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**NOTES ON SOME LIGNICOLOUS BASIDIOMYCETES
OF THE SOUTHEASTERN UNITED STATES**

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Notes on Some Lignicolous Basidiomycetes of the Southeastern United States

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Abstract

Descriptions, illustrations, and discussion are provided for *Columnocystis ambigua* (Pk.) Pouzar, *Hydnochaete olivaceum* (Schw.) Banker, and *Trechispora polyporoidea* (Berk. & Curt. in Berk.) Liberta. *Pseudofistulina brasiliensis* (O. & K. Fidalgo) O. & K. Fidalgo is considered to be conspecific with *Fistulina radicata* Schw. and the new combination is proposed in the genus *Pseudofistulina*.

Introduction

During the summers of 1969 and 1970, collecting trips were made to the areas of Highlands, North Carolina, the Great Smoky Mountains National Park (GSMNP), and Gainesville, Florida. Many of the fungi found were difficult to identify because of the lack of modern descriptions in the literature. The existing descriptions frequently lack accurate microscopic characters or other characters useful in making positive determinations. It seems appropriate, therefore, to present complete descriptions with illustrations and ecological notes for some of these.

In other cases, species have been confused for years, with several names existing for very similar taxa and the limits of the taxa being unknown. It is necessary to establish the limits of the various taxa and determine whether they are in fact conspecific.

This paper provides modern descriptions with illustrations and ecological notes for three poorly described species and discusses the taxonomy of another.

Description and Discussion

- *Columnocystis ambigua* (Pk.) Pouzar, Česká Mycol. **13**: 17. 1959.
≡¹ *Stereum ambiguum* Pk., Report. N.Y. State Museum **47**: 145. 1894.

¹ Throughout this paper when referring to synonymy, = indicates a taxonomic synonym; ≡ indicates a nomenclatural synonym.

Basidiocarp (Fig. 3) 1–2 (–3) mm thick, perennial, orbicular at first, becoming broadly effused and coalescing, individuals attached at one point, adhering loosely elsewhere to substrate by means of upper surface tomentum; upper surface tomentose, dark brown, inconspicuously zonate; context dark brown, obscurely layered; margin 1–2 mm broad, slightly reflexed, light yellow when fresh, darker to brown when dried, fibrillose, sterile; hymenium grayish-brown, pubescent, following in general the contour of the substrate.

Upper surface without defined cutis, composed of end cells of contextual hyphae: hyphae 2–4.5 μ broad, thick-walled (walls 0.5–1.5 μ thick), radially oriented, more or less appressed, pale yellow to reddish-brown, smooth, lacking clamp connections; context a textura intricata²; hyphae 24 μ broad, with slightly thick-walled (walls up to 0.5 μ thick), nearly hyaline, septate, lacking clamp connections, frequently branched, giving rise to mostly reddish-brown hyphae, 2–5 μ broad, thick-walled (walls up to 2 μ thick), infrequently septate, smooth, lacking clamp connections, rarely branched; margin composed of end cells of contextual hyphae; hyphae 2–4 μ broad, thin-walled to slightly thick-walled (walls up to 0.5 μ thick), pale yellow to pale reddish-brown, with scattered hyaline crystals; subhymenium not differentiated; hymenium composed of basidia and cystidia; cystidia of two types; 1) (Fig. 5) 150–250 × 8–14 μ, cylindrical to slightly clavate, thick-walled (walls up to 6 μ thick), reddish-brown, usually with scattered large hyaline crystals on the surface, arising deep in context, imbedded or extending up to 75 μ beyond basidia, infrequently secondarily septate, lacking clamp connections on basal septum; 2) (Fig. 6) sometimes infrequent, 30–80 × 3–5 μ, narrowly clavate, thick-walled (walls 1–2 μ thick), reddish-brown, arising in hymenium, imbedded, with frequent secondary septa, lacking clamp connections on basal septum; basidia mostly immature, 50–75 × 5–8 μ, hyaline to pale yellow, thin-walled, paraphysoid (Fig. 8); at maturity 70–120 × 5–8 μ, narrowly clavate,

² Tissue types indicated are taken from Korf (1958).

hyaline, thin-walled at first, later darker to yellowish-brown, and somewhat thick-walled (0.5–1.5 μ thick) progressing from base to apex, sometimes with secondary septa, lacking clamp connection on basal septum, 4 sterigmata (Fig. 7); *sterigmata* 4–7 μ long; in some cases basidia are formed by transformation of cystidium apex and formation of sterigmata; *basidiospores* (Fig. 9) 12–16(–17) \times 3.5–4 (–5) μ , cylindrical to narrowly fusoid, flattened on one side, hyaline, thin-walled at first, becoming dark yellowish-brown and slightly thick-walled (walls up to 0.5 μ thick) in age, negative in Melzer's reagent, frequently imbedded in area of basidia apices.

This fungus is closely related to *Columnocystis abietina* (Pers. ex Fr.) Pouzar (\equiv *Stereum abietinum* Pers. ex Fr.), which differs in possessing clamp connections and broader spores (up to 6 μ broad). The large protruding cystidia of *C. abietina* are very similar to those in *C. ambigua*, but they are clamped at the base. *Columnocystis ambigua* is restricted in distribution to the *Picea* and *Abies* forests of eastern North America while *C. abietina* is common on these genera in the northwestern United States and further north into western Canada. The range for *C. abietina*, however, extends into the northeastern United States and eastern Canada, where it is rather uncommon. I know of no reports of this fungus in the southeastern United States.

Specimens examined. Maine—Oct. 15, 1936, on *Picea rubens* Sarg., Washington Co. (BPI)³; New York—alex NYS, by C. H. Peck, on spruce; June, Cascadeville, Essex Co., HOLOTYPE of *Stereum ambiguum*; July, Aiden Lair, Essex Co.; August, Floodwood, Franklin Co.; September, Ampersand Pond: North Carolina—HHB (H. H. Burdsall) 2398, 2401, on *Abies fraseri* (Pursh) Poir. or *Picea rubens* Sarg. (BFDL); Lowe 4548, on spruce (?) (BPI), all from GSMNP, Swain Co.; Lowe 4453, on conifer, Mt. Mitchell, Yancey Co., (BPI).

- *Hydnochaete olivaceum* (Schw.) Banker. Mycologia 6: 234. 1914. Figs. 1, 2, 10–13. \equiv *Sistotrema olivaceum* Schw., Schr. Nat. Ges. Leipzig 1: 101. 1822.
- = *Sistotrema fuscescens* Schw., Schr. Nat. Ges. Leipzig 1: 102. 1822.
- \equiv *Irpex fuscescens* (Schw.) Schw., Trans. Amer. Phil. Soc. n.s. 4: 164. 1832.

³ Herbarium abbreviations are those published by Lanjouw and Stafleu (1964) except BFDL, which is found in Anonymous (1966, p. 334).

\equiv *Hydnoporia fuscescens* (Schw.) Murr., N. Amer. Fl. 9: 3. 1907.

= *Irpex cinnamomeus* Fr., Epicr. Myc. 524. 1838.

Basidiocarp (Figs. 1 and 2) broadly effused to erumpent through lenticels, tough to woody, adherent, brown to grayish-brown, warted or hydnceous to nearly poroid by coalescing of teeth; *context* 1–3 mm thick, concolorous with hymenial surface, turning black in 3% KOH; *teeth* up to 3(–5) mm long, flattened, rather blunt, also becoming black in 3% KOH.

Context a textura intricata; *hyphae* of two types; 1) 2–4 μ broad, slightly thick-walled (walls up to 0.5 μ thick), yellow tinted, smooth, infrequently septate, lacking clamp connections, staining blue in lactophenol-aniline blue, giving rise to second type of hyphae; 2) (Fig. 12) 2–4(–5) μ broad, thick-walled (walls 0.5–1.5 μ thick), reddish-brown, smooth, infrequently septate, lacking clamp connections, not becoming blue in lactophenol-aniline blue; *teeth* formed by organization of hyphae into a textura porrecta perpendicular to substrate, hyphae like those of context, mostly thick-walled and reddish-brown; *subhymenium* not well differentiated, cells frequently septate, lacking clamp connections, frequently branched and forming a compact textura intricata; *hymenium* composed of setae and basidia; *setae* (Fig. 13) 35–SO(–150) \times 9–13 μ , subulate, thick-walled (walls up to 4 μ thick), reddish-brown, usually arising as a modified tramal end cell that turns outward and penetrates the hymenium, occasionally with bifurcate or rooting base, darkening in 3% KOH; *basidia* (Fig. 10) 12–20 \times 3–4 μ , cylindrical, hyaline, thin-walled, basal septum without clamp connection, 4 sterigmata; *sterigmata* 2–2.5 μ long; *basidiospores* (Fig. 11), 4.5–6.5 \times 1.2–1.5 μ , allantoid, hyaline, thin-walled, negative in Melzer's reagent.

This species, commonly known as *Irpex cinnamomeus*, is without a modern description; the most recent is that of Murrill (1907); 3) who described it under the name *Hydnoporia fuscescens*, with *Irpex cinnamomeus* as a synonym. It is an extremely variable species in its macroscopic characters, especially in the length and shape of the teeth. It is common on hardwoods, especially *Quercus*, from at least as far north as the Adirondack Mountains to as far south as Mississippi.

Specimens examined. Maryland—FP23658, on *Quercus*, Montgomery Co., (BFDL); HHB 276, on *Quercus*, Prince Georges Co., (BFDL); Michigan—HHB3538, on *Populus*, Cheboygan Co., (BFDL); Mississippi—FP106775, on

Quercus, Stoneville, (BFDL): *New York*—HHB 559, on *Betula*, Warren Co., (BFDL): *Pennsylvania*—Schweinitz, Syn. #540, Host (?), Salem (BPI, PH): *Virginia*—FP57045, on *Quercus*, Camp Todd, (BFDL).

• *Trechispora polyporoidea* (Berk. & Curt. in Berk.) Liberta, *Taxon* 15: 319. 1966. Figs. 4, 14—17.

≡ *Corticium polyporoideum* Berk. & Curt. in Berk., *Grevillea* 1: 177. 1873.

≡ *Coniophora polyporoidea* (Berk. & Curt. in Berk.) Burt, *Ann. Mo. Bot. Gard.* 4: 247. 1917.

Basidiocarp (Fig. 4) broadly effused, thick, membranous to leathery or tough papery, easily separable, fertile area grayish-yellow (near 4B3)⁴ surface sometimes cracked, cracks up to 1 mm broad; context white, showing through cracks in hymenium, extending beyond hymenium to form margin; margin up to 5 mm wide, appressed, thick, white, fimbriate to strongly rhizomorphic, sterile; *rhizomorphs* up to 1 mm thick, white.

Context a loose textura intricata; *hyphae* (Fig. 16) 2.5–4.5(–7.5) μ broad, rather thin-walled to thick-walled (walls up to 1 μ thick), hyaline, with clamp connections, ampullate at some septa, smooth or densely covered with small granules and scattered large crystals; subhymenium not well defined; *hymenium* composed of basidia and paraphysoid cystidia; *cystidia* (Fig. 17) (possibly immature basidia or hyphae growing through hymenium?) irregular in shape and size, from hyphoid to variously constricted or branched, thin-walled and hyaline; basidia (Fig. 14) 30–45 \times 8–10 μ , pedicellate to subclavate, slightly constricted toward middle, arising from clamp connection, 4 sterigmata; sterigmata 4–6 μ long; basidiospores (Fig. 15) 6.5–8(–9) \times 4.5–5.5 μ , broadly ovate, flattened slightly on one side, apiculate, pale yellow, punctate, slightly thick-walled (walls up to 0.5 μ thick), usually 1-guttulate.

This characteristic fungus, described as a *Corticium* by Berkeley and Curtis (1873; 177), was transferred by Burt (1917; 247) to *Coniophora* because of the pigmentation of the spore wall. The spore ornamentation led him further to suggest a relationship to *Hypochnus* (= *Tomentella*). Although this species has several of the characters of *Trechispora*

sensu Liberta—being loosely adnate, having ampullate hyphae, and ornamented non-amyloid spores with thickened walls—it seems to be at best a borderline species here because of its thick basidiocarp and its large spores and basidia. The genus *Trechispora* sensu Liberta does, however, include species related to *Corticium polyporoideum*.

Since the affinities of the species are as yet uncertain, it seems advisable to leave it in its present location rather than to transfer it to a different genus or erect a new one for it.

Specimens examined. *Alabama*—Thos. Peters, ISOTYPE of *Corticium polyporoideum*, (NYS—from M. A. Curtis): *Florida*—HHB 4685, on *Quercus*, Alachua Co., (FLAS): *Georgia*—A. S. Rhoads, Sept. 1, 1963, Early Co., (BPI); HHB 1982, on *Vitis*, Rabun Co., (BFDL): *North Carolina*—HHB 2889, on *Pinus strobus* L. (?), Macon Co., (NY); 4211, on *Robinia pseudo-acacia* L., (GSMNP) Haywood Co., (BFDL): *Tennessee*—HHB 207 (VPI), 2226 (L), 2348 (K), and 4045 (TENN), on *Vitis*; HHB 3967 (BFDL) on *Fagus grandifolia* Ehrh. (?), all from GSMNP, Sevier Co.: *Texas*—HHB 78 (BFDL) and 80 (BPI), Host (?), San Jacinto Co.: State (?)—Eno, 11/15/36, FP70480 (BPI).

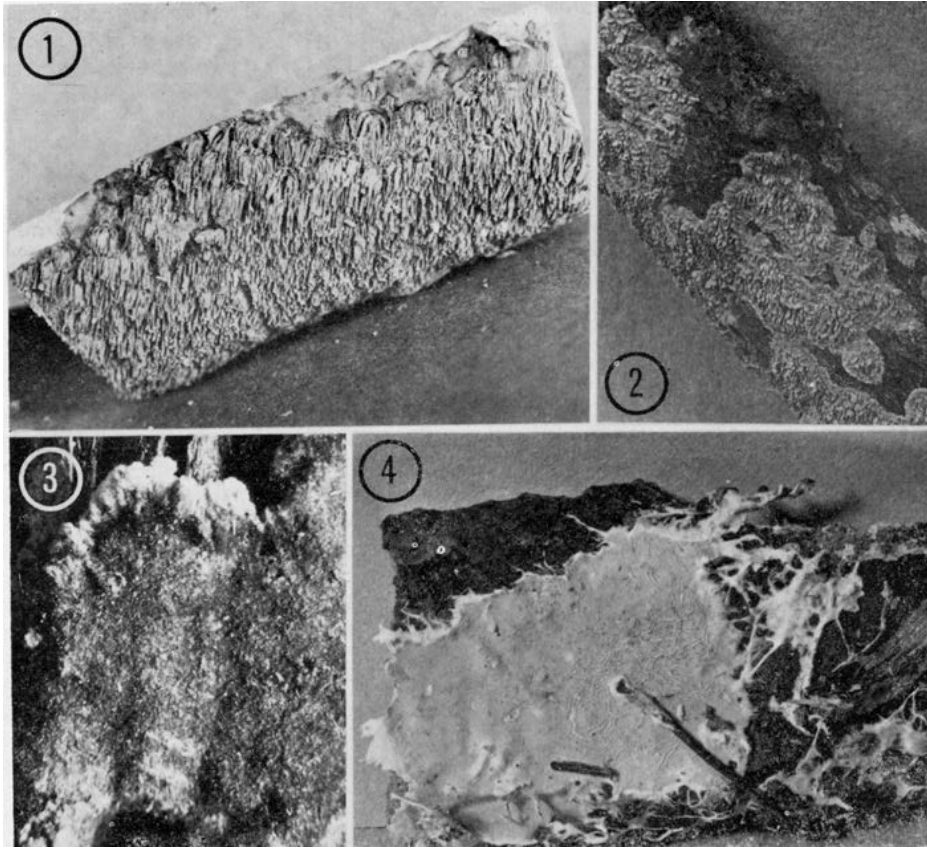
• *Fistulina radicata* Schw., *Schr. Nat. Ges. Leipzig* 1: 100. 1822.

Fistulina radicata is the lesser known of two *Fistulina* species found in North America, the other being *Fistulina hepatica* Schaeff. ex Fr. The species concept concerning *F. radicata* has been argued by Wright (1961) and O. and K. Fidalgo (1958, 1962). The Fidalgos (1958; 145) described a new species, *Fistulina brasiliensis*, and later (1962) transferred it to its own genus *Pseudofistulina*. Wright (1961; 218) stated, after studies of the type specimen of *F. brasiliensis* and authentic material of *F. radicata*, that he felt the two species were synonymous.

I also have studied the authentic material of *F. radicata* from the Schweinitz herbarium (PH) and the type specimen of *F. brasiliensis*, as well as the types of *F. pallida* Berk. & Rav., *F. firma* Pk. and *F. spathulata* Berk. & Curt. A comparison of these types has revealed no significant differences among the specimens.

Although the material of *F. radicata* from the Schweinitz herbarium (PH) is in very poor condition, the microscopic characters of the species are observable and are the same as those of *F. brasiliensis*. For instance, a number of spores (apparently basidiospores) found

⁴Color notations are taken from Kornerup and Wanscher (1967). The notation reading from left to right indicates plate number, vertical column, and horizontal column.



FIGS. 1-4. Figs. 1-2. *Hydnocyste olivaceum* X1. 1. FP23685. 2. FP57045. Fig. 3. *Columnocystis ambigua* HHB2398, pubescent hymenial surface and margin X9. Fig. 4. *Trechispora polyporoidea*, X1. BPI 70480.

floating free in the mounts were like those of *F. brasiliensis* in size and shape. The acanthophyses (trichocysts of Wright, 1961) so characteristic of *F. brasiliensis*, including the blue-staining areas in Melzer's reagent, were also found in the Schweinitz specimen. I must, therefore, agree with Wright (1961; 218), that *F. brasiliensis* is conspecific with *F. radicata* and that the name *Fistulina brasiliensis* must go into synonymy. For detailed descriptions of this fungus, see Fidalgo and Fidalgo (1962; 345, ut *Pseudofistulina brasiliensis*) and Wright (1961; 219).

Concerning the establishment of a new genus for *Fistulina brasiliensis*, the differences between *F. radicata* and *F. hepatica* seem diverse enough that the genus *Pseudofistulina* is warranted as indicated by O. and K. Fidalgo (1962). Considering that *F. brasiliensis* is synonymous with *F. radicata* and that *F. radicata* is the older name, the species epithet in the genus *Pseudo-*

fistulina must be *radicata*. The new combination is proposed here.

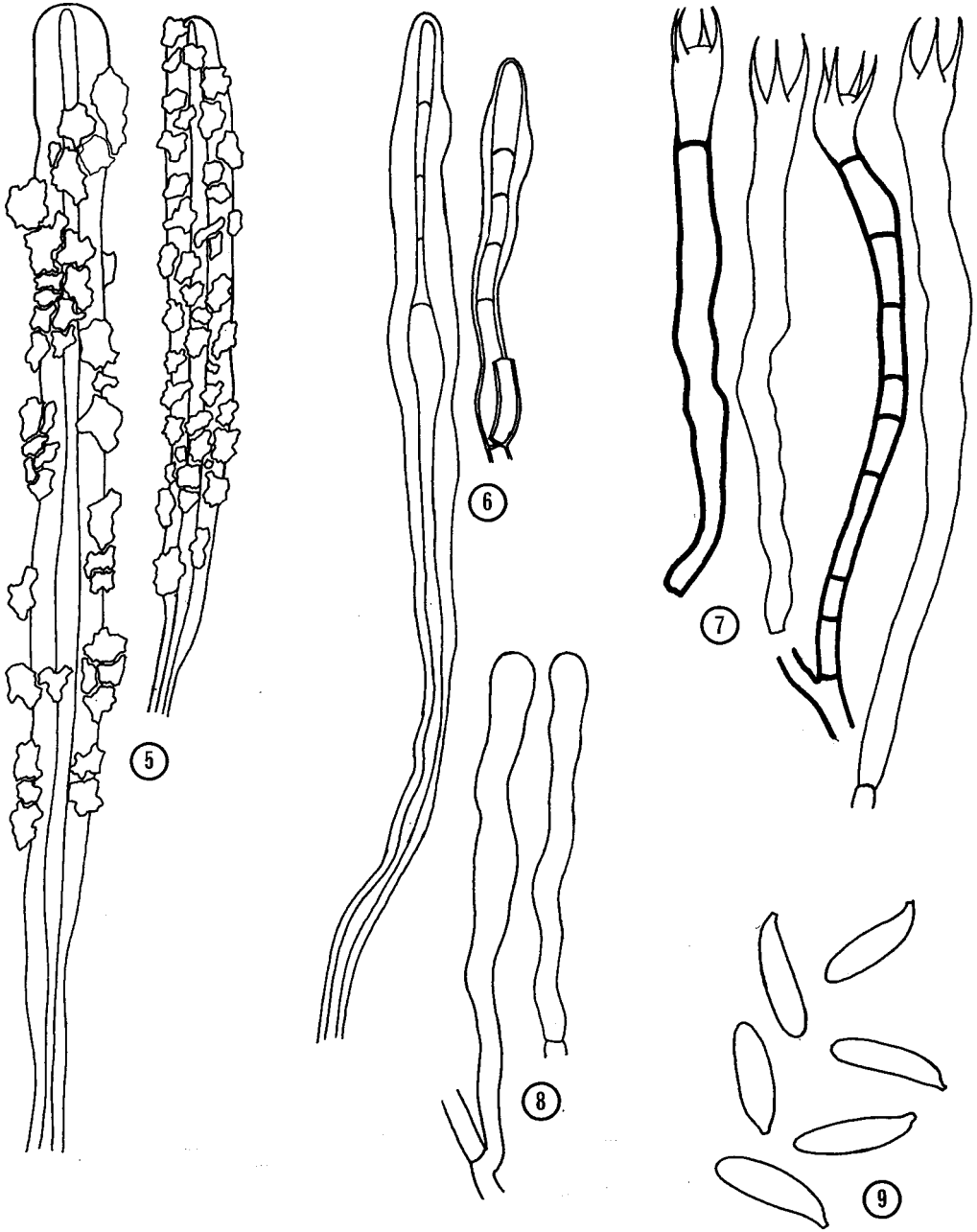
- *Pseudofistulina radicata* (Schw.) H. H. Burdsall comb. nov.
 - ≡ *Fistulina radicata* Schw., Schr. Nat. Ges. Leipzig **1**: 100. 1822.
 - = *Fistulina pallida* Berk. & Rav., Grevillea **1**: 71. 1872.
 - = *Fistulina spathulata* Berk. & Curt., Grevillea **1**: 71. 1872.
 - = *Fistulina firma* Pk., Bull. Torrey Bot. Club **26**: 70. 1899.
 - = *Fistulina brasiliensis* O. & K. Fidalgo, Mycologia **50**: 145. 1958.
 - ≡ *Pseudofistulina brasiliensis* (O. & K. Fidalgo) O. & K. Fidalgo, Mycologia **54**: 345. [1962] 1963.

The problem of whether *Fistulina rosea* is also a synonym is discussed by Fidalgo and

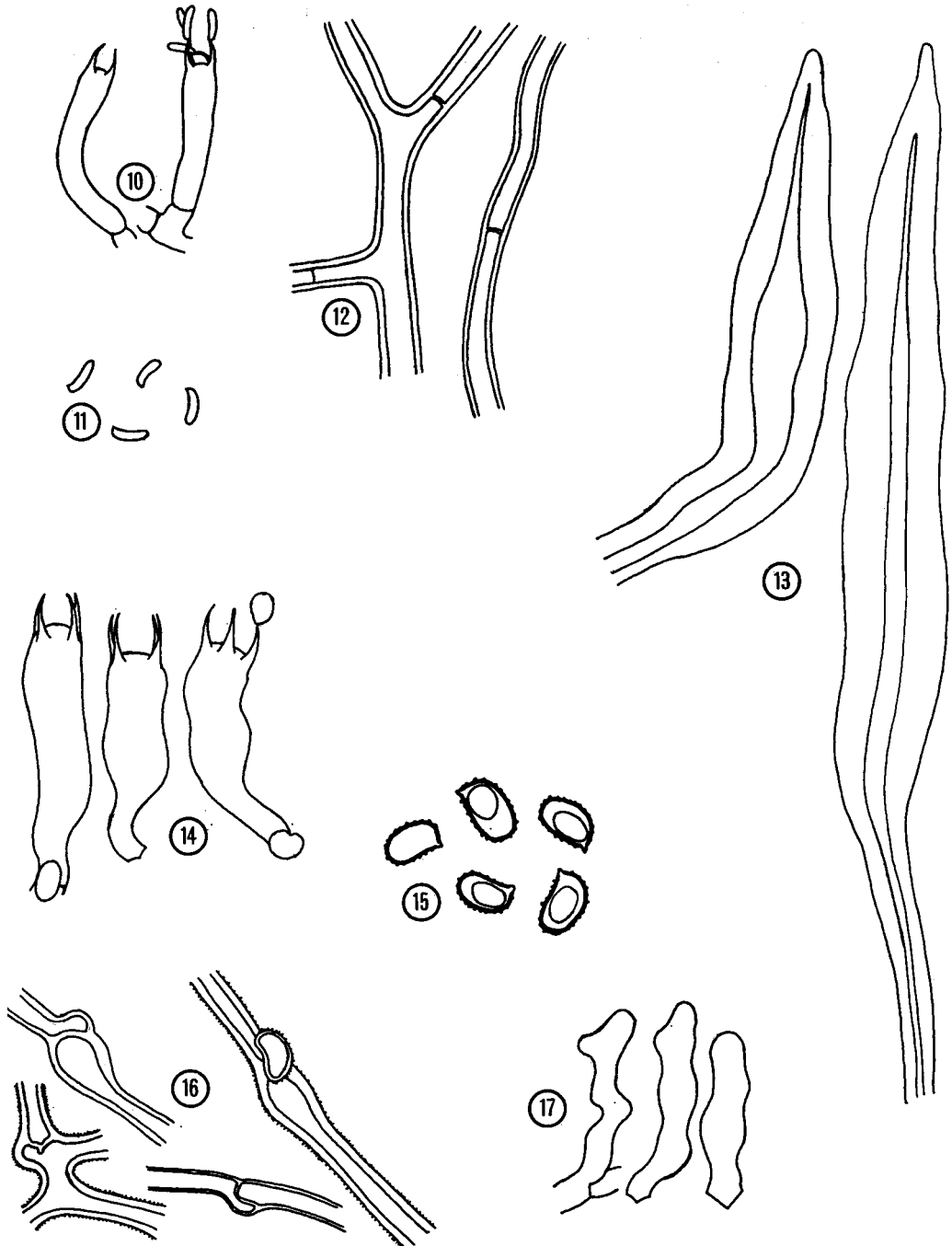
Fidalgo (1962; 342). For the reasons stated there, it is not included in this study.

Specimens examined. Ex Brazil—*ut F. brasiliensis*: 47594, on *Piptadenia colubrina* (Vellozo) Benth., Picado Gardner, Sao Paulo, (BPI); 71628, ISOTYPE of *Fistulina brasi-*

liensis, on roots of angiosperm, Rio de Janeiro, (BPI). Ex Costa Rica—*ut F. radicata*: Plants of Costa Rica 5298, Potrerros of Chino (BPI); Plants of Costa Rica 5323, Potrerros of Retes, (BPI). Ex U.S.A.—*ut F. firma*: G. F. Atkinson 3676, *Quercus alba*, Watauga Co., North



FIGS. 5-9. *Columnocystis ambigua*, Camera lucida drawings. 5. Thick-walled, encrusted cystidia, protruding or imbedded. 6. Unencrusted imbedded cystidia. 7. Basidia. 8. Immature basidia. 9. Basidiospores.



FIGS. 10-13. *Hydnochaete olivaceum*, Camera lucida drawings. Fig. 10. Basidia. Fig. 11. Basidiospores. Fig. 12. Hyphae of context. Fig. 13. Setae. FIGS. 14-17. *Trechispora polyporoidea*. Fig. 14. Basidia. Fig. 15. Basidiospores. Fig. 16. Hyphae. Fig. 17. Paraphysoid cystidia.

Carolina (NYS); October, Mrs. A. M. Headley, Manchester, New Hampshire, HOLOTYPE of *Fistulina firma*, (NYS). ut *F. pallida*: Peters 6339, Alabama, PARATYPE of *Fistulina pallida*, ex herb. Berkeley (K); August, F. S. Boughton, Pittsford, New York (NYS); H. W. Ravenel 1486, earth, Mts. of South Carolina, HOLOTYPE of *Fistulina pallida*, herb. Berkeley (K). ut *F. radicata*: Schweinitz #509, AUTHENTIC (PH); W. B. Cooke 32757, on old stump, Montgomery Co., Indiana (BPI); Michener, circa truncos putridos, Chester Co., Pennsylvania (BPI); HHB 2980, on *Castanea dentata* (Marsh.) Borkh. (?) stump, Blount Co., Tennessee (BFDL). ut *F. spathulata*: Peters 6066, Alabama, HOLOTYPE of *Fistulina spathulata*, herb. Berkeley, (K).

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Fungus Collection, Beltsville, Maryland; Royal Botanical Gardens, Kew, Richmond, England; Philadelphia Academy of Sciences, Philadelphia, Pennsylvania. Dr. Robert L. Gilbertson and Dr. Paul L. Lentz are thanked for their criticism of the manuscript and Mrs. Agnes Swann and John A. Lindsay for their technical assistance.

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