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STUDIES ON DISCOMYCETES—III

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Ascobolus amethystinus Phill. and *Peziza phillipsii* Cooke are studied. The two are considered to be synonyms. The new combination *Jafneadelphus amethystinus* (Phill.) Brumm. is proposed. *Saccobolus succineus* Brumm. is described as a new species from Thailand.

Jafneadelphus amethystinus (Phill.) Brumm., *comb. nov.*—Figs. 1, 2, 3

Ascobolus amethystinus Phill. *in* Grevillea **4**: 84. 1875 (exclusive of part of type, *vide* Wakefield, *1920*; basionym). — *Galactinia amethystina* (Phill.) Wakef. *in* Trans. Br. mycol. Soc. **6**: 375. 1920. — Lectotype: Phillips, *s. loc.*, XI. 1875 (K–A2453, exclusive of the contaminating species of *Ascobolus*; originally the material of collection K–A1980 was also part of the type).[1]
Peziza phillipsii Cooke, Mycographia **1**: 48 *f 80*. 1876. — *Humaria phillipsii* (Cooke) Sacc., Syll. Fung. **8**: 140. 1889. — *Galactinia phillipsii* (Cooke) Boud., Hist. Class. Discom. Eur. 49. 1907 ["*philipsii*"]. — Holotype: Phillips, *s. loc.*, XI. 1875 (K–A2453).

Apothecia scattered, sessile on a broad base, 4–20 mm across, 0.8–2.0 mm high. Receptacle at first cup-shaped, then flattened, purplish-violet or blackish-violet; surface scurfy; margin irregularly roughened by projecting warts, slightly inrolled. Disk concave, then almost flat, dark purplish-violet or blackish-violet. Hymenium 270–330 μ thick. Hypothecium 55–65 μ thick, consisting of interwoven hyphae (textura intricata) 2.5–6 μ wide, together with groups of plasm-rich isodiametric or slightly elongated cells 3.5–13 × 3.5–9 μ. Flesh of varying thickness, consisting of interwoven hyphae (textura intricata) 2–4(–6) μ wide, pale violet. Excipulum 42–60 μ thick, consisting of an inner and an outer layer; inner layer 3–5 cells thick, with the cells cylindrical or oblong, 7–25 × 4–8 μ and their longitudinal axis at right angels to the surface of the receptacle (textura prismatica); outer layer more or less discontinuous, consisting of globular cells 7–20 μ across (textura globulosa); near the margin these globular cells smaller (7–10 × 6–8 μ) and more compacted, forming irregular warts up to 220 μ high. Asci cylindrical, rounded above, 240–270 × 16–20 μ, 8-spored; no part of wall staining blue with iodine. Ascospores obliquely uniseriate, at first ellipsoid, then fusiform-ellipsoid or ellipsoid with strongly pointed ends, hyaline (sometimes stained by the hymenial pigment), (18–)19.5–22(–23) × (9.5)11–12.5(–13) μ, containing two larger and several smaller globules that disappear at maturity, covered by coarse, hyaline, rounded tubercles and semi-globular apiculi at the ends, 1.5–3 μ high and 3–5.5 μ across. Paraphyses simple, septate in the lower half, cylindrical, 2–3 μ thick, not or slightly enlarged, up to 4.5 μ at tip, dark purplish-violet, surrounded by dark purplish-violet, gelatinous masses of pigment soluble in water.
On humid, sandy soil.

[1] For a more accurate indication of herbarium specimens, especially where the labelling is not wholly adequate, I have used the customary abbreviations; these are followed by my own revision numbers.

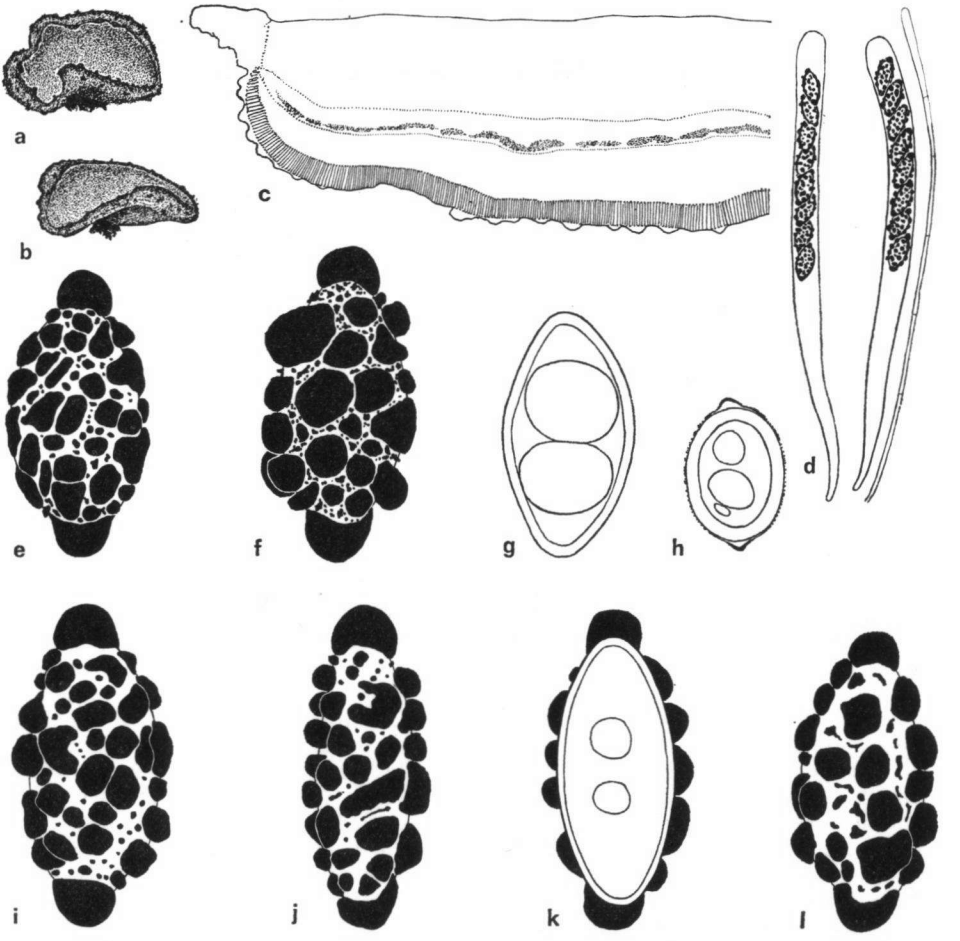

Fig. 1. *Jafneadelphus amethystinus*. — a, b. Habit of fruit-bodies, × 3.5. — c. Diagrammatic section of fruit-body, × 50. — d. Asci and paraphysis, × 200. — e, f, i, j, l. Ascospores, × 1600. — g, h. Young ascospores in optical section, × 1600. — k. Ripe ascospore in optical section, × 1600. (d, i–l, from lectotype of *J. amethystinus*, K–A2453; a–c, e–h, from coll. *Petersen*, L.)

SPECIMENS EXAMINED.—**Great Britain**: *Phillips, s. loc.*, XI. 1875 (K–A1980, as '*Ascobolus amethysteus*'; contaminated with *Ascobolus behnitziensis* Kirschst.); *Phillips, s. loc.*, XI. 1875 (K–A2453, lectotype of *A. amethystinus*, holotype of *Peziza phillipsii*; contaminated with *Ascobolus behnitziensis* Kirschst.; as "*Peziza* (*Humaria*) *Phillipsii*" in Herb. Cooke); *Rodger*, woods near Perth [, Scotland] *s. dat.* (K–A2454).

Denmark: *P. M. Petersen*, on sandy soil, near "Krudtvaerket", Frederikvaerk, Sjaelland' 10.X.1967 (C, L).

When Phillips (*1875*) described *Ascobolus amethystinus* two species were involved: a species of *Ascobolus* and *Peziza phillipsii* Cooke (Cooke, *1876*: 48; Wakefield, *1920*; van Brummelen, *1967*: 146, 206).

From Phillips' description and study of the authentic material it is clear that he had mainly described the *Peziza*. At any rate all the decisive characters mentioned in the description refer to the *Peziza*. When Cooke (*l.c.*) described *Peziza phillipsii* from the same parcel, he probably divided Phillips' collection into two parts (my revision numbers K-A1980 and K-A2453), the former containing for the most part a species of *Ascobolus* identified as *Ascobolus behnitziensis* Kirschst., the latter part chiefly fruit-bodies of the *Peziza*. This latter collection is here formally designated as holotype of *Peziza phillipsii* and lectotype of *Ascobolus amethystinus* Phill. emend Wakef.

Cooke (*1876*) and Phillips (*1887*: 90) considered *Ascobolus amethystinus* in part as a synonym of *Peziza phillipsii*. Phillips did not mention *A. amethystinus* under *Ascobolus* in his "Manuel of the British Discomycetes". Moreover, Massee (*1895*: 417) studied and redescribed the type of *Peziza phillipsii* and placed *Ascobolus amethystinus* in the synonymy of *Humaria phillipsii* (Cooke) Mass. Bearing in mind the principle of priority, Wakefield (*l.c.*) proposed the name *Galactinia amethystina* (Phill.) Wakef. The position of this species in *Galactinia* (Cooke) Boud. (= *Peziza* sensu auct.) is not acceptable, however, because no part of the ascus-wall stains blue with iodine.

Because of the strong similarity in structure of the excipulum and flesh, the type of ascospore ornaments, and the absence of blue staining of the ascus-wall with iodine I have placed this species in the genus *Jafneadelphus* Rifai in the Humariaceae.

In the species of *Jafneadelphus* described so far (cf. Rifai, *1968*) the colour of the disk and the receptacle is usually brown and sometimes purplish-brown. *Jafneadelphus amethystinus* is easily recognized by its abundant, dark purplish-violet pigment.

The purplish-violet pigment, abundantly present in the slightly gelatinous hymenium and among the exterior cells of the excipulum, readily dissolves in water and other mounting media, and stains the surrounding objects, e.g. ascospores, in the microscopical preparations. Superficially this species resembles *Jafneadelphus calosporus* Rifai and *J. ferrugineus* (Phill. apud Cooke) Rifai, especially because of the ornamentation of the ascospores. It differs markedly, however, from the latter two species in the structure of the details of the outer layer of the excipulum and the shape of the ascospores.

Further, Massee & Crossland (*1906*: 9) described this species also from fresh specimens, collected near Masham in England. In this material the asci measured "270–290 × 15 μ" and the ascospores "22–23 × 12 μ".

Some well-preserved fruit-bodies from Denmark, sent by the kindness of Dr. H. Dissing, enabled me to augment the description of this species.

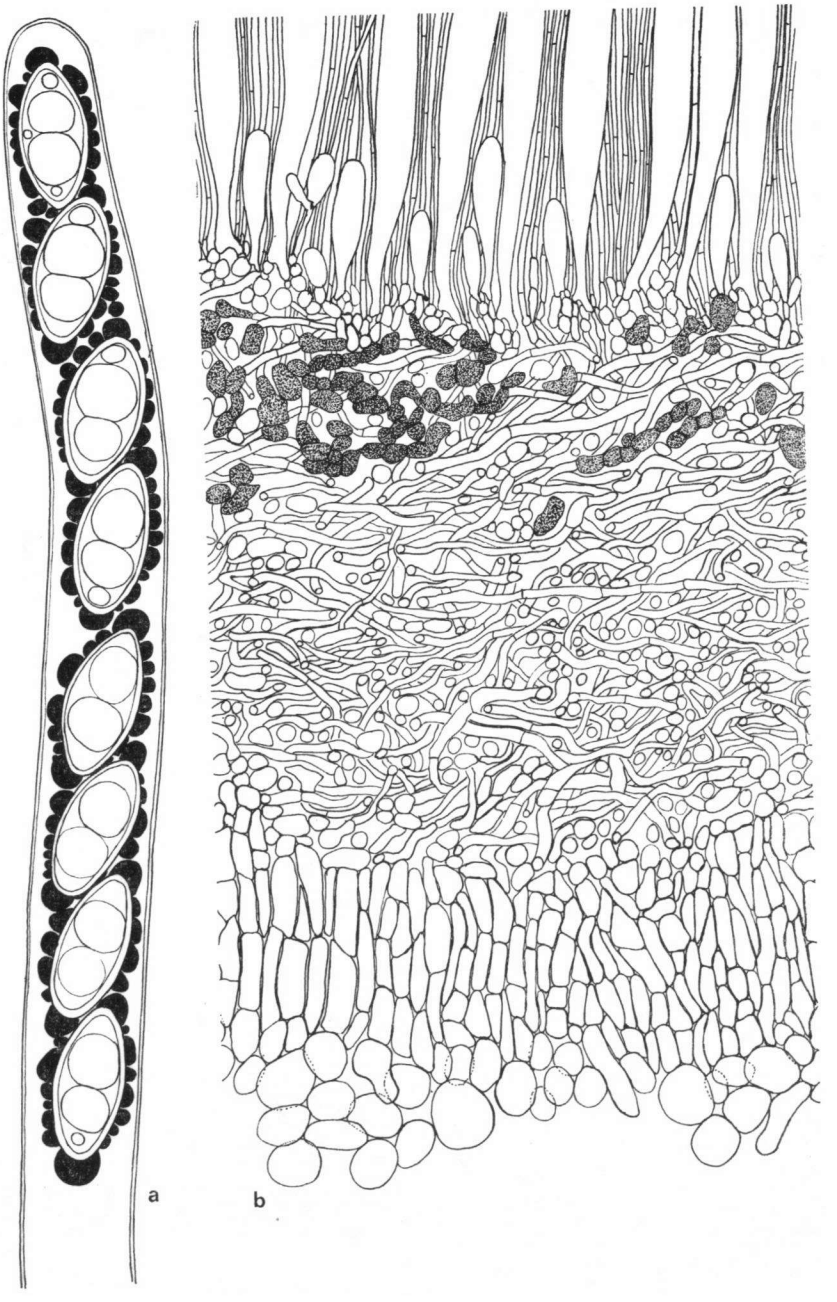

Fig. 2. *Jafneadelphus amethystinus*. — a. Ascus, × 1000. — b. Section of excipulum, flesh, hypothecium and lower part of hymenium, × 500. (From coll. *Petersen*, L.)

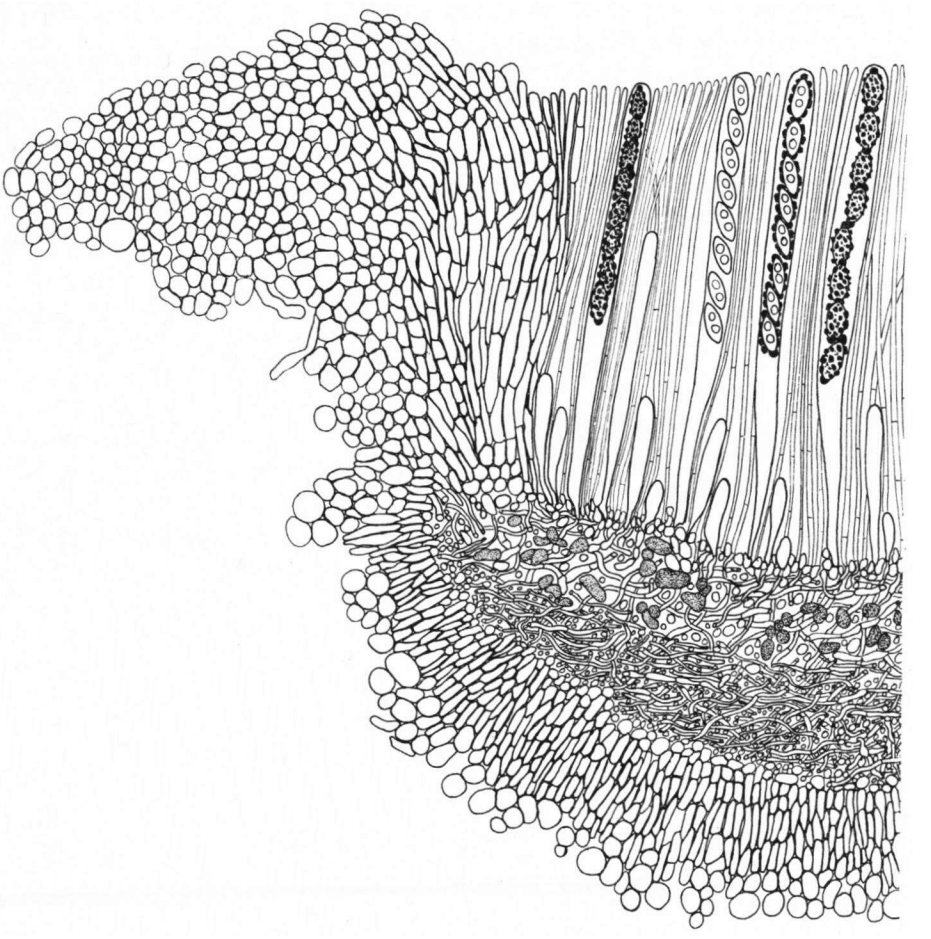

Fig. 3. *Jafneadelphus amethystinus.* — Median section of margin of fruit-body, × 250. (From coll. *Petersen,* L).

Saccobolus succineus Brumm., *spec.nov.*—Fig. 4

Apothecia sessilia, 90–170 μ diam. Receptaculum initio globulare et luteolum, denique pulvinatum et succineum, laeve. Asci clavati, apice truncati, 100–120 × 27–31 μ, 8-spori, pariete omnino iodo caerulescente. Sporum fasciculi elongati, 41–55 × 15.5–18.5 μ. Ascosporae secundum typum I dispositae, ellipsoideae, 18.5–20.5 × 9–10 μ, punctis inter sese distantibus ornatae. Paraphyses valde ramosae, irregulariter filiformes, 1.7–2.6 μ crassae, apice leviter incrassatae, cellulis terminalibus materia succinea repletis. In fimo elephantorum equorumque invenitur. Typus: *van Brummelen 2661* (L).

Apothecia solitary or in small coherent groups, superficial, sessile, 90–170 μ across, 100–120 μ high, watery-fleshy. Receptacle at first globular and pale yellow,

then pulvinate and amber-coloured, sometimes slightly irregular in shape, smooth, without margin, seated on a narrow base. Disk at first flat, then convex, pale yellow to amber-coloured, sometimes rather vividly amber yellow, dotted with the black tips of protruding ripe asci. Hypothecium very thin. Flesh not clearly differentiated. Excipulum of one layer of subglobular or somewhat elongated cells 6–16 × 6–12 μ (textura globulosa). Asci clavate with a short stalk, with truncate apex, 100–120 × 27–32 .μ, 8-spored, the wall blue in Melzer's reagent. Spore-clusters elongated, 41–55 × 15.5–18.5 μ, surrounded by a thick gelatinous envelope. Ascospores arranged according to pattern I (cf. van Brummelen, *1967*: 40), ellipsoid, often slightly asymmetrical or ventricose; at first hyaline, then violet to brownish-purple, finally brownish, 18.5–20.5 × 9–10 μ, ornamented with a regular pattern of isolated dots; pigment in a thin layer about 0.3 μ thick. Paraphyses rather frequently branched, septate, irregularly filiform, 1.7–2.6 μ thick, not or slightly enlarged, up to 4 μ in the terminal element which is filled with an amber-coloured substance.

On dung of elephant and horse.

ETYMOLOGY.—From Latin, succineus, amber-coloured.

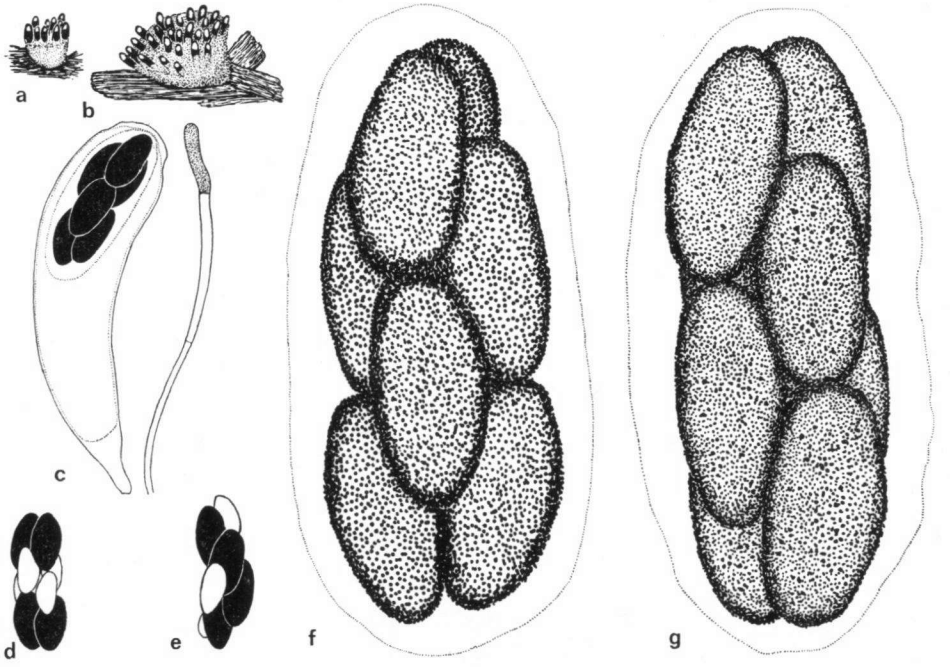

Fig. 4. *Saccobolus succineus*. — a, b. Habit of fruit-bodies, × 55. — c. Ascus and paraphysis, × 200. — d, e. Spore-clusters showing anisospory, × 200. — f, g. Spore-clusters, × 1600. (All from type.)

SPECIMENS EXAMINED.—**Thailand**: *van Brummelen 2661*, on dung of wild elephant (sent by Mr. C. F. van Beusekom), Khao Yai, prov. Kanchanaburi, 10.V.1968 (L, holotype); *van Brummelen 2662*, on dung of horse (sent by Mr. C. F. van Beusekom), Erawan National Park on the Mae Khlong, prov. Kanchanaburi, 15.V.1968.

Judging by the yellowish pigment in the paraphyses and the arrangement of the ascospores in the cluster this is a typical representative of *Saccobolus* sect. *Saccobolus*. The ascospores are arranged according to a symmetrical pattern, with four longitudinal rows of two spores. In fully mature asci, as a result of contraction the clusters are up to 10 % shorter than in almost mature ones.

Saccobolus succineus is related to *S. citrinus* Boud. & Torrend and to *S. truncatus* Vel., occupying a somewhat intermediate position between these species. It differs from *S. citrinus* mainly in its broader ascospores, the slight contraction of the cluster, the finer ornamentation of the episporium, and the colour of the disk. It can be distinguished from *S. truncatus* by its smaller asci and ascospores, different degree of contraction of the spore-cluster, and more vivid colour of the disk.

This is the first time that in a species of *Saccobolus* anisospory has been found within a single spore-cluster. In some fruit-bodies high frequencies of clusters with two or four colourless and smaller ascospores occurred (Fig. 4d, e).

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