

Apothecia in fresh condition, about 8 cm across; apical portion of seta (left), ascus and four paraphyses (x ca 700); ascospore stained with cotton blue (x ca 500); ectal excipulum marginal cells (x ca 400). All from DAOM 126248.

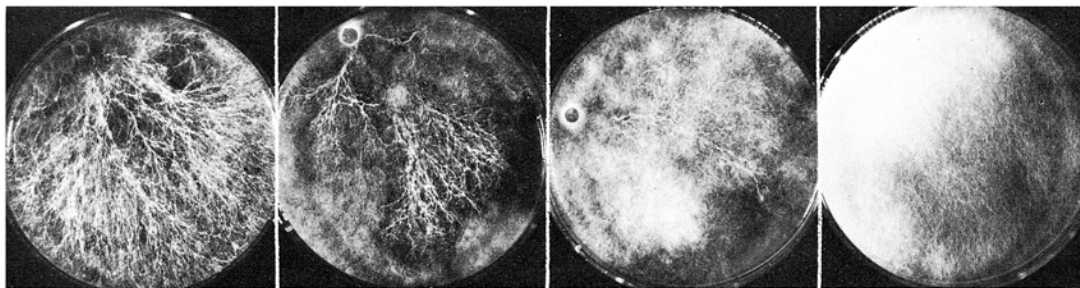
Rhizina undulata Fr., Syst. Myc. 2: 33. 1822.

= *R. inflata* P. Karst., Acta Soc. Fl. Fauna Fenn. 2: 112. 1885.

APOTHECIA discoid and convex to convoluted, 1-3(-12) cm diam., often with a fishy odor when dry; margin usually distinct, pale brown to yellow-brown, 1-3 mm wide; rhizoids attached to the lower surface, pale yellow-brown, up to 3 mm diam.; hymenial surface blackish or dark brown, shiny, granulate, somewhat slimy. ASCI cylindrical, $350-400 \times (11-15(-18) \mu$. PARAPHYSES hyaline, slenderly clavate to almost cylindrical, $(4-7-8(-10) \mu$ diam. at apex, sometimes incrustated with a brownish, resinous deposit. SETAE common throughout the hymenium, arising in the excipulum, cylindrical, $700 \text{ plus} \times 6-9(-12) \mu$; the wall yellow-brown. ASCOSPORES fusiform, 8 per ascus, with 2 or 3 guttules, $(22-28-32(-36) \times (6-8-10 \mu$ excluding the external gelatinous sheath which is attenuated at each end to form an appendage about 6μ long. EXCIPULUM of the *textura intricata* type, the hyphae thin-walled, hyaline, $7-16 \mu$ diam. with cells often inflated to $85 \times 55 \mu$ and then found in extensive chains, terminating in the margin with a broadly clavate apical cell (see figure).

SUBSTRATE: mineral soil of burnt areas in coniferous forests with rhizoids attached to wounded or severed roots and buried woody debris.

DISTRIBUTION: Nova Scotia, New Brunswick, Ontario, British Columbia, Northwest Territories (Mackenzie District).



Hyphal mats after 9 days at 25°C. Isolates 4, A, T1 and G1128 (l. to r.).

COLLECTIONS (selected): N.S., Colchester Co., Truro, 9.IX.1954, DAOM 112926 (K.A. Harrison). N.B., Kent Co., Richibucto, 31.VII.1963, TRTC 41416. Ont., Carleton Co., Merivale, 17.IX.1952, DAOM 34800 (J.W. Groves). B.C., Vancouver I., Ucluelet, 9.IX.1967, DAOM 126248 (S.J. Allen and J. Ginns). N.W.T., Mackenzie Distr., S. Rutledge L., 30.VI.1962, DAOM 91443 (G.W. Scotter).

CULTURAL CHARACTERS: Growth rate rapid, covering 9 cm plate in 7 to 12 days. Mat after 1 week white, with hyphal strands present in most isolates; margin even or bayed due to rapidly growing hyphal fans. Between 2 and 6 weeks the mats become pallid to tan, generally with reddish or chestnut tints, cottony or felty to floccose. Reverse side after 2 weeks tan to chestnut, often mottled; odor slightly sweet. At 6 weeks a few hyphal balls (apothecial initials?) may be scattered over the mat. On tannic acid agar and on gallic acid agar after 1 week the oxidase reaction strong, forming a brown zone 15 to 75 mm diam.

Hyphae of the advancing zone hyaline, thin-walled, the contents of numerous guttules, simple-septate, often constricted at the septa, 3-8(-12) μ diam., gradually tapering to narrow apical cells which are about 350 μ long. The occasional branches arise toward the midpoint of the cell rather than at the septa, the narrower hyphae are rarely branched, the wider ones with 1 or 2 branches in every 3 cells. Aerial hyphae at 6 weeks flexuous, 2-5(-8) μ diam., occasionally branched and then at right angles, hyaline or yellowish, some with refractive contents. Adnate and submerged hyphae at 14 days similar to those of the advancing zone but (4-)10-15(-25) μ diam., with yellow granules on the exterior of some, strands usually present, and the wider hyphae of short, barrel-shaped cells. Strands are composed of about 10 hyphae which have their exterior surface roughened by a yellow-brown incrusting substance.

SPECIES CODE: 2.6.7.(26).32.37.41-42.50.55-56. (Nobles, Can. J. Bot. 43: 1097. 1965).

ISOLATES STUDIED: From ascospores, B.C., Mission City, G1128; Powell R., G1143; Tofino, G1144. England, E. Anglia: Thetford Chase, ex John Rishbeth, "A." From young Scots pine: Thetford Chase, ex J. Rishbeth, "T1". From apothecial tissue: Mission City, 4, coll. J. Ginns & C. Wood.

NOTES: The gelatinous sheath on fresh ascospores readily dissolves in a 0.2% solution of KOH. Ascospores are essentially smooth but Dissing (Persoonia 6:432.1972), in SEM pictures, shows the surface to be slightly roughened. In KOH the apothecial tissue and mycelium from culture exude a yellowish pigment not produced in water mounts. It is apparently the dissolved hyphal incrustations.

The black, crusty deposit covering the hymenium of dried apothecia is liquid in fresh specimens and probably protects the developing ascospores from ultraviolet radiation and drying. Old, large apothecia frequently appear greenish due to algal growth atop the hymenium.

Rhizina undulata has been reported from Prince Edward Island (Wehmeyer, The fungi of N.B., N.S., & P.E.I. N.R.C. Ottawa, 1950), Quebec and Saskatchewan (Canada Forest Insect & Dis. Surv., Ann. Rept. 1970. Ottawa, 1971), and Manitoba (Bisby et al., The fungi of Man. & Sask. N.R.C. Ottawa, 1938). I have seen specimens from U.S.A.: Me., Mass., Conn., N.Y., Pa., N.J., Va., Md., W.Va., Tenn., S.Car., Ala., Mich., Minn., Mont., Idaho, Wash., Ore., Calif., and Wyo.

The fungus is pathogenic to conifers (CMI Descript. 324) and was associated with death of Douglas-fir seedlings in British Columbia (Ginns, J., Pl. Dis. Repr. 52: 579. 1968).

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