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Two new species of *Dermoloma* from India

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Abstract

Two new species of *Dermoloma*, *Dermoloma indicum* and *Dermoloma keralense*, are documented from Kerala State, India, based on morphology. Comprehensive descriptions, photographs, and comparison with phenetically similar species are provided.

Key words: Agaricales, Basidiomycota, biodiversity, taxonomy

Introduction

Dermoloma J. E. Lange (1933: 12) ex Herink (1958: 62) (Agaricales, Basidiomycota) is a small genus of worldwide distribution with around 24 species names (excluding synonyms) listed in Species Fungorum (www.speciesfungorum.org). The genus is characterized primarily by the structure of the pileipellis, which is a pluristratous hymeniderm made up of densely packed, subglobose or broadly clavate cells (Arnolds 1992, 1993, 1995). Although *Dermoloma* is traditionally considered as belonging to the Tricholomataceae, Kropp (2008) found that *D. inconspicuum* Dennis (1961: 78), based on molecular data, had phylogenetic affinities to the Agaricaceae. Most of the known species are recorded from the temperate regions. So far, only a single species of *Dermoloma* has been reported from India (Manimohan & Arnolds 1998). During our studies on the agarics of Kerala State, India, we came across two remarkable species of *Dermoloma* that were found to be distinct from all other previously reported species of the genus. They are herein formally described as new.

Materials and Methods

Conventional morphology-based taxonomic methods were employed for this study. Microscopic observations were made on material stained with 1% aqueous solutions of phloxine and Congo red and mounted in 3% aqueous KOH. Melzer's reagent was used to observe whether the basidiospores and tissues were amyloid. To measure spore size, 20 basidiospores from one specimen of each collection cited were measured. Basidiospore measurements include both the mean and the standard deviation for both the length and the width, together with the range of spore quotient (Q, length/width ratio) and its mean value (Qm). Color codes used in the descriptions are from Kornerup & Wanscher (1978). The examined collections are deposited at Kew (Mycology) Herbarium and the Kew accession numbers (e.g., K(M) 190590) are indicated.

Results

Taxonomy

Dermoloma indicum K.N.A. Raj & Manim., *sp. nov.*, Fig. 1. A–H
MycoBank MB 808549

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Diagnosis:—Characterized by a dark brown pileus with a wrinkled and finely appressed-squamulose surface, white spore print, amyloid basidiospores, hymeniderm-type pileipellis, cutis-type stipitipellis, absence of cystidia, a distinct dark brown band in the pileus trama, and presence of clamp connections. Differing from *Dermoloma cystidiatum* Manim. & Arnolds (1998: 149) in having smaller basidiomata, a fertile lamella edge, and much larger and differently shaped basidiospores.

Type:—INDIA. Kerala State: Thrissur District, Peechi Forest, 7 December 2010, Anil Raj K. N. (K(M) 190589, holotype).

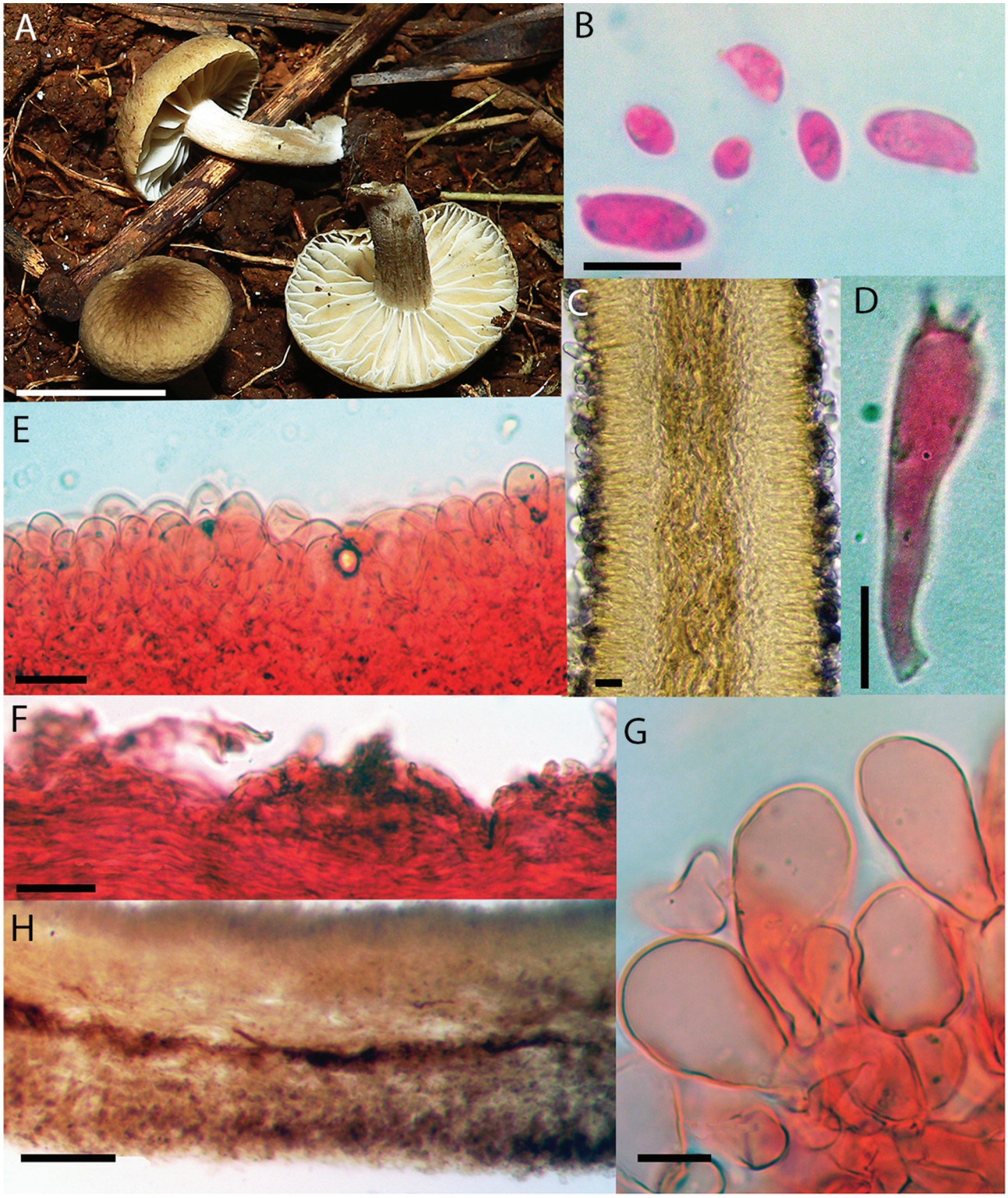

FIGURE 1. A–H: *Dermoloma indicum* (K(M)190589). **A**. Basidiomata; **B**. Basidiospores; **C**. Lamella trama; **D**. Basidium; **E**. Pileipellis; **F**. Stipitipellis; **G**. Elements of the pileipellis; **H**. Pileus trama with dark brown band. Scale bars: **A**=10 mm; **B**–**H**=10 µm.

Basidiomata tricholomatoid. Pileus 6–21 mm diam., almost hemispherical when young, becoming convex with age; surface dark brown (6F7) at the center, gradually fading to brownish orange (6C5) towards margin, not hygrophanous, not pellucid-striate, finely wrinkled at and around the center, finely appressed-squamulose all over, denser towards the center; margin incurved, initially entire, becoming somewhat wavy. Lamellae adnate or adnate with a decurrent tooth, transvenose as well as intervenose, occasionally furcate, subdistant, orange-white (5A2), up to 4 mm broad; edge entire, concolorous with the sides; single tier of lamellulae. Stipe 12–18 × 2–4 mm, central, terete, slightly tapering towards the base, fistulose; surface orange-gray (5B2) when young, becoming brownish gray (5E2), appressed-fibrillose all over; base with whitish mycelial cords. Odor and taste not distinctive. Spore print white.

Basidiospores 7–14 × 3.5–6 (10.57±1.90 × 4.67±0.73) µm, Q = 1.52–3.14, Qm = 2.29, oblong-ellipsoid, subcylindrical or subamygdaliform, thin-walled, hyaline, smooth, with several tiny oil globules, amyloid. Basidia 26–31 × 5–8 µm, narrowly clavate, hyaline or pale yellow, 4-spored, rarely 2-spored; sterigmata ca. 3 µm long but in some rare two-spored basidia up to 11 µm. Lamella edge fertile. Cheilocystidia and pleurocytidia absent. Lamella trama almost regular; hyphae 2–9 µm wide, thin-walled, with very pale brownish yellow plasmatic contents, inamyloid. Pileus trama interwoven made up of pale brown, thin-walled hyphae 3–11 µm wide, the central part of pileus trama often showing a distinct dark brown band owing to concentration of both brown wall pigment and brown contents in the hyphae of that region. Pileipellis a unistratous to pluristratous hymeniderm made up of erect, branched hyphae with clavate, broadly clavate, pyriform, sphaeropedunculate or suglobose terminal cells, 14–44 × 10–15 µm, with a slightly thickened, brownish wall. Stipitipellis a cutis composed of thin-walled hyphae, 2.5–8.5 µm wide, with a pale brownish yellow wall pigment. Clamp connections observed on all hyphae.

Habitat/Distribution:—In small groups on forest floor, among litter, Kerala State, India.

Etymology:—Specific epithet "indicum" refers to India, the country where this species was first observed.

Notes:—The finely appressed-squamulose pileus and the dark brown band in the middle of the pileus trama together make this species unique among *Dermoloma* species. Owing to its amyloid basidiospores, *Dermoloma indicum* belongs to the section *Atrobrunnea* Singer (1986: 424) ex Contu (1992: 80). *Dermoloma cystidiatum* Manimohan & Arnolds (1998: 149), the only other species known from the region, has many macroscopic similarities; it however, differs in having a sterile lamella edge with crowded cheilocystidia, much smaller (3.5–6 × 3–4 µm), broadly ellipsoid basidiospores and a gray discoloration of the lamellae on bruising. *Dermoloma scotodes* (Berkeley & Broome 1871: 522) Pegler (1986: 182) from Sri Lanka has smaller (5.2–6.5 × 3.2–3.7 µm) basidiospores and a white flocculose stipe (Pegler 1986). *Dermoloma atrobrunneum* (Dennis 1951: 476) Singer (1955: 375) ex Bon (1986: 51), a Caribbean species, is very close in morphology but has smaller, subglobose to ovoid basidiospores (Pegler 1983). *Dermoloma hemisphaericum* (Stevenson 1964: 14) E. Horak (1971: 429) from New Zealand has a grayish sepia pileus and oblong-ovoid, much smaller (5–6 × 3.5–4 µm) basidiospores (Horak 1971). *Dermoloma murinum* (G. M. Taylor & Stevenson 1964: 17) E. Horak (1971: 438), another New Zealand species, has moderately crowded, sinuate lamellae and much smaller (5.5–7 × 3.5–4 µm) inamyloid basidiospores (Horak 1971). *Dermoloma josserandii* Dennis & P. D. Orton (1960: 226), a European species, has smaller (4.5–7 × 3.6–4.8 µm) basidiospores (Arnolds 1995). *Dermoloma pseudocuneifolium* Herink (1958: 62) ex Bon (1986: 52), another European species, has much darker brownish or grayish lamellae and smaller basidiospores (Arnolds 1995).

Dermoloma keralense K.N.A. Raj & Manim., *sp. nov.,* Fig. 2. A–E
MycoBank MB 808550

Diagnosis**:**—Characterized by a dark brown pileus with a wrinkled and waxy surface, grayish yellow lamellae, a white spore print, inamyloid basidiospores, pileipellis and stipitipellis with bluish green encrusting pigment, and hyphae with clamp connections. Differing from *Dermoloma cuneifolium* (Fries 1818: 99) Singer (1955: 375) ex Bon (1986: 51), in having smaller basidiospores, grayish yellow lamellae, and a pileipellis and stipitipellis with a bluish green encrusting pigment dissolving in KOH.

Type:—INDIA. Kerala State: Kollam District, Thenmala Shenduruni Forest Division, 10 November 2010, Anil Raj K. N. (K(M) 190590, holotype).

Basidiomata collybioid. Pileus 12–24 mm diam., convex to broadly convex with a slight umbo; surface dark brown (5F3) at the center, gradually fading to brownish orange (5E5) or light brown (5D5) towards margin, weakly hygrophanous and becoming paler, finely pellucid-striate towards margin, slightly wrinkled at and around the center, smooth and somewhat waxy; margin slightly incurved, crenate. Lamellae emarginate often with a small decurrent tooth, transvenose as well as intervenose, occasionally furcate, moderately close, grayish yellow (3B5, 4B5), up to 5 mm broad; edge entire, concolorous with the sides; with 3 tiers of lamellulae. Stipe 17–32 × 2–4 mm, central, terete, equal, hollow; surface grayish yellow (4B5) towards apex, orange-gray (5E5) towards base, appressed-fibrillose all over; base slightly enlarged, with white mycelial cords. Odor and taste not distinctive. Spore print white.

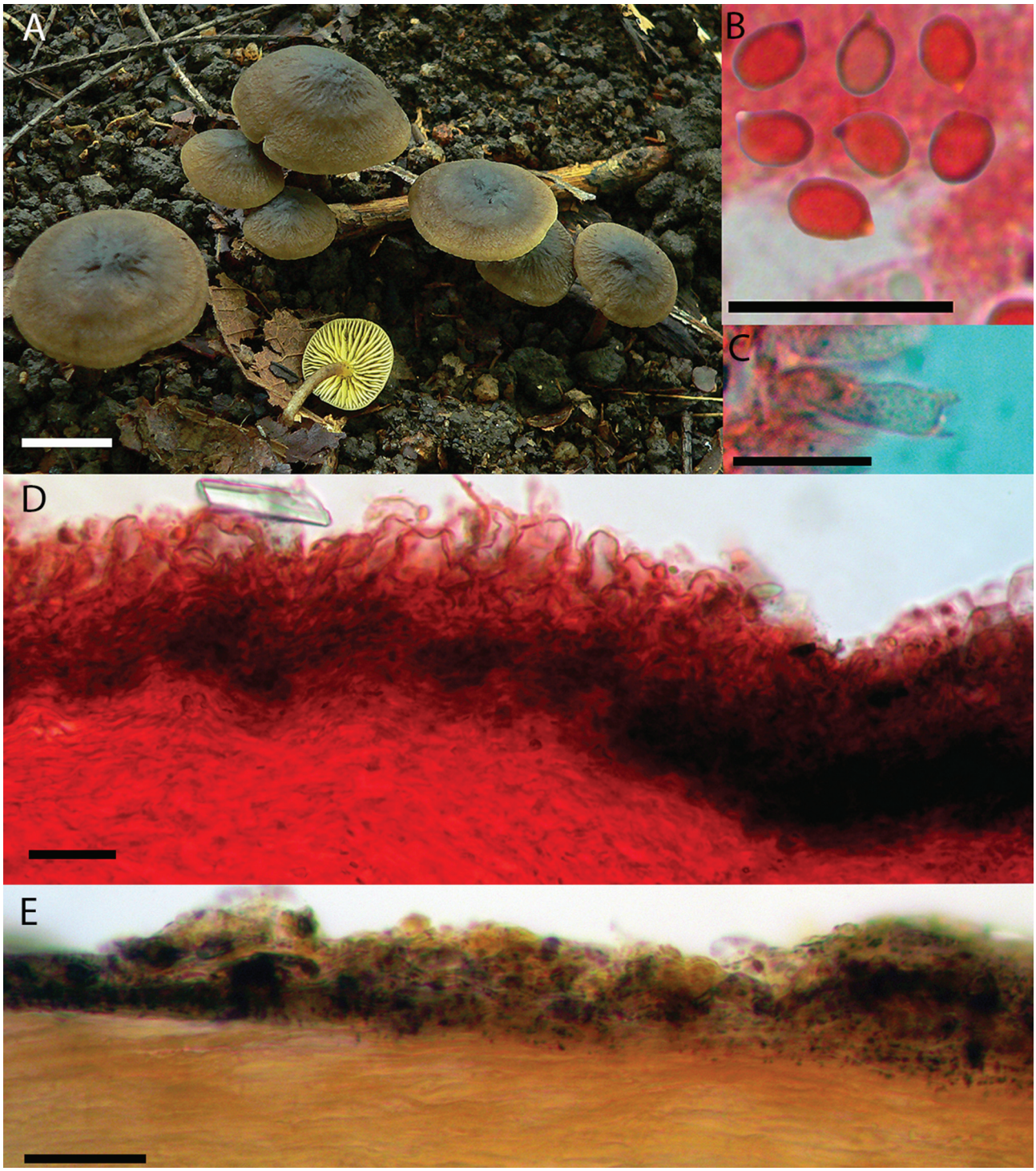

FIGURE 2. A–E. *Dermoloma keralense* (K(M)190590). **A**. Basidiomata; **B**. Basidiospores; **C**. Basidium; **D**. Pileipellis; **E**. Stipitipellis. Scale bars: **A**=10 mm; **B**–**E**=10 µm.

Basidiospores 3–4 × 2–3 (3.55±0.42 × 2.57±0.33) µm, Q = 1.16–1.6, Qm = 1.38, ellipsoid, thin- to slightly thick-walled, hyaline, smooth, inamyloid. Basidia 13–20 × 3.5–5 µm, clavate, with a few oil globules, yellowish brown, 4-spored; sterigmata up to 3 µm long. Lamella edge fertile. Cheilocystidia and pleurocystidia absent. Lamella trama almost regular; hyphae 3.5–14 µm wide, yellowish brown, thin-walled, inamyloid. Pileus trama almost regular; hyphae 3–12 µm wide, thin-walled, yellowish brown, faintly dextrinoid. Pileipellis a hymeniderm with clavate, subglobose, utriform or ellipsoid terminal cells, 19–52 × 12.5–22 µm, slightly thick-walled, with a bluish green encrusting pigment slightly dissolving in KOH. Stipitipellis a cutis, composed of hyphae 3–21 µm wide, with a greenish, granular, encrusting pigment. Clamp connections seen on all hyphae.

Habitat/Distribution:—In small groups on forest floor, among litter, Kerala State, India.

Etymology:—Specific epithet "keralense" refers to Kerala State, India, the region where this species was first observed.

Notes:—Because of the inamyloid nature of the basidiospores, *Dermoloma keralense* fits in the section *Dermoloma* J.E. Lange (1933: 12) ex Herink (1958: 62). The yellowish lamellae contrasting with the dark brown pileus surface is a very distinctive field character of this species. Microscopically, the bluish green/green encrusting pigment that dissolves in KOH is also very distinctive. These two characters together make this species unique among the documented species of *Dermoloma*. *Dermoloma cuneifolium*, a European species belonging to the section *Dermoloma*, shares a few characters such as somewhat similar sized basidiomata, hollow stipe with similar surface features, inamyloid and ellipsoid basidiospores and a fertile lamella edge (Wilhelm 1992). However, *D. cuneifolium* has differently shaped basidiomata, larger basidiospores and caulocystidia. *Dermoloma corylleti* Singer & Clémençon (1971: 120), *D. intermedium* Bon (1979: 42) and *D. emiliae-dlouhyi* Svrček (1966: 147) are some other European species with inamyloid basidiospores (Arnolds 1995), but all those species have much larger basidiospores.

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