

Pachyella hydrophila (Pezizales) – the first finding in Europe

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Norsk tittel: *Pachyella hydrophila* (Pezizales) – første funn i Europa

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SAMMENDRAG

Dette er første rapporterte funn i Europa av den sjeldne discomyceten *Pachyella hydrophila* (Sacc.) Pfister, samlet i ca 900 meters høyde ved Breiddalsvatnet ved Grotli i Oppland fylke i 1990. Arten er originalbeskrevet av C. H. Peck fra Adirondack Mtn. fra staten New York i 1880. Slektens *Pachyella* diskuteres generelt, og spesielt med fokus på forskjeller mellom *P. hydrophila* og *P. punctispora*. Illustrasjoner og bilder følger.

ABSTRACT

This is a report on the first finding in Europe of the rare discomycete *Pachyella hydrophila* (Sacc.) Pfister, originally collected and described by C. H. Peck from the Adirondack Mtns. in New York State 1880/1883. The species was collected near Breiddalsvatnet close to Grotli.

ca 900 metres a.s.l. in Oppland county, Norway in 1990. Discussion of the genus *Pachyella* in general and the difference between *P. hydrophila* and the related *P. punctispora* is provided, along with illustrations of macro- and microcharacteristics of *P. hydrophila*.

INTRODUCTION.

The genus *Pachyella* belongs to the family Pezizaceae (Pezizales, Ascomycota), and is characterized by sessile, pulvinate to shallowly cupulate and broadly attached apothecia occurring on water-soaked submerged wood and plant debris in humid habitats. The species have diffusely amyloid ascospores less than 25 µm long that lack a loosening outer spore wall. The ascospores are all ellipsoid except in one species that has globose spores (Hosoya and Maruyama 2004), and all are smooth or differently ornamented.



Figure 1. Map of central south Norway showing the locality of *Pachyella hydrophila* (RK 90.20), NW of Hamseviki, on the northshore of the lake Breiddalsvatnet. Field view ca 16 km.



Figure 2. *Pachyella hydrophila* RK 90.20 Ascomata in situ. Field of view 10 cm.
Photo: Roy Kristiansen.

Pachyella species typically have a gelatinous excipular tissue and hyphoid hairs embedded in gel on the outer surface (Pfister 1973).

Today the genus comprises 15 species (Häffner 1992, Pfister 1995, Trimbach 1990, Hosoya and Maruyama 2004, Zipcodezoo 2011). The only previously reported species f *Pachyella* in Norway is *P. babingtonii* (Berk. & Br.) Boud. (Schumacher 1979, Kristiansen 1983, Kristiansen 1998). This is rather widespread, but not common, occurring on very wet dead wood. Findings are reported in the Norwegian Mycological Database (NMD 2011) as scattered north to Finnmark; the species has still not been reported south of Bamble, in the Telemark county (cf. Kristiansen 1983). I have also collected *P. babingtonii* in Raggsteindalen, close to Hallingskarvet, Hol, Buskerud county. Another species labelled *P. violaceonigra* (Rehm) Pfister, kept in the herbarium of the University of Bergen, was collected in Rana, in Nordland county, in 1986 by Sigurd Olsen. It was found on a rotten trunk. This species, if correctly identified, is

actually new to Norway, but there are no notes or illustrations with the collection. I have examined the collection (BG), but can not observe solitary warts or low ridges on the ascospores fitting to the key by Pfister and Candoussau (1981), or SEM by Pfister (1975). Besides, *P. violaceonigra* is black in exsiccata, while the Norwegian collection is sepia.

THE DISCOVERY

In 1990 I came across a nice shining very dark brown discomycete in a subalpine site, growing on water-soaked plant debris partly in or close to a small brooklet. At first sight it reminded me of a large species of *Boudiera*, but a subsequent microscopic examination revealed a species of *Pachyella*, different from *P. babingtonii* in several aspects, and with spores unlike any of the ascospores illustrated by Pfister (1975).

However, Pfister (1979) had examined a number of old *Peziza*-collections from Peck's herbarium. One of the "Peziza" collections, labelled *Peziza (Humaria) hydrophila*, was collected by Peck in 1880 in the Adirondack Mtn., New York State. Its characters justified a placement in *Pachyella*, and Pfister (*loc.cit.*) made the new combination *Pachyella hydrophila*. Even though it is not easy to see all characters on dried material of this genus (they are very hard to retrieve), he observed the presence of gelatinous excipular

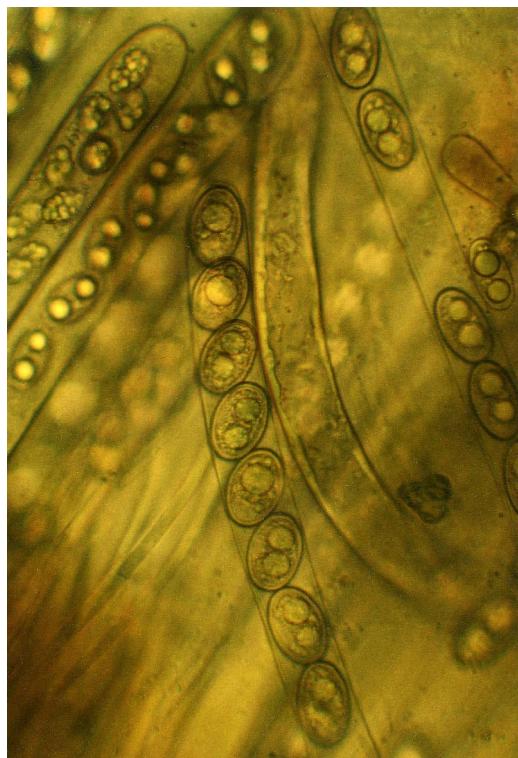


Figure 3. *Pachyella hydrophila* RK 90.20
Ascospores in water. Field of view 150 micron.

material, short pigmented hyphoid excipular hairs, and broad paraphyses at apex. The only closely similar species is *P. punctispora*. Both have very densely pigmented paraphyses and ornamented ascospores, but the apex of the paraphyses of *P. hydrophila* is almost twice as wide as those of *P. punctispora*.

Based on the descriptions of *P. hydrophila* by Pfister (1979) and Peck (1883), as well as examination of the type material and my own observations on the fresh material, I have come to the conclusion that the Norwegian material is conspecific with the American and hence the second find in the world, and new to Europe. It would be interesting to check out its phylogenetic placement compared to *P. punctispora* and *P. babingtonii*.

It is not surprising that the species was first taken for a species of *Boudiera* as there is a close relationship between *Boudiera* and *Pachyella*, as indicated from the phylogenetic data by Hansen et al. (2005). Species of *Boudiera* lack the gelatinous excipular tissue and the hyphoid hairs typical of *Pachyella* (Pfister 1973). And *Boudiera* is commonly found on river banks with sand and silt. Hansen et al. (*loc. cit.*) found that *P. babingtonii* and *P. punctispora* each have distinctive excipular structure and Pfister (1973) noted that *P. punctispora* seems to be transitional between *P. babingtonii* and the other larger more complex species of the genus. A segre-

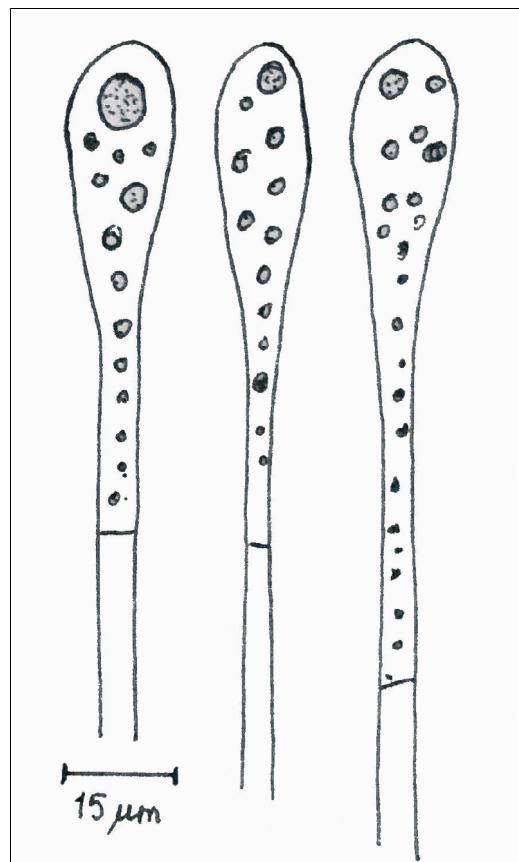


Figure 4. *Pachyella hydrophila*, Drawing of paraphyses. by R. Kristiansen (RK 90.20).

gation of *P.babingtonii* from *Pachyella* is suggested by Hansen et al. (*loc. cit.*). In MycoKey (2011) an illustration of one ascospore of *P. babingtonii* marked Henry Dissing Gr 82.98, is NOT smooth, which it usually is and as illustrated by Pfister (1975). The ascospore in the MycoKey is more like a spore of *P. hydrophila*!

DESCRIPTION (based on fresh material)
Pachyella hydrophila (Sacc.) Pfister.

Synonyms:

- Humaria hydrophila* Sacc, Syll. Fung. 8:140, 1889 = *Peziza (Humaria) hydrophila* Peck, Rep. New York State Mus. 34: 51, 1880 (1883) non *Pach. hydrophila* P. Karst. 1869.
Leucoloma hydrophila (Sacc.) House, Bull. New State Mus. 243-244: 86, 1921.
Psilopezia hydrophila (Sacc.) Seaver ,The North American Cup-fungi (operculates): 106, 1928.
= ? *Peziza rivularis* Clements. Bot. Surv. Nebr. 3:8, 1894.

Apothecia sessile, solitary or rarely caespitose, broadly attached to the substrate, 10 – 15 mm diameter, and 5 – 6 mm high. It is pulvinate to nearly plane, with a somewhat irregularly undulate to crenate margin, fleshy, soft, gelatinous, shining when wet, dark brown with a light brownish grey outside. It becomes thin and leathery hard when dry, and difficult to retrieve in water. Hymenium thick ~ 500 µm, with young and mature asci, staining weakly in Melzer's reagent. Ectal excipulum consists of globular - angular cells, 80 – 100 µm in diameter, which become longitudinally elongate, ending up in hyphoid septate hairs with numerous golden brown vacuoles, up to ~ 300 – 350 x 10 – 12 µm, embedded in a gelatinous matrix.

Asci cylindric, 8-spored, J+ weak, (390) 420 – 440 x 18 – 20 µm, slightly protruding on

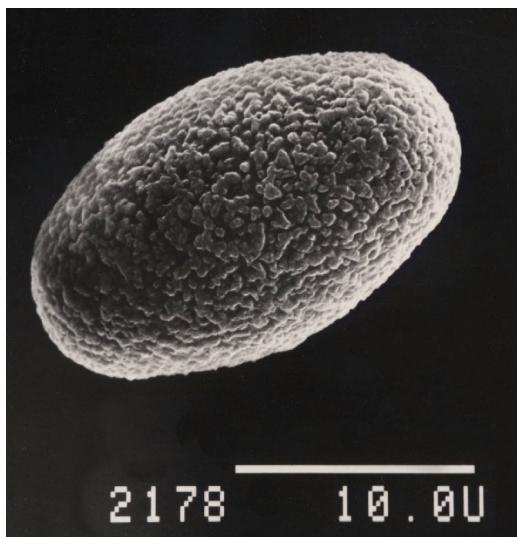


Figure 5. *Pachyella hydrophila*, RK 90.20. Scanning electron micrography of ascospore.

maturity. Ascospores, uniseriate, biguttulate surrounded by smaller oil drops, broadly ellipsoid, (21.3) 22.2 – 26.6 x (11.8) 12.7 – 14.8 µm, ornamented with dense irregular more or less anastomosing low warts, 0.3 – 0.7 µm broad and high, hardly visible in preparations of Cotton blue in lactic acid, but distinct in SEM. deBary bubbles not observed. Paraphyses straight, septate, ~ 5 – 6 µm wide, inflated to 14.8 – 15.5 µm at apex, with granular golden brownish content.

Material examined:

Norway, Oppland, Skjåk , Grotli, near Breiddalsvatnet, close to the road E15, UTM (WGS84) 32V MP 24253, 78809 (latitude 62.03396, longitude 7.55213), ca 900 metres a.s.l., along a small brooklet lined with *Salix* sp., occurring on water-soaked plant debris and gravel, together with *Eriophorum scheuchzeri*, *Carex* sp., *Juncus* sp., and *Cystoderma arcticum*, September 3. 1990, leg. R. Kristiansen, RK 90.20., (O) access no. 370585.

USA, Northern New York state, Adirondack

mountains, C. H. Peck, July 1880. Holotype of *Peziza hydrophila* Peck.

COMMENTS

John Haines, formerly curator of the New York herbarium, wrote me in a personal communication in April 27, 1993, that Peck did not specify where in the Adirondack region he collected the species ("*Peziza*" *hydrophila*), but finds and records show him to have spent the month of July, 1880 in the NW corner of Essex county. It is a mountainous area with a base elevation of ca 500 – 850 metres a.s.l., with some higher peaks around. He told me it has an alpine discomycete flora and might possibly be similar to parts of Norway. Don Pfister got a small part of the Norwegian material from me, and in a letter of January 20, 1993 he replied: "...I think your material is *Pachyella hydrophila*. It is certainly not *P. punctispora*."

The best diagnostic feature is the width of the apex of the paraphyses in *P. hydrophila*, which attain a width of 15 µm, while in *P. punctispora* it is much narrower, and hardly 9 µm. This is what Peck (*loc. cit.*) emphasised also, quote: "... paraphyses numerous, thickened above, brown...". Comparing the scanning electron micrographs of *P. punctispora* in Pfister (1975) with *P. hydrophila*, the former has small short discernable warts, while the latter has more marked dense irregular anastomosing low warts. Besides, the illustration of fresh ascomata from France of *P. punctispora* in Pfister and Candoussau (1981) shows a morphology different from my *P. hydrophila*, and Madame Candoussau (pers. comm. 29.08.1983) kindly supplied me with a colorphoto of the same, which is light brown, and definitively very different from the dark brown *P. hydrophila*.

The geology of the Adirondack mountains is part of the Appalachians, in the upper north east corner of USA. The mountains consist primarily of metamorphic rocks,

mainly gneiss, surrounding a central core of intrusive rocks, probably anorthosite, as a lobe of the Canadian shield, some 880 Ma years old. The Norwegian locality is situated in Precambrian gneiss of strongly metamorphic rocks, like eclogite, and are ca 1600 Ma years old (Torgeir T. Garmo, Lom, pers. comm. 2009).

EPILOGUE

The locality of *Pachyella hydrophila* has not been revisited after 1990. Meanwhile, E15 has been reconstructed to the better, but we do not know if the locality is damaged or not. It would be interesting to look again sometime, preferably around early September.

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