

Mythicomycetes corneipes, a rare agaric, in Fennoscandia

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The taxonomy, distribution and ecology of the rarely collected agaric *Mythicomycetes corneipes* (Fr.) Redhead & Smith are treated. The species has been collected from six sites in Fennoscandia. These collections also represent the known European distribution. A colour photograph, the morphology and a detailed account of the ecology are presented. Features not reported earlier are the amyloid reaction in the cystidial walls, the dextrinoid reaction of the spores and their small plage.

Key words: Agaricales, Basidiomycetes, *Mythicomycetes corneipes*, NW Europe, taxonomy

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In 1989 a study was conducted to map the mycoflora of some interesting sites in the commune of Kaarina, in SW Finland. One of the sites to be mapped was a small brook ravine surrounded by a narrow strip of fairly rich spruce forest (Fig. 1). Along the brook, close to running water, a dark-spored *Hypholoma*- or *Phaeocollybia*-like basidiomycete was frequently observed. This fungus was very difficult to place in any of the well-known genera. It had minutely roughened, brown spores and metuloid cystidia. Curiously, the apices of the cystidia were amyloid.

In 1990 the fungus was recollected, photographed and finally identified. On the basis of a study by Redhead and Smith (1986), we could determine our collections as *Mythicomycetes corneipes* (Fr.) Redhead & Smith, a species formerly placed in *Psilocybe* (Fr.) Quélet. Information from our colleagues and a search of herbaria for other Fennoscandian collections revealed that the species had already been noted and collected more than 10 years earlier in Norway by Dr. Sivertsen (S. Sivertsen, in litt.). Contacting Swedish herbaria clarified the identity of two recent collections (Stridvall & Stridvall 1991, Stålberg 1991). *Mythicomycetes corneipes* is very rare in Europe and, to our knowledge, is known from only a few localities in Fennoscandia.

As Redhead and Smith (1986) gave a thorough description of the species, it will be only briefly described here. The information on the macroscopic

features is based on Fennoscandian material. The measurements of the microscopical features were made on geographically widely separated collections from two continents. The measurements and drawings were made from dried material mounted in 10% NH_4OH , unless otherwise indicated, using x1500 magnification. The colours are given according to the codes of Cailleux (1981) and Küppers (1978).

Mythicomycetes corneipes — Figs. 2–9

Agaricus corneipes Fr., Monogr. Hymenomyc. Suec. 2:304. 1863. — *Psilocybe corneipes* (Fr.) P. Karsten, Bidr. Känned. Finl. Nat. Folk 32:504. 1879. — *Mythicomycetes corneipes* (Fr.) Redhead & Smith, Canadian J. Bot. 64:643. 1986. — Neotype: U.S.A., Idaho, Valley Co., Payette Lakes, in boggy area, X.1943 W.B. Gruber P-88, det. S.A. Redhead (MICH, examined).

Pileus 0.8–2.6 cm in diam, 0.4–1.0 cm high, conical when young, later convex, consistently with a broad umbo, up to 4/5-striate, clearly hygrophanous, with a greasy shine, smooth. Colour in centre reddish brown (Cailleux P45, P60, R47; Küppers $\text{Y}_{99}\text{M}_{50}\text{C}_{50}$), at margin yellowish brown (M79, $\text{Y}_{70}\text{M}_{30}\text{C}_{20}$) when fresh; in dry condition pilei Buff (N80, $\text{Y}_{50}\text{M}_{30}\text{C}_{10}$). Lamellae adnate to narrowly adnate, in fresh condition colour first Straw (K79), later more greyish brown; in dry condition Hazel (P65) to Cinnamon (N69). Lamellulae present. Stipe 3.5–7.5 cm long, 1–2 mm thick, of even thickness, slightly flexuous,



Fig. 1. The ravine Juopinkrotti in Kaarina, SW Finland, photographed in May 1991. — Photo Jukka Vauras.

glossy and smooth except for 2–3 mm at the apex, where slightly pruinose, base not rooting; in fresh condition colour at apex reddish brown ($Y_{70}M_{60}C_{40}$), becoming much darker towards base, where blackish brown ($Y_{90}M_{99}C_{80}$). Odour fungous, taste indistinct to slightly bitter.

Spores 7–9(–10) × (4–)4.5–6(–6.5) μm , total range of mean values 7.5–8.3 × 4.7–5.6 μm , \bar{x} = 8.0 × 5.1 μm (7 collections, 140 spores), Q = 1.4–1.8, the average for 7 collections being 1.57, ovoid to ellipsoid, often somewhat inequilateral, minutely roughened, with plage, lacking germ-pore, some uniguttulate in lactic acid and NH_4OH ; spores in mass greyish brown (P69), pale greyish to yellowish brown in NH_4OH under the microscope, dextrinoid, inamyloid, metachromatic in cresyl blue; guttula blue in cresyl blue. Basidia 24–27 × 7–8 μm , clamped, four-spored. Pleurocystidia 42–71 × 15–27 μm , abundant, ventricose, more rarely broadly obclavate, thick-walled, thin-walled at the pedicel, mostly apically smooth, some with prominent, hyaline crystals; walls often irregular in thickness, yellowish in NH_4OH , moderately amy-

loid at the apex, not or rarely so in lower parts; contents wine red in cresyl blue. Cheilocystidia similar to more irregular in shape. Caulocystidia 32–55 × 9–14 μm , cylindrical to clavate, thick-walled, apically rarely amyloid.

Distribution and phenology

Mythicomycetes corneipes is rare to uncommon in North America, where it is widely distributed (Redhead & Smith 1986). In Europe it is known from six localities in Fennoscandia (Fig. 8), from the Hemiboreal to the Northern Boreal zone. The most recent collection from Sweden (Dalsland, Skållerud, Ryr, 11.IX.1990 A. Stridvall) was not saved, but the material was examined under the microscope and the typical cystidia noted (Stridvall & Stridvall 1991), so it can be included with confidence. The fruiting period is long, coinciding with the frost-free season; it starts in late July and reaches a peak in mid-September (Fig. 9). In Kaarina, SW Finland, the fruiting



Fig. 2. Fruit bodies of *Mythicomyces corneipes*, in situ, x 1.5. (Finland, Varsinais-Suomi: Kaarina, Kuusisto, Juopinkrotti, 9.X.1990 Huhtinen & Vauras 5436F, TURA). — Photo Jukka Vauras.

peaks in late September–early October. At that time several groups of *Mythicomyces* were found along the brook.

Ecology

In North America the species is found along the margins of bogs and in sites flooded in the spring. The substrate is plant debris, mainly pieces of wood (Red-head & Smith 1986). The Norwegian site is a small brook ravine in spruce forest, which is regularly inundated and has relatively open vegetation, without a continuous moss cover. The dominant vascular plants are *Stellaria nemorum* and *Equisetum sylvaticum*.

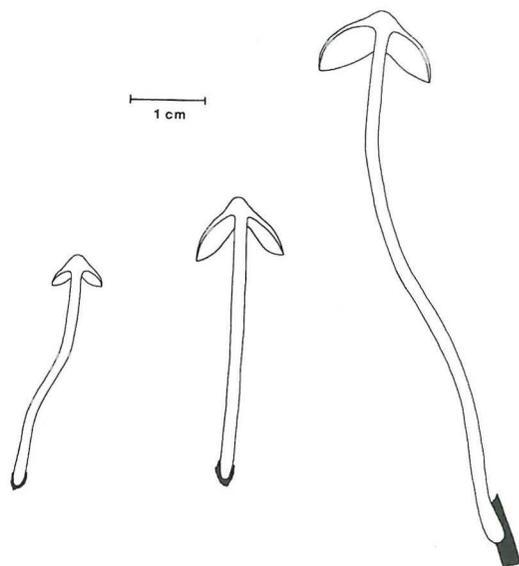
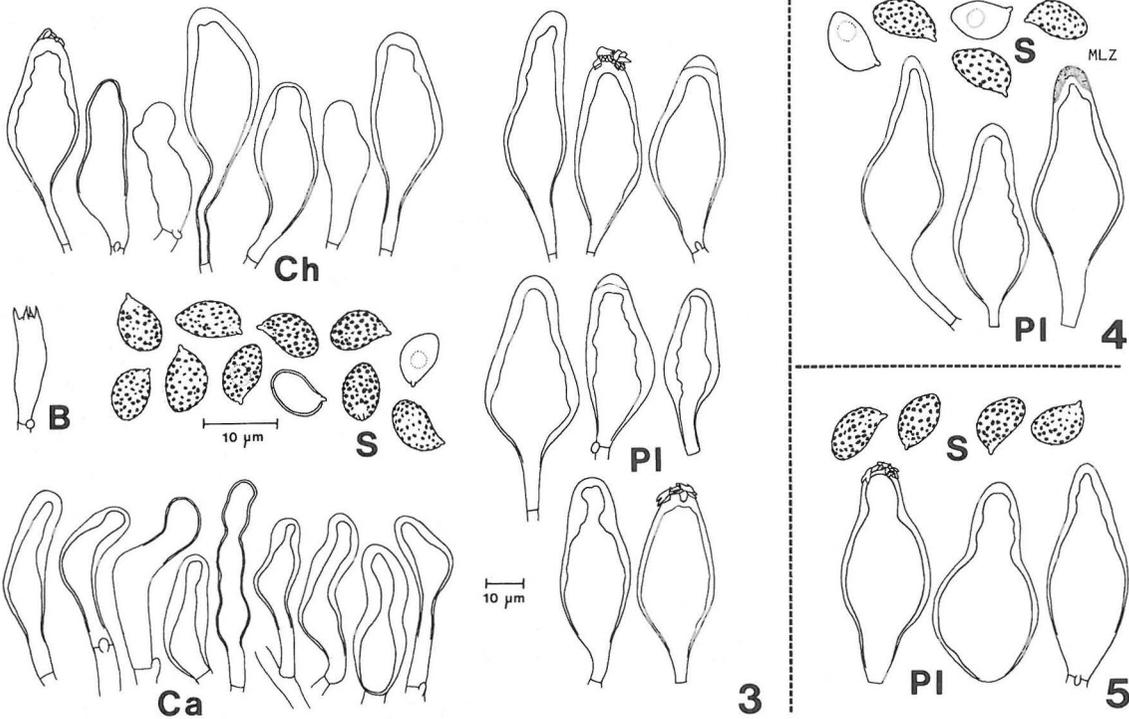


Fig. 3 (Right). Fruit bodies of *Mythicomyces corneipes*, x 1. (From Huhtinen & Vauras 5436F, TURA).



Figs. 4-6. Microscopical details of *Mythicomyces corneipes*. — 4: Huhtinen & Vauras 5436F (TURA). — 5: Sivertsen 15.IX.1976 (TRH). — 6: Gruber P-88 (neotype, MICH). Symbols: Ch = cheilocystidia, B = basidium, S = spores, PI = pleurocystidia, Ca = caulocystidia at stipe apex. Scales: spores x 1000, others x 500.

Urtica dioica, *Rubus idaeus* and *Alnus incana* are also present (S. Sivertsen, in litt.). The recent Swedish collections and the collection from Kuusamo were all

made from moist, fairly rich forests dominated by *Picea abies*. In Kuusamo *Mythicomyces* was found fruiting on a stump.

In Kaarina the inundated brook margins and flats are characterized by *Anemone nemorosa*, *Athyrium filix-femina*, *Equisetum sylvaticum*, *Geum rivale*, *Thelypteris phegopteris*, *Urtica dioica* and *Ranunculus repens*. Common, but less abundant are *Anthriscus sylvestris*, *Caltha palustris*, *Cirsium arvense*, *Hepatica nobilis*, *Oxalis acetosella*, *Ribes nigrum*, *Rubus idaeus*, *Sambucus racemosa* and *Sorbus aucuparia*. The moss layer is fragmented, mainly consisting of *Cirriphyllum piliferum*, *Hylocomium splendens*, *Rhytidiadelphus squarrosus*, *Rhodobryum roseum* and *Sphagnum squarrosum*, and the liverwort *Plagiochila asplenioides*. In Kaarina *Mythicomyces* has been found fruiting once on *Athyrium* rachides, but mostly the fruit bodies occur on mineral soil mixed with litter or on small hardwood and softwood branches partly buried in soil. The pH reaction of the alluvial soil (both fine sand and clayey soil) along the brook varies between 5.8 and 5.9.

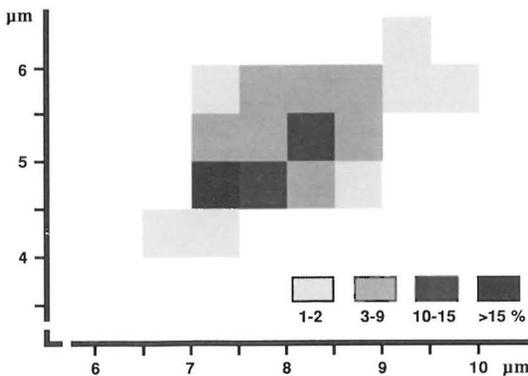


Fig. 7. Percentage sporogram of *Mythicomyces corneipes*, based on 100 spores (five collections).

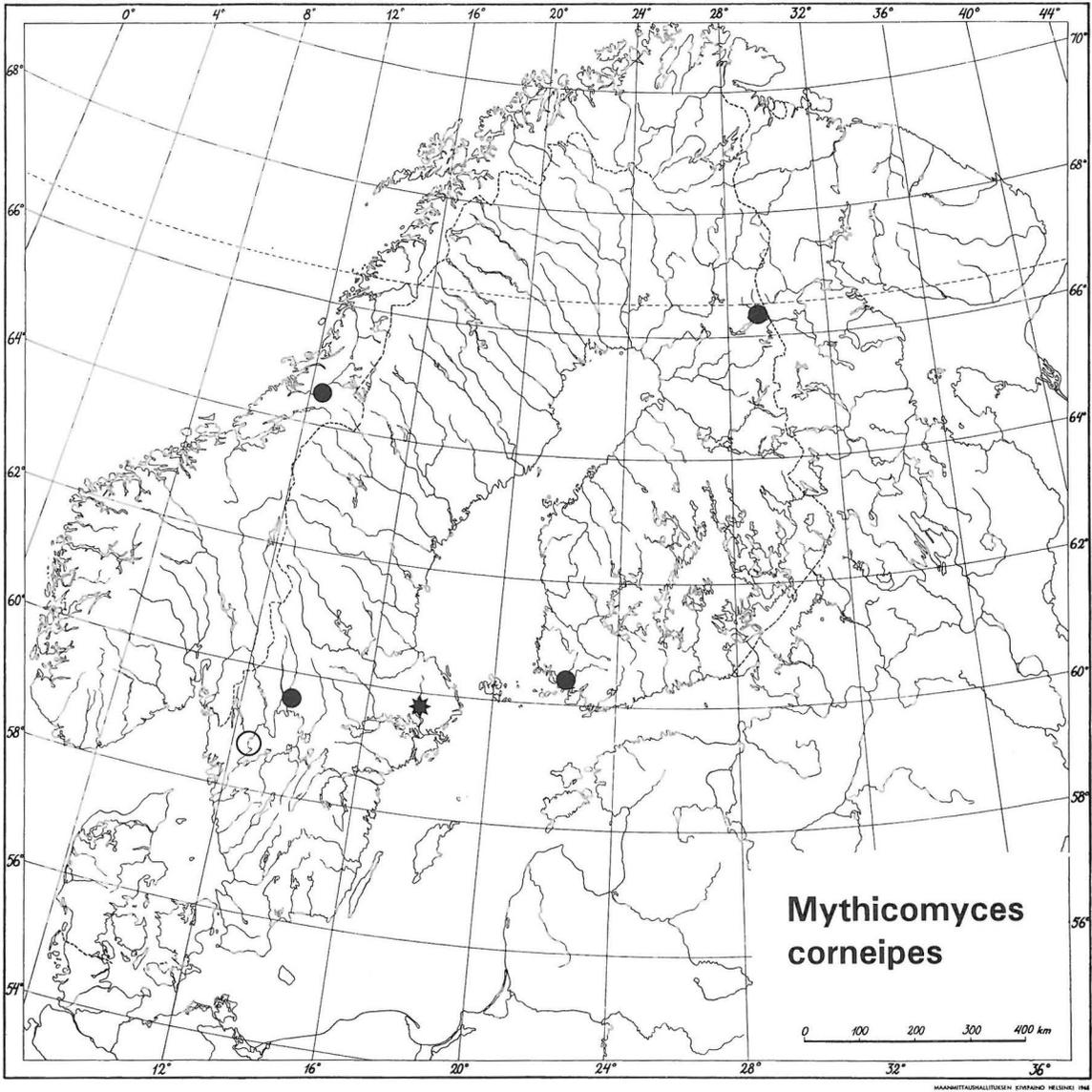


Fig. 8. The distribution of *Mythicomyces corneipes* in Fennoscandia according to the specimens studied (dots), collection not preserved (open circle) and Fries (1877-1884, star).

Discussion

The monotypic genus *Mythicomyces* was established by Redhead and Smith (1986), to accommodate *Agaricus corneipes* Fr. Due to its rough spores and metuloids, the species could not be left in *Psilocybe* (Guz-

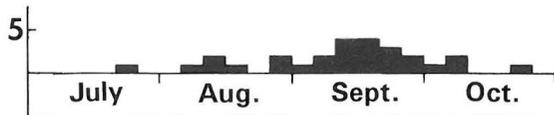


Fig. 9. Fruiting period of *Mythicomyces corneipes*, according to the material cited in the present paper and by Redhead and Smith (1986), divided into pentads.

man 1983, Redhead & Smith 1986), where it had been placed by Karsten (1879). The generic relationships are obscure, Redhead and Smith placed the genus provisionally in the Strophariaceae, mainly basing their treatment on spore characters, e.g. spore colour.

Macroscopically, the species resembles a small *Hypholoma* in the colouration of the pileus and lamellae. The corneous stipe resembles that of a *Marasmius* or *Phaeocollybia*. Under the microscope the species can be mistaken for a *Galerina* or even *Inocybe*. The macroscopic features distinguish *Mythicomycetes* easily from *Inocybe*, it is mainly differentiated from *Galerina* by the paler spores. However, the species shows fairly many affinities to *Galerina*, including the two unreported spore features discussed below. Both the macroscopic and microscopic characters make *Mythicomycetes* easy to identify.

Some unreported features were noted in the present material. A great majority of the spores have a small plage. It is not easily observed under the microscope due to the inconspicuous spore sculpture: the warts are hardly visible in optical section. The small plage is also seen in the scanning electron micrograph published by Redhead and Smith (1986: fig. 2). The other unreported spore character, also noted in the Norwegian material (S. Sivertsen, in litt.), is the clear dextrinoid reaction of the spores.

The amyloid reaction of the cystidia has not been reported earlier, but was observed in the Norwegian material (S. Sivertsen, in litt.). The thickened wall seems to have a dual structure especially at the apex. Most of the wall is inamyloid and the amyloid reaction is more or less clearly localized. The reaction is seen in most collections, being relatively frequent within a mount when present. More rarely, it is seen in lower parts.

A typical feature is also the irregularity of the cystidial wall thickness. The walls quite often show more clearly thickened areas or even form large protuberances inward. Apical crystals are variably present, but were noted in some amount in all the collections. Occasionally, the apices are seen to be surrounded by a hyaline globose body in both Melzer's reagent and lactic acid.

Redhead and Smith (1986) selected a rather distant neotype for the species. Nevertheless, this specimen is illustrated in colour (Smith 1949) and matches well with the plate by Fries (1877–1884) and the Finnish material. The neotype differs slightly in microscopical features, as its cystidia often lack a pedicel. According to our measurements, the spores of the neotype have the following dimensions: 7–8(–9) × 4.5–5(–5.2) µm, average 7.7 × 4.8 µm, Q = 1.6.

Material studied

Finland. *Varsinais-Suomi:* Kaarina, Kuusisto, Juopinkrotti, 1989 SH 89/20 (TUR); 1989 SH 89/66 (TUR); 1989 SH & JV 4179 (TURA, OULU), 4180 (TURA); 1990 JV & SH 90/291, 90/292 (TUR), 90/290 (H, TUR, UPS); SH & JV 5436F, 5439 (TURA). *Koillismaa:* Kuusamo, Oulanka National Park, Kiutaköngäs, 1970 Ulvinen (OULU).

Sweden. *Värmland:* Molkom, Karlbergshöjden, 1984 Stålberg 84/77 (TURA). Location not indicated, 1905 Lloyd (S).

Norway. *Nord-Trøndelag:* Grong, near railway station, 1976 Sivertsen (TRH, ZT); 1978 Sivertsen (TRH).

Canada. *British Columbia:* Glacier Nat. Park, 1980 Redhead (TUR, ex DAOM 178138). Manning, 1985 Kroeger (TUR, ex DAOM 196097). *Nova Scotia:* Kings Co., Waterville Mt., 1968 Harrison 7902A (MICH). *Ontario:* Lake Timagami, 1936 Smith, Biggs & Cain 4443 (MICH).

U.S.A. *Colorado:* San Miguel Co., San Juan Mts., 1956 Smith 52716 (MICH). *Idaho:* Valley Co., Payette Nat. Forest, 1956 Smith 53484 (MICH); Payette Lakes, in boggy area, X.1943 W.B. Gruber P-88. *Oregon:* Clackamas Co., Mt. Hood, 1947 Smith 27500 (MICH).

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