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Boidinella gen. nov. (Cantharellales, Basidiomycota)

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Abstract – The genus *Boidinella* is erected to accommodate *Sistotremella cystidiolophora* and *Dendrothele globulispora*. The genus is characterized by effuse, soft, farinaceous to membranous basidiomata, delicate dendrohyphidia, obclavate leptocystidia, urniform basidia with 4 sterigmata, and subglobose to ellipsoid basidiospores with hyaline, slightly thickened, smooth, cyanophilous walls. *Boidinella* is compared with *Dendrothele*, *Hypochnicium*, *Sistotremella*, and *Leptocorticium*.

Taxonomy / cyanophilous basidiospores / dendrohyphidia / *Dendrothele* / urniform basidia

INTRODUCTION

While studying species of *Dendrothele* Höhn. & Litsch., *Dendrothele globulispora* Boidin & Lanq., an unusual species from the Republic of Central Africa, was examined (Boidin *et al.*, 1996). *Dendrothele globulispora* stood out from other species of *Dendrothele* because of its soft-textured basidioma, obclavate leptocystidia, and slightly thick-walled, cyanophilous basidiospores. A literature search revealed another species with features similar to *D. globulispora*, *Sistotremella cystidiolophora* Boidin & Gilles from Réunion (Boidin & Gilles, 1994). Because of their unique array of characters, the new genus *Boidinella* Nakasone is proposed to accommodate these two species.

MATERIALS AND METHODS

Thin, freehand sections or scrapings from the basidiomata were mounted in Melzer's reagent (Kirk *et al.*, 2008) or 1% (weight/volume) aqueous phloxine and 1% (w/v) aqueous potassium hydroxide. Cyanophily of basidiospore and hyphal walls was observed in 0.1% cotton blue in 60% lactic acid (Kotlaba & Pouzar, 1964; Singer, 1986). Drawings were made with a camera lucida attachment on an Olympus BH2 compound microscope. Photographs were taken with an Olympus DP12 camera attached to an Olympus SZH stereomicroscope. Q values were obtained by dividing average basidiospore length by its width of at least 30 spores (Kirk *et al.*, 2008). Color names are from Kornerup & Wanscher (1978). Herbarium designations follow that of Index Herbariorum (Thiers, continuously updated).

RESULTS

***Boidinella* Nakasone, gen. nov.**

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Basidiomata resupinata, effusa, tenuia mollia, fragilia, laevia, dense farinosa vel membranacea, margine plerumque abrupti. Systema hyphale monomiticum, hyphis fibulatis. Dendrohyphidia delicata. Leptocystidia obclavata, attenuata, interdum moniliformia. Basidia urniformia, oleagineis, tunicis cyanophilis, 4-sterigmatibus. Basidiosporae subsphaericae vel ellipsoideae, tunicis hyalinis, laevibus, parum crassis, cyanophilis, inamyloideis. In monocotyledonibus caulibus emortuis.

Typus: Boidinella globulispora (Boidin & Lanq.) Nakasone

Etymology: In honor of Dr. Jacques Boidin, eminent French mycologist and expert on the corticioid fungi.

Basidiomata resupinate, effuse, thin, soft, fragile, smooth, densely farinaceous to membranous, margin more or less abrupt. **Hyphal system** monomitic with clamped hyphae. **Dendrohyphidia** delicate. **Leptocystidia** obclavate, attenuate, sometimes moniliform. **Basidia** urniform, oleaginous, walls cyanophilous, 4-sterigmate. **Basidiospores** subspherical to ellipsoid, walls hyaline, smooth, slightly thick, cyanophilous, not amyloid. On dead stems of monocots.

Remarks: The essential features of *Boidinella* are its effuse, soft, densely farinaceous or membranous basidioma, urniform basidia with 4-sterigmata, obclavate leptocystidia, dendrohyphidia, and basidiospores with smooth, slightly thickened, cyanophilous walls. *Boidinella* is rare for only two species and just three specimens are known. The species are reported from Africa, Reunion Island, and Japan as saprobes on stems of various monocots in the Poales and Zingiberales. The exact phylogenetic relationship of *Boidinella* cannot be determined without DNA sequence data; however, its urniform basidia suggest a relationship to *Sistotrema* Fr. in the Cantharellales Gäum.

Boidinella is morphologically similar to *Dendrothele sensu stricto*. Both genera produce urniform to suburniform basidia, dendrohyphidia, and subglobose to ellipsoid basidiospores with cyanophilous walls. However, they differ significantly in several features. For example, the overall delicate, fragile nature of the hyphae, dendrohyphidia, cystidia, and basidia of *Boidinella* contrasts with the relative robustness of the same structures in *Dendrothele*. The basidia in *Boidinella* are consistently urniform or suburniform, whereas in *Dendrothele* basidia are clavate, subcylindrical, or pleural (Nakasone, 2006, 2009). Crystals are embedded throughout the basidiomata of *Dendrothele* species, probably as an adaptation to their preferred exposed habitat on bark of living trees and shrubs. In comparison, *Boidinella* species lack crystals and inhabit dead stems of monocots.

Other genera with similarities to *Boidinella* include *Sistotremella* Hjortstam, *Leptocorticium* Hjortstam & Ryvarden, and *Hypochnicium* J. Erikss. In *Sistotremella,* urniform basidia, always with 6-8 sterigmata, are significantly smaller, 8-18 × 3-6 µm, than those in *Boidinella*. Thus, basidiospores in *Sistotremella*, also with cyanophilous walls, are much smaller compared to those in *Boidinella*. Other differences between the two genera include the texture and thickness of the basidiomata (Eriksson *et al.*, 1984).

Shared features between *Leptocorticium* and *Boidinella* include soft, fragile basidiomata, delicate dendrohyphidia, obclavate leptocystidia, and being saprobic on monocots. The leptocystidia are narrower, 3-8 µm diam, in *Leptocorticium* compared to those in *Boidinella*. In *Leptocorticium*, however, the

basidiospore walls are thin and not cyanophilous. Furthermore, basidia in *Leptocorticium* are quite varied. In addition to urniform and suburniform forms, basidia may be cylindrical, clavate or subpleural (Nakasone, 2005).

Some *Hypochnicium* species have basidiomata with a soft, open texture and basidiospores with smooth, slightly thickened, cyanophilous walls similar to that found in *Boidinella*. Although basidia in *Hypochnicium* are sometimes described as suburniform, they are typically clavate and larger than those in *Boidinella*. Obclavate leptocystidia and dendrohyphidia are unknown among species of *Hypochnicium* (Bernicchia & Gorjón, 2010; Eriksson & Ryvarden, 1976).

Species descriptions

Boidinella globulispora* (Boidin & Lanq.) Nakasone, *comb. nov. Figs. 1-6

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≡ *Dendrothele globulispora* Boidin & Lanq., Bulletin Trimestriel de la Société Mycologique de France 112: 103. 1996.

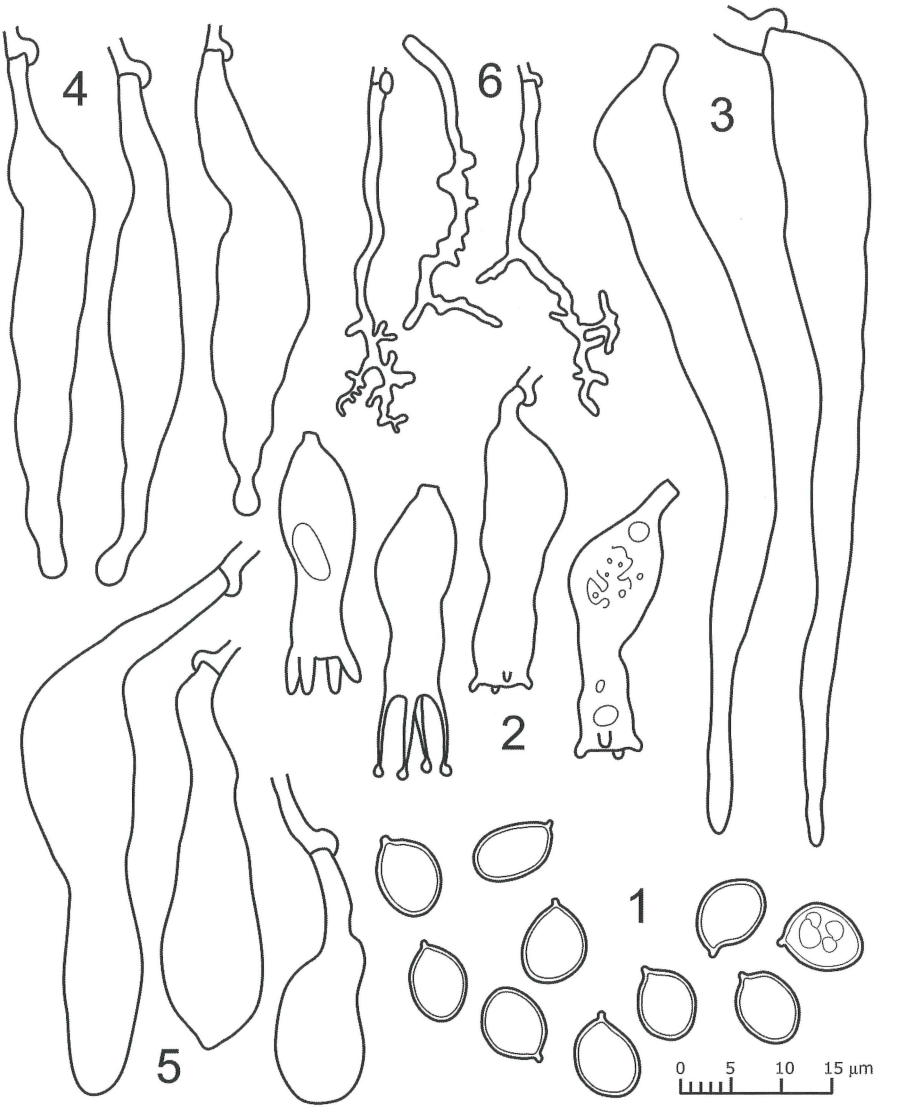
Basidiomata resupinate, widely effuse, linear to orbicular colonies becoming confluent, up to 10 × 2 cm, thin, up to 350 µm thick, adnate, smooth, following contours of substrate, soft, thickly farinaceous to membranous, yellowish white (4A2), pale yellow (4A3), or greyish orange (5B3), bruising brownish orange (5B4) near margins; cracks none; margins adnate, abrupt and distinct or thinning out, pruinose to subfelty. **Hyphal system** monomitic with clamped generative hyphae. **Subiculum** a loose tissue of distinct, even hyphae and embedded cystidia; subicular hyphae 1.5-2.5 µm diam, clamped, moderately branched, walls hyaline, thin, smooth, cyanophilous. **Hymenium** composed of dendrohyphidia, cystidia, and basidia. **Dendrohyphidia** scattered, intricately and finely branched, 30-40 × 1.5-2 µm, clamped at base, walls hyaline, thin, smooth. **Cystidia** of three types: (a) scattered, obclavate, elongate, tapering gradually to an obtuse apex, (30-)70-90(-125) × 8-19 µm, clamped at base, protruding 50 µm or more, walls hyaline, thin, smooth, cyanophilous; (b) enclosed, scattered to abundant, obclavate to subfusiform, apex moniliform or bulbous, 30-60 × 6-10 µm, clamped at base, terminal or lateral, walls hyaline, thin, smooth, cyanophilous; (c) enclosed, clavate to obclavate with rounded or subacute apices, 25-60 × 9-11 µm, clamped at base, often empty, occasionally dark pink in phloxine, walls hyaline, thin, smooth, cyanophilous. **Basidia** collapsed soon after maturity, urniform to suburniform, 23-32 × 7-8 µm, clamped at base, often with oleaginous contents, walls hyaline, thin, smooth, cyanophilous, 4-sterigmate, sterigmata up to 8 × 1 µm. **Basidiospores** broadly ellipsoid with a small apiculus, (7-)8-9(-9.3) × (5.5-)6-6.5(-7.2) µm, average (n = 35) 8.2 ± 0.7 × 6.2 ± 0.4, Q = 1.3, walls hyaline, up to 0.7 µm thick, smooth, cyanophilous, not reacting with Melzer's reagent.

Habitat: On corticate stem of *Trachyphrynium* Benth.

Distribution: Known only from type locality.

Specimen examined: Republic of Central Africa, La Maboké W.SW., sur *Trachyphrynium* sp. vivant en l'air, 11 Sep 1967, J. Boidin, LY 5867 (LY, holotype).

Remarks: *Boidinella globulispora* is characterized by a soft, farinaceous basidiomata, dendrohyphidia, protruding obclavate leptocystidia, enclosed cystidia, urniform basidia, and broadly ellipsoid basidiospores with hyaline, cyanophilous, and somewhat thickened walls. Its broadly ellipsoid basidiospores readily differentiated it from *B. cystidiolophora*. See Boidin *et al.* (1996) for another description and illustration.



Figs. 1-6. *Boidinella globulispora*, LY5867, holotype. 1. basidiospores; 2. basidia; 3. obclavate cystidia, protruding beyond hymenium; 4. cystidia with bulbous apices, enclosed in hymenium; 5. cystidia with rounded or subacute apices, enclosed in hymenium; 6. dendrohyphidia.

Boidinella cystidiolophora* (Boidin & Gilles) Nakasone, *comb. nov. Figs. 7-10

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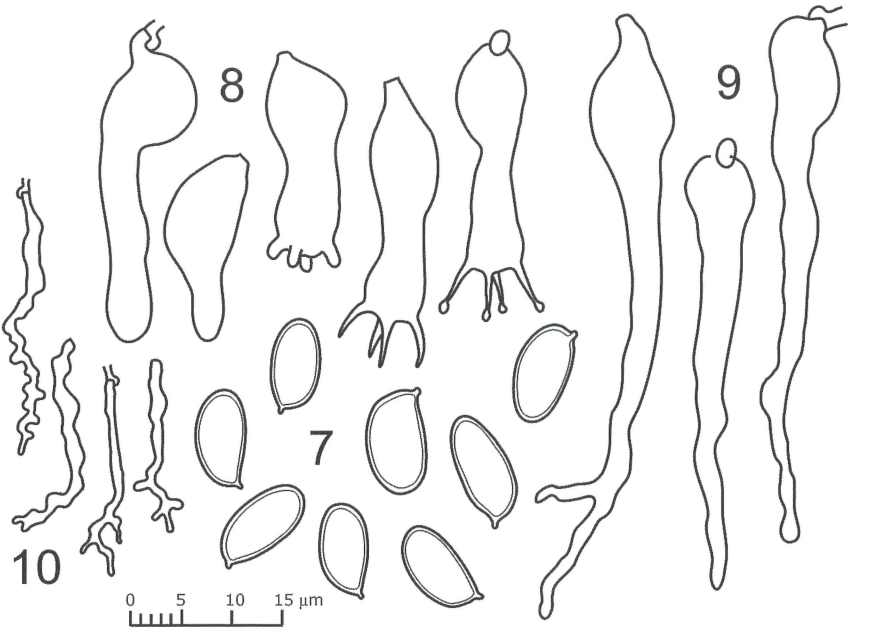
≡ *Sistotremella cystidiolophora* Boidin & Gilles, *Cryptogamie, Mycologie* 15(2): 137. 1994.

Basidiomata resupinate, widely effuse, colonies becoming confluent, up to 35 × 9 mm, thin, up 65 µm thick, loosely adnate, soft, fragile, smooth, finely farinaceous, off-white to yellowish white [(2-3)A2]; cracks none; margins adnate,



Figs. 7-10. *Boidinella cystidiolophora*, LY11429, holotype. 7. basidiospores; 8. basidia; 9. obclavate cystidia; 10. dendrohyphidia.

more or less distinct, rapidly thinning out, pruinose with fimbriate edges. **Hyphal system** monomitic with clamped generative hyphae. **Subiculum** a thin, agglutinated tissue of indistinct hyphae; subicular hyphae 1.5-2.5 µm diam, clamped, moderately branched, walls hyaline, thin, smooth. **Hymenium** composed of dendrohyphidia, cystidia, and basidia. **Dendrohyphidia** inconspicuous, intricately and finely branched, 17-25 × 1-2 µm, clamped at base, walls hyaline, thin, smooth. **Cystidia** scattered, fragile, obclavate, elongate, tapering gradually to an obtuse apex, simple or occasionally branched, 45-62 × 5-8 µm, clamped at base, protruding up to 30 µm, walls hyaline, thin, smooth. **Basidia** urniform to suburniform, 21-30 × 6-8 µm, clamped at base, walls hyaline, thin, smooth, cyanophilous, 4-sterigmate, sterigmata up to 6 × 1.5 µm. **Basidiospores** cylindrical to narrowly ellipsoid with a small apiculus, (9-)9.3-10.5(-10.7) × (4.3-)5-5.5 (-6.1) µm, average (n = 30) 9.9 ± 0.5 × 5.3 ± 0.4, Q = 1.9, walls hyaline, up to 0.7 µm thick, smooth, cyanophilous, not reacting with Melzer's reagent.

Habitat: On stems of *Nastus* Juss. and *Scirpus* L.

Distribution: Réunion, Japan (Maekawa & Nordén, 2002).

Specimen examined: La Réunion, Route du Maïdo (II-85), alt. 1680 m, *Nastus borbonicus* J.F.Gmel., 28 Avril 1985, G. Gilles, LY 11429 (LY, holotype).

Remarks: *Boidinella cystidiolophora* is characterized by a thin, finely pruinose basidioma with delicately branched dendrohyphidia, obclavate leptocystidia, urniform basidia, and cylindrical to narrowly ellipsoid basidiospores with hyaline, cyanophilous, and somewhat thickened walls. It has only one type of cystidium and narrower basidiospores compared to *B. globulispora*. For additional descriptions and illustrations see Boidin & Gilles (1994) and Maekawa & Nordén (2002).

DISCUSSION

In recent years, *Dendrothele* has undergone taxonomic scrutiny. Goranova (2003) demonstrated by molecular phylogenetic analyses that *Dendrothele* is highly polyphyletic with taxa distributed among eleven separate lineages in the hymenochaetoid, russuloid, polyporoid and euagaric clades. Others have shown that the generic type of *Dendrothele*, *D. griseocana* (Bres.) Bourdot & Galzin, is embedded the Agaricales and closely related to *Lachnella* Fr. and *Cyphellopsis* Donk (Binder *et al.*, 2005; Bodensteiner *et al.*, 2004; Larsson, 2007). Nakasone and others (Nakasone, 2006, 2009; Nakasone & Burdsall, 2011; Nakasone *et al.*, 2009) have segregated species of *Dendrothele sensu stricto* from other species, such as *Dendrothele globulispora*, that must be reclassified.

Boidinella is classified in the *Cantharellales* because of similarities in basidium form and development with *Sistotrema* Fr. and *Sistotremella*. Also, the soft basidioma texture and fragile nature of the microscopic structures of *Boidinella* is similar to that in *Botryobasidium* Donk, a member of the *Cantharellales*. Whether or not this classification is correct will have to await future molecular phylogenetic analyses of DNA sequences.

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