, thin-walled, frequently with clamp-connections. Hyphae of the stipe 3–10 μm wide, thin-walled, mostly without clamp-connections, cylindrical and parallel. Walls often with colourless, indistinct, irregular, often interrupted, transversal striation visible in phase contrast. Thromboplerous hyphae rare, colourless, 2–4 μm thick, filled with a homogeneous deuteroplasma. The finely powdery upper part of the stipe bears tufts of more or less erect, clampless, thin-walled, short hyphae with cylindrical, claviform or utriform end cells measuring 19–42 × 5–6 μm. The surface of those hyphae seems to be sticky, as spores are sometimes seen to adhere to it. In some places small clumps of a seemingly resinous matter are visible.

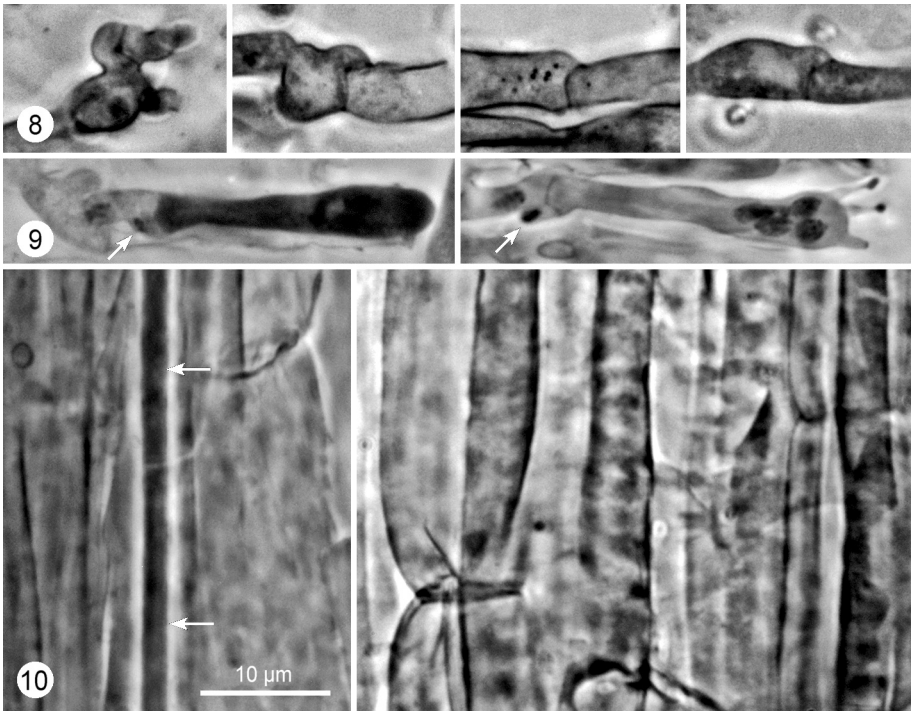
Collections studied. All collections from 'Pfynwald' near Susten VS, Switzerland, about 650 m above sea level, at different lots, leg. F. Ayer.

Types: Ayer 05-49-5869 (holotype LAU); Ayer 05-49-5869 (isotypes LAU).

Other collections (all in LAU): Ayer 04-49-5859; Ayer 05-49-5860; Ayer 05-49-5861; Ayer 05-49-5862; Ayer 05-49-5863; Ayer 05-49-5864; Ayer 05-49-5865; Ayer 05-49-5871; HC 04/013.



Figs. 6, 7. *Pseudobaeospora calcarea*; gill trama and spores. 6. Perradial microtome section stained with the tannin-iron reaction followed by haematoxylin; only the walls are stained. The mediostratum is subregular with some bidirectional hyphae; the subhymenium is loose and ramified. No part is gelatinous; 7. top row: Spores stained with aceto-carmine showing the siderophilous wall, a nucleus and an oil drop. The apiculus is not stained. The 4 bottom rows show the spores in Melzer's iodine solution. The wall is uniformly dextrinoid, the apiculus is not stained.



Figs. 8–10. *Pseudobaeospora calcarea*. 8. True clamp connections, two from the subhymenium (at left), and two from the gill trama. Aceto-carmine, phase contrast; 9. pseudoclamps at the base of a premeiotic basidium (at left) and of a postmeiotic basidium. The arrows indicate the nucleus trapped in the lateral sack that did not fuse with the subterminal cell. Aceto-carmine, phase contrast; 10. longitudinal sections of a stipe. Left: a thromboplerous hypha (arrows); right: faint, colourless incrustations on inflated hyphae. Congo red, phase contrast.

Habitat & ecology — *Pseudobaeospora calcarea* was repeatedly collected at different localities in a rather dry forest of *Pinus sylvestris* (Erico-Pinetum sylvestris with *Quercus pubescens*), at an altitude of about 650 m above sea level, from June to November 2004 and 2005. The average size of the basidiomes decreased gradually from the beginning to the end of the collecting seasons.

It grows among and on mosses, mainly *Hypnum cupressiforme*, *Dicranum scoparium*, and *Hylocomium splendens*, and the majority of the basidiomes were attached to more or less deteriorated gametophytes of *Pleurozium schreberi*. However, in the driest parts of the pine forest, the basidiomes also occurred directly on the litter (needles and bark of *Pinus*), but mosses were always present nearby. Our observations do not allow to know if the fungus is parasitic on the moss, or if the moss only serves as a mechanical support for the basidiome.

The soil is a carbonated humus with pH-values of 6–7. The annual rainfall is 550 mm (200 mm from April to October). The fungus developed in localities that were artificially watered, and in two lots where the rainfall equalled or exceeded 50 mm in two weeks, but this relatively high level is rare in the forest studied.

Pseudobaeospora calcarea belongs to the informal group *Albidula* as defined by Bas (2003): "Basidiocarp white to pale buff. Clamp-connections present. Cheilocystidia absent. Pileipellis not hymenidermoid". The species so far published in this group are *P. albidula* (lacking a suprapellis, pileipellis more regular, different ecology), *P. paulochroma* (turning yellow in KOH, more regular structure of the pileipellis composed of hyphae, weakly metachromatic spore walls), and *P. bavariae* (orange-yellow 'rhizoids' at the stipe base, metachromatic spore walls, regular pileipellis made from hyphae, pale sordid yellow in KOH). They differ from *P. calcarea* mainly in the characters indicated in parenthesis. The key characters of *P. calcarea* are the lack of yellow discoloration with KOH, the non-staining spore walls in toluidine blue, the highly irregular structure of the pileipellis, the very acrid taste (unknown for the other species of the group Albidula), and the occurrence on mosses.

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