The Entolomataceae of the Pakaraima Mountains of Guyana 5: new species of Alboleptonia

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Abstract—This paper is the fifth in a series documenting the Entolomataceae taxa (Agaricales, Basidiomycota) from Guyana. Three new species are described — Alboleptonia angustospora, A. cystidiosa, and A. minima — occurring in tropical rainforests of the Upper Potaro River Basin in Guyana’s Pakaraima Mountains. Macromorphological, micromorphological, and habitat data are provided for each. Alboleptonia has not been previously reported from Guyana.

Key words—Agaricomycotina, fungal taxonomy, Guayana Highlands, Guiana Shield, neotropics

Introduction

Species of Alboleptonia Largent & R.G. Benedict are easily classified into the Entolomataceae (Agaricales) due to their dull pink basidiospores that are angular in all views. Alboleptonia was erected (Largent & Benedict 1970) to accommodate entolomatoid species that combine diagnostic features of the type species, Alboleptonia sericella (Fr.) Largent & R.G. Benedict, including a white to pale cinereous basidioma, a silky to appressed-fibrillose or minutely appressed-squamulose, opaque (not translucent striate), non-hygrophanous pileal surface, which microscopically is composed of an entangled layer of hyphae, unique color reactions in Ehrlich’s reagent, and a low urea concentration. Also, under scanning electron microscopy Alboleptonia basidiospores exhibit a dihedral base and a pair of 4-angled facets on the apico-adaxial side that
results in a 5-sided apical facet (Pegler & Young, 1978). This original concept of \textit{Alboleptonia} has subsequently been applied by Largent (1994), Baroni & Lodge (1998), Pegler (1983, 1997), and Orton (1991a, b). A recent molecular study (Co-David et al. 2009), which putatively shows \textit{Alboleptonia} as polyphyletic, suffered from small sample size (two species) and incongruent application of generic/subgeneric concepts regarding \textit{Alboleptonia} sensu Largent & Benedict and \textit{Entoloma} subgen. \textit{Alboleptonia} (Largent & R.G. Benedict) Noordel. (Noordeloos 1979, 1987, 1988, 1992, 2004).

New World tropical and subtropical species meeting the diagnostic requirements of \textit{Alboleptonia} sensu Largent & Benedict have been found in the Lesser and Greater Antilles (Baroni & Lodge 1998; Pegler 1983), Trinidad and Venezuela (Dennis 1953, 1970), Brazil (Pegler 1997), and elsewhere in South America (Horak 1977, 1982). Over the course of several years of field expeditions in a remote region of the Pakaraima Mountains of Guyana, we have collected fungi representing at least four distinct entolomatoid taxa corresponding to \textit{Alboleptonia} sensu Largent & Benedict, three of which are described here.

\textbf{Materials and methods}

Collections were made during the 2001–03, 2006, and 2009 May–July rainy seasons and the 2003 and 2009 December rainy seasons from the Upper Potaro River Basin, within a 15 km radius of a permanent base camp at 5°18’04.8”N; 59°54’40.4”W; elevation 710 m. This collecting area, located in an undulating valley approximately 20 km east of Mt. Ayanganna (2200 m), is densely forested with a mosaic of primary \textit{Dicymbe}-dominated and mixed forests of the \textit{Eschweilera–Licania} association (Henkel 2003). Methods for field descriptions, microscopic analyses, and image capture were those of Largent et al. (2008). Fungi were field-dried with silica gel. Color designations follow Kornerup & Wanscher (1978) with color plates noted in parentheses (e.g., 4A7). Specimens were deposited in the following herbaria: BRG, HSU, and LSUM (Holmgren et al. 1990). Microscopic structures were measured as described in Largent (1994) and Largent et al. (2008a). Statistics determined include: means of basidiospore length and width, ± standard deviations; E, the quotient of length by width indicated as a range variation in \(n\) objects measured; Q, the mean of E-values; \(n\) = number of objects measured.

\textbf{Taxonomy}

\textit{Alboleptonia angustospora} Largent, Aime & T.W. Henkel, sp. nov. \textit{Mycobank MB 518326}  
\begin{itemize}
  \item \textit{Pileus} 10–17 mm latus, late convexus vel plano-convexus, ad centrum depressus, albus vel eburneus, implexus appressus fibrillosus, siccus. Lamellae adnatae, sub-adnexae, subdistantes, albae vel roseae; margine concolori, cystidiata. Stipes 33–57
Alboleptonia spp. nov. (Guyana) ...

$\times 1–3 \text{ mm}, \text{ equalis, albus, glaber, apice pruinoso. Basidiosporae 5–6-angulares, 7.3–10 \times 5.1–7.6 \mu m. Basidia 4-sterigmata, late cylindracea, 20–34.3 \times 6.6–10.4 \mu m. Cheilocystidia abundantes, cylindro-clavata. Pleurocystidia carentes. Pileipellis constata e intricatis hyphis. Fibulae carentes.}$

Type: Aime 3159 (BRG, holotype; LSUM, isotype).

Etymology: angustus (L. adj.) = narrow; -sporus (L. adj.) = spored; referring to the narrow basidiospores.

Key characters — Alboleptonia angustospora is easily recognized as a member of Alboleptonia because of its white, non-hygrophanous, non-striate, convex-depressed (occasionally umbonate), entirely matted-tomentulose to matted-fibrillose pileus and its 5–6-angled, heterodiametric basidiospores. It is unique among macromorphologically similar species of Alboleptonia in its combination of cylindric to cylindro-clavate, somewhat strangulated cheilocystidia, 5–6-angled, heterodiametric basidiospores that average < 9 µm long and < 7 µm broad, and the lack of pleurocystidia, clamp connections, and pigmentation.

Macrocharacters — Pileus 10–17 mm broad, 5–8 mm high, broadly convex to plano-convex with a distinct central depression occasionally with a very small, blunt umbo, entirely matted-tomentulose to matted-appressed fibrillose, chalky white to off-white to pale cream (4A1–4A2) at times with a faint hint of yellow (2A4) at disc, opaque, dry, not hygrophanous, not translucent; margin somewhat downcurved, entire but under hand lens irregularly and finely crenulate. Lamellae subclose to subdistant, adnate, subadnexed, or subdecurrent, 1.5–2.4 mm tall, chalky white, faintly pink at maturity (5A2–5A3); margin concolorous, finely eroded-cystidiate under hand lens; lamellae 3, of different lengths. Stipe 33–57 mm × 1–3 mm, equal, glabrous, occasionally white-pruinose at apex, concolorous, yellowing with age, cartilaginous, very fragile, hollow. Basal mycelium scant, white. Odor none, pleasantly fungoid, or slightly fragrant; Taste slightly fungoid. spore deposit not obtained.

Microcharacters — Basidiospores distinctly 5–6-angled, isodiametric in polar view, subsisodiametric to heterodiametric (rarely isodiametric) in profile view, 7.3–10 × 5.1–7.6 µm (mean = 8.5 ± 0.56 × 6.44 ± 0.54 µm; E = 1.1–1.68, Q = 1.33 ± 0.12, n = 104). Basidia 4-sterigmate, broadly cylindric and rounded at the base, 20–34.3 (–38.4) × 6.6–10.4 µm (mean = 28.0 ± 2.9 × 8.8 ± 0.79 µm; E = 2.3–4.2, Q = 3.1 ± 0.49; n = 29). Cheilocystidia abundant, cylindric to cylindro-clavate, many somewhat strangulated, 17.3–86.0 × 3.8–9.4 µm (mean = 46.8 ± 15.94 × 6.0 ± 1.28 µm; E = 2.15–19.13, Q = 7.72; n = 29). Pleurocystidia absent. Lamellar trama composed of parallel to subparallel, rather short hyphae, cells 44.8–145.1 × 2.4–15.9 µm. Pileipellis an entangled layer of hyphae throughout; terminal cells cylindric to cylindro-clavate, 23.4–57.1 × 5.6–11.3 µm. Pileal trama composed of entangled hyphae, cells 44.3–140.2
Alboleptonia spp. nov. (Guyana)
Alboleptonia earlei (Murrill) Largent & R.G. Benedict from Cuba and Costa Rica (Baroni & Lodge, 1998) is the only other neotropical Alboleptonia species known that lacks clamp connections and has basidiospores similar in size (7–9 × 5.5–6.5 µm) and shape to those of A. angustospora. Alboleptonia earlei can be differentiated by its lack of cheilocystidia and garlic or onion odor (Largent & Benedict 1970; Baroni & Lodge 1998).

Among Old World alboleptonioid fungi, Entoloma inficetum Corner & E. Horak from the Solomon Islands has many of the same characteristics as Alboleptonia angustospora. However, E. inficetum has a smooth pileus with an entirely repent pileipellis and cheilocystidia with a yellowish, protoplasmic pigment; in A. angustospora, the pileus is consistently matted-fibrillose to matted-tomentose, the pileipellis is an entangled hyphal layer that is never repent, and the cheilocystidia lack pigment (Horak 1980).

Alboleptonia cystidiosa Largent & Aime, sp. nov.

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Type: Aime 2395 (BRG, holotype; LSUM, isotype).

Etymology: cystidiosus (L. adj.) referring to the abundant hymenial cystidia.

Key characters — Alboleptonia cystidiosa is unique in its combination of a convex pileus with a rounded to flattened grayish umbo, slightly acrid taste, small, heterodiametric basidiospores, abundant clavate to obclavate cheilocystidia and pleurocystidia, cylindro-clavate to clavate caulocystidia, and lack of clamp connections.

Macrocharacters — Pileus 8–35 mm broad, narrowly convex to broadly convex to nearly plane but wavy with age, chalky white with a greyish, low flattened umbo; appearing glabrous, under hand lens radially fibrillose, scurfy over umbo; margin entire, finely eroded with age; trama very thin, < 1 mm over stipe. Lamellae close, adnate, thin, narrow, < 1 mm tall, white, faintly pink at maturity, occasionally forking near margin; lamellulae 4–6, of different lengths. Stipe 25–48 × 2.5–7.0 mm, slightly broader and flattened towards base, chalky white, glabrous, finely longitudinally striate under handlens; context white, unchanging, hollow. Basal mycelium lacking. Odor faint, indistinct; taste slightly acrid. Spore deposit salmon pink (7B4).
Alboleptonia spp. nov. (Guyana)
Microcharacters — Basidiospores distinctly 5–6-angled, isodiametric in polar view, subisodiametric to heterodiametric in profile view, rarely isodiametric, 7.6–9.8 × 5.3–8.4 µm, (mean = 8.88 ± 0.53 × 6.92 ± 0.72 µm, E = 1.09–1.56, Q = 1.29 ± 0.1; n = 28). Basidia clavate, 2 or 4-sterigmate, 28.0–38.2 × 7.6–10.7 µm, (E = 3.07–4.72, Q = 3.7 ± 0.38; n = 13). Cheilocystidia abundant, obclavate, occasionally clavate, hyaline, 36.0–129.0 × 8.8–15.4 µm. Pleurocystidia abundant, similar in shape to but smaller than the cheilocystidia, hyaline, 47.2–86.6 × 10.0–15.84 µm. Pileipellis an entangled layer of cylindric hyphae throughout. Pileocystidia clavate to cylindro-clavate, 20.5–50.9 × 4.5–15.7 µm. Caulocystidia in scattered but abundant clusters, cylindro-clavate to broadly clavate, 17.3–59.1 × 5.3–19.3 µm. Refractive hyphae scattered in the pileus and stipe tramas. Refractive granules, brilliant granules, and pigmentation absent. Clamp connections absent.

Ecology, range, distribution — Clustered on sandy soils in mixed riverine forest, known only from the Upper Potaro River Basin of Guyana.


Comments — Alboleptonia cystidiosa is similar to the pantropical Alboleptonia stylophora (Berk. & Broome) Pegler and Entoloma niveum G. Stev. from New Zealand in possessing a white, umbonate pileus that is non-hygrophanous and non-striate, cheilocystidia, and an absence of clamp connections. Alboleptonia stylophora can be distinguished from A. cystidiosa by its cuspidate pileus that tends to develop yellowish hues, cylindro-clavate cheilocystidia, lack of pleurocystidia, and considerably larger basidiospores (9.3–13.8 × 7.7–9.7 µm; Baroni & Lodge, 1998). Entoloma niveum differs from A. cystidiosa in its papillate pileus, farinaceous odor, strangulated cheilocystidia, and lack of pleurocystidia (Horak 1973, 2008). Entoloma neosericellum from New Zealand resembles A. cystidiosa in having a white, innately fibrillose pileus, cheilocystidia and pleurocystidia, and an absence of clamp connections. Entoloma neosericellum is nonetheless easily separated from A. cystidiosa by its vENTICULO-ROSTRATE pleurocystidia, larger basidiospores (10–11.5 × 7.5–8.5 µm), and hygrophanous, translucent-striate, non-umbonate pileus (Horak 2008).

Alboleptonia minima Largent & T.W. Henkel, sp. nov.

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Fig. 3. Macro- and microscopic features of Alboleptonia minima (BRG holotype Henkel 9037). A. Basidiomata. Bar = 10 mm. B. Basidiospores. C. Pileipellis with sub-erect terminal elements. Bar = 10 µm.

Type: Henkel 9037 (BRG, holotype; HSU, isotype).

Etymology: minimus (L. adj.) = very small or tiny, referring to the width of the pileus.

Key characters — Alboleptonia minima is distinguished by its white basidioma with a depressed < 10 mm broad pileus, narrow, relatively long stipe, lack of clamp connections, and a stipitipellis, pileipellis, and lamellar edges composed of an entangled layer of hyphae.

Macrocharacters — Pileus 7–8 mm broad, 1–2 mm high, broadly convex to plane with a broad central depression, white, minutely appressed-fibrillose, opaque, not translucent, not hygrophanous; margin decurved to nearly plane, entire. Lamellae 2–3 mm long, 1 mm tall white at first, faintly pink with age, adnate, close; margin minutely fringed under hand lens; lamellulae not recorded. Stipe 50–56 × 2–3 mm, enlarging slightly toward base, white, minutely pruinose at the apex and minutely fibrillose elsewhere, hollow. Basal mycelium a moderately dense tomentum. Taste, odor, and spore deposit not recorded.
Microcharacters — Basidiospores distinctly 6-angled, isodiametric in polar view, subsidiodiametric or more often heterodiametric in profile view, apex typically rounded and triangular, 7.5–9.1 × 5.8–7.4 µm (mean = 8.5 ± 0.4 × 6.6 ± 0.5 µm; E = 1.15–1.47, Q = 1.29 ± 0.1; n = 28). Basidia 4-sterigmate, clavate, distinctly tapered downward, 24.3–31.7 × 7.2–9.5 µm (mean = 28.1 ± 2.4 × 8.61 ± 0.6 µm; E = 2.66–3.95; Q = 3.27 ± 0.3; n = 14). Lamellar edge a sterile layer of entangled hyphae. Cheilocystidia abundant, cylindric to cylindro-clavate, 31.1–47.6 × 3.8–5.5 µm. Pleurocystidia absent. Lamellar trama subparallel, of relatively short and narrow hyphae, cells 48.9–87.5 × 3.0–4.3 µm. Pileipellis an entangled layer of hyphae with semi-erect terminal cells, particularly over disc. Pileocystidia cylindric to narrowly cylindro-clavate, 21.5–38.9 × 2.8–8.3 µm. Pileus trama composed of interwoven hyphae, cells 68.0–110.9 × 7.0–10.4 µm. Stipitipellis an entangled hyphal layer. Caulocystidia similar in size and shape to the cheilocystidia. Refractive hyphae abundant in the subhymenium and pileus trama adjacent to lamellae, yellowish in 3% KOH, apparently absent in the lamellar trama. Refractive granules, brilliant granules, and pigmentation absent. Clamp connections absent.

Ecology, range, distribution — Scattered on humus of forest floor in Dicymbe forest, known only from the Upper Potaro River Basin of Guyana.

Representative specimens examined. Guyana. Region 8: Potaro-Siparuni. Pakaraima Mountains. Upper Potaro River Basin, 15–20 km east of Mt. Ayanganna, environs of base camp located on Potaro River one km upstream from confluence with Whitewater Creek at 5°18′04.8″N, 59°54′40.4″W, elevation 710–750 m: in Dicymbe plot 2, 11 July 2009, Henkel 9037 (BRG, holotype; HSU, isotype).

Comments — Alboleptonia minima is unique among entolomatoid fungi worldwide because of its white basidioma with a depressed pileus < 10 mm broad, narrow, relatively long stipe, and a stipitipellis, pileipellis, and lamellar edge composed of a similarly entangled layer of hyphae. Although Rhodophyllus pilosellus Romagn. & Gilles from Gabon shares a number of features with A. minima, it can be differentiated by its strongly fibrillose to flocculose pileus and its broader (11–17 µm) cheilocystidia that are covered over their apices with a hyaline, resinous substance (Romagnesi & Gilles 1979).

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**Literature cited**


