Some hyaloscyphaceous fungi from tundra and taiga

S. Huhtinen

Herbarium, University of Turku, SF-20500 Turku, Finland

Huhtinen, S. (1993). Some hyaloscyphaceous fungi from tundra and taiga. – Sydowia 45(2): 188–198.

Eight species of inoperculate, hyaloscyphaceous discomycetes are reported from arctic–alpine and boreal habitats. *Arachnopeziza delicatula* and *A. variepilosa* are reported from Yukon, Canada. The problems in the generic delimitation of *Arachnopeziza*, *Hyaloscypha*, *Psilachnum*, and *Psilocistella* are briefly discussed. *Arachnopeziza monoseptata* and *Hyaloscypha aureliella* are reported from boards in Svalbard. *Lachnellula calyciformis* was collected from driftwood in Svalbard. A Canadian collection of *Cistella tenuicula*, from *Populus* wood, was compared to original, caulicolous material of *Peziza tenuicula* from Finland. Only hair chemistry varied. The typification of *Peziza tenuicula* is discussed. Material referred to *Psilachnum acutum* is reported from Svalbard and Switzerland. Problems concerning the lectotypification and delimitation of the species are discussed. *Lasiobelonium belanense* is reported from Dovre, Norway.

Keywords: Discomycetes, Hyaloscyphaceae, arctic–alpine.

During the ISAM III congress in Svalbard in 1988, hyaloscyphaceous fungi growing on imported hardwood were collected. In addition to the taxa treated below, populations of unnamed species of *Pezizella* Fuckel and *Cistella* Quélet were found. In earlier papers, *Psilocistella obsoleta* (Vel.) Svr. and *Hamatocanthoscypha uncipila* (Le Gal) Huht. were reported from coniferous construction timber in Svalbard (Huhtinen, 1987c; 1990). Corticolous taxa are a rare, introduced part of fungal flora in Svalbard. Natural occurrence on driftwood is often limited by the severe and dry surroundings close to the shoreline.

The material was studied following the same methods described by Huhtinen (1990). The abbreviations and colour coding also follow that study.

Arachnopeziza delicatula Fuckel, Symb. mycol. 304. 1870. – Fig. 1 a–e.

Little can be added to Korf's (1951) detailed description. Material was compared to a collection in CUP, determined by Dr. Korf. The spores in the Yukon collection measure 28–39 x 2.0–3.2 µm and are typically 3–5–septate when mature. The hairs have slightly thickened,

smooth walls. A bulbous basal cell and a somewhat widened apical cell are also often present.

Svrček (1988) recently described *Arachnopeziza depauperata* Svr., which he distinguished from *A. delicatula* by narrower, aseptate spores and hairs. These characters clearly exclude the present collection from *A. depauperata*.

Material studied. – CANADA: Yukon, Kluane Lake, NW of Sulphur Lake, on decayed wood of *Populus tremuloides*, 22. 9. 1987, Huhtinen 87/145 (TUR). - USA: New York, Ringwood, Lloyd-Cornell Preserve, on inner surface of bark, 5. 10. 1951, det. R. P. Korf (CUP-G 50).

Arachnopeziza monoseptata (Galán & Raitv.) Huht., Mycotaxon 30: 18. 1987. – Fig. 3 i–l.

An emended description of this species was given by Huhtinen (1987b), based on the isotype (from Spain) and another collection from northern Norway. The two collections are very similar. The latter originated from an old board, which is exactly the same ecological niche as in the collection from Ny Ålesund. The species was re-encountered in 1991 from Kevo Research Station at Inari Lappland growing again on an old board.

The collections reported here add variation to *A. monoseptata*. Spore septation, typical of the two collections studied earlier (Huhtinen, 1987b), is lacking in the Svalbard collection and rare in material from Kevo. The presence and degree of amyloid reaction in the excipulum and hairs are also variable. Dark violet areas characterize the hairs and excipulum of the earlier material. Such a reaction is frequent in the excipulum of Kevo material but not seen in the hairs. The collection from Ny Ålesund has a MLZ– excipulum, whereas the hairs often show moderately amyloid walls. The colour reaction, however, is not seen as clearly localized, dark violet nodules.

In all four known collections of *A. monoseptata* an amyloid reaction is present in at least some parts of the excipulum or hairs. Other characteristic features are large-celled excipulum, oblong-elongate spores, lack of dextrinoid reactions, presence of resin on the cylindrical-septate hairs, ascal croziers and occurrence on coniferous wood. As noted earlier (Huhtinen, 1987a; 1987b), glassy hair apices are lacking. The two new collections did not show traces of a subiculum.

Material studied. – FINLAND: Inarin Lappi, Utsjoki, Kevo Research Station, on a board in an old cellar, 8. 8. 1991 Huhtinen 91/29 (TUR). - NORWAY: Svalbard, Ny Ålesund, old mining area above the village, on board, 11. 8. 1988 Huhtinen 88/10 (TUR).

Arachnopeziza variepilosa (Galán & Raitv.) Huht., Mycotaxon 30: 14. 1987. – Fig. 1 f–j.

A description of the species was given earlier by Huhtinen (1987b). Important characters which match the type collection (see also Raitviir & Galán, 1986) are hair size and shape, hair wall characters, resin and its distribution, all spore characters, excipular characters, clearly amyloid areas in hairs and excipulum, MLZ+ asci with croziers, paraphyses and ecological characters.

Deviating characters are few. Most hairs are aseptate in their free, protruding part. Less often the hairs are one–septate. In the two specimens studied earlier (Huhtinen, 1987b) septate hairs were common, septa being more frequent in basal parts but also occurring close to hair apices. The amount of resin in the Yukon collection is also smaller and, consequently, hairs are not glued together as strongly. While spore size and shape are identical to the type collection, the asci are larger (25–36 x 4. 5–6.0 µm in the type, 40–50 x 6. 4–8.0 µm in present material).

In addition to the present specimen, another North American collection shows the same deviating character combination. Whether the North American counterpart of *A. variepilosa* should be recognized at subspecific level remains to be seen after study of further collections. The characters linking the four populations are numerous. However, if hair septation proves to be variable in such taxa with thin–walled, cylindrical and smooth hairs, the generic limits are also in serious doubt. Blunt and septate hairs have been excluded from *Hyaloscypha* subg. *Eupezizella* (Höhnel) Huht. (Huhtinen, 1990). If hair septation truly is a variable character within numerous taxa, the delimitation of those taxa close to *Hyaloscypha* Boud., *Arachnopeziza* Fuckel, *Psilocistella* Svr. and even *Psilachnum* Höhnel need revision. Not even the use of ecological characters results in natural entities. Additional characters can perhaps be found using living material (Baral & Krieglsteiner, 1985: 86).

Single spore isolates were derived from the Canadian collection. Cultures were characterized by a dark greyish (Cailleux S92) basic colour. Mats were covered with light brown (L71), velvety aerial hyphae at the centre. The margin was characterized by a 1–4 mm reddish brown (S15) zone.

Material studied. – CANADA: Yukon, Kluane Lake, Outpost Mountain, close to the timberline at ca. 1800 m, on brown rot of *Picea glauca*, 19. 8. 1987 Huhtinen 87/131 (TUR). - USA: Michigan, The Gorge County, Cheboygan, 15. 6. 1948 Korf (Herb. Korf 1233).

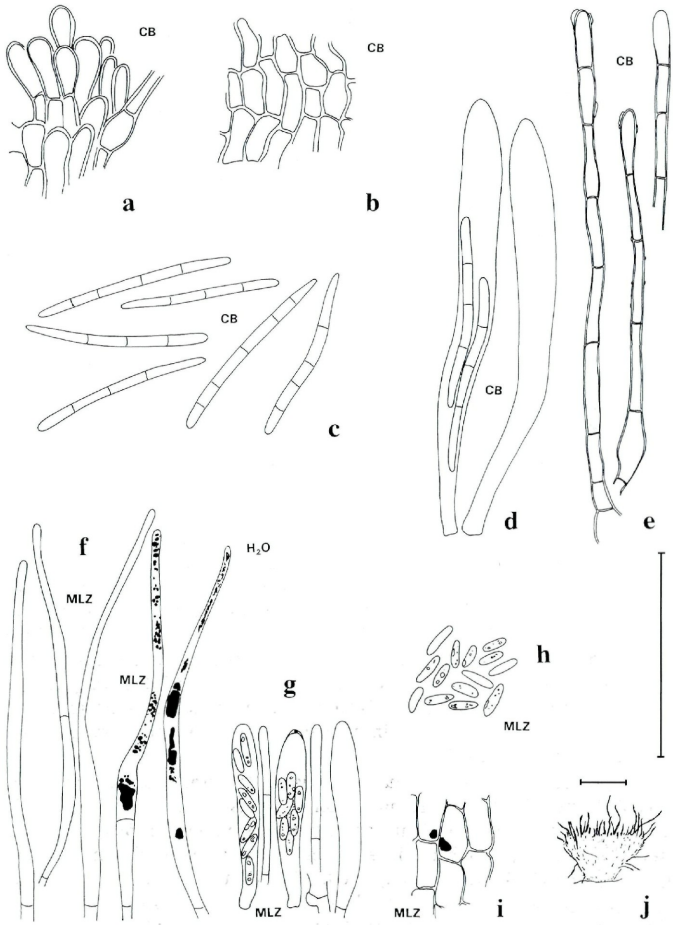

Fig. 1. – a–e: *Arachnopeziza delicatula*. – a. margin; b. ectal excipulum; c. spores; d. asci; e. hairs. – f–j: *A. variepilosa*. – f. hairs showing the resinous contents; g. asci and paraphyses; h. spores; i. ectal excipulum showing the amyloid reaction; j. dry apothecium. – Scale 50 µm, for apothecium 100 µm.

Hyaloscypha aureliella (Nyl.) Huht., Karstenia 29: 107. 1990.

This species was relatively common around Longyearbyen and Ny Ålesund. Populations were fruiting on old boards and other mining timber lying on the tundra. Morphologically the apothecia fall into the core of the species.

Huhtinen (1990) reported three other taxa of *Hyaloscypha* from Spitsbergen: *H. albohyalina* (P. Karsten) Boud. var. *albohyalina*, *H. albohyalina* var. *spiralis* (Vel.) Huht., and *H. britannica* Huht. var. *roseoguttata* Huht. These were, however, less common than *H. aureliella*. All collections originate from coniferous wood imported to the islands.

Material studied. – NORWAY: Svalbard: Longyearbyen, 400 m SE of Svalbard Museum, on construction timber, 17. 8. 1988 Huhtinen 88/66 (TUR); Longyearbyen, old dump at Sverdrupbyen, on a board, 14. 8. 1988 Huhtinen 88/67 (TUR); Ny Ålesund, old mining area above the village, on construction timber, 14. 8. 1988 Huhtinen 88/34 (TUR).

Cistella tenuicula (P. Karsten) Raschle, Nova Hedwigia 30: 665. 1978. – Fig. 2.

The Canadian lignicolous collection is a perfect match of the original material of *Peziza tenuicula* P. Karsten, except for hair exudates. In Karsten's caulicolous material hairs bear warts which deform in MLZ and CB. Stable warts (Fig. 3g, arrows) are rare and always apical. The warts in the Canadian collection appear as small spines even in MLZ and CB. No deformation was observed. The study of further lignicolous collections of *C. tenuicula* will yield interesting information, since we could demonstrate a possible substrate–induced difference in hair exudates within a species as in the genus *Protounguicularia* (Huhtinen, 1987a).

Two collections of *P. tenuicula* exist in Karsten's herbarium in H, nos. 591 and 592. Both originate from *Anthriscus*, which was the original substrate given by Karsten (1869). Specimen no. 591 bears the date 28. 9. 1869, which deviates from the date in the diagnosis (August, before 1868, cf. Karsten, 1869: 102). Of the annotations on this packet only ascal reaction could be claimed to appear in the diagnosis. The spore measurements, observations on their predominantly curved shape and on septa are not described in the diagnosis. The date given on the packet is not a slip of the pen, as Karsten later (Karsten, 1871) also cited collections made in September. Most of the annotations of #591 appear in this emended description. The collection date of #592 is omitted from the packet, but judged from pieces of the substrate and the associated fungi, #592 is only a duplicate of #591. As the two

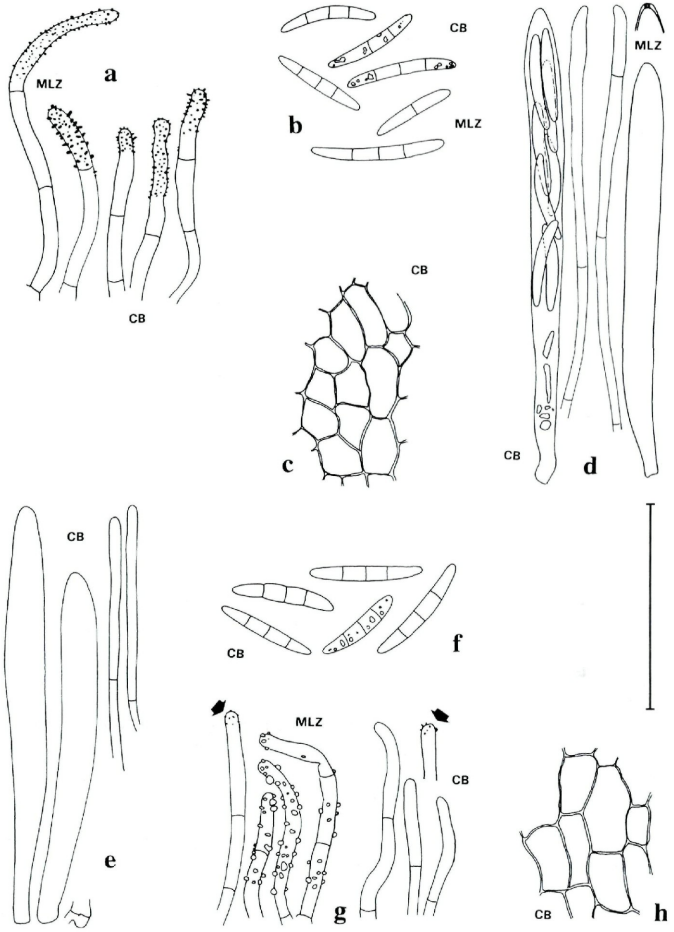

Fig. 2. – *Cistella tenuicula*, SH 87/147 (a–d) and topotype of *Peziza tenuicula* (e–h). – a. hairs; b. spores; c. ectal excipulum; d. asci and paraphyses; e. asci and paraphyses; f. spores; g. hairs, showing deforming and stable (arrows) warts; h. ectal excipulum. Scale 50 µm.

specimens were not the material used for the diagnosis and were not cited, they are not type material, although considered as such by Dennis (1956) and Raschle (1978) (Art. 7. 3, 7. 7).

The complete journal volume, containing "Monographia Pezizarum fennicarum", was issued between 2. 10. and 6. 11. 1869 (Stafleu & Cowan, 1979). A collection made in late September 1869 could unlikely be original material. The protologue was not emended using this material. Of the two collections, #592 would have been a far better choice for the type as it contains many mature apothecia. Dennis (1956), however, unintentionally neotypified *P. tenuicula* by citing #591 as "typus" (Art. 7.9., 8.3).

Material studied. – CANADA: Yukon, Kluane Lake, on decorticated wood of *Populus tremuloides*, 22. 9. 1987, Huhtinen 87/147 (TUR). - FINLAND: Etelä–Häme, Tammela, Mustiala, ad *Ceref. sylv.*, 28. 9. 1869, Karsten (H, Herb. Karsten 591 – Neotype of *Peziza tenuicula*). Mustiala, in *Cerefolio sylv.* [on stems of *Anthriscus sylvestris*, no date], P. A. Karsten (H, Herb. Karsten 592, sub *Helotium tenuiculum*, probably later topotype of *Peziza tenuicula*, designated here).

Lachnellula calyciformis (Willd.: Fr.) Dharne, Phytopathol. Z. 53: 124. 1965. – Fig. 3 e–h.

Using the keys by Dharne (1965) and Baral (1984) the present material can not be named unequivocally. If spore size (6.0–9.5 x 2–3(–5) µm), shape and guttulation are taken as key characters, the most adequate name is *L. calyciformis*. Its closest relative, *L. subtilissima* (Cooke) Dennis, differs in its narrower, aguttulate and fusoid spores (Baral, 1984). Ascus plugs are MLZ– in the present collection, which is typical of the species. Three different reactions are reported for *L. subtilissima* by Dharne (1965: blue), Baral (1984: red) and Breitenbach & Kränzlin (1981: negative). The ascus bases in the present material have croziers, in contrast to the material treated by Baral (1984). Evidently more than one taxon is involved and, at present, *L. calyciformis* must be taken as a complex species.

Material studied. – NORWAY: Svalbard, Longyearbyen, near the village, on a corticated conifer trunk, 19. 8. 1992, Huhtinen 88/72 (TUR).

Lasiobelonium belanense (Svr.) Raitv., Scripta Mycol. 9: 109. 1980. – Fig. 3 a–d.

Raitviir (1980) provided a treatment of this species. In our material, the asci are MLZ+ and arise from croziers. Hair vesture consists of a hyaline resinous exudate forming small warts and amorphous nodules on the hairs. The vesture is not destroyed in 10 % KOH and in Con-

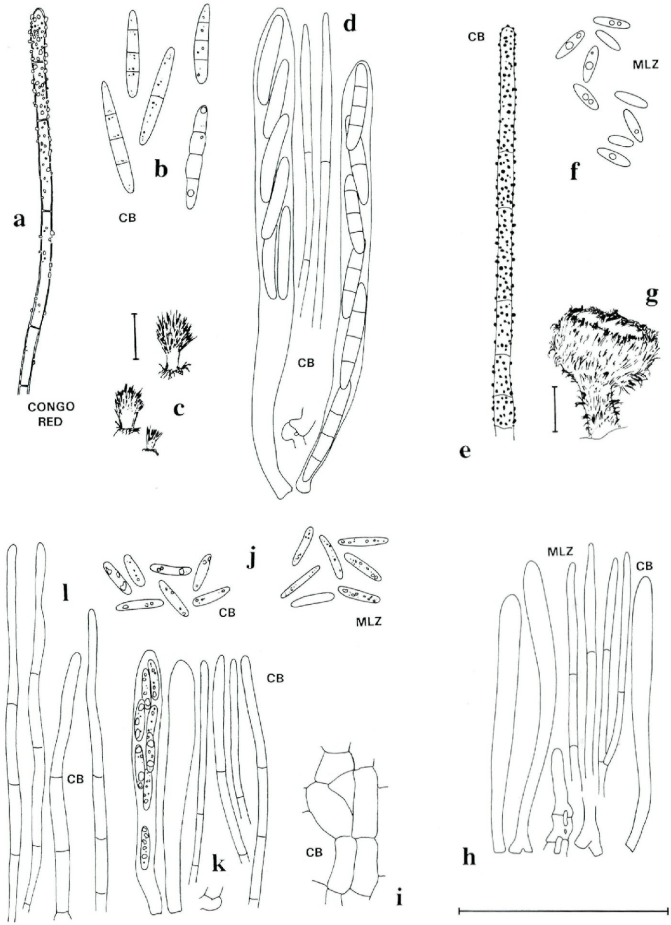

Fig. 3. – a–d. *Lasiobelonium belanense*. – a. hair; b. spores; c. dry apothecia; d. asci and paraphyses. – e–h. *Lachnellula calyciformis*. – e. hair; f. spores; g. dry apothecium; h. asci and paraphyses. – i–l. *Arachnopeziza variepilosa*. – i. ectal excipulum; j. spores; k. asci and paraphyses; l. hairs. – Scale 50 µm, for apothecia 100 µm.

go red, but is mostly lost in heated cotton blue mounts. As in Raitviir's arctic material, the apothecia occur on a well-developed subiculum.

Material studied. – NORWAY: Oppland, Drivdalen, Drivstuseetra, on decorticated wood of *Betula*, 24. 8. 1985, Huhtinen 85/70 (TUR).

Psilachnum acutum (Vel.) Raitv., Eesti NSV Tead. Akad. Toim., Biol. 17: 328. 1968. – Fig. 4.

When Svrček (1979) treated *Lachnum acutum* Vel., he reported only one discontinuity in the otherwise uniform material. Paraphyses were lanceolate in most populations and cylindrical in few. A separate description was given for the specimen selected as lectotype. In this specimen paraphyses were reportedly lanceolate.

The three specimens treated here agree well with Svrček's description of *P. acutum*. Two groups of specimens can be distinguished, one with lanceolate paraphyses and asci with simple basal septa and a second one with predominantly cylindrical paraphyses and asci arising from croziers. Collections 88/64 and 88/125, showing the former character combination, are most likely identical with the lectotype, but a detailed study of the lectotype is needed, since Svrček did not describe ascus development. *Psilachnum crinellum* (Ellis & Everh.) Dennis may be conspecific with the lectotype of *P. acutum*. The description given by Dennis (1963) is largely identical and the paraphyses are lanceolate.

The two other specimens are treated here under *P. acutum* although the combination of morphological characters is peculiar. The name for this taxon can be assessed with certainty only after careful study of the types of the two varieties of *Lachnum acutum* described by Velenovsky (1934).

The species has been reported from Svalbard by Huhtinen (1987c). That collection had more robust apothecia and differed from *P. acutum* in having larger asci. Compared to the three recent collections reported here, that specimen is somewhat more robust and belongs possibly to a distinct taxon.

Material studied. – NORWAY: Svalbard, Ny Ålesund, on gramineous culms, 12. 8. 1988, Huhtinen 88/23 (TUR); Longyearbyen, on culms of *Poa alpigena* f. *vivipara*, 17. 8. 1988, Huhtinen 88/64 (TUR). – SWITZERLAND: Graubünden, Samnaun, on leaves of *Luzula spadicea* at ca. 2500 m a. s. l., 28. 8. 1984, Huhtinen 84/125 (TUR).

Acknowledgments

Dr. Ain Raitviir and Dr. Brian Spooner are kindly thanked for reviewing this paper. Dr. Sharon Gowan kindly revised the English text. Dr. Pekka Isoviita generously offered advice in nomenclatoral matters.

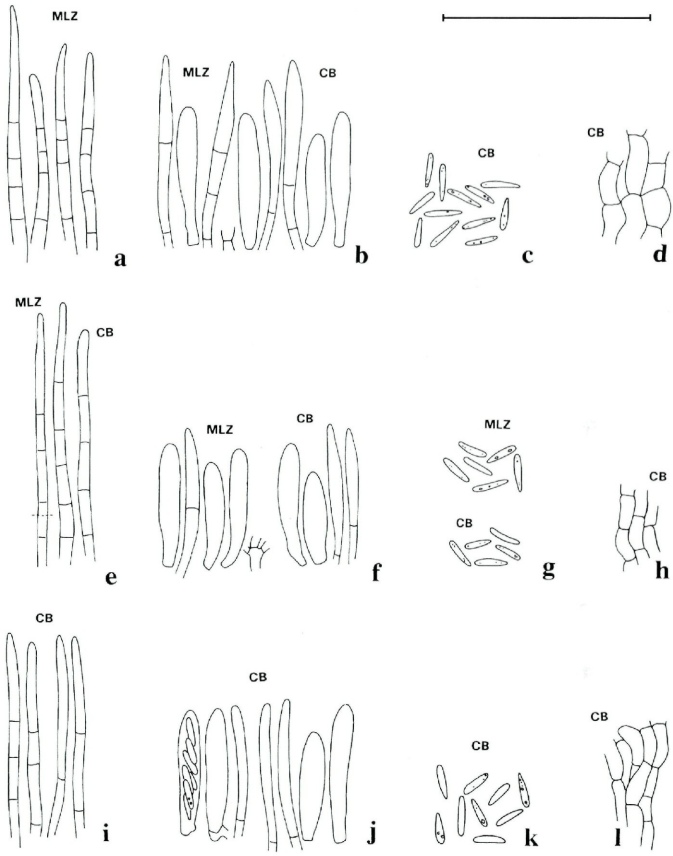

Fig. 4. – *Psilachnum acutum*, SH 88/125 (a–d), 88/64 (e–h) and 88/23 (i–l). – a, e, i. hairs; b, f, j. asci and paraphyses; c, g, k. spores; d, h, l. ectal excipulum. – Scale 50 µm.

References

Baral, H. O. (1984). Taxonomische und ökologische Studien über die Koniferen bewohnenden europäischen Arten der Gattung *Lachnellula* Karsten. – Beiträge zur Kenntnis der Pilze Mitteleuropas 1: 143–156.

—— & G. J. Krieglsteiner (1985). Bausteine zu einer Askomyzeten–Flora der Bundesrepublik Deutschland: In Süddeutschland gefundene inoperculate Diskomyzeten – mit taxonomischen, ökologischen, chorologischen Hinweisen und einer Farbtafel. – Beihefte Z. Mykol. 6: 1–160.

Breitenbach, J. & F. Kränzlin (1981). Pilze der Schweiz 1. Ascomyceten. – Verlag Mykologia, Luzern, 313 pp.

Dennis, R. W. G. (1956). A revision of the British Helotiaceae in the Herbarium of the Royal Botanic Gardens, Kew, with notes on related European species. – Mycol. Pap. 62: 1–216.

—— (1963). A redisposition of some fungi ascribed to the Hyaloscyphaceae. – Kew Bull. 17: 319–379.

Dharne, C. G. (1965). Taxonomic investigations on the discomycetous genus *Lachnellula* Karst. – Phytopathol. Z. 53: 101–144.

Huhtinen, S. (1987a). The genus *Protounguicularia* in Europe. – Beiträge Kenntnis Pilze Mitteleuropas 3: 457–463.

—— (1987b). Taxonomic studies in the genera *Protounguicularia*, *Arachnopeziza* and *Dematioscypha*. – Mycotaxon 30: 9–28.

—— (1987c). New Svalbard fungi. In: Laursen, G. A. & J. F. Ammirati (eds.), Arctic and alpine mycology 2. – Plenum Press, New York: 123–151.

—— (1990). A monograph of *Hyaloscypha* and allied genera. – Karstenia 29: 45–252.

Karsten, P. A. (1869). Monographia Pezizarum fennicarum. – Not. Sällsk. Fauna Flora Fenn. Förh. 10: 99–206.

—— (1871). Mycologia Fennica 1. Discomycetes. – Bidr. Känned. Finlands Natur Folk 19: 1–250.

Korf, R. P. (1951). A monograph of the Arachnopezizeae. – Lloydia 14: 129–180.

Raitviir, A. (1980). The genus *Lasiobelonium*. – Scripta Mycol. 9: 99–132.

—— & R. Galán (1986). A new genus of the Hyaloscyphaceae. – Int. J. Mycol. Lichenol. 2: 221–234.

Raschle, P. (1978). Neufunde und Neukombinationen von Hyaloscyphaceae Nannfeldt (Helotiales). – Nova Hedwigia 30: 653–672.

Stafleu, F. A. & R. S. Cowan (1979). Taxonomic literature 2. – Regnum vegetabile 98: 1–991.

Svrček, M. (1979). New or less known Discomycetes 10. – Česká Mykol. 33: 193–206.

—— (1988). New or less known Discomycetes 18. – Česká Mykol. 42: 137–148.

Velenovsky, J. (1934). Monographia Discomycetum Bohemiae. – 436 pp.

(Manuscript accepted 18th December 1992)