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PARATRICHOPHAEA (PEZIZALES) IN NORTH AMERICA

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ABSTRACT

Paratrichophaea macrocystis is reported from North America, and two other previously described species are transferred to the genus from other genera. The new combinations are *P. michiganensis* and *P. pygmea*. *Paratrichophaea* is compared to *Tricharina, Wilcoxina, Trichophaeopsis, Rhizoblepharia, Trichophaea* and *Cheilymenia* but is considered to be distinct from them.

Key Words: Pezizales, *Paratrichophaea*.

The genus *Paratrichophaea* Trigaux (**1985**) was proposed for a single species, *P. macrocystis* Trigaux, from a single collection composed of three apothecia from France. No type material was saved. The study of some North American collections of operculate discomycetes with setose excipular hairs shows that a fungus which can be referred to *P. macrocystis* is found in North America, and that two other species should also be referred to the genus. The present paper gives descriptions of the North American taxa referred to *Paratrichophaea*.

Paratrichophaea is closely related to a group of genera which includes *Tricharina* Eckblad, *Wilcoxina* Yang and Korf, *Trichophaeopsis* Korf and Erb, *Rhizoblepharia* Rifai, *Trichophaea* Boudier, and perhaps some of the species now placed in *Cheilymenia* Boudier. Boundaries between these taxa remain poorly delimited despite recent studies (Yang and Korf, **1985**; Korf and Erb, **1972**; Erb, **1972**; Moravec, **1984**). *Paratrichophaea,* as it was originally conceived, includes a single species with small, wood-inhabiting apothecia and eguttulate, or indistinctly guttulate, smooth ascospores. The ascospores lack a loosening spore wall. Prominent rooting setae which arise from the medullary excipulum are present on the outer surface of the apothecia. These setae are commonly unbranched. The combination of characters shown in *Paratrichophaea* is found in no other genera known to me. *Paratrichophaea* is unlike *Trichophaea* in that *Trichophaea* has guttulate ascospores and non-rooting hairs. *Wilcoxina* and *Tricharina* both have non-rooting hairs though the spores in each of these genera are non-guttulate. *Scutellinia* has guttulate ascospores and prominent rooting hairs which are branched at the base. *Cheilymenia,* in its broadest sense, is a heterogeneous assemblage of species referred to *Cheilymenia* and *Coprobia* by Moravec (**1984**). It generally has yellow pigments and spore walls which loosen in treatments with potassium hydroxide. Both characteristics are lacking in *Paratrichophaea*. *Paratrichophaea* is much like *Trichophaeopsis,* to which it has been compared in detail in this study. Specimens in FH of both *T. bicuspis* and *T. tetraspora* were studied. *Paratrichophaea,* like *Trichophaeopsis,* has eguttulate or indistinctly guttulate ascospores and prominent hairs. In *Trichophaeopsis,* the most prominent type of hairs are two-pronged and arise superficially from the outer excipulum. Such hairs are lacking in *Paratrichophaea.* The smooth, unwrinkled spore walls and the origin of the apothecial hairs from within the medullary excipulum in *Paratrichophaea* exclude it from *Rhizoblepharia.*

Trigaux (**1985**) has described her collection in detail. It is on the basis of her published work that I have made the identification of my material from North America, since no type material of *P. macrocystis* exists.

PARATRICHOPHAEA Trigaux, Doc. Mycol. **16**(61): 5. 1985.

Apothecia 1–2 mm diam; hymenium white, dirty white, or gray. Hairs long, setose, arising from within the excipulum. Asci operculate, 4- or 8-spored. Ascospores smooth, ellipsoid, eguttulate at maturity. Medullary excipulum of narrow interwoven hyphae. Outer excipulum of globose to angular cells, the outermost cells sometimes smaller than those toward the medullary excipulum. In the outer layer there may also be some broad clavate cells (termed "pseu-

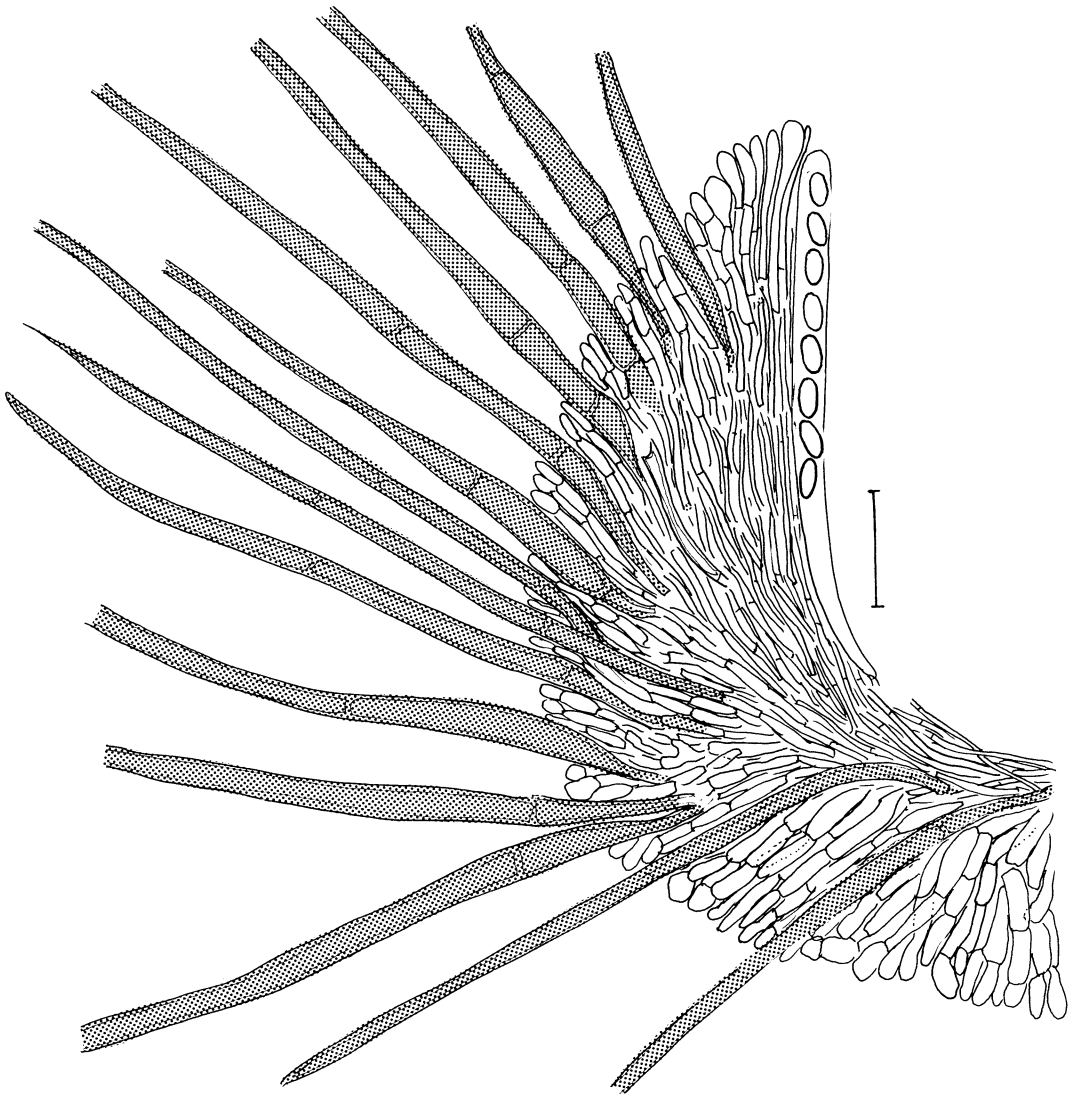

FIG. 1. *Paratrichophaea macrocystis.* Cross-section of apothecium DHP no. 118. Scale = 4 μm.

dopoils" or pseudohairs by Trigaux). Paraphyses are narrow, filiform or clavate.

On wet soil and vegetable debris.

KEY TO THE SPECIES OF *PARATRICHOPHAEA*

1. Asci 8-spored 2
1. Asci 4-spored ..... *P. michiganensis*
   2. Hymenium white; paraphyses narrow, 2–3 μm wide at the apex; hairs up to 1000 μm long ..... *P. macrocystis*
   2. Hymenium gray; paraphyses clavate, up to 6 μm wide at the apex; hairs shorter than above, up to 250 μm long ..... *P. pygmea*

PARATRICHOPHAEA MACROCYSTIS Trigaux, Doc. Mycol. **16**(61): 5. 1985. FIG. 1

Apothecia minute, turbinate to narrowly saucer-shaped. Hymenium white, outer surface brownish white but covered with hairs. Asci 175–200 × 15 μm with croziers, with 8 spores or with fewer, opening with a broad operculum creating a ragged outline. Ascospores 16–17 × 10–11 μm, smooth, without guttules at maturity but with obvious granular contents. Paraphyses narrow, filiform, unexpanded at apex, 2–3 μm broad. Medullary excipulum of *textura intricata.* Ectal

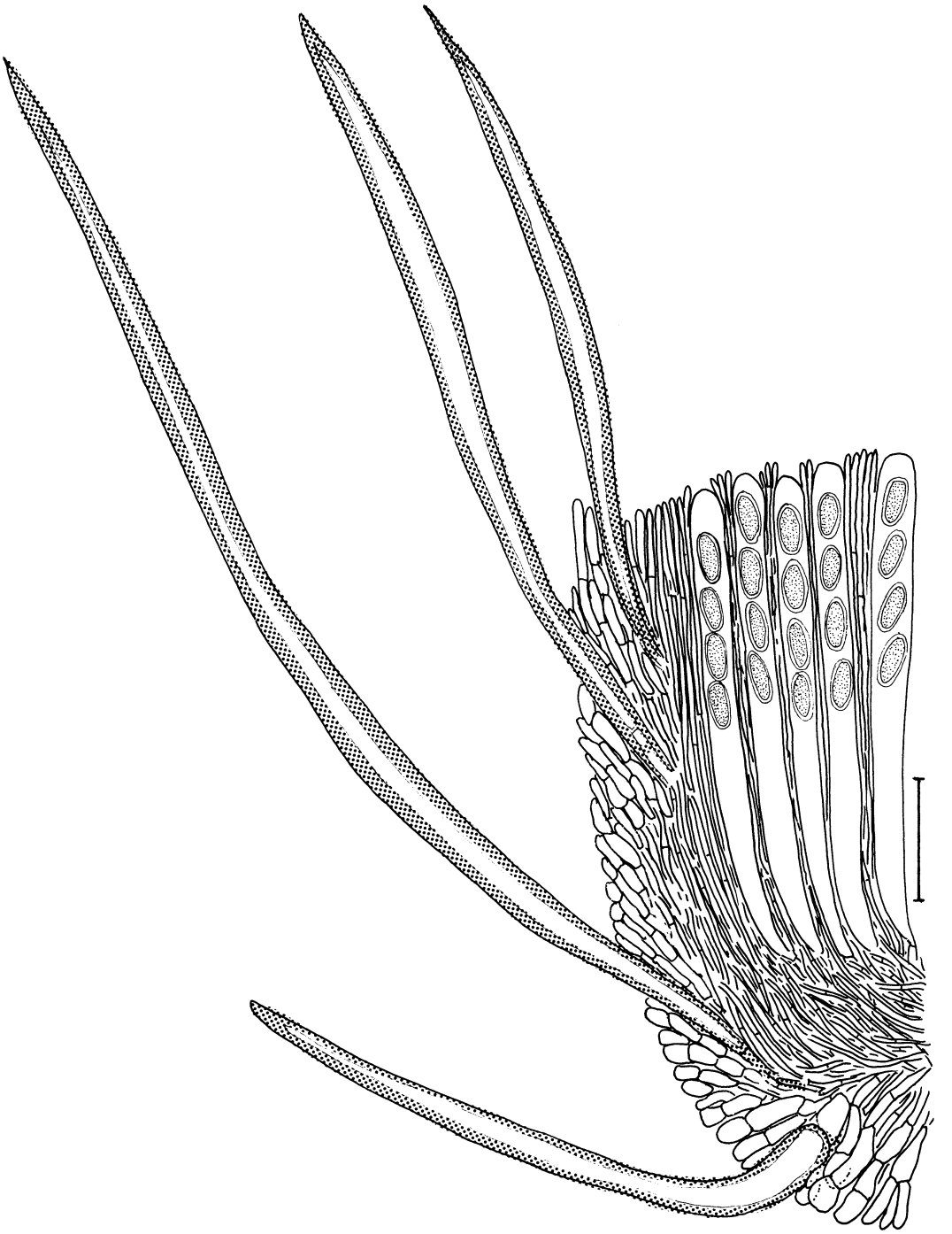

FIG. 2. *Paratrichophaea michiganensis.* Cross-section of apothecium. (Holotype, MICH.) Scale = 4 μm.

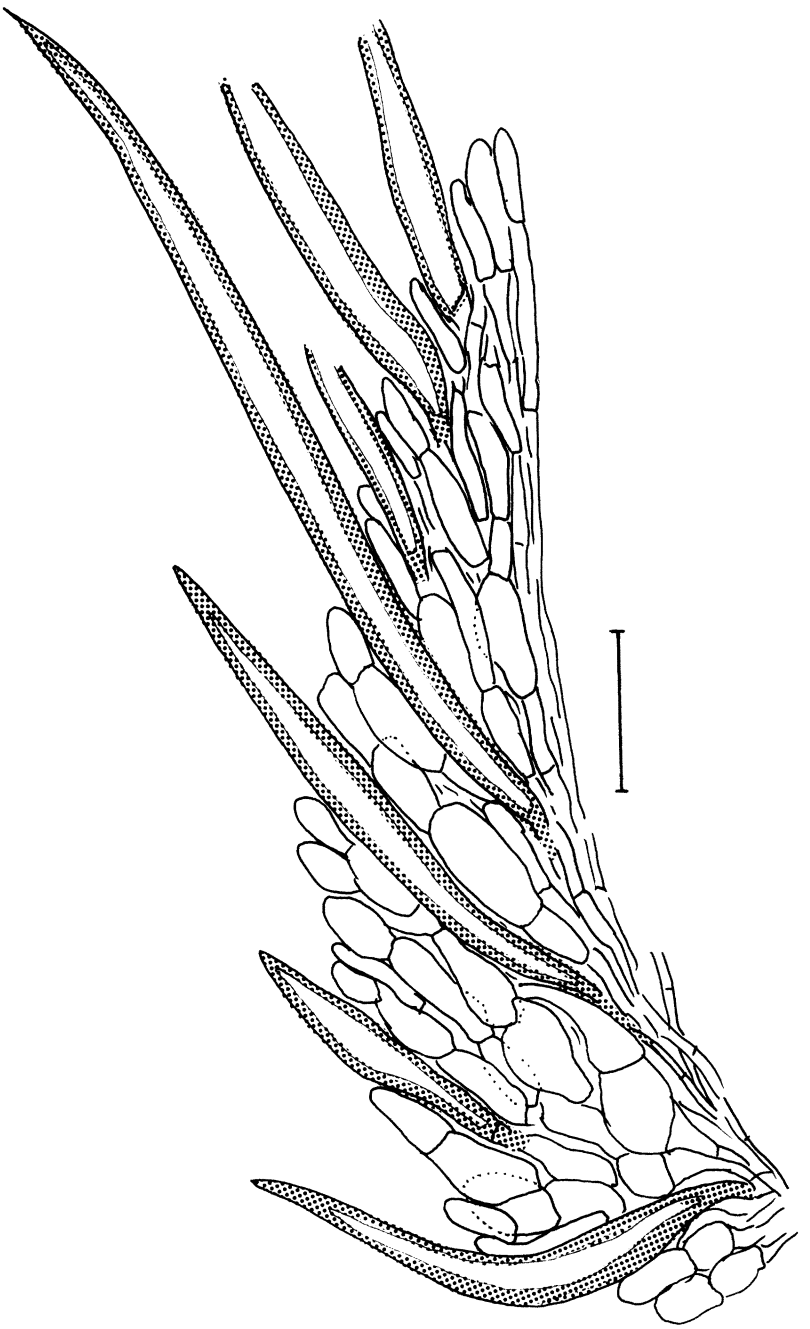

FIG. 3. *Paratrichophaea pygmea.* Cross-section of apothecium. (Holotype, BPI.) Scale = 4 μm.

excipulum composed of globose or angular cells, ≥20 μm diam, brownish. Hairs arising from medullary excipulum, acute apically, dark brown above but lower cells within the excipulum often hyaline, 500–1000 × 20–25 μm.

On decorticated wood and soil.

COLLECTIONS: The holotype, consisting of three apothecia on decorticated wood, was in poor condition and was not saved by Trigaux. North American collections examined: Minnesota, Lake Itasca, 6.VIII.80, on soil and moss under herbaceous plants in low swampy spot near Field Station, Pfister no. 118 and E. L. Pfister; Minnesota, Lake Itasca, 9.VIII.80, on soil near Station, coll. Pfister (FH).

Note: The reference of these North American collections to *P. macrocystis* is made based on their comparison with Trigaux's fine description, since there is no authentic material. The occurrence of the type collection on wood should also be noted as being at variance with the North American collections. I studied my collections over a period of several years, and I had concluded that they represented an undescribed genus. They so closely fit Trigaux's description that I do not hesitate to place them in the genus *Paratrichophaea* and expand the genus by including two similar species.

Paratrichophaea michiganensis (Kanouse) Pfister, *comb. nov.* FIG. 2

≡ *Trichophaea michiganensis* Kanouse, *Mycologia* **50**: 138. 1958.

According to Kanouse (**1958**): apothecia gregarious, sessile, thick, soft, minute, 0.75–1 mm diam, white, inrolled when dry with the hairs nearly covering the hymenium.

From study of type collection: hairs 480–700 × 15 μm, arising from medullary excipulum. Medullary excipulum ~100 μm thick, of *textura intricata*; hyphae 2–3 μm diam. Ectal excipulum of globose-angular cells, 10–20 × 8–12 μm. Hymenium ~150–200 μm thick. Asci 4-spored. Ascospores smooth, ellipsoid, 10–12 × 19–22(–24) μm, granular to more or less guttulate when young, eguttulate at maturity. Paraphyses filiform, 2–3 μm at apex.

On wet, matted leaves.

SPECIMEN EXAMINED: HOLOTYPE: A. H. Smith 22065, Wolf Bog, Cheboygan County, Michigan, 8.VIII.46 (MICH).

Paratrichophaea pygmea (Clem.) Pfister, *comb. nov.* FIG. 3

≡ *Sepultaria pygmea* Clements, *Bot. Surv. Neb.* **4**: 14. 1896.

≡ *Lachnea pygmea* (Clem.) Sacc. & Syd., Syll. fung. **14**: 755. 1899.

From the original description: "Ascomata very minute, ½–¾ mm., rarely 1 mm. in diam., gregarious, carnose, scutellate; hymenium gray or fuscous, margin and external surface furnished with very strict brown, septate, acute, or often truncate hairs, 175–250 × 12½ μ; asci cylindrical, 125–150 × 9–10 μ; sporidia ellipsoid, smooth, 12 × 7 μ; paraphyses exceptionally numerous, filiform."

From examination of isotype at BPI: hairs up to ~250 × 15 μm, originating from the border between ectal excipulum and medullary excipulum. Medullary excipulum of *textura intricata*; hyphae 3–4 μm diam; outer layers of collapsed angular cells, perhaps up to 30 μm. Asci 8-spored. Ascospores smooth, ellipsoid at maturity, young spores with granular contents, older spores eguttulate, 11–13 × 21–23(–25) μm. Paraphyses clavate, up to 6 μm diam at apex. Many diatoms are held in the hyphae at the base of the apothecium.

SPECIMEN EXAMINED: ISOTYPE, on rich ground among filaments of *Lyngbya,* Otowanie Woods, Lancaster County, Nebraska, no date (BPI).

Note: The collection is scanty and difficult to study; little information can be gained about the excipular construction. Color of the apothecia, form and position of the hairs and guttulation of the ascospores all point to an association with *Paratrichophaea.* The broad paraphyses and shorter hairs separate this taxon from other species placed in the genus.

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