

***Alboleptonia* from the Greater Antilles**

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Abstract: Four new species of *Alboleptonia* are described from Puerto Rico and new distribution records for *Alboleptonia* are noted for Puerto Rico and St. John, U.S. Virgin Islands. Information from examination of the type collections of *Alboleptonia ari-poana*, *A. cyathiformis*, and *A. hyalodepas* is discussed. Clarification of conflicting reports in the literature concerning the application of *A. hyalodepas* is presented and a lectotype is designated. Two new combinations are also made for *Entoloma minutoalbum* and *E. talisporum*. A key to the taxa of *Alboleptonia* occurring in and around the Caribbean region is also provided.

Key Words: Agaricales, Basidiomycetes, Caribbean, *Entoloma*, Entolomataceae, identification key, Puerto Rico, St. John Virgin Islands, taxonomy

INTRODUCTION

Stevenson (1975) published a list of Agaricales found in Puerto Rico and the Virgin Islands, which included 75 species in 33 genera. There are no species of Entolomataceae listed in this publication, nor in other earlier reports (Seaver and Chardón, 1926; Stevenson, 1918). Apparently members of this family, though rather abundant in Puerto Rico, for whatever reasons were not collected. Additionally, there have been no recent publications on members of Entolomataceae from Puerto Rico or St. John, USVI.

Several authors have described entolomataceous fungi from other islands and the main continents in and around the greater Caribbean area, and this information is well covered in Pegler (1983, 1987a, b). Murrill (1911) published 11 new species of Entolom-

ataceae from Jamaica, Cuba and Mexico. Dennis (1953) described 10 new taxa from Trinidad and 18 new taxa from Venezuela while preparing his mycofloristic treatment of Venezuela and adjacent countries (Dennis, 1970) in which 44 taxa of Entolomataceae were listed. Pegler (1983) described 13 new species and a total of 48 members of the Entolomataceae from the Lesser Antilles, while producing a mycofloristic treatment for this and other families of the Agaricales for those islands.

Although our investigations on the diversity of basidiomycetes of the Greater Antilles are still preliminary, several undescribed species of Entolomataceae have been noted from Puerto Rico. Some of these new taxa are described and compared to the known species of *Alboleptonia* Largent & Benedict, especially those reported from the Caribbean region. It was necessary to examine type collections of various *Alboleptonia* species during our investigations, and the information obtained from those type studies is also presented in order to clarify species concepts. A key to the Caribbean species of *Alboleptonia* is provided.

Due to the complexity of opinions concerning taxonomy of the Entolomataceae, a brief discussion of genera placed in the family is warranted. The Entolomataceae includes *Clitopilus* (Fr.) Kummer, *Rhodocybe* Maire, *Rhodocybella* Baroni & Peterson, *Rhodogaster* Horak, *Richoniella* Costantin & Dufour, and depending upon the author consulted either one very large genus *Entoloma* (Fr.) Kummer with well over 1500 species and consisting of several subgenera (Romagnesi, 1941, 1978; Romagnesi and Gilles, 1979; Noordeloos, 1981; Singer, 1986), or the subgenera are recognized as distinct genera, e.g., *Alboleptonia*, *Claudopus* (W. G. Smith) Gillett, *Inocephalus* (Noordeloos) P. D. Orton, *Leptonia* (Fr.) Kummer, *Nolanea* (Fr.) Kummer, etc. (Largent, 1974, 1994; Largent and Baroni, 1988; Pegler and Young, 1978; Orton, 1991a, b). In some cases *Entoloma* is accepted without infrageneric classification (Hesler, 1967; Horak, 1976, 1978, 1980). We prefer to recognize the smaller genera and are of the opinion that most, if not all, will turn out to be monophyletic groups. For lists of these genera and keys to aid in their identification, refer to Largent and Baroni (1988) or Largent (1994). These smaller genera can be clearly defined with the use of macroscopic and microscopic characters.

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Therefore *Alboleptonia* is a distinctive genus that typically can be identified in the field with the aid of a hand lens. Several subsidiary microscopic and chemical characters further support the recognition of *Alboleptonia* (Largent and Benedict, 1970; Largent, 1994). For a synopsis of the diagnostic features of *Alboleptonia*, refer to the introductory comments in the key at the end of this paper.

METHODS

Techniques utilized for preserving fresh specimens and for examining microscopic structures were those of Baroni (1981), Baroni and Horak (1994), and Lodge and Pegler (1990). However special consideration was given to measurements of the basidiospores due to the varied and complex shapes encountered. Measurements of cuboid or quadrate spores were made using the flat sides of the 4-sided spores, from the apex to the base and from the adaxial to the abaxial facet while the spore was in lateral (profile) view (e.g., FIG. 8, upper left basidiospore) (Horak, 1976). In all other cases, when measuring the length of noncuboid/quadrate spores, the longest axis from the base to the apex of the spore, excluding the hilar appendix or apiculus, was measured as the length when the spores were in profile view only (Noordeloos, 1992). The width was measured as the widest point perpendicular to the axis of the length. All measurements were made in 10% NH_4OH unless otherwise noted. In the description of the basidiospores, $n/2 = 30$ indicates that a total of 30 spores were measured from 2 different collections; L^m = mean length; W^m = mean width; E = length/width of individual spores and is given as a range; Q = the mean of all E values in a sample; Q^m = the mean of Q values where more than one collection is included in measurements. Basidiospores were measured with an Olympus BHS light microscope under a 100 \times Hoffman interference lens using a semi-automated image analysis system (a GTCO digitizer pad and Metrics5 software written by Dr. David Malloch). Descriptive statistical analysis of the measurements was obtained using EXCEL 5.0. All scanning electron micrographs were made on an ISI Supra IIIA scanning electron microscope following the procedures for specimen preparation in Baroni (1981). All line drawings of microscopic structures were made with the aid of a drawing tube.

Color names are mainly from Smithe's (1975) partial reproduction of Ridgway (1912) colors and are described by capitalized names with the precise color hue designated in parentheses, e.g., Buff (0.9 Y7.77/5.5). The color hue designations are Munsell notations (Hamley, 1949). In some cases, where a Smithe

color name was not available, Ridgway (1912) names were used with the appropriate Munsell notations as listed in Hamley (1949) and are noted as follows, Ivory Yellow (Hamley 1Y-7Y 8-10/2-5). In a very few cases capitalized names are from Ridgway (1912) and are indicated as such in parentheses, e.g., Shell Pink (Ridgway). Also, a limited number of color notations are from Kornerup and Wanscher (1978) and then the color name is placed in quotation marks with the hue designation of that system following in parentheses, e.g., "Sunburn" (6D5). Coordinates of collecting sites were obtained with a hand held GPS device. All sites were referenced to map datum WGS84.

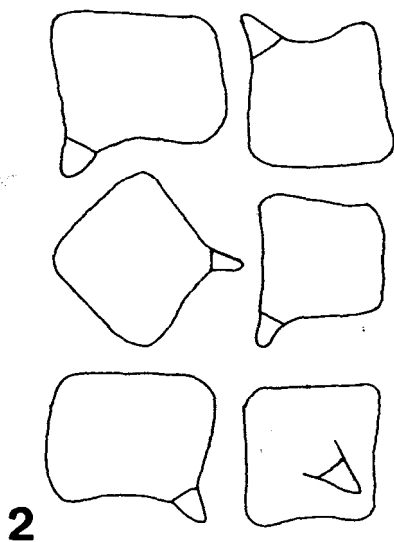
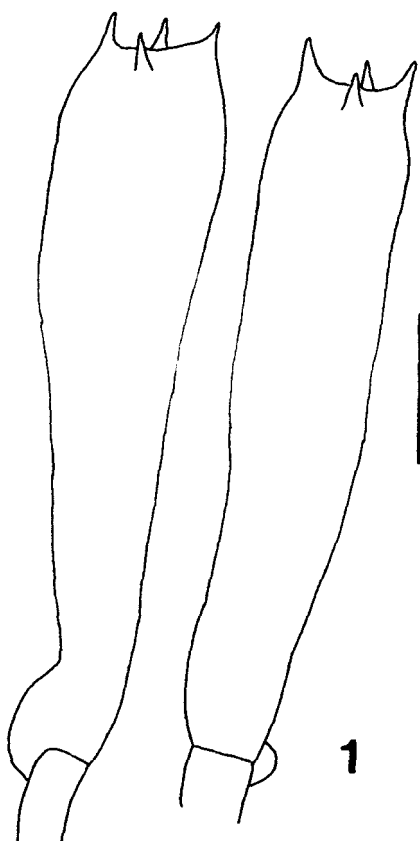
DESCRIPTION OF SPECIES

Alboleptonia subrosea Baroni & Lodge, sp. nov.

FIGS. 1-3

Pileus 10-18 mm latus, roseolus deinde pallido-vinaceus, primum convexus margine decurvato deinde plano-convexus margine ascendentis, fibrillosus, fibrillis radiatim adpressis. *Lamellae* cremeae deinde subrosescens, sinuatae vel subdecurrentes, confertae. *Stipes* pileo concolor, 20-35 mm longus, 1-3 mm latus, aequilatus, adpresso-fibrillosus. *Basidiosporae* 7-11 \times 7-10 μm , cubicae. *Basidia* 4-sterigmatibus praedita. *Cystidia* nulla. *Pileipellis* hyphis decumbentibus, cylindraceis, 3-12 μm latis, haud incrustatis, hyalinis praedita. *Fibulae* abundantes. *Terricola*, in sylvia tropica Puerto Rico in folia putrescentia lecta. HOLOTYPUS D. J. Lodge & L. Prieto PR 88 (K).

Pileus Pale Pinkish Buff (8.8 YR 7.55/4.3) to Shell Pink (Ridgway), becoming Light Russet Vinaceous (1.0 YR 6.16/4.9) over the disc, 10-18 mm broad, broadly convex at first with decurved margin, becoming plane to uplifted, occasionally with low umbo, matted fibrillose to felted over disc, radially fibrillose to margin, hygrophanous. *Lamellae* Cream Color (3.4 Y 8.40/4.2), becoming pale Pinkish Buff (0.4 Y 7.5/4.3), sinuate or short decurrent, close to crowded (1-3/mm), some forked and also intervenose, up to 2 mm broad, edges concolorotis. *Stipe* Beige (4.6 YR 6.84/3.2), Pale Pinkish Buff (8.8 YR 7.55/4.3), a pale shade of Light Russet Vinaceous (1.0 YR 6.16/4.9), becoming Light Drab (0.9 Y 5.83/2.5) or Cinnamon Drab (5.2 YR 5.9/3.7), 20-35 mm long, 1-3 mm broad, equal or tapered toward base, twisted appressed-fibrillose overall, white mycelioid at base and with white rhizoidal strands at base, lightly stuffed to hollow. *Odor* and *Taste* not noted. *Basidiospores* in deposit pale fleshy brown, 7-11 \times 7-10 μm , ($n/l = 20$, $L^m = 9 \pm 1.18$, $W^m = 8 \pm 0.57$, $E = 1.0-1.41$, $Q = 1.11$), cuboid. *Basidia* 44-51 \times 10-12 μm , 4-sterigmate, clavate. *Hymenial cystidia* absent. *Lamella trama* composed of parallel, cylindric, hyaline hyphae, 4-8 μm diam, also with scattered yellowish refractive, re-



FIGS. 1, 2. Macroscopic and microscopic features of *Alboleptonia subrosea*. 1. Basidia (PR 89). 2. Basidiospores (HOLOTYPE, PR 88). Scale bar = 10 μ m.

pository hyphae. *Pileus context* radially arranged. *Pileipellis* a repent layer of compact to loosely entangled, cylindric, hyaline hyphae, 3-12 μ m diam, not encrusted. *Clamp connections* present in pileipellis, lamella trama and hymenium.

Habit, habitat, distribution. Scattered in leaf litter of subtropical rainforest. Oct. Puerto Rico.

Material examined. PUERTO RICO. Luquillo Mts., Caribbean National Forest, El Verde Research Area, north side of Zucca Plot 3, 360 m. elev., N18° 19' 24" W65° 49' 3", 30 October 1985, PR 88 D. J. Lodge & L. Prieto (K, HOLOTYPE), and at entrance from main trail to Zucca Plot 3, 30 October 1985. PR 89 D. J. Lodge & L. Prieto (K).

Etymology. *subrosea* = pale rose color of the pileus.

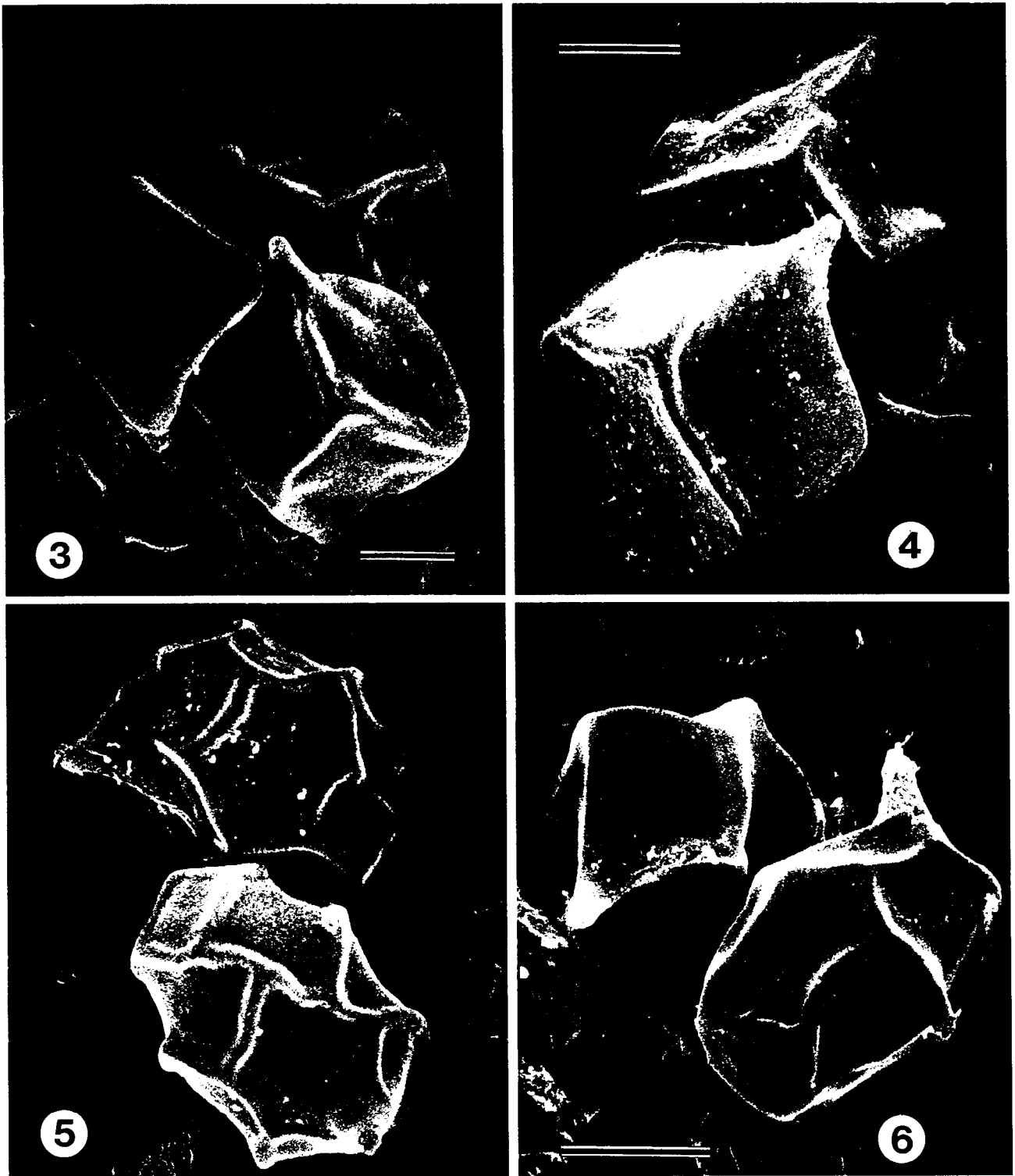
The cuboid spore form is unusual for species of *Alboleptonia* since only a few taxa besides *A. subrosea*, which belong in *Alboleptonia*, exhibit this type of spore, e.g., *Alboleptonia largentii*, *Alboleptonia talispora* (Corner & Horak) Baroni & Lodge, comb. nov. [= *Entoloma talisporum* Corner & Horak, Sydowia 28: 176. 1976] and *Alboleptonia minutoalba* (Horak) Baroni & Lodge, comb. nov. [= *Entoloma minutoalbum* Horak, Sydowia 28:182. 1976]. Of these three taxa, only *A. minutoalba* is similar to *A. subrosea* because of its small, convex, silky-fibrillose pileus surface, which is white at first but develops pinkish hues with age. However, *A. minutoalba* differs from *A. subrosea* most notably by its smaller spores which are only 6-8 μ m, and by the encrusted hyphae of the pileipellis (vide Horak, 1976; but see Horak, 1980). *A. minutoalba* is presently known from New Zealand and Tierra del Fuego, Argentina (Horak, 1976, 1980). For a discussion of *A. talispora* see under *A. largentii*.

***Alboleptonia largentii* Baroni & Lodge, sp. nov.**

FIGS. 4, 7-11

Pileus 6-12 mm latus, albus vel subroseus, convexus, primum discum depressum ostendens deinde planus, valde umbilicatus, striatus, sericeo-fibrillosus, fibrillis radiatim adpressis. Lamellae subroseae, adnatae, subdistantes. Stipes albus vel cremeus basi, 15-18 mm longus, 1-2 mm latus, aequilatus, sericeo-fibrillosus, fibrillis adpressis. Basidiosporae 8-11.4 \times 7.6-10.5 μ m, cubicae. Basidia 4-sterigmatibus praedita. Cystidia nulla. Pileipellis hyphis decumbentibus, cylindraceis, 8-14 μ m latis, haud incrustatis, hyalinis, cellulas terminales subclavatas erectas dispersas, 22-70 \times 10-24 μ m. Fibulae nullae. In solo sylvae tropicae Puerto Rico lecta. HOLOTYPUS D. J. Lodge PR 310 (K).

Pileus white, pinkish when water soaked, 6-20 mm broad, broadly convex with a depressed disc, becoming plane with a sharply depressed, umbilicate disc, striate over the margin (to 3 mm) or slightly sulcate-striate, dry, radially appressed fibrillose-silky overall or with small appressed fibrillose-scales over the margin. *Context* very thin. *Lamellae* pale pinkish or pinkish, adnate or adnate with a decurrent tooth, subdistal (L = 17-20, 1 = 1-2 irregularly), edge even, concolorous. *Stipe* white overall or with a blush of creamy yellow, 8-20 mm long, 1-2 mm broad, equal, strict



FIGS. 3-6. Scanning electron micrographs of basidiospores of *Alboleptonia* species. 3. *A. subrosea* (holotype, PR 88). 4. *A. largentii* (TJB 7963b). 5. *A. flavifolia* (TJB 7948). 6. *A. sulcata* (HOLOTYPE, PR 476). Scale bars = 5 μ m. Lower scale bar for 5 and 6.

or slightly curved, silky appressed fibrillose at first, glabrescent with age. *Odor* none. *Taste* nutty, sweet. *Basidiospores* $8-11.4 \times 7.6-10.5 \mu\text{m}$ ($n/2 = 39$, $L^m = 10.7 \pm 0.74$, $W^m = 8.7 \pm 0.78$, $E = 1-1.31$, $Q^m = 1.12$), mostly \pm cuboid or at least 4-sided, a very few 5-sided. *Basidia* $36-40 \times 12-18 \mu\text{m}$ mostly 4-sterigmate, some 2-sterigmate, broadly clavate. *Hymenial cystidia* absent. *Lamella trama* composed of parallel, cylindrical, hyaline hyphae, 4-8 μm diam. *Pileus context* radially arranged, cylindrical to slight inflated, hyaline hyphae, 5-10 μm diam, less than 100 μm long. *Pileipellis* a compact, hyaline layer of repent, cylindrical hyphae, 8-14 μm diam, producing scattered ascendant, cylindrical to subclavate end cells, $22-70 \times 10-24 \mu\text{m}$, all thin-walled and not encrusted. *Stipitipellis* with erect clavate or occasionally cylindrical caulocystidia, $32-42 \times 10-22 \mu\text{m}$. *Clamp connections* absent.

Habit, habitat, distribution. Solitary or scattered, on clay soil, often on banks along trails. Jun. through Sep. Puerto Rico.

Material examined. PUERTO RICO: Luquillo Mts., Caribbean National Forest, El Verde Research Area, 380 m elev., N18° 19' 24" W65° 49' 3", 7 September 1984, PR 310 (previously as PR 474) D. J. Lodge (HOLOTYPE, K); same location and mycelium, 30 August 1984, PR 317 (previously as PR 475), D. J. Lodge (K); El Verde Research Area, same general area as previous two collections, 28 June 1996, 79636 T. J. Baroni (CORT); Luquillo Mts., Caribbean National Forest, Sabana Station area, Bisley Watershed, 230 m elev., N18° 18' 53" W65° 44' 48", 6 Jun. 1997, 8485 T. J. Baroni (collected by Peter Roberts) (NY; UPRRP).

Etymology. This species is named in honor of Professor David L. Largent, the individual who originally recognized and described the genus *Alboleptonia*.

Alboleptonia largentii is one of two species of *Alboleptonia* found in Puerto Rico which has cuboid basidiospores and these taxa can be separated using the key provided. However, *A. talisporum*, known only from Papua New Guinea and the Solomon Islands, is also somewhat similar to *A. largentii* in macromorphology. These two species are clearly different since *A. talisporum* has a pileus which turns yellowish instead of pinkish with age, and its cuboid spores are only 6-8 μm (Horak, 1976, 1980).

While examining small pieces of hymenium under the scanning electron microscope, it became obvious that collection 7963b T. J. Baroni of *A. largentii* had a high preponderance of 5-sterigmate basidia (FIG. 11). Ten random fields of view were examined and the number of sterigmata on 51 different basidia were recorded. Of the basidia examined 17.5% were 5-sterigmate. As one might expect, the largest number of basidia were 4-sterigmate, i.e., 45%, but there were also numerous 3-sterigmate basidia (25.5%), with fewer numbers of 2-sterigmate basidia (8%) and

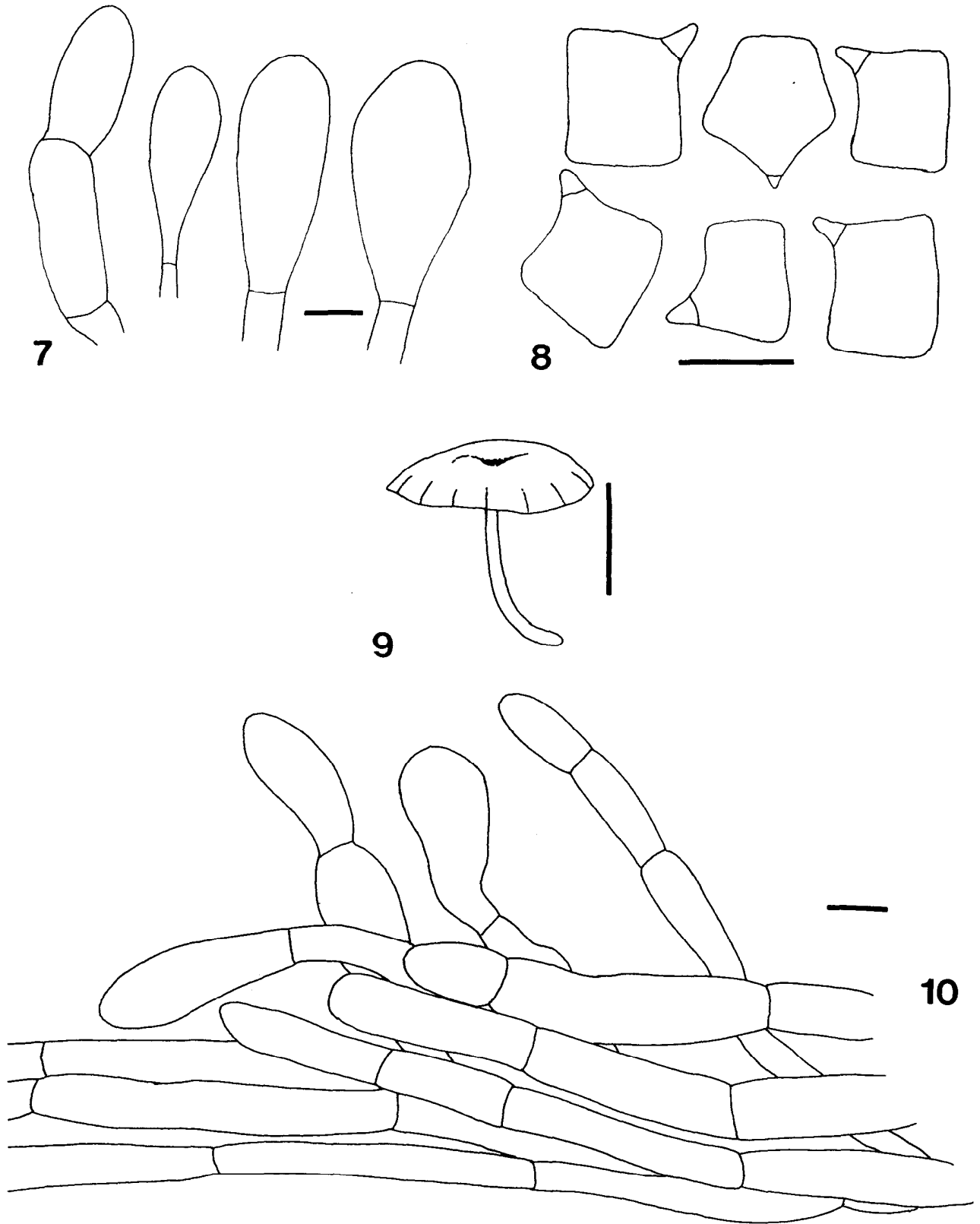
6-sterigmate basidia (4%) recorded. The presence of five and six sterigmate basidia is atypical for members of the Agaricales (Singer, 1986), and this may well be the first report of such an occurrence. Certainly this is the first recorded incidence of 5 and 6 sterigmate basidia in the Entolomataceae. If these extra spores are viable and secondarily homothallic, then the production of 5- and 6-sterigmate basidia may afford some advantage to these agarics when competing for substrates in tropical ecosystems.

Alboleptonia flavifolia Baroni & Lodge, sp. nov.

FIGS. 5, 12-14

Pileus 9-24 mm latus, albus deinde pallido-cinnamomesens, convexus disco subdepresso primum margine incurvato deinde ascendenti, radiatim fibrillosus, puberulus vel in disco subtomentosus. Lamellae cremeae deinde salmonescens, adnatae vel subdecurrentes, confertae. Stipes pileo concolor, 12-24 mm longus, 1.5-2 mm latus, aequilatus, sericeo-fibrillosus. Basidiosporae $12-16 \times 7.2-8.8 \mu\text{m}$, heterodiametricae, 6-7-angulatae. Basidia 4-sterigmatibus praedita. Cheilocystidia $20-65 \times 11-25 \mu\text{m}$, clavate-inflata vel globipedunculata vel ventricoso-rostrata hyalina. Pleurocystidia nulla. Pileipellis hyphis repentibus, cylindratis, 3-18 μm latis, haud incrustatis praedita. Fibulae nullae. Terricola, in sylvia tropica Puerto Rico in folia putrescentia lecta. HOLOTYPE D. J. Lodge PR 302 (K).

Pileus ivory white, dark cream or Pale Horn Color (2.5 Y 8.08/3.5), becoming pale cinnamon in age, 9-24 mm broad, convex with shallow depression over disc, margin inrolled at first, becoming broadly convex and then uplifted, translucent-striate at first and also slightly or obviously sulcate-striate from disc to margin with age, dry, radially fibrillose, pubescent or subtomentose over disc. *Context* very thin. *Lamellae* Cream Color (3.4 Y 8.40/4.2), becoming Buff (0.9 Y 7.77/5.5), Pale Pinkish Buff (8.8 YR 7.55/4.3) to Salmon (5.0 YR 6.90/6.0), adnate, slightly emarginate or arcuate with slight decurrent tooth, close to crowded (2-3/mm), with 2-3 tiers lamellulae, some forked, broad (1-2 mm). *Stipe* more or less concolorous with pileus, 12-30 mm long, 1.5-2.5 mm broad, equal or slightly expanded at base or apex, dry, fibrillose-silky overall, white mycelioid at base. *Odor* fungoid or somewhat mealy. *Taste* similar to odor. *Basidiospores* $10.5-16 \times 7.2-9.7 \mu\text{m}$, ($n/3 = 70$, $L^m = 12.3 \pm 1.34$, $W^m = 8.4 \pm 0.51$, $E = 1.16-2$, $Q^m = 1.46$; HOLOTYPE $n = 29$, $L^m = 13.4 \pm 1.31$, $W^m = 8.5 \pm 0.65$, $E = 1.16-2$, $Q = 1.58$), heterodiametric, 6-7 + rounded angles in profile view. *Basidia* 4-sterigmate, clavate. *Cheilocystidia* $20-65 \times 11-25 \mu\text{m}$, versiform but often clavate-inflated, sphaeropedunculate or broadly ventricose-rostrate, thin-walled, hyaline. *Pleurocystidia* absent. *Lamella trama* composed



FIGS. 7-10. Macroscopic and microscopic features of *Alboleptonia largetii* (HOLOTYPE, PR 310). 7. Caulocystidia. 8. Basidiospores. 9. Basidioma. 10. Pileipellis. Scale bars = 10 μ m, except scale bar in 9 = 5 mm.



FIG. 11. Hymenium of *Alboleptonia largentii* (TJB 7963b) showing 3-, 4-, 5-sterigmate basidia and a basidium with 6 spores attached. Scale bar = 10 μ m.

of parallel, inflated hyphae, subhymenium pseudo-parenchymatous. *Pileus context* radially arranged with short cylindrical or short inflated cells, 3-18 μ m diam. *Pileipellis* an hyaline, compact, repent layer of cylindrical to slightly inflated hyphae, 3-18 μ m diam, not encrusted. *Clamp connections* absent.

Habit, habitat, distribution. Solitary or scattered on leaf litter of mixed tropical hardwoods (*Inga*, *Ormosia*, etc.) or on soil. Jun.-Jul., Oct. Puerto Rico.

Material examined. PUERTO RICO: Sierra de Cayey, Lake Carite, 620 m. elev., N18° 0' 35" W65° 4' 35", 16 Oct. 1988, PR 302 (previously as PR 477) D. J. Lodge (HOLOTYPE, K); Maricao Municipio, Maricao Recreation Area, 810 m. elev., N18° 19' 13" W65° 59' 34", 25 Jun. 1996, 7948 T. J. Baroni (CORT); Luquillo Mts., Caribbean National Forest, El Verde Research Area, ridge above bridge over the Rio Sonadora, 370 m. elev., N18° 19' 24" W65° 49' 3", 4 Jul. 1993, PR 1213 D. J. Lodge (NY); Luquillo Mts., Caribbean National Forest, off of Rt. 191, Angelito Trail, N18° 19' 23" W65° 44' 50", 5 Jun. 1997, 8480 T. J. Baroni (UPRRP).

Etymology. *flavifolia* = referring to the cream yellow lamellae.

Alboleptonia flavifolia is characterized by its cream to buff colored lamellae, the convex pileus with a shallow depression on the disc, the cream then cinnamon colors developing on the pileus with age, the elongate heterodiametric-elliptic basidiospores with 6-7 or more rounded angles, the abundant, frequently inflated cheilocystidia, and the lack of clamp

connections. *Alboleptonia flavifolia* was originally thought to be a collection of *A. aripoana* (Dennis) Pegler because of the unusual elongate spores. However, *A. aripoana* is a lignicolous species (Dennis 1953, 1970) which does not develop cinnamon colors on the pileus, the lamellae are neither cream nor buff colored at first, the cheilocystidia are long-cylindrical, the spores are smaller (\bar{x} = 10.4 \times 7.7 μ m according to measurements taken from the type) and clamp connections are present and numerous (Horak, 1978; Pegler, 1983; also see the type study below).

Alboleptonia sulcata, which might be confused with *A. flavifolia*, is most easily distinguished from *A. flavifolia* because of its smaller and differently shaped basidiospores, i.e., \bar{x} = 10.5 \times 7.7 μ m with mostly 5-6 angles in profile view for *A. sulcata*. The mean spore dimensions for *A. flavifolia* are \bar{x} = 12.3 \times 8.4 μ m and the spores are mostly 6-7 angled in profile view. The difference in spore lengths between these two species is statistically significant ($P \leq 0.05$). Refer to the key for other distinguishing features.

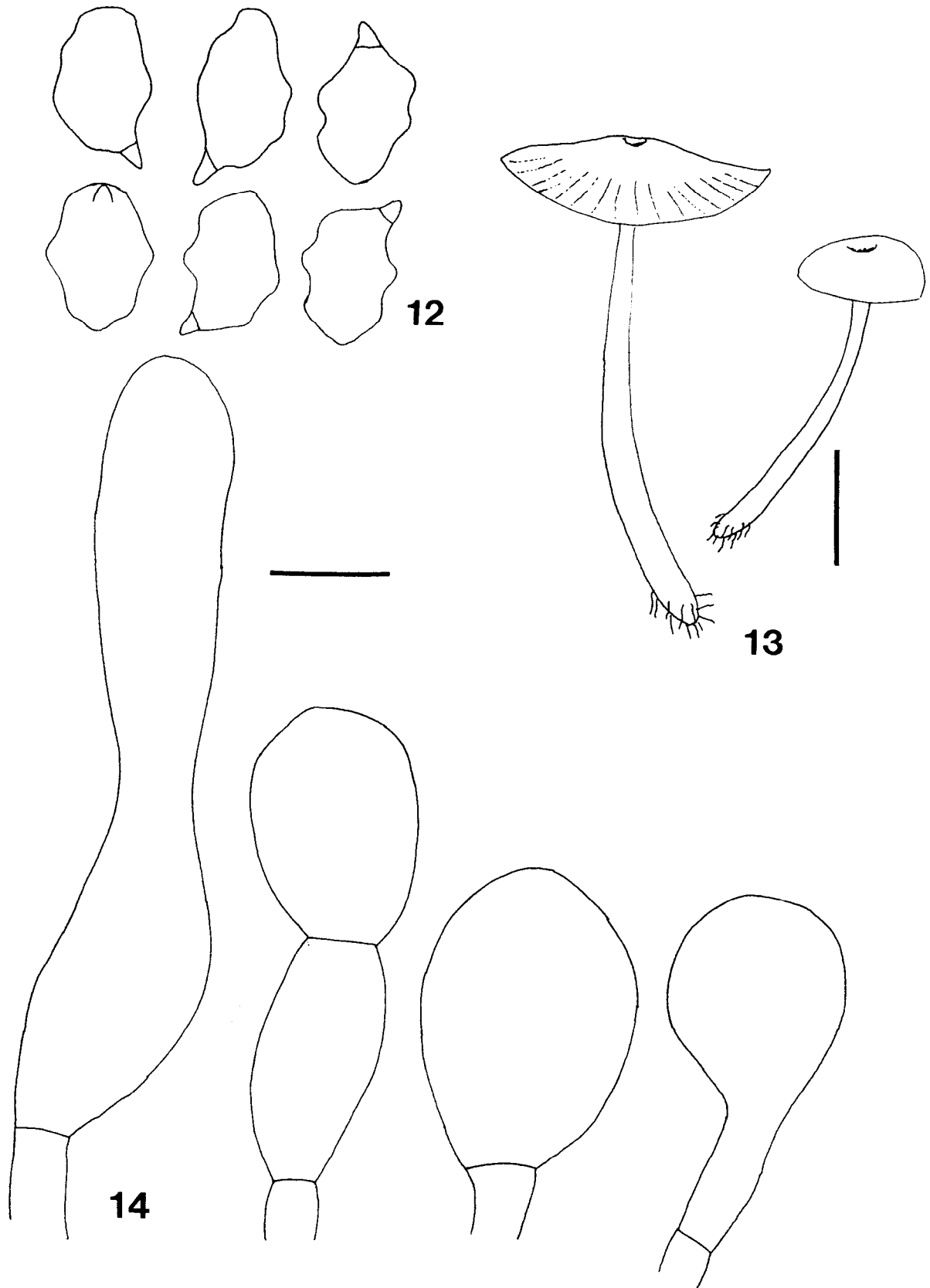
Another species which might be confused with *A. flavifolia*, *A. cyathiformis* (Dennis) Pegler, does have prominent, inflated cheilocystidia. However *A. cyathiformis* differs by several features and can be readily identified with the key provided.

Other *Alboleptonia* species with obvious cheilocystidia are *A. ochracea* Largent & Benedict and *A. rubellotincta* Largent & Watling [= *Entoloma queletii* (Boud.) Noordeloos, sensu Noordeloos, 1992]. Both *A. ochracea* and *A. rubellotincta* are easily distinguished and separated from *A. flavifolia*, and the other Caribbean species. *Alboleptonia ochracea*, presently known only from under conifers in the Pacific Northwest, develops ochraceous colors on the pileus with age or from handling, the lamellae are white, the spores are distinctly 5-6 angled in profile view, and clamp connections are also present on the hyphae of the basidiomata (Largent and Benedict, 1970; Largent, 1994). *Alboleptonia rubellotincta*, another temperate species described from Scotland, turns dark reddish brown over the entire basidioma when handled. *Alboleptonia rubellotincta* also has a lacerate-scaly pileus surface, white lamellae which stain dark reddish brown when bruised, and spores which are 5-6 angled in profile view (Largent and Watling, 1986).

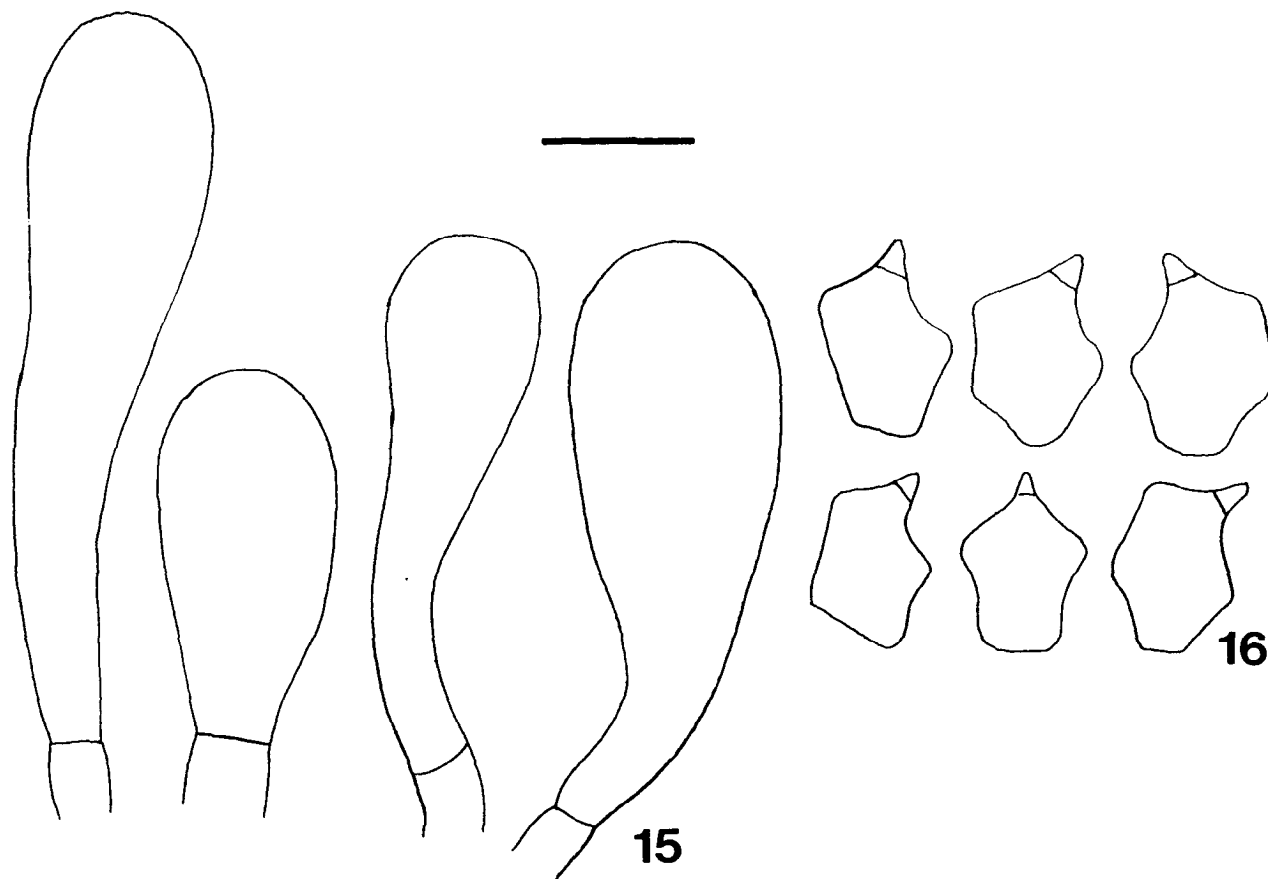
Alboleptonia sulcata Baroni & Lodge, sp. nov.

FIGS. 6, 15-16

Pileus 7-16 mm latus, cremeus, planus disco depresso, sericeo-fibrillosus, fibrillis adpressis, margine pellucido-striato et sulcato praeditus. Lamellae cremeae, adnatae, distantes vel subdistantes. Stipes pileo concolor, 11-20 mm lon-



FIGS. 12-14. Macroscopic and microscopic features of *Alboleptonia flavifolia* (HOLOTYPE, PR 302). 12. Basidiospores. 13. Basidiomata. 14. Cheilocystidia. Scale bars: 13 = 10 mm; 12, 14 = 10 μ m.



FIGS. 15, 16. Microscopic features of *Alboleptonia sulcata* (HOLOTYPE, PR 476). 15. Cheilocystidia. 16. Basidiospores. Scale bar = 10 μ m.

gus, 0.5-2 mm latus, aequilatus vel ad apicem expansus, apicem versus pruinato-pubescens. Basidiosporae 10.5-13 \times 8-9.7 μ m, 5-6 angulatae. Basidia 4-sterigmatibus praedita. Cheilocystidia 19-46 \times 9-18 μ m, clavate-inflata, hyalina. Pleurocystidia nulla. Pileipellis hyphis repentibus, cylindraceis, 4-10 μ m latis, haud incrustatis praedita. Fibulae nullae. Inter muscos in solo Puerto Rico lecta. HOLOTYPE D. J. Lodge PR 476 (K).

Pileus Cream Color (3.4 Y 8.4/4.2) or "Yellowish White" (4A2), in some cases becoming pale grayish pink or with "Orange White" to "Pale Orange" hues (5A2-3) with age, 7-16 mm broad, convex or broadly convex with shallowly depressed disc, becoming plane with shallowly depressed disc, margin decurved, typically sulcate-striate to the disc or infrequently subsulcate-striate at margin, some also translucent-striate, occasionally irregularly lacerate, dry, appressed sericeous fibrillose overall, some becoming glabrescent with age. *Context* very thin. *Lamellae* Cream Color (3.4 Y 8.4/4.2), pale creamy pinkish buff, eventually with some salmon hues i.e. "Orange White" to "Pale Orange" (5A2-3), adnate, broadly adnate or adnate with short decurrent tooth, subdis- tant or distant (L = 15, 1 = 1 or 2), broad, edge

concolor, fimbriate. *Stipe* pale creamy white or "Cream" (4A3) to "Light Yellow" (4A4) and mostly concolorous with the pileus, usually translucent, 11-20 mm long, 0.5-2 mm broad, equal or expanded toward apex, terete, often curved or flexuous, dry, fine white pruinato-pubescent over apex, glabrous elsewhere, sparse white mycelioid at base. *Odor* none. *Taste* not recorded. *Basidiospores* 8.7-13 \times 6.8-9.7 μ m, (n/4 = 50, L^m = 10.5 \pm 1.2, W^m = 7.7 \pm 0.66, E = 1.22-1.62, Q^m = 1.36; HOLOTYPE n = 15, L^m = 12.01 \pm 0.7, W^m = 8.38 \pm 0.53, E = 1.31-1.62, Q = 1.44), mostly 5, some 6-angled in profile view, mostly 4-angled in polar view. *Basidia* 26-28 \times 9-11 μ m, mostly 4-sterigmate, but 1-, 2- and 3-sterigmate basidia also present, clavate. *Cheilocystidia* mostly clavate or inflated clavate, abundant, hyaline, 19-46 \times 9-18 μ m. *Pleurocystidia* absent. *Pileipellis* a compact repent layer of hyaline or pale straw yellow, cylindrical, non-encrusted hyphae, 4-10 μ m diam, terminal cells cylindrical or narrowly clavate. *Clamp connections* absent.

Habit, habitat, distribution. Solitary or scattered in moss on a clay soil bank, on bare clay soil, or on

decaying leaf litter. Jun., Aug. and Nov. Puerto Rico and St. John, United States Virgin Islands.

Material examined. PUERTO RICO: Luquillo Mts., Caribbean National Forest, El Verde Research Area, near lower entrance to Zucca plot 3, 360 m elev., N18° 19' 26" W65° 49' 3", 6 Aug. 1988, *PR 476 D. J. Lodge* (HOLOTYPE, K); Caribbean National Forest, El Yunque, Caimitillo Trail, 640 m. elev., N18° 18' 9" W65° 47' 11", 29 Jun. 1996, 7972 *T. J. Baroni* (NY); ST. JOHN, USVI: Bordeaux Mountain, on the east side of the Bordeaux Mountain road several hundred yards south of the sign for the Spice Hill Community, approx. 300 m. elev., 15 Nov. 1996, 8311 *T.J. Baroni* (CORT); Cinnamon Bay, on the Cinnamon Bay Trail south-east of the North Shore Road, approx. 70 m. elev., 16 Nov. 1996, 8323 *T. J. Baroni* (NY).

Etymology. *sulcata* = referring to the sulcate-striate pileus margin.

Alboleptonia sulcata is characterized by the sulcate-striate and slightly depressed pileus, clavate or broadly clavate cheilocystidia, pentagonal basidiospores, and hyphae which lack clamp connections. It can be difficult to separate *A. sulcata* from *A. flavifolia* based solely on macromorphology since *A. sulcata* may have cream colored lamellae at first, and *A. flavifolia* may have a sulcate pileus margin in some basidiomata. See the discussion of *A. flavifolia* and the key to species for details about the differences between these two taxa.

Alboleptonia cyathiformis has basidiospores and cheilocystidia which have similar shapes as those found for *A. sulcata*, however the basidiospores in *A. cyathiformis* are smaller (7.9-11.6 × 6.6-8.6 μm, from the type), the lamellae of *A. cyathiformis* are not cream color, and the pileus is typically cyathiform and not sulcate nor translucent-striate. *Alboleptonia cyathiformis* also has clamp connections on its hyphae, a feature which is consistently absent in *A. sulcata*.

Alboleptonia stylophora (Berk. & Br.) Pegler, Kew Bull. 32:199. 1977. FIGS. 17-21, 25, 26

≡ *Agaricus Stylophorus* Berk. & Br., J. Linn. Soc. Bot. 11: 537, 1871.

≡ *Entoloma stylophorum* (Berk. & Br.) Sacc., Syll. Fung. 5:687. 1887.

≡ *Rhodophyllus stylophorus* (Berk. & Br.) Romagn., Prodr. Fl. Mycol. Madag. 2:132. 1941

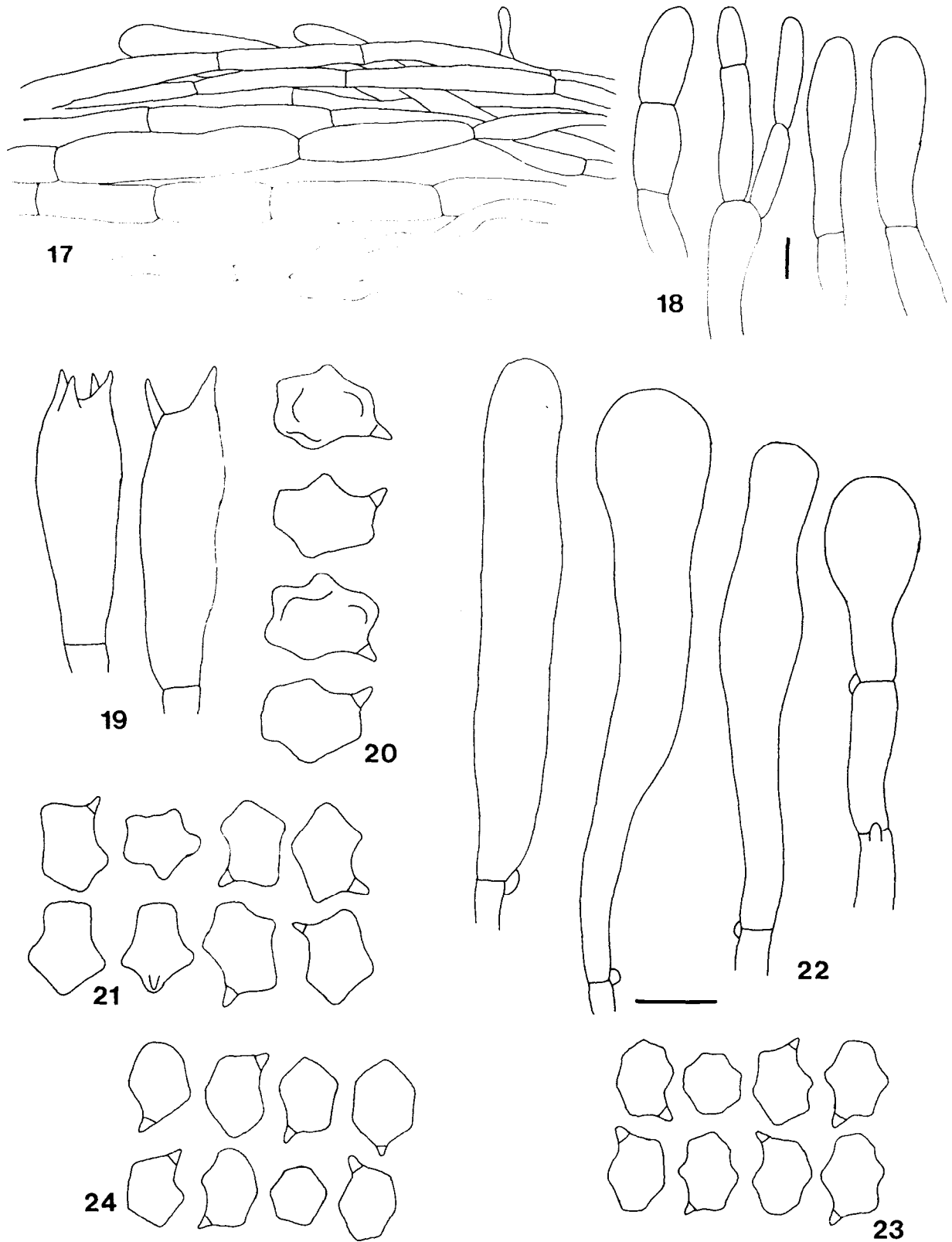
≡ *Leptonia stylophora* (Berk. & Br.) Dennis, Kew Bull. Add. Ser. 3:78. 1970.

Pileus basically white, but with Buff (0.7 Y5.98/7.4), Beige (4.6 YR 6.84/3.2), Cream Color (3.4 Y 8.40/4.2), "Yellowish White" (3A2), or Ivory Yellow (Hamley 1Y-7Y 8-10/2-5) hues at first, becoming Pale Pinkish Buff (8.8 YR 7.55/4.3) or Pinkish (8-

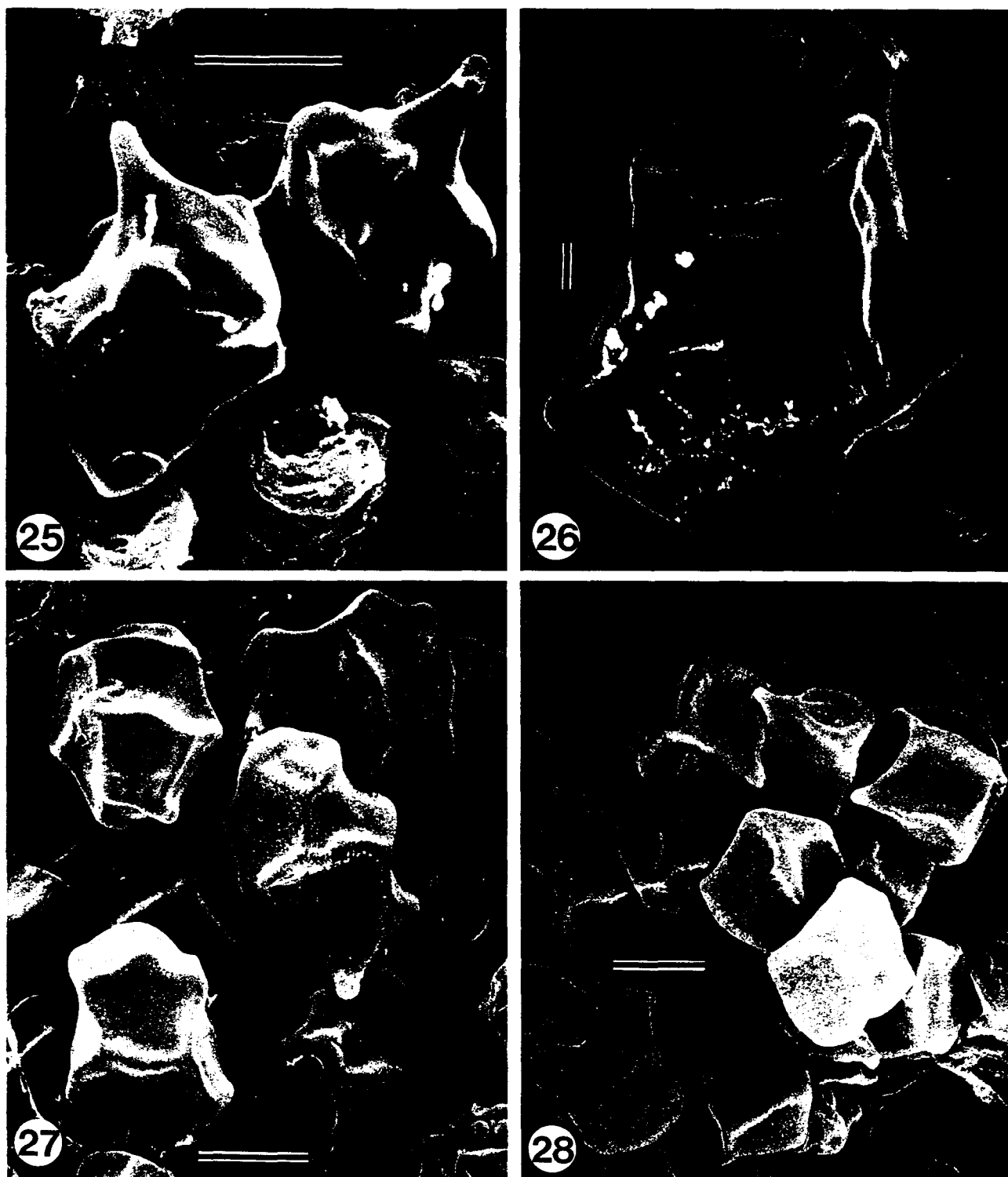
9A2) over the margin with age, some with a slight orange tint, 3-23 mm broad, convex with a cuspidate umbo, umbo often up to 2 mm long and occasionally bent nearly horizontal, or occasionally conico-campulate and broadly mammillate-umbonate at first, becoming piano-papillate, moist or dry, felted on the umbo, radially appressed or scurfy silky-fibrillose to margin, margin even or slightly sulcate-striate, undulate and/or lacerate on some, hygrophanous. *Context* very thin and fragile, milk white. *Lamella* white at first, becoming "Flesh" (6B3). Flesh Color (0.8 YR 6.95/5.9) or "Pale Red" (7A3) or Salmon Color (5.0 YR 6.90/6.0), adnate, emarginate, slightly sinuate or adnate with short decurrent tooth, subdistant (2-3/mm) with 2 tiers of lamellulae, occasionally forked, broad (up to 3 mm), edges concolorous, smooth. *Stipe* concolorous with pileus, but most often Ivory (Hamley 1-9 Y 8-10/2-4.5) with white mycelioid base, 3-45 mm long, 0.5-2 mm broad, central, equal, terete or slightly expanded toward base, dry, translucent when fresh, but mostly opaque, silky-appressed fibrillose, glabrescent with age. *Odor* and *Taste* not distinctive. *Basidiospores* in deposit fleshy brown ("Greyish Orange" to "Reddish Blonde" 5B-C4); (8.8-) 9.3-13.8 (-15.4) × (6.6-) 7.7-9.7 (-10.5) μm, (n/8 = 101, L^m = 11.2 ± 1.5, W^m = 8.7 ± 1, E = 1.05-1.5, Q^m = 1.29; HOLOTYPE n = 16, 10.8-14 × 8-10.7 μm, L^m = 12.1 ± 0.89, W^m = 9 ± 0.65, E = 1.18-1.43, Q = 1.35), mostly 5, some 6 angled in profile view and often complex, somewhat nodulose-angular, mostly pentagonal in face view, mostly 4 or 5 angled in polar view. *Basidia* 22-38 × 9-12 μm, mostly 4-sterigmate with some 2- or less frequently 1-sterigmate, clavate to broadly clavate or subclavate. *Cheilocystidia* cylindrical, subcapitate, subclavate to narrowly clavate, some septate, abundant, thin-walled and hyaline, frequently collapsed after specimens are dried and difficult to demonstrate, 24-46 × 5-10 μm. *Pleurocystidia* absent. *Lamella trama* composed of parallel, cylindrical to slight inflated, short hyphae, 30-90 μm long, 5.5-18.5 μm diam. *Pileus context* radially arranged, cylindrical or inflated hyphae, 9-18 μm diam, with scattered or abundant branched, yellowish refractive hyphae, 3-8 μm diam. *Pileipellis* a hyaline to pale yellow, repent, compact layer of cylindrical, nonencrusted, radially arranged hyphae, 4-9 μm diam. *Clamp connections* absent.

Habit, habitat, distribution. Scattered to gregarious on soil in mixed forests. May, Jun. and Aug. through Dec. Puerto Rico, Trinidad, Martinique (Pegler, 1983) and Costa Rica (Ovrebó, 1994).

Material examined. COSTA RICA: Heredia Province, La Selva Biological Station and Reserve, near the "Iguana" dormitory, 10 May 1991, *CO 2994 C. L. Ovrebó* (CSU).



FIGS. 17-24. Microscopic features of *Alboleptonia* species. 17-20. *A. stylophora* (PR 464). 17. Pileipellis. 18. Cheilocystidia. 19. Basidia. 20. Basidiospores. 21. *A. stylophora* (HOLOTYPE) Basidiospores. 22, 23. *A. aripoana* (HOLOTYPE). 22. Cheilocystidia. 23. Basidiospores. 24. *A. cyathiformis* (HOLOTYPE) Basidiospores. Scale bars = 10 μ m. Vertical scale bar for 17, 18; horizontal scale bar for all others.



FIGS. 25-28. Scanning electron micrographs of basidiospores of *Alboleptonia* species. 25, 26. *A. stylophora* (PR 25). 27. *A. aripoana* (HOLOTYPE). 28. *A. cyathiformis* (HOLOTYPE). Scale bars: 25, 27, 28 = 5 μ m; 26 = 1 μ m.

PUERTO RICO: Carite Commonwealth Forest near Guavate, soil and litter of rarely used jeep trail, 620 m. elev., N18° 0' 35" W65° 4' 35", 1 Sep. 1985. PR 25 D. J. Lodge (K); Luquillo Mts., Caribbean National Forest, El Verde Research Area, trail to Rio Sonadora, 370 m. elev., N18° 19'

24" W65° 49' 3", 12 Oct. 1988, PR 458 D. J. Lodge (K); same general location, beneath *Dacryodes excelsa* Vahl., *Sloanea berteriana* Choise and *Manilkara bidentata* (A. DC.) Chev., 370 m. elev., 14 Aug. 1984, PR 464 D. J. Lodge (K); same general location, at entrance to the trail to Rio Sonadora,

350 m, N18° 19' 25" W65° 49' 19", 31 May 1992, PR 1420 (previously as PR 829) D. J. Lodge (collected by R. H. Petersen) (CORT); same general location, inside field station by driveway, 350 m elev., N18° 19' 25" W65° 49' 13", 18 Oct. 1988, PR 938 D. J. Lodge (NY); same general location, on a ridge above the Rio Sonadora near small grate in front of bridge, 370 m elev., N18° 19' 24" W65° 49' 3", 7 Sept. 1984, PR 939 D. J. Lodge (K); same general location, on the ridge above the bridge over the Rio Sonadora, 370 m elev., PR 941 D. J. Lodge (NY); same general area, on soil of bank near field station, 350 m elev., N18° 19' 25" W65° 49' 13", 19 Jun. 1996, 7891 T. J. Baroni (CORT); Luquillo Mts., Caribbean National Forest, Sabana Station area, trail between Bisley Watersheds 3 and 5, 230 m elev., 18 May 1994, PR 2295 D. J. Lodge (NY); same general area, on soil, 230 m elev., N18° 18' 53" W65° 44' 48", 6 Jun. 1997, 8488 T. J. Baroni (collected by Mayda Serrano) (CORT); Luquillo Mts., Caribbean National Forest, off of Rt. 191, Angelito Trail, N18° 19' 23" W65° 44' 50", 5 Jun. 1997, 8483 T. J. Baroni (CORT); Luquillo Mts., Caribbean National Forest, in forest near Sabana Station, on soil, 9 Jun. 1997, 8519 T. J. Baroni (collected by Peter Roberts) (CORT). TRINIDAD: Arima Mountains, Simla Research Station, trail behind the station, 29 Dec. 1983, 4462 T. J. Baroni (NY). SRI LANKA: Peradeniya, "on the ground", Sep. 1968, no. 748 (K, HOLOTYPE).

This small white species is readily identified by the sharply papillate-conic umbo, the tendency to develop cream or yellowish hues on the pileus and stipe, the rather large complex spores, the lack of clamp connections, and by the presence of cylindrical to narrowly clavate cheilocystidia. Pegler (1977, 1986) reports that the type collection and collections from Martinique and Trinidad (Pegler, 1983) have clamp connections and lack cheilocystidia. However, Horak (1980) states that collections of *A. stylophora* he has studied from Papua New Guinea, Solomon Islands and Singapore lack clamp connections and have cheilocystidia, characters which we find in our material from Puerto Rico and from Trinidad. Unfortunately, Dennis (1970) and Romagnesi (1941) did not discuss these characters when reporting on *A. stylophora* in Trinidad and Madagascar, respectively. However, a recent publication by Horak and Desjardin (1993) points out that their Hawaiian Island collection is characterized by the presence of cylindrical to subclavate cheilocystidia and the lack of clamp connections on the hyphae, agreeing with our observations for this species.

A study of the type collection provided little further information. Small samples of tissue could not be revived, even with soaking and intermittent gentle heating over a 24 h. period. Thus it was not possible to determine if cheilocystidia were present or absent, nor if clamp connections were present or absent in

the type specimens. The distinctively shaped spores were present and are illustrated here (FIG. 21).

The discrepancy among investigators in noting the presence or absence of clamp connections is odd, but cheilocystidia, especially thin-walled leptocystidia such as those found on *A. stylophora*, often collapse and may be difficult to demonstrate on older or ill prepared materials. The cheilorystidia for some of our *A. stylophora* collections were difficult to revive, but these structures were present and demonstrable if enough time was allocated to soaking and heating tissues. *A. stylophora* clearly has a pantropical distribution (Horak, 1980; Horak and Desjardin, 1993; Ovrebo, 1994; Pegler, 1977, 1983, 1986; Romagnesi, 1941).

TYPE STUDIES

- Alboleptonia aripoana* (Dennis) Pegler. 1983. Kew Bull. Add. Series 9:364. FIGS. 22, 23, 27
 = *Entoloma aripoanum* Dennis. 1953. Bull. Soc. Mycol. Fr. 69:196.

The type consists of one small dried basidioma which has been cut in half. The pileus measures 9 mm broad, while the stipe is 3 × 15 mm and covered with a dense matted fibrillose or punctate-fibrillose covering. The lamellae are broad and possess a sordid yellow or golden fimbriate edge. Only a small fragment of one lamella was examined under the compound light microscope, with the following results.

Basidiospores 9.5-11.8 × 6.9-8.4 μm (n = 22, L^m = 10.4 ± 0.64, W^m = 7.7 ± 0.38, E = 1.23-1.54, Q = 1.35), heterodiametric, (5-) 6-7 angled in profile view, 7-8 angled in polar view. *Basidia* 32-40 × 11-16 μm, 4-sterigmate, clavate, many with slightly thickened walls. *Cheilocystidia* 46-110 × 12-18 μm, mostly clavate, some cylindrical or some with tapered apices. *Clamp connections* abundant and obvious on hymenial elements

Material examined. TRINIDAD: Aripo Valley, L'Orange, 13 Oct. 1949, Dennis 172 (K, HOLOTYPE).

The spores of *A. aripoana* are clearly heterodiametric and multiangled in profile view. We find the typical spore to be 6-7 angled in the type and not 8-10 faceted as described by Pegler (1983). In addition, *A. aripoana* is characterized further by its convex pileus, solid stipe, habitat "sur les troncs" (Dennis, 1953), abundant clamp connections, and by the clavate cheilocystidia. The collections of Fiard and Pegler (Pegler, 1983) from Martinique and Dominica, which were found on litter or dead leaves, may well represent a different taxon. Pegler (1983) illustrated,

for *A. aripoana*, a specimen with a shallowly depressed pileus, a hollow stipe, and spores with 8-10 angles in profile view, characters which are incongruous with the type collection.

Alboleptonia aripoana has not been found in the Greater Antilles so far. As can be seen in the key provided below, *A. aripoana* is most similar morphologically to *A. sericella* (Fr.) Largent & Benedict and other taxa of temperate North America.

Alboleptonia cyathiformis (Dennis) Pegler 1983. Kew Bull. Add. Series 9:363 FIGS. 24, 28
 = *Entoloma cyathiforme* Dennis. 1953 Bull. Soc. Mycol. Fr. 69:196

The type consists of an incomplete half of a basidioma with many lamellae intact, and there are also several tiny fragments of lamellae, pileus and stipe loose in the packet. Only a very small piece of one lamella was excised from the basidioma and examined. The edge of the lamella looked to be sterile from collapsed hyaline cheilocystidia, however several attempts at reviving these cells were unsuccessful. Dennis (1953) described and illustrated vesiculose and cylindrical cheilocystidia for this species.

Basidiospores 7.9-11.6 × 6.6-8.6 μm (n = 30, L^m = 9.6 ± 0.95, W^m = 7.6 ± 0.54, E = 1.08-1.40, Q = 1.27), heterodiametric, 5-6 angled in all views. *Clamp connections* present in lamella trama.

Material examined. TRINIDAD: Arema Forest, 1 Dec. 1949, Dennis 416 (K, HOLOTYPE).

Alboleptonia cyathiformis has not been found in the Greater Antilles as yet.

Alboleptonia hyalodepas (Berk. & Br.) Pegler 1983. Kew Bull. Add. Series 9:363. FIG. 29
 = *Agaricus hyalodepas* Berk. & Br., J. Linn. Soc., Bot. 11: 540. 1871.
 = *Eccilia hyalodepas* (Berk. & Br.) Sacc., Syll. Fung. 5:733. 1887.
 = *Entoloma hyalodepas* (Berk. & Br.) Horak, Sydowia 28: 177, 1976.
 = *Rhodophyllus hyalodepas* (Berk. & Br.) Romagn. & Gilles, Beih. Nova Hedwigia 59:194. 1979.

A justification for choosing a lectotype for *A. hyalodepas* follows. A review of the literature on *A. hyalodepas* revealed two differing concepts of this taxon. Horak (1976, 1980) stated that *Agaricus hyalodepas* has cuboid basidiospores and this concept has been followed by Romagnesi and Gilles (1979). While Pegler (1977, 1983, 1986) insisted that the basidiospores are heterodiametric-ovate and pentagonal. Both investigators had studied and cited what

HERBARIUM MYCOLOGICUM BERKELEYANUM.
 Presented by the Rev. M. J. BERKELEY, 1879.

29

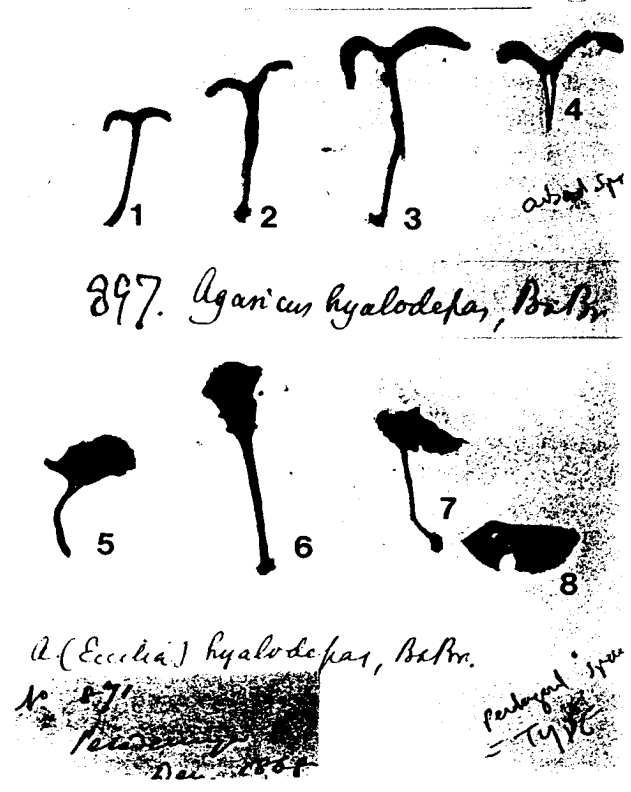


FIG. 29. Photograph of dried specimens of a part of the HOLOTYPE of *Agaricus hyalodepas* affixed to a card and bequeathed to KEW by M. J. Berkeley. Note that the card contains two different collections, a No. 897 and a No. 871. The lower specimens, labeled No. 871, were the only ones cited in the protologue and therefore are representative of the holotype. Each individual specimen was labeled with a number by us after photographing the collection. See details in text for clarification. The words "cuboid spores" and "pentagonal spores = Type" penciled directly on the card are assumed to be annotations by someone other than Berkeley, since all other information is written in black ink from what appears to have been a quill pen.

was purported to be the type collection, nbr. 871 from Ceylon (Sri Lanka) as listed by Berkeley and Broome (1871). We therefore borrowed the type material from the Royal Botanic Gardens at Kew (K) hoping to resolve this discrepancy.

The "type" currently consists of three individual packets containing several specimens each. One packet is labelled "Herb. Berkeley, A. (*Eccilia*) *hyalodepas* B. & Br., Peradeniya, Dec. 1868, no. 871" and this packet contains a card with two tiers of thinly sliced specimens glued to the card (FIG. 29). The upper tier of specimens is labelled "897. *Agaricus hyalodepas*" and the lower tier is labelled "No. 871. A. (*Eccilia*) *hyalodepas*, Peradeniya, Dec. 1868" as pointed out by Horak (1976). These specimens were

obviously studied by Berkeley and served as the basis for the description of *A. hyalodepas* (Berkeley and Broome, 1871). Unfortunately the tier of specimens bearing the "No. 871," which is a portion of the type and clearly designated as such in the protologue, is a mixed collection with three specimens possessing cuboid basidiospores (numbers 5, 7 & 8 of FIG. 29) and one with pentagonal basidiospores (number 6 of FIG. 29). In addition, although Horak (1976) indicated that the specimens of collection No. 897 had pentagonal basidiospores, these specimens also are composed of a mixture of two different species. The sliced basidiomata given numbers 1 and 4 (FIG. 29) possess cuboid basidiospores, while the ones numbered 2 and 3 (FIG. 29) have pentagonal basidiospores. The second packet in the type collection, labelled "Herb. Broome, *Agaricus* (*Eccilia*) *hyalodepas*, Ceylon, 871", another portion of the type, also contains a card with several specimens glued to it. These thinly sliced basidiomata consist of a mixture of specimens with pentagonal spores (4 of the 7) and with cuboid spores (3 of the 7). The third packet, labelled "Herb. Berkeley, *A. hyalodepas*, 871 Dupl.," also a portion of the type collection, consists of three specimens with cuboid basidiospores mixed in with three specimens having pentagonal basidiospores. These specimens are not glued to cards.

The morphological species concept of *Agaricus hyalodepas* was clearly derived from two different elements by Berkeley and Broome (1871). The mixing of these two different species in the "holotype" collection make it necessary to select as a lectotype one of these elements, in order to accurately apply the name *A. hyalodepas* (ICBN, Art. 9.9). Horak (1976) in recognizing that at least a portion of the "type" consisted of two different collections and two different species chose No. 871 over No. 897 as, dictated by the citation of No. 871 in the protologue (Berkeley and Broome, 1871). Unfortunately, he had examined only a sliced specimen with cuboid spores in No. 871 and only a sliced specimen with pentagonal spored specimens in No. 897, thus arguing that *A. hyalodepas* has cuboid spores. While Pegler (1977, 1983, 1986) had examined the specimens of No. 871 with pentagonal basidiospores and was insistent that *A. hyalodepas* was a species characterized by pentagonal spores. Horak and Pegler were obviously unaware of the fact that both No. 871 and No. 897 consist of mixed elements and neither investigator has formally proposed lectotypification.

Hence the name *A. hyalodepas* still requires such action. Horak's concept of this taxon is based solely on the mixed type collection, whereas Pegler (1983) has been able to locate and examine additional collections of the pentagonal spored entity from the

Lesser Antilles. Therefore, since there are about an equal number of specimens with pentagonal and cuboid basidiospores represented in the type collection, and since the concept of Pegler (1977, 1983, 1986) seems to closely reflect that of the protologue, we formally propose the selection of the specimens in the type collection with pentagonal basidiospores to serve as the nomenclatorial type for *Agaricus hyalodepas*. Future investigations on collections of *Alboleptonia* producing cuboid spores in and around Sri Lanka are now necessary to resolve the taxonomy of the other, perhaps unnamed element. The cuboid spored collections with inflated, septate cheilocystidia from Africa (Romagnesi and Gilles, 1979) clearly represent an undescribed species of *Alboleptonia* which is not similar to the cuboid spored taxon from Sri Lanka (see also Horak, 1980).

Very little information other than spore size and shape could be obtained from the type materials. Our measurements of the pentagonal spores are very similar to those published by Pegler (1983): $11.7-14.5 \times 9-11.8 \mu\text{m}$ ($n=43$, $L^m = 13 \pm 0.5$, $W^m = 10.5 \pm 0.5$, $E = 1.13-1.39$, $Q = 1.23$)

Material examined. SRI LANKA: Peradeniya, Dec. 1868, No. 871 (LECTOTYPE, K—pentagonal spored elements, see discussion).

KEY TO ALBOLEPTONIA OF THE CARIBBEAN ISLANDS AND THE ADJACENT MAINLAND AREAS

Basidiomata small to medium sized. Pileus is entirely white, pale cinereous, pale cream or pale ochraceous, pileus surface appressed fibrillose, silky fibrillose or appressed squamulose. Lamellae white or pale cream at first, becoming fleshy-pink from maturation of basidiospores. Stipe concolorous with pileus, pruinose, squamulose or merely fibrillose-appressed over apex, glabrescent elsewhere. Basidiospores variable in shape, cuboid, pentagonal or heterodiametric elongate and up to 6-7 angled in profile view. Pileipellis a cutis over the margin making transitions to an irregularly entangled trichodermium with narrowly clavate or cylindrical terminal cells near and over the disc, pileipellis often not well differentiated from the context. Basidiomata of *Alboleptonia* produce unique Ehrlich positive reactions and have low urea concentrations when compared to the other species groups of *Entoloma* sensu lato.

1. Odor of garlic or onions when fresh *A. earlei*
(Murr.) Largent & Benedict. (known only from Cuba
and Costa Rica)
1. Odor may or may not be present, but not alliaceous
..... 2
2. Pileus conical or campanulate but with a distinct
papillate umbo, cheilocystidia cylindrical, spores
heterodiametric (5-6 angled in profile view) and
also complex nodulose *A. stylophora*
2. Pileus and spores not as above 3
3. Spores cuboid or at least mostly 4 sided in profile
view, cheilocystidia absent 4

- 3. Spores heterodiametric elongate, with 5 or more angles in profile view, cheilocystidia present or absent 5
- 4. Pileus and stipe pale rose color, clamp connections present, spores $\bar{x} = 9 \times 8 \mu\text{m}$ *A. subrosea*
- 4. Pileus and stipe white, clamp connections absent, spores $\bar{x} = 10 \times 9 \mu\text{m}$ *A. argentii*
- 5. Cheilocystidia absent, clamp connections absent, spores $\bar{x} = 13 \times 10.5 \mu\text{m}$ *A. hyalodepas* (if spores $\bar{x} = 8 \times 6 \mu\text{m}$ and clamps present only at base of hymenial elements see *A. earlei*)
- 5 Cheilocystidia present, clamp connections present or absent 6
- 6. Clamp connections present 7
- 6. Clamp connections absent 9
- 7. Pileus depressed to cyathiform, stipe solid, cheilocystidia inflated clavate or cylindrical (Dennis, 1953), spores 5-6 angled in profile view ($\bar{x} = 9.6 \times 7.6 \mu\text{m}$, from the type) *A. cyathiformis*
- 7. Pileus only slightly depressed on disc if at all, stipe solid or hollow, cheilocystidia narrowly clavate, cylindrical or variously shaped but not inflated clavate (however see *A. sericella* var. *lutescens* f. *roseoalbicotrina* (Atkinson) Largent & Benedict in Largent and Benedict, 1970) 8
- 8. Growing on logs, stipe solid, cheilocystidia clavate or narrowly clavate, spores 6-7 angled in profile view ($\bar{x} = 10.4 \times 7.7 \mu\text{m}$, from the type) *A. aripoana*
- 8. Growing on the ground from soil or leaf litter, stipe typically hollow with age, pileus typically convex or campanulate, however the disc may be very shallowly depressed on some, cheilocystidia versiform but typically not inflated [*A. adnatifolia* (Murr.) Largent & Benedict, *A. ochracea* and several varieties and forms of *A. sericella* from North and South America, none of which are known from the Caribbean as yet, refer to Largent and Benedict (1970) and Dennis (1961, 1970)]
- 9. Spores heterodiametric elongate, mostly 6-7 angled ($\bar{x} = 12.3 \times 8.4 \mu\text{m}$), cheilocystidia inflated and globose to sphaeropedunculate or some clavate *A. flavifolia*
- 9. Spores heterodiametric elongate, mostly 5-6 angled ($\bar{x} = 10.5 \times 7.7 \mu\text{m}$), cheilocystidia clavate *A. sulcata*

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LITERATURE CITED

Baroni, T. J. 1981. The genus *Rhodocybe* Maire (Agaricales). *Beih. Nova Hedwigia* 67: 1-194.

———, and E. Horak. 1994. Entolomataceae in North America III: new taxa, new combinations and notes on species of *Rhodocybe*. *Mycologia* 86: 138-145.

Berkeley, M. J., and C. E. Broome. 1871. The fungi of Ceylon (Hymenomyces from *Agaricus* to *Cantharellus*). *J. Linn. Soc., Bot.* 11: 494-571.

Dennis, R. W. G. 1953. Les Agaricales de l'île de La Trinité: Rhodosporeae-Ochrosporeae. *Bull. Soc. Mycol. France* 69: 145-198.

———. 1961. Fungi venezuelani: IV. Agaricales. *Kew Bull.* 15: 67-156.

———. 1970. Fungus flora of Venezuela and adjacent countries. *Kew Bull., Addit. Ser.* 3: 1-531.

Hamley, D. H. 1949. The Ridgeway Color Standards with a Munsell notation key. *J. Optical Soc. Amer.* 37: 592-599.

Hesler, L. R. 1967. *Entoloma* in southeastern North America. *Beih. Nova Hedwigia* 23: 1-196.

Horak, E. 1976. On cuboid-spored species of *Entoloma* (Agaricales). *Sydowia* 28: 171-236.

———. 1978. *Entoloma* in South America. 1. *Sydowia* 30: 40-111.

———. 1980. *Entoloma* (Agaricales) in Indomalaya and Australasia. *Beih. Nova Hedwigia* 65: 1-352.

———, and D. E. Desjardin. 1993. Agaricales of the Hawaiian Islands. 2. Notes on some *Entoloma* species. *Mycologia* 85: 480-489.

Kornerup, A., and J. H. Wanscher. 1978. *Methuen handbook of colour*. 3rd ed. E. Methuen, London. 252 pp.

Largent, D. L. 1974. Rhodophylloid fungi of the Pacific coast (United States) IV: infrageneric concepts in *Entoloma*, *Nolanea*, and *Leptonia*. *Mycologia* 66: 987-1021.

———. 1994. *Entolomatoid fungi of the western United States and Alaska*. Mad River Press, Inc., Eureka, California. 495 pp.

———, and T. J. Baroni. 1988. *How to identify mushrooms to genus VI: modern genera*. Mad River Press, Inc., Eureka, California. 277 pp.

———, and R. G. Benedict. 1970. Studies in the rhodophylloid fungi II: *Alboleptonia*, a new genus. *Mycologia* 62: 437-452.

———, and R. Watling. 1986. A new species of *Alboleptonia* from Scotland. *Mycologia* 78: 132-133.

Lodge, D. J., and D. N. Pegler. 1990. Hygrophoraceae of the Luquillo Mountains of Puerto Rico. *Mycol. Res.* 94: 443-456.

Murrill, W. A. 1911. Agaricaceae of tropical North America-IV. *Mycologia* 3: 271-282.

Noordeloos, M. E. 1981. Introduction to the taxonomy of the genus *Entoloma* sensu lato (Agaricales). *Persoonia* 11: 121-151.

- . 1992. *Entoloma* s. l. *Fungi Europei* 5: 760.
- Ovrebo, C. L. 1994. Agaricales of La Selva: diversity in a lowland tropical rain forest. P. 164. In: Fifth International Mycological Congress Abstracts. August 14–21, 1994, Vancouver, British Columbia.
- Orton, P. D. 1991a. A revised list of the British species of *Entoloma* sensu lato. *Mycologist* 5: 123–138.
- . 1991b. A revised list of the British species of *Entoloma* sensu lato. *Mycologist* 5: 172–176.
- Pegler, D. N. 1977. Entolomataceae (Agaricales) from India & Sri Lanka. *Kew Bull.* 32: 189–220.
- . 1983. Agaric flora of the Lesser Antilles. *Kew Bull., Addit. Ser.* 9: 1–668.
- . 1986. Agaric flora of Sri Lanka. *Kew Bull., Addit. Ser.* 12: 1–519.
- . 1987a. A revision of the Agaricales of Cuba 1. Species described by Berkeley & Curtis. *Kew Bull.* 42: 501–585.
- . 1987b. A revision of the Agaricales of Cuba 2. Species described by Earle and Murrill. *Kew Bull.* 42: 855–888.
- , and T. W. K. Young. 1978. Entolomataceae Kotl. & Pouz. *World Pollen Spore Fl.* 7: 1–32.
- Ridgway, R. 1912. *Color standards and color nomenclature*. Washington, D.C. 43 pp. 53 plates.
- Romagnesi, H. 1941. Les rhodophylles de Madagascar (*Entoloma*, *Nolanea*, *Leptonia*, *Eccilia*, *Claudopus*). *Prodrome Flore Mycol. Madagascar* 2: 1–164.
- . 1978. *Les fondements de la taxinomie des rhodophylles et leur classification*. J. Cramer, Vaduz. 80 pp.
- , and G. Gilles. 1979. Les Rhodophylles des forêts côtières du Gabon et de la Côte d'Ivoire. *Beih. Nova Hedwigia* 59: 1–649.
- Scaver, F. J., and C. E. Chardon. 1926. Scientific survey of Porto Rico and the Virgin Islands—Mycology. *New York Acad. Sci.* 8: 1–209.
- Singer, R. 1986. *The Agaricales in modern taxonomy*. Koeltz Scientific Books, Koenigstein. 981 pp. 88 plates.
- Smithe, F. B. 1975. *Naturalist's color guide*. The American Museum of Natural History, New York.
- Stevenson, J. A. 1918. A check list of Puerto Rico fungi and a host index. *J. Dept. Agric. Puerto Rico* 2: 125–264.
- . 1975. *The fungi of Puerto Rico and the American Virgin Islands*. Contributions to the Reed Herbarium 25, Baltimore, Maryland. 743 pp.