

On *Lagerheima* SACC. and *Bulgariella* KARST.

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Abstract. — Based upon type studies of species referred to both *Lagerheima* SACC. and *Bulgariella* KARSTEN it is proposed to transfer *L. sphaerospora* (B. & C. ap. PHILLIPS) to *Bulgariella*.

In connection with my work on the Helotiales of Tierra del Fuego (Argentina) I have collected material tentatively determined as *Lagerheima* SACC. (ut *Lagerheimia*). As the genus is poorly known, I thought it sensible to get acquainted with the type species. This led me to the solution of the original problem of determination of the samples, but also to a taxonomic reevaluation of the species disposed in the genus.

Lagerheima was conceived by SACCARDO (1892: 55) for species characterized by patellate, sessile, dark and marginate apothecia with octosporous asci, paraphyses, and sphaeroid to ellipsoid, unicellular ascospores. He added “est *Patinella phaeospora*” and placed it in the family Patellariaceae Sect. Phaeospora. The species described and listed are:

1. *L. sphaerospora* (BERK. & COOKE ap. PHILLIPS) SACC.
2. *L. carteri* (BERK.) SACC.

Later in SACCARDO & TROTTER (1928: 1376) two more taxa are found:

3. *L. carbonicola* TORRENT
4. *L. dermatoida* REHM

Two more species are known:

5. *L. melanochlora* BOEDIJN
6. *L. pilosa* SYDOW

The genus was dedicated to N. G. LAGERHEIM (1860—1926), a Swedish professor of Botany at the University of Quito (Ecuador), co-author of PATOULLARD'S “Champignons de l'Equateur”.

Lagerheima SACC. was accepted by BOUDIER (1907: 148) who, however, described and recognized only *L. sphaerospora*. It was also cited by CLEMENTS & SHEAR (1931: 314) who selected as type species *L. sphaerospora* (B. & C.) SACC., and considered the genus a member of the Patellariaceae. NANNFELDT (1932: 324) accepted the genus with the orthographic variant *Lagerheimia* (establishing *Patellaria sphaerospora* B. & C. as “*pseudotypus*”) adding: “known to me through

MASSEE's description and drawings", and placing the genus in the Helotiaceae. Effectively MASSEE (1895: 97) gave a short description and figures (51—54) for the type species.

Modern treatises on *Discomycetes* do not cite the genus, except a superficial reference by KORF (in AINSWORTH & SUSSMAN, 1973: 304) when he keys-out *Xylogramma*, saying: "This appears to be the correct name for most of the species previously called *Durella* . . . Species of *Lagerheimia* differing in having brown, one-celled spores, will also key here".

In view of the contradictory opinions I believe that one of the best solutions for incorporating *Lagerheima* to the correct family is to study the excipulum in the species attributed to the genus, especially in the type species. Fortunately, I was able to locate all species listed above, and following the classical methodology for *Discomycetes* (using 3% KOH for soaking dried fructifications, making freezing-microtome sections, using MELZER reagent, lactophenol and lactic blue as routine mounting media) I could carry-out the work. One of the most striking observations was the presence of a weak ionomidotic reaction in all taxa except one collection examined, which is preserved in FAA.

***Lagerheima* SACCARDO 1892**

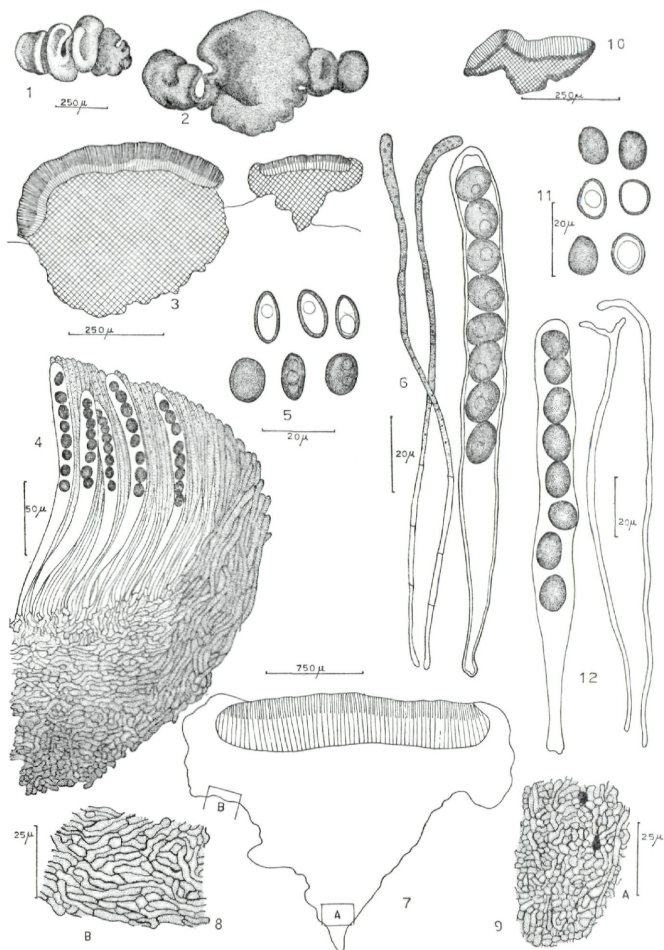
Type species: *Patellaria sphaerospora* B. & C. ap. PHILLIPS 1890

1. *Lagerheima sphaerospora* (B. & C. ap. PHILLIPS) SACC. 1892: Syll. Fung. 10: 55. — MASSEE 1895: Brit. Fung. Fl. IV: 97, figs. 51—54.

Bas. *Patellaria sphaerospora* B. & C. ap. PHILLIPS 1890: Grevillea 18: 85.

Apothecia black, sessile, dried leathery to carbonaceous, somewhat gelatinous when soaked, giving in KOH a chestnut-brown pigment, isolated or in groups, in that case arising from a common black stroma, sunken in the substrate and resembling *Durella*; hymenium convex to undulate black with a greenish tinge; margin upturned, striated; 0.5—6 mm diam. Asci 8-spored, cylindrical, rounded and thickened at the apex, iodine negative in general, occasionally with a small J + cylinder, 120—160 μ m. Paraphyses simple or sometimes forked or curved on top, multiseptate, usually containing brown, opaque guttules in its upper portion, 2.4—4.8 μ m. diam at the apex. Excipulum homogeneous, of compact "textura intricata" with tightly interlaced hyphae 2.5—4.5 μ m diam. and blackish incrusted, unevenly thickened walls. Ascospores 1-seriated, smooth, ovoid to subglobose, sometimes ellipsoidal due to variation in length, dark brown, containing one or two guttules, 10—13 (14.4) \times 7.7—9.6 μ m. (Pl. 1, figs. 1—12).

There is some variation in: a) color of the paraphyses, which are hyaline in the type specimen and in LPS 39594; b) iodine reaction of



Pl. 1, figs. 1—9. „*Lagerheima*“ *sphaerospora* (B. & C. ap. PHILIPPS) SACC. (LPS 39540). — 1—2. Groups of apothecia. — 3. Diagrammatic sections of apothecia. — 4. Section at the margin. — 5. Ascospores. — 6. Ascus and paraphyses. — 7. Enlarged diagrammatic section of apothecium. — 8. Detail of B in fig. 7—9. Detail of A in fig. 7

Figs. 10—12. „*Lagerheima*“ *sphaerospora* (B. & C. ap. PHILIPPS) SACC. (TYPUS, FH). — 10. Diagrammatic section of two apothecia. — 11. Ascospores. — 12. Ascus and paraphyses

the asci, being J — in type specimen, LPS 35376 and LPS 39540 and J + in the rest of material examined. The last fact is not infrequent in Helotiales, whose iodine reaction can vary within collections of one and the same species. MASSEE (*loc. cit.*, *op. cit.*) did not make any reference to the reactions with KOH or iodine, although he examined the type. Anyway his description and drawings coincide with our observation. He was the only mycologist who correctly described the excipulum (“consisting on interwoven hyphae of dingy olive color”). However, he placed the genus in the family Patellariaceae.

Material examined: USA: Carolina Septentrionalis, Monte Nigro, “ad ligno carioso”, Sept. 1864, Herb. CURTIS, No. 4460 (FH, holotype; isotype in K, Herb. RAVENEL). — Argentina: Tierra del Fuego: Estancia Moat, leg. HORAK, 18-III-1975, on decorticated wood of *Drymis winteri*, LPS 39540. — Ushuaia, Martial Glacier Valley, leg. GIAIOTTI, 11-III-1975 on decorticated wood, LPS 39594. — Puerto Harberton, Rancho Barney, leg. GAMUNDI & ARAMBARRI, 25-II-1970, on decorticated wood of *Nothofagus betuloides*, LPS 35376.

Regarding the systematic position of *Lagerheima*, I think it can not be included in Patellariaceae (despite the general appearance of the apothecia) because the asci are unitunicate in the type species. I rather agree with NANNFELDT in placing it in the Helotiaceae.

For further discussion and proposed new combination see below.

2. *Lagerheima carteri* (BERK.) SACC. 1892: Syll. Fung. 10: 55

SYN. *Patellaria carteri* (BERK.) PHILL. 1891: Grevillea 19: 75.

Apothecia isolated or gregarious, sessile, dried black, with an inflexed transversely corrugated margin; attached to the substrate very firmly by dark brown hyphae, showing a weak ionomidotic reaction that turns red-brown in KOH, 1—4 mm diam. Asci 8-spored, J —, cylindrical with a rounded and thicken apex, 78—97 × 4.8—6.2 μm. Paraphyses filiform, pluriseptate, usually forked at the apex or sometimes simple, light brown in the upper part, embedded in a reddish brown gelatinous matrix, 1—2 μm diam. Ascospores uniseriated, light fuliginous, smooth, ellipsoidal, without guttules, all maturing simultaneously, 8.6—10.6 × 4.3—5.8 μm. Excipulum olivaceous brown in section, composed by a cortex 120—220 μm thick, of “textura globulosa”, formed by globose, thickwalled, brown cells 20—60 μm diam. the outermost bigger and darker than the innermost; medulla 24—30 μm thick, of compact, light-brown hyphae lying horizontally, 1—3.4 μm diam. Basal cells originate abundant brown hyphae, 8—10.5 μm thick. Subhymenium light chesnut brown, of compact “textura globulosa” to “angularis”. (Pl. 2, figs. 1—3).

Material examined: India: Bombay, on decorticated wood, CARTER (K, holotype).

The excipular structure is typically dermateaceous and is completely different from the type species of the genus as can be seen in plates 1, 4 and 2, 1. Beside that, its brownish ascospores, ionomidotic reaction and J — asci make the species to belong to the genus *Catinella* BOUDIER (1907: 150) (Dermateaceae) as redescribed by DURAND (1922: 15) and DENNIS (1978: 197).

This species is very close to *Catinella olivacea* (BATSCH. ex PERS.) BOUD., and despite its smaller size I think it is conspecific with it.

3. *Lagerheima carbonicola* TORREND ap. de WILDEMAN 1913: Bull. Jard. Bot. Brux. 4: 29

Apothecia sessile, patelliform, dark grey, superficial, fleshy, firmly attached to the substrate by thick brown hyphae; margin granulated and transversely corrugated; weak ionomidotic reaction; 1—1.3 mm diam. Asci 8-spored, cylindric, J —, rounded apex, 90—100×3.8—7.7 μm. Paraphyses filiform, regularly septate, simple, brown, 1—1.5 μm thick, without epithecium. Ascospores uniseriate, ellipsoidal, slightly constricted at the middle, smooth, fuliginous, with guttules, 9.5—11.5×3.8—5.3 μm. Excipulum reddish-brown composed by a cortex 100—120 μm thick, “textura globulosa” to “angularis”, formed by brown-walled cells 20—43 μm diam. giving rise to brown and thick walled hyphae, medulla 30—60 μm thick, of horizontally disposed light brown hyphae, 3.4—5.3 μm diam. Subhymenium 20—30 μm thick, brown of compact “textura globulosa” to “angularis”. (Pl. 2, figs. 4—6 and 11).

Material examined: CONGO: Kisantu, on burnt wood, VANDERYST (BR, holotype).

Also in this species the excipulum is dermateaceous. Regarding ascospores and microscopical structure, the entire fungus shows close affinity with *Catinella olivacea* (BATSCH. ex KARST.) BOUD. I found differences in the colour of apothecia: in section the excipulum is more reddish brown than olivaceous brown (as in European collections). Moreover, I have not observed a typical epithecium. For that reason I propose to consider TORREND's species only a form of *Catinella olivacea*, thus naming it:

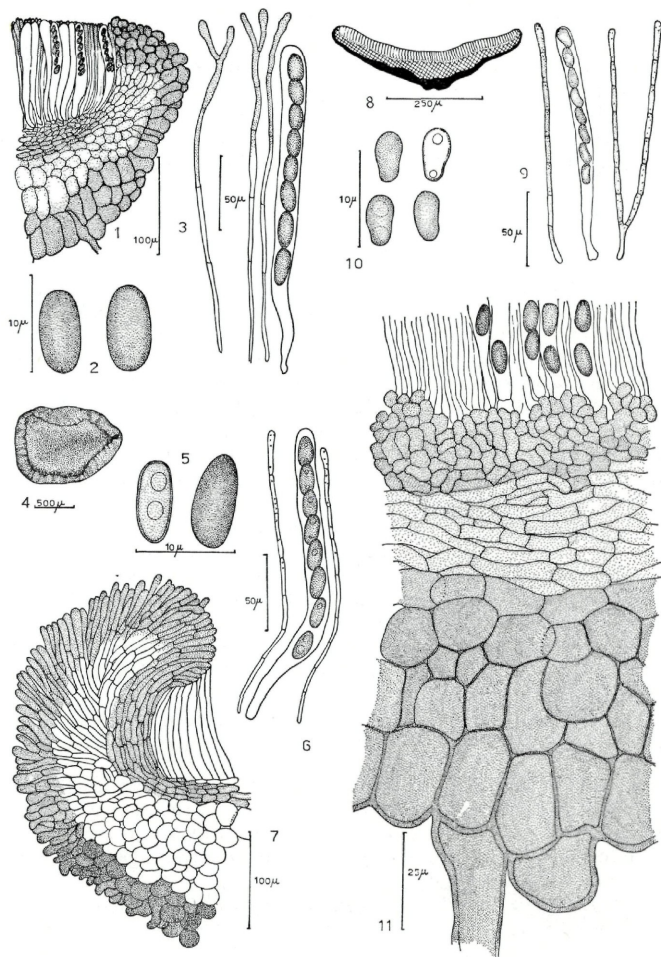
Catinella olivacea (BATSCH. ex PERS.) BOUD. f. *carbonicola* (TORREND) GAMUNDÍ nov. comb., nov. stat.

(Basionym: see above).

4. *Lagerheima dermatoida* REHM 1916: Leaflet. Phil. Bot. 8: 2938

Material examined: PHILIPPINE ISLANDS: LOS Baños, on dead branches of *Derris philippinensis*, II. 1913, BAKER, 2006 b (FH, holotype).

Carefully revising the type collection I found only yellowish stromata with immature and mature perithecia of *Nectria*, and sporo-



Pl. 2, figs. 1–3. „*Lagerheima*“ *carteri* (BERK.) SACC. (TYPUS, K). — 1. Section of apothecium. — 2. Ascospores. — 6. Ascus and paraphyses
 Figs. 4–6. „*Lagerheima*“ *carbonicola* TORR. (TYPUS, BR). — 4. Apothecium. — 5. Ascospores. — 6. Ascus and paraphyses. — 11. Excipulum
 Fig. 7. *Catinella olivacea* (BATSCH ex FR.) BOUD. (Austria, Steiermark, leg. RECHINGER, K). Excipulum
 Figs. 8–10. „*Lagerheima*“ *melanochlora* BOEDLJN (TYPUS, BO). — 8. Diagrammatic section of apothecium. — 9. Ascus and paraphyses. — 10. Ascospores

dochia of the *Tubercularia* type associated with immature perithecia. I have not seen a trace of apothecia. Anyway, according to the original description the excipulum ("ex cellulis longitudinalibus fusci, parenchymatice contexta crasse dermatoidea") suggests a construction quite different from the type species (*L. sphaerospora*). If one has to rely on REHM's description, *L. dermatoidea* is near *Catinella*, since it has light-fuscous, one-celled spores (12–15 × 7–8 μm). Further collections at the type locality could elucidate the "status" of this species.

5. *Lagerheima melanochlora* BOEDIJN 1940: Bull. Jard. Bot. Buitenzorg III, 16: 366, fig. 2

Apothecia patelliform, sessile, with a conical base, margin inflexed, pruinose, as well as the surface of apothecia, black; firmly attached to the substrate by abundant, dark brown hyphae; 4–7 mm diam. (Material preserved in FAA; I have not seen ionomidotic reaction). Asci 8-spored, cylindric with rounded apex, J —, 60–70 × 3.8–4.3 μm. Paraphyses filiform, simple or forked, containing diffuse brown pigment and guttules, 1.4–2 μm diam. Ascospores uniseriated, brown, smooth, irregularly ellipsoidal and slightly constricted at the middle, with the larger end oriented upwards, sometimes containing two guttules, 5.3–6 × 2.9–3.2 μm. Excipulum composed by a cortex 100–170 μm thick of "textura angularis" with brown and thick-walled cells, the biggest at the base (25–50 μm) and the smaller at the side of apothecium (12–36 μm), the outermost with incrustated brown pigment; medulla 70–145 μm thick, formed by light-brown, thin-walled, cylindrical cells, horizontally disposed at the side but obliquely in the central part of apothecium, 48–54 × 18–30 μm. Subhymenium 24–36 μm thick, light-brown, of compact "textura globulosa". (Pl. 2, figs. 8–10).

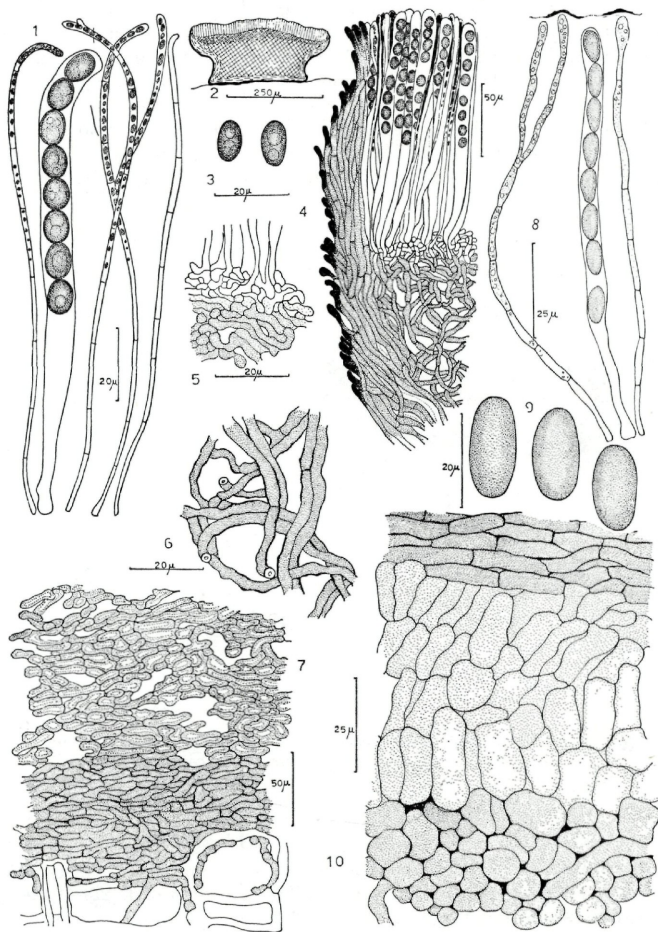
Material examined: INDONESIA: Krakatau Isl., on wood, 18. X. 1933, BOEDIJN, B No. 2764 (BO, 14379, holotype).

According to the excipular structure and the ascospores, the species is evidently a *Catinella*, near *C. olivacea* but with smaller asci and spores. I think it is better to maintain the name of the species, since it is one of the first fungi collected in Krakatau after the volcanic eruption in 1883. It should be transferred to:

Catinella melanochlora (BOEDIJN) GAMUNDI nov. comb.
(Basionym: see above).

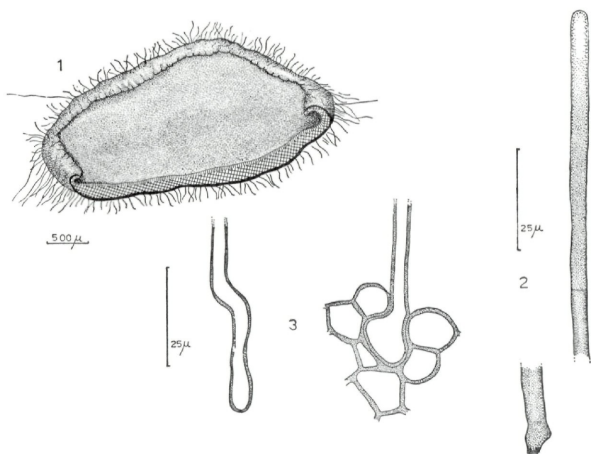
6. *Lagerheima pilosa* SYDOW in De WILDEM. 1909: Fl. Bas.-Moy. Congo, Fasc. 1: 19 (Tab. III). — SACCARDO & TROTTER 1913: Syll. Fung. 22: 754

Apothecia patelliform, sessile, superficial solitary or gregarious; hymenium plane, fuscous, 2–5 mm diam.; margin inflexed, trans-



Pl. 3, figs. 1-7. *Bulgariella pulla* FR. (England, Pertshire, leg. REID, K). — 1. Ascus and paraphyses. — 2. Diagrammatic section of an apothecium. — 3. Ascospores. — 4. Apothecium at the margin. — 5. Subhymenium. — 6. Medulla. — 7. Cortex at the apothecial base
 Figs. 8-10. „*Bulgariella*“ *argentinensis* SPEG. (TYPUS, LPS). — 8. Ascus and paraphyses. — 9. Ascospores. — 10. Cortex and medulla

versally corrugated, reddish-brown; attached to the substrate by abundant brown hyphae interspersed with brown, seldomly-septate, rigid hairs, 8.4—12 μm . thick and very long, arising from the superficial cortical cells. Strongly ionomidotic, giving purplish colour in KOH. Asci 8-spored, cylindric, $J -$, $96-108 \times 4.8-6 \mu\text{m}$. Paraphyses simple, filiform, regularly septate, embedded in an orange reddish epithecium, 1.2—2 μm . thick. Ascospores 1-seriated, fuliginous, smooth, ellipsoidal but slightly constricted at the middle, unicellular, with two guttules, $9.6-10.6 \times 4.3-5.3 \mu\text{m}$. Excipulum composed by a cortex of "textura globulosa" with brown walled



Pl. 4, figs. 1—3. „*Lagerheima*“ *pilosa* SYD. (TYPUS, S). — 1. Apothecium. — 2. Hair. — 3. Base of the hair, in optical view

cells, the outermost dark brown and thicker walled; medulla reddish-brown of horizontally disposed hyphae. Subhymenium of compact "textura intricata". (Pl. 4, figs. 1—3).

Material examined: CONGO: Kisantu, on wood, 25. I. 1907, VANDERYST (S, holotype).

In all features agrees with *Catinella olivacea* (BATSCH. ex PERS.) BOUD., except in the hairs, which are pauciseptate and rounded at the apex (not uniseptate as in original description). It resembles a black *Scutellinia*, because it has free hairs apart of those anchoring the apothecia to the substrate. I think it could be considered a hairy form of *C. olivacea* and be named:

Catinella olivacea (BATSCH ex PERS.) Boud. f. *pilosa* (SYDOW)
GAMUNDÍ nov. comb., stat. nov.

Bulgariella KARSTEN 1885

KARSTEN (1885: Acta Soc. Fauna Fl. Fenn. 2: 142) named this genus as a diminutive of *Bulgaria* which externally resembles it by its sessile, dark, subgelatinous apothecia, cylindric 8-spored asci and brown spores. He created the genus for *Patellaria pulla* FR. [SACCARDO, (1889: 638)] and included also *B. nigrita* (FR.). CLEMENTS & SHEAR (1931: 313) typified *Bulgariella* with *B. pulla* (FR.) KARST., but considered it a synonyme of *Bulgaria* FR., disposing the genus in the Bulgariaceae. NANNFELDT (1933: 311) considered *Bulgariella* a good monotypic genus, designating *B. pulla* (FR.) KARST. (KARSTEN, Fungi Fennici No. 823) as type of the species and including it in the Helotiaceae, Ombrophiloidae. He stated that *B. nigrita* (FR.) SACC. and *B. foliacea* STÄRB. are not congeneric with *B. pulla* (FR.) KARST.

The genus was characterized by DENNIS (1959: 168) as follow: Apothecia small, superficial, solitary, gelatinous. Disc dark, flat or nearly so. Receptacle turbinate, dark, scurfy. Flesh of dark slender hyphae, the outermost cells short and rounded. Asci 8-spored, the pore not blue in iodine. Ascospores elliptical, dark, unicellular. Paraphyses cylindrical. He agreed with NANNFELDT's taxonomical concept and described *B. pulla* (FR.) KARST. for the British Islands.

KORF (1973: 300) placed *Bulgariella* near *Bulgaria* (Leotiaceae, viz. Leotioideae, Leotieae) having only one species: *B. pulla* (FR.) KARST.

In the past, there was some confusion regarding *Bulgariella* FR. and *Catinella* BOUD., perhaps due to the common macroscopic features and the brown spores which led SEAVER (1952: 219) to suggest that *Catinella* BOUD. = ? *Bulgariella* KARST. He followed DURAND's (1922: 15) concept of *Catinella* who selected as type *Catinella nigro-olivacea* (L. v. S.) DURAND and not *C. olivacea* (BATSCH ex PERSOON) BOUD. DURAND (*op. cit.*: 16) listed in the synonymy of the former *Bulgariella pulla* β. *nigro-olivacea* (FR.) SACC. and this may be the source of SEAVER's suggestion.

I have examined European collections of *Catinella olivacea* *) (Pl. 2, fig. 7) and *Bulgariella pulla* **) (Pl. 3, figs. 1—7), and, from my point of view, there is no confusion between the genera possible, if one

*) Austria: Steiermark, Aussee, leg. K. RECHINGER, VIII-1908, on *Fagus*, det. NANNFELDT (K), and type of *Rhizina olivacea* CURREY (K).

**) England: Borlum Wood, ex Herb. REA, 17-IX-1908, on rotten wood (K). — Walford, near Ross-on-Wye, leg. GRADDON, 9-I-1976 (K). — Near Glos., leg. WAKEFIELD, 19-X-1938 (K). — Perthshire, Dunkeld, Murtley Castle State, leg. REID, 6-IX-1953, on alder wood (K). — Tasmania: leg. RODWAY, No 590 (K).

takes into account the excipulum: it is typically dermateaceous in *Catinella* and truly bulgarioid ("textura intricata") in *Bulgariella* giving a fragile consistency to the former and a gelatinous one to the latter. What is indistinguishable, except minor details, is the excipulum and consistency of *Bulgariella pulla* and *Lagerheima sphaerospora*.

To reinforce our opinion, an illustration is given (Pl. 3, figs. 1—7) of a british collection of *Bulgariella pulla*, where the excipulum is shown and can be compared with the structure of *L. sphaerospora*. The differences are minor: outermost hyphae of apothecia with a black content and lying parallel to the surface; absence of a stroma; asci constantly J — and ionomidotic reaction variable (negative in Borhum collection to weak, purplish-brown, in the Murtley exsiccata). The Tasmanian collection examined lacks the black superficial hyphae, and I am inclined to consider it conspecific with *L. sphaerospora*.

As the conclusion for the reasons explained above I propose the following transfer:

Bulgariella sphaerospora (B. & C. ap. PHILLIPS) GAMUNDÍ comb. nov.

Bas. *Patellaria sphaerospora* B. & C. ap. PHILLIPS 1890: *Grevillea* 18: 85.

Syn. *Lagerheima sphaerospora* (B. & C. ap. PHILLIPS) SACCARDO 1892: *Syll. Fung.* 10: 55.

Being both — *L. sphaerospora* and *B. pulla* — type species of their respective genera, *Lagerheima* SACCARDO (1892) becomes a taxonomic synonym of *Bulgariella* KARSTEN (1885), the latter having priority over the former.

Apart from the species here considered under *Bulgariella*, a third one was published: *Bulgariella argentinensis* SPEG. The type material has been examined by DENNIS (1954: 342) and assigned to *Catinella olivacea* (BATSCH ex PERS.) BOUD. After re-examining SPEGAZZINI'S type and European collections of *C. olivacea* — cited above — I arrived to the same conclusion. (Pl. 3, figs. 8—10).

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