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Hygrophorus Notebook 3

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HYGROPHORUS ROSEIBRUNNEUS Murrill

North American Flora 9:394. 1916

Illustrations:

Plate

Smith & Hesler, Lloydia 2, pl. 15.

Pileus 2-9 cm. broad, convex, becoming broadly umbonate or subturbinate, sometimes flattened and with a decurved or elevated margin, "buff pink," "light vinaceous cinnamon," to "vinaceous buff," at times, "pinkish buff" to "pale ochraceous salmon," at times "pinkish cinnamon," usually paler on the margin, subglutinous to viscid, appearing agglutinated-fibrillose near the cottony tomentose inrolled, even margin, somewhat streaked toward the disk. Context white, unchanging, soft, thick on disk, thin on margin; odor and taste mild.

Lamellae adnate, often becoming adnexed or decurrent, white, close to crowded, thin, moderately narrow, tapering either way, many short, edges even.

Stipe 3-9 cm. long, 4-18 mm. thick, white, equal or tapering slightly toward the base, stuffed-solid, dry, ^{or} sublubricous when wet, densely pruinose to fibrillose-punctate, subglabrous toward the base, stuffed-solid, becoming hollow, base often curved. Partial veil slight, fugaceous.

Spores (6) 7-8 (9) x 3.5-5 μ , ellipsoid, smooth, white in mass, yellow in Melzer's reagent. Basidia 36-58 x 5-8 μ , 2- and

4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-9 μ broad. Cuticle a broad (50-200 μ) gelatinous zone with repent, slender (3-4 μ) hyphae imbedded, - an ixocutis. No hypodermium. Pileus trama ~~hyphae~~ ^{of} ~~both~~ ^{radially} ~~disposed~~ ^{disposed} ~~hyphae~~ ^{and pericarpial}. Clamp connections on the hyphae of the cuticle of the pileus and stipe, and the gill-trama. The minute structure of the stipe is as follows: when viewed in longitudinal section, the stipe is seen to be composed of parallel to subparallel, vertically-disposed hyphae; when viewed in transverse section the component hyphae ^{resemble} ~~appear as~~ a distinct pseudoparenchyma. On the surface there are a few hyphae which may be regarded as epicuticular and which at times seem to be slightly subgelatinous; these hyphae, when wet, give a moist to sublubricous feel.

Habit, habitat, and distribution. - Gregarious under oak, beech, fir, and pine, California, Michigan, Ohio, Tennessee, and Florida, October-March.

Material studied. - CALIFORNIA: Murrill 135 (type, from Jasper Ridge, near Stanford University, January 11, 1912), 176, February 8, 1912; Pusateri 100; Rea ~~114~~, 392, 1172; Smith 9234, 9432, 55639, 55988; FLORIDA: Hesler 21070; MICHIGAN: Kauffman, Ann Arbor, Oct. & Nov., 1926; Smith 6149, 15519; OHIO: Watters 189; TENNESSEE: Hesler 8643, 10110, 13020, 13171, 14142, 15212, 15531, 18865, 20065, 20628, 20759, 20761, 21616.

Observations. - The following observations on the type have been recorded: Spores 6-8 x 3.5-4.5 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 28-43 x 4.5-5.5 μ .

Spores Barbara, Feb. 21, 1929

Pleurocystidia and cheilocystidia none. Gill-trama divergent. Epicutis fibrillose. Clamps present on the cuticular hyphae.

(1918)

Kauffman (X) at first considered this to be a small form of H. pudorinus, but later in his notes indicated that he considered it distinct. The brownish to pinkish brown virgate pilei with more or less tomentose margins when young, the stature, and the densely pruinose-punctate upper portion of the stipe all strongly point to a relationship with H. arbustivus Fr. sensu Quélet. The thin, close to crowded lamellae and possibly the dry stipe distinguish the American species.



Hygrophorus roseibrunneus



20065 - *Hygrophorus roseibrunneus* Murr.



13020 - *Hypoglyphus roseibrunneus* Murr.



Hygrophorus roseibrunneus Murr.

(Sm - 6149)



18865 - ~~A~~ *Hygrophorus roseibrunneus* Murr.



20761 - *Hygrophorus roseibrunneus* Murr.



Hygrophorus roseibrunneus

Sm-6149



Hygrophorus roseibrunneus Murr. Fr.

Hygrophorus roseibrunneus Murr.

(Stipe wrong?)

cf. *H. maunae*!

HYGROPHORUS RUBROPUNCTUS Pk.

New York State Mus. Bull. 116:49. 1907

Hygrophorus glutinosus Pk., N. Y. State Mus. Bull. 54:950. 1902.

Illustrations:

Plate

Coker, Elisha Mitchell Sci. Soc. Jour. 64, pls. 17 and
18; pl. 25, fig. 3.

Hesler, Tenn. Acad. Sci. Jour. 26, fig. 4.

Pileus 4-5 (10) cm., convex-hemispheric then convex, obtusely umbonate, glabrous, glutinous, the gluten colorless, disk "cream buff," elsewhere "ivory yellow," dry bright "primuline yellow," margin at first involute, even. Context white, thick on disk, thin on margin; odor and taste none.

Lamellae adnate to rounded-adnate, scarcely emarginate, at first white, then "ivory yellow," broad behind, abruptly narrowed in front, close then subdistant, alternately long and short, lamelullae of four ranks, edges even.

Stipe 4-9 cm. x 8-15 mm., white, rough (scabrous-ridged), floccose-tomentose and glutinous-viscid up to an apical collar, enlarged below the collar (subventricose), gluten leaving pale yellowish-brown stains or spots (simulating reticulations), apex when fresh dotted with watery-drops which on drying form reddish glandular dots, solid.

Spores 8-10 (12) x 5-6 (7) μ , ellipsoidal, smooth, white in deposits, yellowish in Melzer's reagent. Pleurocystidia and cheilocystidia none. Basidia (48) 56-60 x 8-10 μ , 2- and 4-spored. Gill-trama of divergent hyphae, 7-9 μ broad. Cuticle a gelatinous zone, 350-600 μ thick, hyphae loosely tangled, tending toward being erect (as in H. gliocyclus), narrow (2-5 μ), yellowish. Hypodermium distinct, composed of parallel, periclinally-disposed, narrow hyphae. Pileus trama of radially disposed hyphae. Clamp connections present on the cuticular hyphae but rare.

Habit, habitat, and distribution. - On soil, in deciduous woods, Michigan, New York, North Carolina, Tennessee, September-December.

Material studied. - MICHIGAN: Smith 15439, 57873; NEW YORK: Peck (type, from Bolton, Sept., as H. glutinosus Pk.); NORTH CAROLINA: Coker 932, 3771, 4993; OREGON: Syse 709; TENNESSEE: Hesler 19398.

Observations. - The type (labelled H. glutinosus) has been studied, and observations have been recorded as follows: spores 8-10 (12.5) x 5-6 μ , ellipsoid, subinequilateral, smooth, pale yellowish in Melzer's reagent. Basidia 43-55 x 6-7 μ , 2- and 4-spored, the 4-spored type predominant. Pleurocystidia and cheilocystidia none. Gill-trama divergent, the hyphae 3-6 μ broad. Cuticle of gelatinous hyphae (see above). Clamp connections present.

This species is near H. flavodiscus which lacks the pronounced reddish glandular dots on the stipe-apex, and has spores smaller than those of H. rubropunctus.

HYGROPHORUS RUSSULA (Fr.) Qué1.

Ench. Fung., p. 49. 1886.

Agaricus russula Fr., Hymen. Eur., p. 52. 1874.

Tricholoma ^(Fr.) ~~russula~~ Gill., Champ., Fr., p. 91. 1874.

Melanoleuca russula (Gill.) Murr., N. A. Flora 10:22. 1914.

Illustrations:

Bresadola, Fung. Mang., pl. 22 (as Tricholoma russula).

Bresadola, Icon. Myc. 2, pl. 67 (as T. russula).

Cooke, Illus., No. 1116, t. 926. (as T. russula).

Hard, Mushrooms, fig. 51 (as T. russula).

Kauffman, Agar. Mich. pl. 26.

Krieger, Mushroom Handbook, pl. 20.

Michael, Führer f. Pilzfreunde, 2 (as T. russula).

Peck, N. Y. State Mus. Bull. 54, pl. 77, figs. 1-5 (as T. russula).

Pomerleau, Mushrooms of Eastern Canada and the U.S., fig. 17A.

Ricken, Blätterpilze, pl. 4, fig. 1.

Smith and Hesler, Lloydia 2, pl. 18.

Pileus 5-12 cm. broad, hemispheric or convex, sometimes broadly umbonate, expanding in age and often with an elevated margin, margin long remaining inrolled and finely cottony pubescent, color variable: "shrimp pink," "cameo pink," "coral pink," "vinaceous-pink" or "deep vinaceous," the margin whitish to "Chatenay pink," disk purplish-red or pinkish-red, viscid, soon dry, usually streaked with purplish red fibrils, surface smooth at first but breaking up into minute appressed fibrillose

patches giving the disk a granulose to subscaly appearance, sometimes staining yellowish when rubbed. Context thick, white or tinged pinkish, firm; odor and taste mild.

Lamellae bluntly adnate, becoming decurrent, white when young, soon flushed with pale pink and later spotted with sordid purplish-red spots, sometimes sordid purplish red over all in age, rather close, narrow to moderately broad, acuminate at the ends.

Stipe 3-7 cm. long, 15-35 mm. thick, white at first, becoming stained, streaked, or laved with pinkish, finally more or less concolorous with the pileus, equal or slightly tapering downward, at times subventricose, dry, apex pruinose to glabrous, glabrous below, solid.

Spores 6-8 x 3-4.5 (5) μ , ellipsoid, smooth, white in deposits, yellowish in Melzer's reagent. Basidia 40-53 x 5-6 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent with a mediostrate composed of large hyphae, 5-16 μ broad. Cuticle a well-defined gelatinous zone, 50-180 μ thick, with slender hyphae, 2-4 μ broad, loosely interwoven, imbedded. An ixotrichodermium, not a palisade. Fibril-aggregations on the pileus consist of mounds of brownish hyphae together with a brown pigment in the gluten. Hypodermium none. Pileus trama homogeneous, ^{loosely} interwoven, ^{radially} ~~periclinally~~ disposed. Clamp connections present on the gill-trama and cuticular hyphae.

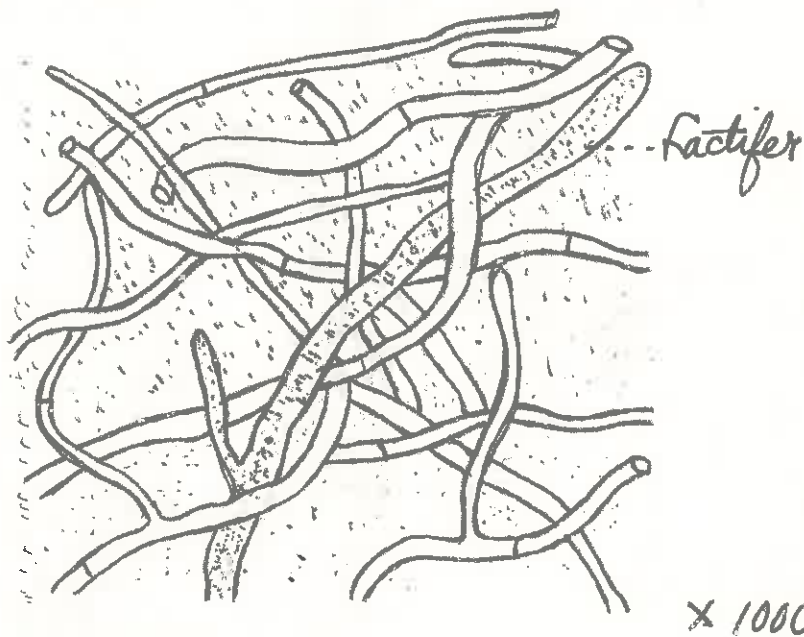
Habit, habitat, and distribution. - Gregarious, at times

in arcs or fairy-rings, in oak and mixed oak-pine woods, Canada, Massachusetts, New York, Michigan, Illinois, Tennessee, North Carolina, Alabama, Texas, and Washington; also Europe; August-December.

Material studied. - ALABAMA: Burke 2090, Robinson Springs, Nov. 29, 1942; ILLINOIS: Leathers, Charleston, Sept. 28, 1949; MASSACHUSETTS: ^{Bigelow 8709;} Seymour, Boston, Sept. 20, 1911; MICHIGAN: Kauffman, 1359 (99), Marquette, Sept. 3, 1906; Smith 14938, 15285, 20725, 20773, 38383, 58151, 62124; NEW YORK: Kauffman, Ithaca, Oct. 4, 16, & 17, 1902; TENNESSEE: 4442, 4457, 4458, 9642, 13021, 14765, 16577, 19441, 19468; TEXAS: Thiers 1918, 4725; WASHINGTON: Kauffman, Olympic Mts., Oct. 16, 1915; CANADA: Bell 3764; Groves 8783, 21900; Smith 835, 14644; Belgium: Heinemann 2037.

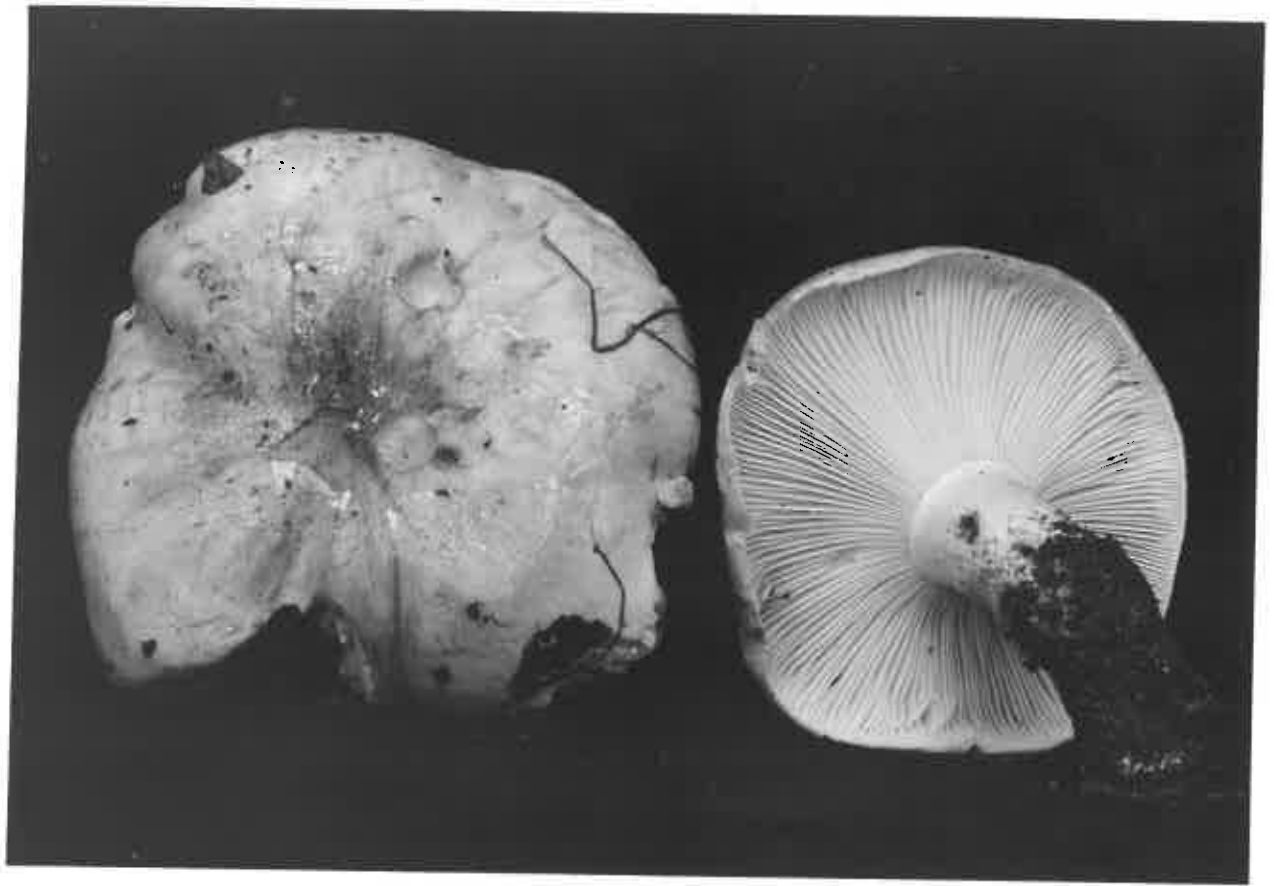
Observations. - Hygrophorus erubescens is most closely related to H. russula, but in the latter the lamellae are close to crowded (120-130 reach the stipe) and it ^{usually} grows in deciduous woods; in the former the lamellae are subdistant to close (75-95 reach the stipe), grows in coniferous woods, the pilei are usually smaller and less compact, the stipes more slender, and the color-change to yellow when bruised is more pronounced.

Hygrophorus russula
No. 16577



Cuticle a gelatinous zone 50-180 μ thick, with colorless, narrow (2-4 μ), tangled (loosely interwoven), — an isotrichodermium (not a palisade). Sections made thro fibril-aggregations show mounds of brownish hyphae together with a brown stain in the gluten. Hypodermium none.

Pileus trama homogeneous, interwoven, and disposed radially
~~to the periphery (peripherally)~~





Hypoglyphis bovis muricata (Fr.) Fr.



16 gnomophonus rustula hm 64068



Bostrychia muricata Sm - 64514





Hygrophorus russula

Sm- 1957



Hygrophorus russula

Sm-26

HYGROPHORUS RUSSULIFORMIS Murr.

Elisha Mitchell Sci. Soc., Jour. 55:371. 1939

Illustration:

Text fig.

Pileus 5-8 cm. broad, convex, finally more or less depressed, at times wavy, "brownish vinaceous" to "deep brownish vinaceous," with "vinaceous brown" streaks, margin paler, viscid, fibrillose-squamulose, margin at first incurved, even. Context white, unchanging, thick on the disk, thin on the margin; odor and taste mild.

Lamellae adnexed, rounded behind, white, becoming purplish where bruised, narrow, crowded, inserted, edges even.

Stipe 1-4 cm. long, 14-20 mm. thick, apex whitish, elsewhere streaked vinaceous, equal above the slightly enlarged base, striate, moist, not viscid, solid.

Spores 8-10 (12) x 2-3.2 μ , oblong, often obliquely apiculate, smooth, colorless or very faintly yellowish in Melzer's reagent. Basidia 38-57 x 5-7 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 2-7 μ broad. Cuticle a gelatinous zone 100-400 μ thick, hyphae pale brownish, narrow (1.5-4 μ), with scattered lactifers. Hypodermium none or indistinct. Pileus trama loosely interwoven, ~~hyphae disposed~~ ^{disposed hyphae.} both radially and ~~periclinally~~. The entire cuticular structure is similar to that of H. russula. Clamp connections present on the cuticular and gill-trama hyphae. *Lactifers in pileus trama.*

Habit, habitat, and distribution. - On soil, under oak, Florida, November-December.

Material studied. - FLORIDA: Murrill F 18404 (type, from Gainesville, November 16, 1938); Hesler 21062.

Observations. - We have studied the type, and have collected and studied fresh material taken in Florida. The following notes were recorded on the type: Spores 8-12 x 2.5-3.5 μ , oblong, obliquely apiculate, smooth, colorless. Pleurocystidia and cheilocystidia none. Basidia 38-57 x 5-7 μ , 4-spored. Gill-trama of divergent hyphae; sections of dried material show slightly interwoven to subparallel hyphae, but in sections allowed to stand a few hours in chloral-hydrate the trama assumed the divergent form. Cuticle of interwoven hyphae (see above). Clamp connections present on the hyphae of the cuticle and gill-trama.

The gill-trama is divergent but in sections of dried material it appears to be ^{somewhat} interwoven. The spores are indeed distinctive for an Hygrophorus. The species is related to H. russula. Murrill (¹⁹³⁹) says that dried specimens have an odor of coconut candy, - *an odor we have not detected.*

HYGROPHORUS SAXATILIS Sm. & Hes.

Lloydia 5:89. 1942

Illustrations:

Plate

Smith and Hesler, Lloydia 5, pl. 18.

Pileus 3-8 (10) cm. broad, obtuse with an inrolled margin when young, becoming plane or with a low obtuse umbo and decurved finely pubescent margin, color whitish to very pale buff with a developing cinnamon tinge ("pale pinkish buff" to "light pinkish cinnamon") and occasionally spotted or zoned with "pinkish cinnamon" spots or zones, slightly viscid when young and moist but soon merely moist or dry, glabrous or when dry appearing appressed fibrillose under a lens. Context thick, soft, watery-punctate and "pinkish buff" to "light pinkish cinnamon;" taste mild, odor lacking or faintly fragrant and reminding one of dried peaches.

Lamellae short-decurrent, "light ochraceous salmon" to "light pinkish cinnamon" (more or less pinkish cinnamon-tan) and very beautiful, evenly colored, bright when young and becoming duller in age, subdistant (30-36 reach the stipe), 1-2 tiers of lamellulae, frequently more or less wrinkled or crisped, very soft and fragile, narrow to moderately broad (3-6 mm. and tapered both ways), rather thick, edges even.

Stipe 6-8 (12) cm. long, 10-15 (20) mm. thick at apex, surface whitish or concolorous with the pileus, equal or narrowed slightly toward the base, solid, flesh concolorous with that of pileus, unchanging, dry, thinly appressed-fibrillose to the fibrillose-pruinose apex, often appearing more or less longitudinally striate, glabrescent in age and then concolorous with the gills.

Spores 7-9.5 x 4-5 (6) μ , subellipsoid, smooth, pale yellowish in Melzer's reagent. Basidia 46-60 (70) x 6-9 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-8 μ broad. Cuticle undifferentiated; surface hyphae of the pileus repent, narrow (2-3 μ), colorless, more or less parallel, only slightly gelatinous, - a cutis. No hypodermium. Pileus trama of loosely interwoven, more or less radial hyphae. Clamp connections present on the hyphae of the cuticle, gill-trama, and subhymenium.

Habit, habitat, and distribution. - Scattered under conifers on steep hillsides or very rocky dry soil, Washington, Oregon, and Idaho, August-October.

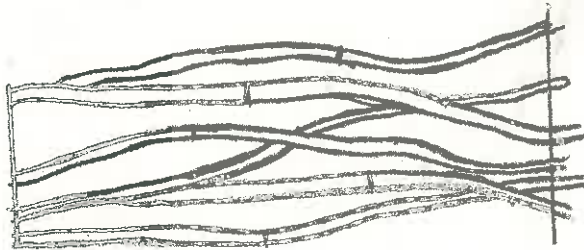
Material studied. - IDAHO: Smith 53746, 54144, 54365; OREGON: Smith 18156 (type, from Lost Creek, Oct. 30, 1941), 19254, 19991, 24438, 24962, 26654, 27543, 28390; WASHINGTON: Bigelow 48905; Smith 17665, 17769, 17896, 17979, 31213, 31719, 48592, 48931; Smith & Bigelow 47821, 49078.

Observations. - This is a very striking and easily recognized species because of the beautiful gills. The odor is very easily

missed in collections of only a few fruiting bodies, but when several baskets full are brought into a room the odor becomes very noticeable. At Lost Creek, Oregon, where the fungus was found most abundantly, it was noticed that spore-prints made on the top of one cap by an overhanging pileus were more or less dark ochraceous salmon in color, darker than the color of the pileus on which the deposit was made. All spore prints made in the laboratory from these and other pilei were white. As yet we have no explanation for these observations. At least a dozen colored spore-prints were observed in the field at Lost Creek, and it was apparent that the age of either cap had no bearing on spore-color. The habitat of this fungus is peculiar insofar as our data go, but data based on a single season's collections must not be given too much emphasis. The character of the stipe is also peculiar for a species of this section in that it is evenly fibrillose at first and pruinose at the apex instead of scabrous. No evidences of a partial veil were visible even in the smallest buttons. It appears to be related to H. karstenii Sacc. & Cub. but differs in its more or less salmon colored rather than yellow gills.

Hygrophorus saxatilis

No. 14223



The cuticle is not differentiated from the pileus trama. The surface hyphae of the pileus are repent, narrow (2-3 μ), colorless, ^{\pm parallel,} and only slightly gelatinous. No ~~gelatinous~~ zone of gelatin present. This is a cutis.
Hypodermium none.

Pileus trama of loosely interwoven, \pm radial hyphae.

If the hyphae ^{are} ~~were~~ gelatinous this type would be called an ixocutis.





Hygrophorus saxatilis
(Sm-18156)

HYGROPHORUS SICICIPES Sm. & Hes.

Sydowia 8:312. 1954

Pileus 2-3 cm. broad, convex, margin incurved, expanding to plane or the margin elevated slightly and the disk depressed, "Isabella color" with a "warm buff" margin, disk becoming tinged with cinnamon and then more or less "Sayal brown," glutinous and appearing fibrillose-streaked beneath the gluten. *Odor and taste not distinctive.*

Lamellae decurrent, "ivory yellow" becoming "warm buff," narrow, distant.

Stipe 4-6 cm. long, 3-6 mm. thick at apex, concolorous with gills, equal or narrowed downward, dry, with a median fibrillose zone from the partial veil.

Spores 8-10 x 4-5 μ , nearly elliptic in face view, smooth, hyaline in KOH, yellowish in Melzer's reagent. Basidia 38-50 x 8-9 μ , 4-spored. Pleurocystidia and cheilocystidia none seen. Gill-trama divergent. Cuticle a well-defined zone 200-300 μ thick, of fuscous, gelatinous hyphae, 2-3.5 μ broad, more or less erect, loosely tangled (no palisade), - an ixotrichodermium. Hypodermium indistinct or none. Pileus trama *chiefly* radially ~~disposed~~ *disposed* hyphae ~~some perigonal~~. Clamp connections present.

Habit, habitat, and distribution. - Gregarious in a pine barren, Oregon, October.

Material studied. - OREGON: Smith 25005 (type, from

Rhododendron, October 27, 1946).

Observations. - When collected, the specimens were in perfect condition, but no evidence of a gelatinous veil over the stipe was present, nor were there any indications that ^{such a veil} ~~any ever~~ had ^{ever} been present. In all other characters the fungus appears to be H. hypothejus, and it is worthy of note because of the number of "parallel species" of the kind in the subgenus Hygrophorus. There is H. albidus Karst. and H. eburneus Fr. both common in the Cascades; ^{or} Also H. varicolor Murrill and H. bakerensis Smith & Hesler ^{likewise} ~~also~~ from the Cascades. Since the subgenus Hygrophorus has been divided on the basis of the presence or absence of a universal glutinous veil, it is interesting to see how closely related species can become widely separated in such a classification. However, if one places primary emphasis on color of ^{the} pileus, one still encounters the same problem (see H. pudorinus f. subcinereus, page). H. lucorum sensu Kühner & Romagnesi may belong here but the color of the pileus as given is too pale and certainly not fibrillose streaked as in H. hypothejus.

HYGROPHORUS SORDIDUS Pk.

Torrey Bot. Club Bull. 25:322. 1898

Illustrations:

Hard, Mushrooms, fig. 176.

Kauffman, Agar. Mich., pl. 27.

Smith and Hesler, Lloydia 2, pl. 12.

Pileus 8-20 cm. broad, convex then expanded plane, pure white or rarely tinged yellowish buff on the disk, viscid, glabrous, margin at first involute and subfloccose, even. Context moderately compact, thick, white; odor and taste mild.

Lamellae adnate to decurrent, white, slightly yellowish in age, subdistant, rather broad, acuminate at the ends, sub⁴intervenose.

Stipe 6-10 cm. long, 15-30 mm. thick, white, dry, equal, often attenuated toward the base, glabrous, even, upper portion obscurely floccose, solid.

Spores 6-8 x (3.5) 4-5.5 μ , ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 38-50 x 5-7 μ , 4-spored (rarely 2-spored). Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-8 μ broad. Cuticle a gelatinous zone 200-280 μ thick, of two distinct zones: (1) an outer zone 50 μ thick of brownish hyphae; (2) an inner, subjacent zone 150-230 μ thick, of colorless, loosely interwoven hyphae; all cuticular hyphae 2-4 μ broad. No hypodermium. Pileus trama of radial hyphae. Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious on soil in open oak-hickory woods, District of Columbia, Maryland, New York, North Carolina, Michigan, and Illinois, July-November.

Material studied. - DISTRICT OF COLUMBIA: Williams (Peck's type, Takoma Park, Nov. 1897); ILLINOIS: Leathers, Coles Co., Sept. 24, 1949; MARYLAND: Charles, near Cabin John, Nov. 9, 1911; MASSACHUSETTS: Bigelow 9411; MICHIGAN: Kauffman 604 (1362); Smith 6071, 6113, 7093, 7295, 15322, 18487, 18775, 18915, 21165, 32012, 34212, 36220, ^{62135,} 62291; NEW YORK: Kauffman, Ithaca, Aug. 14, 1903; NORTH CAROLINA: Coker 2004; Totten & Holland, Chapel Hill, Nov. 16, 1919.

Observations. - Notes on the type: Spores 6-8 x 4-5.5 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 40-52 x 5-7 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 2-4 μ broad. Cuticle of gelatinous hyphae (see above). Clamp connections present in the cuticle.

Peck recognized the close similarity of this species to H. penarius Fr. It differs from the latter in the absence of a gelatinous universal veil, the typically white gills and pileus, and obscurely floccose apical region of the stipe. H. penarius has been reported for the United States, and very likely does occur here. Forms which apparently were this species have been found in Michigan but not in sufficient quantity or in good enough condition to justify a critical study.

In Tennessee, Georgia, and Alabama, there is a common white species, H. ponderatus, which has a viscid stipe, and which resembles H. sordidus. The latter species, however, has a dry stipe in all stages of its development.



9411 - *Hygrophorus sordidus* PK.

(Photo by Bigelow)



Hygrophorus sordidus

Sm-27

HYGROPHORUS SPECIOSUS Pk.

New York State Mus. Ann. Rept. 29:43. 1878

Hygrophorus coloratus Pk., New York State Mus. Bull. 122:21. 1908.

Illustrations:

Plate

Bresadola, Icon. Myc., tab. 313.

Farlow, Icon. Farlow., pl. 28.

Kalchbrenner, Hymen. Hung., pl. 26, fig. 2.

Kauffman, Agar. Mich., pl. 24.

Peck, N. Y. State Mus. Ann. Rep., 29, pl. 2, figs. 1-5.

Peck, Mem. N. Y. State Mus., 3, pl. 51, figs. 21-28.

Smith and Hesler, Lloydia 2, pl. 4.

Pileus 2-8 cm. broad, campanulate at first, then expanded-umbonate or umbo obsolete in age, bright scarlet red or rosy reddish orange when young, fading near the margin to yellow but remaining orange-red on the umbo, glutinous, pellicle separable, glabrous, margin at first incurved, soon spreading. Context white, yellow or orange tinted under the pellicle, moderately thick, soft; odor and taste not distinctive.

Lamellae decurrent, white to pale citrine, distant, rather broad, acute at the ends, intervenose.

Stipe 3-10 cm. long, 8-15 (20) mm. thick, whitish, equal or subcompressed, coated over the lower half with gelatinous universal veil remnants, peronate from a thin white-fibrillose

partial veil up to the evanescent annular zone, becoming white floccose-fibrillose, variegated with glistening spots from the drying of the gluten, upper portion subglabrous, spongy within, rarely hollow.

Spores 8-10 x 5-6 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 38-55 x 6-8 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-15 μ . Cuticle of repent to more or less erect, gelatinous hyphae, 2-4 μ broad. No hypodermium. Pileus trama of radial hyphae. Clamp connections on the cuticular and gill-trama hyphae.

Habit, habitat, and distribution. - Scattered to gregarious, under pine, cedar, tamarack, and spruce, and in sphagnum bogs, Maine, Massachusetts, New York, Pennsylvania, Tennessee, Alabama, Michigan, Idaho, Oregon, Washington, and Canada, July-January.

Material studied. - ALABAMA: Burke 91b; IDAHO: Bigelow 47157; Cooke 18554; Gruber P55, P85; Slipp 1275, 1474; MAINE: Webster, Kennebunk, Oct. 20, 1901; MASSACHUSETTS: Bigelow 9370; MICHIGAN: Bailey 110; Smith 1077, 1086, 1237, 15480, 31953, 38758, 43891, 43976, 50929; NEW YORK: Kauffman, North Elba; Peck (type, from Grieg, Lewis Co.); Smith 966; Snell, Newcomb, 1934; OREGON: Smith, Ochocho Nat. Forest, Nov. 13, 1941; PENNSYLVANIA: Rea 442; TENNESSEE: Hesler 4427; WASHINGTON: Copeland, Bumping River, Oct. 17, 1948; CANADA (Ontario): Jackson 9630.

Discussion. - Farlow (1929) reports it from Maine and

Massachusetts, on swampy ground, usually under or near tamarack trees. Kauffman regarded H. speciosus as the American form of H. aureus, a closely related European species with a yellow-fulvous pileus. The stipe of the latter species lacks the variegated spots observed in H. speciosus.

Observations on the type: spores 8-9 x 4.5-5.5 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 41-54 x 6-8 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-8 μ broad. Cuticle of gelatinous hyphae (see above). Clamp connections present on the cuticular hyphae.



Hygrophorus speciosus

Sm-43891



Nyctographus speciosus Pk.

~~Sm - 966~~

var. *speciosus*

Fig. 84



9370 - *Hygrophorus speciosus* Pk.

(Photo by Bigelow)



*Hygrophorus speciosus*Pk.
(Kauffman)

24619 HYGROPHORUS SPECIOSUS Pk. var. SPECIOSUS

Pileus 10-15 mm. broad, scarlet, not fading; on drying the color darkening to "Brazil red", glabrous, viscid, even. Context white, yellow under the cuticle.

Lamellae decurrent, white then yellowish, medium broad, subdistant.

Stipe 2-5 cm. x 2-3 mm., with a yellowish hue or stains, nearly glabrous, equal, solid. Veil glutinous.

Spores 7.5-9.5 x 4.3-5 μ , ellipsoid. Basidia 40-52 x 5-6 μ .

HYGROPHORUS SUBALPINUS Smith

University of Michigan Herbarium Contr. 5:19. 1941

Illustration:

Smith, Univ. Mich. Herb. Contr. 5, pl. III.

Pileus 4-6 cm. broad, broadly convex when young, becoming obtuse or plane, sometimes with a slight umbo and the margin spreading or decurved, opaque, snow white over all and with a distinct luster, viscid, pellicle thin and scarcely separable from the flesh, merely subviscid in age, not discoloring appreciably, often having patches of the broken veil adhering along the margin. Context thick (1 cm. more or less near the stipe), white, soft; odor and taste perfectly mild.

Lamellae decurrent from the first, close (68-113 reach the stipe, many very narrow individuals extend to the stipe making the count difficult), narrow (3-4 mm.), one row of short individuals, concolorous with the pileus or a duller white, edges even.

Stipe short, 3-4 cm. long, 1-2 cm. thick at the apex, base bulbous when young, nearly equal in age, somewhat rounded beneath the bulb, solid, white within, peronate to the apex of the bulb by a white membranous sheath which terminates in a flaring sub-membranous to fibrillose inferior annulus, white and silky above, annulus sometimes evanescent, no gelatinous universal veil evident.

Spores 8-10 x 4.5-5 (6) μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 48-62 x 7-9 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 4-7 μ broad. Cuticle of repent, more or less radial, gelatinous hyphae, at times appearing a distinct gelatinous zone 125-300 μ thick, the hyphae 3-5 μ broad, - an ixocutis. Pileus trama of radially disposed hyphae. Clamp connections present on the pileus trama hyphae.

Habit, habitat, and distribution. - Gregarious under conifers, Washington, Oregon, Idaho, Colorado, Wyoming, and Michigan, June-October.

Material studied. - COLORADO: Davidson, June 1956; IDAHO: Smith 44557, 44810, 55040; Smith & Bigelow 44684; Trueblood 58608; MICHIGAN: Smith 38581, 43890; OREGON: Smith 19655, 20041, 20125, 25032, 25033, 26689, 26992, 27639, 28125; WASHINGTON: Smith 14397 (type, from Deer Park, Olympic Mts., June 16, 1939), 14418; WYOMING: Hittle 30; Thiers, Medicine Bow Mts., July 5, 1950; Wilson, Medicine Bow Mts., July 12, 1950.

Observations. - Hygrophorus ponderatus Britz. closely resembles H. subalpinus in color and stature, but differs in ~~its~~ possessing a gelatinous universal veil. It differs from H. sordidus Pk. in having a dry membranous sheath and a more or less membranous annulus, as well as a thick, equal or somewhat bulbous stipe. The close, narrow, waxy gills are also distinctive. ~~It~~ ^{were} it not for the decidedly waxy appearance of the lamellae and the typical

divergent gill-trama, H. subalpinus could be placed in Armillaria next to Armillaria arenicola, with which it has a superficial likeness.



Hygrophorus subalpinus Smith

Sm-14397



Hygrophorus subalpinus

Sm - 44684

Photo by H. E. Bigelow



Hygrophorus subalpinus

Sm-44684

(Photo by Bigelow)



Hygrophorus subalpinus
Sm-43890

HYGROPHORUS SUBISABELLINUS Smith & Hesler

Lloydia 2:40. 1939

Pileus 4.5-7 cm. broad, hemispheric-convex then expanded, obtusely umbonate, "pinkish buff" to "cinnamon-buff," margin usually somewhat paler, glabrous but under a lens with a mat of closely woven fibrils, viscid, margin involute and downy. Context white, 10 mm. thick on the disk, thin on the margin; odor and taste mild.

Lamellae adnate, becoming slightly notched, white, close, narrow, tapering at either end, edges even.

Stipe 4-9.5 cm. long, 5-12 mm. thick, white, dingy below (almost concolorous with pileus), dry, upper portion floccose-scabrous, flexuous, equal or tapering toward the base, solid.

Spores 5.5-7 x 3-4 μ , ellipsoid, smooth, very pale yellow in Melzer's reagent. Basidia 38-57 x 5-8 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama of divergent, hyphae 7-14 μ broad when fresh. Cuticle a gelatinous zone 75-200 μ thick, with slender, imbedded hyphae, the surface hyphae brownish, 3-5 μ broad, the subjacent hyphae colorless, some surface hyphae repent, many more or less erect and cystidioid forming more or less of a turf (not a palisade), - an ixotrichodermium. No hypodermium. Pileus trama of radial hyphae. Clamp connections present on the hyphae of the cuticle.

Habit, habitat, and distribution. - Gregarious on humus in

mixed woods, Tennessee, February and May.

Material studied. - TENNESSEE: Sharp 111427 (type, collected by A. J. Sharp, Knox County, May 26, 1938); Hesler (February 22-29, 1939).

Observations. - The mild odor and taste, the paler colors, and the mat of closely woven fibrils separate it readily from H. tennesseensis. It lacks the dense pruinose covering of the stipe of H. roseibrunneus as well as the pinkish tan colors of the dried specimens of the latter. The close gills and innate squamules over the upper part of the stipe distinguish it from H. arbustivus Fr. From pale forms of H. pudorinus it is readily distinguished in the dried condition by the lack of reddish punctate points over the upper portion of the stipe. *The dried pilei of the type of H. subisabellinus are in color vary from "orange cinnamon" to "cinnamon."*

HYGROPHORUS SUBLUTESCENS SP. NOV.

Pileus 1.5-4 cm. broad, obtuse to broadly convex, color a pale dingy tan (near "cinnamon buff") on disc, grayer toward the margin (near avellaneous or a grayish pinkish buff), the color duller than in H. discoideus, viscid, glabrous. Context firm, pallid; odor and taste mild.

Lamellae broadly adnate to subdecurrent, broad, close varying to subdistant, dingy pinkish buff drying dingy pallid to grayish buff, edges even.

Stipe 1-3 cm. long, 3-6 mm. thick at apex, pubescent to fibrillose over lower half, pruinose-scurfy to silky above, typically becoming lemon yellow over basal part and any part of surface soon bright yellow when touched with KOH, equal, dry.

Spore deposit white, spores 6-7.5 x 3.5-4.5 μ , subvoid, smooth, thin-walled, hyaline in KOH, yellowish hyaline in Melzer's reagent. Basidia 4-spored, 36-48 x 5-7 μ , pedicels flexuous. Pleurocystidia and cheilocystidia none. Gill trama of divergent hyphae. Epicutis of pileus a tangled trichodermium of short, narrow filaments (1-2.5 μ wide) dingy yellowish as revived in KOH. Clamp connections present.

Habit, habitat, and distribution. - Gregarious under cedar and spruce, Michigan, October.

Material studied. - MICHIGAN: Smith 63330 (type, from

Wilderness State Park, Emmet Co., Oct. 15, 1960).

Observations. - The dry stipe often changing to yellow at the base, and spotting yellow where touched in KOH, the dingy color and lack of an odor and taste are distinctive. It is related to H. avellaneifolius but is not as soft and the gills are paler and dry paler.

HYGROPHORUS SUBPRATENSIS Murr.

Mycologia 3:199. 1911

Pileus 3-4 cm. broad, convex, obtuse, pale fuscous when young, becoming pallid or whitish with a darker disk, slimy-viscid, pellicle separable, margin even. Context white, unchanging; odor and taste mild.

Lamellae deeply sinuate, white, broad, crowded.

Stipe 3-4 cm. long, 3-4 mm. thick, white, slimy-viscid, cylindric, equal, spongy-solid. Partial veil slimy-viscid, scarcely leaving an annulus.

Spores 4-5 x 3.5-5 μ , globose to subglobose, smooth, colorless in Melzer's reagent, at times adhering together in fours. Basidia 26-33 x 5-6 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent. Epicutis of loosely arranged, gelatinous hyphae. Clamps present in epicuticular hyphae. Stipe exhibiting a gelatinous sheath.

Habit, habitat, and distribution. - On lawns and on banana trash, Cuba, June; *also Antigua (St. John's Island).*

Material studied. - CUBA: Earle 68, 373 (type, Santiago de las Vegas, June 1, 1905).

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

The pileus of the type (dried) is "ochraceous tawny," and superficially resembles H. praetensis, but differs in its divergent hyphae of the gill-trama, its globose to subglobose spores, and slimy-viscid stipe.

Dennis ⁽¹⁹⁵³⁾ (~~Kew Bull. No. 2:225~~) says the spores in deposit are white, becoming yellowish with age.

HYGROPHORUS SUBPUNGENS Smith & Hesler

Sydowia 8:312, ~~313~~, 1954

Pileus 1.5-3 (4) cm. broad, obtuse when young, the margin incurved, soon nearly plane or with just a trace of an obtuse umbo, in age the disk depressed as a result of the uplifting of the margin, viscid, dull white ("tilleul buff") at first, gradually darkening on the disk in age to near pale avellaneous, the margin remaining dingy whitish. Context thin, soft, dull white, unchanging or gradually becoming vinaceous buff to avellaneous; odor faint but spicy-fragrant, taste mild.

Lamellae broadly adnate and becoming short-decurrent, subdistant to nearly close, one tier of lamellulae, moderately broad, dark "tilleul buff" young (pallid), becoming "cinnamon buff" and in age nearly clay color, edges even.

Stipe 2.5-4 cm. long, 3-7 mm. thick, equal, sometimes hollow in age, dry, whitish and pruinose over-all at first, glabrescent, becoming dingy where handled but never as dark as the old gills.

Spores 7-8 x 4.5-5 μ , elliptic in face view, in side view slightly bean-shaped, smooth, yellowish in Melzer's reagent. Basidia 4-spored, 44-56 x 7-8 μ , basidia in sections of hymenium revived in KOH dull pale cinnamon in color. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyaline, hyphae 4-7 μ

broad. Cuticle a gelatinous zone 70-120 μ thick, hyphae repent, radial, 2-3 μ broad, - an ixocutis. No hypodermium. Pileus trama of radial hyphae, 4-10 μ broad. Clamp connections present.

Habit, habitat, and distribution. - Densely gregarious on wet soil near a beaver pond, Oregon, October.

Material studied. - OREGON: Smith 22027 (type, from East Fork, Salmon River, Mt. Hood, Oct. 20, 1944).

Observations. - This species is related to H. discoideus which, however, has a gelatinous veil. Excellent material was studied, and the lack of a glutinous veil in H. subpungens was definitely established. The colors of H. subpungens are paler and the spores smaller than in H. discoideus. It is only remotely related to H. russocoriaceus which, according to material from Bas, the Netherlands, is a Camarophyllus.

HYGROPHORUS SUBRUFESCENS Pk.

New York State Mus. Bull. 67:23. 1903

Camarophyllus subrufescens (Pk.) Murr., North Amer. Flora 9:387.
1916.

Illustration:

Peck, N. Y. State Mus. Bull. 67, pl. M., figs. 1-6.

Pileus about 2.5 cm. broad, convex or nearly plane, pale pink or grayish-red, dry, minutely floccose-squamulose. Context whitish faintly tinged pink; taste mild.

Lamellae decurrent, whitish, distant, medium-broad.

Stipe 4-8 cm. long, 4-8 mm. thick, white, equal, glabrous, solid.

Spores 5.5-8 x 4-5 μ , ellipsoid, smooth, non-amyloid. Basidia 52-68 x 6-8 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 3-7 μ broad. Cuticle a trichodermium, the surface hyphae radial and more or less erect (not a palisade), septate, 3-10 μ broad, the terminal elements often cystidioid. No hypodermium. Pileus trama of radially disposed hyphae. Clamp connections present on the cuticle and gill-trama.

Habit, habitat, and distribution. - On soil, among fallen leaves, in woods, New York, August.

Material studied. - NEW YORK: Peck (type, from Port

Jefferson, Suffolk County, August).

Observations. - This species was thought by Peck (1903) to be a *Camarophyllus*, but the gill-trama of the type is divergent. The ^{description of} microscopic characters given above ~~are~~ ^{is} based on our study of the type.

HYGROPHORUS SUBSALMONIUS Smith & Hesler

Lloydia 2:30. 1939

Illustrations:

Plate

Smith and Hesler, Lloydia 2, pl. 11.

Pileus 4-12 (15) cm. broad, convex, becoming plane or in age depressed from an elevated margin, disk "madder brown," "ferruginous," "cadmium orange," to "rufous," margin paler ("salmon-buff"), in age "madder brown," "ferruginous," "salmon-buff," "zinc orange" or "apricot-buff" over all, glutinous, the gluten pale-amber or colorless, viscid in age, glabrous except for a cottony fibrillose margin. Context thick, firm, white or at times faintly tinged sordid incarnate; odor and taste none or mild.

Lamellae adnate to slightly adnexed, usually becoming decurrent, at first "cartridge buff" or "sea-shell pink" then "pale pinkish buff," darker incarnate-tan in age or when decaying, close to subdistant, moderately broad, alternately long and short, edges even.

Stipe 3-10 cm. long, 5-20 mm. thick, whitish or tinged incarnate tan, the color often deeper in age, equal or with a flaring apex and a narrowed base, basal portion glutinous from the remains of the thick gelatinous universal veil, minutely squamulose above the viscid portion, solid.

Spores 6.5-8 x 3-4.5 μ , ellipsoid, smooth, yellow in Melzer's reagent, white in mass. Basidia 38-50 x 6-9 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-9 (15) μ broad, with a mediostrate of narrow (3-5 μ), parallel hyphae. Cuticle a broad gelatinous zone, the upper portion (200 μ) of clear gelatinous substance, the lower portion a turf, or ixotrichodermial palisade, of slender, erect hyphae, 90-130 x 2-4 μ . ^{No hypodermium.} Pileus trama homogeneous, of loosely interwoven ~~both radially & paraclinally~~ ^{paraclinally} disposed hyphae. Clamp connections present on the hyphae of the pileus-trama and gill-trama.

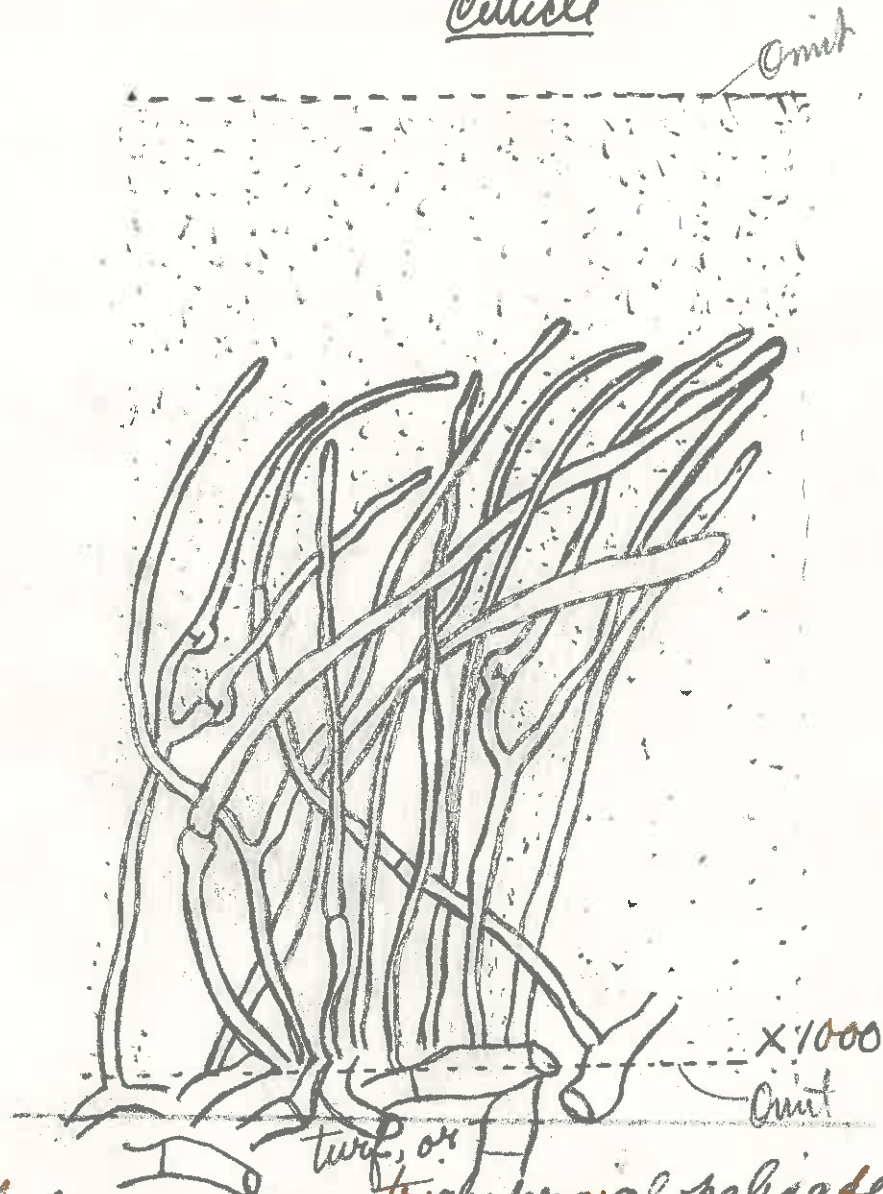
Habit, habitat, and distribution. - Gregarious under oak and hickory or in brush along roadsides, Iowa, Michigan, Ohio, Tennessee, and Georgia, September-November.

Material studied. - GEORGIA: Hesler 22229; IOWA: Oleson, Ft. Dodge, Nov. 7, 1919; MICHIGAN: Smith 6045, 6143 (type, Five-Mile Woods, oak, Ann Arbor, October 23, 1936), 15389, 32052, 34232; Staebler, Ann Arbor, Oct. 12, 1936, OHIO: Walters 145; TENNESSEE: Hesler 4445, 8406, 22218, 23525.

Observations. - This species is related to H. pudorinus but H. subsalmonius is of brighter colors: the pileus is salmon buff to cadmium orange, the lamellae are sea-shell pink; the spores are slightly more narrow; and the glutinous veil is thick and persistent. In H. subsalmonius the cuticle is a striking ixotrichodermial palisade. Finally, its squamules on the stipe apex, when dried, are pale orange, never as reddish dots as in H. pudorinus.

Hymenopus subcaluonius - No. 23525

Cuticle



An isotrichodermium, \pm a ^{twigs, or} trichodermial palisade. The hyphae are somewhat branched, septate, some with thin walls, some thick, $\approx 90-130 \times 2-4 \mu$. All immersed in a thick, colorless, gelatinous zone. The hyphal tips tend to curve and present a leaning appearance. The gelatin may extend 200μ above ^{the hyphal tips.}

No differentiated hypodermium

The pilous trama is homogeneous, of loosely interwoven hyphae.



23525- *Hygrophorus subsalmonius* Sm. & Hke.



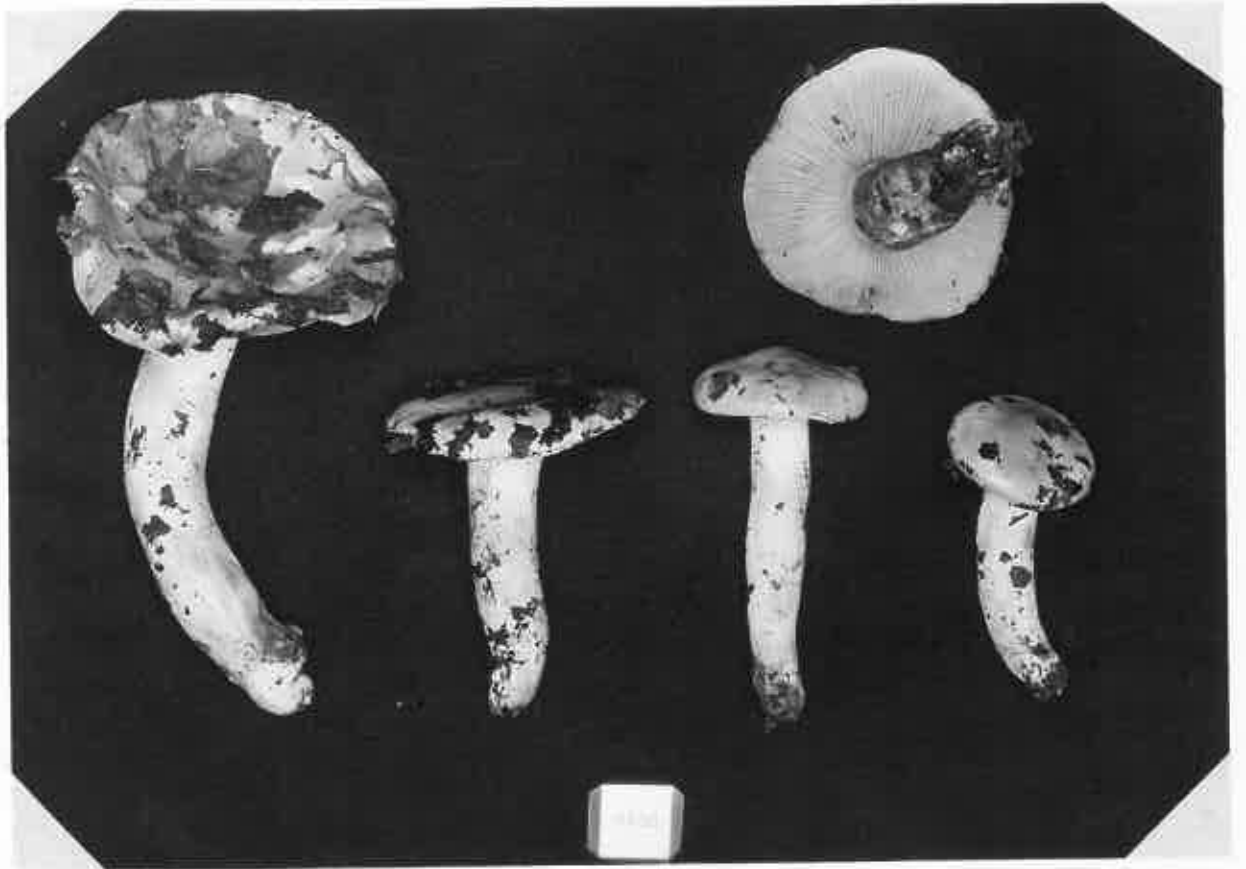
22718 - *Hygrophorus subsalmonius* Sm. + Hes.



22229 - *Hygrophorus subsalmonius* Smith & Hesler



22218 - *Hyprophorus subsalmonius* Em. + Hes. X $\frac{2}{3}$



8406 - *Hygrophorus subsalmonius* Sm. + Hes.

HYGROPHORUS SUBSORDIDUS Murr.

Elisha Mitchell Sci. Soc. Jour. 55:371. 1939

Illustration:

Plate

Pileus 4-10 cm. broad, convex, finally expanding, often somewhat depressed, entirely white or the disk at times straw-yellow, minutely rivulose-silky or appearing glabrous, viscid, margin even, undulate or lobed. Context white, unchanging, thick, abruptly thin on the margin; odor and taste mild.

Lamellae adnexed or adnate-subdecurrent, white, unchanging, narrow, subdistant, some forking midway, lamellulae numerous, edges even.

Stipe 3-8 cm. long, 10-20 mm. thick, white, moist and usually somewhat lubricous, not viscid, equal or often tapering downward, apex pruinose, elsewhere fibrillose, subrimose, solid.

Spores (5.5) 6-8 x 3-4 μ , oblong-cylindric, smooth, white in mass, yellow in Melzer's reagent. Basidia 35-44 x 5-6 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 6-12 μ broad. Cuticle a distinct gelatinous zone 125-180 μ thick, the hyphae (2.5-4 μ broad) forming an ixotrichodermium (not a palisade). No distinct hypodermium. Pileus trama of ^{loosely interwoven,} radial hyphae which are rather broad (5-20 μ), ~~with frequent septa, so that the trama appears more or less cellular.~~ Clamp connections present on the cuticular hyphae.

Habit, habitat, and distribution. - Gregarious in oak-pine woods, Florida, and Alabama, and Texas, November-December.

Material studied. - ALABAMA: Burke 90; FLORIDA: Murrill F 18403 (type, from Newnan's Lake, near Gainesville, November 15, 1938), unnumbered (Jan. 18, 1940, and December 22, 1941); Hesler 20244, 21039, 21042, 21049; TEXAS: Thiers 1428.

Observations. - This species is distinguished from H. sordidus by more narrow lamellae and more slender spores. One collection (~~Hesler-20244~~) was found growing in an arc of a fairy-ring, about ten feet in diameter.

Notes on the type: spores 6-8 x 3-3.5 μ , oblong-cylindric, smooth, non-amyloid, in mass: white, or on white paper tinged cream. Basidia 36-42 x 5-6 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama of divergent hyphae, 7-13 μ broad. Cuticle of interwoven, gelatinous hyphae, with numerous free ends; clamp^{connections} present.



21039 - *Hygrophorus subsordidus* Murr.



21042 - *Hygrophorus subsordidus* Murr.



21049 - *Hygrophorus subsordidus* Murr.



20244 - *Hygrophorus subsordidus* Murr.

HYGROPHORUS TENAX SP. NOV.

Pileus 2-4 cm. latus, convexus, deinde planus vel depressus, albidus, discus subluteus, interdum luteus laesus, primum viscidus, cito siccus, glabrosus deinde fibrillosus vel squamulosus; odore et guster blandus; lamellae sub-decurrentes, pallidae demum "pinkish buff," subdistantes, angustae; stipes 3-5 cm. longus, 4-6 mm. crassus, albidus, tarde subluteus laesus, siccus, apice fibroso-punctatus, satis fibrosus, tenax, nullum velum; sporae 6-8 x 3.5-4.5 μ , ellipsoideae. Specimen typicum in Herb. Univ. Mich. conservatum; lectum prope Warren Dunes, State Park, Michigan, Oct. 1, 1955, A. H. Smith, n. 50625.

Pileus 2-4 cm. broad, convex, expanding to plane or slightly depressed, dull white with a tendency toward yellow on the disc, at times showing yellowish stains where injured, surface thinly viscid when young but soon dry and merely with a slight resinous feel, glabrous but soon more or less appressed fibrillose to squamulose, margin ribbed in age. Context thin but tough (for this genus); odor and taste not distinctive.

Lamellae slightly decurrent, near "pinkish buff" (not as white as the pileus), unchanging when injured, sub-distant, narrow, edges even.

Stipe 3-5 cm. long, 4-6 mm. thick, whitish, slowly discoloring to yellowish on bruising, equal or narrowed downward, dry, apex fibrous-punctate, rather fibrous-tough, veil none.

Spores 6-8 x 3.5-4.5 μ , ellipsoid with a curved apiculus, smooth, hyaline in KOH, yellowish-hyaline in Melzer's reagent. Basidia 30-40 x 6-7 μ , 4-spored, pale yellowish in Melzer's. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 6-14 μ broad. Cuticle of subgelatinous hyphae 3-5 μ broad, some with enlarged end-cells but these not truly cystidioid, the hyphae more refractive in KOH than is usual for the genus. Clamp connections present.

Habit, habitat, and distribution. - Scattered in an upland beech woods, Michigan, October.

Material studied. - MICHIGAN: Smith 50625 (type, from near Warren Dunes State Park, Oct. 1, 1955).

Observations. - The rather tough consistency, small spores, lack of any veil and refractive hyphae of the pellicle distinguish it from any other Hygrophorus known to us. The gills become dark brown in drying as do those of H. bakerensis and a few other species in the section Hygrophorus. The stature is that of H. eburneus.

HYGROPHORUS TENNESSEENSIS Smith & Hesler

Lloydia 2:40. 1939

Illustration:

Plate

Pileus (2) 6-12 cm. broad, convex then expanded, becoming depressed, marginal portion whitish to "clay color" or "tawny-olive," central portion "tawny" to "fawn color," viscid or glutinous, pellicle separable to disk, glabrous, margin even or substriate, involute, floccose-fibrillose. Context white, thick (up to 8 mm.) on the disk, thin on margin, compact; odor distinct in young and in fresh specimens, resembling that of raw potatoes, taste bitter.

Lamellae adnate becoming short-decurrent, white, linear, about 7 mm. broad, subdistant, many lamellulae, venose at cap, edges even.

Stipe 6-10 cm. long, 8-18 mm. thick, whitish or dingy, dry, more or less flexuous, tapering downward, fibrillose-striate, upper portion floccose-scabrous, solid.

Spores (6) 7-9 x 4.5-6 μ , ellipsoid, smooth, yellowish in Melzer's reagent. Basidia 38-54 x 7-9 μ , 4-spored, rarely 2-spored. Pleurocystidia and cheilocystidia none. Gill-trama of divergent hyphae, 4-9 μ broad. Cuticle of gelatinous, colorless or nearly colorless hyphae, 3-5 μ broad, repent or more or less erect and

tangled, - an ixotrichodermium (no palisade). No ~~trichodermium~~ ^{hypodermium.}
Pileus trama of radial, ~~and~~ slightly interwoven hyphae. Clamp connections on the hyphae of the cuticle and the gill-trama.

Habit, habitat, and distribution. - Gregarious on soil, under conifers, Tennessee, North Carolina, Kentucky, Massachusetts, and California, September-February.

Material studied. - KENTUCKY: Stevenson 16579; CALIFORNIA: Rea 917, 361; MASSACHUSETTS: Bigelow 8387, 8616, 8640, 8731; NORTH CAROLINA: Hesler 12371, 16438, 17147, 19386, 21006, 23479; TENNESSEE: Hesler 4443, 10922 (type, from Cades Cove, Great Smoky Mts. Nat. Park, Oct. 17, 1937), 13077, 16578, 18157, 18285, 19471, 19477, 20201, 22420 ^{the last} (forming a fairy-ring [^] fifteen feet in diameter).

Observations. - The odor, taste, colors, dry stipe, and resemblance to H. pudorinus in stature are the distinctive features of this species. In its colors it closely resembles H. varicolor Murr. but its dry stipe and bitter taste distinguish it at once. The brown pilei and bitter taste distinguish it readily from H. pudorinus. H. arbustivus Fr. sensu Nüesch (14) is also closely related but differs in its virgate pileus and mild odor and taste. In addition other investigators have usually described the pileus of the latter as more reddish or incarnate tan.



22420 - *Hygrophorus tenuisporus* Sm. & Hes.



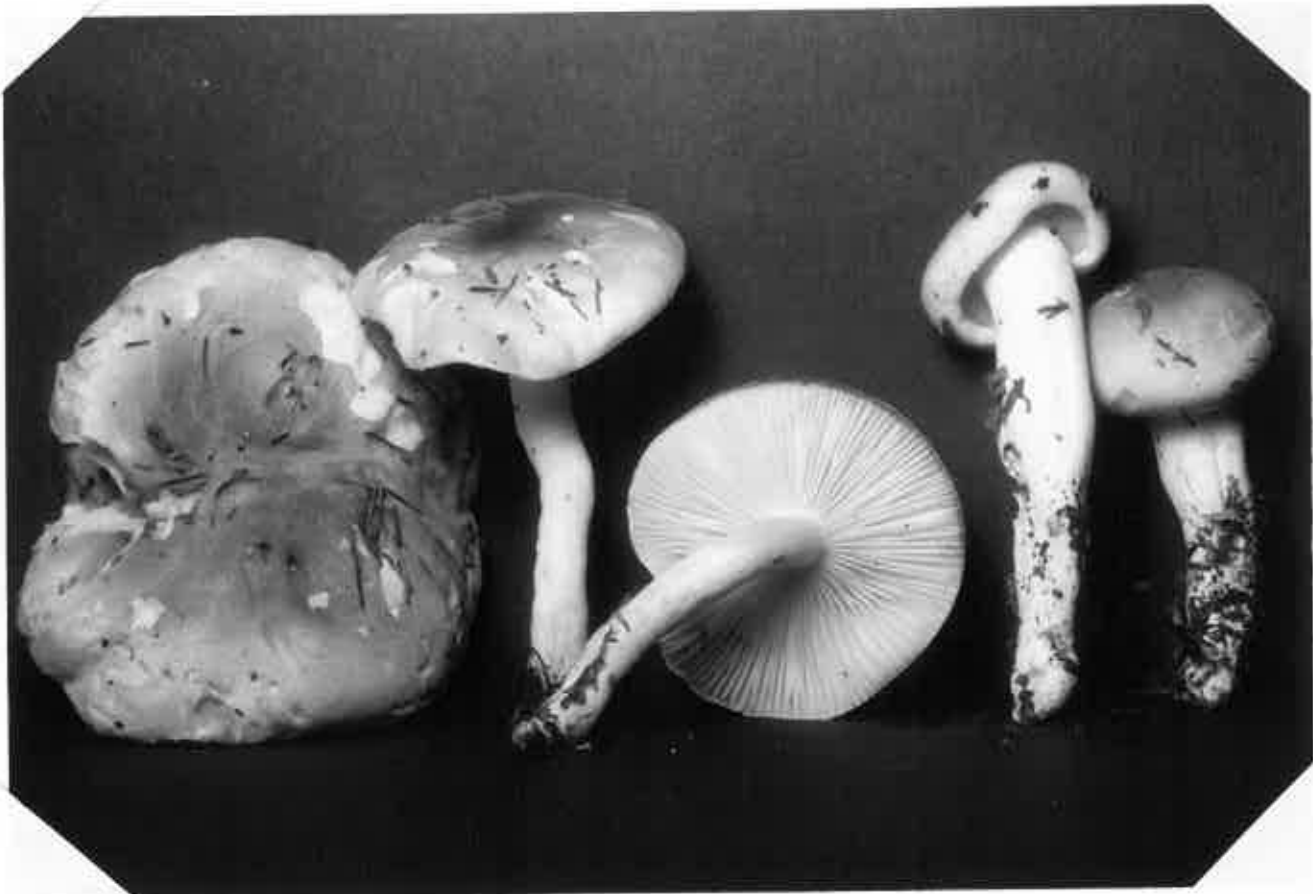
19477 - *Hygrophorus tenuisecus* Sm. + Hes.



18285 - *Hygrophorus tennesseensis* Sm. & R. K. S.



4443 - *Agrophorus tennesseensis* Sm. & A. K.



21006 - *Hygrophorus tennesseensis* Sm. + Ste.

HYGROPHORUS TEPHROLEUCUS var. AUREOFLOCCOSUS Sm. & Hes.

Lloydia 2:26. 1939

Illustration:

Plate

Pileus 2-5.5 cm. broad, convex, finally expanding-convex-depressed or plane, at times umbonate, "deep mouse gray," "drab" to "hair-brown," or near "fuscous," paler when covered by leaves, viscid, innately squamulose to glabrous, often pustulate, margin incurved often floccose, even or crenulate. Context white, medium thick; odor and taste not distinctive.

Lamellae adnate-decurrent, white, finally pale, creamy in age, subdistant to nearly close, medium broad, lamellulae numerous and alternating, edges even.

Stipe 2.5-7 (12) cm. long, 3-8 (10) mm. thick, at times compressed, apex and base whitish or base yellowish, elsewhere tinged brownish or concolorous with the pileus, floccose-squamulose or scabrous, tips of scales golden yellowish at first, then ashy to brownish or darker, viscid, equal or tapering downward, solid, becoming hollow.

Spores 8-15 x 4.5-6 (6.5) μ (mostly 8-10 x 4.5-5 μ , several 10-15 x 5-6 μ), ellipsoid to sub-lanceolate, smooth, pale yellow in Melzer's reagent. Basidia 44-58 x 6-8 μ , 2- and 4-spored, sterigmata at times long (10-38 μ). Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 7-15 μ broad.

Cuticle of fuscous, more or less erect, loosely tangled, gelatinous, narrow (3-4.5 μ) hyphae,- an ixotrichodermium. No hypodermium. Pileus trama of radial, more or less parallel hyphae. Clamp connections present on the hyphae of the cuticle and the gill-trama.

Habit, habitat, and distribution. - Gregarious in pine, spruce, and cedar-pine (mixed), and oak woods, Alabama, Florida, Georgia, Kentucky, and Tennessee, October-January.

Material studied. - ALABAMA: Hesler 22261; FLORIDA: Hesler 20245, 21051; GEORGIA: Hesler 21082, 21605; TENNESSEE: Hesler 3114, 4466 (type, under pine, Knox County, December 2, 1934), 4467, 8444, 8453, 10102, 10949, 13026, 13035, 13047, 23556,

Observations. - The golden yellow tips of the scales over the upper portion of the stipe distinguish it at once. The change in color which they undergo indicates a relationship of the variety to H. tephroleucus rather than to H. pustulatus although the pileus surface has the characters of both.



21051 - *Hygrophorus tephroleucus* Fr.

var. *aureofloccosus* Sm. + Hes.

x $\frac{2}{3}$



4466 - *Hygrophorus tephroleucus* var. *aureo-floccosus* Sm. & Ales.

HYGROPHORUS TEPHROLEUCUS (Fr.) Fr. var. tephroleucus

Epicr. Myc., p. 328. 1838

Agaricus tephroleucus Fr., Syst. Myc., p. 34. 1821.

Simacium tephroleucum (Fr.) Kummer, Der Führer in die
Illustrations: Pilzkunde, p. 119. 1871.

Plate

Lange, Flora Agar. Dan. 5, pl. 163A.

Smith and Hesler, Lloydia 2, pl. 9.

Pileus 1-3 cm. broad, convex to plane, occasionally slightly
depressed, not umbonate ^(No. 24601 is slightly umbonate), pallid cinereous near the margin, dark
ashy gray over the disk, fading to pale ashy gray over all in
age, viscid, appearing appressed fibrillose under the gluten, in
age appressed-scaly. Context whitish, soft, thin; odor and
taste not distinctive.

Lamellae adnate, becoming decurrent, white, becoming creamy
in age, subdistant, broad.

Stipe 4-6 cm. long, 2-3 (4) mm. thick, white over all at
first, equal, solid, white within, white fibrous-punctate near
the apex, more or less fibrillose below, base in young specimens
coated with a thin layer of gluten, soon dry, the fibrils over
the upper part cinerascens and dark gray in age.

Spores (7) 8-10 x 4-5 μ , ellipsoid, smooth, pale yellow
in Melzer's reagent. Basidia 40-58 x 6-8 μ , 4-spored.
Pleurocystidia and cheilocystidia none. Gill-trama divergent,

hyphae 4-9 μ broad. Cuticle of gelatinous, more or less erect or somewhat repent, fuscous, narrow (3-4 μ) hyphae, usually forming somewhat of an ixotrichodermium, more rarely an ixocutis. No hypodermium. Pileus trama ^{of} radial, more or less parallel ^{hyphae}. Clamp connections present on the cuticular and gill-trama hyphae.

Habit, habitat, and distribution. - Gregarious under conifers and in sphagnum bogs, Florida, Michigan, Idaho, California, and Oregon, Canada, Argentina, and Europe, September-February.

Material studied. - CALIFORNIA: Smith 56486, 56822, 56888, 56953; FLORIDA: Hesler & Meyer 20245; IDAHO: Smith 53233; MICHIGAN: Bailey 143; Smith 999, 1108, 1135, 1235, 31929, 43973, 50957, 51035; OREGON: Smith 4844, 26660; Smith & Gruber 19247; CANADA: Groves 11881; ARGENTINA: Singer M413.

Observations. - Our material corresponds well to the descriptions of most European investigators. Nüesch ⁽¹⁹²²⁾ ~~(X)~~ describes the stipe as dry. The thin layer of gluten disappears very soon, and, depending on weather conditions, one might describe the stipe as viscid on one occasion and as dry on the next. Consequently the above mentioned discrepancy is not serious. The outstanding characters are the ash colored pilei, and the fibrils on the stipe which are typically white but soon change to gray. Konrad ⁽¹⁹³⁶⁾ ~~(X)~~ apparently believes that H. olivaceoalbus var. gracilis is the fungus Fries described under the name H. tephroleucus. It remains to be seen whether or not this concept will be generally accepted by European investigators. Konrad would ^{probably} ~~very likely~~ place the species here described as H. tephroleucus under H. pustulatus.

The pilei of the California collection of the latter, however, were not as fibrillose as those of H. tephroleucus and the stems were punctate above as in H. pudorinus rather than furnished with fine fibrillose points as in H. tephroleucus.



24609 - *Hygrophorus tephroleucus* var. *tephroleucus*



Hygrophorus tephroleucus Fr.

Sm - 34-999

HYGROPHORUS VARIICOLOR Murr.

Mycologia 4:210. 1912

Illustrations:

Plate

Smith and Hesler, Lloydia 2, pl. 10.

Pileus 4-7 cm. broad, obtuse, at maturity slightly umbonate, sometimes plane and with a decurved margin, "tawny" to "cinnamon-brown" on the disk, paler tawny toward the whitish margin, glutinous, more or less fibrillose streaked beneath the gluten, margin cottony tomentose and often beaded with drops of moisture. Context white, thick on the disk, firm; taste mild, odor of almonds when cut or bruised.

Lamellae bluntly adnate but soon short decurrent, pure white, close to subdistant (58-70 reach the stipe), equal, narrow (3-4.5 mm).

Stipe 8-10 cm. long (3-5 cm. in alpine forms), 10-15 mm. thick at the apex, pure white over all or the base discolored slightly, gradually tapered to a long pointed subradicating base, solid, lower portion glutinous from the remains of a gelatinous universal veil, appressed fibrillose beneath the gluten, the upper half dry and pruinose to minutely white fibrillose-furfuraceous, often beaded with drops of moisture near the apex.

Spores 7-9 x 4.5-5.5 μ , ellipsoid, smooth, yellow in Melzer's reagent. Basidia 42-54 x 5.5-7 μ , 2- and 4-spored.

Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-9 μ broad. Cuticle a well-defined gelatinous layer, 150-270 μ thick, hyphae more or less erect, 3-6 μ broad, - an ixotrichodermium. No hypodermium. Pileus trama of radial, sub-parallel hyphae. Clamp connections on the cuticular and gill-trama hyphae.

Habit, habitat, and distribution. - On soil, in woods,
California,
and Washington,
Oregon, October-November.

Material studied. - CALIFORNIA: Sipe 392; Smith 8087, 8088, 8154, 8856, 26778; OREGON: Murrill 802 (type, from near Mill City, November 9, 1911), Smith 8087; WASHINGTON: Flett, Bremerton, Dec. 18, 1939; Smith 3253.

Observations. - The collection^S by Smith listed above agree~~X~~ with the type. This species is related to H. discoideus but differs in its size and in the more yellowish brown colors. It also resembles H. laurae in certain respects, but the color changes in drying separate the two at once. When properly dried the gills of H. laurae do not become reddish brown. H. arbustivus Fr. sensu Rea is apparently the nearest European species. Rea's (¹⁹²²)_^ description is very suggestive of Murrill's species. The outstanding character of H. arbustivus is said to be that the apex of the stipe is covered by white free mealy granules. Murrill described the stipe as pulverulent, and the veil as represented by a few short brownish fibrils at the center of the stipe. A study of Murrill's type, however, shows that it is the species we have

described above in spite of any apparent discrepancies in the original description. The glutinous veil may be present only around the base of the stipe and under unfavorable conditions might be easily overlooked. The difference between the pruinose to furfuraceous particles on the stipe of one and the free mealy granules on the other might easily be a difference of interpretation. However, in the absence of specimens of H. arbustivus for comparison, and due to conflicting opinions as to its characters among European investigators, we prefer to use the name given to the American material.

Notes on the type: Spores 7-8.5 x 4.5-5.7 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 34-48 x 5-6 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent. Cuticle fibrillose, hyphae loosely interwoven, gelatinous. Clamp connections on the hyphae of both gill-trama and cuticle.



Hygrophorus variicolor

~~Sm-8087~~

Fig. 80

HYGROPHORUS VELATUS SP. NOV.

Pileus 1.5-3 cm. broad, convex, very pale pinkish, glabrous, viscid, margin even; flesh whitish, odor and taste mild; lamellae decurrent, pale buff, close to subdistant, medium broad; stipe 3-5 cm. long, 4-6 mm. thick, pallid to pale buff, white-fibrillose above, dry, equal; veil white-fibrillose, copious; spores 5.5-6 (7-8) x 3.5-4 μ , ellipsoid to sub-ellipsoid. Specimen typicum in Herb. Univ. Mich.; lectum Burgdorf, Idaho, Aug. 13, 1958, A. H. Smith n. 59968.

Pileus 1.5-3 cm. latus, convexus, pallido-rubicundulus, glaber, viscidus, margine aequo; caro albida, odore et gustu mitis; lamellae decurrentes, pallidus ochraceae, paene subdistantes, modice latae; stipes 3-5 cm. longus, 4-6 mm. crassus, pallidus demum pallidus ochraceae, albo-fibrillosus superne, siccus, aequalis; velum albo-fibrillosum, plenum; sporae 5.5-6 (7-8) x 3.5-4 μ , ellipsoideae demum sub-ellipsoideae. Specimen typicum in Herb. Univ. Mich.; lectum prope Burgdorf, Idaho, Aug. 13, 1958, A. H. Smith, n. 59968.

HYGROPHORUS VELATUS SP. NOV.

Pileus 1.5-3 cm. latus, convexus, pallido-rubicundulus, glaber, viscidus, margine aequo; caro albida, odore et gustu mitis; lamellae decurrentes, pallidus ochraceae, paene subdistantes, modice latae; stipes 3-5 cm. longus, 4-6 mm. crassus, pallidus ^{pallidus ochraceae,} ~~demum pale buff,~~ albo-fibrillosus superne, siccus, aequalis; velum albo-fibrillosum, plenum; sporae 5.5-6 (7-8) x 3.5-4 μ , ellipsoideae demum sub-ellipsoideae. Speciman typicum in Herb. Univ. Mich.; lectum prope Burgdorf, Idaho, Aug. 13, 1958, A. H. Smith, n. 59968.

Pileus 1.5-3 cm. broad, convex, more or less expanding, very pale pinkish, glabrous, viscid, margin even. Context whitish, medium thin; odor and taste not distinctive.

Lamellae decurrent, pale buff, rather close to subdistant, medium broad, edges even.

Stipe 3-5 cm. long, 4-6 mm. thick, pallid to pale buff, white-fibrillose above (veil-remnants), dry, equal. Veil white-fibrillose, copious.

Spores 5.5-6 (7-8) x 3.5-4 μ , ellipsoid to sub-pipshaped, smooth, yellow in Melzer's reagent. Basidia 42-54 x 6-8 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-9 μ broad. Cuticle a zone, 180-300 μ broad, composed of colorless, loosely interwoven, gelatinous hyphae. Clamp connections present on the cuticular and gill-

trama hyphae. Stipe cuticular hyphae are non-gelatinous and have clamps.

Habit, habitat, and distribution. - On soil, under conifers, Idaho, August.

Material studied. - IDAHO: Smith 59968 (type, from northwest of Burgdorf, Aug. 13, 1958).

Observations. - This species is clearly related to H. purpurascens, but the pileus lacks the red fibrils, and the lamellae are not reddish spotted. It is likewise related to H. proximus which lacks a veil. The spores of all three species are similar in size.

HYGROPHORUS VELATUS SP. NOV.

Pileus 1.5-3 cm. broad, convex, more or less expanding, very pale pinkish, glabrous, viscid, margin even. Context whitish, medium thin; odor and taste not distinctive.

Lamellae decurrent, pale buff, rather close to subdistant, medium broad, edges even.

Stipe 3-5 cm. long, 4-6 mm. thick, pallid to pale buff, white-fibrillose above (veil-remnants), dry, equal. Veil white-fibrillose, copious.

Spores 5.5-6 (7-8) x 3.5-4 μ , ellipsoid to sub-pipshaped, smooth, yellow in Melzer's reagent. Basidia 42-54 x 6-8 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-9 μ broad. Cuticle a zone, 180-300 μ broad, composed of colorless, loosely interwoven, gelatinous hyphae. Clamp connections present on the cuticular and gill-trama hyphae. Stipe cuticular hyphae are non-gelatinous and have clamps.

Habit, habitat, and distribution. - On soil, under conifers, Idaho, August.

Material studied. - IDAHO: Smith 59968 (type, from northwest of Burgdorf, Aug. 13, 1958).

Observations. - This species is clearly related to

H. purpurascens, but the pileus lacks the red fibrils, and the lamellae are not reddish spotted. It is likewise related to H. proximus which lacks a veil. The spores of all three species are similar in size.

HYGROPHORUS VERNALIS Smith

Univ. of Mich. Herb. Contr. 5:20. 1941.

Illustration:

Univ. Mich. Herb. Contr. 5, pl. 4.

Pileus 3-5 cm. broad, obtuse when young and with an incurved white downy-pubescent margin, obtusely umbonate in age, margin "pale vinaceous-fawn," the disk "vinaceous-buff" and with watery spots when young, in age flushed over all with brighter pale vinaceous colors, glabrous, viscid. Context thick, concolorous with the surface or whitish vinaceous; odor and taste not distinctive.

Lamellae arcuate when young, long decurrent in age, whitish (paler than the margin of the pileus), close, 50-55 reach the stipe, narrow (3.5 mm. more or less), edges even.

Stipe 4-6 cm. long, 7-9 mm. thick, equal or slightly enlarged at the base, stuffed or becoming hollow, lower part covered by a thin layer of gluten, which forms sordid yellowish patches of varnish over the basal area, appressed cottony fibrillose to the apex (not punctate above), sordid whitish or concolorous with the gills, darker in age.

Spores 11-15.5 x 5.5-7 μ , ellipsoid, at times oblong-ellipsoid, smooth, yellow in Melzer's reagent. Basidia 50-70 x

7-11 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 3-6 μ broad. Cuticle a broad (250-350 μ), gelatinous zone with loosely interwoven, narrow (2-3 μ), radially disposed hyphae, - an ixocutis. No hypodermium. Pileus trama of radial hyphae. Clamp connections rare on the cuticular hyphae and more common on the gill trama hyphae.

Habit, habitat, and distribution. - Scattered under conifers, near snow banks, Washington, May-July.

Material studied. - WASHINGTON: Smith 13333, 14304 (type, from below Deer Lake, Olympic National Park, June 13, 1939), 15636.

Observations. - This species is nearest H. variicolor Murr., which, however, is darker, is without a vinaceous tint, and with smaller spores.

HYGROPHORUS VINICOLOR SP. NOV.

Illustration:

Plate

Pileus 2.5-5 cm. latus, subviscidus, cito siccus, colore variabilis, disco "wood brown", "vinaceous buff" prope marginem; odore aromaticus, gustu ingratus; lamellae decurrentes, paene "pale pinkish cinnamon," distantes, latae; stipes 3-5 mm. longus, 10-20 cm. crassus, albus, siccus, rosaceo-pruinosis; sporae 10-14 x 6-8 μ , ellipsoideae. Specimen typicum in Herb. Univ. Mich.; lectum in Cape Horn Summit, Sawtooth Mts., Idaho, Aug. 25, 1954, A. H. Smith, n. 47116.

Pileus 2.5-5 cm. broad, obtuse with an inrolled margin, becoming paler or nearly so, color variable, "wood brown" on disc and "vinaceous buff" toward margin, margin rather pink in age at times, surface slightly viscid but soon dry. Context white or vinaceous near cuticle; taste disagreeable, odor aromatic - as in H. agathosmus, no color changes when bruised.

Lamellae decurrent, near "pale pinkish cinnamon", distant, broad.

Stipe 3-5 cm. long, 10-20 mm. thick, white throughout, dry, surface minutely pruinose at first and the pruina developing a pinkish tone, solid.

Spores 10-14 x 6-8 μ , ellipsoid, smooth, thin-walled, hyaline in KOH, yellowish hyaline in Melzer's reagent. Basidia 50-70 x 6-9 μ , 4-spored, pedicels flexuose. Pleurocystidia and cheilocystidia none. Gill trama of divergent hyphae (young gills), in old gills appearing almost interwoven. Cuticle of pileus rather indistinct and only subgelatinous as revived in KOH. Pileus trama of floccose, interwoven hyphae broader than those of cuticle. Clamp connections present.

Habit, habitat, and distribution. - Gregarious on a mossy bank, Idaho, August.

Material studied. - IDAHO: Smith 46714 (type, from Cape Horn, Aug. 25, 1954), 47116.

Observations. - The two collections referred here could very well be only a variant of H. monticola. The characters which seem to distinguish H. vinicolor are the "pale pinkish cinnamon" gills — almost the color of those of H. saxatilis, — the disagreeable taste, and the pink pruina of the stipe, — which might be only a continuation of the change toward pink which both show in the pileus of old or drying specimens.

HYGROPHORUS VIRGATULUS Pk.

New York State Mus. Ann. Rept. 26:64. 1874

Pileus 2.5-5 cm. broad, convex or expanded, whitish with a brownish disk, minutely virgate with innate blackish fibrils, viscid when moist.

Lamellae arcuate-decurrent, distant, medium broad, white.

Stipe 6-10 cm. long, 4-6 mm. thick, solid, viscid, equal or tapering downwards, with a few small white floccose scales at the top.

Spores 7-9 x 3.5-5 μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 32-54 x 5-7 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill-trama divergent, hyphae 4-8 μ broad. Cuticle of gelatinous, fuscous, radial, repent to more or less erect, thick-walled hyphae which vary in breadth (3-15 μ). No hypodermium. Pileus trama of radial hyphae. Clamp connections rare on the cuticular hyphae. Lactifers at times abundant in the gill-trama.

Habit, habitat, and distribution. - Subcaespitose, on soil in open woods, New York.

Material studied. - NEW YORK: Peck (type, from North Greenbush).

Observations. - The type specimens from North Greenbush,

New York, are pale and sordid yellowish brown. They do not remind one of H. occidentalis, H. pustulatus, or any other grayish brown species which we have studied. The ^{description of} microscopic characters given above ~~are~~ ^{is} based on our study of the type.

HYGROPHORUS WHITEII SP. NOV.

Pileus 2.5-5 cm. broad, convex, "warm buff", viscid, glabrous; flesh white, thin, odor and taste mild; lamellae decurrent, slightly arcuate, "warm buff", subdistant, medium broad; stipe 4-7 cm. long, 5-8 mm. thick, pallid, viscid; spores 9-11 x 5-6 (7) μ , ellipsoid. Specimen typicum in Herb. Univ. Mich.; lectum Patrick Point, California, Dec. 15, 1956, A. H. Smith n. 56693.

Pileus 2.5-5 cm. latus, convexus, "warm buff", viscidus, glaber; caro alba, tenuis, odore et gustu mitis; lamellae decurrentes, modice arcuatae, "warm buff", subdistantes, modice latae; stipes 4-7 cm. longus, 5-8 mm. crassus, pallidus, viscidus; sporae 9-11 x 5-6 (7) μ , ellipsoideae. Specimen typicum in Herb. Univ. Mich.; lectum Patrick Point, California, December 15, 1956, A. H. Smith n. 56693.

HYGROPHORUS WHITEII SP. NOV.

Pileus 2.5-5 cm. latus, convexus, "warm-buff", viscidus, glaber; caro alba, tenuis, odore et gustu mitis; lamellae decurrentes, modice arcuatae, "warm buff," subdistantes, modice latae; stipes 4-7 cm. longus, 5-8 mm. crassus, pallidus, viscidus; sporae 9-11 x 5-6 (7) μ , ellipsoideae. Specimen typicum in Herb. Univ. Mich.; lectum Patrick Point, California, Dec. 15, 1956, A. H. Smith, n. 56693.

Pileus 2.5-5 cm. broad, convex, expanding somewhat convex, "warm buff", viscid, glabrous, margin even. Context white, thin; odor and taste not distinctive.

Lamellae decurrent, more or less arcuate, "warm buff", subdistant, medium broad, lamellulae numerous, at times anastomosing, edges even.

Stipe 4-7 cm. long, 5-8 mm. thick, pallid, viscid, somewhat silky-appressed, equal or slightly enlarged below.

Spores 9-11 x 5-6 (7) μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 44-60 x 6-9 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 6-12 broad. Cuticle a gelatinous zone, - an ixocutis, colorless, hyphae mostly repent. No hypodermium. Clamp connections present. Pileus trama of radially disposed hyphae.

Habit, habitat, and distribution. - On soil, under spruce, California, December.

Material studied. - CALIFORNIA: Smith 56693 (type, from Patrick Point, Dec. 15, 1956).

Observations. - This species is related to H. eburneus, but differs in its pale yellow pileus and lamellae, and in its larger spores. It is perhaps closest to H. flavodiscus which has smaller spores and becomes more orange colored on drying.

HYGROPHORUS WHITEII SP. NOV.

Approved by A.H.S.
letter 3/28/67

Pileus 2.5-5 cm. broad, convex, expanding somewhat convex, "warm buff", viscid, glabrous, margin even. Context white, thin; odor and taste not distinctive.

Lamellae decurrent, ^{more or less} arcuate, "warm buff", subdistant, medium broad, lamellulae numerous, at times anastomosing, edges even.

Stipe 4-7 cm. long, 5-8 mm. thick, pallid, viscid, somewhat silky-appressed, equal or slightly enlarged below.

Spores 9-11 x 5-6 (7) μ , ellipsoid, smooth, pale yellow in Melzer's reagent. Basidia 44-60 x 6-9 μ , 4-spored. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 6-12 μ broad. Cuticle a gelatinous zone, - an ixocutis, colorless, hyphae mostly repent. No hypodermium. Clamp connections present. Pileus trama radial.

Habit, habitat, and distribution. - On soil, under spruce, California, December.

Material studied. - CALIFORNIA: Smith 56693 (type, from Patrick Point, Dec. 15, 1956).

Observations. - This species is related to H. eburneus, but differs in its pale yellow pileus and lamellae, and in its larger spores. It is perhaps closest to H. flavodiscus which has smaller spores and becomes more orange colored on drying.

HYGROPHORUS Sm-62135

H. ardensis?

Notes by Smith

Pileus 3-5 cm. broad, pinkish tan. Odor and taste none. Lamellae pale. Stipe dry.

Notes by Hesler

Spores 5-6 (7.5) x 3-3.5 μ , ellipsoid, smooth, yellowish in Melzer's. Basidia 37-48 x 4-6 μ , 2-spored and 4-spored. Pleurocystidia and cheilocystidia none. Gill trama divergent, hyphae 3-11 μ broad, (both narrow and broad hyphae abundant). Cuticle a clear gelatinous zone, 100-170 μ thick, hyphae 2-5 μ broad, more or less erect, tangled, - an ixotrichodermium. No hypodermium. Pileus trama interwoven, more or less radially arranged. Clamp connections on the cuticular hyphae. Stipe cuticle of non-gelatinous hyphae. It does not have a short, fusoid stipe of H. penarius, as figures by Lange, Fl. Agar. Dan.