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The Entolomataceae of the Pakaraima Mountains of Guyana IV: new species of *Calliderma*, *Paraeccilia* and *Trichopilus*

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Abstract: This paper is the fourth in a series documenting the Entolomataceae taxa (Agaricales, Basidiomycota) from Guyana. Six new species in three genera are described—*Calliderma caeruleosplendens*, *Paraeccilia unicolorata*, *Trichopilus tibiiformis*, *T. fasciculatus*, *T. vividus*, and *T. luteolamellatus*—occurring primarily in mixed tropical rainforests of the Potaro River Basin in the Pakaraima Mountains. Macromorphological, micromorphological and habitat data are provided for each. None of these genera had been reported from Guyana.

Key words: Agaricomycotina, fungal systematics, Guayana Highlands, Guiana Shield, Neotropical fungi

INTRODUCTION

The Entolomataceae Kotl. & Pouzar is a cosmopolitan and species-rich family of Agaricales containing more than 1000 described species (Kirk et al. 2001). Species of Entolomataceae are easy to identify to family because all produce pink basidiospores that are angular at least in polar view. However members can be difficult to diagnose to genus and the literature reflects varying generic concepts (e.g. Noordeloos 1987, Largent 1994). Molecular phylogenetics have yet to shed light on this situation; preliminary studies suggest that large traditional genera such as *Entoloma* (Fr.) P. Kumm. and *Leptonia* (Fr.) P. Kumm. are polyphyletic but have yet to resolve generic boundaries (e.g. Moncalvo et al. 2004, V. Hofstetter pers comm). In Guyana intensive sampling in the Pakaraima Mountains has uncovered a rich flora of Neotropical Entolomataceae, most of which are undescribed species (e.g. Largent et al. 2008a, b; Henkel et al. 2009). In our ongoing taxonomic studies of these we follow Largent (1994) in recognizing 13 genera of Entolomataceae based on a combination of macro- and micromorphological characters. These include *Calliderma*, *Paraeccilia* and *Trichopilus*, new species of which are described here.

Romagnesi introduced *Rhodophyllus* section *Calliderma* to contain those species of Entolomataceae that have a hymeniform pileipellis most commonly with a single layer of pileocystidia (Romagnesi 1974). Largent (1994) raised *Calliderma* (Romagn.) Largent to generic rank and provided the additional characteristics of a tricholomatoid stature, a pruinose, tomentose, velutinous, or rivulose pileus, and hymeniform pileipellis. Entolomatoid species with the suite of characters of *Calliderma* have been reported from Madagascar and central Africa (Romagnesi 1941, 1956; Romagnesi and Gilles 1979), North America (Largent 1977, 1994), Indomalaya and Australasia (Horak 1980), Europe (Noordeloos 1992), the Lesser Antilles (Pegler 1983, Baroni pers obs) and South America (Dennis 1953, 1970; Horak 1983).

Paraeccilia Largent was created to accommodate those species previously classified in *Entoloma* subgenus *Claudopus* section *Undati* (Romagn.) Noordeloos (Largent 1994). Species of *Paraeccilia* have an omphalinoid stature, a convex, densely appressed fibrillose pileus, externally incrusted pigmentation on the walls of the hyphae of at least the pileal trama and the pileipellis, and most lack clamp connections (Largent 1994). *Paraeccilia* species have been reported from North America including Alaska (Largent 1994), and species classified by others in *Entoloma s.l.* or *Rhodophyllus* with the characteristics of a *Paraeccilia* have been reported from Europe (Noordeloos 1992), Chile (Horak 1977), New Zealand (Horak 1973), Tasmania (Gates and Noordeloos 2007) and Java (Horak 1980, 2008). *Paraeccilia rusticoides* (Gillet) Largent (as *Entoloma rusticoides* [Gillet] Noordel.) has been reported from Argentina (Singer 1969), and *Eccilia fuscorufescens* Speg. from Brazil likely represents a second South American *Paraeccilia* species (Pegler 1997).

Species of *Trichopilus* (Romagn.) P.D. Orton are typically tricholomatoid in stature with a densely fibrillose to tomentose pileus and trichodermial

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pileipellis, the hyphae of which have an intracellular pigment. Cheilocystidia, when present, are clavate to lageniform and typically capitate or mucronate. The basidiospore morphology is variable, occasionally 4–5- or 5–6-sided (e.g. section *Parastaurospori* Romagnesi and section *Leptonidei* [Fr.] Quél. in Romagnesi and Gilles 1979) or more typically 6–8-sided; clamp connections usually are present (Largent 1994; Noordeloos 1981, 1992; Romagnesi and Gilles 1979). *Trichopilus* species or those of *Entoloma s.l.* or *Rhodophyllus* with characteristics of *Trichopilus* have been reported regularly from North America (Hesler 1967, Largent 1994), Europe (Noordeloos 1992) and more rarely from New Zealand, Australasia, Indomalaya (Horak 1973, 1980) and the Ivory Coast (Romagnesi and Gilles 1979). As far as can be determined *Trichopilus* has not been reported from the Lesser Antilles (Pegler 1983), South America (Horak 1977, 1982) or elsewhere in the Neotropics.

Herein we provide descriptions and illustrations of six new species in *Calliderma*, *Paraeccilia* and *Trichopilus*: *C. caeruleosplendens* represents the first report of this genus from Guyana; *P. unicolorata* is the first report of an entolomatoid species with decurrent gills and incrusted pigmentation from Guyana; four species of *Trichopilus* are reported for the first time in South America, *T. tibiiformis*, the first report of a South American entolomatoid species with tibiiform cystidia and three species with granulose-fibrillose pileus and stipe, *T. fasciculatus* with distinctive tufts of pileocystidia, *T. luteolamellatus* with yellow lamellae and flesh and *T. vividus* with vivid, nearly fluorescent colors.

MATERIALS AND METHODS

Methods for collection, field descriptions, microscopic analyses and image capture were those of Largent et al. (2008a). Color designations are according to Kornerup and Wanscher (1978); herbarium designations are according to Holmgren et al. (1990). Microscopic structures were measured as described by Largent (1994) and Largent et al. (2008a). Statistics include: $\bar{x}$, the arithmetic means of basidiospore length and width, ± standard deviation; E, the quotient of length by width indicated as a range variation in n objects measured; Q, the mean of E-values; L–D, the length minus the diameter of basidiospores; and AL–D, the average L–D; n/4 indicates the number of objects measured/per each collection studied.

TAXONOMY

Calliderma caeruleosplendens Largent, Aime et T.W. Henkel sp. nov. FIGS. 1a, 2
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Pileus 35–140 (diam.) × 4–37 mm, late convexus ad plano-convexus, atrocaeruleus, dense implexo-tomentosus. *Lamellae* adnexae vel adnatae, pallidae. *Stipes* 39–90 × 4–24 mm, colore eodem modo ac in stipite vel pallidiore, longistrorsum implexo-appressus fibrillosus. *Basidiosporae* 5–6-gonae, subisodiametrae, 7.8–10.1 × 5.5–9.2 µm. *Basidia* 2–4-sterigmata, clavata basi angusta, 31.3–61.0 × 7.3–11.2 µm. *Cheilocystidia* typice carentia. *Pleurocystidia* carentia. *Pileipellis* hymeniformis, constrata e pileocystidiis unistratis. *Pileocystidia* clavata, napiformia vel late obclavata, 11.5–51.6 × 2.8–21.7 µm. *Stipitipellis* constrata e dispersis fasciculis agglutinatarum hypharum. *Caulocystidia* clavata vel cylindro-clavata, 52.9–65.8 × 4.2–4.9 µm. *Pigmentum* solum in pileipelle et stipitipelle, solubile in 3% KOH. *Fibulae* praesentes.

Stature tricholomatoid. *Pileus* 35–140 mm broad, 4–37 mm high; varying from broadly convex without an umbo to plano-convex with a broad, rounded umbo; dark blackish blue throughout in youth (19–22F6 to 19–22F8), at maturity with a dark blackish blue margin, dark blue (21F4 or 22D4 or 24F4) disk, and moderately dark blue to blackish blue central region; densely matted-tomentose throughout, fibrils toward disk minutely erect under hand lens, at times radially rugose over inner 4/5, becoming rugulose at margin; submoist; often subsulcate over outer 3/5; margin slightly and regularly crenate when young, irregularly undulating with age, uprolled, often splitting to reveal whitish pileitrama. *Pileal context* off-white; 4–13 mm thick over stipe; solid. *Lamellae* adnexed occasionally appearing free to adnate; 15 mm at broadest point; thick; close to subdistant; pale yellowish white to pink with basidiospore maturity, occasionally with bluish or purplish cast particularly on the edges in mature specimens; edges smooth; lamellulae of three tiers, much narrower than lamellae. *Stipe* 39–90 × 4–24 mm; frequently equal but at times enlarging toward the base, sometimes flaring slightly at apex; concolorous with the pileus but typically lighter, deep blue (19D–E6–8) to blue (21–22D–E4–5), the coloration originating from longitudinally oriented, superficial matted-appressed fibrils, extreme apex white; cartilaginous; dry; longitudinally striate-furrowed throughout; base of stipe with white tomentum, occasionally with whitish strigose hairs. *Stipe context* off-white; fibrous, more or less solid. *Odor* mild, slightly fragrant or sweet; *flavor* slightly mealy to disagreeable. *Macrochemical spot tests* 10% NH_4OH and 3% KOH negative on pileus; 3% KOH green on stipe base; 10% NH_4OH and 3% KOH distinctly yellow on stipe flesh. *Basidiospores* 5–6-sided, distinctly angular but lacking protruding angles, not prismatic, isodiametric to heterodiametric, on average subisodiametric; 7.8–10.1 × 5.5–9.2 µm, ($\bar{x}$ = 8.5 ± 0.5 × 7.0 ± 0.5 µm, E = 0.9–1.5, Q = 1.2 ± 0.07, L–D 0.0–3.4 µm, AL–D 1.30 ± 0.5 µm; n/7 = 121). *Basidia* 2–4-sterigmate; clavate, tapering downward toward a long, narrow base; sterigmata consistently to 4.0 µm long,

FIG. 1. Basidiomata of new species of Entolomataceae from the Pakaraima Mountains of Guyana (bar = 2.0 cm). a. *Calliderma caeruleosplendens* (*T.W. Henkel 8804*). b. *Paraeccilia unicolorata* (HOLOTYPE, *T.W. Henkel 8723*). c. *Trichopilus fasciculatus* (HOLOTYPE, *M.C. Aime 2217*). d. *Trichopilus luteolamellatus* (HOLOTYPE, *M.C. Aime 1480*). e. *Trichopilus vividus* (HOLOTYPE, *M.C. Aime 1478*).

31.3–61.0 × 7.3–11.2 µm, ($\bar{x}$ = 48.4 ± 3.6 × 9.3 ± 0.7 µm, E = 3.3–7.6, Q = 5.5 ± 0.4; n/3 = 40). *Cheilocystidia* typically absent; in one collection (MCA 1648) present but nearly indistinguishable from the basidioles, colorless, found only in eroded areas on a few gill edges, 20.1–40.5 × 6.1–9.1 µm. *Pleurocystidia* absent. *Lamellar trama* hyphae similar to those in the pileal trama at the top of the lamellae, more slender in the middle and edge of the lamellae, subparallel, in squash mounts of gill sections easily separated in the lateral strata and subhymenium and thus appearing loosely branched and distinct from the central stratum; relatively short, 37.9–84.7 × 4.9–21.0 µm (E = 2.8–8.9, Q = 5.2; n = 11). *Pileipellis* hymeniform, composed of a single layer of pileocystidia along the entire surface; subterminal cells typically not inflated

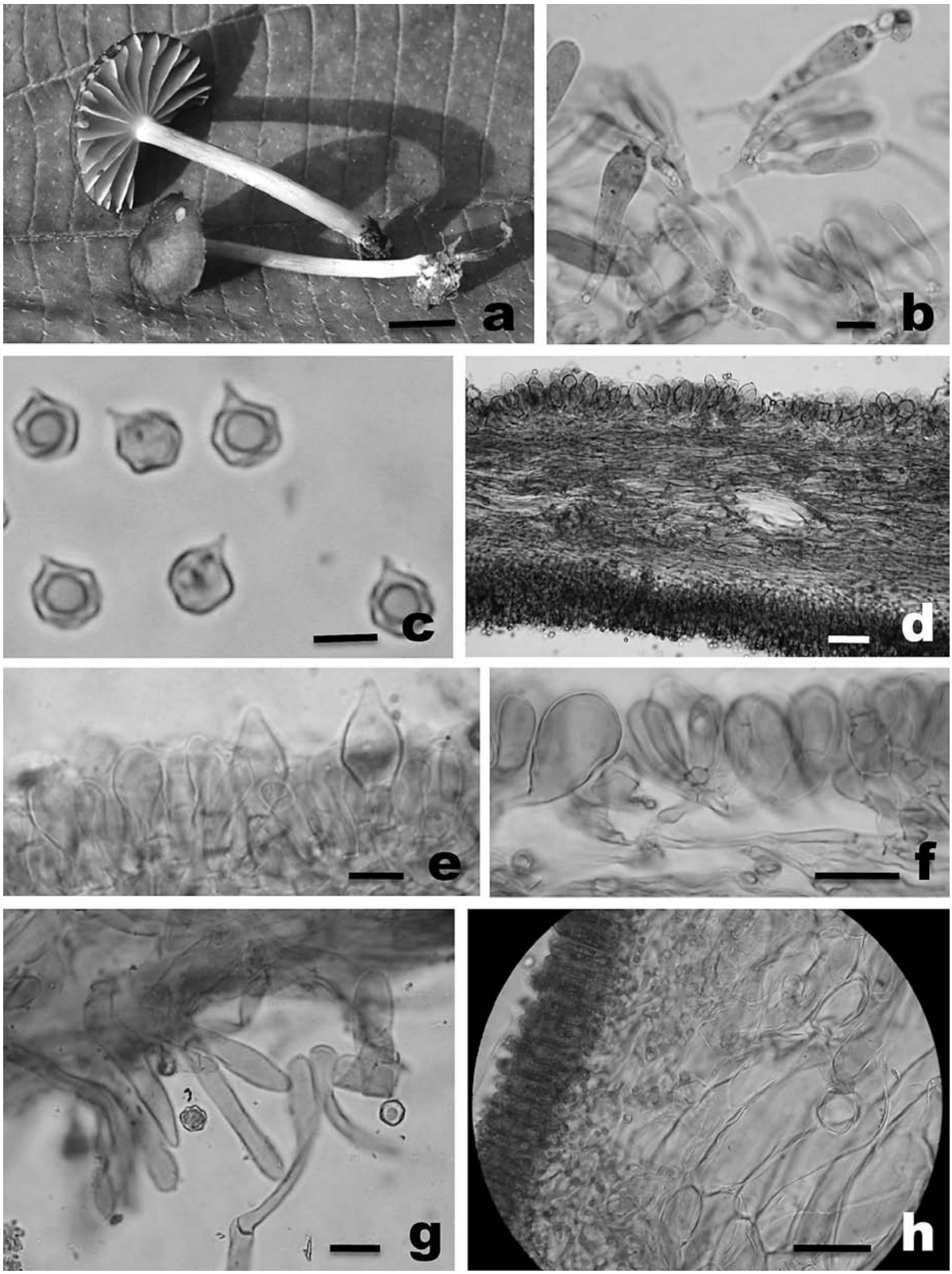

FIG. 2. Photomicrographs, *Calliderma caeruleosplendens*. a. Basidiomata (HOLOTYPE, *M.C. Aime 3127*) (bar = 2.0 cm). b. Basidia and basidioles (*T.W. Henkel 8664*) (bar = 10 μm). c. Basidiospores (*M.C. Aime 1648*) (bar = 10 μm). d. Section through pileal disk showing, from the top down, the pileipellis, pileal trama, subhymenium and hymenium (*T.W. Henkel 8664*) (bar = 50 μm). e. Pileocystidia (HOLOTYPE, *M.C. Aime 3127*) (bar = 20 μm). f. Pileocystidia (*T.W. Henkel 8664*) (bar = 20 μm). g. Caulocystidia (*M.C. Aime 1648*) (bar = 20 μm). h. Cross section through lower pileus showing, left to right, hymenium, subhymenium and broad hyphae in pileal trama (HOLOTYPE, *M.C. Aime 3127*) (bar = 50 μm).

but rarely so; hyphae of the subpellis loosely entangled and thus differentiated from the trama proper. *Pileocystidia* clavate, broadly clavate, napiform or very broadly obclavate; shorter cells found near the disk, longer cells toward and at the margin, 11.5–51.6 × 2.8–21.7 μm ($\bar{x}$ = 25.6 ± 10.9 × 12.9 ± 5.8 μm, E = 0.9–5.6, Q = 1.5 ± 0.6; n/3 = 47). *Pileal trama* loosely interwoven throughout; individual hyphal cells 36.3–264.7 × 18.08–31.0 μm (E = 1.8–8.5, Q = 4.8; n = 11). *Stipitipellis* composed of scattered clumps or clusters of agglutinated hyphae. *Caulocystidia* clavate to cylindro-clavate, somewhat sinuous and capitate in a few; 52.9–65.8 × 4.2–4.9 μm. *Stipititrama* hyphae more or less parallel to subparallel and slightly entangled. *Refractive hyphae* scattered in the stipititrama, scattered to abundant in the pileal trama, particularly evident immediately below the pileipellis. *Pigmentation* restricted to the pileipellis and the stipitipellis, cytoplasmic in the pileocystidia, soluble and exuding in 3% KOH, visible for up to 10 min in water sections. *Clamp connections* small and difficult to discern, present at the base of the basidia, and on hyphae of the lamellar trama, subhymenium, stipititrama, pileipellis, and stipitipellis.

Holotype. M.C. Aime 3127 (BRG; ISOTYPE LSUM).

Habit, habitat and distribution. Common, solitary on humus or scattered on earth, in mixed tropical forest of the *Eschweilera-Licania* association and in forests dominated by *Dicymbe corymbosa* Spruce ex Benth. (Caesalpiniaceae, tribe Amherstieae); fruiting during the May–July rainy season and into August; known from the type locality in the Upper Potaro River Basin in the Pakaraima Mountains of Guyana and from the adjacent Ireng River Basin.

Etymology. *Caerule, splendens* (Latin), referring to the splendid blue of the pileus and stipe.

Specimens examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence of Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. In *Dicymbe* forest upstream from base camp, 5 Jun 2000, *M.C. Aime 1125* (BRG, LSUM); vicinity of base camp, 18 May 2001, *M.C. Aime 1467* (BRG, LSUM); in mixed plot 1, 16 May 2001, *T.W. Henkel 8158* (BRG, HSU); in mixed plot 2, 27 May 2001, *M.C. Aime 1648* (BRG, LSUM); vicinity of base camp, 10 Jun 2001, *M.C. Aime 1852* (BRG, LSUM); mixed plot 2, 24 Jun 2001, *T.W. Henkel 8367* (BRG, HSU); mixed plot 1, 9 Jun 2004, *T.W. Henkel 8664* (BRG, HSU); 1 km SW of base camp in *Dicymbe* forest, 28 May 2005, *T.W. Henkel 8804* (BRG, HSU); Lance plot 1, east of Benny's Ridge in *Dicymbe* forest, 29 Jun 2006, *M.C. Aime 3127* (HOLOTYPE BRG, ISOTYPE LSUM); vicinity of base camp, 17 Aug 2007, *T.W. Henkel 8871*, (BRG, HSU).

Commentary. *Calliderma caeruleosplendens* can be identified by its dark blackish blue and densely matted-tomentose pileus, pale whitish lamellae that turn pink, dark blue stipe that is slightly lighter than the pileus, 5–6-sided, subisodiametric basidiospores, and cylindro-clavate and sinuous caulocystidia. In addition *C. caeruleosplendens* has distinctive macrochemical reactions with 3% KOH (green on stipe base; yellow on stipe flesh) and 10% NH_4OH (yellow on stipe flesh). *Calliderma caeruleosplendens* has been found to fruit consistently over 8 y during the May–July rainy season of the Potaro River Basin. Its large stature and blue pigment distinguish it as one of the more distinctive and easily recognizable macrofungi found in that area.

Several described entolomatoid species with blackish blue pileus, blue stipe and a hymeniform pileipellis might be confused with *C. caeruleosplendens*. *Leptonia howellii* (Peck) Dennis possesses deep blue coloration and a tomentose pileus and is known from adjacent Venezuela (Dennis 1970, Largent 1977). However *L. howellii* has a smaller, conic to convex pileus (10–20 mm vs. 35–140 mm broad), a stipe that is narrower at the apex (1–2 mm vs. 4–24 mm), larger basidiospores (10–13 × 6.5–8.0 μm vs. 7.8–10.1 × 5.5–9.2 μm), and a pileipellis composed of agglutinated clusters of hyphae with short, clavate pileocystidia. *Leptonia caeruleocapitata* (Dennis) Pegler from the Lesser Antilles and Venezuela (Dennis 1970, Pegler 1983) also can be differentiated by its smaller basidioma (19–20 mm broad pileus and 2–3 mm broad stipe), white pileal margin, pungent, metallic or slightly farinaceous odor, and 6–8-sided, isodiametric basidiospores with rounded angles. *Calliderma indigofera* (Ellis) Largent from the eastern USA can be distinguished by its sinuate, emarginate white lamellae, white stipe that is only tinged blue, smaller basidiospores (7–8 × 6.5–7.5 μm), lack of caulocystidia, and large, pseudoclamp-like clamp connections (Largent 1994). *Rhodophyllus callidermus* Romagn. from Zaire, Madagascar, Gabon and the Ivory Coast can be separated from *C. caeruleosplendens* by its smaller pileus (35–75 mm broad × 6–110 mm high) becoming brownish with age, lack of yellow coloration in the lamellae, weakly reddish macrochemical reaction to 10% NH_4OH, smaller basidiospores (6.5–8.5 × 5.7–8.0 μm) and smaller basidia (30–38 × 10–11.5 μm) (Romagnesi 1941, Romagnesi and Gilles 1979).

Several Asian species with blue pilei, tricholomatoid statures and a hymeniform pileipellis have been described. *Entoloma burkillii* Massee from Singapore, Malaysia and Papua New Guinea is easily distinguished from *C. caeruleosplendens* by the former's glabrous pileus, white to pallid gray stipe, and cylindrical, narrow pileocystidia. *Entoloma divum* Corner and E. Horak from Malaysia can be distin-

guished by its slender stipe (5–7 mm broad at the apex), cylindrical to narrowly fusoid pileocystidia, and narrower, heterodiametric, 5–7-sided basidiospores (Horak 1980). *Entoloma marinum* Corner & E. Horak from Singapore and *E. simillimum* Corner & E. Horak from Malaysia and Singapore (Horak 1980) can be separated by their abundant, vesiculose to broadly clavate (in *E. simillimum*) or fusoid (in *E. marinum*) cheilocystidia and smaller basidiospores (6.5–8 × 6.0–6.5 µm and 7–8 × 5.5–6.5 µm respectively vs. 7.8–10.1 × 5.5–9.2 µm in *C. caeruleosplendens*).

Horak (1983) described two new species from South America that he classified into *Entoloma* section *Callidermi*, *Entoloma peculiare* E. Horak & Corner from Brazil and *E. pruinatum* E. Horak from Argentina. Neither species is similar to *C. caeruleosplendens* given their fuliginous or fuscous pilei, collybioid stature with up to 12 mm broad pileus and up to 1 mm diam stipe, and absence of clamp connections.

Paraeccilia unicolorata Largent et T.W. Henkel sp. nov. FIGS. 1b, 3

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Pileus 21–31 mm diam, irregulariter convexus, atrobrunneus, minute pustulatus. *Lamellae* decurrentes ad subdecurrentes, colore eodem modo ac in pileo. *Stipes* 38–68 × 3.5–6.0 mm, aequus vel subbulbosus, colore eodem modo ac in pileo sed longitudine brunneo-griseo-striatus. *Basidiosporae* 5–6-gonae, subisodiametrae vel heterodiametrae, 8.3–10.6 × 6.9–9.0 µm. *Basidia* 2–4-sterigmata, plus minusve clavata sed parallelis lateribus, 30.6–42.5 × 6.9–11.6 µm. *Cheilocystidia* abundantia, cylindro-clavata, 29.8–92.8 × 5.8–8.2 µm, sine pigmento. *Pleurocystidia* abundantia, clavata vel cylindrico-clavata, 28.5–42.3 × 6.9–12.1 µm, pallido porphyreo pigmento in cytoplasmate. *Pileipellis* constrata e laxe intricato vallo cellularum terminalium. *Pileocystidia* cylindro-clavata, similia cheilocystidiorum, 19.2–88.2 × 6.2–12.0 µm. *Caulocystidia* similia cheilocystidiorum, 37.2–130.4 × 6.2–13.2 µm. *Pigmentum* valde incrustatum in totis telis praeter hymenialia cystidia. *Fibulae* carentes.

Stature omphalinoid. *Pileus* 21–31 mm broad; irregularly convex; chocolate brown to teak brown (6F4–6F5) throughout, with a slight, light cinnamon brown (6D6) central depression; minutely pustulose, glabrous when fresh, felty-fibrillose in dried specimens; not hygrophanous; pileal cuticle up to 1 mm thick, concolorous with the pileal surface; pileal margin decurved to incurved, entire, not translucent. *Pileal context* off-white, up to 1mm thick at the margin, 2 mm thick at stipe attachment, extending 5–7 mm radially. *Lamellae* decurrent to subdecurrent; 8.75–16 mm long, up to 4 mm high; narrow; close; concolorous with pileus; somewhat sericeous due to pleuro- and cheilocystidia that are visible with 10× hand lens; lamellulae 3–5 between lamellae, 1.5–6.0 mm long, in 2 (2 short, 1 medium) to 3 (2 short, 2 medium, 1 medium long) tiers. *Stipe* 38–68 × 3.5–6.0 mm; even to subbulbous; slightly flattened, cartilaginous; dry; concolorous with pileus but appearing sericeous due to brownish gray (6E2) longitudinal striations; with a white felt-like basal tomentum. *Stipe context* hollow, filamentous near the stipitipellis except at the base; basal context three-layered, white, then concolorous with the stipe surface, then white in tomentum. *Odor* slightly spermatic; *flavor* mild becoming slightly bitter. *Basidiospores* 5–6-sided in profile and face views, 4–5-sided in apical view; distinctly angular, not prismatic, subisodiametric to heterodiametric; 8.3–10.6 × 6.9–9.0 µm, ($\bar{x}$ = 9.4 ± 0.5 × 7.8 ± 0.6 µm, E = 1.0–1.3, Q = 1.2 ± 0.1, L–D 0.4–2.7 µm, AL–D 1.7 ± 0.5 µm; n = 26). *Basidia* 2–4-sterigmate; more or less clavate but with parallel sides and not significantly tapered at the base; 30.6–42.5 × 6.9–11.6 µm ($\bar{x}$ = 37.8 ± 3.2 × 9.8 ± 1.4 µm, E = 2.9–5.3, Q = 3.9 ± 0. 6; n = 12). *Cheilocystidia* abundant, forming a sterile layer on the gill edge originating as terminal cells of the hyphae of the gill trama; cylindro-clavate with undulating sides; hyaline; 29.8–92.8 × 5.8–8.2 µm. *Pleurocystidia* abundant as pseudocystidia originating from the inner portion of the subhymenium; clavate to cylindro-clavate; with a light reddish brown cytoplasmic pigment throughout; 28.5–42.3 × 6.9–12.1 µm, ($\bar{x}$ = 34.6 ± 4.1 × 8.7 ± 1.6 µm; E = 2.9–5.2, Q = 4.1 ± 0.5; n = 16). *Lamellar trama* hyphae parallel and with incrusting pigment, 50.4–119.6 × 4.5–11.8 µm. *Pileipellis* a loosely entangled palisade of pileocystidia; subpellis a densely interwoven layer. *Pileocystidia* similar in shape to cheilocystidia, cylindro-clavate, faintly strangulated and undulating; typically not pigmented; 19.2–88.2 × 6.2–12.0 µm. *Pileal trama* hyphae entangled, 68.5–168.3 × 7.0–10.8 µm, interspersed with scattered, large refractive hyphae. *Stipitipellis* composed of abundant clusters of caulocystidia. *Caulocystidia* similar in shape to, but usually on the average longer than, the cheilocystidia; not pigmented; 37.2–130.4 × 6.2–13.2 µm. *Refractive hyphae* scattered in the pileal trama. *Pigmentation* heavily incrusted on the hyphae of the gill trama, pileal trama, stipititrama and subpellis of the pileipellis, occasionally incrusted on a few pileocystidia but appearing cytoplasmic in most; cytoplasmic and light reddish brown in 3% KOH in the pleurocystidia. *Clamp connections* absent on all tissues.

Holotype. T.W. Henkel 8723 (BRG; ISOTYPE HSU).

Habit, habitat and distribution. Scattered and infrequent on mineral soil in mixed rainforest of the *Eschweilera-Licania* association during the May–July

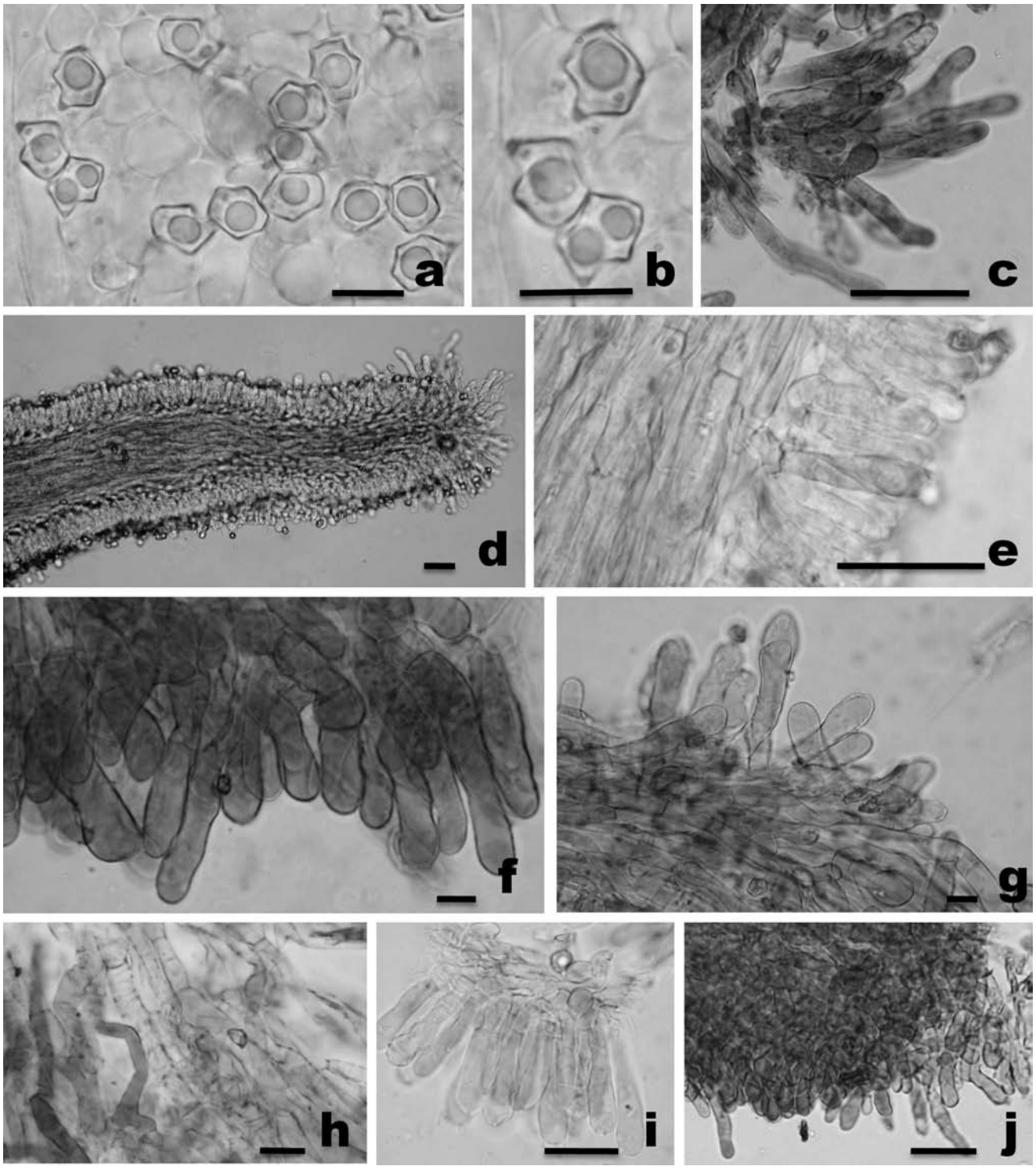

FIG. 3. Photomicrographs, *Paraeccilia unicolorata* (HOLOTYPE, *T.W. Henkel 8723*). a and b. Basidiospores (bar = 10 μm). c. Cheilocystidia (bar = 50 μm). d. Lamellar section showing pigmented trama, hymenium and cheilocystidia (bar = 50 μm). e. Origin of pleurocystidia (bar = 30 μm). f. Pileocystidia (bar = 10 μm). g. Caulocystidia at stipe apex (bar = 10 μm). h. Externally incrusted hyphae and refractive hyphae in pileal trama (bar = 20 μm). i. Basidia (bar = 20 μm). j. Pileipellis near disk (bar = 50 μm).

rainy season. Known only from the type locality in the Upper Potaro River Basin of Guyana.

Etymology. *Uni*, *color* (Latin), referring to the single uniform color of the pileus, stipe, and lamellae.

Specimens examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence of Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. In mixed plot 3, 30 Jun 2004, *T.W. Henkel 8723* (HOLOTYPE BRG; ISOTYPE HSU).

Commentary. *P. unicolorata* is recognized macroscopically by its omphalinoid stature and dark gray-brown basidiomata with decurrent gills reminiscent of a species of *Rhodocybe* Maire. However the basidiospores of *P. unicolorata* are 4–5-angled and lack the characteristic pustulate ornamentation of *Rhodocybe* basidiospores. In addition the strongly incrusted pigmentation found throughout the basidiomata and lack of clamp connections refer this taxon to *Paraeccilia*. Other distinguishing microscopic characters include embedded pleurocystidia, a suprapellis composed of a palisade of terminal cells over a densely interwoven subpellis and sinuous cylindro-clavate pileocystidia that are similar in shape to the cheilo- and caulocystidia. No other species of Guyanese entolomatoid fungi possess this combination of characters.

Paraeccilia unicolorata has some superficial characteristics that make it reminiscent of *Entoloma fumosifolium* Hesler from Tennessee (Hesler 1967), which is the type species of *Entoloma* section *Fibropilus* Noordeloos (Noordeloos 1988) (= *Fibropilus* [Noordeloos] Largent [Largent 1994]). Both species share the features of dark brown basidioma, matted fibrillose, non-hygrophanous pileus, decurrent lamellae, long fibrillose stipe, subiso- or heterodiametric basidiospores, cylindro-clavate cheilo- and pileocystidia and incrusting pigmentation. However *E. fumosifolium* differs from *P. unicolorata* in its distinctly clitocyboid stature, larger pileus (30–60 mm vs. 21–31 mm), thicker stipe (5–10 mm vs. 3.5–6.0 mm broad), smaller basidiospores (8.0 × 6.0 µm vs. 9.4 × 7.8 µm), lack of pleurocystidia, subfarinaceous odor, sweetish flavor, and most important by the presence of clamp connections in the lamellar trama that are characteristic for *Fibropilus* but typically lacking in *Paraeccilia* (Largent 1994).

The basidioma color and decurrent lamellae of *P. unicolorata* also can be found in the illustrations of *E. undatum* (Fr.) M.M. Moser by Noordeloos (1992), a species found throughout Europe, and in *P. perundata* (Largent & B.L. Thomps.) Largent from Idaho and California. However *Entoloma undatum s.* Noordeloos can be separated from *P. unicolorata* by the presence of clamps and lack of cheilo- and pleurocystidia (Noordeloos 1992). The deeply umbilicate, hygrophanous mature pileus, pale brown to yellow stipe 10–30 mm long, and pileipellis that is a cutis also distinguish the former from the latter. *Paraeccilia perundata* can be separated by its hygrophanous, infundibuliform mature pileus, much smaller stipe (6–20 mm long), smaller basidiospores up to 6.5 µm wide, cuticular pileipellis, lack of pleurocystidia and clamped basidia (Largent 1994).

Eccilia rusticoides Gillet, reported from Argentina by Singer (1969) and *E. fuscorufescens* Speg. from Brazil share the features of decurrent lamellae and brown basidiomata with *P. unicolorata*. *Eccilia rusticoides*, like *P. unicolorata*, has an omphalinoid stature and externally incrusting pigment, which prompted the transfer of this species to *Paraeccilia* by Largent (1994). However *E. rusticoides* can be distinguished from *P. unicolorata* by the lack of hymenial cystidia and presence of isodiametric basidiospores in the former (Largent 1994). *Eccilia fuscorufescens*, unlike *P. unicolorata*, is reddish brown with a finely striate, umbilicate pileus, slender stipe (1–2 mm diam), and lacks hymenial cystidia. Due to a lack of material available for examination of *E. fuscorufescens* (see Horak 1977) it is not possible to compare pigmentation in the basidioma and pileipellis, but it is possible that this taxon too represents a species of *Paraeccilia*.

In the eastern hemisphere only *Entoloma choanomorphum* G.M. Gates & Noordel. from Tasmania and *E. crinitum* E. Horak and *E. rancidulum* E. Horak from New Zealand are morphologically similar to *P. unicolorata*. While all four share the features of dark brown pileus and omphalinoid stature, *E. choanomorphum* is readily separated by larger basidiospores (10–14 × 8–11 µm), larger, lageniform cheilocystidia (40–100 × 6–12 × 2–5 µm), and strong odor of sulfur or burnt rubber (Gates and Noordeloos 2007). The two species from New Zealand are differentiated from *P. unicolorata* by their isodiametric basidiospores and lack of hymenial cystidia (Horak 1973, 2008).

Trichopilus tibiiformis Largent et Aime sp. nov. FIG. 4
MycoBank MB 513504

Pileus 18 mm diam, planus, lateritius, hirtis atro-brunneo-purpureis fibrillis. *Lamellae* adnate, angustae, confertae, albae. *Stipes* 34 × 2 mm apice, aurantio-cinereus, glaber, cavus. *Basidiosporae* 5–6-gonae, typice heterodiametrae, 7.6–9.8 × 4.5–6.7 µm. *Basidia* 2–4-sterigmatae, clavatae et angustatae, 30.8–39.5 × 9.4–11.5 µm. *Cheilocystidia* abundantia, capitata, tubiformia vel anguste lecythiformia, leptocystidia, 29.2 × 40.6 × 2.5 × 8.2 µm. *Pleurocystidia* carentia. *Pileipellis* constrata e intricato trichodermio insidens disco, repens circa discum. *Pileocystidia* cylindro-clavata, 36.4–221.5 × 9.1–16.8 µm. *Stipitipellis:* cutis.

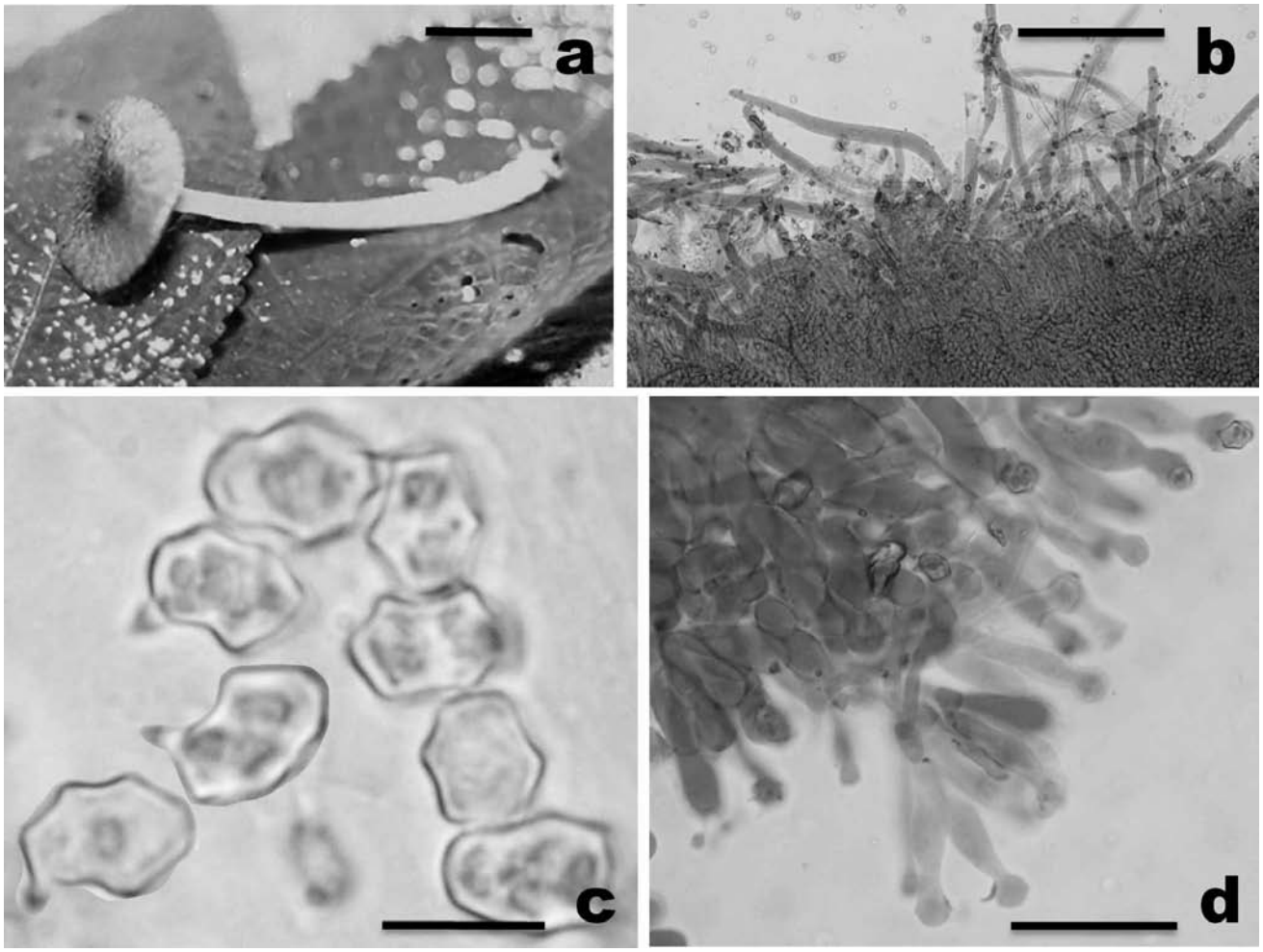

FIG. 4. *Trichopilus tibiiformis* (HOLOTYPE, *M.C. Aime 2426*). a. Basidioma (bar = 10 mm). b. Pileipellis on disk (bar = 100 μm). c. Basidiospores (bar = 10 μm). d. Basidia and cheilocystidia (bar = 30 μm).

Pigmentum uniformiter cytoplasmicum et solum in pileipelle. *Fibulae* carentes.

Pileus 18 mm broad; plane but with a broad, low, flat umbo; ground color a grayish red (8B3) with shaggy, dark violet-brown (10–11F5) fibrils covering disk from which the fibrils radiate outward; dry. *Pileal context* hyaline, 1 mm thick at disk. *Lamellae* adnate-toothed; narrow, 1.5 mm at broadest point; close; white at first becoming pale pink (6A2) with basidiospore maturity. *Stipe* 34 × 2 mm at apex to 3.5 mm wide at base; orange-gray (6B2) except for the white base; glabrous; cartilaginous; basal tomentum absent. *Stipe context* fistulose. *Odor* none; *flavor* not noted. *Basidiospores* 5–6-sided in profile, face and apical views, angles distinct except for the typically rounded apex, subheterodiametric to heterodiametric (not prismatic); 7.6–9.8 × 4.5–6.7 μm, ($=\bar{x}$ 8.5 ± 0.7 × 5.5 ± 0.5 μm, E = 1.4–1.8, Q = 1.9 ± 0.1, L–D 2.2–4.1 μm, AL–D 3.0 ± 0.5 μm; n = 34). *Basidia* 2–4-sterigmate; clavate and tapered; 30.8–39.5 × 9.4–11.5 μm ($\bar{x}$ = 34.4 ± 2.3 × 10.2 ± 0.5 μm; E = 2.9–4.0, Q = 3.8 ± 0.2; n = 13). *Cheilocystidia* abundant and more or less forming a sterile gill edge of capitate, tibiiform to narrowly lecythiform leptocystidia; 29.2–40.6 × 2.5–8.2 μm. *Pleurocystidia* absent. *Lamellar trama* hyphae 71.8–158.5 × 5.4–14.2 μm. *Pileipellis* a slightly entangled layer of hyphae, these generally erect at least on the disk, thus nearly an entangled trichodermium, more repent away from the disk. *Pileocystidia* cylindro-clavate; 36.4–221.5 × 9.1–16.8 μm. *Stipitipellis* a cutis; caulocystidia or hymenial clusters absent. *Refractive hyphae* rare in the stipititrama, absent elsewhere. *Pigmentation* restricted to the pileipellis and uniformly cytoplasmic, exuding into water mounts. *Clamp connections* absent on all tissues.

Holotype. M.C. Aime 2426 (BRG; ISOTYPE LSUM).

Habit, habitat and distribution. Solitary on humus in mixed tropical forest of the *Eschweilera-Licania* association during the December–January rainy season.

Known only from the type locality in the Upper Potaro River Basin of Guyana.

Etymology. *Tibiiformis* (Latin), referring to the tibiiform cheilocystidia.

Specimen examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence of Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. In mixed plot 1, 3 Jan 2004, *M.C. Aime 2426* (HOLOTYPE BRG; ISOTYPE LSUM).

Commentary. *Trichopilus tibiiformis* is known from a single collection of a single fruit body found during the shorter (December–January) rainy season in the Pakaraima Mountains. However this species is distinct from all other Guyanese entolomatoid fungi due to its combination of small, delicate basidioma, pileus with shaggy, dark reddish brown fibrils on a lighter brown background, long cylindro-clavate pileocystidia, 5–6-sided basidiospores reaching 10 × 7.0 µm, and capitate, tibiiform cheilocystidia.

Few entolomatoid taxa could be confused with *T. tibiiformis*. A few described species—*Entoloma mariae* G. Stev. from New Zealand, and *Rhodophyllus capitatus* Romagn. and Gilles, *R. lepiotoides* Romagn. and Gilles, and *R. applanatus* Romagn. and Gilles from West Africa—share the features of capitate cheilocystidia, a brown, squamulose pileus and relatively small, similarly shaped basidiomata with *T. tibiiformis*. However *E. mariae* can be recognized by its larger basidiospores (9–11 × 7–8.5 µm vs. 7.6–9.8 × 4.5–6.7 µm), much larger cheilocystidia with longer neck (35–100 × 10–22 µm vs. 29.2–40.6 × 2.5–8.2 µm), pruinose stipe (vs. glabrous in *T. tibiiformis*), and umbilicate pileus (Horak 1973, 2008). *Rhodophyllus capitatus* and *R. lepiotoides* can be differentiated by their 4–(5)-sided prismatic basidiospores and the lack of violet in the pileus. *Rhodophyllus applanatus* can be separated by its translucent-striate pileus that lacks any violet, pale yellow stipe, pale brownish lamellae, broader and shorter cheilocystidia (25–35 × 12–18µm) and shorter pileocystidia (40–70 × 10–16µm vs. 36.4–221.5 × 9.1–16.8 µm) (Romagnesi and Gilles 1979).

Trichopilus fasciculatus Largent et Aime sp. nov.

FIGS. 1c, 5

MycoBank MB 513505

Pileus 28–42 mm diametro, convexus tum planus et postea concavus, atro-violaceus, atro-brunneus suffusus, primo omnino lanatus vel velutinus postea hirtus appressus granuloso-squamulosus or tomentosus. *Lamellae* adnexae, latae, confertae, cinereo-violaceae vel cinereo-purpureae, margine saepe atro-violaceae. *Stipes* 38–60 × 4–6 mm apice, 6–10 mm lati basi, clavati, dimidio vel omnino tecti cum atro-violaceis granulosis fibrillis. *Basidiosporae* 5–6-gonae, typice heterodiametrae, 8.8–12.2 × 6.2–9.3 µm. *Basidia* 2–4-sterigmata, clavata, 32.1–45.1 × 9.6–11.4 µm. *Cheilocystidia* abundantia, clavata, 11.9–54.7 × (2.4–)9.7–11.4 µm. *Pleurocystidia* obscura, similis basidiolo basi 29.6–62.8 × 4.7–9.0 µm cum, apice cylindrico 4.3–5.2µm × 1.8–3.7 µm. *Pileipellis:* trichodermium cum cellulis terminalibus agglutinatis in caespites acutos. *Pileocystidia* clavata vel obclavata, typice late aculeata, 58.9–141.8 × 6.1–13.3 µm. *Caulocystidia* cylindrico-clavata, 41.7–149.2 × 6.0–11.4 µm. *Pigmentum* purpurascens, cytoplasmicum, laeviter in aquam solubile et clare solubile in 3% KOH. *Fibulae* abundantes.

Stature tricholomatoid. *Pileus* 28–42 mm broad; convex becoming plane and upturned in age, with a shallow umbo; dark bluish violet (15E8) overall with deep, dark brown tones due to dark brownish blue velvety fibrils, more uniformly dark blue in dried specimens; entirely velvety to woolly at first, becoming shaggy appressed granulose-squamulose or appressed tomentose with age; dry; margin incurved throughout development. *Pileal context* pale yellow to entirely white, not discoloring when cut or bruised; 4.5 mm deep at the disk; solid. *Lamellae* adnexed; broad; close; grayish violet to pale deep violet (17D5) at first, purplish gray (13D3) with spore maturity; edges often with distinct dark violet margin. *Stipe* 38–60 × 4–6 mm at apex to 6–10 mm wide at base; clavate; covered with dark violet (17E8) granular fibrils, extreme apex white; basal tomentum dense, white, cottony. *Stipe context* solid, white. *Odor* fragrant; *flavor* acrid. *Basidiospores* 5–6-sided, distinctly angular but with angles at times more or less rounded, subisodiametric to heterodiametric; 8.8–12.2 × 6.2–9.3 µm ($\bar{x}$ = 10.5 ± 0.8 × 7.7 ± 0.7 µm, E = 1.1–1.6, Q = 1.4 ± 0.1, L–D 1.1–4.2 µm, AL–D 2.8 ± 0.7 µm; n/2 = 47). *Basidia* 2–4-sterigmate; clavate and distinctly tapered from above the middle to the base; 32.1–45.1 × 9.6–11.4 µm ($\bar{x}$ = 40.0 ± 4.1 × 10.6 ± 0.6 µm, E = 3.2–4.4, Q = 3.8 ± 0.3; n/2 = 17). *Cheilocystidia* abundant and forming a sterile edge; clavate; resembling basidioles and basidia in shape but without granular cytoplasm and larger; 11.9–54.7 × (2.4–) 9.7–11.4 µm (n/2 = 17). *Pleurocystidia* not easily observed in all lamellar sections, restricted to an area just above the gill edge; with a long base 29.6–62.8 × 4.7–9.0 µm and a narrow, cylindrical apex, 4.3–5.2 µm long × 1.8–3.7 µm wide. *Lamellar trama* hyphae subparallel, 59.6–135.0 × 7.9–15.9 µm (n/2 = 6). *Pileipellis* a trichodermium with the terminal cells agglutinated into pointed tufts and originating from a tightly entangled subpellis layer. *Pileocystidia* clavate to obclavate, typically broadly aculeate, long and slender; 58.9–141.8 × 6.1–13.3 µm. *Pileal trama* typically loosely entangled, hyphae 69.5–139.0 × 7.9–11.9 µm (n/2 = 2). *Stipitipellis* at the stipe apex composed of abundant clusters of agglutinated hyphae. *Caulocystidia* uniformly cylindro-clavate; 41.7–149.2 × 6.0–11.4 µm

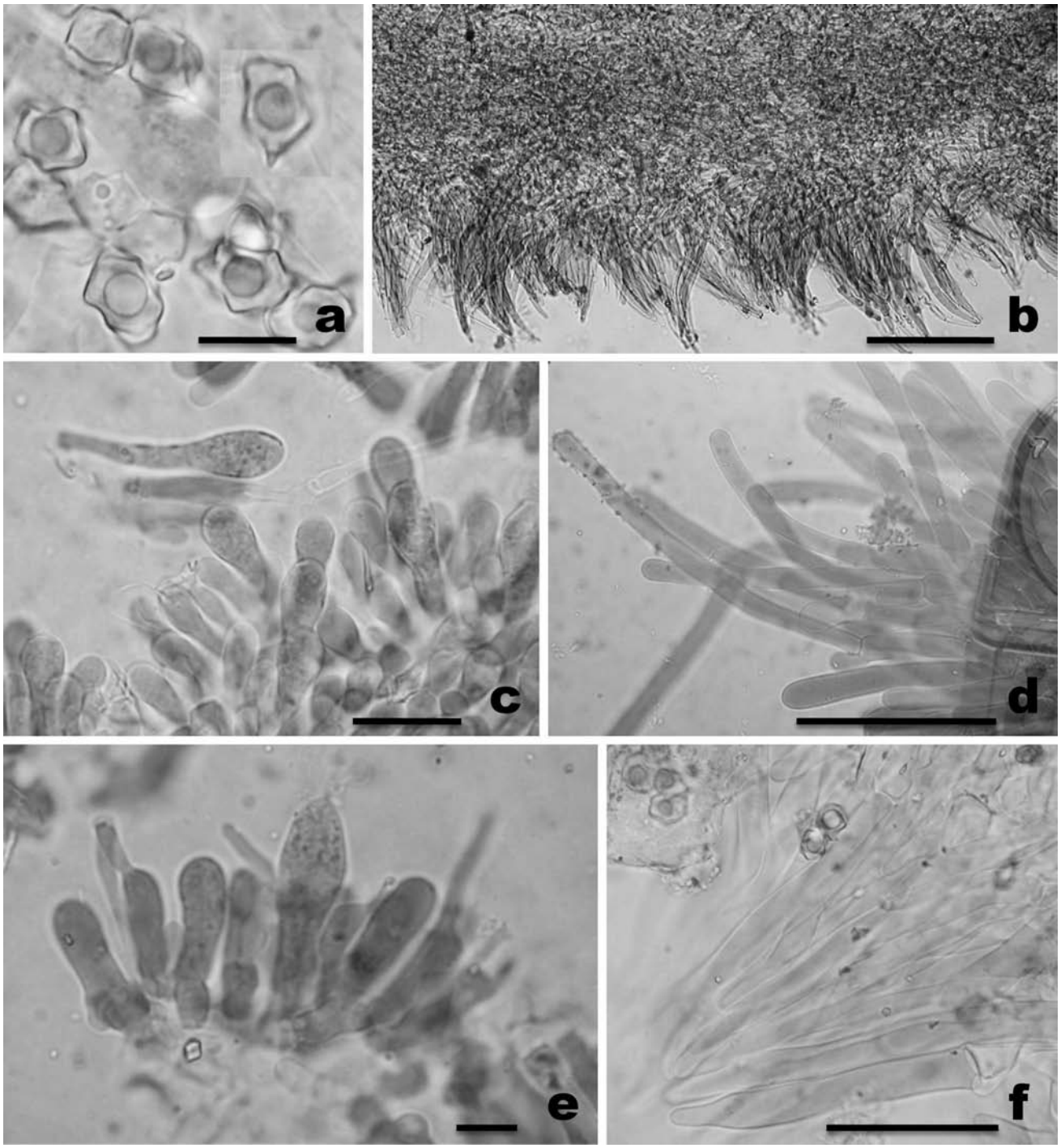

FIG. 5. Photomicrographs, *Trichopilus fasciculatus*. a. Basidiospores (HOLOTYPE, *M.C. Aime 2217*) (bar = 10 µm). b. Pileipellis on disk (HOLOTYPE, *M.C. Aime 2217*) (Bar = 100 µm). c. Cheilocystidia (HOLOTYPE, *M.C. Aime 2217*) (bar = 20 µm). d. Caulocystidia (HOLOTYPE, *M.C. Aime 2217*) (bar = 50 µm). e. Basidia and pleurocystidia (*M.C. Aime 3191*) (bar = 10 µm). f. Pileocystidia (*M.C. Aime 3191*) (bar = 25 µm).

(n/2 = 15). *Refractive hyphae* not seen in the trama of the gill and the stipe, rare to abundant in pileal trama. *Pigmentation* purplish, cytoplasmic, slightly soluble in water and distinctly soluble in 3% KOH; present in the pileocystidia, caulocystidia and the hyphae of the apical portion of the lamellar trama; pigmentation absent in the basidia, hymenial cystidia and subhymenium. *Clamp connections* abundant, typically large, present in all tissues.

Holotype. *M.C. Aime 2217* (BRG; ISOTYPE LSUM).

Habit, habitat and distribution. Solitary, fruiting in mosses on a standing dead snag and from humus on the side of a living trunk in forests dominated by *Dicymbe corymbosa* during May–July rainy season. Known only from the type locality in the Upper Potaro River Basin of Guyana.

Etymology. *Fasciculatus* (Latin), referring to tufted hyphae in the pileipellis.

Specimens examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence of Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. In *D. corymbosa* dominated forest on line back from mixed plot 1, in mosses on standing snag, 25 Jun 2003, *M.C. Aime 2217* (HOLOTYPE BRG; ISOTYPE LSUM); in *D. corymbosa*-dominated forest on opposite side of Potaro from base camp, growing on side of trunk, 4 Jul 2006, *M.C. Aime 3191* (BRG; LSUM).

Commentary. *T. fasciculatus* constitutes a distinctive species of *Trichopilus* due to its tricholomatoid stature, entirely woolly or velvety pileus that becomes shaggy with age, distinctive trichodermial pileipellis with hyphae agglutinated into pointed tufts, punctate stipe, 5–6-sided basidiospores and abundant clamp connections. Other distinguishing characteristics are its striking dark bluish violet basidiomata and tendency to fruit in elevated positions on the side of tree trunks and snags. In addition when visible the pleurocystidia also are distinctive, consisting of a clavate basidiole-like cell with long cylindric outgrowths and actually might represent repetitive basidia of the type illustrated in Aime (2001) for some species of *Crepidotus*.

The macro- and micromorphological features of *Entoloma dichroum* (Pers.) P. Kumm. *sensu* Noordeloos (1987, 1992) from Europe are similar to those of *T. fasciculatus*. However *E. dichroum* is distinguished by its white lamellae (vs. violet), dark blue punctae only at the stipe apex, finely tomentose pileus, cylindric to clavate or lageniform cheilocystidia, and a trichodermial pileipellis with the hyphae not forming tufts.

Other entolomatoid species with similar basidioma colors are *Entoloma purpureum* Petch from Ceylon and Singapore *sensu* Horak (1980), *Rhodophyllus cyanoides* Romagn. from Madagascar, *E. lazulinellum* (Singer) E. Horak from Argentina and Venezuela, *E. austroanatinum* (Singer) E. Horak from Argentina, *E. portentosum* E. Horak from Chile, *E. egregium* E. Horak from Papua New Guinea, and *E. panniculus* (Berk.) Sacc. from Tasmania and New Zealand. However each of these species can be differentiated from *T. fasciculatus* as follows: (i) *E. purpureum* by its lack of cheilocystidia and caulocystidia, terrestrial fruiting habit, conic-campanulate pileus, adnate gills with a decurrent tooth, sparsely fibrillose stipe, and stipititrama that becomes bluish or greenish with age (Horak 1980); (ii) *R. cyanoides* by its smaller basidiospores (8–10[–11.5] × 6.5–7.5 μm vs. 8.8–12.2 × 6.2–9.3 μm), fibrillose stipe that lacks punctae, absence of caulocystidia and cheilocystidia, and translucent-striate pileus (Romagnesi 1941); (iii) *E. lazulinellum* by smaller basidiomata with pileus reaching only 12 mm, a stipe that can be eccentric (thus not truly tricholomatoid), smaller basidiospores (7.5–8.5 × 5.5–6.0 μm), smaller basidia (25–35 × 8–9 μm vs. 32.1–45.1 × 9.6–11.4 μm), lack of violet pigment, and glabrous stipe (Horak 1977); (iv) *E. austroanatinum* and *E. portentosum* by their incrusting pigmentation and glabrous stipe (Horak 1977); (v) *E. egregium* by its white lamellae at first, fusoid, scattered cheilocystidia, and the lack of brown in the pileus (Horak 1980); and (vi) *E. panniculus* by its terrestrial fruiting habit, broadly fusoid pileocystidia, and smaller collybioid or mycenoid stature with a 10–25 mm broad pileus (vs. 28–42 mm) and stipe up to 2 mm diam at the apex (vs. 4–6 mm) (Horak 1980). In addition to *T. fasciculatus* two other entolomatoid species, *T. luteolamellatus* and *T. vividus* (described below), in Guyana are known that have a tricholomatoid stature, granular to velvety pileus and punctate stipes.

Trichopilus luteolamellatus Largent et Aime sp. nov.
FIGS. 1d, 6

MycoBank MB 513506

Pileus 20–50 × 10–18 mm diam, plano-convexus vel quasi planus, brunneo-fulvus, dense granuloso-fibrillosus; contextus luteolus. *Lamellae* adnatae, aliquantum latae, confertae vel aggregatae, luteolae. *Stipes* 42–55 × 5–8 mm, brunneo-fulvus, omnino appressus granuloso-fibrillosus. *Basidiosporae* 4-gonae, subisodiametricae, 7.0–8.8 × 6.1–7.7 μm. *Basidia* 2–4-sterigmata, clavata, 35.4–43.3 × 7.5–12.6 μm. *Cheilocystidia* abundantia, subclavata vel cylindrico-clavata, 26.0–66.9 × 5.1–11.7 μm, hyalina. *Pleurocystidia* carentia. *Pileipellis* similis trichodermio. *Pileocystidia* cylindrica vel obclavata, pigmentifera, 80.6–162.3 × 10.4–20.4 μm. *Caulocystidia* cylindro-clavata, 73.4–162.4 × 5.8–9.1 μm. *Pigmentum* cytoplasmicum. *Fibulae* praesentes in totis telis praeter pileipelle.

Stature tricholomatoid. *Pileus* 20–50 mm broad, 10–18 mm high; broadly plano-convex to nearly plane, when young with a large, acute umbo becoming less pronounced with age; dark yellowish brown (5F8); dry, entirely densely granulose-fibrillose; cuticle cracking with age and easily peeling. *Pileal context* pale yellow (1A2–4); 2.5 mm high × 6 mm wide in umbo, about 1.25 mm above the stipe, and up to 1 mm thick at the margin. *Lamellae* adnate; moderately broad, 7 mm at broadest point; almost crowded; thin; pale yellow to pastel yellow (1A3–4) at first, becoming mottled pink (5A2) with basidiospore maturity; in

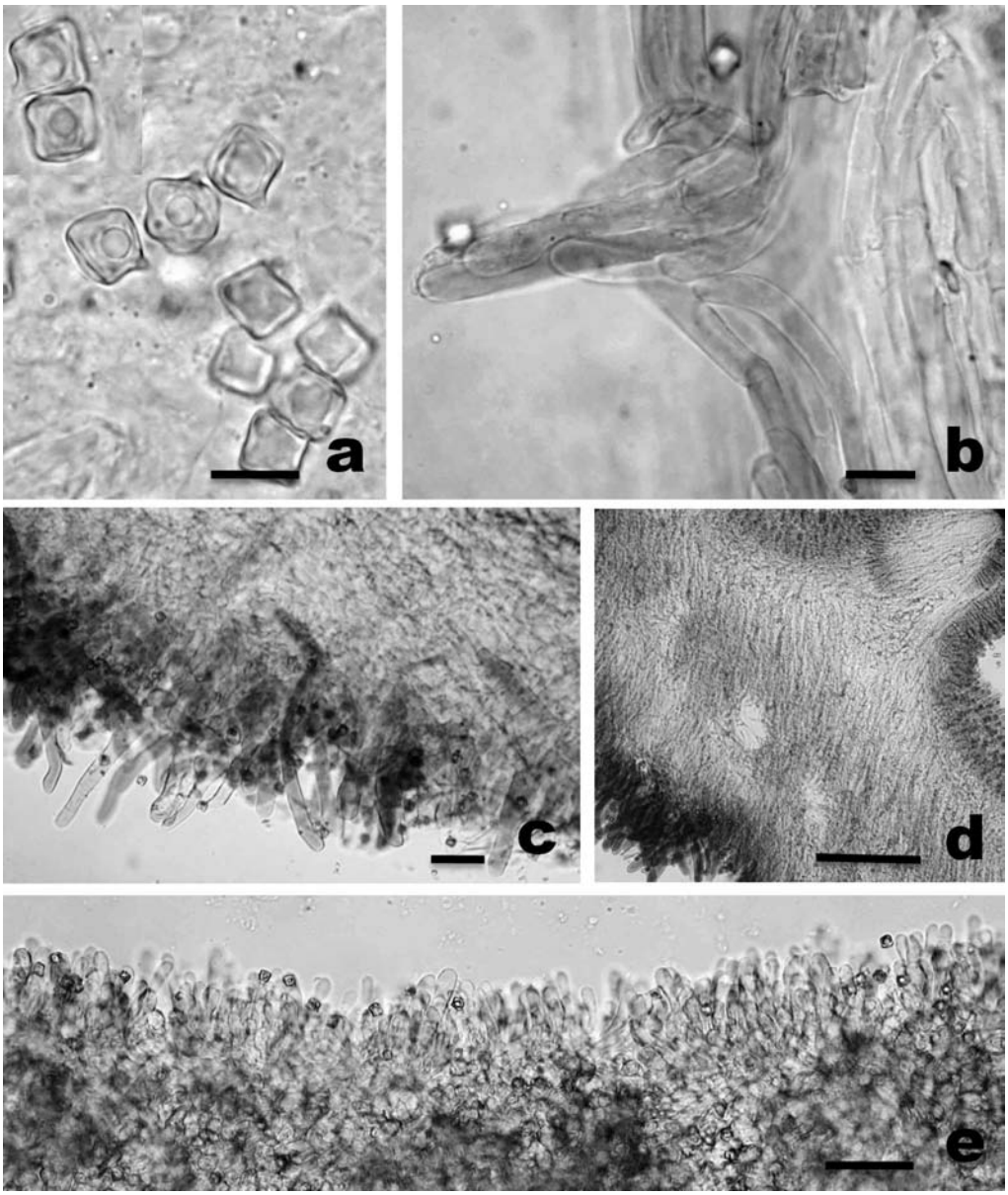

FIG. 6. Photomicrographs, *Trichopilus luteolamellatus* (HOLOTYPE, *M.C. Aime 1480*). a. Basidiospores (bar = 10 μm). b. Caulocystidia (bar = 20 μm). c. Pileipellis on disk (bar = 30 μm). d. Tangential section of pileus showing pileipellis (bottom left) to hymenium (upper right) (bar = 100 μm). e. Cheilocystidia (bar = 50 μm).

mature specimens edges toward pileal margin stippled brown as seen with a 10× hand lens; forking toward the pileal margin in older specimens; lamellulae 3–4, of different lengths. *Stipe* 42–55 × 5–8 mm; equal or slightly wider at base; clothed entirely in interwoven appressed, dark yellowish brown (5F8) granulose fibrils; basal tomentum tightly appressed, white and cottony. *Stipe context* hollow. *Odor* and *flavor* none but mucilaginous when tasted. *Basidiospores* four-sided, sides even, not concave, angles distinct, not prismatic, subisodiametric; 7.0–8.8 × 6.1–7.7 μm ($\bar{x}$ = 7.9 ± 0.5 × 6.8 ± 0.4 μm, E = 1.0–1.3, Q = 1.2 ± 0.1, L–D 0.3–1.9 μm, AL–D 1.1 ± 0.5 μm; n = 21). *Basidia* 2–4-sterigmate; clavate or subclavate and tapered or slightly tapered to the base; with granular contents; 35.4–43.3 × 7.5–12.6 μm ($\bar{x}$ = 39.1 ± 2.7 × 10.4 ± 1.6 μm, E = 3.0–5.5, Q = 3.9 ± 0.7; n = 16). *Cheilocystidia* abundant, forming a sterile layer on the lamellar edge; clavate, subclavate, or cylindro-clavate; hyaline; 26.0–66.9 × 5.1–11.7 μm. *Pleurocystidia* absent. *Lamellar trama* homogeneous, wide in sections. *Pileocystidia* cylindrical, cylindro-clavate, or clavate, a few obclavate; pigmented; 80.6–162.3 × 10.4–20.4 μm. *Stipitipellis* a cutis between

TABLE I. Diagnostic characters of the Guyanese species of *Trichopilus* with a tricholomatoid stature, granular to velvety pileus and punctate stipe

	T. fasciculatus	*T. luteolamellatus*	*T. vividus*
Basidioma color	Dark blue to violet with dark brown-blue granular fibrils	Yellow-brown with dark yellow-brown granular fibrils	Brilliant lilac to magenta with dark violet-brown granular fibrils
Basidiospores	5–6-sided	4-sided	5–6-sided
Pileipellis	A distinct trichodermium	Entangled, trichodermium-like	Entangled, trichodermium-like
Cheilocystidia	Clavate	Clavate	Broadly clavate and mucronate
Pleurocystidia	+/−, but when present with long cylindrical projections	No	Similar to clavate-mucronate cheilocystidia
Clamp connections	Yes	Yes	No
Habit	In moss on tree trunks and snags	Terrestrial	Terrestrial

abundant anticlinal clusters of caulocystidia. *Caulocystidia* cylindro-clavate, arranged parallel in clusters; 73.4–162.4 × 5.8–9.1 μm. *Refractive hyphae* scattered to rare in the trama of the pileus and stipe. *Pigmentation* cytoplasmic, uniform and medium brown in the stipitipellis and the pileipellis. *Clamp connections* present at the bases of basidia and cheilocystidia and on the stipitipellis hyphae; not observed on the pileipellis hyphae.

Holotype. M.C. Aime 1480 (BRG; ISOTYPE LSUM).

Habit, habitat and distribution. Terricolous, rare in mixed tropical forest of the *Eschweilera-Licania* association during the May–July rainy season. Known only from the type locality in the Upper Potaro River Basin of Guyana.

Etymology. Luteus, lamellatus (Latin), referring to the yellow lamellae.

Specimens examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence of Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. Mixed plot 2, 22 May 2001, *M.C. Aime 1480* (HOLOTYPE BRG; ISOTYPE LSUM).

Commentary. Trichopilus luteolamellatus can be recognized by its dark date-brown to dark yellow brown, appressed, granulose-fibrillose pileus, yellowish lamellae when young, granulose-fibrillose stipe that is similar in color to the pileus, four-sided basidiospores, and abundant clavate to cylindro-clavate cheilocystidia. While the sympatric *T. vividus* and *T. fasciculatus* both have basidiomata of a similar stature and size and a granulose-fibrillose pileus and stipe, their pilei are dark bluish violet to dark violet and their basidiospores are 5–6-sided (TABLE I).

Two other entolomatoid species are similar to *T. luteolamellatus* in coloration, basidioma size, and in the possession of cytoplasmic pigmentation, clamp connections, and a trichodermial pileipellis: *Rhodophyllus dichrooides* Romagn. & Gilles from Gabon and *E. petchii* E. Horak (= *E. brunneum* Hesler) from Indomalaya, Australasia and Madagascar. *Rhodophyllus dichrooides* differs in its 6–8-sided (vs. four-sided), heterodiametric basidiospores and lack of hymenial cystidia (Romagnesi and Gilles 1979); *E. petchii* can be recognized by its larger (8.5–12.0 μm vs. 7.0–8.8 μm) basidiospores, brown, floccose lamellar margin, and larger (50–120 [–150] μm vs. 26.0–66.9 μm) cheilocystidia with brown cytoplasmic pigment (Horak 1980).

Trichopilus vividus Largent et Aime sp. nov. FIGS. 1e, 7

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Basidiomata cum vividis, quasi fluorescentibus lilacinis et magenteis coloribus. *Pileus* 30–42 (diam.) × 25–30 mm, conico-convexus vel late convexus, violaceo- vel magenteo-brunneus, granuloso-fibrillosus; contextus cinereo-violaceus. *Lamellae* adnatae to adnexae, angustae, confertae vel aggregatae, purpureo-cinereae vel cinereo-magenteae. *Stipes* 55–82 × 5–9 mm, rubescento-lilacinus vel cineraceo-magenteus vel cinereo-rubineus, omnino granuloso-fibrillosus, cum sparso cinereo-lilacino tomento. *Basidiosporae* 5–6-gonae, subisodiametricae, 7.6–10 × 6.4–8.7 μm. *Basidia* 2–4-sterigmata, clavata et contracta, 35.1–42.2 × 8.3–11.2 μm. *Cheilocystidia* abundantia, clavata et typice mucronata 29.9–86.7 × 6.6–15.5 μm. *Pleurocystidia* forma similia cheilocystidiorum, 55.6–87.6 × 12.7–19.1 μm, spadicea in 3% KOH. *Pileipellis:* trichodermiale vallum vel trichodermium insidens disco. *Pileocystidia* cylindro-clavata vel clavata, 28.0–140.0 × 6–16.0 μm. *Stipitipellis* cum abundantibus dispersis fasciculis hypharum dense intricatarum. *Caulocystidia* clavata vel cylindro-clavata, 39.1–81.7 × 7.1–13.6 μm. *Pigmentum* aeque cytoplasmicum in 3% KOH, glandulaceum ad spadiceum in pileipelle, valde atro-brunneus in superis stratis tramae pilei, spadiceum in pleurocystidiis. *Fibulae* carentes.

Stature tricholomatoid. *Pileus* 30–42 mm broad, 25–30 mm high; conic-convex to broadly convex; in youth minutely granulose-fibrillose and violet brown (11E7), granulose fibrils separating with pileal expan-

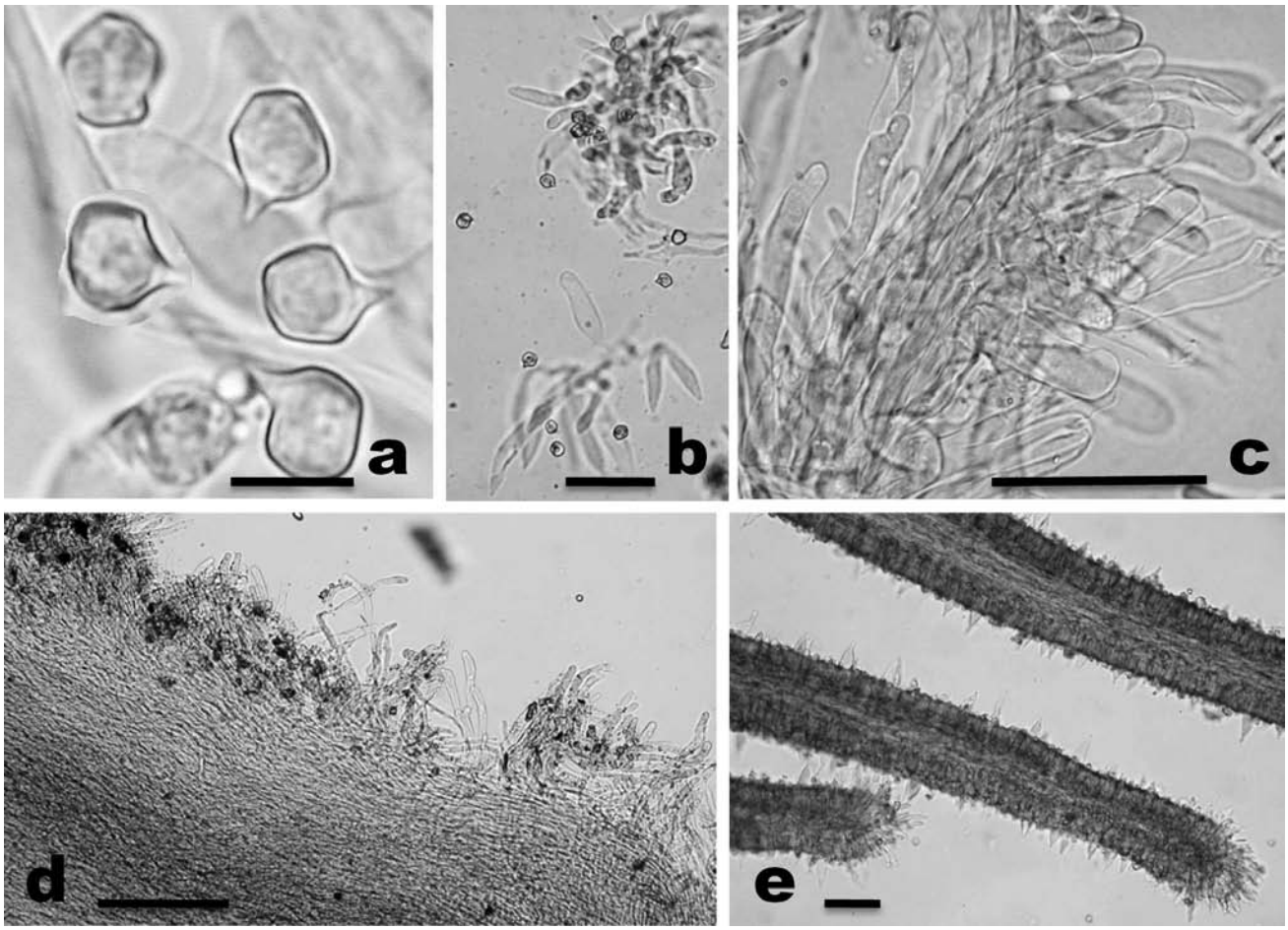

FIG. 7. Photomicrographs, *Trichopilus vividus* (HOLOTYPE, *M.C. Aime 1478*). a. Basidiospores (bar = 10 μm). b. Cheilocystidia (bar = 50 μm). c. Caulocystidia (bar = 50 μm). d. Pileipellis on disk with subtending pileal trama (bar = 100 μm). e. Lamellar section with abundant pleuro- and cheilocystidia (bar = 200 μm).

sion to form tiny, dense appressed-squamules with granulose apices, these particularly evident at the margin; at maturity dark violet (near 15F7–8) with a violet brown (11E7) disk; dry; margin entire, slightly incurved. *Lamellae* adnate to adnexed; narrow, 3.5 mm at broadest point; almost crowded, 2 lamellae/mm at margin; purplish gray to light grayish magenta (~ 13D3) with ruby margins (near 12C8); lamellulae 2–4 of different lengths. *Stipe* 55–82 × 5–9 mm; equal; ground color reddish lilac to light grayish magenta (~ 14D4), grayish ruby at apex (12D8), at base dark grayish ruby to dark ruby (~ 12E5); entirely granulose-fibrillose; basal tomentum scant, grayish lilac (13B3). *Stipe context* fibrous but with hollow core, 1–2 mm thick, grayish violet throughout (15C4). *Odor* and *flavor* not distinctive. *Basidiospores* 5–6-sided, isodiametric to more typically subisodiametric, angles distinct, sides not concave, not prismatic; 7.6–10 × 6.4–8.7 μm ($\bar{x}$ = 8.7 ± 0.6 × 7.4 ± 0.6 μm, E = 1.0–1.3, Q = 1.2 ± 0.1, L–D 0.3–1.9 μm, AL–D 1.2 μm; n = 21). *Basidia* 2–4-sterigmate; clavate and tapered gradually toward base; 35.1–42.2 × 8.3–11.2 μm ($\bar{x}$ = 37.9 ± 2.8 × 9.6 ± 1.0 μm, E = 3.4–4.4, Q = 4.0 ± 0.36; n = 8). *Cheilocystidia* abundant and forming a sterile layer on the gill edge; broadly clavate and typically mucronate, 29.9–86.7 × 6.6–15.5 μm. *Pleurocystidia* abundant as pseudocystidia; similar in shape but occasionally larger than the cheilocystidia; 55.6–87.6 × 12.7–19.1 μm. *Lamellar trama* hyphae subparallel, 160–425 × 6–12 μm, with abundant granular contents. *Pileipellis* a trichodermial palisade to a trichodermium on the disk, composed of loosely to densely entangled clusters of hyphae, clusters dense and more or less erect on the disk, scattered and repent toward the margin. *Pileocystidia* cylindro-clavate to clavate, shorter ones intermingled with longer ones on the disk, typically only longer ones away from the disk; 28.0–140.0 × 6–16.0 μm. *Pileal trama* uniform; hyphae tightly interwoven near the pileipellis, more loosely interwoven toward the top of the lamellae; hyphae 80–340 × 6–12 μm. *Stipitipellis* of abundant clusters of densely

entangled caulocystidia. *Caulocystidia* cylindro-clavate to clavate; 39.1–81.7 × 7.1–13.6 µm. *Stipitrama* more or less parallel; hyphae 80–480 × 8–16 µm, narrowing toward the stipitipellis. *Pigmentation* uniformly cytoplasmic in 3% KOH, yellow brown to light brown in the pileipellis, decidedly dark brown in the pileal trama adjacent to the pileipellis and in the stipitipellis hyphae. *Clamp connections* absent in all tissues.

Holotype. M.C. Aime 1478 (BRG; ISOTYPE LSUM).

Habit, habitat and distribution. Terricolous in forests dominated by *D. corymbosa* during May–July rainy season. Known only from the type locality in the Upper Potaro River Basin of Guyana.

Etymology. Vividus (Latin), referring to the vivid or brilliant, almost fluorescent colors of the basidiomata.

Specimens examined. GUYANA. Region 8 Potaro-Siparuni. Pakaraima Mountains, Upper Potaro River Basin, ~ 20 km east of Mount Ayanganna, environs of base camp on Potaro River 1 km upstream from confluence with Whitewater Creek at 5°18′04.8N, 59°54′40.4W, 710–750 m. *Dicymbe* plot 2, 22 May 2001, *M.C. Aime 1478* (HOLOTYPE BRG; ISOTYPE LSUM).

Commentary. Trichopilus vividus is a striking species that can be recognized by its vivid violet-brown granulose pileus, purplish gray lamellae with ruby margins and granulose stipe that has mixtures of grayish-lilac, magenta or ruby. This species is also distinctive in its microscopic features that include abundant mucronate cheilocystidia, pleurocystidia on the sides of the lamellae and the absence of clamp connections on its hyphae. *Leptonia venezuelana* Dennis has similar coloration to that of *T. vividus* but has shorter, non-mucronate cheilocystidia, a collybioid stature and lacks pleurocystidia (Dennis 1970). Several other species in the Entolomataceae are known to possess blue-violet basidiomata. These are discussed in the commentary under *T. fasciculatus*. (Diagnostic characters for the three known Guyanese *Trichopilus* species with tricholomatoid statures are provided in TABLE I.)

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