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Type studies of resupinate hydnaceous Hymenomycetes described by Patouillard

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Résumé – Les spécimens types de quatorze espèces résupinées ou piléaires, aiguillonnées (Basidiomycotina, Aphyllophorales) décrites par Patouillard ont été étudiées. Les espèces sont originaires d'Equateur, de la Guadeloupe, de Java, de Madagascar, de la Tunisie, du Venezuela et du Vietnam. Les nouvelles combinaisons *Beenakia hololeuca* (Pat.) Nakasone, *Hyphodontia ochroflava* (Pat.) Nakasone, *Phlebia citrea* (Pat.) Nakasone, *Scopulodontia latemarginata* (Pat.) Nakasone, et *Scopulodies subgelationsa* (Pat.) Nakasone sont proposées. En outre, la nouvelle combinaison *Phlebia subceracea* (Wakef.) Nakasone est proposée pour un taxon d'Australie semblable à *P. citrea*.

Abstract – Type specimens of fourteen resupinate or pileate, hydnaceous (Basidiomycotina, Aphyllophorales) species described by Patouillard were studied. The species are from Ecuador, Guadeloupe, Java, Madagascar, Tunisia, Venezuela, and Vietnam. New combinations *Beenakia hololeuca* (Pat.) Nakasone, *Hyphodontia ochroflava* (Pat.) Nakasone, *Phlebia citrea* (Pat.) Nakasone, *Scopulodontia latemarginata* (Pat.) Nakasone, and *Scopulodies subgelationsa* (Pat.) Nakasone are proposed. In addition, the new combination *Phlebia subceracea* (Wakef.) Nakasone is proposed for a taxon from Australia that is similar to *P. citrea*.

***Acia* / *Beenakia* / Corticiaceae / *Hydnum* / *Odontia* / *Radulum* / taxonomy / type specimens**

INTRODUCTION

Narcisse T. Patouillard (1854-1926) was a prolific and influential mycologist who described 111 new genera and nearly 1,900 new species of basidiomycetes, ascomycetes and their anamorphs, and zygomycetes (Pfister, 1977). Patouillard described several hydnaceous species of *Acia, Hydnum, Odontia,* and *Radulum* from Vietnam, Java, Ecuador, Guadeloupe, Venezuela, and Tunisia, including resupinate and pileate forms. Most of these species have not been examined since they were first described. This study was undertaken to provide detailed descriptions and illustrations of the fourteen type specimens available for study.

MATERIALS AND METHODS

Patouillard's type specimens were borrowed from the Farlow Reference Library and Herbarium of Cryptogamic Botany (FH) and Museum National d'Histoire Naturelle, Laboratorie de Cryptogamic (PC). Thin, freehand sections from the specimens were mounted in aqueous potassium hydroxide (2% weight/volume) and aqueous phloxine (1% w/v) or Melzer's reagent (Hawksworth *et al*., 1995, p. 437) and examined under an Olympus BH2 compound microscope. Drawings were made with a camera lucida attachment. An Olympus zoom stereo microscope, model SZH, with a DP10 digital camera system was used to take photographs of the hymenophores. Color names are from Kornerup and Wanscher (1978) or, if capitalized, from Ridgway (1912), and literature citations follow B-P-H/S (Bridson & Smith, 1991) for journals and the Taxonomic Literature second edition series (Stafleu & Cowan, 1976-1988) for books. Herbarium designations follow those of Holmgren *et al*. (1990).

TAXONOMIC PART

Acia sericea Pat. in Duss, *Énum. champ. Guadeloupe* p. 19. 1903.
≡ *Hydnum sericeum* (Pat.) Sacc. & D. Sacc. in Sacc., *Syll. fung*. 17: 151. 1905.
= ***Hyphodontia brevidens*** **(Pat.) Ryvarden**, *Occasional Papers of the Farlow Herbarium of Cryptogamic Botany* 18: 9. 1983.
Holotype: Guadeloupe, Camp Jacob, sur la racine sous ligneuses d'une scitaminée, no. 223 (FH).

Basidiome resupinate, effused, with a loose, open, porous texture, greyish orange (5B4), odontoid with very small spines, up to 300 × 80 µm, up to seven spines per mm, margin not observed. Hyphal system monomitic but appearing dimitic from tramal cystidia (pseudocystidia). Subicular hyphae with typical *Hyphodontia*-like aspect, 3-4 µm diam, nodose septate, walls thin to thick, hyaline, smooth. Tramal cystidia very long, with a basal clamp connection, arising from subiculum and forming core of spines, walls thick. Basidia 4-sterigmate, rare. Basidiospores subglobose to broadly ellipsoid, 4.5-5(-5.5) × 3.5-4.5 µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

Acia sericea is conspecific with *Hyphodontia brevidens*, a distinctive but rare species known from Brunei (Hjortstam *et al*., 1998), Ecuador, and Rwanda (Langer, 1994).

Hydnum chlorascens Pat., *Bulletin Trimestriel de la Société Mycologique de France* 18: 50. 1902.
= ***Kavinia alboviridis*** **(Morgan) Gilb. & Budington**, *Journal of the Arizona Academy of Science* 6 (2): 95. 1970.
Holotype: Tunisie, El Feidja, tronc de chêne liege (*Quercus suber* L.), 19 Avril 1901 (FH).

Basidiome resupinate, widely effused, 12 × 2 cm, hydnaceous with thin, smooth or felty areas between spines, soft, pale yellow (4A3) or light orange (5A4) to olive brown [4(E-F)8] or yellowish brown (5B8); spines subulate, up to 3 × 0.3 mm, 3-4 spines per mm, soft, smooth, gradually tapering to an acute apex, at

first pale yellow or orange then becoming olive brown to brown; margin adnate, fimbriate with radiating cordons, white to pale orange, sterile. Hyphal system monomitic. Subicular hyphae 1.8-3.5 µm diam, nodose septate, walls thick to slightly thickened, hyaline to light brown, smooth. Cystidia none. Basidia rare, clavate, 26-32 × 6 µm, tapering to 2-2.5 µm diam, with a basal clamp, 4-sterigmate, walls thin, hyaline, smooth. Basidiospores abundant, fusiform, 7-8(-10) × 2.8-3.5 µm, walls thin, yellow to light brown, finely spinose, negative in Melzer's reagent.

Hydnum chlorascens is conspecific with *Kavinia alboviridis*. The type specimen is a large collection of five pieces that is in good condition with numerous basidiospores on the hymenial surface, although basidia were rarely observed.

Hydnum citreum Pat. in Pat. & Lagerh., *Bulletin de l'Herbier Boissier* 3: 55. 1895. Figs. 1, 3, 4

≡ ***Phlebia citrea* (Pat.) Nakasone, *comb. nov.***

Holotype: Ecuador, Pululahua, sur troncs pourris, leg. de Lagerheim (FH).

Basidiome widely effused, 9 × 15 mm, closely adnate, hydnaceous to plicate, with smooth, felty, subfelty, to porose areas between spines and folds, 70-125 µm thick, ceraceous to subceraceous, with a mottled appearance from the contrasting dark spines and light-colored hymenial areas; cracks developed in localized areas; context cream-colored; hymenophore composed of tubercules and folds, spines cylindrical, up to 0.8 × 0.2 mm, 3-4 spines per mm, terete, single or sometimes fused at base, ceraceous, smooth, with an obtuse, rounded apex, mature tubercules brownish orange [5C(4-6)], golden brown (5D7) to brown (6E7) with thin, light yellow (4A5) to light orange (5A4) areas between spines, spines becoming smaller and light orange (5A4) toward margins, folds narrow, up to 1 mm long, rarely branched, sometimes radiating; margin indistinct or slightly raised, cream-colored, felty to fimbriate.

Hyphal system monomitic, composed of nodose-septate generative hyphae. Spines composed of a central core of agglutinated hyphae, sometimes with a pseudoparenchymatous aspect, enclosed by distinct subhymenial and hymenial layers; hyphae and hymenial elements coated with a thin layer of brownish yellow mucilaginous material that does not react or dissolve in KOH, occasionally hyphae in base of tubercules heavily encrusted with hyaline, crystalline materials. Subiculum 50-70 µm thick, composed of agglutinated hyphae arranged parallel to substrate; subicular hyphae 2.2-5 µm diam, nodose septate, sparingly branched, walls thin, hyaline, coated with mucilaginous materials; occasionally wider hyphae (4-5 µm diam) adjacent to substrate heavily encrusted with closely appressed, hyaline, crystalline material. Subhymenium up to 18 µm thick, composed of short-celled, non-agglutinated hyphae in a compact, dense tissue; subhymenial hyphae 1.5-3 µm diam, nodose septate, frequently branched, walls thin, hyaline, coated with brownish yellow mucilaginous material. Hymenium composed of cystidia and basidia in a dense palisade. Cystidia fusiform with a rounded apex, 30-40 × 4-5.5 µm, tapering to 1.5-2 µm diam at base, with a basal clamp connection, protruding up to 20 µm, walls thin, hyaline, smooth or coated with yellow mucilaginous material. Basidia narrowly clavate, 16-25 × 3-4 µm, tapering to 1.5-2 µm diam at base, with a basal clamp connection, 4-sterigmate, walls thin, hyaline, smooth or coated with yellow mucilaginous material. Basidiospores short cylindrical to ellipsoid, 4-5 × (1.8-) 2-2.2 µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

Additional specimen examined: U.S.A., Louisiana, E. Baton Rouge Parish, Jefferson Hwy, Cazedessus residence, on corticate branch of *Quercus nigra* L., 9 April 1982, M. Blackwell 636 (ARIZ, CFMR).

Figs. 1-2. Camera lucida drawings of microscopic elements from basidiomes. Fig. 1, *Hydnum citreum* (holotype), a, cystidia; b, basidia; c, basidiospores. Fig. 2, *Hydnum glaucum* (holotype), a, subicular hyphae; b, basidia; c, basidiospores; d, fascicles of hyphae protruding through spine.

The holotype is in good condition although basidia and basidiospores were not observed in all parts of the specimen. The specimen apparently has darkened from the original yellow-orange color described by Patouillard and de Lagerheim (1895). The fragile and inconspicuous cystidia should be observed before squashing the mounted sections. The plicate hymenophore is slightly developed and was observed only in one area near the margin; nevertheless, this is a critical feature of this species. The ceraceous texture and plicate hymenophore of the basidiome, fusiform cystidia, narrowly clavate basidia, and small, cylindrical basidiospores indicate that *H. citreum* is congeneric with *Phlebia* species. This is consistent with Patouillard and de Lagerheim's (1895) observation that *H. citreum*

is similar to *H. fuscoatrum* Fr. (≡ *Phlebia fuscoatra* (Fr.) Nakasone). *Phlebia citrea* is most similar to *Acia subceracea* Wakef. Both taxa have spines with rounded apices and cystidia of similar shape and size. *Acia subceracea,* originally described from Australia, has slightly larger basidiospores (5-6 × 2.5-3 μm) and spines (1.5 × 0.3 mm). Thus, the new combination, *Phlebia subceracea* (Wakef.) Nakasone, *comb. nov*. (Basionym: *Acia subceracea* Wakef., *Transactions of the Royal Society of South Australia* 54: 155. 1930), is proposed.

Hydnum glaucum Pat., *Annales du Jardin Botanique de Buitenzorg, Supplement* 1: 115. 1897.

Figs. 2, 5, 6

Holotype: Java, forêt de Tjibodas, Janv. 1895, leg. Massart no. 1227 (FH).

Basidiome resupinate, effuse, developing a few knobby outgrowths, 5 × 5 mm, that support spines, hydnaceous with distinct smooth areas between spines, up to 1.5 mm thick excluding spines, sometimes developing tubercules on spines, ceraceous, light brown [6D(4-5)], greyish brown (6F3), or brown (6F4) with patches of greyish orange (5B4); no cracks developed; not reacting to KOH; context bilayered with a brown, ceraceous upper layer, up to 150 μm thick, and a thicker, off-white, membranous lower layer, up to 1.3 mm thick; spines subulate, tapering gradually to an acute, entire apex, up to 5 × 0.5 mm, 2-5 spines per mm, single or fused at base, often procumbent and fused to basidiome surface, terete, ceraceous or brittle, smooth but procumbent spines developing small warts, brown, glaucous, at apex brownish yellow to off-white; margin not observed.

Hyphal system monomitic with nodose-septate generative hyphae. Spines composed of an inner core of tramal hyphae arranged in parallel, then developing a dense, narrow (20-30 μm thick), brownish yellow subhymenial layer and a narrow (20-60 μm thick), dark brown hymenial layer, apex sterile with protruding tramal hyphae encrusted with crystalline and brownish yellow mucilaginous material; tramal hyphae 2-5.5 μm diam, nodose septate, sparingly branched, lumen narrow and pulling away from walls, walls thin to thick, hyaline, smooth. Subiculum in lower part next to substrate a dense tissue of intertwined hyphae interspersed with hyphal strands running parallel to substrate, in upper part developing lacunae and hyphae becoming vertical; subicular hyphae 2-7 μm diam, nodose septate, rarely branched and developing H-connections in hyphal strands to frequently branched, often branches short and knobby, walls hyaline, up to 1.8 μm thick, smooth. Subhymenium thickening, up to 65 μm thick, a compact, dense tissue of vertically oriented hyphae; subhymenial hyphae 1.5-3 μm diam, nodose septate, short-celled, irregular, frequently branched. Hymenium composed of a dense, compact palisade of basidia and fascicles of hyphae. Fascicles of hyphae scattered over hymenial surface, up to 45 μm broad, protruding up to 30 μm, often covered by hyaline, mucilaginous substance, composed of undifferentiated, cylindrical, unbranched, aseptate, thin-walled hyphae, 1.5-3 μm diam, with rounded, obtuse apices. Basidia cylindrical to narrowly clavate, 14-20 × 2-3.5 μm, tapering to 1.5-2 μm diam at base, nodose septate at base, 4-sterigmate, sterigmata slender, up to 3.5 μm long. Basidiospores narrowly cylindrical to allantoid, 5-6 × 1-1.3 μm, walls thin, hyaline, smooth, negative in Melzer's reagent.

This striking species is characterized by long spines with a glaucous cast, densely intertwined, thick-walled subicular hyphae, small, slender basidia, and narrowly cylindrical to allantoid basidiospores. The knobby outgrowths and hyphal fascicles are important, cryptic features. The generic placement of *H. glaucum* is

Figs. 3-13. Close-up photographs of basidiome hymenophores. Figs. 3 and 4, *Hydnum citreum* (holotype). Figs. 5, *Hydnum glaucum* (holotype). Fig. 6, *Hydnum glaucum* (holotype) tubercules developed on procumbent spines. Figs. 7 and 8, *Hydnum ochroflavum* (holotype). Fig. 9, *Odontia latemarginata* (holotype). Fig. 10, *Odontia leucacantha* (holotype). Fig. 11, *Odontia subgelationsa* (holotype). Figs. 12 and 13, *Radulum calceum* (holotype). Bar equals 1 mm.

not known; however, basidia, basidiospores, and the thick-walled subicular hyphae are reminiscent of those found in *Dacryobolus sudans* (Fr.) Fr.

Hydnum hololecum Pat., *Bulletin du Muséum National d'Histoire Naturelle* 30: 410. 1924.
Fig. 14
≡ ***Beenakia hololeuca* (Pat.) Nakasone, *comb. nov.***
Holotype: Madagascar, Sakaramy, Province de Diègo Suarez, sur les vieux bois, 20 Mars 1917, Wanch 101 No. 2, leg. M. Poisson (PC).

Basidiome pileate, specimen consists of two spathulate pieces, 22 × 18 mm and 21 × 12 mm, narrowed to about 7 mm at base, sessile, apparently laterally attached, pileus upper surface with smooth areas and shallow ridges and furrows, up to 3 mm thick, fragile, soft, brown (6D6) to yellowish brown (5D5) with scattered brown (6E6) areas, lower surface with a hydnaceous hymenophore; context white, friable; spines cylindrical to conical, with acute apices, up to 2 × 0.2-0.3 mm, 4 spines per mm, terete to compressed, occasionally fused, smooth, brittle, soft, light brown (6D6) to pale orange (5A3), distinct smooth areas between spines disappear as spines become larger; margin smooth at first, then developing small spines.

Hyphal system monomitic with nodose-septate generative hyphae. Pileus trama composed of moderately dense, intertwined hyphae; pileal hyphae 2-5 μm diam, nodose septate, even, occasionally branched, walls thin, hyaline smooth. Spines composed of a core of tramal hyphae in parallel enclosed by subhymenial and hymenial layers; tramal hyphae 2.5-4 μm diam, nodose septate, even, infrequently branched, occasionally with H-connections, forming the sterile apex, walls thin, hyaline, smooth. Subhymenium 10-20 μm thick, composed of short-celled,

Figs. 14-15. Camera lucida drawings of microscopic elements from basidiomes. Fig. 14, *Hydnum hololeucum* (holotype), a, hyphae from pileus trama; b, basidia; c, basidiospores; d, hyphae from spine apex. Fig. 15, *Hydnum ochroflavum* (holotype), a, cystidia, sphaeropedunculate type; b, cystidia, torulose type; c, basidia; d, vegetative lagenocystidia; e, basidiospores.

much branched hyphae. Hymenium up to 10 µm thick, a palisade of primarily immature basidia. Cystidia absent. Basidia obclavate at first, often curved at base, 12-18 × 6-8 µm, tapering to 1.5-2 µm diam at base, with a basal clamp, 4-sterigmate, walls thin, hyaline, smooth. Basidiospores ellipsoid, 4.5-5.5 × 3.2-4(-4.5) µm, walls thick to slightly thickened, hyaline, asperulate, not reacting in Melzer's reagent.

The holotype specimen is in good condition except for the scarcity of mature basidia. *Beenakia hololeuca* appears to be closely related to *B. subglobospora* Nuñez & Ryvarden (Nuñez & Ryvarden, 1994) especially when comparing basidiospore size and shape; however, discrepancies in basidiome form and upper pileus surface texture remain. A comparative study of the two taxa is necessary to determine if they are conspecific.

Hydnum ochroflavum Pat., *Bulletin du Muséum National d'Histoire Naturelle (Paris)* 29: 337. 1923.
Figs. 7, 8, 16
≡ ***Hyphodontia ochroflava*** **(Pat.) Nakasone,** ***comb. nov.***
Holotype: (Vietnam), Annam, Nha Trang, 4 July 1922, leg. Poilane no. 4379 (PC).

Basidiome resupinate, widely effused, largest piece 9 × 4.5 cm (up to 30 × 15 cm, Patouillard 1923), adnate, up to 1.5 mm thick (including prostrate spines), hydnaceous, spines crowded, dense, soft, brittle; no cracks observed; spines cylindrical, terete or compressed, up to 3 × 0.1-0.3 mm, 3-5 spines per mm, apices acute or rounded, fused at the base or laterally, often prostrate and fused to substrate, smooth to finely tomentose especially at base, brownish orange [5C(5-6)], Cinnamon-Buff, Tawny Olive, or Buckthorn Brown, with patches of Saccardo's Umber; margin not observed.

Hyphal system monomitic with nodose-septate generative hyphae. Spines with a central core of parallel, somewhat thick- to thick-walled tramal hyphae, which superficially resemble skeletal hyphae, surrounded by subhymenial and hymenial layers, often with lagenocystidia developed on vegetative hyphae at base of spines; tramal hyphae 2-4 µm diam, nodose septate, sparingly branched, walls up to 1 µm thick, hyaline to dark yellow, smooth. Subhymenium up to 20 µm thick; subhymenial hyphae 2-3 µm diam, nodose septate, short-celled, frequently branched, walls thin, hyaline, smooth. Hymenium a dense palisade of cystidia and basidia. Cystidia of three types: (1) lagenocystidia rare in hymenium, lageniform, 16-22 × 2.5-4 µm, tapering to 1.5 µm diam at base, terminal, with a basal clamp connection, walls thin, hyaline, encrusted at apex with hyaline crystals; frequently developed on vegetative hyphae at base of spines, lageniform to acicular, 15-25 × 1-2.5 µm, lateral, arising at right angles, lacking basal clamp or septum, walls thin to thick, hyaline, encrusted at apex with loosely adherent, hyaline crystals; (2) torulose, cylindrical to slenderly clavate, capitate, often with an apical papilla, scattered throughout hymenium, (12-)19-40 × 3-4 µm, tapering to 1.5-2 µm diam at base, with a basal clamp connection, enclosed, walls thin, hyaline, smooth; (3) sphaeropedunculate with a long stalk, rarely found in the apex of spines, 30-38 × 6-6.5 µm, walls thin, hyaline, smooth. Basidia rare, broadly clavate with a slight median constriction, 10-15 × 3-4 µm, clamped at base, 4-sterigmate, walls thin, hyaline, smooth. Basidiospores cylindrical to narrowly ellipsoid, flattened on adaxial side, 4.5-5 × 2-2.5(-3) µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

The hydnaceous hymenophore, lagenocystidia, torulose cystidia, and ellipsoid basidiospores together distinguish *Hyphodontia ochroflava* from other species of *Hyphodontia*. An unusual feature of *H. ochroflava* is the development of lagenocystidia on vegetative hyphae at the base of the spines. These lagenocystidia are produced laterally, at right angles on supporting hyphae and often lack the characteristic flask shape. Another important feature is the somewhat thick- to

Figs. 16-19. Camera lucida drawings of microscopic elements from basidiomes. Fig. 16, *Odontia latemarginata* (holotype), a, encrusted cystidia; b, basidiospores. Fig. 17, *Odontia leucacantha* (holotype), a, subicular hyphae; b, microbinding hyphae; c, basidiospores; d, hyphidia; e, basidium; f, cystidia. Fig. 18, *Odontia subgelatinosa* (holotype), a, tramal cystidia; b, hymenial cystidia; c, basidiospores. Fig. 19, *Radulum calceum* (holotype), a, ampullate hyphae from hyphal cords; b, hyphae from spine apex; c, basidia; d, basidiospores; e, hyphae protruding through spine apex.

thick-walled tramal hyphae of the central spine that superficially resemble skeletal hyphae. *Hyphodontia ochroflava* is closely related to *H. arguta* (Fr.) John Erikss. that possesses significantly broader basidiospores (4.5-6 × 3.5-4 µm).

Hydnum tropicale Pat. & Gaillard, *Bulletin Trimestriel de la Société Mycologique de France* 4: 38. 1888.
≡ *Mycoleptodon tropicale* (Pat.) Pat., *Essai tax. Hyménomyc*. p. 117. 1900.
Holotype: (Venezuela, Région de Haut-Orénoque), Atures, Août, 1887, leg. A. Gaillard no. 215 (FH).

Basidiome imbricate, pileate, entire specimen 33 × 22 mm, pilei up to 5 mm wide, upper pileus surface smooth, light orange (5A4), greyish orange (5B4) or brownish orange (5C4), lower pileus surface with spines, spines up to 360 × 180 µm, 4-5 spines per mm, single, terete, conical, tapering to an acute apex, pale orange (5A3) to light orange (5A4); margins sterile and smooth, later developing small tubercules and ridges. Hyphal system dimitic, composed of nodose-septate generative and thick-walled, skeletal hyphae. Skeletal hyphae 2-3.5 µm diam, clamped at base, unbranched or with a short appendage near base, distributed throughout spines, walls thick, hyaline, smooth. Hymenium degraded. Cystidia (pseudocystidia) clavate with a long stalk, sometimes with swellings, 68-160 × 6-7 µm, tapering to 2-3 µm diam at base, clamped at base, originating in spine trama and curving into hymenium, walls thick but thinning at base, hyaline, encrusted at apex. Basidia and basidiospores not observed, although small, globose spores of a contaminating hyphomycete were seen.

Because of the degraded hymenophore, it is not possible to identify this specimen. The pilei, spines, dimitic hyphal system, and tramal cystidia suggest that *Hydnum tropicale* is probably a species of *Steccherinum.*

Odontia andina Pat. in Pat. & Lagerh., *Bulletin de l'Herbier Boissier* 3: 56. 1895.
Holotype: (Ecuador), Pululahua (on rotten wood and bark), Mars 1892, leg. de Lagerheim, *ut Kneiffia andina* (FH).

Basidiome resupinate, adnate, effused, up to 20 × 7 mm, composed of coalescing, small, white, orbicular patches with abrupt, defined margins, 1 × 2 mm, finely spinose, spines 100 × 55 µm, 8-10 spines per mm. Hyphal system monomitic, generative hyphae with clamp connections. Spines composed of branched dendrohyphidia and abundant, coarse, hyaline crystals. Basidia rare, broadly clavate, 25-30 × 7-9 µm, tapering to 3-3.5 µm at base, clamped at base, with two sterigmata. Basidiospores rare, globose to subglobose, 8-12 × 7-10 µm, with a distinct, papillate apiculus, walls thin to slightly thickened, hyaline, smooth, negative in Melzer's reagent.

The month is recorded differently in the protologue (as "Février") and on the holotype label (as "Mars"). Fertile areas are difficult to find in the holotype, and the microscopic features are obscured by numerous crystals. Frequently, only fragments of clamped hyphae were observed. This specimen is a species of *Dendrothele*. Although similar to *Dendrothele griseocana* (Bres.) Bourdot & Galzin in the developing sterile spines of dendrohyphidia, *O. andina* differs by having clamped hyphae and larger basidiospores.

Odontia badia Pat., *Journal de Botanique (Morot)* 11: 342. 1897.
≡ ***Phlebia badia* (Pat.) Nakasone,** *Mycotaxon* 81: 487. 2002.
Holotype: (Vietnam), HN, Thinh Chaû, vieux tronc de *Psidium guyara*, 13 Xbre (December) 1891, leg. Bon no. 4969 (FH).

Phlebia badia was recently described and illustrated by Nakasone (2002). It is characterized by slender, ceraceous spines, a dimitic hyphal system of simple-septate generative and thick-walled, partially dextrinoid skeletal hyphae, and clavate cystidia capped with a globular, dark yellow, resinous-like substance. The condition of the holotype specimen is only fair. The specimen is overgrown with several species of hyphomycetes, and well-developed spines are present only on the edges of several pieces of bark. Basidiospores, cystidia, and tramal hyphae were observed, but not basidia and subicula.

Odontia hirta Pat., *Journal de Botanique (Morot)* 11: 342. 1897.
Non *Odontia hirta* Fuckel, *Jahrbuch Nassauischen Vereins für Naturkunde* 23-24: 22. 1870.
= *Odontia patouillardii* Sacc. & P. Syd., *Syll. fung*. 14: 210. 1899.
= ***Scopulodontia latemarginata* (Pat.) Nakasone**
Holotype: (Vietnam, Tonkin), HN, Văn Xá (Vô Xâ), 21 Octobre 1891, leg. Bon no. 4896 (FH).

Basidiome in ten pieces, the largest a roughly rectangular piece 8 × 4 cm, effused, appressed, tuberculate with distinct smooth areas between tubercules, up to 250 μm thick exclusive of tubercules, crustaceous-ceraceous; cracks scattered, deep; context homogenous, ceraceous, compact; tubercules cylindrical with rounded apices, up to 1.5 mm long, (1-)2-3 per mm, single or clustered, finely tomentose from projecting cystidia, greyish orange (5B4) to light brown (6D4) or brownish orange (6C4); margin not observed.

Hyphal system monomitic, composed of nodose-septate, generative hyphae. Subiculum absent. Subhymenium thickening, up to 230 μm thick, ceraceous, with numerous, embedded encrusted cystidia throughout trama; subhymenial hyphae agglutinated, not separable. Hymenium degraded, composed only of cystidia. Cystidia numerous, fusiform with acute apices, 45-60 × 7-9 μm, tapering to 2-3 μm diam at the base, with a basal clamp, developing throughout basidiome, walls slightly thickened, hyaline, smooth or moderately to heavily encrusted with hyaline, granular or crystalline materials. Basidia not observed. Basidiospores scarce, ellipsoid, 3.5 × 2.2 μm, walls thin, hyaline, smooth. Small ellipsoid spores with truncate ends from a contaminating hyphomycete were observed.

Although basidiospores are scarce and basidia were not observed in the type specimen, there is no doubt that *O. hirta* is conspecific with *O. latemarginata* Pat.

Odontia latemarginata Pat., *Journal de Botanique (Morot)* 11: 342. 1897.
Figs. 9, 16
≡ ***Scopulodontia latemarginata* (Pat.) Nakasone, comb. nov.**
= *Odontia hirta* Pat., *Journal de Botanique (Morot)*11: 342. 1897.
= *Odontia patouillardii* Sacc. & P. Syd., *Syll. fung*. 14: 210. 1899.
= *Odontia tessellata* G. Cunn., *Transactions of the Royal Society of New Zealand* 86(1): 89. 1959.
= *Scopulodontia loricata* Hjortstam & P. Roberts, *Kew Bulletin* 53 (4): 821. 1998.
Holotype: (Vietnam, Tonkin), TH, Bái Thôn, in putrido trunco, 14 Junis 1892, leg. Bon no. 5450 (FH).

Basidiome effused, broken up in many pieces, largest fragment 5 × 2.5 mm, closely attached to substrate, smooth and felty to verrucose, up to 450 μm thick excluding tubercules, ceraceous, yellowish white to pale yellow [4A(2-3)] or greyish orange to brownish orange [5(B-C)4]; cracks few, shallow to deep, sometimes on drying the cracked edges detach from the substrate and curve upward;

context ceraceous, sometimes distinctly stratified with narrow, dark brown lines alternating with thicker, cream-colored lines; tubercules up to 1 × 0.25 mm, up to 5 spines per mm, finely tomentose and glaucous from projecting cystidia, with white, rounded, smooth apices; margin not observed.

Hyphal system monomitic, composed of nodose-septate generative hyphae. Subiculum 100-200 µm thick, composed of a dense, golden yellow, compact lower layer of agglutinated hyphae running parallel to substrate and an upper layer of vertical, short-celled, agglutinated hyphae; subicular hyphae 2-5(-7) µm diam, nodose septate, walls thin to 1.5 µm thick, smooth, hyaline to golden yellow. Subhymenium thickening, stratified, 100-200 µm thick, a dense, agglutinated tissue of hyphae and embedded cystidia, 50-60 µm thick, layered between thin, golden yellow layers of dense, agglutinated hyphae and lacunae, 20-35 µm thick; subhymenial hyphae 2-3 µm diam, nodose septate, walls thin, hyaline, smooth. Hymenium a dense palisade of cystidia and basidia, ~50 µm thick. Cystidia cylindrical to fusiform, 30-65 × 4-9 µm, including encrustations, tapering to 1.5-3 µm diam at base, with a basal clamp connection, embedded throughout subhymenium and tubercule trama, protruding up to 27 µm, walls thin to 1 µm thick, hyaline, encrusted with loosely adherent crystals. Basidia not observed. Basidiospores rare, ellipsoid, 3.5-4.5(-4.7) × 2.2-2.5(-2.8) µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

Additional specimens examined: BRUNEI. Temburong District, Belalong Field Centre, by river on rotten decorticated log, 17 March 1992, Spooner B440, K(M) 43726 (holotype of *Scopulodontia loricata*: K); Sungai Belalong, riverside track near Field Centre, on rotten log, 21 March 192, Spooner B587, K(M) 28122 (paratype of *S. loricata*, K). NEW ZEALAND. Otago, Ulva, Stewart Island, on bark of *Weinmannia racemosa* Linn.f., 18 Feb. 1954, J.M. Dingley, PDD 18041 (holotype *of Odontia tessellata*: PDD).

This striking species is immediately identifiable because of the stratified, rimose, dense basidiomes with rounded tubercules, encrusted, thickwalled cystidia, and small, ellipsoid basidiospores. Although the holotype specimen of *O. latemarginata* lacks basidia, it is otherwise morphologically similar to *S. loricata* and *O. tessellata*. The holotype specimen of *Odontia tessellata* is a particularly fine, extensively rimose, and well-developed specimen with the largest piece measuring 15 × 7 cm. The paratype specimen of *S. loricata* from Ecuador (on wood, T. Læssøe TL-155, K(M) 55757 (K)) differs from the holotype specimen of *S. loricata* by its longer (up to 2 mm), brittle, smooth, cylindrical spines, slightly shorter and narrower cystidia (25-50 × 5-6.5 µm), and short-ellipsoid basidiospores (only 3-3.5 µm long). Other differences in texture and thickness of the basidiome suggest that the Ecuadorian specimen is congeneric with *S. loricata* but probably is a different taxon.

See Hjortstam *et al.* (1998, as *S. loricata*) and Cunningham (1959, as *O. tessellata*) for additional descriptions and illustrations of *S. latemarginata*.

Odontia leucacantha Pat., *Bulletin Trimestriel de la Société Mycologique de France* 40: 33. 1924.
Figs. 10, 17
Holotype: (Vietnam, Tonkin), ravin á Nam-Kep, sur troncs morts, Juillet 1922, leg. M. Petelot no. 457 (FH).

Basidiome resupinate, appressed, widely effused, 90 × 45 mm, closely adnate, smooth, tuberculate to hydnaceous, with or without smooth areas between the spines, up to 350 µm thick exclusive of spine, ceraceous, Buckthorn Brown to Tawny Olive with a glaucous cast (from encrusted fascicles of hyphae protruding

from spines), turning reddish purple then black in KOH; not cracking on drying; context membranous, bright yellow; spines terete to conical, 100-500 × 100-400 µm, 3-4 spines per mm, single or fused, ceraceous, tapering to an obtuse apex with penicillate, refractive bristles protruding up to 100 µm; margin slightly raised to raised, pale cream, even, distinct, fimbriate or indistinct and thinning out.

Hyphal system dimitic with nodose-septate generative and microbinding hyphae. Spines composed of a trama of agglutinated generative hyphae at the core surrounded by a thickening subhymenium and a hymenial layer, with narrow columns of fascicled, heavily encrusted hyphae traversing from the base and protruding through the apex. Subiculum up to 250 µm thick, consisting of a basal, ceraceous layer of dense, agglutinated hyphae arranged parallel to substrate, up to 100 µm thick, then developing an upper, lacunose layer consisting of vertical, agglutinated hyphae; subicular hyphae 2-5 µm diam, nodose septate, rarely branched, walls thin to 2 µm thick (in basal layer), hyaline, smooth; microbinding hyphae abundant in substrate, 0.5-2 µm diam, aseptate, frequently branched, walls up to 1 µm thick, hyaline, smooth. Subhymenium thickening, up to 30 µm thick, a tissue of vertically arranged, compact, short-celled, collapsed hyphae; subhymenial hyphae 2-3 µm diam, nodose septate, walls thin, hyaline, smooth. Hymenium an agglutinated, compact palisade of basidia, cystidia, and hyphidia. Hyphidia rare, cylindrical, slightly enlarged at base or apex, 30-40 × 3 µm, tapering to 2 µm diam at base, with a basal clamp, walls thin, hyaline, smooth. Cystidia broadly clavate to cylindrical with a small apical papillae, with or without a stalk, (14-)18-22 × 4.5-9.5 µm, tapering to 1.5-2 µm diam at base, clamped at base, walls thin, hyaline, smooth. Basidia rare, clavate, 20 × 5 µm, tapering to 2 µm at base, 4-sterigmate, walls thin, hyaline, smooth. Basidiospores ellipsoid, (4-)4.5-5 × 2-2.5 µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

The holotype consists of a continuous basidiome developed on decorticated wood and appears to be in good condition. However, at the microscopic level, the agglutinated nature of the tissue makes it difficult to see hyphae and hymenial elements. Patouillard did not observe basidiospores, but they are present in the younger hymenial areas. The hymenophore varies from smooth to hydnaceous. The hymenial reaction in KOH, dimitic hyphal system, and papillate cystidia are diagnostic for species in the *Phlebia chrysocreas* (Berk. & M. A. Curtis) Burds. group. The final disposition of this species is deferred until the taxa within the *P. chrysocreas* species complex are resolved.

Odontia subgelatinosa Pat., *Bulletin Trimestriel de la Société Mycologique de France* 36: 33. 1924.
Figs. 11, 18
≡ ***Scopuloides subgelatinsoa*** **(Pat.) Nakasone, comb. nov.**
Holotype: (Vietnam, Tonkin), ravin á Nam-Kep, sur tronc pourri, Juillet 1922, leg. M. Petelot no. 468 (FH, isotype BPI).

Basidiome resupinate, widely effused, 7 × 1.5-3 cm, hydnaceous to odontoid with distinct smooth areas between spines, 100-300 µm thick exclusive of spines, ceraceous, greyish brown (6D3), light brown [6(C-D)(4-5)], greyish brown (7D3), light brown (7D4), or brown (6D6); cracks locally abundant; context thin, ceraceous; spines cylindrical, up to 350 × 100-150 µm, 4-6 spines per mm, single or fused at base, finely pubescent from protruding cystidia, with a rounded, obtuse apex; margin indistinct, gradually thinning out.

Hyphal system monomitic, composed of simple-septate generative hyphae. Subiculum up to 150 µm thick, a dense, compact tissue of tightly agglutinated hyphae; subicular hyphae 2.5-4.5 µm diam, simple septate, moderately bran-

ched, agglutinated, walls up to 2 µm thick, hyaline, smooth. Subhymenium not observed. Cystidia of two types: (1) tramal cystidia (pseudocystidia) embedded in spines and subiculum, narrowly clavate with an obtuse apex or fusiform with an acute apex, 50-70 × 7-8 µm, with long stalks tapering to 2-3 µm diam at base, simple septate at base, walls up to 2.5 µm thick, hyaline, encrusted with hyaline crystals at distal end; (2) metuloid hymenial cystidia developed in subhymenium and curving into hymenium, protruding up to 10 µm beyond hymenium, clavate to broadly fusiform with acute or rounded apices, 25-40 × 5.5-8 µm, up to 20 µm wide including encrustations, tapering to 2-3 µm diam at base, simple septate at base, walls up to 2.5 µm thick, hyaline, encrusted with adherent, coarse, hyaline crystals. Basidia not observed. Basidiospores rare, scattered, ellipsoid, 2.7-3 × 1.3-1.8(-2) µm, walls thin, hyaline, smooth, negative in Melzer's reagent.

The holotype and isotype specimens consist of three and four rectangular pieces, respectively, on decorticated wood and are in good condition although no basidia were observed. The ceraceous basidiome, spiny hymenophore, simple septate generative hyphae, metuloid cystidia, and small basidiospores indicate that *O. subgelatinosa* is congeneric with *Scopuloides*. The basidiospores in *S. subgelatinosa* are significantly smaller than those in *S. rimosa* (Cooke) Jülich and *S. hydnoides* (Cooke & Massee) Hjortstam & Ryvarden.

Radulum calceum Pat., *Bulletin Trimestriel de la Société Mycologique de France* 15: 20. 1899.

Figs. 12, 13, 19

= *Trechispora nivea* (Pers.) K. H. Larsson, *Symbolae Botanicae Upsalienses* 30: 110. 1995.

Holotype: (Guadeloupe), sur le tronc pourri d'un *Andira racemosa*, 18 Mais 1898, Camp Jacob, (leg. Duss) no. 575 (FH).

Basidiome resupinate, appressed, widely effuse, soft, fragile, hydnaceous with extensive smooth, fertile, felty areas among spines, up to 200 µm thick excluding spines, pale yellow (4A3), with a few thin hyphal cords traversing beneath subiculum, spines conical, up to 1 × 0.3 mm, 5-6 per mm, single, terete to spathulate, fused at base or throughout length, then tapering gradually to apex, apex obtuse or rounded; margin not observed.

Hyphal system monomitic, composed of nodose septate generative hyphae. Hyphal cords up to 180 µm diam, consisting of parallel hyphae 1.5-5 µm diam, often ampullate, sparingly branched, walls hyaline, thin, encrusted with numerous druses. Spine trama composed of a central core of parallel hyphae that is surrounded by thin subhymenial and hymenial layers, often with embedded clusters of hyaline crystals at the base of spines; terminal hyphae at apex slightly differentiated, 1.5-2 µm diam, contorted, knobby, walls thin, hyaline, smooth. Subiculum up to 150 µm thick, composed of two parts, lower subiculum a loose array of hyphae arranged parallel to substrate, up to 100 µm thick, then hyphae becoming more or less vertical, forming a loose, open tissue up to 50 µm thick; subicular hyphae 1.5-3.5 µm diam, nodose septate, moderately branched, with occasional H-connections, walls up to 1 µm thick, hyaline, smooth with occasional tiny warts, often encrusted with spherical clusters of hyaline crystals, 4-7 µm diam. Subhymenium a dense tissue of vertically arranged hyphae, up to 25 µm thick; subhymenial hyphae 2.5-4 µm diam, nodose septate, short-celled, frequently branched, walls thin, hyaline, smooth. Hymenium up to 20 µm thick, a dense palisade of basidia. Basidia cylindrical with a median constriction, 9-13 × 3.5-5 µm, tapering to 2-2.5 µm diam at base, with a basal clamp connection, 4-sterigmate.

Basidiospores subglobose to short ellipsoid, 3-3.5 × 2.5-2.8 µm (inclusive of ornamentation), walls thin, hyaline, verrucose, negative in Melzer's reagent.

The holotype is a single specimen, 6 × 2 cm, fruiting on bark. Hyphal cords were observed only under the subiculum as marginal areas are absent in the holotype. The specimen agrees well in most aspects with the description of *T. nivea* in Larsson (1995) except that the basidiome of *R. calceum* is pale yellow.

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