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Pseudobaeospora aphana, a new species from California

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Abstract: *Pseudobaeospora aphana*, characterized by a brownish pileus with a lilac sheen, yellowish lamellae, a cutis of narrow hyphae on a subpellis of relatively wide and short cells, absence of cheilocystidia and color changes in KOH, and abundant clamp connections, is described as new. It was discovered during the Jan 2007 Mycoblitz at Point Reyes National Seashore, the fourth such event in an ongoing effort to inventory the mycoflora of this national park.

Key words: Agaricales, Basidiomycota, biodiversity, systematics, Tricholomataceae

INTRODUCTION

Genus *Pseudobaeospora* Singer has been basking in attention since the observations by Bas (1995) that the Dutch collections (in L) represented two new species and did not belong to either of the two species hitherto known for Europe. A cascade of new species was described in Europe (Bas 2002, 2003; Adamčík and Bas 2002; Adamčík and Ripková 2004; Arnolds et al 2003; Bas and Krieglsteiner 1998; Bas et al 1997; Bas et al 2002; Clémençon and Ayer 2007) resulting in 15 new species, two new varieties and two provisionally described species. Bas (2003) also emended Singer's genus description (Singer 1942, 1963) to accommodate not only species with a cutis as pileipellis but also those with a hymeniform pileipellis and species with basidiocarps changing color in KOH. A second-generation set of articles is now appearing, critically reassessing the described species (Adamčík et al 2007, Ronikier and Moreau 2007). Outside Europe five species are known from North America (Desjardin 2004) and another seven from the rest of the world (Arnolds et al 2004; Singer 1963, 1969; Horak 1964; Rawla and Arya 1991; Aberdeen 1992).

The main characters in the genus used for species delimitation are colors of the basidiocarp, spore sizes and shapes, presence or absence of cheilocystidia and clamp connections, and the structure and reactions of the pileipellis in KOH or ammonia.

In North America one new species recently was described from California. *Pseudobaeospora stevensii* Desjardin has clamp connections, cheilocystidia, and a strong, macroscopical and microscopical color change in KOH (Desjardin 2004).

Another *Pseudobaeospora* species was discovered during the fourth Mycoblitz held at Point Reyes National Seashore in Jan 2007. It lacks the character combination just listed for *Ps. stevensii* and does not fit any described species, although the differences among some species are subtle. This new species brings the number of species known for North America to six.

MATERIALS AND METHODS

Standard methods for describing the basidiocarps were applied, using the terminology of Vellinga and Noordeloos (2005). Color annotations in the macroscopical descriptions are from Munsell soil color charts (1975). The notation ''n = 20'' indicates that measurements were made on 20 spores in one sample. Only thick-walled spores occurring on the pileipellis were measured. These abbreviations are used: L for lamellae, l for lamellulae, avl for average length, avw for average width, Q for quotient of length and width and avQ for average quotient. Herbarium abbreviations are according to Holmgren and Holmgren (1998).

TAXONOMY

Pseudobaeospora aphana Vellinga, sp. nov. FIGS. 1, 2

TYPE. UNITED STATES OF AMERICA. CALIFORNIA: Marin County, Point Reyes National Seashore, along Olema Trail south of Five Brooks Trailhead, 37°59.503′ N, 122°45.480′W, 52 m elev., 20 Jan 2007, anonymous, *E.C. Vellinga PtR440.* (**HOLOTYPE designated here, UC 1860002**).

Etymology. Aphana is the Latinized, feminine version of the Greek ''αφανης'' meaning ''inconspicuous, unseen'' because of the size of the basidiocarps and the lack of striking characters in this new species.

Pseudobaeosporae pallidifoliae *simillima, sed in lamellis luteoribus differt; pileipellis ope KOH coloris alterationem non demonstrat.*

Pileus 7–15 mm, campanulate-umbonate, planoconvex with age, brownish at center with slight lilac sheen, (at center 7.5 YR 5/4, 6/4, at margin 7.5 YR 8/4), very pale at margin, not changing color with ammonia, not striate at margin; surface tomentose under lens. *Lamellae,* L = 21–23, l = 3–5, not crowded, adnexed to emarginate, relatively wide, slightly ventricose up to 2.5 mm wide, distinctly

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FIG. 1. *Pseudobaeospora aphana*. Basidiocarps (Photo by Mike Wood).

cream-yellowish at first, later yellowish (almost like lamellae of an *Inocybe* species) (10 YR 7–6/4 to 2.5 Y 7/6), with concolorous even edge. *Stipe* 33–39 × 2–2.5 mm, cylindrical or slightly attenuated at base, with whitish bloom over purplish-lilac-brown background, slightly different than pileus color (7.5 YR 5–4/4), paler on drying, hollow, with cystidia at apical part. *Context* thin in pileus, concolorous with surface, pale on drying; in stipe concolorous with surface, but whitish around cavity. *Odor* rancid-unpleasant, such as smelt mixed with iodine. *Flavor* not tried.

Basidiospores (n = 20; from pileus surface in ammonia) 4.0–5.4 × 3.2–4.2 µm, avl × avw = 4.4 × 3.7 µm, Q = 1.12–1.49, avQ = 1.21, (n = 20; from pileus surface in Melzer's reagent) 4.0–5.2 × 3.1–3.8 µm, avl × avw = 4.5 × 3.5 µm, Q = 1.11–1.45, avQ = 1.27, subglobose, broadly ellipsoid, ellipsoid, thick-walled when mature, with drop, with conspicuous hilar appendage, en masse orange-brown in Melzer's reagent (after 8 h), but individual spores often not colored, cyanophilous and thick-walled spores metachromatic in cresyl blue. *Basidia* 24–29 × 4–5 µm, 4-spored, with a low percentage of 2-spored basidia, with basal clamp connection; thick-walled, dextrinoid basidia scattered. *Cystidia* absent. *Pileipellis* a cutis with an upper layer of 1–2 cylindrical or slightly inflated 2–5 µm wide, nonradially oriented, colorless hyphae, on a subpellis of broad and short celled hyphae, 20–37 × 11–18 µm, not changing color in ammonia. *Pileitrama* made up of narrow hyphae. *Stipitipellis* a cutis of 3–5 µm wide, cylindrical, colorless hyphae, with at apex of stipe numerous

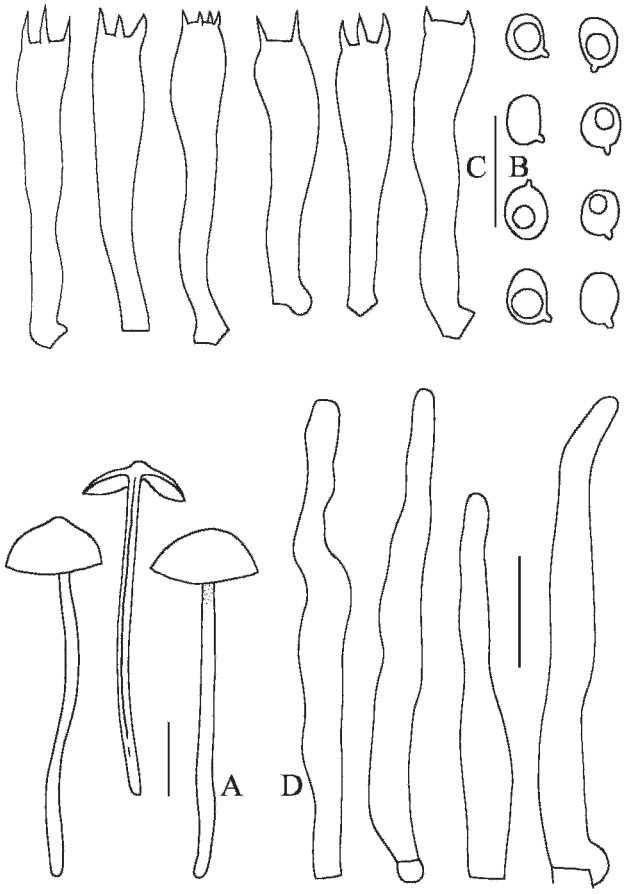

FIG. 2. *Pseudobaeospora aphana*. A. basidiocarps; B. spores; C. basidia; D. caulocystidia. Bars: A = 10 mm, B–D = 10 µm.

caulocystidia; caulocystidia 27–43 × 3.5–5.0 µm, cylindrical to slightly attenuated at apex, and slightly flexuous, with clouded contents and basal clamp connection. *Clamp connections* present in all tissues.

Habitat and distribution. Caespitose, terrestrial in mixed forest. So far collected only in Marin County, California, in January.

Collection examined. UNITED STATES OF AMERICA. CALIFORNIA: Marin County, Point Reyes National Seashore, along Olema Trail south of Five Brooks Trailhead, 37°59.503′N, 122°45.480′W, 52 m elev., 20 Jan 2007, anonymous, *E.C. Vellinga PtR440*. (HOLOTYPE UC 1860002).

DISCUSSION

Pseudobaeospora aphana stands out among its sister *Pseudobaeospora* species on account of its yellowish lamellae, the robust stipe, absence of a color change in KOH, absence of cheilocystidia, thin cutis of thin hyphae on a subpellis of relatively short and broad cells and presence of numerous clamp connections.

Placement of this species in genus *Callistosporium*

Singer close to *C. olivascens* var. *aerinum* (Quél.) Bon was considered in particular on account of the colors of the lamellae, the relatively low number of lamellae and the indistinct dextrinoid reaction of the spores in Melzer's reagent. However the presence of clamp connections, dextrinoid thick-walled basidia, and the absence of yellow to brown, or purple necropigment in the spores and basidia in the dried collection of the new species exclude this possibility (Singer 1944, 1986, Bon 1976). Phylogenetic taxonomical treatments of *Pseudobaeospora* and *Callistosporium* are lacking, and the relationship between the two genera needs to be investigated.

Pseudobaeospora aphana keys out to the group of species around *Ps. frieslandica* Bas ex Bas in the identification keys provided by Bas (2002, 2003). *Pseudobaeospora frieslandica* has dark violaceous gray lamellae; *Ps. ellipticospora* is completely violet-lilac, lacks a suprapellis and is much more slender than *Ps. aphana*; and *Ps. pallidifolia* has whitish to pinkish cream lamellae and its pileipellis turns fairly dark greenish blue in KOH and NH_4OH.

Pseudobaeospora paulochroma Bas is also similar in its microscopic characters but has a whitish pileus with a pale buff center.

Desjardin (2004) discussed the then known five North American species in detail. They have either violet to lilac basidiocarps (*Prunulus syringeus* Murrill sensu Coker [1929]; *Tricholoma microspermum* Ellis) or differ in distinct microscopic characters from the present species. *Pseudobaeospora pillodii* lacks clamp connections (Redhead 1982, Ronikier and Moreau 2007), *Ag. fuscolilacinus* Peck has 2-spored basidia and the pileipellis is hymeniform (Desjardin 2004), and *Ps. stevensii* is the only known North American species to change color with KOH, and it is provided with cheilocystidia (Desjardin 2004).

Pseudobaeospora aphana differs from *Ps. pillodii* (Quél.) Wasser (synonym *Ps. oligophylla* [Singer] Singer) in the presence of clamp connections, the nonlilac-tinged lamellae and the 4-spored basidia. Kühner (in Kühner and Romagnesi 1954) observed that in *Ps. pillodii* basidia are 2-spored, clamp connections absent and the hyphae of the stipe uninucleate. Ronikier and Moreau (2007) suggested that some recently described species could be closely related to *Ps. pillodii*.

The phylogenetic position of genus *Pseudobaeospora* has not been determined. Vellinga (2004) showed that it does not belong to the Agaricaceae, as hypothesized by Singer (1963, 1975, 1986) and Horak (1964, 2005). Bas (1995) treated it as part of family Tricholomataceae, but the genus has not been included in the analysis of the Agaricales by Matheny et al (2007a), in which the dispersal of the members of this family over six clades within the Agaricales and some orders outside the Agaricales, was demonstrated.

The importance of inventorying and monitoring projects lies not only in a contribution to our knowledge of biodiversity in a certain area but also in the enhancement of our basic knowledge of species (e.g. Redhead and Norvell 1993, Matheny et al 2007b). The concerted efforts at inventorying one specific area, in this case Point Reyes National Seashore, already have borne fruit (http://pmb.berkeley.edu/~bruns/tour/mycoblitz1.html). In addition to the here described *Pseudobaeospora aphana* one novel *Amaurodon* and a *Suillus* species will be described shortly (Bruns pers comm).

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