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STUDIES IN CUP-FUNGI—I

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(With 18 Text-figures)

In the present paper four species are chosen at random for closer study. *Melastiza rubra* is proposed as a new combination, *Peziza limnaea* as a new name and species.

This is the first instalment of a series intended to accommodate miscellaneous observations on Ascomycetes.

For information concerning or loan of material I am greatly indebted to the Directors of the following herbaria: 'Botanisch Laboratorium, Afd. Plantensystematiek', Groningen (GRO), The Herbarium, Kew (K), and 'Muséum National d'Histoire Naturelle, Laboratoire de Cryptogamie', Paris (PC).

The material of one of the species dealt with here was found during a collecting trip in the northwestern part of India. This journey was made possible by a grant from the 'Netherlands Organization for the Advancement of Pure Research (Z.W.O.)'.

Melastiza rubra (Batra) Maas G., *comb. nov.*—Figs. 1–6

Aleuria rubra Batra *in* Mycologia **52**: 526, figs. 1–3. 1960 [1961]; *apud* L. R. Batra & S. W. T. Batra *in* Kansas Univ. Sci. Bull. **44**: 135. 1963. — Type locality: India, Uttar Pradesh, Mussoorie.

Apothecia gregarious, up to 25 mm across, discoid, centrally attached. Disc orbicular, scarlet. Receptaculum covered with minute hairs, orange-red except at the margin which is brown. Hairs scattered over the surface and faintly coloured, more densely clustered and dark brown towards the margin, sometimes arranged in streaks. Excipulum made up of textura angularis, the outer cells of which have moderately thickened, yellowish cell walls. Hairs arising from the outer cells (Figs. 1–3), up to 70 μ.long, 7–10 μ wide, flexuous or curved, unbranched, septate, moderately thick-walled, with blunt apex, yellowish except towards the margin of the apothecium where they are yellow-brown. Asci 225–245 × 11–12 μ, cylindrical, 8-spored, not stained in Melzer's reagent (Fig. 4). Spores (measured without ornamentation) 12.5–14.3 × 6.7–7.4 μ, ellipsoid, heavily ornamented, colourless, with two large oil drops; ornamentation consisting of a strongly raised reticulum, which at the poles may reach a height of 2.7–4 μ (Fig. 5). Paraphyses 2–2.5 μ wide below, septate, filled with orange granules, the apex swollen up to 5–6 μ (Fig. 6).

Habitat.—On bare loamy soil of road-side, exposed, 2000 m alt.

Material examined.—India: Uttar Pradesh, Mussoorie, near Charleville, 13 Sept. 1964, *R. A. Maas Geesteranus 14519* (L).

The characters indicated above cleary identify this species as a member of *Melastiza*. *Melastiza* is a small genus, but a growing one and the distinction of its species may cause difficulties. The following key is mainly based on the data taken from literature (Graddon, 1961: 609, fig. 3a; Le Gal 1947: fig. 52 and 1958: 151, 152, fig.).

KEY TO THE SPECIES RECOGNIZED IN MELASTIZA

1. Ornamentation of the spores consisting of coarse warts, with a low and often very incomplete reticulum between the warts.
   2. Spores up to 21 μ long (measured without ornamentation).
      3. Spores 6–9 μ broad . . . . . *M. greletii* Le Gal
      3. Spores 9.5–12.5 μ broad . . . . . *M. boudieri* (Höhn.) Le Gal
   2. Spores 23–28 μ long (measured without ornamentation). . . . *M. scotica* Graddon
1. Ornamentation of the spores consisting of a conspicuous reticulum.
   4. Spores under 15 μ long, reticulum strongly raised (Fig. 5) . *M. rubra* (Batra) Maas G.
   4. Spores over 15 μ long, reticulum low (Fig. 7) . . *M. chateri* (W. G. Smith) Boud.

Batra (l.c.) recorded the spores as "(18–)24–26(–28) × 10–13 μ reticulis inclusis . . ." This is an unusual and unfortunate way of measuring the spores considering that the ornamentation forms no part of the spore-body proper. However, from his drawings it is possible to estimate the spore size as approximately 11–12 × 6.5 μ, which is well in agreement with the measurements given above.

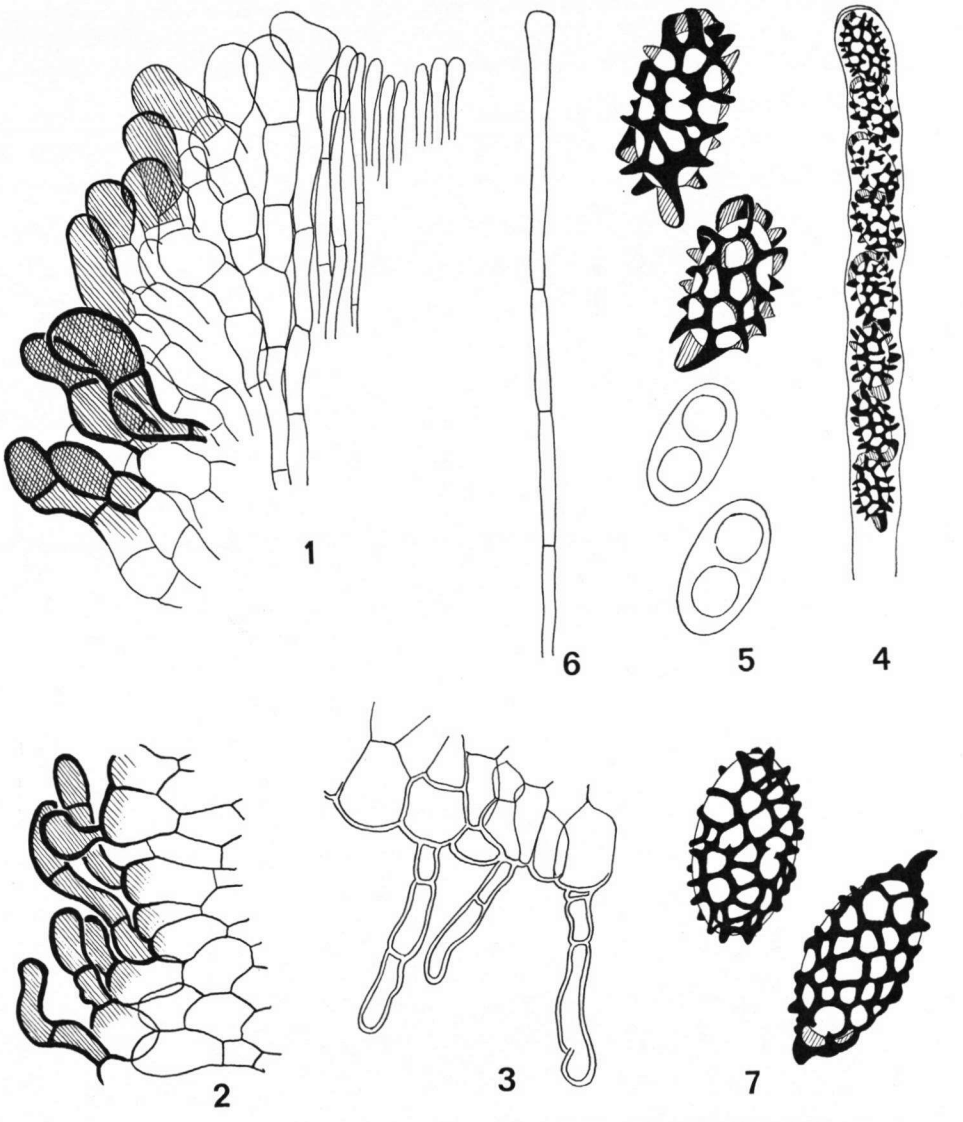
Denison (1963: 109) recorded a find of what he called *Aleuria rubra* from Costa Rica. It is not clear from his description, which lacks information about the surface of the receptacle, whether his specimens are actually referable to *Melastiza*. However, to judge from the spores illustrated in his Fig. 9, it seems safe to conclude that at all events his material is not conspecific with *M. rubra*.

Very likely the size of the spores and their ornamentation are not the only features by which the species can be told. The colour of the disk and the excipular hairs, as indicated by Graddon, may well prove useful as differential characters.

OMBROPHILA VIOLACEA Fr.—Figs. 8–13

Peziza clavus var. *violascens* Alb. & Schw., Consp. Fung. 306. 1805; *ex* Pers., Mycol. eur. 1: 322. 1822; Fr., Syst. mycol. 2: 138. 1822. — *Ombrophila violacea* Fr., Summa Veg. Scand. 357. 1849. — Type locality: Germany, Oberlausitz, 'Moholzer Haide' and 'Schöpswiesen'.

Apothecium up to 4 mm across, at first stipitate, but stipe becoming less apparent with age, finally disappearing and receptaculum centrally attached to the substratum. Disc lilaceous to violaceous, becoming vaulted and wrinkled with age, which makes the fungus resemble a *Tremella* (Fig. 8). Receptaculum glabrous, concolorous with the disc or paler to whitish. Flesh soft, aqueous-gelatinous, made up of loosely interwoven hyphae (Fig. 9); hyphae anastomosing, branched, septate, narrow, 4–6 μ wide, thin-walled, embedded in a gelatinous matrix, more closely spaced toward the excipulum. Excipulum made up of closely coherent, very large and inflated hyphae, measuring 60–200 × 8–24 μ, which are thin-walled, and parallel to the surface (Fig. 10). Asci 80–90 × 6–8 μ, 8-spored, the pore blue in Melzer's reagent (Fig. 11). Spores 9.0–10.7 × 4.2–5.4 μ, obliquely 1-seriate in the



Figs. 1–6. *Melastiza rubra.* — 1. Excipular cells and dark hairs near margin, × 400. — 2. Excipular cells and hairs farther down the receptacle, × 400. — 3. Excipular cells and hairs as they appear in the greater part of the receptacle, × 400. — 4. Ascus, × 600. — 5. Immature and mature spores, × 1400. — 6. Paraphysis, × 600. (*Maas Geesteranus 14519*, L)
Fig. 7. *Melastiza chateri.* Two mature spores, × 1400. (Dutch material, L)

ascus, ellipsoid-fusiform, 1-celled, smooth, colourless, with two oil drops (Fig. 12). Paraphyses 1–1.5 μ wide, unbranched (?), filled with oily matter, 1.8–3.0 μ wide above (Fig. 13).

HABITAT.—On decayed wood, bark, and vegetable debris in Alnetum.

MATERIAL EXAMINED.—NETHERLANDS: Noord-Holland, 's-Graveland, 'Schaep en Burgh', 8 & 9 Nov. 1965, *J. Daams* (L); Kortenhoef, 12 Nov. 1965, *J. Daams* (L).

Ombrophila violacea is a small and inconspicuous species that grows in damp, uninviting places. It is reputed to be rare, but once its environmental requirements are understood it may well prove to be "per totum territorium frequens" (Velenovský, 1934: 106).

von Höhnel (1918a: 350; 1918b: 584) and Seaver (1951: 232) have dealt at some length with the confusion concerning the author's citation of the present species and its alleged relation to some other species. I need not enlarge further upon this point.

Collections and good descriptions of the species seem to be equally rare. The only good description of recent date that I know of has been published by Dennis (1956: 163), but one would have welcomed a figure. The chief purpose of the present note is to provide such one figure.

Oudemans (1902: 686) recorded *Ombrophila violacea* from Valkenburg (prov. Limburg), collected by J. Rick S.J., October 1900, on decayed wood of *Salix*. The record lacks a description but Rick's collection is still in existence (herb. Oudemans, GRO). Although it is in poor condition and probably immature, some of its features seem to indicate that Oudemans identified the material correctly. In my opinion, however, it is too unsatisfactory to be used for further reference.

A species that on account of its violaceous colour might be taken to be related is *Ombrophila palumbina* Malençon (1927: 98, fig. 3, pl. 6 figs. 11–13). However, the similarity is only superficial for it differs from *O. violacea* in that the ascus pore remains unstained in iodine and the spores are said to be "sans globules internes." Very probably the species is not even congeneric.

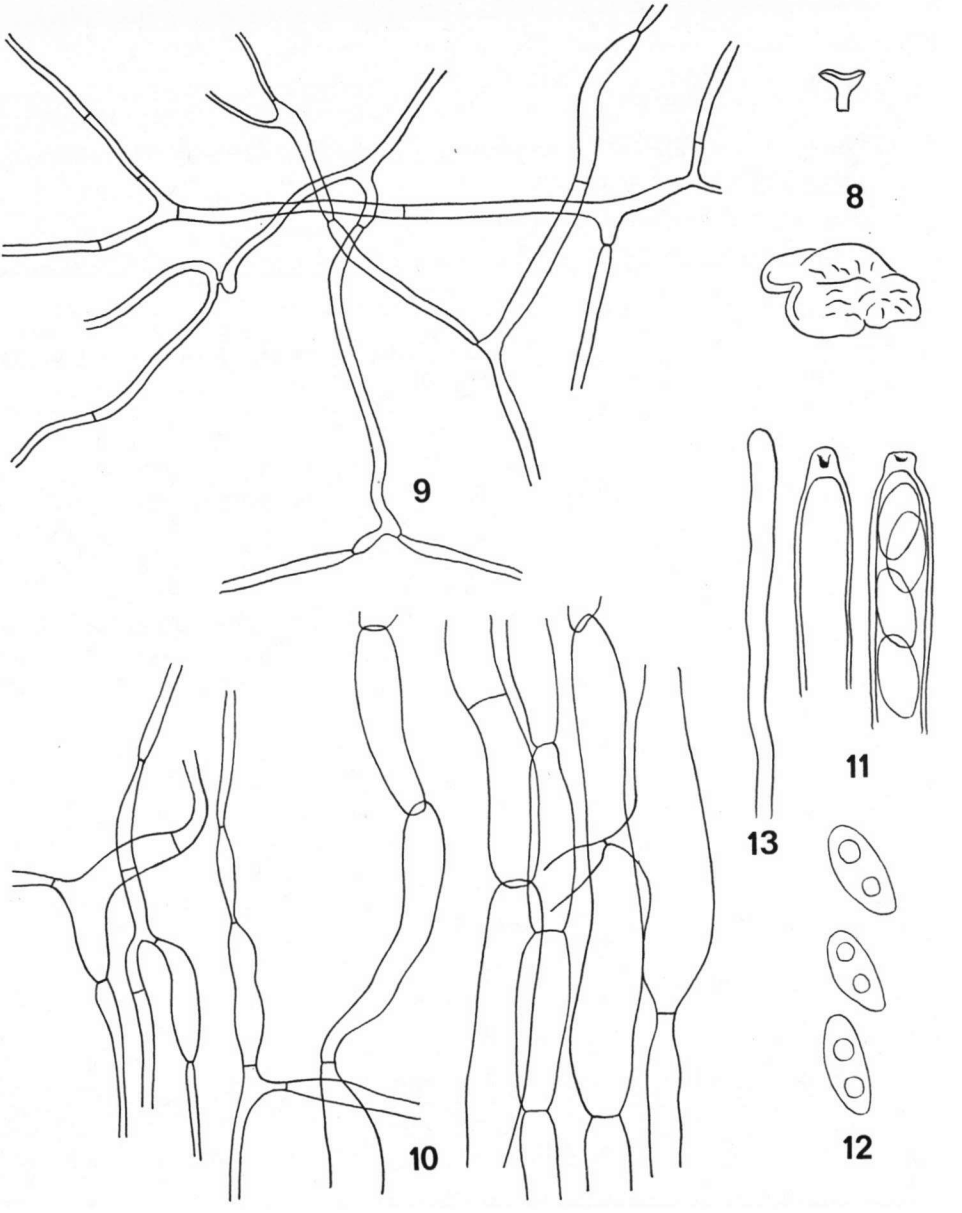
PEZIZA ANTHRACINA Cooke—Figs. 14, 15

Bulgaria carbonaria Fuck., Fungi rhen., No. 1137. 1865. — *Plicaria carbonaria* (Fuck.) Fuck. *in* Jb. nassau. Ver. Naturk. **23–24**: 326, pl. 4 fig. 35. 1870. — *Peziza* (*Humaria*) *anthracina* Cooke, Mycogr. 235, pl. 111 fig. 396. 1878 (name change); not *Peziza carbonaria* Alb. & Schw. *ex* Pers., Mycol. europ. **1**: 228. 1822. — *Barlaea anthracina* (Cooke) Rehm *in* KryptFl. Deutschl., Zweite Aufl., **1**(3): 934. 1894; Sacc., Syll. Fung. **11**: 396. 1895. — Type collection: Fuckel, Fungi rhen., No. 1137 (K).

Plicaria trachycarpa var. *muricata* Grelet *in* Bull. Soc. bot. Centre-Ouest 44. 1937 (not validly published, lacking a Latin description). — *Galactinia muricata* (Grelet) Le Gal *in* Bull. Soc. mycol. Fr. **78**: 212. 1962 (not validly published). — Type locality: France, surroundings of Savigné.

MISAPPLIED NAME: *Plicaria anthracina* (Cooke) Boud., Hist. Class. Discomyc. Eur. 50. 1907; Icon. mycol., Livr. 19, No. provis. 371. 1908 (= **2**: pl. 307; **4**: 170).

Cupulis lato-obconicis turbinatisve, substipatis, 1–2''' latis, extus pulveraceis, fuscis; disco



Figs. 8–13. *Ombrophila violacea.* — 8. Two apothecia, the smaller one in section, × 5. — 9. Hyphae of the flesh, branched in every direction, loosely interwoven, and embedded in gelatina, × 600. — 10. Hyphae of the excipulum, predominantly longitudinal, coherent, not embedded in a gelatinous matrix, on the left passing into hyphae of the flesh, × 600. — 11. Asci, × 1400. — 12. Spores, × 1400. — 13. Paraphysis, × 1400. (Netherlands, 's-Graveland, collection of 8 Nov., L)

plano, nitido, atro-fusco, gelatinoso-elastico, margine elevato; ascis cylindraceis, stipatis, amplis, 8 sporis; sporidiis globosis, hyalinis, paraphysibus mixtis.

In carbonariis humidis, rarissime. Autumno. In sylva Hostrichiensi.

The above is the original description which accompanied Fuckel's exsiccate. It was in its essentials copied by Cooke, but this author after having studied his copy of the exsiccate added a few characteristic details from his own observation. To Cooke's description the following observations may be added, which I made on the copy of Fuckel's exsiccate preserved at Kew:—

Asci (Fig. 14) operculate, 236–245 × 18–20 μ, the apex blue in Melzer's reagent. Spores (Fig. 15) 1-seriate or zigzag in the ascus, 11.2–15 μ in diameter, colourless, ornamented with blunt spines. Paraphyses about 3 μ wide, colourless, tips united by a yellow-brown mucus.

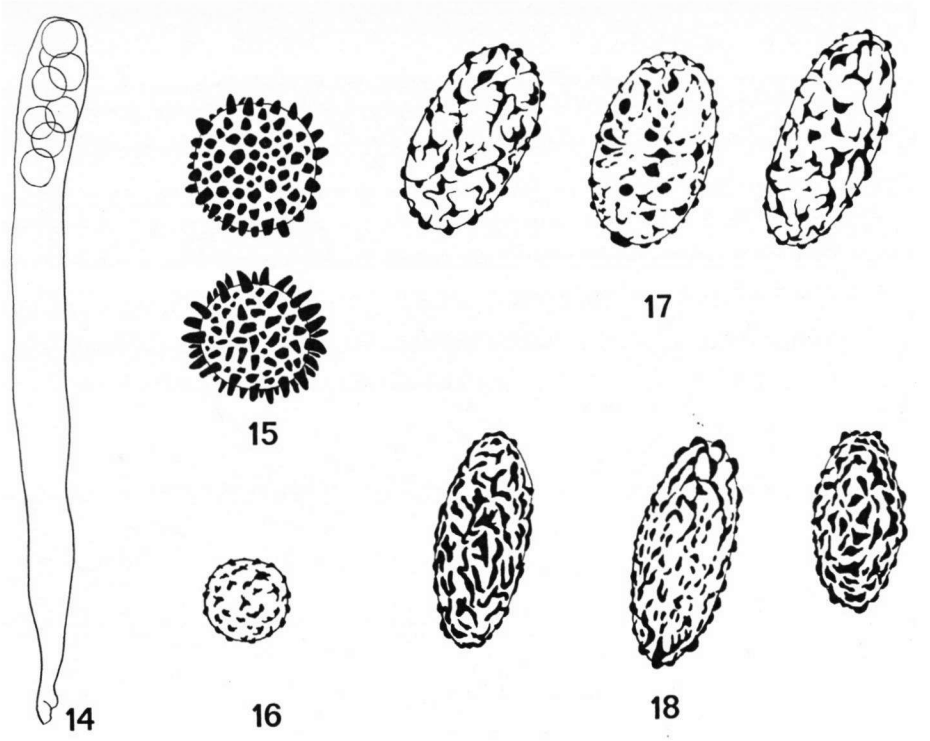
Plicaria trachycarpa var. *muricata* Grelet has been understood as a fungus, of which the spores are ornamented with fairly slender spines. At least the spores were so pictured by Le Gal (1947: fig. 8E) and Dennis (1960: pl. II fig. D, spore on the left). This is all that can be said of Grelet's variety, for it appears that no material of the two syntypes mentioned by Grelet (collected 8 July 1914 and 24 July 1930) can be located in the herbarium at Paris. A specimen collected by someone else at a later date (1939) and annotated by Grelet with the words "caractères microscopiques de la var. *muricata*," proved on re-examination to be the common *Peziza trachycarpa* Currey. However, taking into account that there is full agreement of Grelet's description with what is now known of the type of *P. anthracina*, *Plicaria trachycarpa* var. *muricata* is here reduced to synonymy.

Re-examination of the collection, which served Boudier for the illustration of his '*Plicaria anthracina*', showed that this fungus bears no relation to *Peziza anthracina*. The asci are 8-spored and do not stain blue in Melzer's reagent. The spores (Fig. 16) are spherical, 7.6–8.5 μ diameter, colourless, and ornamented with low, sometimes stellate warts, very different from the ornamentation of the spores of *Peziza anthracina*. The material seems best referable to *Svrčekia*, a genus recently proposed by Kubička (1960: 214), but the literature has not been sufficiently searched to know whether there exists a specific description that would cover Boudier's collection.

Peziza limnaea Maas G., *nom. et sp. nov.* [1]—Figs. 17, 18

Galactinia castanea var. *limosa* Grelet *in* Bull. Soc. bot. Centre-Ouest 166. 1936 (not validly published, lacking a Latin description). — *Galactinia limosa* (Grelet) Le Gal & Romagnesi *in* Revue Mycol. 4: 176. 1939 (not validly published). — *Peziza limosa* (Grelet) Nannfeldt *in* Lundell & Nannfeldt, Fungi exs. suec., praes. upsal., Fasc. 19–20: 46. 1941 (not validly published); not *Peziza limosa* Spreng., Syst. Veg., ed. 16, 4(2): 335. 1827. — Type: "*Galactinia castanea* (Quélet) Boud. var. *limosa* var. nov. [crossed out and rewritten: *limosa* (Grelet) Le Gal et Romagnesi] / (purpureo-brunnea — mycelio floccoso candido insidens) / Sur le bord vaseux d'un fossé, dans la prairie de Savigné (en face de ... [illegible]), le 2 octobre 1914" (PC).

[1] Etymology: λιμναῖος, of or from the marsh.



Figs. 14, 15. *Peziza anthracina.* — Ascus with immature spores, × 400. — Two spores, the lower one presumably being the older, × 1400. (K)

Fig. 16. *Plicaria anthracina* sensu Boud. — Spore, × 1400. (Nice, leg. J. B. Barla, herb. Boudier, PC)

Fig. 17. *Galactinia castanea* var. *limosa.* — Three spores, × 1400. (Type, PC)

Fig. 18. *Peziza limnaea.* — Three spores, × 1400. (Dutch material, L)

Receptaculum sessile, concavum, initio vix cupulatum, dein expansum et interdum lobatum, 5–15 mm latum, fere hymenio concolor sed saepe tomento crasso albo obtectum, margine leviter pruinoso excepto. Hymenium obscure purpuraceo-rufo-umbrinum. Asci cylindracei, ad basin parum attenuati, octospori, 355–425 × 17–22 μ, apice iodo ope coerulescentes. Paraphyses simplices vel ad basin extremam solum divisae, septatae, apice vix incrassato 7–10 μ, interdum partibus superioribus subfulvae. Sporae ellipsoideae, initio laeves et hyalinae, dein verrucosae atque aetate fulvescentes, vulgo 2 guttulis imparilibus praeditae, interdum 1-guttatae, rarius 3-guttatae, 18–20 × 10–11 μ.

The above is the Latin translation of Grelet's description. If only Grelet had copied the few Latin words from his label, these would have validated his publication. As it is, Article 36 of the International Code (1961) dictates that *Galactinia castanea* var. *limosa* was not validly published.

Peziza limnaea is not rare in the Netherlands, where it shows greater variability than has been indicated by Grelet, and therefore it would seem a suitable occasion to redescribe the species as it presents itself in this country. It will be seen that the

spores in the indigenous material (Fig. 18) have a different ratio of length and breadth from that shown in some of the spores of the type (Fig. 17). It should be realized, however, that the latter in all probability are not mature. Most Discomycetes on drying expel their ripe spores first, and the remaining immature ones possibly fail to regain their original shape when soaked in an alkaline solution. The spores of the type were found to measure 19.7–21.5 × (9–)10.3–10.7 μ.

Receptacle sessile on a small base or with a very short stalk, up to 45 mm diameter, variable as to the nature of its surface and its colour: glabrous or finely tomentose below, furfuraceous to verrucose towards the margin; ochraceous yellow-brown, brown, olive brown, chocolate brown or dingy purplish-brown, the margin often purplish-brown; the base covered with a whitish or dingy yellowish tomentum. Flesh brownish. Hymenium often with an olive green bloom when young, soon passing into purplish-brown to dark purplish-brown, nearly black-brown in old specimens. Asci 270–400 × 11–18 μ, the apex blued in Melzer's reagent (this reaction failed to show up in the type material, probably because it had been poisoned). Spores (15–)17.9–22.4 × (8–)9–10.7 μ, with 2 equally large oil drops, or 1 large and 1 small drop; the ornamentation consisting of fairly low, irregularly shaped and often curved warts, which either have tapering spurs or become interconnected by sinuous lines or ridges, without a network being formed (Fig. 18). Paraphyses 3–5 μ wide, colourless, gradually widened to a clavate apex, 6–9 μ, with yellowish contents.

On damp mud in swampy, well-wooded areas, and in muddy banks in deep shade.

MATERIAL EXAMINED. — NETHERLANDS:

Overijsel, Denekamp, Borchbos, 14 Oct. 1961, *C. Bas 2508* (L).

Gelderland, Baak, 6 Sept. 1953, *H. S. C. Huijsman* (L); 's-Heerenberg, Bijvank, 6 Sept. 1953, *H. S. C. Huijsman* (L); Elten - Stokkum, 8 July 1952, *H. S. C. Huijsman* (L); Vorden, 29 Sept. 1957, *E. Kits van Waveren* (L).

Utrecht, Oud-Loosdrecht, 17 Oct. 1963, *J. Daams* (L).

Zuid-Holland, Oegstgeest, 28 Aug. 1961, *M. A. Donk* (L).

Noord-Brabant, Strijbeek, Goudbergven, 15 July 1959, *P. B. Jansen* (L); 18 Aug. 1959, *R. A. Maas Geesteranus 12917* (L); Zundert, Krochten, 28 June 1955, *R. A. Maas Geesteranus 10416* (L); 27 July 1955, *C. Bas 791, 792* (L).

Möller (1958: 108) reported the occurrence of the present species in the Faeroes, where it was found to grow under conditions that do not seem particularly wet. The climate in these islands, however, is more humid than in The Netherlands, whilst their mean temperature in the warmest month, July, is many degrees lower than in this country.

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