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BASIDIOMYCETES THAT DECAY JUNIPERS IN ARIZONA. II¹

R. L. Gilbertson² and J. P. Lindsey²

ABSTRACT.— Five additional species of wood rotting basidiomycetes on Arizona junipers are described and illustrated. All cause a white rot of dead, fallen trees. *Leptosporomyces juniperinus* is proposed as a new species. *Varraria fibra* is reported from the United States for the first time.

Twenty-seven species of wood-rotting basidiomycetes were previously reported on junipers in Arizona (Gilbertson and Lindsey 1975). Since then five additional wood-rotting fungi have been found on Arizona junipers, all on dead fallen trees. This paper presents information on these species. Scanning electron microscopy was done with an ETEC Autoscan. Capitalized color names are from Ridgway (1912). Voucher specimens are deposited in the Mycological Herbarium of the University of Arizona (ARIZ).

Hymenochaete arida Karst.

Hymenochaete arida Karst., in Sacc., Syll. Fung. 9:228. 1891.

Basidiocarps resupinate, effused up to 15 cm, adnate or peeling away at the margin; hymenial surface Buckthorn Brown to Sudan Brown, smooth, finely setulose under 30X lens, not cracking on drying; margin abrupt, fertile; subiculum thin, up to 200 μm thick, with a single layer of setae from the subhymenial and hymenial hyphae; subicular hyphae (Fig. 1b) loosely arranged, interwoven, simple-septate, moderately thick-walled, pale brown, darkening in KOH, with frequent branching, 3–6 μm diam; setae (Fig. 1c-d) abundant, narrowly subulate, becoming thick-walled, dark brown in KOH, 60–100 \times 5–8 μm , projecting up to 60 μm , straight or slightly curved with a loose membranous sheath (Figs. 2, 3) that disappears or becomes inconspicuous in KOH or Melzer's reagent; basidia (Fig. 1e) clavate, in loose candelabrum from hyaline

subhymenial hyphae (Fig. 1a), 4-sterigmate, 20–22 \times 5–6 μm , simple-septate and thick-walled at the base; basidiospores (Fig. 1f) cylindrical, 5–7 \times 2–2.5 μm , hyaline, smooth, negative in Melzer's reagent.

Hymenochaete arida also decays wood of mesquite (*Prosopis juliflora* (Sw.) DC), a common associate of junipers at the lower limits of the pinyon-juniper type (Gilbertson et al., 1975) in Arizona. It is associated with a white rot. When viewed with a scanning electron microscope, the dark, thick-walled setae are seen to have a loose membranous sheath (Figs. 2, 3). Thin-walled, pale brown setae in early stages of development do not have a sheath. Setae are initiated as subulate, thin-walled hyphal ends originating in loose candelabrum with basidia. Secondary wall material is laid down until a narrow lumen remains. During this process the primary wall apparently separates from the secondary wall and forms a loose, membranous sheath that hangs loosely on the seta with folds and wrinkles. Reeves and Welden (1967) illustrate setae of *Hymenochaete luteo-badia* (Fr.) Hoehn. et Litsch. and *H. berkeleyana* (Mont.) Cke. with a sheath. However, they interpret the sheath as being composed of thin-walled, hyaline hyphae. Although occasional setae of *H. arida* have hyphae appressed to them, the majority have a sheath that is not hyphal in origin.

Voucher Specimen: RLG 11321, on alligator juniper (*Juniperus deppeana* Steud.), Gardner Canyon, Santa Rita Mts., Coronado Nat. Forest, Santa Cruz County, AZ.

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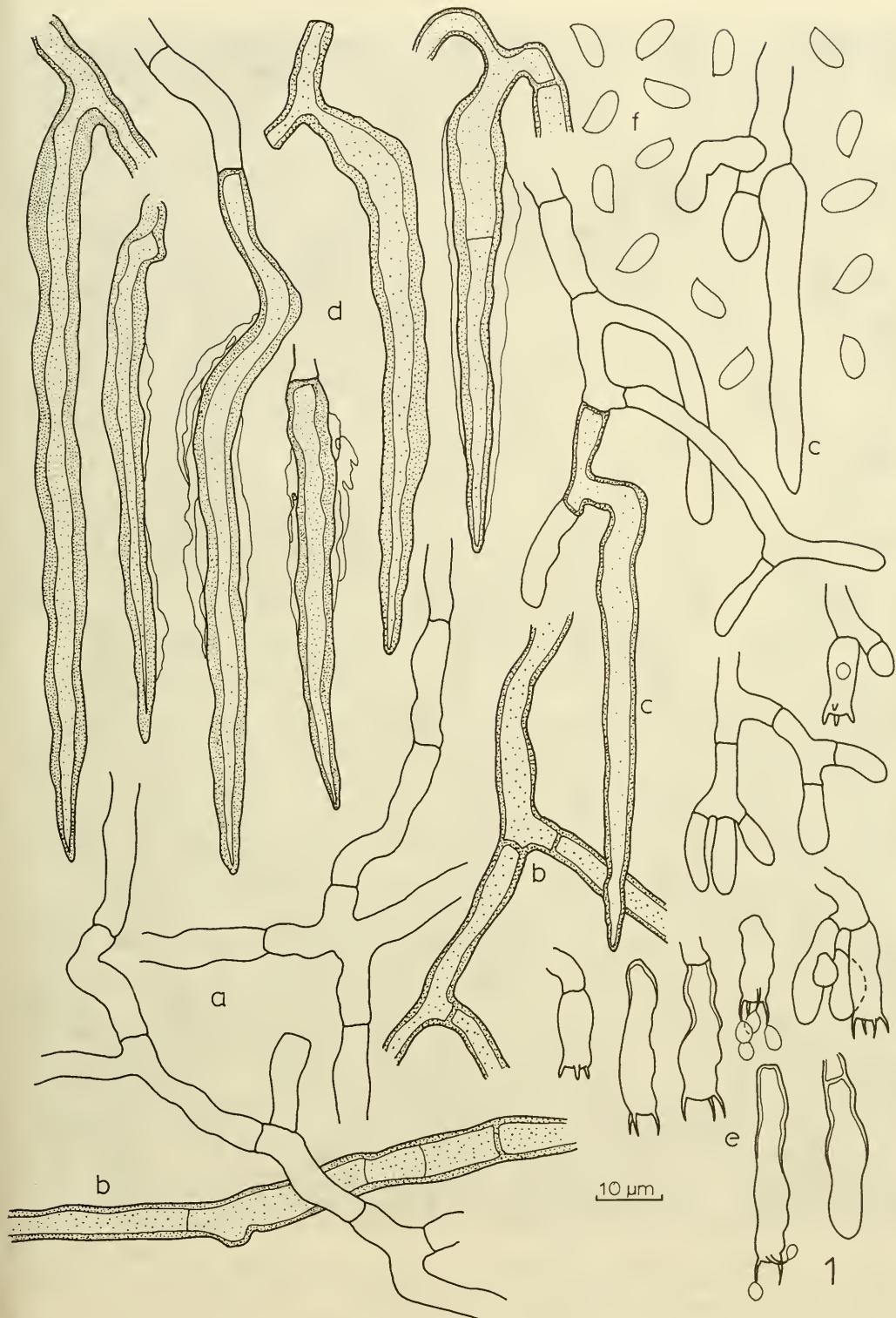
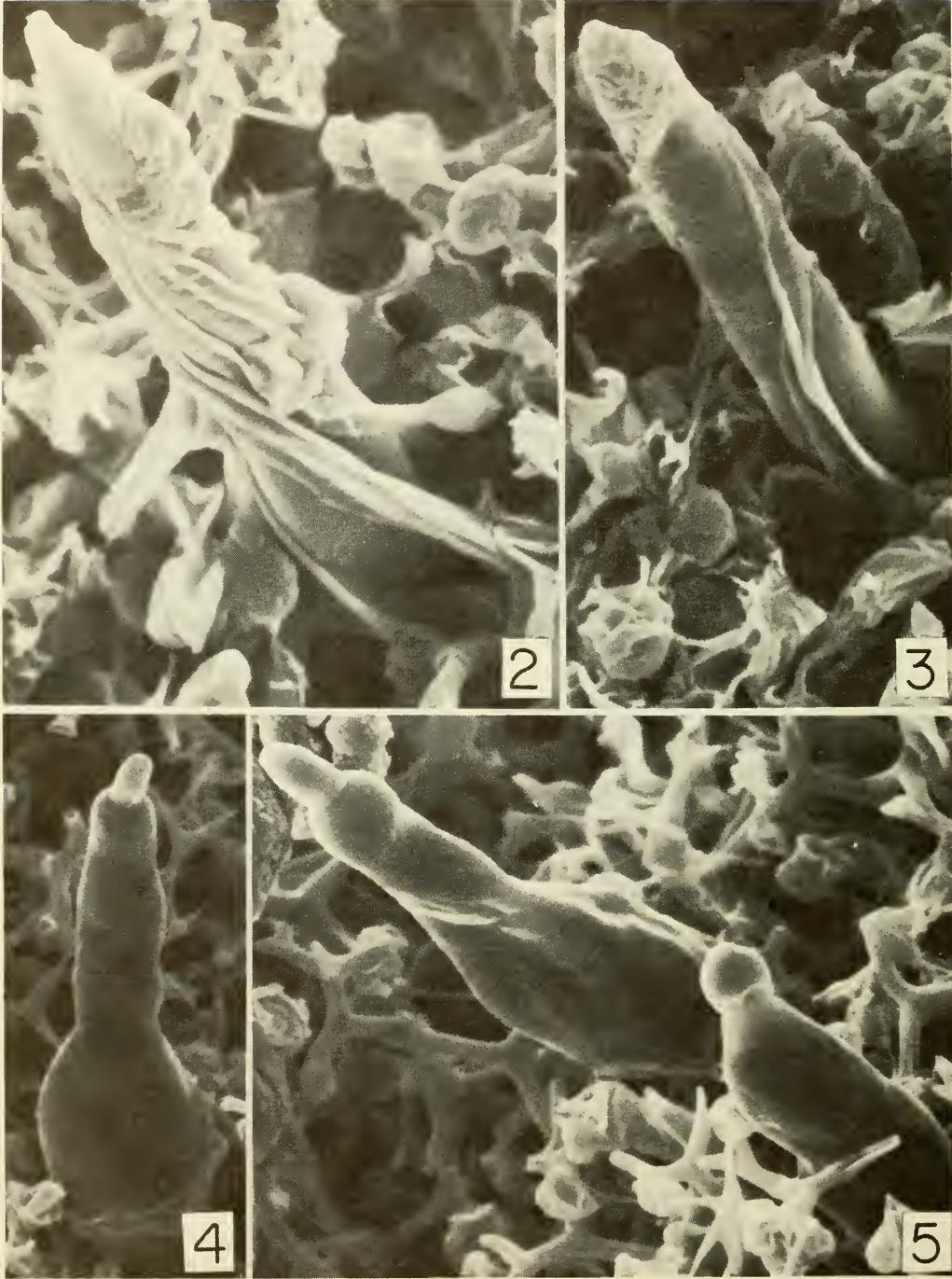


Fig. 1. Microscopic characters of *Hymenochaete arida* (RLG 11321). a, thin-walled, hyaline subhymenial hyphae; b, thick-walled, pigmented hyphae from lower subiculum; c, setae in early stages of development; d, mature setae, some with membranous sheaths; e, basidia; f, basidiospores.



Figs. 2-5. Scanning electron micrographs of hymenial surfaces of *Hymenochaete arida* (RLG 11321) and *Vararia fibra* (RLG 11312). Figs. 2 and 3, setae of *H. arida* showing membranous sheath; Figs. 4 and 5, mammillate gloeocystidia projecting through dichohyphidia of *V. fibra*.

Leptosporomyces juniperinus

Gilbn. & Linds., sp. nov.

Fructificatio annua, effusa, alba vel cremaea, laevi; rhizomorphae albae; hyphae fibulatae, 2–3 μm diam; cystidia nulla; basidia clavata, 4-sterigmatibus, 8–15 \times 4–5 μm ; basidiosporae subglobosae, hyalinae, laeve, tenuitunicatae, apiculatae, non-amyloideae, 2.5–3 \times 2.5–3.5 μm . Holotypus: R. L. Gilbertson No. 11325, on *Juniperus deppeana* Steud., Gardner Canyon, Santa Rita Mts., Coronado Nat. Forest, Santa Cruz County, Arizona; in herb. National Fungus Collections, Beltsville, MD (BPI).

Basidiocarps becoming widely effused, adnate, cracking into small angular blocks on drying; hymenial surface white to cream-colored, smooth, minutely tomentose; margin thinning out; white mycelial strands present in wood under basidiocarp or at margin; associated with a green alga that becomes incorporated in the subiculum and gives the basidiocarp a greenish tint; hyphal system monomitic; subicular hyphae (Fig. 6a) thin-walled, nodose-septate, 2–3 μm diam, with abundant coarse crystalline material; cystidia or other sterile hymenial structures lacking; basidia (Fig. 6b) in short candelabrums, clavate, 4-sterigmate, 8–15 \times 4–5 μm , with a basal clamp; basidiospores (Fig. 6c) subglobose, thin-walled, 2.5–3 \times 2.5–3.5 μm , hyaline, smooth, negative in Melzer's reagent, with a prominent apiculus.

Leptosporomyces juniperinus is associated with a white laminated rot with white mycelial strands developing between the layers of wood. Jülich (1972) in his monograph of the Athelieae describes an unidentified fungus (*Leptosporomyces* spec. 8650, p. 210) that is similar to *L. juniperinus*. The subglobose spores of *L. juniperinus* distinguish it from the other described species in *Leptosporomyces*. The alga associated with this fungus is a species of the genus *Chlorococcum* Fries.

Voucher Specimen: RLG 11325, on alligator juniper, Gardner Canyon, Santa Rita Mts., Santa Cruz County, AZ.

Stromatoscypha fimbriata (Pers. ex Fr.)
Donk

Stromatoscypha fimbriata (Pers. ex Fr.) Donk, Reinwardtia 1:219. 1951.

Porotheleum fimbriatum Pers. ex Fr., Syst. Myc. 1:506. 1821.

Basidiocarps annual, resupinate, becoming widely effused, readily separated from substratum; pore surface white to cream-colored, the tubes arising after the development of apical pores in isolated papillae that become crowded and confluent; pores circular to angular, 3–5 per mm in mature specimens, margin concolorous, soft, rhizomorphic, usually widely sterile; subiculum white, soft-fibrous, up to 1 mm thick; hyphal system dimitic; subicular generative hyphae (Fig. 7a) thin-walled, nodose-septate, 2.5–3.5 μm diam; subicular skeletal hyphae (Fig. 7b) thick-walled, aseptate, with rare branching, 2–2.5 μm diam; cystidia or other sterile hymenial elements lacking; basidia (Fig. 7c) clavate to cylindrical, 4-sterigmate, 23–30 \times 5–6 μm , with a basal clamp; basidiospores (Fig. 7d) short-cylindric to ellipsoid, hyaline, smooth, negative in Melzer's reagent, 5–5.5 \times 2.5–3 μm .

Stromatoscypha fimbriata has been found on many hardwoods and conifers and causes a white rot.

Voucher Specimen: RLG 11324, on alligator juniper, Gardner Canyon, Santa Rita Mts., Coronado Nat. Forest, Santa Cruz County, AZ.

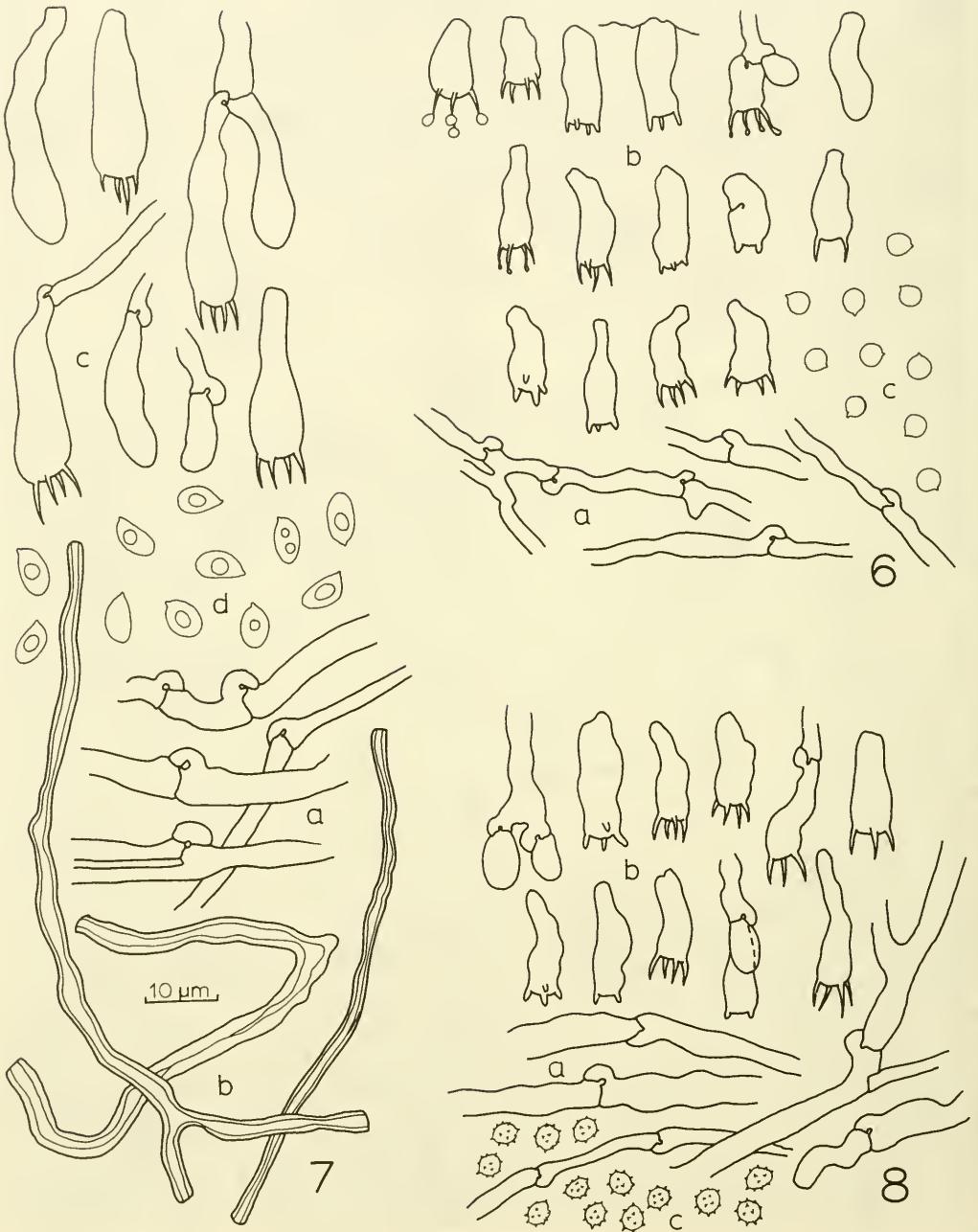
Trechispora farinacea (Pers. ex Fr.) Liberta

Trechispora farinacea (Pers. ex Fr.) Liberta, Taxon 15:318. 1966.

Hydnum farinaceum Pers. ex Fr., Syst. Myc. 1:419. 1821.

Basidiocarps annual, resupinate, thin and fragile; hymenial surface white to pale buff, grandinioid to hydnceous; margin floccose, often rhizomorphic; hyphal system monomitic; subicular hyphae (Fig. 8a) thin-walled, nodose-septate, frequently ampullate, 2–3.5 μm diam; cystidia and other sterile hymenial elements lacking; basidia (Fig. 8b) short-cylindric to clavate, 4-sterigmate, 3.5–5 μm diam and up to 15 μm long, with a basal clamp; basidiospores (Fig. 8c) ellipsoid to subglobose, echinulate, hyaline to pale yellow, negative in Melzer's reagent, 3–4 \times 2–3 μm .

Trechispora farinacea is associated with a white rot of conifer and hardwood logs and slash.



Figs. 6-8. Microscopic characters of: 6, *Leptosporomyces juniperinus* (RLG 11325). a, subicular hyphae; b, basidia; c, basidiospores; 7, *Stromatoscypha fimbriata* (RLG 11324). a, generative subicular hyphae; b, skeletal subicular hyphae; c, basidia; d, basidiospores; 8, *Trechispora farineacea* (RLG 11326). a, subicular hyphae; b, basidia; c, basidiospores.

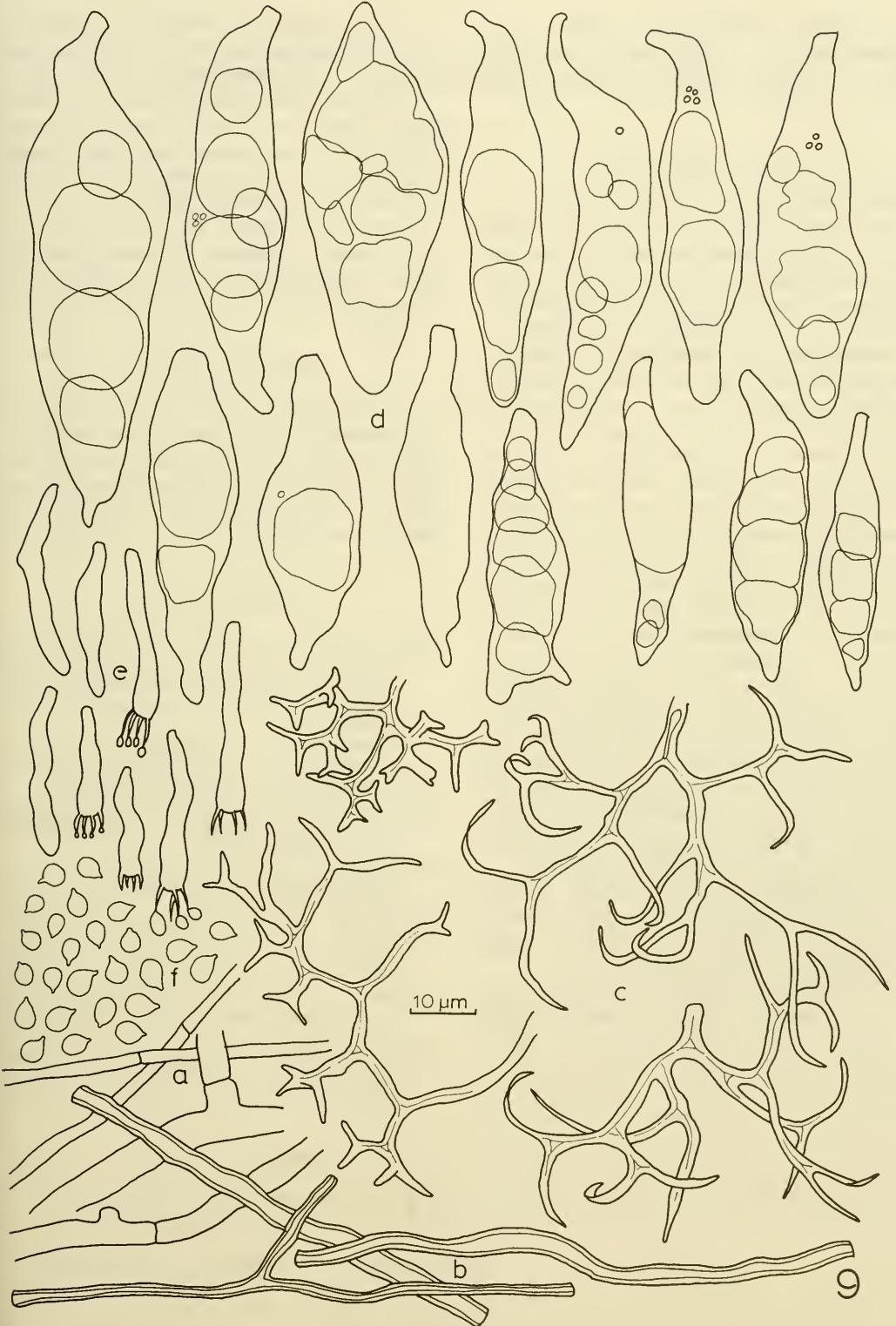


Fig. 9. Microscopic characters of *Vararia fibra* (RLG 11312). a, thin-walled, simple-septate subicular hyphae; b, thick-walled, aseptate fiber hyphae; c, dichohyphidia; d, gloeocystidia; e, basidia; f, basidiospores.

Voucher Specimen: RLG 11326, on aligator juniper, Garden Canyon, Santa Rita Mts., Coronado Nat. Forest, Santa Cruz County, AZ.

Vararia fibra Welden

Vararia fibra Welden, Mycologia 57:507. 1965.

Basidiocarps annual, resupinate, effused up to 5 cm, easily separated from substratum; hymenial surface pale buff, minutely tomentose, cracking into small angular blocks on drying, smooth or assuming the configuration of underlying rhizomorphs; margin thinning out, tomentose to floccose, concolorous, with coarse rhizomorphs that originate in the subiculum and form a network under the hymenial layer; subicular hyphae of two types, some simple-septate (Fig. 9a), thin-walled, some partially to completely incrustated, with frequent branching, 2–5 μm diam; fiber hyphae (Fig. 9b) thick-walled, aseptate, with rare branching, 1.5–4 μm diam; dichohyphidia (Fig. 9c) occasional to abundant, with profuse dichotomous branching, strongly dextrinoid in Melzer's reagent, with ultimate branches slender and recurved, less than 1 μm diam; gloeocystidia (Fig. 9d) abundant, fusoid to capitate or mammillate, thin-walled, with large refractive globules, very weakly positive in sulfuric benzaldehyde, 45–75 \times 8–20 μm , with a basal septum; basidia (Fig. 9e) narrowly clavate, 4-sterigmate, 20–28 \times 3–3.5 μm , with a basal septum; basidiospores (Fig. 9f) ovoid, hyaline, smooth, negative in Melzer's reagent, with a prominent apiculus, 3–4 \times 2–3 μm .

Vararia fibra has previously been reported only from Jamaica. It is associated with a white rot of dead juniper and oak in southern Arizona. *Vararia fibra* is similar to *Vararia ochroleuca* (Bourd. & Galz.) Donk. As pointed out by Welden (1965) and Boi-

din and Lanquetin (1975), *V. ochroleuca* lacks rhizomorphs and fiber hyphae and has spores that are more subglobose than those of *V. fibra*. The scanning electron microscope shows the typical catayahmenium (Figs. 4, 5) with mammillate gloeocystidia and basidia projecting through the loose surface layer of dichohyphidia.

Voucher Specimen: RLG 11317, on aligator juniper, Gardner Canyon, Santa Rita Mts., Coronado Nat. Forest, Santa Cruz County, AZ.

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