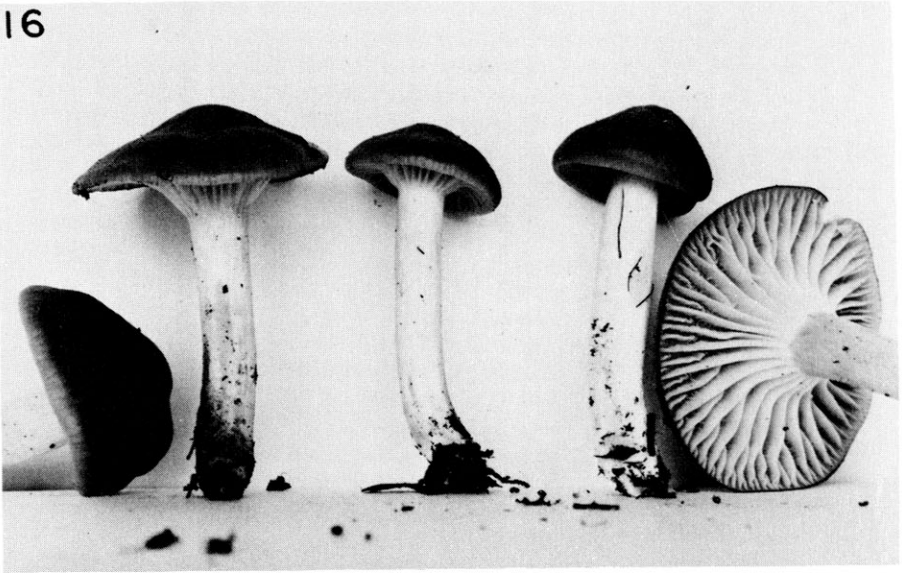
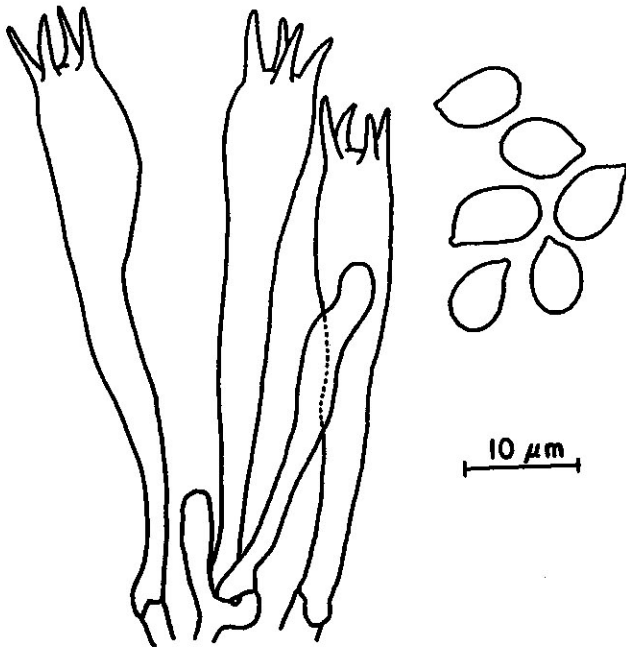


16

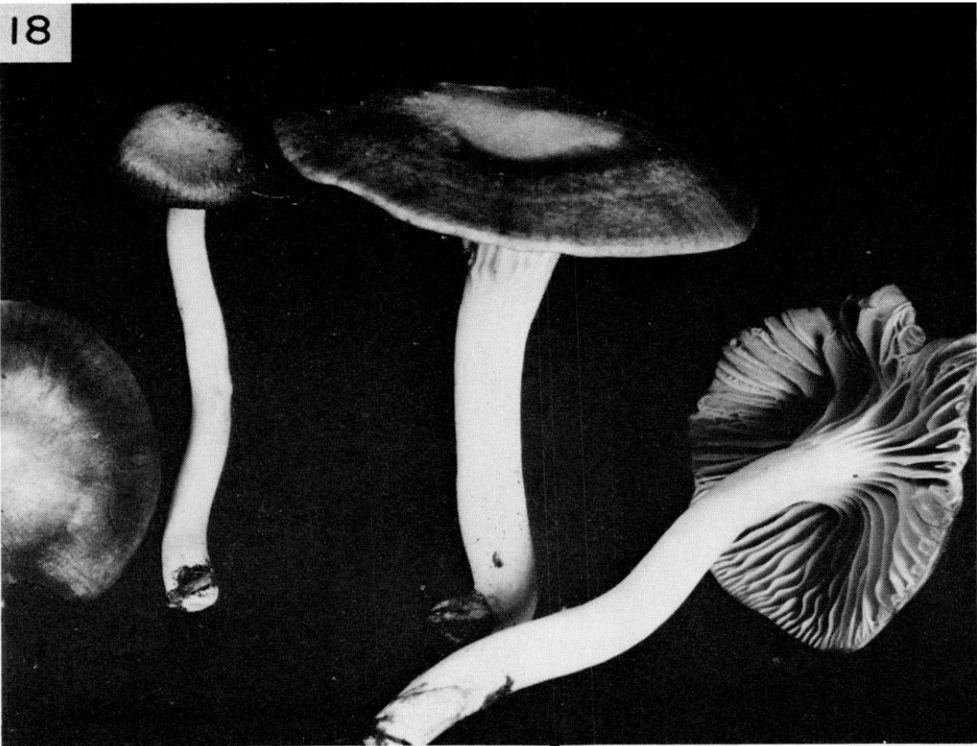


17

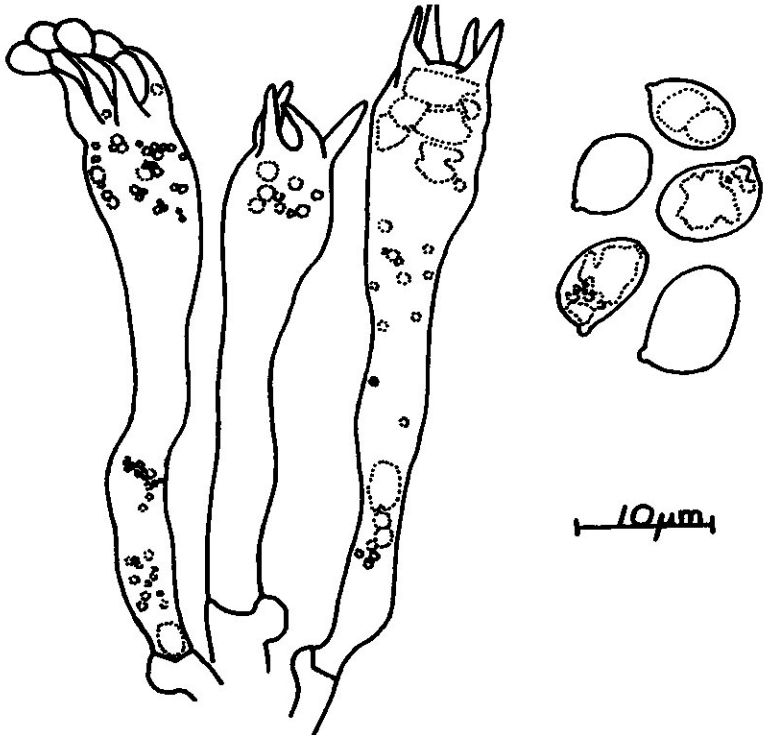


Figs 16, 17. *H. colemannianus*. Fig 16. Smith 43816, X .65. Fig 17. ACAD 288, basidia and spores.

18



19



Series CAMAROPHYLLOPSIS

Pileus colored, not viscid; spores usually longer than $6.5 \mu\text{m}$, lamellar trama interwoven.

7. *Hygrophorus pratensis* (Fr.) Fr. var. *pratensis*

Epicr. Myc., p. 326. 1838.

Agaricus pratensis Fr., Syst. Myc. 1: 99. 1821.

Camarophyllus pratensis (Fr.) Kummer, Führ. in Pilzk., p. 118. 1871.

Hydrocybe pratensis (Fr.) Murr., Mycologia 6: 2. 1914.

Camarophyllus fulvosus Murr., N. Am. Flora 9: 387. 1916.

Figs 20, 21.

Basidiocarp: Pileus 1-4 cm broad, convex, expanding to plano-convex and slightly depressed on disc, moist to dry, glabrous to faintly fibrillose, carrot red (6B7) (ISCC-53) overall at first, fading to pale orange (5A3) (ISCC-73) on the margin; context moderately thick on disc (2-2.5 mm), thin to membranous over gills, pallid apricot; odor and taste not distinctive. Lamellae decurrent, pallid yellow to pale orange (5A3) (ISCC-73), moderately narrow (1-3 mm broad), subdistant, forked and intervenose at margin in older specimens, thickish, edges even. Stipe 3.5-4.5 cm long, 5.5-15 mm thick at apex, streaky pallid orange or champagne (4B4) (ISCC-90), whitish at the base, pale yellowish within, dry, glabrous or appressed fibrillose, subequal, sometimes narrowing toward apex, occasionally unevenly compressed and flexuous, stuffed or with narrow hollow.

Microscopic Structures: Spores $6-8(8.5) \times 4-6 \mu\text{m}$, short-elliptical to subglobose, at times obovate, smooth, inamyloid. Basidia $41-64 \times 6.5-7.5 \mu\text{m}$, slender, narrowly clavate, 4-spored, the sterigmata stout to slender, up to $5 \mu\text{m}$ long. Pleurocystidia and cheilocystidia absent. Gill trama of interwoven hyphae $1.7-18.5 \mu\text{m}$ broad. Cuticle a poorly differentiated epicutis, the hyphae yellowish, more or less radial, non-gelatinous, slightly narrower than those of the context. Pileal trama of interwoven hyphae $2.5-8 \mu\text{m}$ broad; hypodermium absent. Clamp connections present in the gill and pileal tramas.

Habit and Habitat: Scattered in mixed forest.

Material Studied: ACAD 2639, Agriculture Experimental Station, Kentville, Kings Co., 20 Sept. 1953; ACAD 12248, Moose River, Pictou Co., 14 Oct. 1968.

Remarks: Kauffman (1918) listed a var. *pallidus*, identical with var. *pratensis* except for its whitish pileus. Hesler and Smith (1963) suggested that this variety was actually old, faded sporophores of variety *pratensis*, which decays slowly and persists for relatively long periods in good condition. Lange (1940) also mentioned var. *pallidus* B. & Br., claiming it to be intermediate between *H. pratensis* and *H. virgineus*, with which it often occurs.

The E.C. Smith Herbarium contains three Nova Scotian collections identified as *H. pratensis* var. *pallidus*, ACAD 3952, ACAD 7122, ACAD 7125. As there are no field data on these collections, it is advisable to adopt the viewpoint of Hesler and Smith (1963) and consider them *H. pratensis* var. *pratensis*. However, the spores of ACAD 3952 measure $7-9.5(11) \times 4-6 \mu\text{m}$, suggesting that there may indeed be a variety of *H. pratensis* transitional to *H. virgineus*.

Figs 18, 19. *H. murinus*. Fig. 18. H-8337 (K.A. Harrison), X 1.0. Fig 19. ACAD 12120, basidia and spores, redrawn by permission of the National Research Council of Canada from the *Canadian Journal of Botany*, 48, pp. 403-411, 1970.

Subsection MICROSPORI (Sm. & Hes.) Hes. & Sm.
N. Am. Spec. of *Hygrophorus*, p. 82. 1963.

Spores usually shorter than 6.5 μm globose or subglobose; lamellar trama interwoven.

Type species: *H. microsporus* Sm. & Hes.

Series MICROSPORI

Pileus not viscid.

8. *Hygrophorus canescens* Sm. & Hes.

Lloydia 5: 10. 1942.

Camarophyllus canescens (Sm. & Hes.) Singer, Lilloa 22: 148. 1951.

Figs 22, 23.

Basidiocarp: Pileus 2-5 cm broad, convex, the margin lobed; surface subglabrous, or overlain with a thin layer of appressed fibrils, dry, grayish brown (8F3) (ISCC 47) to light purplish gray or dull red (10C3) (ISCC 32); context gray, unchanging; odor and taste not distinctive. Lamellae subdecurrent, dull violet (17E3) (ISCC 228), subdistant. Stipe 4-6 cm long, 5-8 mm thick, tapering toward base, glabrous, pale purplish gray, lighter than pileus, in age nearly white overall; context pale gray, hollow at maturity.

Microscopic Structures: Spores 4-5.5(6) \times 4-5 μm , globose to subglobose, smooth, inamyloid. Basidia 25-35(40) \times 4.5 μm , subclavate, the sterigmata large, to 5 μm long. Pleurocystidia and cheilocystidia absent. Lamellar trama of interwoven hyphae 2-5 μm broad. Pileal cuticle undifferentiated, of interwoven hyphae 2-3 μm broad with numerous erect terminal cells giving appearance of a trichodermium, some terminal cells clavate and 4-5 μm broad at apex, others not expanded. Clamp connections present.

Habit and Habitat: In soil under hemlock, coniferous forest.

Material Studied: ACAD 10451, Aylesford Lake, Kings Co., 9 Aug. 1973; ACAD 10543, Aylesford Lake, Kings Co., 4 Sept. 1973; H-11889 (University of Michigan Herbarium), Aylesford Lake, Kings Co., 1 Sept. 1972.

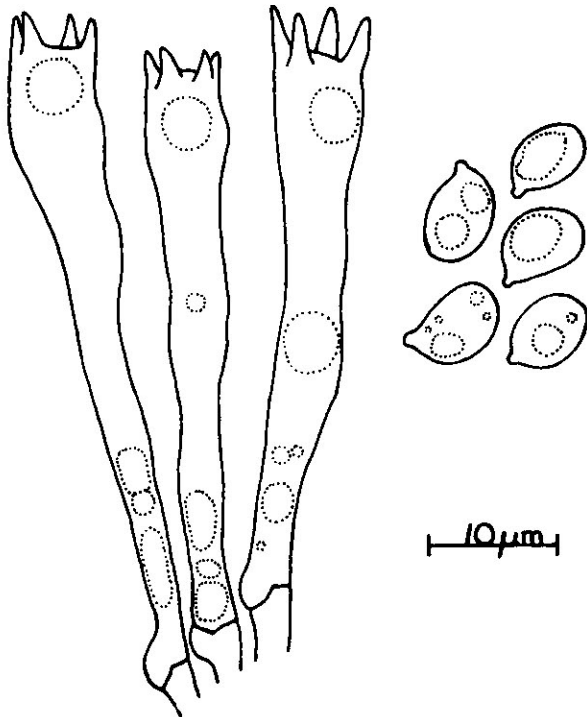
Remarks: This rare species was first reported from Canada (Grund & Harrison 1974) from specimens collected at Aylesford Lake, and to date has been found only in this area. In color, it resembles *H. rainierensis*, but lacks an odor of green corn. The canescent pileal surface is also distinctive.

Figs 20, 21. *H. pratensis* var *pratensis*. Fig 20. Smith 64526, X 1.0. from *North American Species of Hygrophorus*, by L.R. Hesler and A.H. Smith, (c) 1963 by the University of Tennessee Press, Knoxville, reprinted by permission of the University of Tennessee Press. Fig 21. ACAD 12248, basidia and spores.

20

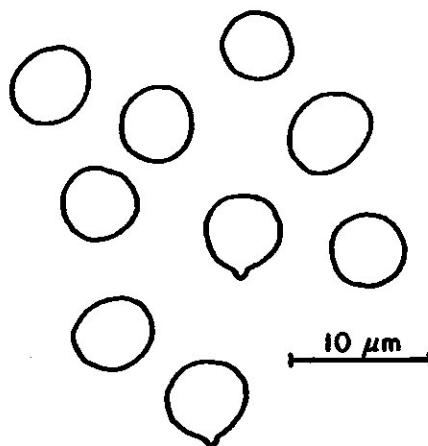


21





23



Figs 22, 23. *H. canescens*. Fig 22. ACAD 10543, X 1.0. Fig 23. ACAD 10451, basidia and spores.

Section HYGROTRAMA (Sing.) Hes & Sm.

N. Am. Spec. of *Hygrophorus*, p. 96. 1963.

Lamellar trama moderately interwoven; pileal cuticle hymeniform.

Type species: *H. dennisianus* (Sing.) Hes. & Sm.9. *Hygrophorus hymenocephalus* Sm. & Hes.

J. Elisha Mitchell Sci. Soc. 56: 311. 1940.

Camarophyllus hymenocephalus (Sm. & Hes.) M. Lange, Friesia 4: 63. 1950.*Armillariella hymenocephala* (Sm. & Hes.) Singer, Lilloa 22: 217. 1951.*Hygrotrama hymenocephalum* (Sm. & Hes.) Singer, Sydowia 12: 222. 1959.

Fig 24.

"Pileus 5-20(30) mm broad, convex to hemispheric, margin incurved, often becoming nearly plane, glabrous, hygrophanous, when wet 'snuff brown', 'light pinkish cinnamon', or 'tawny olive', fading to 'clay color' or 'pinkish buff', slowly darker and grayer, sometimes faded specimens 'drab' or 'olive brown' and atomate, finally becoming 'mummy brown', often the margin crenate or lobed. Context thick on the disc, thin elsewhere, waxy, pallid or concolorous with the surface; odor and taste none.

Lamellae broadly adnate, becoming decurrent, concolorous with the pileus when young, nearly so in age or 'hair brown', subdistant to distant, broad, edges pallid and even.

Stipe 2-8 cm long, 2-7 mm thick, concolorous with the pileus, darkening in age, finally becoming 'mummy brown', equal or tapering downward, fragile, terete or compressed, the apex canescent at first, elsewhere glabrous, solid becoming hollow.

Spores 4-6 x 4-5 μ , globose to subglobose, at times short-ellipsoid, often more or less flat-sided, smooth, pale yellowish in Melzer's reagent. Basidia 34-50(64) x 5-8 μ , 2- and 4-spored. Pleurocystidia and cheilocystidia not differentiated. Gill trama of interwoven hyphae 4-10 (16) μ broad, the hymenium appearing as a blackish line in sections of old material. Pileus with an epicutis of an irregular palisade of inflated cells (30)40-85 x (10)14-22(30) μ —an epithelium. Pileus trama of subparallel hyphae, radially disposed. No clamp connections." (Hesler & Smith 1963).

Habit and Habitat: "Gregarious to scattered on soil and decaying logs . . . in mixed and coniferous woods . . ." (Hesler & Smith 1963).

Remarks: J. Walton Groves collected this species at Aldershot, Kings Co., in 1952 (K.A. Harrison, pers. comm.). It has not been found since then in Nova Scotia.

10. *Hygrophorus subfuscescens* Sm. & Hes. var. *subfuscescens*

Sydowia 8: 317. 1954.

Figs 25, 26.

Basidiocarp: Pileus 0.6-2 cm broad, convex, margins nearly inrolled young, becoming broadly rounded and crenate at maturity, glabrous, moist to subviscid, hygrophanous, at first champagne (4B4) (ISCC 90), becoming honey yellow (4D6) (ISCC 95) to orange-white (5A2) (ISCC 73), and finally sunburn (6D5) (ISCC 57); context grayish brown to pallid, brittle; odor not distinctive, taste faintly subnauseous. Lamellae decurrent, clay (5D5) (ISCC 76), distant. Stipe 2-4 cm long, 2-3 mm thick, glabrous, pale yellow (ISCC 89).

Microscopic Structures: Spores 5-6 x 4.5-5 μ m, subglobose to globose, smooth, inamyloid. Basidia 35-40 x 5-7 μ m, clavate to subcylindric, 4-spored. Pleurocystidia and cheilocystidia absent. Pileal cuticle hymeniform, of clavate to nearly

subglobose, thin-walled cells 30-40 x 15-20 μm , hyaline to light brown in KOH. Lamellar trama moderately interwoven. Clamp connections not observed.

Habit and Habitat: On black muck in swampy areas of mixed woods.

Material Studied: ACAD 10542, Aylesford Lake, Kings Co., 4 Sept. 1973.

Remarks: This rare *Hygrophorus* has been collected only once in Nova Scotia. The distant lamellae, yellow glabrous stipe, hymeniform cuticle, and small globose spores are distinctive for this species. Hesler and Smith (1963) also mentioned the habitat of black muck; thus, the substratum also may be characteristic.

Section HYGROPHORUS

Lamellar trama divergent.

Type species: *H. eburneus* Fr.

Subsection HYGROPHORUS

Stipe with a gelatinous outer veil almost to apex.

Series CHRYSODONTINI (Sing.) Hes. & Sm.

N. Am. Spec. of *Hygrophorus*, p. 249. 1963.

Sporocarp white with yellow granules on stipe apex and pileus margin.

Type species: *H. chrysodon* (Fr.) Fr.

11. *Hygrophorus chrysodon* (Fr.) Fr.

Epicr. Myc., p. 320. 1838.

Agaricus chrysodon Fr., Syst. Myc. 1: 32. 1821.

Limacium chrysodon (Fr.) Kummer, Führ. in Pilzk., p. 118. 1871.

Figs 27, 28.

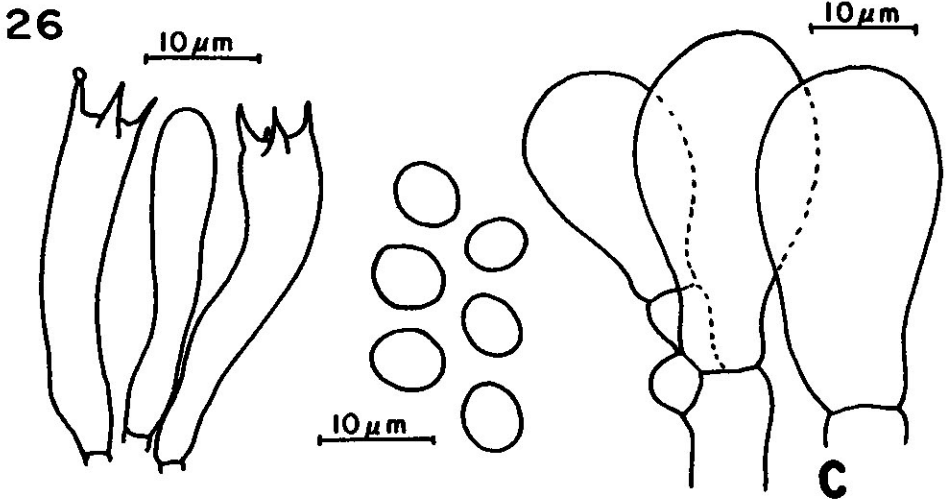
Basidiocarp: Pileus 1.5-4 cm broad, convex, expanding, margin incurved when young, viscid, soon dry, margin shaggy-tomentose young, pallid yellow-pruinose overall at first, later white and glabrous, with superficial yellow floccules and granules on margin, sometimes remaining yellow-pruinose on disc; context thin to moderately thick (1.5-3 mm on disc), white, spongy; odor and taste not distinctive. Lamellae short-decurrent, white, becoming pale creamy yellow or pallid tan in age, subdistant to rather close, moderately broad (2-4 mm), thin, edges even. Stipe 3.5-8 cm long, 5-7.5 mm thick at apex, whitish, with yellow floccules at apex, usually flushed yellowish over the middle, the yellow fibrils darkening in KOH and the white tissue yellowing, white within, apex dry, lower part briefly viscid from a thin, gelatinous veil, pruinose to glabrous beneath the gluten, annulus obsolete; subequal to terete, stuffed.

Microscopic Structures: Spores (7)7.5-11.5 x (3.5)4-6 μm , ellipsoidal, smooth, in-amyloid. Basidia 32-44 x 6-8(10.5) μm , narrowly clavate, 4-spored, the sterigmata stout and prominent, to 6 μm long. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 2.5-10 μm broad. Cuticle a thin ixocutis, 30-65(138) μm deep, of gelatinous, generally radial, repent to erect hyphae 1.7-3.5(6) μm broad, topped by scattered masses of yellowish hyphae and amorphous matter. Pileal trama of radial, slightly interwoven hyphae 3.5-17.5 μm broad; hypodermium absent. Clamp connections present in the cuticle, gill trama, and pileal trama.

Habit and Habitat: Solitary to subcespitate in coniferous woods. Rare.



Fig 24. *H. hymenocephalus*. H-10383 (K.A. Harrison), X 2.5.



Figs 25, 26. *H. subfuscescens* var. *subfuscescens*. Fig 25. ACAD 10542, X 1.25. Fig 26. ACAD 10542, basidia, spores, and hymeniform cuticular cells (C) of the pileus.

Material Studied: ACAD 12204, Washabuck, Victoria Co., 25 Sept. 1968; ACAD 12238, near Denver, Guysborough Co., 14 Oct. 1968.

Remarks: *Hygrophorus chrysodon* is easily distinguished by the yellow granules on the white pileus margin and stipe apex. Like most local species of subsection *Hygrophorus*, it soon loses its viscid stipe veil, but sectioning will reveal gelatinous remnants.

Series HYGROPHORUS

Sporocarp entirely white to whitish before maturity; lamellar trama divergent; stipe with a gelatinous outer veil.

12. *Hygrophorus eburneus* (Fr.) Fr.

Epicr. Myc., p. 321. 1838.

Agaricus eburneus Fr., Syst. Myc. 1: 33. 1821.

Limacium eburneum (Fr.) Kummer, Führ. in Pilzk., p. 119. 1871.

Figs 29, 30.

Basidiocarp: Pileus 2-5.5 cm broad, obtuse or convex young, later plane, the disc at times depressed, viscid fresh, soon resinous to dry, glabrous, white, tending to very pale yellowish on disc; context thick (3-5 mm on disc), white, compact; odor and taste not distinctive. Lamellae adnate young, then uncinatate and finally decurrent, creamy white, drying pale ochraceous, subdistant, moderately broad (2-6 mm), edges even. Stipe 4.5-6 cm long, 4-9 mm thick at apex, white, faintly tomentose at apex, viscid below, soon dry and innately fibrillose, equal or narrowed upwards, white within, solid or stuffed.

Microscopic Structures: Spores (6)6.5-8.5(10) x 4-6 μ m, short-elliptical, occasionally tending to subglobose, or obovate, or broadened at the apicular end, smooth, inamyloid. Basidia (23)30-60 x 5-11 μ m, narrowly clavate, rarely stout, 4-spored, sometimes 2-spored as well, the sterigmata large and prominent, up to 8 μ m long, mostly about 6 μ m. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 2.5-21 μ m broad. Cuticle an ixocutis, 60-140 μ m deep, the hyphae 2.3-4.5 μ m broad, gelatinous, tangled, generally repent with several to many ascending free ends. Pileal trama radial and subparallel; hypodermium absent. Stipe surface with a few scattered, subgelatinized hyphae, but no definite gelatinous sheath persisting after maturation or drying. Clamp connections present on the hyphae of the cuticle, gill trama, pileal trama, stipe surface and context.

Habit and Habitat: Gregarious in moss (*Pleurozium* sp.) under hemlock.

Material Studied: ACAD 310, ravine, Agriculture Experimental Station, Kentville, Kings Co., 9 Sept. 1933; ACAD 1408, Agriculture Experimental Station, Kentville, Kings Co., 15 Oct. 1951; ACAD 12107, ravine, Agriculture Experimental Station, Kentville, Kings Co., 4 Oct. 1967.

Remarks: The gelatinous veil covering the stipe is thin and evanescent, and the apparently dry stipe will lead to identification of the mushroom as *H. piceae* Kühn. & Romagn. or *H. sordidus* Pk. of Series *Clitocyboides* Hes. & Sm. in Subsection *Camarophylli*. Sectioning of the stipe is very important if the presence of a gelatinous veil is suspected. In the field, this striking white fungus may be mistaken for *H. niveus*, *H. borealis* f. *borealis*, or even *H. virgineus* if the pileal gluten has dried. Examination of the lamellar trama will easily separate it from these three members of Section *Camarophyllopsis*.

Groves (1962), Hesler and Smith (1963), and Wakefield and Dennis (1950) all

described the pileus as pure white. The yellow tinge apparent in our material also appears in color illustrations of *H. eburneus* by Michael and Schulz (1927) and Poelt and Jahn (1963), and may have been occasioned by age or partial drying of the sporocarps.

Murrill (1916) discussed *H. eburneus* under synonymy with *H. jozzulus* (Scop.) Murrill.

Series AUREI (Bataille) Hes. & Sm.

N. Am. Spec. of *Hygrophorus*, p. 273, 1963.

Pileus yellow, orange, or red, at least on disc; lamellar trama divergent; stipe with gelatinous outer veil.

Type species. *H. aureus* Arrh. in Fr.

13. *Hygrophorus speciosus* Pk. var. *speciosus*

N. Y. State Mus. Ann. Rep. 29: 43. 1878.

Figs 31, 32.

Basidiocarp: Pileus 2.5 cm broad, "convex, expanding, at times umbonate, . . ." (p. 277, Hesler & Smith 1963), at length depressed, viscid, soon dry and glossy, obscurely virgate near disc, red orange (ISCC 34) at first, fading to yellow-orange on margin (ISCC 48, 66); context rather thin (1.5 mm on disc in depressed pileus), whitish to pallid yellowish, soft; odor and taste not distinctive. Lamellae adnate to decurrent, uniformly yellowish-white, subdistant, moderately broad (2.5 mm), edges even. Stipe 3.5 cm long, 4 mm thick at apex, whitish, sheathed over lower two-thirds by a thin, evanescent gelatinous veil which dries in yellow streaks and terminates above in a narrow, tawny, gelatinous, fugacious ring, pruinose to fibrillose above, subequal, slightly enlarged downwards, pallid yellow within, solid.

Microscopic Structures: Spores 7.5-10.5 x 4.5-6 μm , ellipsoidal, occasionally narrowed toward the apiculus, smooth, inamyloid. Basidia 37-57 x 7-10 μm , long-clavate, 4-spored, the sterigmata up to 6 μm long. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 3.5-6(10) μm broad. Cuticle a narrow ixotrichodermium of gelatinous, more or less erect hyphae 3-6 μm broad, arising from a substratum of yellowish, repent hyphae, in places remaining repent after drying and then forming an ixocutis. Pileal trama radial and slightly interwoven; hypodermium absent. Clamp connections present in the cuticle, gill trama, and pileal trama.

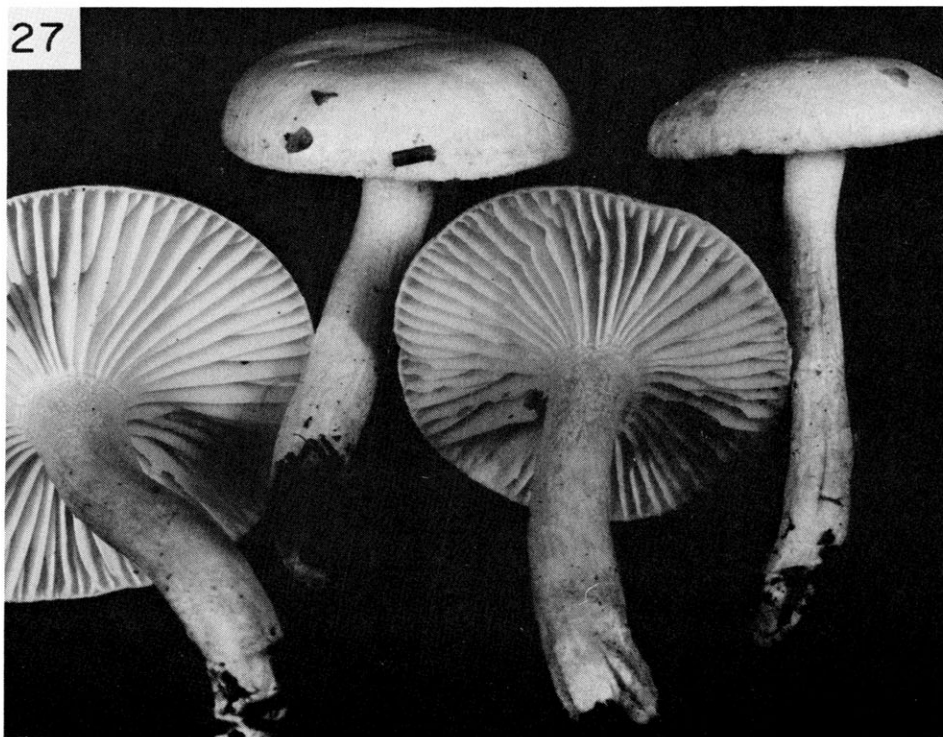
Habit and Habitat: Solitary among mosses under larch in spruce-larch forest.

Material Studied: ACAD 12233, River Head, Queens Co., 11 Oct. 1968.

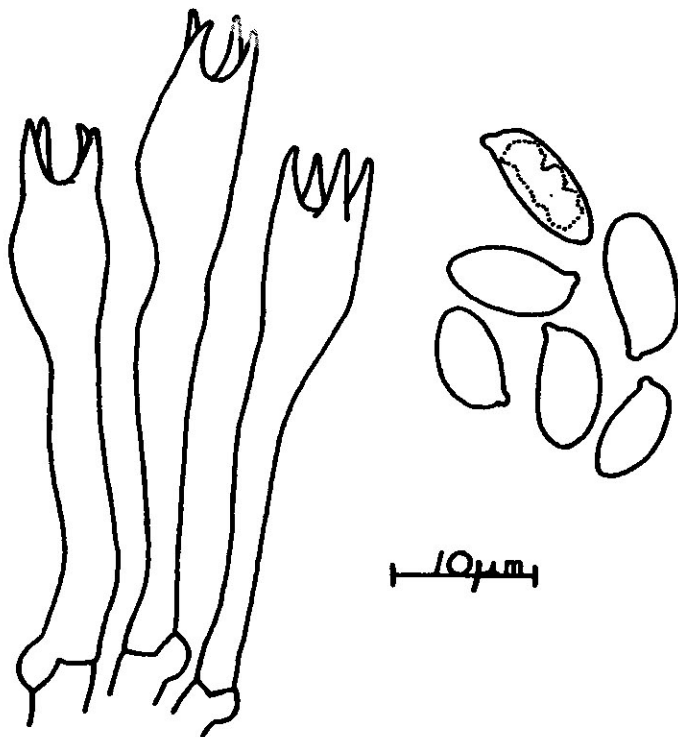
Remarks: This species is evidently rare in our area. The single, small but mature carpophore on which the above description is largely based, is the only specimen of *H. speciosus* taken in Nova Scotia from 1968 to date, despite considerable collecting in habitats with larch.

Hygrophorus speciosus var. *speciosus* is one of several closely related and nearly identical fungi in the *H. aureus*-*H. speciosus* group. The only other member of this complex reported in North America is *H. speciosus* var. *kauffmanii* Hes. & Sm.

27



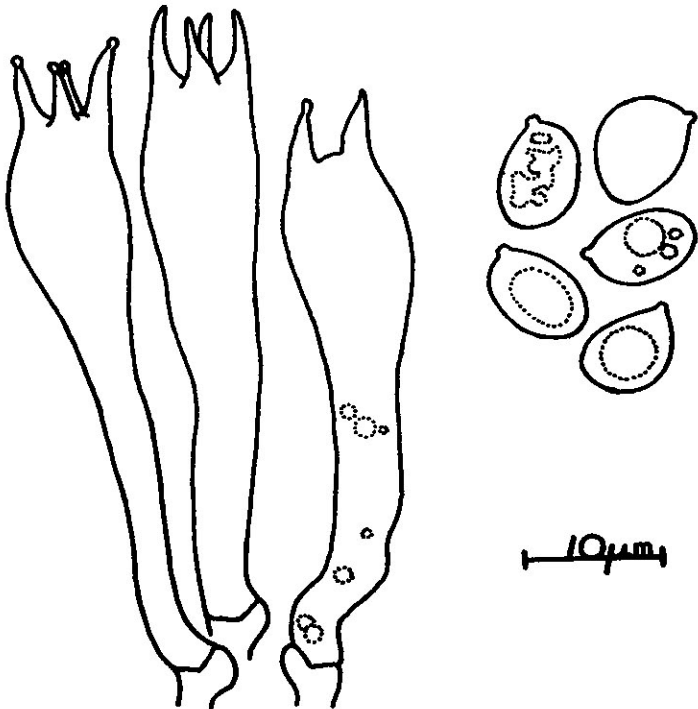
28



29



30

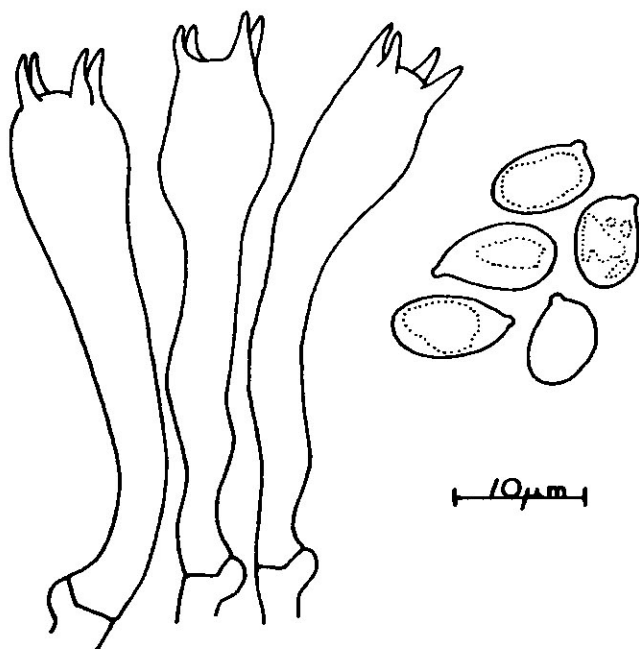


Figs 29, 30. *H. eburneus*. Fig 29. Courtesy of K.A. Harrison, X .8. Fig 30. ACAD 12107, basidia and spores.

31



32

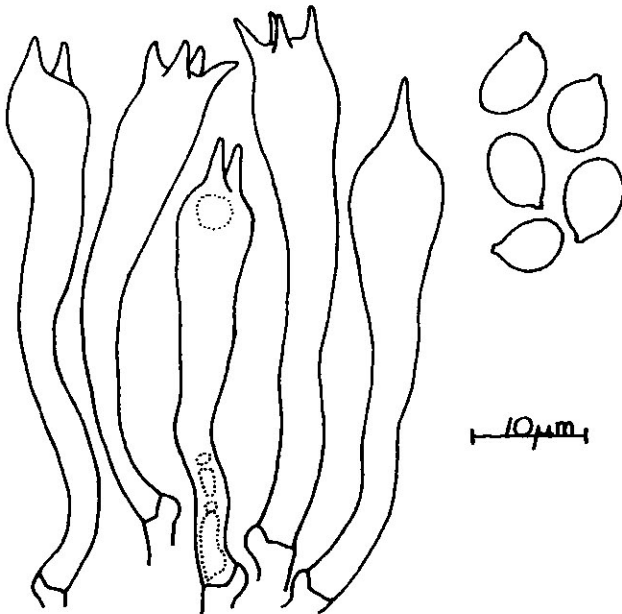


Figs 31, 32. *H. speciosus* var. *speciosus*. Fig 31. Smith 58294, X .65. Fig 32. ACAD 12233, basidia and spores.

33



34



Figs 33, 34. *H. flavodiscus*. Fig 33. ACAD 12274, X .75. Fig 34. ACAD 12274, basidia and spores, redrawn by permission of the National Research Council of Canada from the *Canadian Journal of Botany*, 48, pp. 403-411. 1970.

(formerly *H. coloratus* Pk.). It differs from the typical variety in the thin, fibrillose inner veil apparent on the stipes of young sporophores, and in being associated with other conifers besides larch (Hesler & Smith 1963; Peck 1908). However, in the original description of *H. coloratus*, Peck (1908) suggested that this and other members of the complex may be a single, variable species.

The E.C. Smith herbarium contains a single collection of *H. aureus* (ACAD 5263, Gore, Hants Co., 1963), found under larch. As *H. aureus* is a European species associated with hardwoods, the Nova Scotian collection is probably *H. speciosus* var. *speciosus*.

14. *Hygrophorus flavodiscus* Frost apud Pk.

N. Y. State Mus. Ann. Rep. 35: 134. 1884.

Figs 33, 34.

Basidiocarp: Pileus 2.5-5.5 cm broad, hemispheric young with involute margin, becoming broadly convex, sometimes subumbonate, finally planoconvex to depressed, glutinous when moist, the gluten thick, frequently granular and rubbery, glabrous beneath, uniformly butter yellow (4A5) (ISCC 86) or maize yellow (4A6) (ISCC 83) in buttons, lightening to pallid yellow on the margin as the pileus expands, becoming streaked or dotted ochraceous yellow on drying; context thick (3-10 mm on disc), soft, white; odor and taste mild, not distinctive. Lamellae short-decurrent, at times adnate, very pale yellowish white, subdistant to rather close, moderately broad (3-4 mm) and thin, edges even. Stipe 4-9 cm long, 7-16 mm thick at apex, sheathed almost to apex by a scant, white, fibrillose inner veil and a copious, yellowish, glutinous outer veil, white and tomentose to silky above a rudimentary, evanescent, superior annulus, in age whitish and streaked and laved below with yellow veil fragments, equal, straight or curved; context white, pale greenish in KOH, solid.

Microscopic Structures: Spores 6-8.5 x 3.5-5 μm , short-elliptical to obovate, smooth, inamyloid. Basidia 31-55 x 6.5-8 μm , slender, clavate, sometimes flexuous, mostly 2- and 4-spored, rarely 1-spored, the sterigmata stout, up to 6 μm long. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 4-20 μm broad. Cuticle a very thick (450-1150 μm) ixotrichodermium of narrow, branched, gelatinous hyphae, not forming a palisade. Pileal trama radial and slightly interwoven; hypodermium none. Clamp connections present in the cuticle, gill trama, and pileal trama.

Habit and Habitat: Gregarious in pine woods.

Material Studied: ACAD 12274, Centreville, Kings Co., 27 Oct. 1968.

Remarks: The copious gluten covering the pileus and stipe is almost entirely responsible for the conspicuous yellow hues of fresh material. The colors reported above do not agree with those given by Peck (1907), Murrill (1916), Kauffman (1918), or Hesler and Smith (1963), all of whom described a white pileus with a yellow or red-yellow disc, and a white stipe plus or minus yellow stains. However, Bigelow (1959) reported *H. flavodiscus* as even darker yellow overall than the Nova Scotian specimens. Color in *H. flavodiscus* is intensified considerably by drying (Hesler and Smith 1963, Smith and Hesler 1939), but the bright colors of ACAD 12274 are not due to desiccation as the specimens were in prime condition when collected. Rather, the greater thickness of gluten probably accounts for the discrepancy; if the gelatinous layers in ACAD 12274 were as thin as indicated by Hesler and Smith (1963) for this species (180-350 μm), the colors then would be similar to those described by Peck and others.

A second difference in ACAD 12274 is the absence of pinkish tints on the gills, in all stages of development. Whereas Peck, the author of the species, described the

gills as "... sometimes with a flesh-colored tint" (Peck 1907), we surmise the feature is not a critical one.

The double veil of the stipe is discernible only in the button stage, in which a thin coating of white fibrils lines the inner surface of the gluten extending between the stipe and pileus margin.

Spore size is a fairly definitive feature. No other macroscopically similar species has spores this small. The presence of 2-spored basidia in ACAD 12274 does not appear to alter spore size from the typical range for *H. flavodiscus*.

Collection ACAD 12271 (under pine, ravine, Agriculture Experimental Station, Kentville, Kings Co., 15 Oct. 1968) is macroscopically identical with the material described above. Microscopically, it differs in having spores (6)6.5-10.5(11.5) x 3.5-7 μm , although the basidia are still typically 2- and 4-spored as in ACAD 12274. This variant is intermediate between *H. flavodiscus* and the similar but larger-spored *H. gliocyclus*.

15 *Hygrophorus gliocyclus* Fr.

Monogr. Hymen. Suec. 2: 311. 1863.

Figs 35, 36.

Basidiocarp: Pileus 3-9 cm broad, convex and expanding, or broadly rounded at margins, subumbonate, glabrous, glutinous, gluten separable; light brown, chamois color (ISCC 76) to buff (ISCC 73); context solid and thick under umbo, becoming thin at margin, odor and taste not distinctive. Lamellae adnate to decurrent at maturity, subdistant, yellowish buff (ISCC 90). Stipe 2-6 cm long, 6-15 mm thick, equal and abruptly tapered at base, surface with a glutinous sheath that forms an annulus near the apex, above the annulus floccose or minutely fibrillose, apex white, remainder chamois color (ISCC 76) under the hyaline gluten; context solid, pallid.

Microscopic Structures: Spores 8-10(12.5) x 4-5 μm , elliptical, in profile inequilateral or approaching subfusiform, smooth, inamyloid. Basidia 35-44 x 7.5-9.5 μm , narrowly clavate, mostly 4-spored, at times 2-spored also, the sterigmata slender, up to 6 μm long. Pleurocystidia and cheilocystidia absent. Gill trama of narrow to inflated divergent hyphae 3-22 μm broad. Cuticle an ixotrichodermium about 170 μm thick, sometimes rehydrating as an ixocutis, the hyphae gelatinous, 2.3-5.5 μm broad, erect to repent, tangled. Pileal trama of radial, subparallel hyphae similar to those of gill trama; hypodermium absent. Stipe surface with a definite zone, 100-130 μm thick, of loose, repent, longitudinal or tangled gelatinous hyphae similar to those of cuticle. Clamp connections present in the cuticle, gill and pileal tramas, stipe veil, and stipe context.

Habit and Habitat: Gregarious in coniferous woods. Rare.

Material Studied: ACAD 292, Annapolis Royal, Annapolis Co., 15 Oct. 1932.

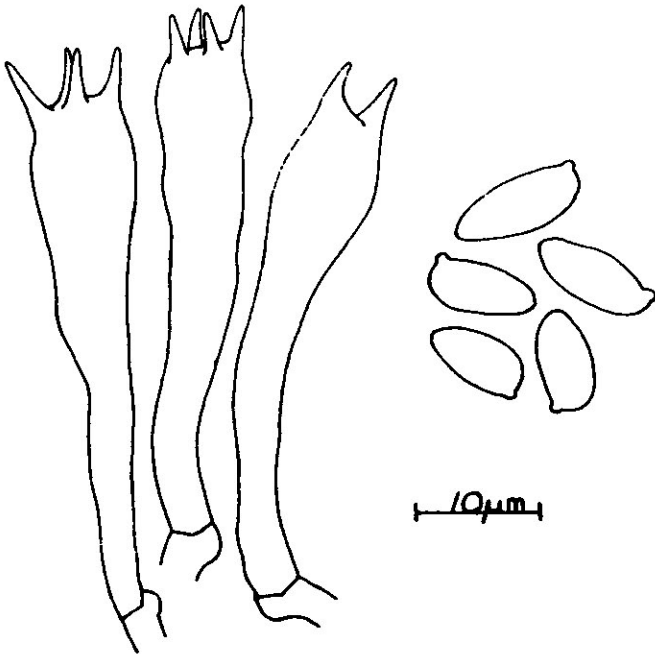
Remarks: The presence of this species in Nova Scotia is questionable. We did not encounter it in the field, and the single collection of it in the E.C. Smith herbarium bears the note: "A. H. Smith says 'This may be a slender specimen of *H. gliocyclus* Fr.'". The microscopic data seem to indicate that Smith is correct.

Hygrophorus gliocyclus is macroscopically very similar to *H. flavodiscus* as we know it, with its butterscotch-yellow pileus, its whitish lamellae, and its copious gluten. However, stipe coloration in *H. gliocyclus* is borne by hyphae beneath hyaline gluten, while in *H. flavodiscus* the color is carried in the gelatinous veil itself. In the absence of fresh specimens with well-developed stipe veils, spore size is the only reliable feature distinguishing the two species.

35



36

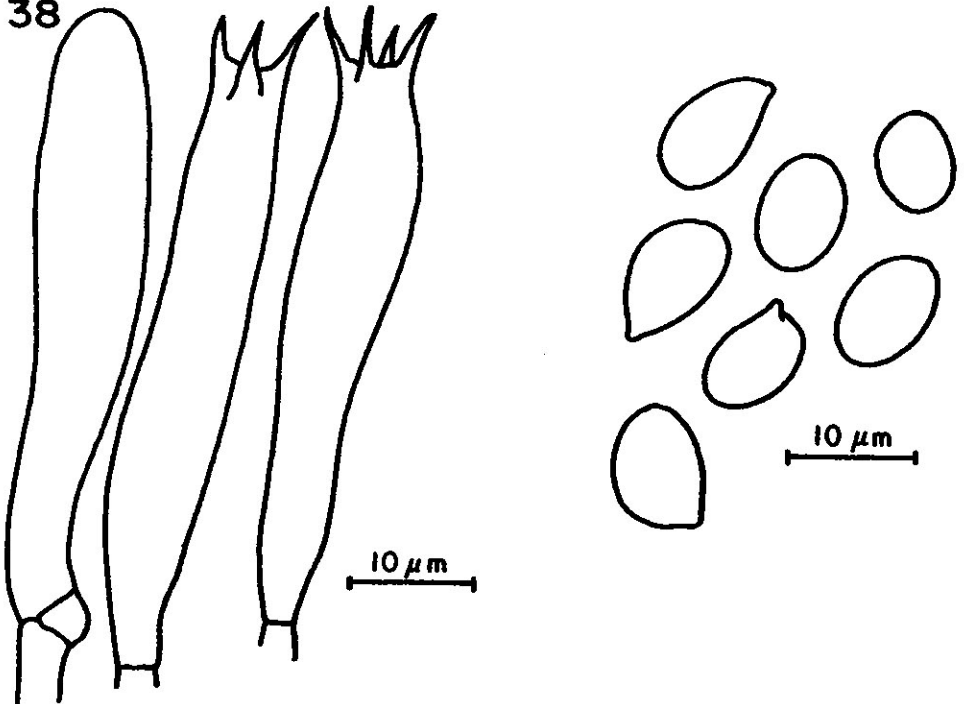


Figs 35, 36. *H. gliocyclus*. Fig 35. Smith 65644, X .75. Fig 36. ACAD 292, basidia and spores.

37



38



Figs 37, 38. *H. hypothejus*. Fig 37. DG 1670 (D.W. Grund), X 1.0. Fig 38. ACAD 5459, basidiole, basidia, and spores.

16. *Hygrophorus hypothejus* (Fr.) Fr.

Epicr. Myc., p. 324. 1838.

Agaricus hypothejus Fr., Syst. Myc. 1: 35. 1821.*Hydrocybe arenicola* Murr. Mycologia 4: 208. 1912.*Hygrophorus subpustulatus* (Murr.) Murr. Mycologia 4: 210. 1912.*Limacium hypothejum* (Fr. ex Fr.) Kummer, Führ. in Pilzk., p. 119. 1871.

Figs 37, 38.

Basidiocarp: Pileus 2-8 cm broad, convex becoming plane, umbonate, viscid, glabrous or with appressed fibrils at margin, hair brown (5E4) (ISCC 80) on disc, shading to pastel green (30A4) (ISCC 121) at margin, in old age becoming yellowish with occasional development of reddish shades; context thin, pallid, becoming pale yellow under pellicle; odor and taste not distinctive. Lamellae decurrent, pale yellow to pale green, mostly distant. Stipe 7-16 cm long, 5-12 mm thick, annulate, silky fibrillose and pale yellow (ISCC 104) above annulus, glutinous to viscid with olive brown (ISCC 95) to orange shades below; context pale yellowish, firm, solid.

Microscopic Structures: Spores 8-10(12) x 5-7 μm , ellipsoid, smooth, inamyloid. Basidia 40-50 x 4-8 μm , cylindric to subcylindric, 4-spored. Pleurocystidia and cheilocystidia absent. Pileal surface a viscid pellicle 250-300 μm thick, of tangled gelatinous hyphae 3-5 μm thick, with numerous clamp connections. Lamellar trama divergent from a mediostrate of parallel hyphae. Pileal trama of interwoven, radial-ly oriented hyphae.

Habit and Habitat: Gregarious under *Pinus banksiana* Lamb.

Material Studied: H-12777 (University of Michigan Herbarium), Isle Madame, Richmond Co., 14 Oct. 1977; ACAD 5459, Priest Lake, Idaho, U.S.A.

Remarks: This species has been collected 3 times in Nova Scotia—twice on Isle Madame, and once in Cape Breton Highlands National Park. However, the specimens are not deposited locally, and thus the microscopic details illustrated are taken from the Idaho collection cited above. As we are familiar with *H. hypothejus* from collections (DWG's) made in the Pacific Northwest of the United States, we recognize the presence of this mushroom in Nova Scotia. Its habit of growing under two-needle pines is characteristic.

Series OLIVACEOUMBRINI (Fr.) Hes. & Sm.

N. Am. Spec. of *Hygrophorus*, p. 283. 1963.

Pileus umber, olive brown, gray-brown, or gray, at least on the disc; lamellar trama divergent; stipe with gelatinous outer veil.

Type species: *H. olivaceoalbus* (Fr.) Fr.

17. *Hygrophorus olivaceoalbus* (Fr.) Fr. var. *olivaceoalbus*

Epicr. Myc., p. 324. 1838.

Agaricus olivaceoalbus Fr., Syst. Myc. 1: 35. 1821.*Limacium olivaceoalbum* (Fr. ex Fr.) Kummer, Führ. in Pilzk., p. 119. 1871.

Figs 39, 40.

Basidiocarp: Pileus 2-5 cm broad, convex to obtuse young, expanding, at times subumbonate, finally plane with a low to pronounced umbo or with uplifted margin,

glutinous to viscid when fresh, drying appressed fibrillose, virgate when expanded, blackish brown on disc, paling to tobacco brown (5F6), (ISCC 78), mustard brown (5E6) (ISCC 77), hair brown (5E4) (ISCC 80), or dark blond (5D4) (ISCC 77) on margin; context moderately thick (2-7 mm on disc), white, sometimes tinged brownish under the pellicle, soft, compact; odor and taste not distinctive. Lamellae adnate and unciniate, becoming short-decurrent, white, subdistant, thickish, moderately broad (2.5-5.5 mm), occasionally intervenose or forked near margin. Stipe 3.5-7 cm long, 6-13 mm thick at apex, sheathed almost to apex by two veils: (1) the outer veil gelatinous, soon disappearing, leaving a superior, thin, brown, glutinous to membranous, fugacious ring; (2) the inner veil of appressed fuscous to medium brown fibrils similar to those of pileus, often breaking into ragged, encircling zones or patches as the stipe elongates; apex dry, white, silky to pruinose; white within, equal or enlarged downwards, at times slightly expanded at annular zone, solid.

Microscopic Structures: Spores (8.5)9.5-12.5(14.5) x 4.5-8 μm , ellipsoidal, smooth, inamyloid. Basidia 48-70(78) x 6.5-13.5 μm , narrowly clavate, 4-spored, the sterigmata stout and prominent, up to 10(14.5) μm long. Pleurocystidia and cheilocystidia absent. Gill trama divergent from a central strand, the hyphae slender to inflated, 3.5-24.5 μm broad. Cuticle an ixocutis 70-500 μm thick, the hyphae 2.5-6 μm broad, light brown, gelatinous, radial and repent or loosely interwoven, branched, arising from a compact layer of brownish hyphae transitional to the context. Pileal trama of radial, slightly interwoven hyphae similar to the gill tramal hyphae; hypodermium absent. Clamp connections present in the cuticle, gill trama, and pileal trama.

Habit and Habitat: Scattered to gregarious in moss or coniferous litter in spruce or hemlock woods. Frequent.

Material Studied: ACAD 12110, Wolfville, Kings Co., 13 Oct. 1967; ACAD 12210, Kentville Ravine, Kings Co., 30 Sept. 1968; ACAD 12261, Aspen, Guysborough Co., 14 Oct. 1968; ACAD 12282, North Mountain, Kings Co., 29 Oct. 1968.

Remarks: This species is distinguished by its viscid, brown pileus and the brown stipe sheath. *H. inocybiformis* bears a superficial resemblance but has a dry pileus and larger spores.

The transience of the gelatinous veil on the stipe presents problems in identification, as there are similar species with dry stipes in Subsection *Camarophylli*. Examination of sporophores in all stages of development showed that in local material, there is a thin, viscid coating at first, but this veil fragments and disappears as the stipe elongates, leaving only a narrow, glutinous to moist ring. In old sporophores, even this rudimentary annulus sometimes vanishes.

In keeping with the present criteria of the variety (Hesler and Smith, 1963), we are including only 4-spored forms with spores about 9-12 μm long in our description of var. *olivaceoalbus*. Forms with 2- and 3-spored basidia and larger spores are interpreted as the *Hygrophorus olivaceoalbus* complex.

18. *Hygrophorus fuliginus* Frost apud Pk.

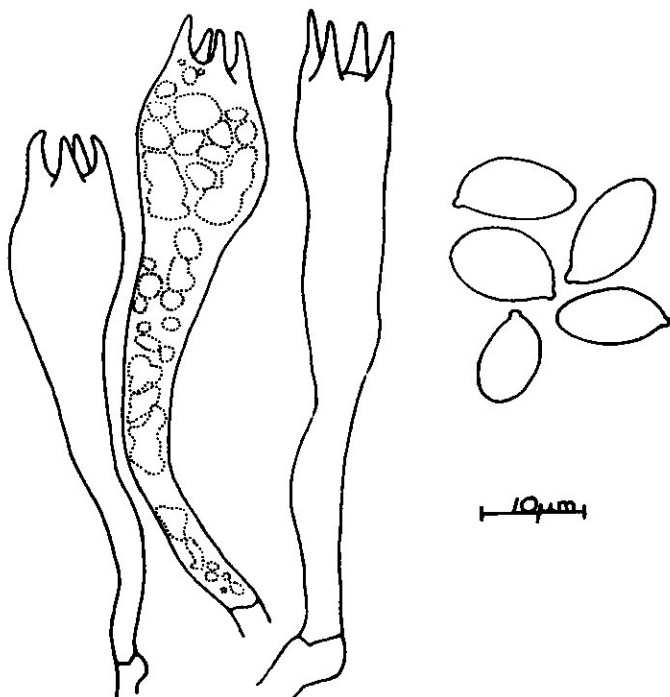
N.Y. State Mus. Ann. Rep. 35: 134. 1884.

Figs 41, 42.

Basidiocarp: Pileus 4-11 cm broad, convex expanding to plane at maturity; surface glabrous, overlain with a hyaline mantle of gluten, blackish brown (ISCC 62) to dark olive brown (ISCC 96), becoming lighter at margins, sometimes drying a lighter olive brown (ISCC 91); context firm, white; taste and odor not distinctive. Lamellae adnate to subdecurrent, pallid, subdistant at maturity. Stipe 4-9 cm long, 8-20 mm thick, equal or tapering at base, white, glabrous to minutely fibrillose at apex, tomentose below, and overlain by a coat of hyaline gluten; context solid and white.



40

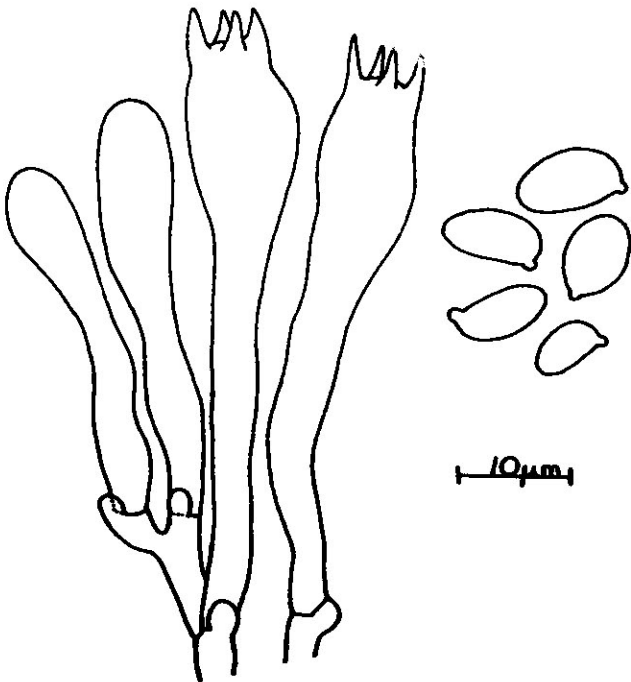


Figs 39, 40. *H. olivaceoalbus* var. *olivaceoalbus*. Fig 39. ACAD 12282, X 1.0. Fig 40. ACAD 12210, basidia and spores.

41



42



Figs 41, 42. *H. fuligineus*. Fig 41. Smith 33952, X .8. Fig 42. ACAD 2630, basidioles, basidia, and spores.

Microscopic Structures: Spores (7)8-9.5 x (4)4.5-6 μm , short-elliptical, smooth, inamyloid. Basidia 42-58 x 8-9.5 μm , narrowly clavate, 4-spored, the sterigmata up to 4.5 μm long. Pleurocystidia and cheilocystidia absent. Gill trama divergent from a colorless to pallid yellowish central strand, the hyphae 3.5-9.5 μm broad, rather sparingly septate. Cuticle an ixotrichodermium 345-520 μm deep, the hyphae 2.3-4.5 μm broad, gelatinous, generally erect and tangled, almost forming a palisade, colorless to very pale yellow as revived in KOH, merging beneath with yellow-brown hyphae. Pileal trama of radial, subparallel to rather interwoven hyphae 4.5-19 μm broad. Stipe surface covered with tangled, roughly longitudinal, gelatinous hyphae 2.3-6 μm broad, merging with the context hyphae; no discrete inner fibrillose veil. Clamp connections present in the cuticle, gill and pileal tramas, stipe veil, and stipe context.

Habit and Habitat: "On soil, in conifer and mixed woods, . . ." (Hesler & Smith 1963).

Material Studied: ACAD 2630, Aldershot, Kings Co., 10 Sept. 1953.

Remarks: *Hygrophorus fuliginus* is distinguished by its viscid, blackish to grayish brown pileus and its viscid, whitish stipe. The stipe gluten is relatively persistent in contrast with that of most other species in Subsection *Hygrophorus*. Once the gluten dries, old, faded sporophores resemble *H. agathosmus* but lack an amygdaline odor.

Bresadola (1928) considered *H. fuliginus* conspecific with *H. limacinus* Fr., a paler brown species with larger spores (Hesler and Smith, 1963). Bresadola's description of *H. limacinus* could apply to *H. fuliginus*, but his illustration does not represent the North American concept of the latter species.

Murrill (1916) reduced *H. fuliginus* to synonymy with *H. hypothejus*. Most mycologists separate these two species on the basis of the yellow lamellae and the pileal color changes in *H. hypothejus*.

Hesler and Smith (1963) mentioned a well-defined hypodermium of brownish, interwoven hyphae. This could be the yellow-brown subcuticular hyphae interpreted in our description as part of the colored cuticle.

19. *Hygrophorus tephroleucus* (Fr.) Fr. var. *tephroleucus*.

Epicr. Myc., p. 325. 1838.

Agaricus tephroleucus Fr., Syst. Myc. 1: 34. 1821.

Limacium tephroleucum (Fr.) Kummer, Führ. in Pilzk., p. 119. 1871.

Figs 43, 44.

Basidiocarp: Pileus 0.5-3 cm broad, hemispheric with involute margin when young, expanding convex to planoconvex or convex-depressed, at times subumbonate or with a small, pointed umbo, viscid to glutinous when moist, glabrous to appressed fibrillose beneath the gluten, disc at times appressed floccose, margin often becoming obscurely crenate, beaver (5F4) (ISCC 59), hair brown (5E4) (ISCC 80), nougat (5D3) (ISCC 60), sallow (4D3) (ISCC 91), or beige (4C3) (ISCC 90), darker on disc, occasionally zonate; context thin (1-3 mm on disc), white or tinged cinereous under pellicle, soft; odor and taste not distinctive. Lamellae adnate to subdecurrent, at times unciniate, white, subdistant, thickish, moderately broad (1-5 mm), rarely forked near the stipe, edges even or eroded. Stipe 2-6 cm long, 2-7 mm thick at apex, at first white and pruinose to fibrillose overall, later with minute cinereous apical squamules and basal fibrils, finally minutely fuscous-squamulose over entire length except for embedded portion of base, the ornamentation coarser above, base slightly viscid in young specimens, very soon dry, equal or tapering downward, rarely narrowed above, sometimes flexuous, white within, stuffed or solid.

Microscopic Structures: Spores (7)7.5-10.5 x 4.5-6 μm , short-elliptical, smooth, in-

amyloid. Basidia 32-55 x 6.5-11 μm , narrowly clavate, 4-spored, the sterigmata slender, up to 6 μm long. Brachybasidioles rare, occurring sporadically and in groups, similar to basidioles but sphaeropedunculate, 10-14 μm broad at apex, intergrading with normal basidioles, rarely initiating sterigmata. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 3-14 μm broad. Cuticle an ixocutis 40-175 μm deep, the hyphae 1.7-5.5 μm broad, gelatinous, light fuscous, more or less repent or occasionally erect, radial and loosely interwoven, underlain by a compact layer of brownish hyphae transitional to the context. Pileal trama of radial, slightly interwoven hyphae; hypodermium not seen. Stipe surface of narrow, light brown hyphae here and there reflexed and aggregated into squamules, the terminal elements cylindrical, occasionally very slightly gelatinized but not forming a discrete gelatinous veil. Clamp connections present in the cuticle, gill and pileal tramas, stipe surface, and stipe context.

Habit and Habitat: Scattered to gregarious on soil or among mosses (*Pleurozium*, *Sphagnum*) under spruce, hemlock, or other conifers.

Material Studied: ACAD 12232, River Head, Queens Co., 11 Oct. 1968; ACAD 12242, near Denver, Guysborough Co., 14 Oct. 1968; ACAD 12279, Gaspereau Valley, Kings Co., 29 Oct. 1968.

Remarks: *Hygrophorus tephroleucus* var. *tephroleucus* is a small mushroom distinguished by its viscid, brown to gray-brown pileus and its cinerescent to finely fuscous-squamulose stipe. In both these respects, it resembles *H. pustulatus* which is larger and has a more coarsely ornamented stipe. Spore size does not vary significantly between the two. For further comparison of these two species, see *H. pustulatus*.

Young sporophores may be mistaken for small specimens of *H. agathosmus*, in which the stipe is also white and cinerescent. However, *H. agathosmus* has a decidedly gray pileus and a pronounced amygdaline odor.

Bresadola (1928) and Lange (1940), while not definitely describing the stipe as dry, failed to mention any viscosity. The thin layer of gluten disappears very soon, depending on weather conditions, and thus, the stipe appears dry. Consequently, the species may be keyed in both Subsections *Hygrophorus* and *Camarophylli*.

Lange (1940) noted that *H. tephroleucus* is the smallest of the *Limacium* group (now Section *Hygrophorus*).

20. *Hygrophorus pustulatus* (Fr.) Fr.

Hymen. Eur., p. 411. 1874.

Agaricus pustulatus Fr., Syst. Myc. 1: 34. 1821.

Limacium pustulatum (Fr.) Kummer, Führ. in Pilzk., p. 119. 1871.

Figs 45, 46.

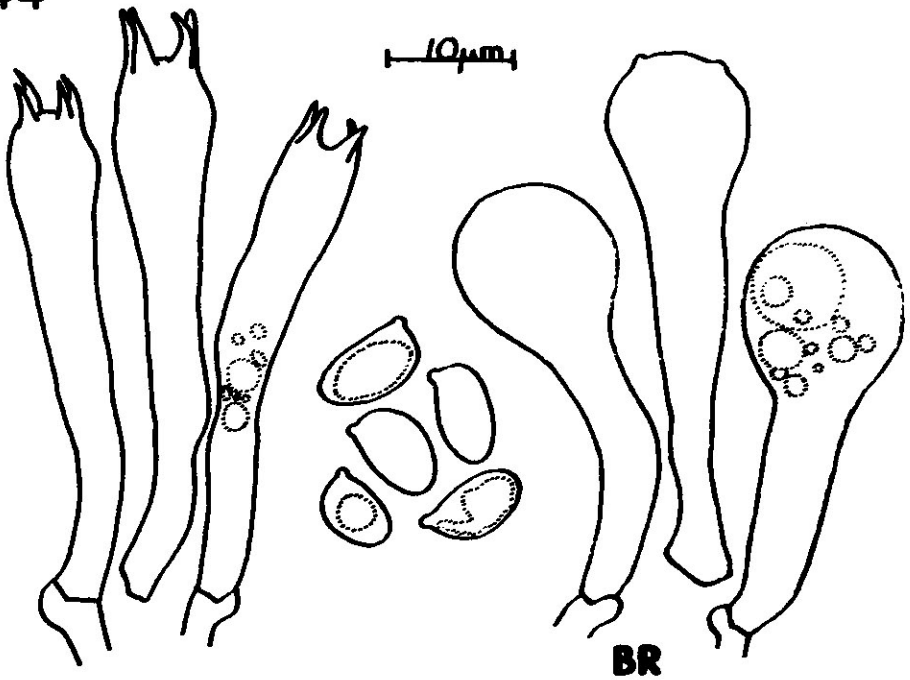
Basidiocarp: Pileus 3-5.5 cm broad, convex-depressed, becoming depressed with margin uplifted and wavy, glutinous to viscid when moist, drying dull or slightly polished, virgate, fuscous to medium brown on disc, paling to sallow (4D3) (ISCC 91) on margin, sometimes uniformly beige (4C3) (ISCC 90) to putty (4B2) (ISCC 84); context

Figs 43, 44. *H. tephroleucus* var. *tephroleucus*. Fig 43. ACAD 12242, X 1.0. Fig 44. ACAD 12232, spores and basidia; ACAD 12242, brachybasidioles (BR) from hymenium near stipe; redrawn by permission of the National Research Council of Canada from the *Canadian Journal of Botany*, 48, pp. 403-411. 1970.

43



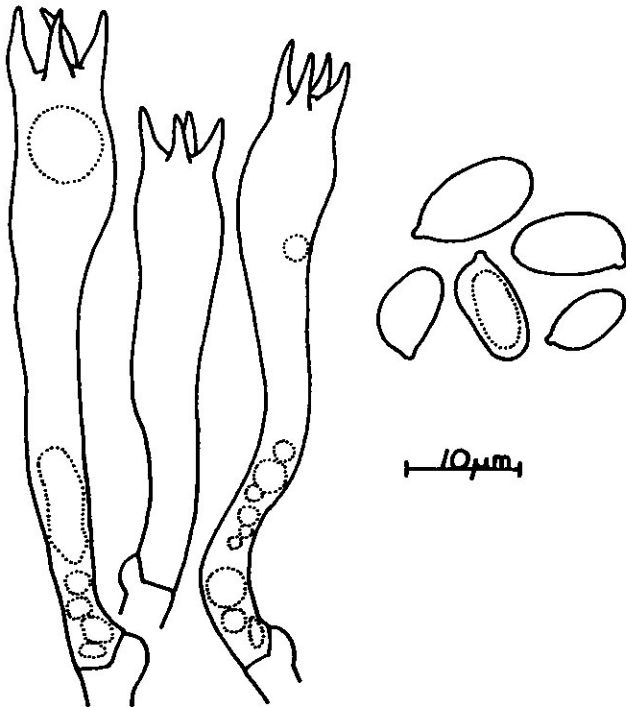
44



45



46



Figs 45, 46. *H. pustulatus*. Fig 45. DG-1573 (D.W. Grund), X 1.0. Fig 46. ACAD 12286, basidia, and spores.

rather thin, soft, whitish; odor and taste not distinctive. Lamellae short-decurrent, whitish, moderately narrow (to 5 mm) in mature pilei, subdistant, thick, occasionally intervenose. Stipe 4-5.5 cm long, 5-10 mm thick at apex, white, eventually brown-dotted over entire length, subviscid near base, dry above, minutely scabrous overall but more coarsely so above, the squamules coalescing just beneath the lamellae in a light brown, floccose ring (not a velar remnant), equal or slightly narrowed above, sometimes subcompressed or twisted, white within, stuffed.

Microscopic Structures: Spores (7)7.5-10.5(11.5) x 4.5-6(7) μm , short-elliptical, smooth, inamyloid. Basidia 40-60 x 6.5-9.5 μm , long-clavate, 4-spored, the sterigmata stout and prominent, up to 6.5 μm long. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 4-20 μm broad. Cuticle a rather narrow ixotrichodermium, 43-78 μm deep, sometimes approaching an ixocutis, the hyphae 2.3-3.5 μm broad, subgelatinous, tangled, erect to repent, colorless to light fuscous or yellow-brown. Pileal trama radial and slightly interwoven; hypodermium not seen. Stipe surface of colorless to yellow-brown hyphae 2.5-7 μm broad, in places tangled and knotted to form the squamules, the terminal segments clavate to slightly bulbous, occasionally subgelatinous near the base; no distinct gelatinous veil seen. Clamp connections present in the cuticle, gill and pileal tramas, stipe surface, and stipe context.

Habit and Habitat: Scattered in spruce woods. Infrequent.

Material Studied: ACAD 12286, North Mountain, Kings Co., 29 Oct. 1968.

Remarks: The above description is based on a single collection of mature to old sporocarps. This is the first record of this species in Nova Scotia.

Hygrophorus pustulatus closely resembles *H. tephroleucus* var. *tephroleucus* but is larger and stouter, and has coarser stipe ornamentation. Occasionally, darkening of the squamules may be delayed, as in the specimens illustrated (Fig 45), and the scabrous stipe then appears essentially white.

Lange (1940) described the pileus of *H. pustulatus* as minutely squamulose on the disc, a feature not mentioned by Hesler and Smith (1963) and not encountered in the Nova Scotian specimens. However, he added that the pileal squamules may be washed away in wet weather, and then *H. pustulatus* approaches *H. tephroleucus*. Heim (1957) reported the pileus of *H. pustulatus* as woolly-fibrillose.

Bresadola (1928) appeared to have the 2 species confused. He attributed an appressed-scaly pileus to *H. tephroleucus* and a subglabrous one to *H. pustulatus*. Moreover, he described *H. pustulatus* as smaller than *H. tephroleucus*, with larger spores. His illustration of *H. pustulatus* f. *minor* more closely resembles our concept of *H. tephroleucus* than does his illustration of the latter species.

In *H. pustulatus*, as in many other species of Subsection *Hygrophorus*, the gelatinous stipe veil quickly disappears as the sporophores age. Hesler and Smith (1963) reported it as absent from the beginning on most of the upper stipe. Bresadola (1928), Heim (1957) and Lange (1940) omitted to mention viscidiness of stipe. Thus, the species is keyed in both Subsections *Hygrophorus* and *Camarophylli*.

Subsection CAMAROPHYLLI Hes. & Sm.

N. Am. Spec. of *Hygrophorus*, p. 309. 1963.

Stipe dry, lacking a gelatinous veil; lamellar trama divergent.

Type species: *H. camarophyllus* (Fr.) Dumée.

Series PUDORINI (Bataille) Hes. & Sm.
N. Am. Spec. of *Hygrophorus*, p. 332. 1963.

Stipe apex ornamented with white squamules which stain yellow in KOH, and become yellow-brown to red-brown with age.

Type species: *H. pudorinus* (Fr.) Fr.

21. *Hygrophorus pudorinus* (Fr.) Fr. var. *pudorinus* f. *pudorinus*.

Epicr. Myc., p. 322. 1838.

Agaricus pudorinus Fr., Syst. Myc. 1: 33. 1821.

Limacium pudorinum (Fr.) Wünsche, Die Pilze, p. 117. 1877.

Figs 47, 48.

Basidiocarp: Pileus 1.5-4.5 cm broad, at first hemispheric or convex, expanding, at times broadly umbonate, margin persistently involute, slightly viscid, drying glabrous to faintly appressed-fibrillose, the disc sometimes obscurely tessellate-areolate, caramel (6C6) (ISCC 57) to pale tan on disc, paling to orange-white (5A2) (ISCC 73) on margin, at times uniformly salmon buff, brownish in age; context thick (2-8 mm on disc), white, tinged salmon under pellicle, spongy; odor and taste not distinctive. Lamellae broadly adnate, pale cream, flushed pale orange toward the pileus margin, fairly close to subdistant, occasionally forked near pileus margin, narrow (2-6 mm), edges even. Stipe 3.5-7.5 cm long, 8-15 mm thick at apex, white-squamulose above, the punctae quickly yellow in KOH and becoming yellow-brown to red-brown with age or drying, gradually pruinose to glabrose downwards, then with appressed fibrils and low uneven ridges below, streaked and laved with pale orange buff, pallid yellow at base, white and often salmon-tinged within, dry, stout, long-ventricose to subequal, occasionally subcompressed, solid to stuffed.

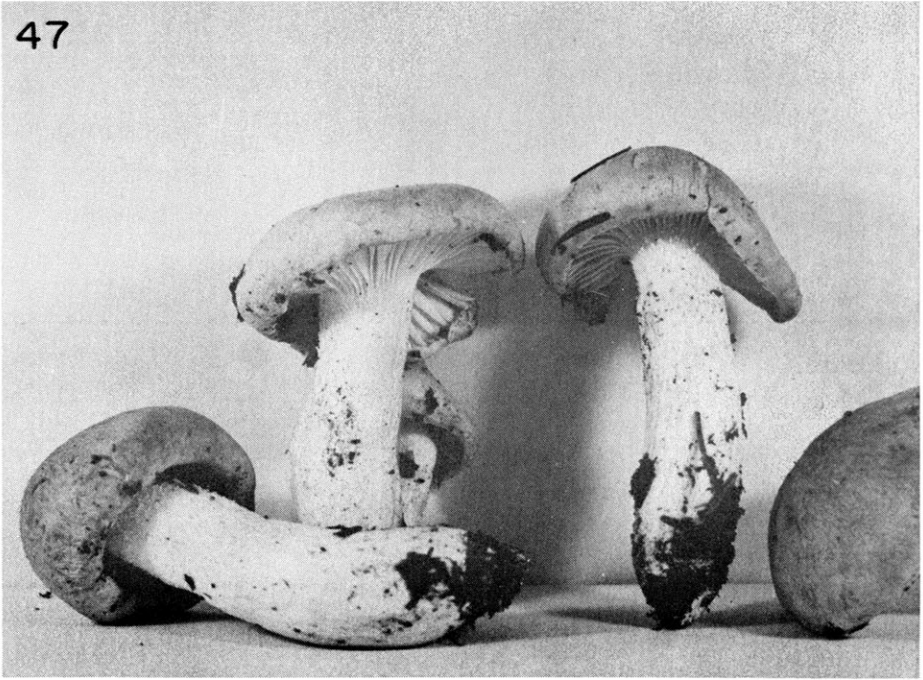
Microscopic Structures: Spores (7)8-10.5(11.5) x 4.5-6 μ m, short-elliptical, smooth, in-amyloid. Basidia (36)50-70 x 6.5-10.5 μ m, long-clavate, 4-spored, the sterigmata up to 6 μ m long. Pleurocystidia and cheilocystidia absent. Gill trama of divergent hyphae 3-20 μ m broad. Cuticle an ixocutis 130-520 μ m deep, the hyphae gelatinous, more or less radial and repent, 2-4 μ m broad. Pileal trama radial and rather interwoven; hypodermium absent. Clamp connections present in the cuticle, gill trama, and pileal trama.

Habit and Habitat: Solitary, gregarious, or subcespitate on grassy soil or coniferous litter, under hemlock, fir, or other conifers. Frequent.

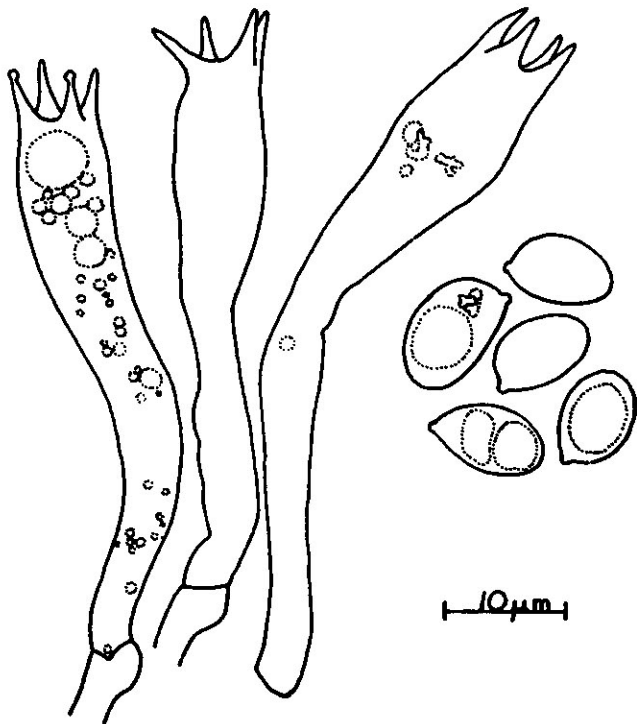
Material Studied: ACAD 5258, Cape Split, Kings Co., 16 Oct. 1955; ACAD 12115, Gaspereau Valley, Kings Co., 23 Oct. 1967; ACAD 12259, Willowdale, Pictou Co., 14 Oct. 1968; ACAD 12272, Willowdale, Pictou Co., 16 Oct. 1968.

Remarks: This species is distinguished by the combination of a salmon to light buff pileus, and a stout dry stipe with apical squamules that become yellow- to red-brown on drying. The latter feature is missing from most of the earlier Nova Scotian collections of *H. pudorinus*, and we conclude that these specimens are probably *H. tennesseeensis*. However, *H. pudorinus* has been collected previously in Nova Scotia, as *H. laurae* (See Doubtful and Excluded Species, p. 12). *H. laurae* is macroscopically similar to *H. pudorinus*, but the stipe is more slender, sheathed by a thin gelatinous

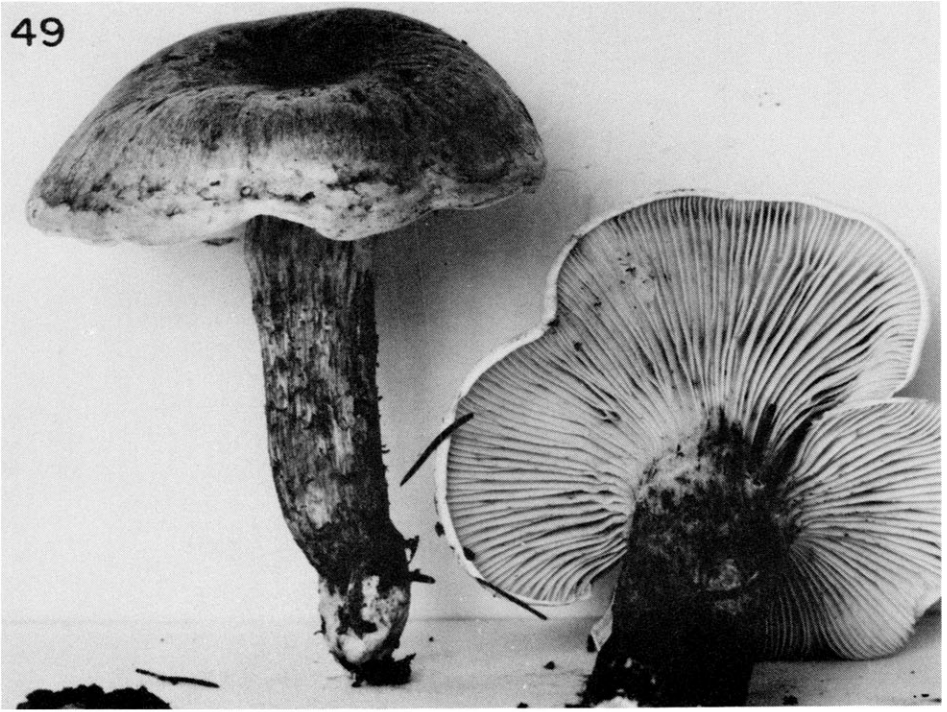
47



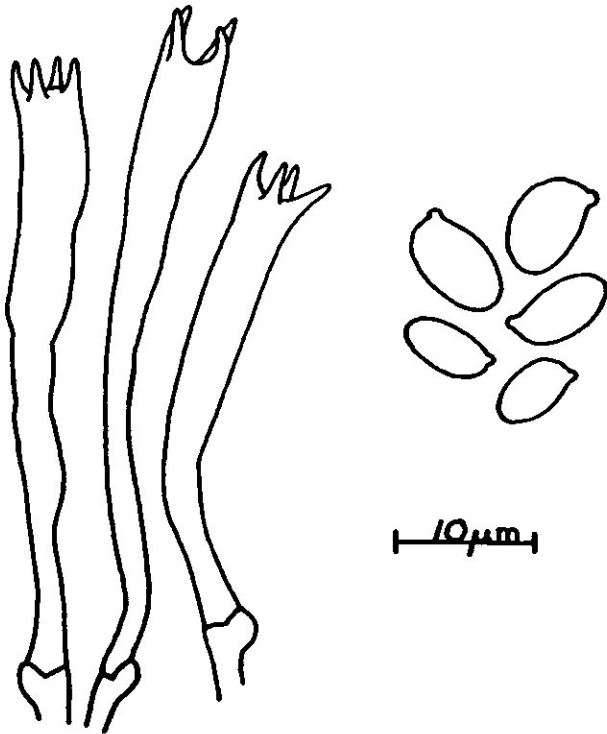
48



49



50



veil, and lacking reddish punctae when dried. Moreover, its spores are smaller than those of *H. pudorinus*. *H. glutinosus* Pk. (not in Nova Scotia) also develops red-brown dots on the stipe apex, but the pileus is whitish instead of tan, drying bright yellow, and the stipe is rough and glutinous (Hesler & Smith 1963; Peck 1902).

Bresadola (1928) described the stipe of *H. pudorinus* as viscid, and the odor as subnauseous. Romagnesi (1962-63) also mentioned a viscid stipe and reported an odor of resin or jasmine.

Series RUBENTES (Fr.) Hes. & Sm.

N. Am. Spec. of *Hygrophorus*, p. 340. 1963.

Lamellae becoming vinaceous-spotted near edges, or vinaceous overall; lamellar trama divergent; stipe dry.

Type species: *H. erubescens* (Fr.) Fr.

22. ***Hygrophorus purpurascens* (Fr.) Fr.**

Epicr. Myc., p. 322. 1838.

Agaricus purpurascens Fr., Syst. Myc. 1: 34. 1821.

Limacium purpurascens (Fr.) Kummer, Führ. in Pilzk., p. 118. 1871.

Figs 49, 50.

Basidiocarp: Pileus 2 cm broad, convex with involute margin or disc at times depressed, slightly viscid, the pellicle separable and obscurely appressed-fibrillose, the inrolled margin cottony, the disc heavily streaked and flushed dark vinaceous brown (9F7) (ISCC 44), becoming pale, yellowish white (2A2) (ISCC 92) on the margin; context white, thick (4 mm on disc), spongy; odor and taste mild. Lamellae short-decurrent, whitish at first, soon ivory (4B3) (ISCC 90) and flushed drab pink near the edges, 3 mm broad, subdistant, rather thin, edges even. Stipe 5 cm long, 5 mm thick at apex, white above, streaked and laved below over most of length with vinaceous to brownish fibrils, white within, dry, pruinose-scurfy above, appressed-fibrillose below, equal, attenuated or subradicating at base, terete, solid. Partial veil whitish, sparse, cottony to cortiniform, leaving an evanescent, superior annulus. Vinaceous surface hyphae of pileus and stipe quickly yellowish to yellow-brown in KOH; pileal context very slightly yellowish, and stipe context unaffected by KOH.

Microscopic Structures: Spores 6-8 (10) x 3.5-5(6) μm , ellipsoidal, smooth, inamyloid. Basidia 32-49 x 3.5-5 μm , long-clavate to subcylindric, very slender, often flexuous, 4-spored, the sterigmata slender and up to 5 μm long. Pleurocystidia and cheilocystidia absent. Gill trama divergent from a grayish, ill-defined mediostriate, the hyphae narrow, 3-8 μm broad. Cuticle an ixocutis, 60-130 μm deep, of radial, appressed, light vinaceous, gelatinized hyphae 2.3-4 μm broad. Pileal trama interwoven, the hyphae more or less radially disposed; hypodermium absent. Clamp connections present on hyphae of the cuticle, gill trama, and pileal trama.

Habit and Habitat: Solitary in coniferous woods. Rare.

Material Studied: ACAD 12277, Centreville, Kings Co., 27 Oct. 1968.

Remarks: The above description is based on a single, unexpanded sporocarp, and data on mature specimens are lacking. Despite several previous collections of this

Figs 49, 50. *H. purpurascens*. Fig 49. Smith 9333, X .8. Fig 50. ACAD 12277, basidia and spores; redrawn by permission of the National Research Council of Canada from the *Canadian Journal of Botany*, 48, pp. 403-411, 1970.