November 2013

Hygrocybe Notebook 2

L. R. Hesler

HYGROPHORUS HONDURENSIS (Murr.) Murr.

Mycologia 4:332. 1912

Hydrocybe hondurensis Murr., Mycologia 3:197. 1911.

Illustrations:

Plate

Smith & Hesler, Lloydia 5, pl. 17.

Dennis, Kew Bull. 2, fig. 9.

Pileus 1-1.5 cm. broad, convex to plane, slightly depressed, red to luteous, very viscid, radiate-striate. Context deep yellow, thin.

Lamellae short-decurrent, ivory yellow, rather narrow, subdistant, inserted.

Stipe 3-4 cm. long, 1-2 mm. thick, lemon to deep chrome, very viscid, equal.

Spores 5-7 x 3-4.5 μ, ellipsoid, smooth, pale yellowish in Melzer's reagent. Basidia 34-43 x 5-6 μ, 2- and 4-spored. Pleurocystidia none; cheilocystidia abundant or rare, 28-36 x 1.5-2.3 μ, cylindric. Gill-trama subparallel. Cuticle gelatinous, fibrillose, the hyphae repent to more or less erect. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - On soil, British Honduras, Trinidad, Florida, Michigan, and Washington, August-October.

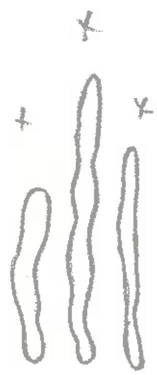
Material studied. - BRITISH HONDURAS: Morton E. Peck (type, deposited in New York Bot. Gard. Herb., 1906); FLORIDA: Singer F560A; MICHIGAN: Smith 57505; TRINIDAD: Dennis 91, 91B (Kew Herb.); WASHINGTON: Smith 18021.

Observations. - The type consists of one carpophore in which the lamellae have in part been devoured, and the pileus is slightly moldy. The description of the microscopic characters given above is based on our study of the type.

Dennis (1953) has studied the type, as well as his two collections from Trinidad (No. 91, September 29, 1949; and No. 91B, October 27, 1949). He reports the pileus grenadine red to light cadmium; the context hygrophanous, deep yellow; the lamellae ivory-yellow, subdistant; the spores 5.5-8 x 3-4.5 μ; cystidia none.

A form intermediate between H. laetus and H. hondurensis was found in a pasture at Cape Flattery, Washington, Oct. 19, 1941 (Smith-18021). It is much more cartilaginous than H. laetus, dries a dull yellow instead of pink, has gelatinous cheilocystidia, a thick gelatinous subhymenium, and also thick gelatinous layers over both pileus and stipe. The fresh fruiting bodies are clear pale yellow, and faded as if hygrophanous to nearly white. When dried, however, all pilei regained their yellow color. In all probability these specimens should be classified in H. hondurensis. We believe it likely that future studies of H. hondurensis from the American tropics will reveal that it characteristically has the filamentous cheilocystidia.

H. hondurensis



Ch- × 1000

HYGROPHORUS HURONENSIS Sm. & Hes.

Lloydia 5:59. 1942

Hygrocybe huronensis (Sm. & Hes.) Sing., Lilloa 22:153. 1951. ~~1949.~~

Illustrations:

Plate

Smith and Hesler, Lloydia 5, pl. 14.

Pileus 1-3 cm. broad, convex, the margin incurved somewhat, the disk flattened but not appreciably depressed, becoming broadly convex to nearly plane in age, not umbonate, appearing glassy and shining watery white, sometimes with a watery-gray circle around the disk (similar in color to the radial striae), opaque when faded and snow-white over all, glabrous, viscid, hygrophanous, at times the disk becoming irregularly cracked, conspicuously translucent striate when moist. Context thin, firm, very waxy, watery-white, becoming snow-white, not very brittle; odor and taste mild, no color change noted in age or where bruised.

Lamellae sharply adnexed, white, unchanging, subdistant (33-37 reach the stipe, 1-2 tiers of short individuals), broad (3-4.5 mm.), thin but firm, edges even.

Stipe 3-5 cm. long, 3-5 mm. thick, translucent and appearing glassy when moist but not viscid, becoming opaque in age but color changing very slowly, snow-white in age, not staining

when bruised, equal or a bit enlarged above, stuffed, becoming hollow, firm and waxy in consistency, the pith when present fibrillose, surface glabrous.

Spores 7-9 x 4.5-6 μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 24-40 x 7-10 μ, mostly 4-spored, some 2-spored. Pleurocystidia and cheilocystidia none. Gill trama parallel to subparallel, hyphae 12-23 μ broad. Cuticle a thin zone of gelatinous repent hyphae,-an ixocutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections present on the cuticular hyphae. Lactifers in the pileus trama and gill trama, 4-6 μ broad.

Habit, habitat, and distribution. - Gregarious on grassy soil, under brush, Michigan, September.

Material studied. - MICHIGAN: Smith 15376 (type, from along the Huron River, Ann Arbor, September 15, 1940).

Observations. - The convex viscid pileus, dry stipe, adnexed gills, and white color throughout amply characterize this species. It appears to be the counterpart of H. flavescens but is white instead of yellow. Singer (1951: ~~Lilloa 22:~~ 153, footnote) says that white forms have been observed among groups of H. flavescens which are indistinguishable from H. huronensis. H. purus, another white species, differs in having a sharply conic pileus and a viscid stipe. Lactifers are present in the flesh of the pileus and occasionally in the gill-trama of H. huronensis, but are not as large as those of H. flavescens.

16 Hygrophorus huronensis Sm 15376

HYGROPHORUS IMMUTABILIS Pk.

New York State Mus. Ann. Rept. 51:292. 1898

Hydrocybe immutabilis (Pk.) Murr., North Amer. Flora 9:382. 1916.

Pileus 15-25 mm. broad, conical or convex and umbonate, greenish brown or yellowish brown, not changing color on drying, margin often striate when dry.

Lamellae whitish or yellowish, subdistant, broad or medium broad.

Stipe 2.5-5 cm. long, 3-4 mm. thick, yellow, glabrous, hollow.

Spores 8-11 x 5-7 μ, ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 30-46 x 8-10 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama parallel, hyphae 3.5-8 μ broad. Cuticle of repent to more or less erect, non-gelatinous hyphae, 2-4 μ broad, brownish. No hypodermium. ~~Pileus trama of periclinally disposed hyphae.~~ Clamp connections present and few on the cuticular hyphae.

Habit, habitat, and distribution. - On dry sandy or heathy soil, New York, August.

Material studied. - NEW YORK: Peck (type, from North Elba, August, 1897).

Observations. - The microscopic characters given above are

based on our study of the type.

Peck (1898) comments on this species as follows: "This plant is manifestly closely allied to Hygrophorus conicus, and might easily be considered a mere variety of it. It differs, however, in being less regularly and acutely conical, in having no orange, scarlet or red hues, in its paler or whitish lamellae and specially in its unchangeable color. Specimens of H. conicus collected at the same time and place and subjected to the same method of drying turned black, as usual, but these retained their colors."

HYGROPHORUS LAETISSIMUS Sm. & Hes.

Lloydia 5:63. 1942

Hygrocybe laetissima (Sm. & Hes.) Singer, Lilloa 22:153. 1951.

Illustrations:

Plate

Smith and Hesler, Lloydia 5, pl. 12.

Pileus 6-8 cm. broad, obtuse, becoming nearly plane, color "spectrum red" over the disk (more brilliant than scarlet red), the margin orange to yellowish and opaque, not fading appreciably, margin incurved at first, spreading in age, viscid, glabrous. Context dull yellow except for a thin red subseparable pellicle; odor and taste not distinctive.

Lamellae narrowly adnate to adnexed, "peach-red" (rufous with a tinge of pink) near the margin, "orange-chrome" near the stipe (brilliant orange), broad (up to 8-10 mm.), subdistant (50 more or less reach the stipe), thick but the edges thin.

Stipe 4-6 cm. long, 10-30 mm. thick, white, the base splashed with scarlet or yellow, equal above a constricted base, hollow, fragile surface somewhat furfuraceous above, glabrous below.

Spores 7-10 x 4-5 μ, mostly ellipsoid, some subovoid or at least ome end broader, smooth, yellowish in Melzer's reagent. Basidia 40-60 x 6-9 μ, mostly 4-spored, some 2-spored. Pleurocystidia and cheilocystidia none. Gill trama subparallel, hyphae

4-10 μ broad. Cuticle a conspicuous gelatinous zone, 100-125 μ thick, with imbedded interwoven hyphae, - an ixocutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections on the cuticular hyphae few, often small and inconspicuous.

Habit, habitat, and distribution. - Scattered under redwoods, California, November.

Material studied. - CALIFORNIA: Smith 9148 (type, Prairie Creek State Park, Orick, November 27, 1937), 9419.

Observations. - The outstanding features of this species are its exceptionally brilliant red, viscid pileus and white stipe. In its other characters it closely resembles H. puniceus and H. coccineus. Both of these two have colored stipes and were collected along with H. laetissimus so that a comparison of fresh specimens of all three species was made. There is also a rather distinct difference in color between dried specimens. Those of the last are a bright fiery orange compared to the duller colors of both the others. H. marchii Bres. is also close to H. laetissimus but the former has a highly colored, more slender stipe.

HYGROPHORUS LAETUS (Fr.) Fr.

Epicr. Myc., p. 329. 1838

Agaricus laetus Fr., Syst. Myc. 1:102. 1821.

Hygrophorus peckii Atk., Jour. Myc. 8:114. 1902.

Hygrophorus davisii Pk., Torrey Bot. Club Bull. 33:214. 1906.

Hydrocybe davisii (Pk.) Murr., North Amer. Flora 9:382. 1916.

Hydrocybe roseiceps Murr., Lloydia 5:138. 1942.

Hygrophorus roseiceps Murr., Lloydia 5:157. 1942.

Hygrocybe laeta (Fr.) Kummer, Der Führer in die Pilzkunde, p. 112. 1871.

Illustrations:

Plate

Bresadola, Icon. Myc., tab. 340.

Fries, Ic. Hymen., pl. 167, fig. 2.

Gillet, Champ. Fr., pl. 132 (338).

Juillard-Hartmann, Icon. Champ., pl. 50, fig. 16.

Lange, Flora Agar. Dan., 5, pl. 168 F & F^{1} (as Hygrocybe).

Ricken, Die Blätterp. Deutschl., pl. 8, fig. 8.

Smith and Hesler, Lloydia 5, pl. 16a.

Wakefield and Dennis, Common British Fungi, pl. 33, fig. 1.

Pileus 1-3.5 cm. broad, convex, then plane or depressed, the margin sometimes turned up giving the cap a sub-infundibuliform appearance, color variable, when young "pale violet gray" to "light vinaceous gray", often sordid olivaceous orange becoming "Mars orange" to "orange-rufus" at maturity, sometimes "tawny olive",

"buff orange", "pinkish buff" or "onion skin pink", glabrous, slimy-viscid, translucent-striate. Context thin, tough, concolorous with the surface or paler; odor none or faintly disagreeable (fishy), taste not distinctive.

Lamellae adnate to decurrent, variously colored (like the pileus), pinkish, pale violet-gray or light vinaceous gray and becoming "buff pink", edges at times pinkish purple, tough, sub-distant, narrow to moderately broad.

Stipe 3-12 cm. long, 2-4 (6) mm. thick, more or less concolorous with the pileus, apex often "pale violet gray", slimy-viscid, equal, hollow, fairly pliant, glabrous.

Spores 5-7 (8) x 3-4 (5) μ, broadly ellipsoid, smooth, yellowish in Melzer's reagent. Basidia (25) 38-66 x 4-7 μ, 2- and 4-spored. Pleurocystidia none; cheilocystidia 25-52 x 1.5-2.5 μ, slender-filamentous, at times branched, projecting. Gill-trama parallel or subparallel, hyphae 7-20 μ broad, the subhymenium usually more or less gelatinizing. Pileus-trama homogeneous beneath a thick gelatinous pellicle. Cuticle a zone of more or less erect, gelatinous, narrow (1-3 μ) hyphae. - an ixotrichodermium. No hypodermium. Pileus trama radial. Clamp connections present on the cuticular hyphae, at times rare.

Habit, habitat, and distribution. - Gregarious on damp soil in woods and on moss in bogs, Canada, Maine, Massachusetts, New York, Maryland, Pennsylvania, West Virginia, North Carolina, Tennessee, Florida, Michigan, Idaho, California, Oregon, and

Washington, May-December. Singer (1951) reports it from South America, and Hongo (1951b) from Japan.

Material studied. - ALABAMA: Burke, Montgomery, Dec. 26, 1920, 72, 76, 77, 87; CALIFORNIA: Smith 9146, 9171, 56510; FLORIDA: Singer F490; Murrill F18737 (type of H. roseiceps, Feb. 13, 1939); IDAHO: Kauffman, Copeland, Sept. 7, 1922; Wehmeyer, Copeland, Sept. 8, 1922; MAINE: Bigelow 3638, 3784, 4056; Rea, Raymond, Aug. 2, 1940; MASSACHUSETTS: Bigelow 6205, 7018, 7034, 7132, 7222, 8345, 8976; Simon Davis (type of H. davisii, from Stow, Aug. 29, 1905); MICHIGAN: Imshaug 4810; Smith 1305, 1560, 1569, 1570, 1607, 6563, 6665, 7698, 9620, 18420, 21853, 21901, 25088, 33166, 33211, 33613, 33624, 44131, 49800, 50112; Thiers 815, 2944, 3239, 3277, 3493, 3552, 3661, 3882; NEW YORK: Cornell Univ. Herb., as H. peckii Atk.: Atkinson 20311; Bigelow 5075; Bradfield 13040; Mencke 24239; C. O. Smith 9649, 9733, 9759; Whetzel 9870; A. H. Smith 410 (Univ. Mich. Herb.); NORTH CAROLINA: Coker 2796, 3112; Hesler 4407, 8058, 12268; King & Hesler 9456; Sharp 4412, 4413; Sharp & Hesler 8249, 9249, 9311, 12747, 14259; Smith & Hesler 7392, 9766, 11726; OHIO: Walters, Cleveland, Aug. 22, 1934; OREGON: Smith 19064, 19218; PENNSYLVANIA: Krieger 1660; TENNESSEE: Bain & Hesler 7904; Hesler 4381, 4430, 4435, 9153, 11543, 12883; Sharp 7965, 8149; Sharp & Hesler 4404; Sharp & Underwood 7929; TEXAS: Thiers 1816; WASHINGTON: Imshaug 1019, 1792, 1793; Slipp 1167; Smith 2670, 16478, 16652, 29419, 30010, 30446, 30578, 40646; Smith & Bigelow 49085; WEST VIRGINIA: Sharp 12735; CANADA: Bigelow 5870; Groves & Hoare 28859; Jackson, Aug. 28, 1936; Smith 565; BELGIUM: Heinemann 2970.

Observations. - The following notes are based on eight collections of H. peckii Atk., determined by Atkinson (the type not specified): spores 5.5-8 x 3.5-5 μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia (25) 38-66 x 4-7 μ, 2- and 4-spored. Pleurocystidia none; cheilocystidia filamentous, 26-52 x 1.7-2.5 μ. Gill trama parallel to subparallel. Cuticle of loosely arranged, gelatinous hyphae. Clamp connections rare.

Notes on the type of H. roseiceps Murr.: spores (4.5) 5.5-7 x 4-4.8 μ, ellipsoid to subovoid, smooth, yellowish in Melzer's reagent. Basidia 36-41 x 4-6 μ. Pleurocystidia none; cheilocystidia 34-42 x 1.5-2 μ. Gill trama of subparallel hyphae. Cuticle of loosely interwoven, gelatinous hyphae, 1.5-2 μ broad. Clamp connections rare on the cuticular hyphae.

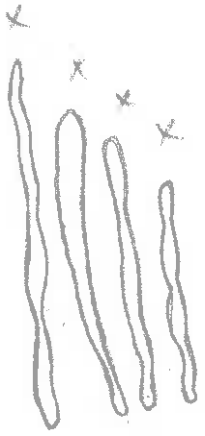
Notes on the type of H. davisii Pk.: spores 5.5-7 x 3.5-4.5 μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 29-48 x 5.5-7 μ 2- and 4-spored. Pleurocystidia none; cheilocystidia 32-65 x 1-2 μ, clustered, cylindric-filamentous, at times slightly branched. Gill-trama subparallel, hyphae 4-10 μ broad. Cuticle of gelatinous hyphae. Clamp connections present om the cuticular hyphae.

The species, H. laetus, is variable in many characters. On material from Michigan the spores from deposits measure 5-6 x 3-3.5 μ. On specimens from Tennessee they were 6-8.5 x 4-5 μ. An examination of a series of specimens, however, showed considerable intergradation; consequently we do not regard difference in spore

size as significant. Fresh specimens vary in color, but there is intergradation, and when dried all collections are uniformly and characteristically a beautiful "flesh color" to "orange pink", and all exhibit the typical filamentous cheilocystidia.

Orton (1960) has described H. xanthochrous sp. nov. from England, a species which is related to H. laetus, but his species differs in its colors, and in its lack of cheilocystidia. Hygrophorus houghtonii Berk. & Br. is listed as a synonym by Dennis, Orton, and Hora (1960).

H. lactis



Ch. – × 1000

Hygrophorus lacteus (Fr.) Fr. – × 2/3

(Sm - 18021)

Hygrophorus laetus

(Smith)

Hygrophorus ~~pecten~~ laetus (Fr.) Fr. ~~Fr~~

(Photo by Kauffman)

Hygrophorus laetus

(Photo by Smith)

Hygrophorus laetus (Fr.) Fr.

(Sm - 33-595)

HYGROPHORUS LAETUS ~~Fr.~~ f. PALLIDUS A. H. Smith

Michigan Acad. Sci., Arts, and Letters, Papers 38:59. 1953

Pileus white. Lamellae decurrent, distant, pallid. Stipe glutinous, pallid.

Habit, habitat, and distribution. - On soil, Michigan, August.

Material studied. - MICHIGAN: Smith 37616 (type from Pellston, Aug. 11, 1951; collected by Harry Thiers).

Observations. - The microscopic characters all agree with those of ~~forma~~ *H.* laetus, and the ~~typical~~ disagreeable odor was also present. Young stages were found, and the pallid pileus, gills, and stipe were characteristic, so that there is no possibility of the carpophores being merely faded fruiting bodies.

HYGROPHORUS LUTEISTIPES Dennis

Kew Bull. 2:264. 1953

Illustration:

Dennis, Kew Bull. 2, fig. 10.

Pileus 2 cm. broad, hemispheric to campanulate, then expanded, obtusely umbonate, viscid, scarlet to orange, yellowish, striate.

Lamellae adnexed then free, white then eburneus (near cartridge buff), 2 mm. broad, edges denticulate.

Stipe citrine-luteus, cylindric, undulate, viscid, solid.

Spores 5-8 x 3-4 (6) μ, ellipsoid. Basidia 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama parallel, hyphae thin-walled, broad. Cuticle of slender hyphae embedded in mucilage.

Habit, habitat, and distribution. - Gregarious on soil, in woods, Trinidad.

Material studied. - TRINIDAD: Dennis 424 (type, from Morne Bleu).

Observations. - This species, according to Dennis (1953), differs from H. hondurensis Murr., H. minutulus Pk., H. subminutulus Murr., and H. mucilaginosus Berk. & Curt. in its almost free gills.

Notes on type: spores 5.5-8 x 3-5 μ, ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 32-38 x 5-7 μ, 2-, mostly 4-spored. Pleurocystidia and cheilocystidia none. Gill trama parallel, hyphae 8-16 (25) μ broad, thin-walled. Cuticle a gelatinous zone, with tangled hyphae which are colorless, 3-6 μ broad. Clamp connections few.

HYGROPHORUS MARCHII Bres.

Icon. Myc. 7:343. 1928

Hygrocybe marchii (Bres.) Singer, Lilloa 22:153. 1951. ~~1949 (1951)~~.

Illustrations:

Plate

Bresadola, Icon. Myc., pl. 343.

Pileus 3-6 cm. broad, convex with an incurved margin, expanding to plane or the margin uplifted and somewhat crenate, blood red to scarlet when young but soon fading to orange red and finally to yellow (orange-yellow to yellow dried), glabrous, viscid but soon dry. Context yellowish; odor and taste not distinctive.

Lamellae adnate to adnexed, orange yellow to pale yellow, moderately broad, subdistant, edges even.

Stipe 4-6 cm. long, 3-6 mm. thick, concolorous with pileus, equal or nearly so, often becoming compressed, glabrous and naked, moist.

Spores 7-10 x 3.5-5 µ, narrowly ellipsoid, at times faintly constricted, smooth, pale yellow in Melzer's reagent. Basidia 34-41 x 5-7 µ, 2- and 4-spored. Pleurocystidia and cheilocystidia not seen. Gill-trama parallel or nearly so, hyphae 7-14 µ broad. Cuticle a thin gelatinous pellicle of narrow hyphae,-an ixocutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections present on the hyphae of the cuticle, gill-trama, and subhymenium.

Habit, habitat, and distribution. - Gregarious under hardwoods and in mixed forests, Alabama, Michigan, and California, July-October; also Iceland, the Faeröes, and Europe.

Material studied. - ALABAMA: Burke 78; CALIFORNIA: Smith 56213; MICHIGAN: Smith 25974, 25975, 25976, 25978, 25991, 30985; 32421, 37486, 57360, 58155; Thiers 969; Denmark: J.P. Jensen (H-23940).

Observations. - This species has been a puzzle to us. It is very close to H. flavescens, in fact it differs in color from that species in much the same way that H. cuspidatus differs from H. acutoconicus. H. marchii was reported by Møller (1945) from the Faëroes but he did not describe the pileus as viscid, and we are inclined to question his identification on that basis. His species, by virtue of the non-viscid pileus and somewhat curved-apiculate spores may possibly be the same as H. quietus Kühner. Perhaps H. marchii should be regarded as a variety of H. puniceus, but this is not the impression one gets from seeing both in the fresh condition. H. puniceus has a characteristic appearance. It seems to be a fleshier species than H. marchii. It differs from H. laetissimus in its much more slender stipe (3-6 mm. thick), in its fading pileus, and orange yellow to pale yellow lamellae. On the other hand, in H. laetissimus the stipe is 10-30 mm. thick, the pileus scarcely fades, and the lamellae are peach red.

Favre (1955) records this species from Switzerland, and Hongo (1951) reports it from Japan (a first report). Lange (1955) has found it in Iceland, ~~and Møller (1945) from the Faeröes. Lange says it is well-described by Møller~~. Mosten and says that it is well described by Lundell (1932) reports it from Sweden.

HYGROPHORUS MARGINATUS Peck var. MARGINATUS

New York State Mus. Ann. Rept. 28:50. 1878

Hydrocybe marginata (Pk.) Murr., North Amer. Flora 9:378. 1916.

Tricholoma marginatum (Pk.) Singer, Mycologia 35:154. 1943.

Humidicutis marginata (Pk.) Singer, Sydowia 12:225. 1958 (1959).

Illustrations:

Plate

Kauffman, Agar. Mich., pl. 31.

Smith and Hesler, Lloydia 5, pl. 5.

Pileus 1-5 cm. broad, obtusely conic, then convex or campanulate, sometimes plane or with a low obtuse umbo, in age occasionally lacerate-squamulose or rimose, "deep chrome," "cadmium yellow," "zinc orange" to "orange" or with a tinge of olive when moist, fading to pale yellowish or nearly white, at first glabrous, moist and hygrophanous, at times lubricous, margin at times faintly striatulate. Context thin, waxy, fragile, concolorous with the surface; odor and taste mild.

Lamellae arcuate-adnate, soon adnexed, sometimes emarginate, seceding in age, "Mikado orange," "deep chrome" to "orange chrome," color usually persisting at least on the edges, broad and ventricose, subdistant, intervenose, edges even.

Stipe 4-10 cm. long, 3-6 mm. thick, "warm buff" to "pale

orange-yellow," equal or slightly ventricose, curved or flexuous, dry, terete or compressed, fragile, glabrous, moist, not viscid, soon dry, hollow.

Spores 7-10 x 4-6 μ, ellipsoid to sub-oblong, smooth, white in deposits, pale yellow in Melzer's reagent. Basidia 31-58 x 6-9 μ, 2- and 4-spored. Pleurocystidia and cheilocystidia not differentiated. Gill trama subparallel to slightly interwoven, cells 10-100 x 8-20 μ, yellowish in Melzer's reagent. Lactifers rare in the gill trama, slender (2-3 μ broad). Pileus-trama homogeneous. Cuticle at first of repent hyphae, - a cutis; finally the surface hyphae loosen, and become more or less erect and then forming a type of trichodermium. No hypodermium. Pileus trama radial, with scattered lactifers. Clamp connections absent.

Habit, habitat, and distribution. - Singly or gregarious on soil and humus, in mixed woods, Maine, Vermont, Massachusetts, New York, Pennsylvania, Maryland, Virginia, North Carolina, Tennessee, Florida, Alabama, Kentucky, Michigan, Idaho, Oregon; also Canada; June-October. Kühner (1936) has reported it from Europe.

Material studied. - ALABAMA: Burke 57, 67, 82, 93; FLORIDA: Singer F471A, F608; IDAHO: Wehmeyer, Copeland, Sept. 8, 1922; KENTUCKY: Kauffman, Harlan, Sept. 6, 1916; MAINE: Bigelow 3662, 3695, 3810, 3928; Rea 641; MARYLAND: Kauffman, Takoma Park, Aug. 24, 1919; MASSACHUSETTS: Bigelow 7426, 8262, 8344, 8951; Davis, Stow, July, 1919; MICHIGAN: Chmielewski 30, 46, 62, 91; Kauffman 482; Smith 1287, 6570, 7010, 18617, 21855, 25963, 25965, 25967,

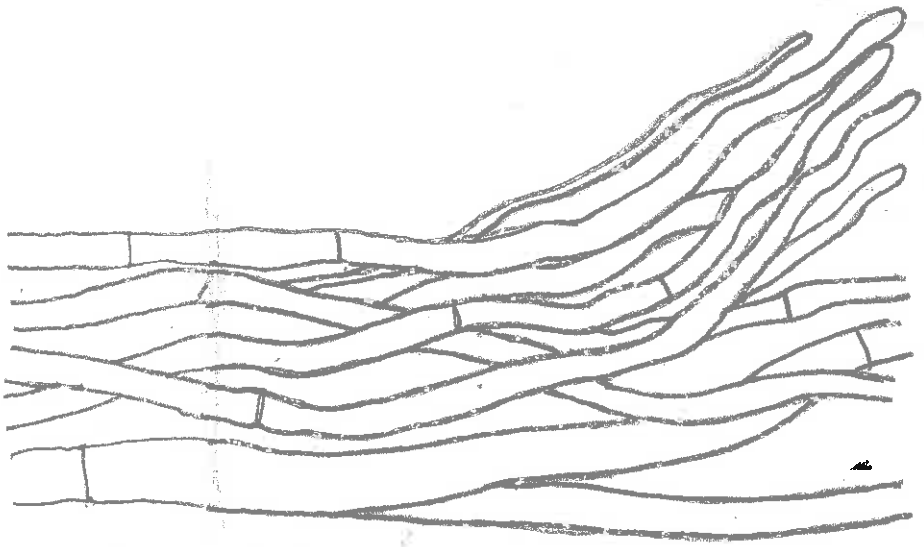
26056, 32490, 32498, 32771, 32909, 33415, 33416, 36979, 36983, 37215, 37234, 37252, 37513, 37778, 38109, 38538, 39497, 39651, 42294; Thiers 910, 980, 3231, 3271, 3325, 3397, 3888; NEW YORK: Bigelow 5123, 5124; Peck (type, from Northville, Fulton Co., August); Smith 430; Snell (Univ. Tenn. Herb.) 8183, 8184, 9057; NORTH CAROLINA: Hesler 7348, 12253, 1395, 20930; Sharp 4405, 4414, 4415, 8217; Smith 7407, 10144; Smith & Hesler 7407; OREGON: Smith 40023; PENNSYLVANIA: Kauffman, Mt. Gretna, Sept. 7, 1924; TENNESSEE Burke 64; Hesler 4383, 4385, 7931, 7941, 11511, 12222, 17696; Sharp 4382, 8174; Sharp & Hesler 12741, 12825; Smith 9985, 10657, 10729; VERMONT: Rea 480; VIRGINIA: Milliken (Univ. Tenn. Herb.) 10853, 21904; CANADA: Bigelow 5850; Kelly 1669, 1688; Krieger 1805, 1851; Smith 661, 4603; Wehmeyer 661a.

Observations. - Notes on the type: spores 7-9 x 4.5-6 μ, ellipsoid to subovoid, smooth, yellowish in Melzer's reagent. Basidia 37-44 x 7-8 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama subparallel to slightly interwoven. Cuticle fibrillose, non-gelatinous. Clamp connections none.

This is a very distinctive fungus readily characterized by the manner in which the gills hold their orange-yellow color after the other parts have faded or after the fruiting bodies have been dried. Our observations verify Kauffman's statement that the species is not viscid. The apparent viscidity occasionally noted is not caused by a gelatinous pellicle, but is rather the slight tackiness one frequently gets from contact with a moist surface. In many respects the species is related to H. calyptraeformis, but differs in color, stature, and in the absence of cystidia on the gills.

UT-12222

marginatus var. marginatus



X 1000

H. marginatus var. marginatus

radial view of cutis
at times the surface hyphae
loosen + become ± erect

Hygrophorus marginatus 2.

(Smith)

Hygrophorus marginatus (Pk.) var. marginatus
(Sm - 32771)

Hygrophorus marginatus

Sm-10657

Hygrophorus marginatus Pk.

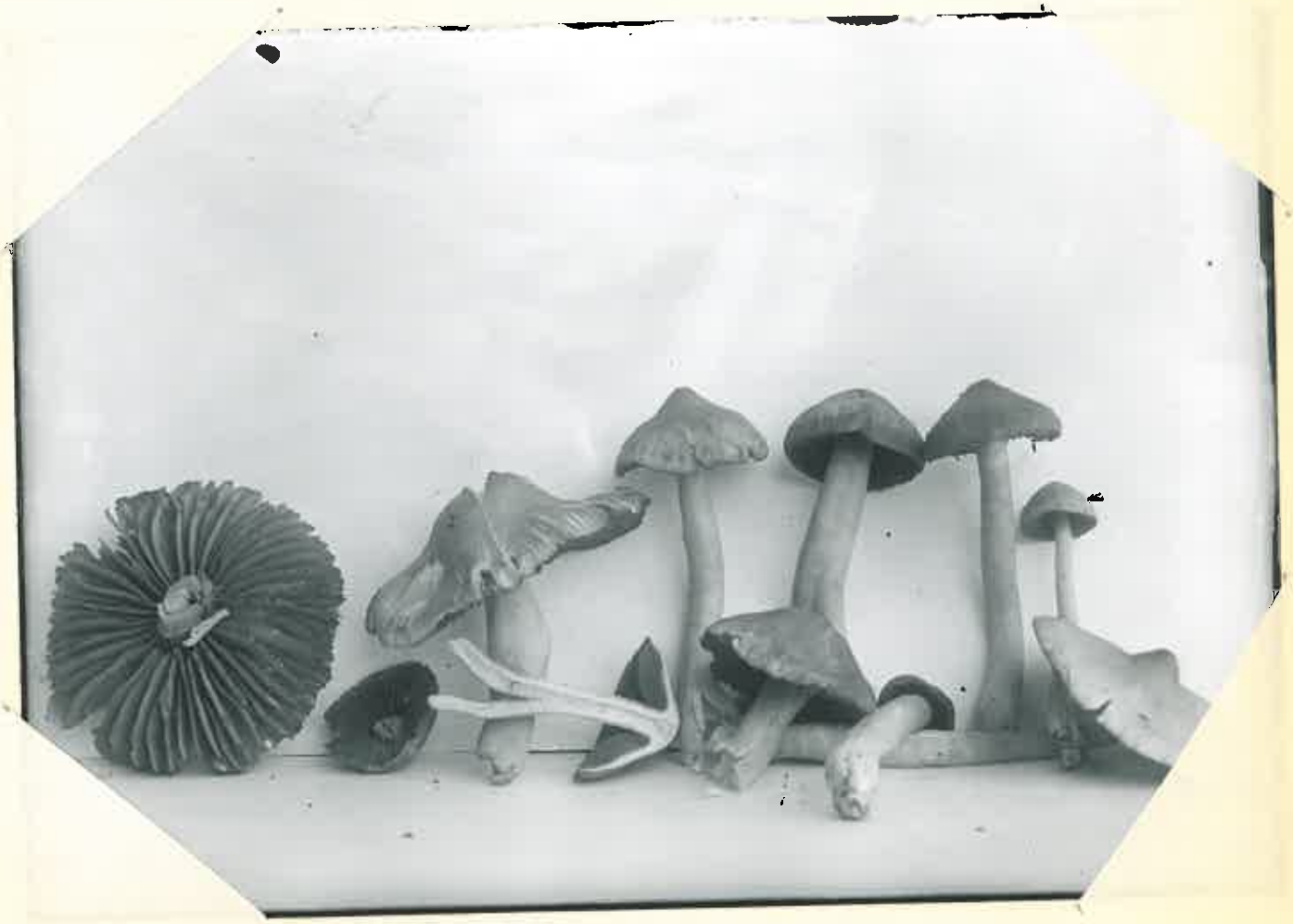
Sm-33-588

Hygrophorus marginatus

(Smith)

Hygrophorus marginatus

Sm- 38356



Hygrophorus marginatus

(Smith)

20930 – Hygrophorus marginatus PK. var. marginatus

20930 – Hygrophorus marginatus PK.

4382 - Hygrophorus marginatus PK.

HYGROPHORUS MARGINATUS var. CONCOLOR A. H. Smith

Michigan Acad. Sci., Arts, and Letters,
Papers 38:59. 1953

Pileus 1-3 cm. broad, conic to obtusely conic, becoming conic-campanulate, color "deep chrome" overall, or in some the disc "orange" in buttons, in age "Mars yellow" (brilliant orange yellow), fading finally to near "apricot-yellow" overall; surface glabrous, moist and hygrophanous, margin finally spreading, thin and striatulate. Context thin, brittle, concolorous with surface; odor and taste not distinctive.

Lamellae broadly adnate, "capucine yellow" to "deep chrome" (not brighter than pileus), broad, subdistant.

Stipe 3-6 cm. long, 4-8 mm. thick, "primuline yellow" (clear bright yellow), equal or narrowed below, naked and glabrous, moist.

Spores 7-9 x 4-5 μ, ellipsoid, smooth. Basidia 36-44 x 7-9 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill trama of short-ellipsoid cells more or less parallel in central strand but flanked by interwoven tissue (sub-hymenium) on either side. Pileus trama with a rudimentary non-gelatinous cuticle, flesh floccose and interwoven. Clamp connections none.

Habit, habitat, and distribution. - Scattered under hemlock, Tahquamenon Falls, Michigan, and Massachusetts, August-September.

Material studied. - MASSACHUSETTS: Bigelow 9238; MICHIGAN: Bigelow 684; Smith 33324 (type, Tahquamenon Falls State Park, Sept. 5, 1949), 37514, 38356.

Observations. - This variety has been somewhat of a puzzle, but collections over a three-year period and comparisons with typical material have shown it to be constant and distinct. In var. marginatus the gills are "cadmium orange."

A. H. Smith

Hygrophorus marginatus var. concolor

(SM-33324)

HYGROPHORUS MARGINATUS var. OLIVACEUS Sm. & Hes.

Lloydia 5:40. 1942

Tricholoma marginatum var. olivaceum (Sm. & Hes.) Singer, Lilloa 22:224. ~~1949.~~ 1951.

Pileus 2.5-3.5 cm. broad, sharply conic, becoming sharply conic-campanulate and finally nearly plane except for a sharp conic umbo, color "olive brown" to "deep olive" over central portion or over all when real young, soon pale dull orange near the margin, in age the olive fading and the orange more widespread (never brilliant orange, however), surface glabrous and moist but not viscid, margin translucent striate. Context thin and fragile, more or less dull olive gray; odor and taste mild.

Lamellae ascending adnate, toothed, evenly "ochraceous orange" and scarcely fading, broad (5 mm. more or less) close to subdistant (2 tiers of short individuals, 20-30 reach the stipe).

Stipe 3-5 cm. long, 2-4 mm. thick, "grape green" becoming pallid greenish yellow, equal, soon hollow, very fragile, glabrous.

Spores 6.5-8 x 4-5 μ, subellipsoid, colorless in Melzer's reagent. Basidia 38-50 x 7-9 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill trama subparallel, hyphae 7-16 μ broad. Cuticle at first of repent, non-gelatinous hyphae,-a cutis; finally the hyphae loosening and at times more or less erect and then formimg a trichodermium. Hypodermium none. Pileus trama of

radial hyphae. Clamp connections none.

Habit, habitat, and distribution. - Singly on very rotten wood of conifers, Massachusetts, Maine, Michigan and Washington, July-September.

Material studied. - MAINE: Bigelow 3811; Massachusetts: Bigelow 8449, 9113; MICHIGAN: Mukai, Douglas Lake, July 26, 1951; Smith 25870, 36924; 39331; Thiers 3638, 4101; WASHINGTON: Smith 16709, 26633 (type, from Baker Lake, Sept. 5, 1941), 30156a, 30284, 30285, 30649, 30833.

Observations. - The prominent green color of the stipe and more pronounced olive color of the cap distinguish the variety from the species. The habitat may also be distinctive, but here more information is needed.

HYGROPHORUS MEPHITICUS Pk.

Torrey Bot. Club Bull. 33:213. 1906

Pileus 2-4 cm. broad, convex becoming plane or nearly so, hygrophanous, yellowish-brown when moist, ochraceous when dry, sometimes tinged green, margin striatulate when moist. Context whitish, sometimes tinged yellow; odor mephitic.

Lamellae sinuate, adnexed, grayish-violaceous or grayish-purple, broad, thick, distant, at times connected by veins, often wavy, lamellulae present.

Stipe 3-5 cm. long, 2-5 mm. thick, concolorous with the pileus or paler, base often whitish-mycelioid, equal or tapering below, curved or flexuous, brittle, hollow.

Spores 8.5-12 x 5-7 μ, ellipsoid, smooth, pale yellowish in Melzer's reagent. Basidia 46-63 x 6-8 μ, 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama of undulating-subparallel, or very slightly interwoven hyphae, 4-9 μ broad. Cuticle of repent hyphae, a few with free ends. Clamp connections few in the gill-trama.

Habit, habitat, and distribution. - Among sphagnum in swamps, Massachusetts, August.

Material studied. - MASSACHUSETTS: Davis (type, collected by Simon Davis, Stow, August 25, 1905).

Observations. - The microscopic characters given above are based on our study of the type.

Peck (1906) states that this is a peculiar and well-marked species, easily recognized by its unusual colors, odor of skunk, and habitat. The odor persists several days after the plants have been collected.

The dried specimens (type), especially their broad, more or less distant gills, remind one of Laccaria laccata (Fr.) Berk. & Br.

There is no reason to place H. mephiticus in synonomy with H. auratocephalus as was done by Murrill (1916). Although both species have a mephitic odor, the larger spores and violaceous gills will distinguish H. mephiticus at once. Bigelow's H. purpureofolius differs in pileus colors, gill attachment, and odor of the context.

HYGROPHORUS MEXICANUS (Sing.) comb. nov.

├—Hygrocybe mexicana Sing., Sydowia 12:225. 1958.

Pileus about 10mm. broad, convex, umbilicate, brightest scarlet red, glabrous, not viscid, margin sulcate and transparent striate half-way to disk. Context almost concolorus with the surface; odor none.

Lamellae very broadly adnate, a slight decurrent tooth present or absent, or subdecurrent, yellow mixed with pinkish red, distant, very broad.

Stipe 21mm. long, 1.5mm. thick at apex, reaching 2.5mm. at base, brightest scarlet red, not viscid, not striate, slightly tapering upwards.

Spores 7-9.5 x 4-7 µ, ellipsoid, rather variable but not falling into definite categories of size or shape, smooth, hyaline. Basidia 25-35 x 7.2-9.2µ, 2- and 4-spored, clavate, not dimorphic but remarkably short as compared with spore-size. Pleurocystidia and cheilocystidia none. Gill trama subregular. Clamp connections present.

Habit, habitat, and distribution.--Gregarious, on soil and humus, Mexico (Oaxaca), July. Type, M-1531, from Huautla de Jiménez, July 12, 1957.

~~Material studied: MEXICO~~ Singer

Observations. - Singer says that this species is closely related to the European H. coccineus sensu Smith & Hesler. The latter, he says, is rare in the United States, and is larger than H. mexicanus. Singer also points out that it is close to H. firmus but lacks dimorphic spores. We have not seen the type.

HYGROPHORUS MINIATUS (Fr.) Fr. var. MINIATUS

Epicr. Myc. p. 330. 1838

Agaricus miniatus Fr., Syst. Myc. 1:105. 1821.

Hygrophorus congelatus Pk., New York State Cab. Ann. Rept. 23:114. 1872.

Hygrocybe miniata (Fr.) Kummer, Führer in die Pilzkunde, p. 112. 1871.

Hygrophorus flammeus Schroeter, Die Pilze Schlesiens, 31:528. 1889.

Hygrophorus miniatus var. congelatus Pk., New York State Mus. Bull. 116:61. 1907.

Hydrocybe constans Murr., Mycologia 4:208. 1912.

Mygrophorus constans Murr., Mycologia 4:217. 1912.

Hydrocybe flammea (Scop.) Murr., North Amer. Flora 9:381. 1916.

Hygrophorus miniatus Fr. var. typicus Sm. & Hes., Lloydis 5:28. 1942.

Illustrations:

Plate

Bresadola, Icon. Myc. tab. 337, fig. 2.

Juillard-Hartmann, Icon, Champ., pl. 48, fig. 14.

Lange, Flora Agar. Dan. 5, pl. 166 F (as Hygrocybe).

Murrill, Mycologia 2, pl. 27, fig. 9.

Peck, N. Y. State Mus. Ann. Rept. 48, pl. 28, figs. 1-10.

Pomerleau, Mushrooms of Eastern Canada and U. S., pl. 2, fig. 15.

Ricken, Die Blätterp. Deutschl., pl. 8, fig. 9.

Smith, Mushrooms in their Natural Habitats, Reel 12, No. 78.

Thomas, Field Book of Common Gilled Mushrooms, pl. 10, fig. 60.

Wakefield and Dennis, Common British Fungi, pl. 36, fig. 1.

Pileus (1) 2-4 cm. broad, broadly convex margin incurved when young, in age convex or plane, the disk often depressed or slightly umbilicate, brilliant scarlet when moist and then appearing glabrous, sub-hygrophanous, fading to orange or pale yellow and them minutely fibrillose-scurfy, at times translucent striate when moist, occasionally slightly rimose in age or when dried. Context thin, brittle, waxy, concolorous with or paler than the surface, varying from scarlet to orange or pale yellow, unchanging; odor not distinctive, taste mild or slightly earthy.

Lamellae bluntly adnate but becoming broadly adnexed, at times subdecurrent, almost concolorous with the pileus, fading to orange or yellow, close to subdistant, broad, becoming ventricose, the edges eroded.

Stipe 3-5 cm. long (up to 7 cm. long when in deep humus) 3-4 mm. thick, concolorous with the pileus and fading slowly, hence usually more reddish than the faded pilei, the cortex orange, glabrous or in faded specimens faintly fibrillose, stuffed with a yellow pith, equal.

Spores 6-8 (10) x 4-5 (6) µ, ellipsoid, (a few apparently abnormal spores shaped more or less like corn kernels are sometimes found), smooth, yellow in Melzer's reagent. Basidia 34-48 x 5-8 µ, 1-, 2-, and 4-spored. Pleurocystidia and cheilocystidia not differentiated. Gill-trama subparallel, the hyphae with long cylindric cells, 7-19 µ broad, often with an opaque mediostrate. Pileus-trama homogeneous. Cuticle composed of erect to repent hyphae which are septate, more or less constricted, the terminal elements somewhat clavate. There is no hypodermium. The pileus

trama is interwoven, and the hyphae are radially disposed. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious on soil, at times among moss, or on rotting logs and humus, in deciduous and mixed woods, general throughout the United States, and the world, July-November.

Material studied. - ALABAMA: Hesler 21969; CALIFORNIA: Smith 3939, 9169; COLORADO: Mains 5206; FLORIDA: Singer F422; IDAHO: Slipp 1300; Smith 53527; MAINE: Bigelow 4448; Rea 624; MASSACHUSETTS: Bigelow 6939, 7231, 7232, 8483, 8605, 8680, 9214; MICHIGAN: Brooks 1254; Chmielewski 111; Imshaug 3714, 3920, 3928; Johnson 1833; Lowe F1143; Mains 32393; Povah 157; Smith 6667, 7041, 7277, 15449, 18514, 18761, 18882, 25877, 25961, 33016, 33586, 37113, 41719, 42467, 42490, 50458, 53765, 57204, 57308, 57625, 61245, 61348; Thiers 2742, 2757, 2870, 2960, 2992, 3117, 3206, 3440, 3922; MONTANA: Mains 6028; NEW JERSEY: Ellis 303; NEW YORK: Smith 662, 804; NORTH CAROLINA: Hesler 4408, 8067, 14338; King 9455; Sharp 4416; Sharp & Hesler 12746; Smith 10827; Smith & Hesler 11775; OREGON: Gruber 691; Smith 7911, 19029; TENNESSEE: Hesler 4431, 4437, 7975, 8201, 9154, 9565, 10934, 11605, 12201, 12833; King 9397; Smith 7454, 9738, 9870, 9895, 10098, 10744; WASHINGTON: Imshaug 1097; Slipp 1003; Smith 16474, 17176, 17546, 18035, 18074, 30880, 30989, 31035, 39512, 48306, 49131, 49132, 49247; CANADA (Ontario): Groves 11229; Jackson 3748; Kelly 765; Smith 26313, 26314, 26287; (Nova Scotia) Smith 651a; (Quebec): Bigelow 6171; WEST INDIES: Dennis, Isle of Rhum, July 18, 1951; Denmark: J. P. Jensen (H-23941, 23942); Belgium: Heinemann (H-23993).

Observations. - Hesler has taken the following color notes

on specimens from Tennessee: Pileus "dragon's blood red", "scarlet red", "flame scarlet", "rufous", "ochraceous orange", "orange", "pinkish buff", or "salmon buff", fading to "light orange-yellow" or paler. Lamellae "ochraceous buff" to "apricot orange". Thus it may be said that the colors are variable. It is not always possible to determine whether one has truly fresh material or specimens that have been remoistened.

The attachment of the gills also varies considerably. One would naturally assume that a mushroom with adnexed, ventricose gills was distinct from one in which the gills were truly decurrent. However, after studying many collections we are inclined to doubt the validity of maintaining such a distinction. The gills of the species are typically bluntly adnate. From this condition they may become ventricose and adnexed if the pileus does not expand completely, or subdecurrent if it does.

Hygrophorus constans Murrill was said by its author to retain its red color on drying and thereby be distinct from H. miniatus. In Oregon Smith has collected specimens answering to Murrill's description but was unable to distinguish them from H. miniatus. The type of H. constans has been studied and no distinctive characters found. The pileus-trama and the hyphae forming the surface-covering of the cap are similar to those of H. miniatus. As a result of the above observations we consider H. constans to be synonymous with H. miniatus.

Hongo (1958a) reports it from Japan. He found 2- and 4-spored

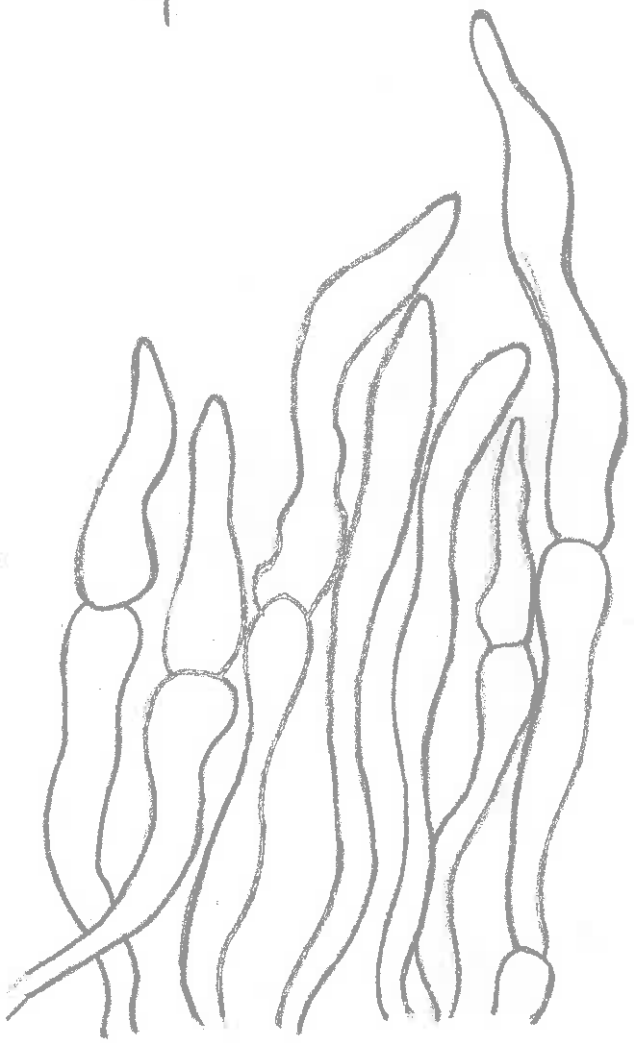
basidia, and thus he accounts from variability in spore-size which he gives as 8-10.5 (11) x 4.5-5.5 μ, basidia 35-54 x 6-7 μ. He says it occurs in Japan, India, Europe, North America, Australia.

H. miniatus var. miniatus

No. 12833

5 ♀

Epicutis

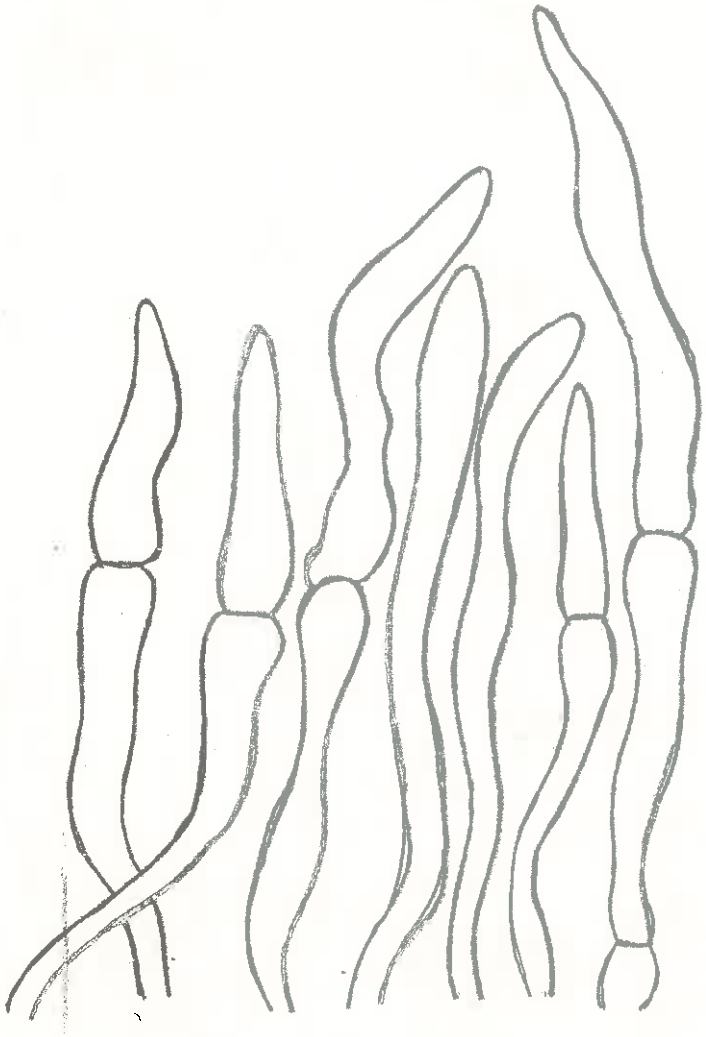


Epi

Hygrophorus miniatus var. miniatus

No. 17833

28



×1000

Epicutis, at maturity of the carpophore, of erect, somewhat fasicled, septate, constricted hyphae.

No Hypodermium.

Pileus trama homogeneous, hyphae interwoven, ± radially disposed -

Hygrophorus miniatus (Fr.) Fr. var. miniatus

Sm - 62866

12201 - Hygrophorus miniatus F. var. miniatus

Is this f. longipes ?

12833 - Hygrophorus miniatus Fr. var. miniatus.

12316 - Hygrophorus miniatus Fr.

specimen lost?

squamulosus Ell. & Ev.

HYGROPHORUS ~~MINIATUS var. FIRMUS Sm. & Hes.~~
Phil. Acad. Sci. Proc. 1893:440. 1894.
~~Lloydia 5:27. 1942~~

miniatus var. firmus Sm. & Hes. Lloydia 5:27. 1942.

Hygrophorus ~~squamulosus Ellis & Ev., Philadelphia Acad. Sci. Proc. 1893:440. 1894.~~

Camarophyllus squamulosus (Ellis & Ev.) Murr., North Amer. Flora 9:388. 1916.

Illustrations:

Plate (Hesler No. 19313)

Smith, Mich. Acad. Sci., Arts, & Letters 20, pl. 32 (as H. squamulosus).

Pileus 1.5-5 cm. broad, obtuse to convex, the disk often slightly depressed, the margin incurved, color "flame scarlet," "grenadine red," to "orange chrome" (bright red to brilliant orange-yellow), margin yellowish at times, fading throughout to "ochraceous-salmon," finally becoming bright yellow over all, surface dry or only slightly moist, glabrous when young but very soon breaking up into minute or distinct fibrillose scales especially near the margin. Context thick and firm, concolorous with the surface and fading to yellow; odor and taste not distinctive.

Lamellae bluntly adnate or with a slight decurrent tooth, seceding quite readily, reddish to pale yellow, close to subdistant (18-22 reach the stipe, 2-3 tiers of short individuals), broad (4-6 mm.), thick, edges even.

Stipe 3-5 cm. long, 3-6 mm. thick, "apricot-yellow" or tinged with red, concolorous within except for the white pith, frequently compressed, equal, hollow, apex white-pruinose, glabrous elsewhere.

Spores 6-8 (9) x 4-5 μ, subellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 30-46 x 5-7 (8) μ, 2- and 4-spored. Pleurocystidia none; cheilocystidia 40-50 x 3-6 μ, occasional, filamentous, often flexuous. Gill trama parallel to subparallel, hyphae 8-20 μ broad, yellowish in Melzer's reagent. Pileus-trama homogeneous. Cuticle a turf-like covering of upright or subappressed, septate, more or less constricted hyphae, the terminal element often clavate. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Scattered to gregarious, particularly around rotten stumps and very rotten logs, Ontario, Massachusetts, New Jersey, Pennsylvania, Michigan, Tennessee, and Washington, August-September; also Canada and Europe.

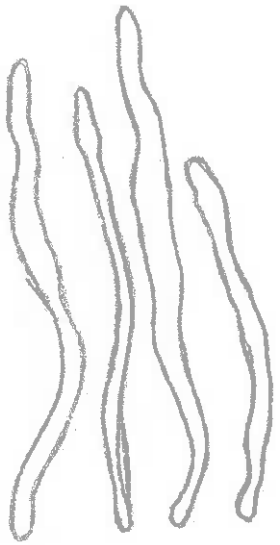
Material studied. - MICHIGAN: Imshang 3786; Smith 7045, 10958, 50099, 50482, Whitmore Lake, August 13 and September 1, 1929; NEW JERSEY: Ellis & Everhart, N. A. Fungi, 1912 (as H. squamulosus); PENNSYLVANIA: Kauffman, Mt. Gretna, Sept. 8 & 11, 1924, and Sept. 1, 1926; TENNESSEE: Sharp 4436; Sharp & Hesler 12761; Hesler 13873; WASHINGTON: Smith 49244; CANADA: Cain, Ontario, Sept. 5, 1936; Smith 26328; Massachusetts: Bigelow 8654; Netherlands: Bas 694.

Observations. - This fungus was recognized by Smith (1935) as H. squamulosus E. & E., but additional collections since

that time have emphasized its resemblance to H. miniatus. The cheilocystidia noted in the above description are not numerous enough to be of any service in distinguishing the variety since they are so rare that one often has to examine many sections to demonstrate them. The habit and appearance suggest an affinity to H. miniatus, but thick, firm flesh of the pileus is distinctive.

H. squamulosus E. & E.

No. 1912 E & E – N. A. Fungi

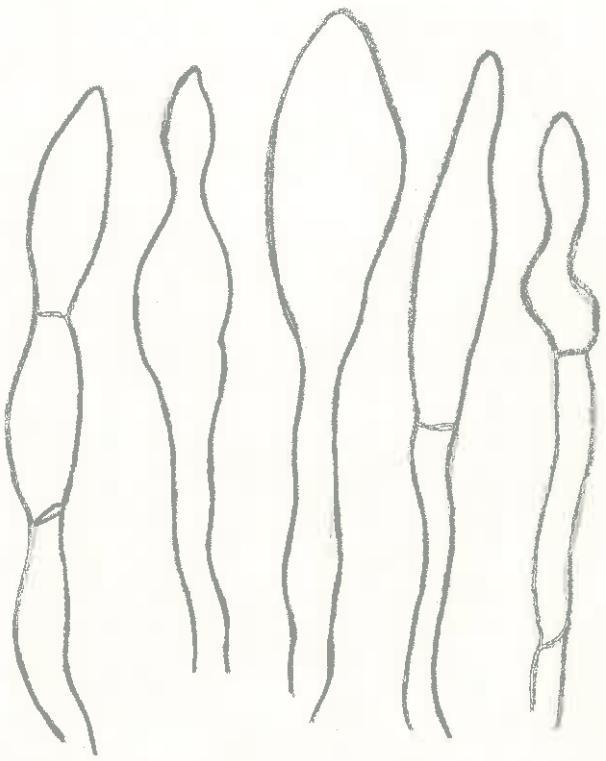


Ch – × 1000

Hygrophorus squamulosus E. & E.

No. 1912, Ellis & Everhart, N. A. Fungi.

(= *H. miniatus* var. *formus* Sm. & Hes.)



Epicuticular hyphae - x 1000

Hygrophorus ~~squamulosus~~ miniatus var Fermus — Ellis

(Photo by Smith)

HYGROPHORUS MINIATUS f. LONGIPES Sm. & Hes.

Sydowia 8:321. 1954

Pileus 1-3 cm. broad, convex becoming plane or slightly depressed, often remaining convex, color "English red" to "flame scarlet" gradually fading out to pale yellow margin, surface glabrous and moist, only in age slightly squamulose, surface shining but not viscid, when faded becoming unpolished to faintly furfuraceous, distinctly translucent striate when moist (often conspicuously so). Context orange to yellowish; odor and taste none.

Lamellae broadly adnate, orange-yellow to pale yellow, close, broad, edges even and pallid.

Stipe 3-8 cm. long, 2-4 mm. thick, concolorous with pileus and changing color with it, usually paler below, equal, hollow, fragile, transversely undulating.

Spores 7-8 x 4.5-5 µ, ellipsoid, smooth, hyaline, yellowish in Melzer's solution. Basidia 48-60 x 7-8 µ, 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama parallel. Pileus trama floccose-interwoven, cuticle a trichoderm of elongate hyphae which become appressed to the pileus, clamp connections mostly absent at the cross walls, end-cells cylindric to ellipsoid. Clamp connections present quite regularly at the base of the stipe.

Habit, habitat, and distribution. - Gregarious in a sphagnum bog, Michigan, September.

Material studied. - MICHIGAN: Smith 42560 (type, from Pike Lake, Luce County, September 11, 1953), 42561, 42562, 42563, 42564, 42565, 61247, 61249.

Observations. - This agaric might, at first sight, appear to be a growth form with a long slender stipe, no doubt a variation caused by the habitat. However, the rather conspicuously striate pileus which becomes squamulose only in age is not a combination of characters likely to be influenced by habitat. In addition, clamp connections are relatively rare on the septa of the cuticular hyphae a character which may indicate a trend toward the clampless species most of which appear to have been derived from the miniatus group.

HYGROPHORUS MINUTULUS Peck

New York State Mus. Bull. 1 (No. 2):9. 1887

Hydrocybe minutula (Pk.) Murr., North Amer. Flora 9:380. 1916.

Pileus 5-15 mm. broad, convex, then broadly convex to plane, the disk not depressed, "scarlet", "flame scarlet", to "Mars orange", hygrophanous, fading to "antimony yellow", glabrous, appearing silky ~~when dry~~ on losing moisture, distinctly viscid or glutinous, margin striatulate when fresh. Context thin, fragile, concolorous with the surface; odor and taste mild.

Lamellae adnate to adnexed or with a decurrent tooth, "orange buff" to "bittersweet orange", close to subdistant, broad and somewhat ventricose, edges even.

Stipe 1.5-5 cm. long, 1-3 mm. thick, at first red above, yellowish or whitish below, fading to yellow over all in age, fragile, equal or tapering downward, glutinous or viscid, stuffed, becoming tubular.

Spores 7-10.3 x 4-5 (6) μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 30-45 x 5-8 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill trama of parallel to subparallel hyphae, yellow in Melzer's reagent, cells 6-15 μ broad. Cuticle a gelatinous pellicle, of repent, colorless hyphae,-an ixocutis; at times the surface hyphae are more or less erect. Hypodermium none. Pileus trama of radial hyphae. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious to scattered on grassy soil, New York, Nova Scotia, North Carolina, Tennessee, Alabama, Michigan, and Oregon, May-October; also Japan (Hongo, 1951).

Material studied. - ALABAMA: Burke 61, 89; MICHIGAN: Brooks 1255; Smith 18714, 22072, 61296; MONTANA: Kauffman, Echo Lake, July 14, 1928; NEW YORK: Peck (type, from Sandlake, July); NORTH CAROLINA: Coker 8197; Hesler 7332, 8197, 13721, 14387, 22356; Smith 10158; OREGON: Smith 28356; TENNESSEE: Hesler 11556, 12908, 13799, 14429, 19637; Sharp 4399, 19695; TEXAS: Thiers 1862: CANADA (Nova Scotia): Harrison 44494.

Observations. - The following notes have been recorded for the type: spores 8-10 x 4-5 μ, ellipsoid, smooth, faintly yellow in Melzer's reagent. Basidia 34-48 x 5-7 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama parallel to subparallel, hyphae 4-8 μ broad. Cuticle of more or less repent, gelatinous hyphae. Clamp connections present on the cuticular hyphae.

Hygrophorus subminutulus is similar but has smaller spores. Apparently Coker's material (No. 2791), reported from North Carolina as H. sciophanus is not different from H. minutulus.

HYGROPHORUS MUCILAGINOSUS B. & C.

Jour. Bot. & Kew Misc. 1:98. 1849

Pileus 12-18 mm. broad, convex, at length plane, pale reddish-yellow, darker in the center, very mucilaginous, margin striate.

Lamellae subdecurrent, flesh-colored, unequal, medium broad, distant, fleshy.

Stipe 2.5-5 cm. long, 2 mm. or more thick, pale yellow or carneous, composed of longitudinal fibers, brittle, subpellucid, fistulose.

Spores 5-7 x 3-4.5 μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 40-52 x 5-6 μ, 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama subparallel. Subhymenium indistinct. Cuticle of the pileus fibrillose, the surface hyphae gelatinous. Clamp connections not found.

Habit, habitat, and distribution. - On low ground, South Carolina.

Material studied. - SOUTH CAROLINA: The type, borrowed and studied through the courtesy of Kew ~~Gardens.~~ the Herbarium.

Observations. - The microscopic characters given above are based on our study of the type.

The cuticular hyphae of the stipe are non-gelatinous, and

the stipe is therefore not viscid. The species is near H. subminiatus the spores of which are larger and of different shape. It differs from H. subceraceus in its broader spores; from H. nitidus in its subdecurrent, flesh-colored lamellae, its dry stipe, and its smaller spores; and from H. parvulus in its pileus colors, its subdecurrent lamellae, its much larger basidia, and slightly smaller spores.

HYGROPHORUS MYCENOIDES Smith & Hesler

Lloydia 5:42. 1942

Pileus 6-12 mm. broad, convex or conic at first, the margin incurved, becoming convex to plane and with a slight umbo, disk at times depressed slightly and the margin spreading, "deep chrome" to "light orange-yellow" over the center, the margin "mustard-yellow" to "naples-yellow" (orange-yellow around the disk, pale yellow toward the margin), finally fading to almost pure white, the yellow color occasionally persistent in various places, moist and lubricous (not truly viscid), striate to the disk at first. Context thin, waxy, fragile, bright yellow fading to white; odor and taste not distinctive.

Lamellae broadly adnate to subdecurrent, bright yellow at first, the faces fading to white or pale yellow before the edges, and hence the lamellae frequently appear marginate, whitish over all in age, subdistant, sometimes appearing close when the short gills are well developed, narrow or at late maturity rather broad.

Stipe 2.5-4 cm. long, 1-1.5 mm. thick, pale wax-yellow or concolorous with the pileus, equal, slender, tubular.

Spores (5) 6-7 x 2.5-3.5 μ, narrowly ellipsoid, smooth, hyaline, yellowish in Melzer's reagent. Basidia 18-30 x 4.5-6 μ, 4-spored. Pleurocystidia none; cheilocystidia (16) 28-33 x (4) 7-9 μ, abundant, subcylindric, the apices obtuse, thin-walled, with yellow contents at first, hyaline in age. Gill-trama of subparallel to slightly interwoven hyphae, the cells 8-20 μ wide

and 15-60 μ long, at first with pale yellow contents. Cuticle of repent hyphae, - a cutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections rare on the cuticular hyphae, none found on the hyphae of the stipe.

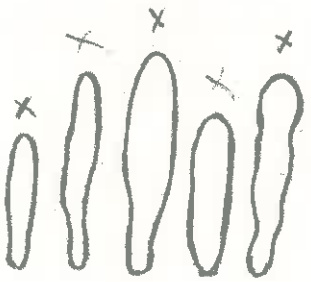
Habit, habitat, and distribution. - Scattered on humus, in mixed woods, Tennessee, August.

Material studied. - TENNESSEE: Smith 9988 (type, from Cades Cove, Great Smoky Mts. National Park, August 10, 1938), 10137 (paratype, same locality, August 13, 1938).

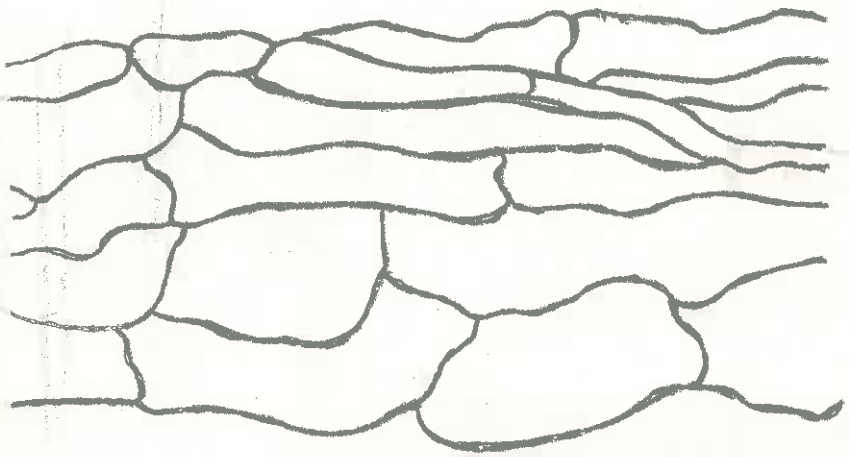
Observations. - In all respects, except its basidia, this species appeared to be a true Hygrophorus, and in fact is similar to H. ceraceus or H. parvulus in many respects. It is more Mycena-like than either, however, hence the specific name. It is also close to the very poorly known H. aurantiaco-luteus B. & C. but is distinct from that species as described by its broadly adnate rather than long-decurrent gills. Both apparently have brilliant orange colors and slender stature. Our specimens showed no resemblance to Omphalia fibula in general appearance, and it is largely on this basis that we have considered them to represent a different species. H. subceraceus Murr. also appears to be closely related, but is described as having a viscid pileus. H. wynniae B. & Br. is close but has much broader spores and narrow decurrent lamellae.

Hygrophorus myxenoides Sm. + Hes.

No. 13723 (Sm-10137) Paratype



Ch. × 1000



Cuticle of pileus - × 1000

HYGROPHORUS NITIDUS B. & C.

Ann. Mag. Nat. Hist. II, 12:424. 1853

Hydrocybe nitida (B. & C.) Murr., North Amer. Flora 9:378. 1916.

Illustrations:

Plate

Smith & Hesler, Lloydia 5, pl. 16b. 1942

Pileus 1-4 cm. broad, when young broadly convex or flattened and with an incurved margin, disk very soon becoming depressed, in age deeply infundibuliform, the margin either spreading or remaining decurved, "primuline yellow" to "apricot yellow," over all at first, fading to whitish or pale cream color, glabrous, viscid, striatulate when moist. Context soft, fragile, very thin, yellowish, fading to white; odor and taste not distinctive.

Lamellae arcuate at first, soon long-decurrent, pale yellow, edges often deeper yellow, subdistant to distant, narrow, moderately broad in age, intervenose, very fragile and easily broken, edges even.

Stipe 3-8 cm. long, 2-5 mm. thick, concolorous with the pileus at first, fading to whitish, fragile, equal or slightly enlarged above, flexuous at times, surface viscid and glabrous, glistening when dry, hollow.

Spores 6.5-8 (9) x (3.5) 4-5 (6) μ, ellipsoid to subovoid, smooth, very pale yellow in Melzer's reagent. Basidia 34-45 x 5-7 μ, 4-spored. Pleurocystidia and cheilocystidia not differentiated. Gill-trama of subparallel to slightly interwoven hyphae of very large cells (40-135 x 10-32 μ). Cuticle a zone of gelatinous, repent hyphae, - an ixocutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections present on the hyphae of the cuticle and pileus trama.

Habit, habitat, and distribution. - Gregarious to scattered on humus, on wet soil, and in bogs, Nova Scotia and Ontario in Canada, and Maine, Massachusetts, New Jersey, New York, Pennsylvania, Michigan, Washington, North Carolina, South Carolina, Alabama, Tennessee; Murrill reports it for eastern United States including Florida, July-October.

Material studied. - ALABAMA: Burke 81; MAINE: Bigelow 3408, 3490, 3782; Rea 470, 537, 642; MASSACHUSETTS: Bigelow 7671, 8289, 8303, 9131; MICHIGAN: Bigelow, Emmet Co., 1955; Kauffman 328, Bay View, Aug. 24, 1905; Mains 32-107, 32111; Potter 3909; Povah P306; Smith 1259, 7030, 9621, 18404, 18764, 21856, 32575, 33586, 37074, 37791, 49997, 50100; Thiers 3268, 3343, 3438, 3635, 3897, 4017, 4042, 4204, 4291; NEW JERSEY: Ellis & Everhart, N. A. Fungi N. 22; NEW YORK: Ellis, Aug. 17, 1882; NORTH CAROLINA: Coker 5624; Hesler 12190, 13951, 14260, 16324; Sharp & Hesler 9312, 12745; Smith 10148; PENNSYLVANIA: Kauffman, Mt. Gretna, Sept. 4, 1924; TENNESSEE: Smith 9832,

10864; WASHINGTON: Kauffman, Cascade Mts., Sept. 18, 1915; CANADA: Bigelow 5664, 5882; Cain, Ontario, Sept. 3, 1936; Kelly 884, 1180, 1231; Krieger 1709; Smith 632.

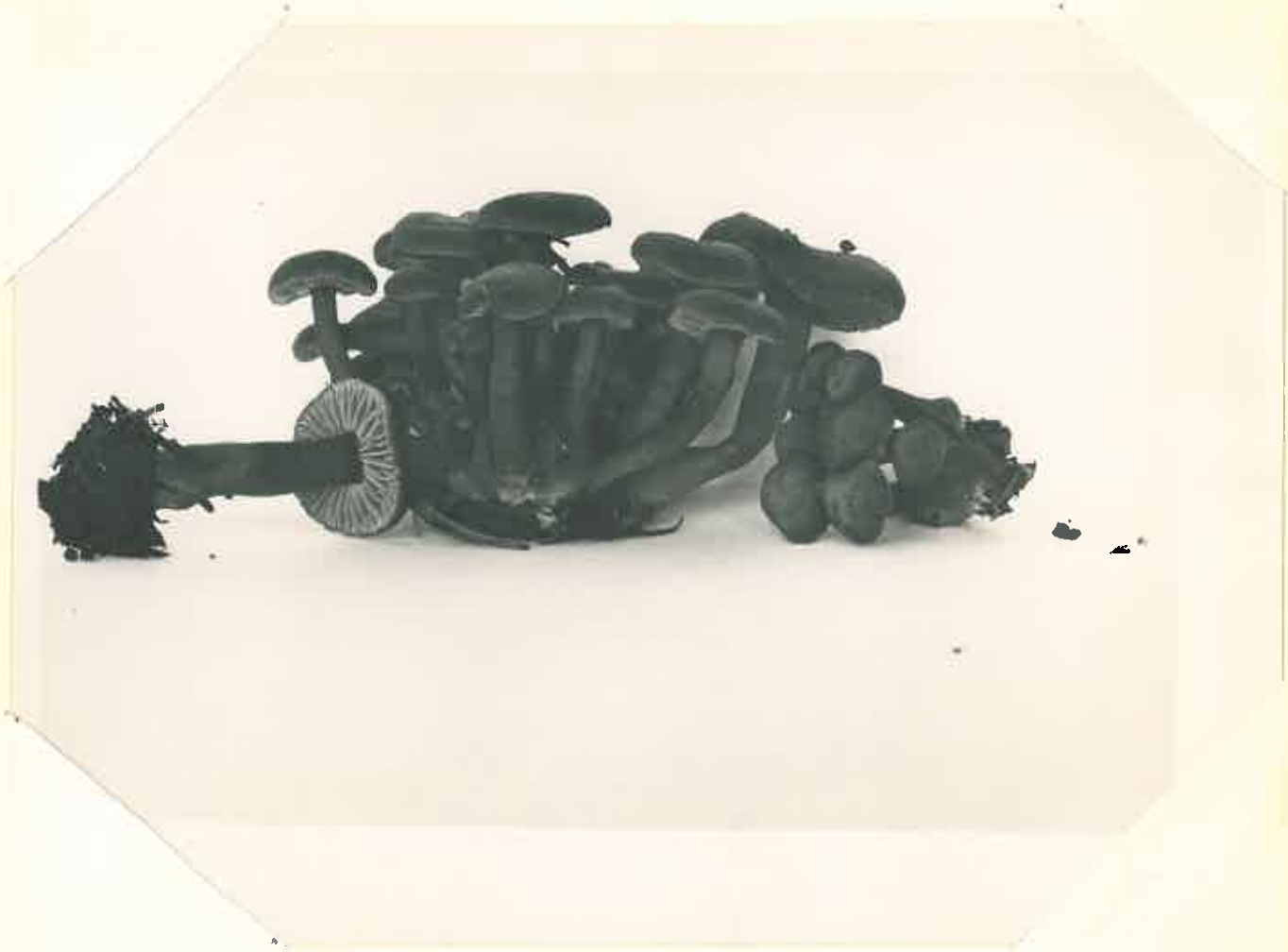
Observations. - We have not seen the type, which is from South Carolina, but have studied Ellis' collection at the New York Botanical Garden which Murrill, in turn, was found to agree with the type at Kew. Lange (1955) reports H. vitellinus Fr. sensu Møller, from Greenland, and believes it to be different from H. nitidus. In the latter, he points out, the hyphae of the gill trama are much broader than those of H. vitellinus, and the stipe is more slender.

Hygrophorus nitidus B. & C. non F.

Sm - 33-586

Hygrophorus nitidus

(Smith)



Hygrophorus nitidus?

Sm - 30989

probably *coccineus*?

Hygrophorus nitidus

(Photo by Wehmeyer)

HYGROPHORUS NITIOSUS Blytt

Norges Hymenomycetes. Videnskab Selskabets Skrifter.
Math. - Naturv. Kl. 1904. No. 6. 1905

Hygrocybe ingrata Jensen & ~~Moeller~~ Møller, in Møller, Fungi of the Faeröes, p. 136. 1945.
Camarophyllus nitratus subsp. ovinus sensu J. Schaeffer
Hygrocybe nitiosa (Blytt) Moser apud Gams, Kleine Kryptogamenfl. ~~1953.~~ von Mitteleuropa, p. 34. 1953.

Pileus 2-5 cm. broad, convex-umbonate, expanding slightly, near "snuff brown", moist, soon dry, radiately appressed-fibrillose, margin even. Context dingy-grayish, at times pinkish when cut, relatively thin; odor nitrous, taste acidulous.

Lamellae deeply emarginate, whitish changing to pinkish, and at times becoming blackish, where bruised, broad, subdistant, edges even.

Stipe 4-8 cm. long, 3-8 mm. thick, pallid brownish, becoming pinkish brown where bruised, drying blackish, at times ventricose below, often compressed, glabrous, striate, dry, hollow.

Spores 7.5-10 x 4.5-6 μ, ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 33-42 x 7-8 μ, mostly 4-spored, a few 2-spored. Pleurocystidia and cheilocystidia none. Gill trama of broad, subparallel hyphae. Cuticle of repent to more or less erect, brownish hyphae. Pileus trama of radial hyphae. Clamp connections on the cuticular hyphae.

Habit, habitat, and distribution. - On soil, in deciduous wood, Tennessee, July-August; also Europe.

Material studied. - TENNESSEE: Hesler 12737, 22383; FRANCE: Bas 1112 (ex-Herb. Univ. Leiden).

Observations. - This species is between H. ovinus (which turns pinkish where bruised, and the odor faint but not nitrous), and H. nitratus (the color of which is unchanging, but has a nitrous odor). Hygrophorus nitiosus shows the color change of ovinus, and the nitrous odor of nitratus.

Haller (1951) discusses this species as known to him through his collections. In his material, the lamellae are cream; in our collections and that of Bas' collection from France, the lamellae are whitish. In all these collections, however, the gills become reddish, pinkish, or brownish where bruised. It is Haller's opinion that H. nitiosus is included in the description which we (Smith & Hesler, 1942) give for H. ovinus. In the present studies, we have referred to H. ovinus those individuals of this complex which show a color change and a faint but fragrant (fruity) odor. In our earlier work (1942) we followed Bresadola (1928) in admitting to H. nitratus a collection in which there was a color change. That and similar collections we here refer to H. nitiosus. It is now known that H. metapodius differs from all of these in its amyloid spores (see Sub-genus Pseudohygrophorus).

HYGROPHORUS NITRATUS Fr.

Hymen. Eur., p. 421. 1874

Hygrocybe nitrata (Fr.) Wünsche, Die Pilze, p. 112. 1877.

Camarophyllus nitratus Ricken, ~~1920~~ Vademecum für Pilzfreunde, p. 197. 1920.

Illustrations:

Plate

Bresadola, Icon. Myc. tab. 353.

Lange, Flora Agar. Dan. 5, pl. 165E.

Ricken, Die Blätter. Deutschl, pl. 7, fig. 7.

Pileus 2-5 (7) cm. broad, singly or subcespitose, convex to obtusely conic, somewhat umbonate in age, very pale brownish at first, at times "snuff brown," usually becoming grayish to gray-brown (not matched), finally dark grayish brown to nearly blackish, moist or soon dry, at length fibrillose-squamulose, margin even, splitting readily. Context thin, brittle, pale to dark brownish gray, unchanging; odor nitrous, taste acidulous.

Lamellae emarginate, whitish, darkening somewhat in age, at times yellowish with a grayish tint, subdistant, broad (up to 10 mm.), intervenose, alternating long and short, edges even.

Stipe 4-10 cm. long, 2-10 mm. thick, pale brownish at first, dark grayish in age, fragile, terete to compressed, glabrous, somewhat longitudinally striate, equal or slightly ventricose downward, base often white and pointed, hollow.

Spores 7.5-10 x 4.5-6 μ, subovoid to ellipsoid, smooth, white in mass, pale yellow in Melzer's reagent. Basidia 4-spored, 32-43 x 6-9 μ, mostly 4-spored, a few 2-spored. Pleurocystidia and cheilocystidia not differentiated. Gill-trama subparallel, hyphae 7-25 μ broad, yellowish in Melzer's reagent. Cuticle of non-gelatinous, repent or more or less erect hyphae, 4-12 μ broad, which are brownish, the terminal elements with more or less rounded apices and cystidioid. No hypodermium. Pileus trama of radial, subparallel hyphae. Clamp connections on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious to scattered, on soil in deciduous or coniferous woods, North Carolina, Tennessee, Massachusetts, Michigan, and Canada, June-August; also Europe.

Material studied. - MAINE: Bigelow 3232, 3628, 3806; MASSACHUSETTS: Bigelow 7234, 9079; Davis, South Acton, Aug. 1916; Stow, Aug. 1916 and July 1917; MICHIGAN: Smith 37312; Thiers 3941; NORTH CAROLINA: Hesler & Sharp 12737; Hesler 14437, 21813, 22383; Smith 10149; TENNESSEE: Hesler 18624, 19174, 20881; G S M N P: Smith 9930, 10647; CANADA (Quebec): Bigelow 5515, 5516, 5517; NETHERLANDS: Bas 1655.

Observations. - The nitrous odor and gray-brown colors distinguish this species from its near relatives. It is closely related to H. nitiosus which is characterized by a nitrous odor and a pinkish to brownish color-change on bruising; and to H. ovinus in which the odor is mild or at times faintly fruity and the color of the flesh, gills, and stipe changes to pinkish to brownish where bruised.

19174 – Hygrophorus nitratus Fr.

21813 - Hygrophorus nitratus F.

Hygrophorus *nitratus*
Bigelow 3232

Hygrophorus nitratus

Bigelow 3232

HYGROPHORUS NODULISPORUS Dennis

Kew Bull. 2:259. 1953

Hygroaster nodulispora (Dennis) Singer, Sydowia 9:370. 1955.

Illustration:

Dennis, Kew Bull. 2, fig. 4.

Pileus 2.5 cm. broad, convex, subumbilicate, silky, black. Context black, thin, hygrophanous.

Lamellae adnato-decurrent, grayish, subdistant, narrow, thick, often forked.

Stipe grayish, cylindric, glabrous, fistulose.

Spores 7-10 x 6-8 μ, ellipsoid, nodulose, nodules obtuse, 1 x 1 μ, non-amyloid. Basidia 48-58 x 7-11 μ, 4-spored, cylindric-clavate. Pleurocystidia and cheilocystidia none. Gill trama of subparallel to woven hyphae which tend to diverge toward the hymenium, permeated by a few dark staining vermiform hyphae. Cuticular hyphae 4-11 μ broad.

Habit, habitat, and distribution. - On soil, Trinidad.

Material studied. - TRINIDAD: Dennis 385 (type, from Upper Caura Valley).

Observations. - Dennis (1953) states that although this

species has spores like those of a Mycenella, its whole aspect is that of an Hygrophorus. He cites the long basidia and absence of cystidia to indicate an affinity with Hygrophorus.

Singer (1955) studied the type at Kew and found the gill trama with a central strand of fuscous, non-gelatinous, slightly interwoven hyphae, and a hyaline lateral stratum consisting of thin filamentous hyphae, more or less diverging toward the hymenium, and imbedded in a gelatinous mass. All hyphae without clamp connections.

Singer (1955) studied the type and observed that this is a very distinctive species, undoubtedly a representative of the Hygrophoraceae but differing from all other known members of the group by its stellate spores. It also has another unique correlation of characters, viz. bilateral trama and hyphae without clamp connections. Thus, he proposes (1955:370) a new genus, Hygroaster.

Notes on the type: spores 7-10 x 6-8 μ, ellipsoid, nodulose, nodules 1-2 x 1-2 μ, blunt. Basidia (40) 50-62 x 9-12 μ, 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill trama of somewhat woven to subparallel hyphae of relatively short cells, tending to diverge toward the hymenium. Lactifers present in the gill and pileus trama. Cuticle of repent or semi-erect hyphae, which are septate, pale fuscous, 5-10 μ broad. Clamp connections none.

HYGROPHORUS ODORUS SP. NOV.

Pileus 5 cm. broad, conic, dominantly whitish, disc pale cinereous, margin dingy, becoming pale salmon where bruised, glabrous, subviscid; flesh thick, white, very brittle; odor fragrant, taste mild; lamellae adnexed, creamy white, staining pale salmon where bruised, close, medium broad; stipe 7.5 cm. long, 10 mm. thick, white, unchanging, appressed-fibrillose; spores 6-8 x 4-5 (6) μ, ellipsoid to subovoid. Specimen typicum in Herb. Univ. Mich.; lectum Milford, Mich., Sept. 17, 1940, A. H. Smith n. 15421.

Pileus 5 cm. latus, conicus, plerumque albidus, disco pallido-cinereus, margine furvus, salmoneo colore contusus, glaber, subviscidus; caro crassa, alba, perfragilis; odor suavis, gustus mitis; lamellae adnexae, colore ut flos lactis, colore pallido-salmone contusae, densae, modice latae; stipes 7.5 cm. longus, 10 mm. crassus, albus, constans, appresso-fibrillosus; sporae 6-8 x 4-5 (6) μ, ellipsoideae demum subovoideae. Specimen typicum in Herb. Univ. Mich.; lectum Milford, Mich., Sept. 17, 1940, A. H. Smith n. 15421.

HYGROPHORUS ODORUS SP. NOV.

Pileus 5 cm. latus, conicus, pleumque albidus, disco pallido-cinereus, margine furvus, salmoneo colore contusus, glaber, subviscidus; caro crassa, alba, perfragilis; odor suavis, gustus mitis; lamellae adnexae, colore ut flos lactis, colore pallido-salmone contusae, densae, modice latae; stipes 7.5 cm. longus, 10 mm. crassus, albus, constans, appresso-fibrillosus; sporae 6-8 x 4-5 (6) μ, ellipsoideae demum subovoideae. Specimen typicum in Herb. Univ. Mich.; lectum Milford, Mich., Sept. 17, 1940, A. H. Smith n. 15421.

Pileus 5 cm. broad, disc obliquely conic, dominantly whitish, disc pale cinereous, margin dingy, changing to pale salmon color where bruised, glabrous, subviscid, margin slightly recurved and tending to split. Context thick, white, not changing color readily when cut, very brittle; odor fragrant, taste mild.

Lamellae adnexed, creamy white, staining pale salmon where bruised, not blackening, close, medium broad, strongly veined.

Stipe 7.5 cm. long, 10 mm. thick, white, unchanging, base narrowed slightly, glabrous but with appressed fibrils.

Spores 6-8 x 4-5 (6) μ, ellipsoid to subovoid, smooth, yellow in Melzer's reagent. Basidia 38-42 x 5-7 μ. Pleurocystidia and cheilocystidia none. Gill trama subparallel, hyphae 5-10 μ broad. Cuticle of appressed, non-gelatinous hyphae, or

more rarely a few surface somewhat gelatinous, at times a few hyphae more or less erect.

Habit, habitat, and distribution. - Singly, on soil, under aspen, Michigan, September.

Material studied. - MICHIGAN: Smith 15421 (type, Milford, Sept. 17, 1940).

Observations. - This species is related to H. acutoides, but is distinct in its dominantly whitish pileus, which changes to pale salmon when cut, and in its fragrant odor.

HYGROPHORUS ODORUS SP. NOV.

Pileus 5 cm. broad, disc obliquely conic, dominantly whitish, disc pale cinereous, margin dingy, changing to pale salmon color where bruised, glabrous, subviscid, margin slightly recurved and tending to split. Context thick, white, not changing color readily when cut, very brittle; odor fragrant, taste mild.

Lamellae adnexed, creamy white, staining pale salmon where bruised, not blackening, close, medium broad, strongly veined.

Stipe 7.5 cm. long, 10 mm. thick, white, unchanging, base narrowed slightly, glabrous but with appressed fibrils.

Spores 6-8 x 4-5 (6) μ, ellipsoid to subovoid, smooth, yellow in Melzer's reagent. Basidia 38-42 x 5-7 μ. Pleurocystidia and cheilocystidia none. Gill trama subparallel, hyphae 5-10 μ broad. Cuticle of appressed, non-gelatinous hyphae, or more rarely a few surface somewhat gelatinous, at times a few hyphae more or less erect.

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Observations. - This species is related to H. acutoides, but is distinct in its dominantly whitish pileus, which changes to pale salmon when cut, and in its fragrant odor.

HYGROPHORUS OLIVASCENS Sm. & Hes.

Sydowia 8:328. 1954

Pileus 10-25 mm. broad, obtuse with an incurved margin, expanding to plane or with a few flattened umbo, when young "chamois" with a smoky brown cast, becoming a clearly chamois color at maturity and then somewhat translucent, when faded opaque and pale buff, moist, hygrophanous, surface glabrous, becoming fibrillose squamulose as in H. miniatus. Context very waxy and brittle, pale watery yellow (paler than pileus) or concolorous with pileus surface; odor sharp and fragrant, taste slightly acidulous, when broken staining brownish;

Lamellae depressed-adnate, concolorous with edge of pileus, whitish in age, distant to subdistant, broad, edges with a tendency to stain olivaceous where bruised.

Stipe 4-6 mm. long, 5-8 mm. thick, concolorous with pileus or brownish spotted from handling, equal or narrowed below, glabrous and naked.

Spores 7-8.5 x 4.5-5.5 µ, ellipsoid, hyaline to pale yellowish in Melzer's reagent, smooth but as revived in KOH often appearing granulose but under oil immersion the granules or droplets are found to be just inside the wall. Basidia 30-48 x 7-9 µ, clavate, the lower half often flexuous, 4-spored. Pleurocystidia and cheilocystidia none seen. Gill-trama parallel or nearly so, hyaline in KOH, hyphae 4-7 µ broad.

Cuticle a trichodermium, the hyphae more or less erect, at times repent, septate, end cells rounded, at times clavate and then as pilocystidia, fascicles projecting as the squamules. No hypodermium. Pileus trama of radial hyphae, somewhat interwoven. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious on humus, in climax beech-maple forest, Michigan, July.

Material studied. - MICHIGAN: Smith 39276 (type, from Tahquamenon Falls State Park, July 24, 1952).

Observations. - The smoky brown color of young caps, the sharp fragrant odor, and tendency of the gill edges to stain olivaceous are distinctive field characters. The species appears to be most closely related to H. caespitosus Murr., but differs in the olive-staining gills and tendency of the stipe to stain brownish where handled.

HYGROPHORUS OVINUS (Fr.) Fr.

Epicr. Myc., p. 328. 1838

Agaricus ovinus Fr., Syst. Myc. 1:109. 1821.

Camarophyllus ovinus (Fr.) Kümmer, Dér Führer in die Pilzkunde, p. 117. 1871.

Hygrocybe ovina (Fr.) Kühner, Le Bot. 17:44. 1926.

Illustrations:

Plate

Bresadola, Icon. Myc., tab. 336.

Juillard-Hartmann, Icon. Champ., pl. 48, fig. 9.

Lange, Flora Agar. Dan. 5, pl. 166E.

Ricken, Die Blätterp. Deutschl., pl. 7, fig. 6.

Smith & Hesler, Lloydia 5, pl. 3.

Pileus 2-5 cm. broad, convex to hemispheric, becoming broadly convex to somewhat expanded in age, the disk often remaining obtuse or somewhat flattened, gray-brown to brownish-fuliginous, paler and more grayish when faded, at times "clay color" on the disk to "pinkish buff" on the margin, darkening in age, moist but soon dry and not viscid, silky when faded, rimose in age, at times disk cracked to form scales, margin even. Context thick on disk, thin toward, margin brittle, pallid, pinkish when bruised; odor faint, at times fruity, taste slightly alkaline.

Lamellae adnate, soon deeply emarginate, whitish, pinkish

when bruised, finally spotted blackish, usually blackening when dried, broad, moderately close to subdistant.

Stipe 4-7 cm. long, 5-10 mm. thick, equal, the apex at times flared, terete or compressed, pallid or concolorous with the pileus, pinkish-brown to vinaceous when handled, finally blackish, often curved, hollow.

Spores (6) 7-9 (10) x 4.5-6 (7) μ, ellipsoid to subovoid, smooth, white in mass, yellowish in Melzer's reagent. Basidia 4-spored, 38-57 x 6-8 (10) μ. Pleurocystidia and cheilocystidia none. Gill-trama parallel to subparallel, hyphae 6-20 μ broad, pale sordid vinaceous brown in Melzer's reagent. Cuticle of repent to semi-erect, non-gelatinous, brownish hyphae which are radially disposed, the cells 40-125 x 8-20 μ, only slightly or not at all constricted at the septa. No hypodermium. Pileus trama hyphae radial, similar to those of the surface. Clamp connections rare on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious on soil, in deciduous, mixed, and coniferous woods, Tennessee, North Carolina, and California, July-September; also Europe and Japan.

Material studied. - CALIFORNIA: Smith 9392, and Trinidad (Calif.), Jan. 1938; NORTH CAROLINA: Smith & Hesler 7457; Hesler 19123; Totten 4332 (as H. metapodius); TENNESSEE: Hesler 20889, 22003, 23738; R. F. Rodier 20122; Austria: Moser (H-24120).

Observations. - The dull colors, the odor (not nitrous,

but at times fruity), equal stipe, the color change exhibited by the various parts, and the deeply emarginate gills distinguish our collections. Orton (1960) says the odor is none or nitrous. The vinaceous reaction to Melzer's reagent of the gill-trama and flesh of the pileus, described above, is best observed on specimens which have not blackened on drying. The reaction is sporadic and weak, most of the tissue remaining sordid yellowish brown.

Singer (1951) lists H. metapodius as a synonym of H. ovinus. But, J. Lange (1935-40), Bresadola (1928), and Orton (1960) distinguish these two species. Orton (1960:256) reports the amyloid character of the spores of H. metapodius, a feature which adequately separates it from H. ovinus.

Hongo (1928a) reports H. ovinus from Japan.

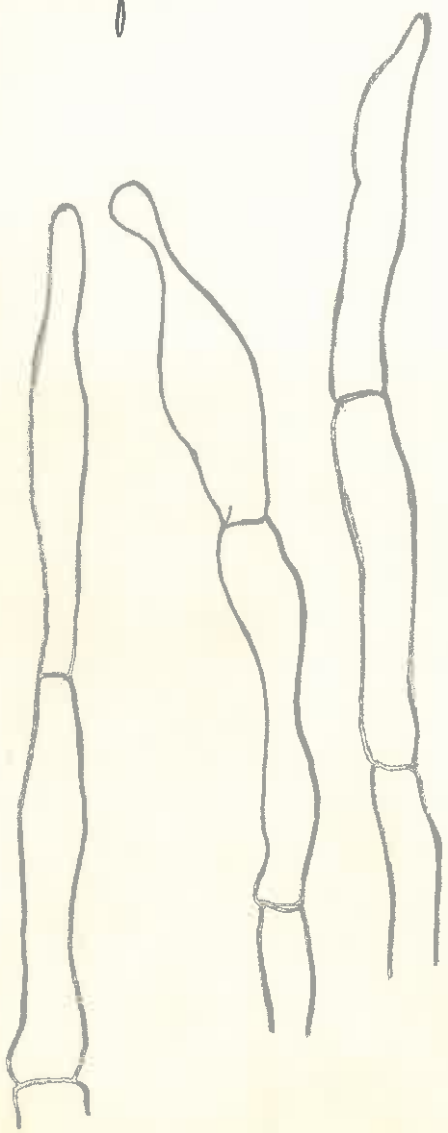
Material from Austria identified by Moser as H. ovinus has pseudocystidia, - bodies not found in American material.

Hygrophorus ~~nitratus~~ .ovinus Fr.

U.T - 20881

Cuticle of repent or ± erect hyphae, non-gelatinous, 4-12μ broad, which are brownish, the terminal elements somewhat rounded and cystidioid. No hypodermium.

Pileus trama of radial, subparallel hyphae.



20889 - Hygrophorus ovinus (Fr.) Fr.

Hygrophorus ovinus

Sm-9392