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NOTES ON CUP-FUNGI—I

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The soil inhabiting *Ascobolus terrestris* sp. nov. and the coprophilous *Thecotheus agranulosus* Kimbr. are described from French collections.

Ascobolus terrestris Brumm., spec. nov. — Figs. 1, 2

Apothecia sessilia, 1–2 mm diam. Receptaculum initio subglobulare, deinde cupulatum, denique expansum, dilutissime lilacinum, laeve, margine obtuso. Excipulum textura globulosa. Asci cylindrici, 210–240 × 19 µm, 8-spori, parietibus iodo caerulescentibus. Ascosporae ellipsoideae, 16.2–18.5 (–19.6) × 8.7–9.7(–10.2) µm, arte verrucis rotundis instructae. Paraphyses tenues, filiformes, simplicae vel ramosae, 1.5–2.0 µm crassae, apice leviter incrassatae. Ad terrum argillosam inter muscos infra abietem albam. — Typus: *G. Moyne 81.08.26.13*, Frasne, Doubs, Gallia, 26.VIII.1981 (L).

Apothecia solitary or in small groups, superficial, sessile, 1–2 mm diameter, 0.5–1 mm high. Receptacle at first subglobular, then cup-shaped, finally expanded, very pale lilac, almost white; surface smooth; margin obtuse, slightly discernible. Disc concave then flat, roughened by protruding ripe asci, lilac-violet dotted with the darker ripe ascospores. Hymenium 200–230 µm thick. Hypothecium not clearly differentiated. Flesh of varying thickness, hyaline, near the base up to 150(–180) µm thick, at the margin very thin or absent, consisting of isodiametric and oblong thin-walled cells 7–18 × 7–12 µm. Excipulum of varying thickness, 20–200 µm thick, near the base 100–200 µm thick, at the margin 20–45 µm wide, almost colourless, consisting of subglobular and oblong cells 7–19 × 7–12 µm (textura globulosa). Asci cylindrical, narrower towards the base, rounded above, operculate, 210–240 × 14.5–19 µm, 8-spored, the wall clearly blue in Melzer's reagent. Ascospores 1–2-seriate, at maturity irregularly arranged in the upper part of the ascus, ellipsoid (length/width ratio 1.7–2.0, average 1.88), at first hyaline, then pinkish violet to violet, becoming brownish at maturity, 16.2–18.5 (–19.6) × 8.7–9.7(–10.2) µm (without ornamentation), sometimes swollen up to 21 × 12.5 µm, with homogeneous contents, ornamented with a regular pattern of rather closely placed rounded warts 0.3–1.1 µm wide and 0.5–1.0 µm high. Paraphyses septate, slender filiform, sometimes curved, simple or branched, hyaline, 1.5–2.0 µm thick, enlarged up to 5 µm at the tip, not embedded in coloured mucus, without granules.

Habitat. — On damp loamy soil among young mosses, under *Abies alba*.

Etymology. — From Latin, terrestris, pertaining to the earth, growing on the ground.

Specimen examined. — FRANCE, Dép. Doubs, Frasne, 26.VIII.1981, *G. Moyne 81.08.26.13* (L, holotype).

This species of *Ascobolus* was kindly sent for identification, together with several others, by Dr. G. Moyne. It was collected again a few weeks later from the same locality near Frasne.

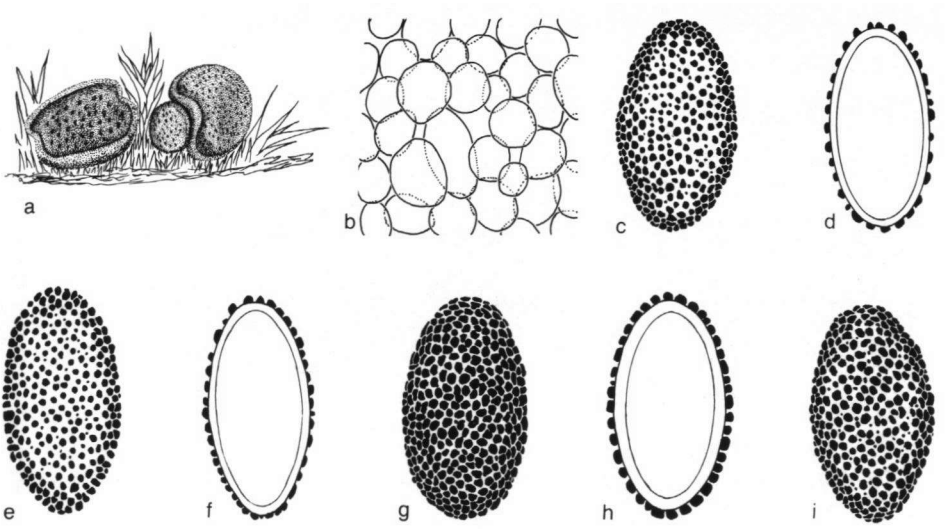

Fig. 1. *Ascobolus terrestris*, type. — a. Habit of fruit-body × 10. — b. Texture of excipulum seen from outside × 800. — c, e, g, i. Ascospores × 1600. — d, f, h. Ascospores in optical section × 1600.

Ascobolus terrestris is close to *A. geophilus* Seaver but differs in the smaller fruit-bodies, the absence of greenish yellow pigment in the receptacle and hymenium, the smaller ascospores and the ascospore ornamentation (cf. van Brummelen, 1967).

On average, typical mature ascospores of *A. terrestris* do not exceed 20 µm in length (inclusive of the pigment layer), while those of *A. geophilus* are longer.

In *A. geophilus* the pigment layer is initially deposited on the ascospore walls as a uniform smooth layer. On further ripening the pigment layer forms fine cracks in all directions, eventually followed by still further partitioning. This results in a net-work of fine fissures and finally sometimes in a pattern of warts.

In *A. terrestris* the regular dense pattern of rounded warts is present from the beginning of pigment precipitation on the ascospore wall.

There is a more remote relationship of *A. terrestris* with two other soil inhabiting species of *Ascobolus*, viz. *A. behnitziensis* Kirschst. and *A. albinus* Seaver. Both have larger fruit-bodies and ascospores, a furfuraceous or rough receptacle, and a different colour.

Thecotheus agranulosus Kimbr. — Figs. 3, 4

Thecotheus agranulosus Kimbr. in Mycologia 61: 112. 1969.

Apothecia gregarious or in small groups, superficial, sessile, 0.4–1.5 mm diam., 0.4–0.6 mm high. Receptacle at first obconical or subpyriform, then turbinate, becoming expanded, finally discoid to pulvinate, brownish purple to purplish grey; surface pruinose; margin broad, smooth, slightly incurved. Disc flat, then convex, studded with the apices of the far-protruding asci, pale purplish grey. Hymenium up to 300 µm thick. Hypothecium 40–50 µm thick. Flesh 90–160 µm thick, consisting of subglobular cells 8–18 µm diameter strongly intermingled with filamentous hyphae 2–3 µm wide.

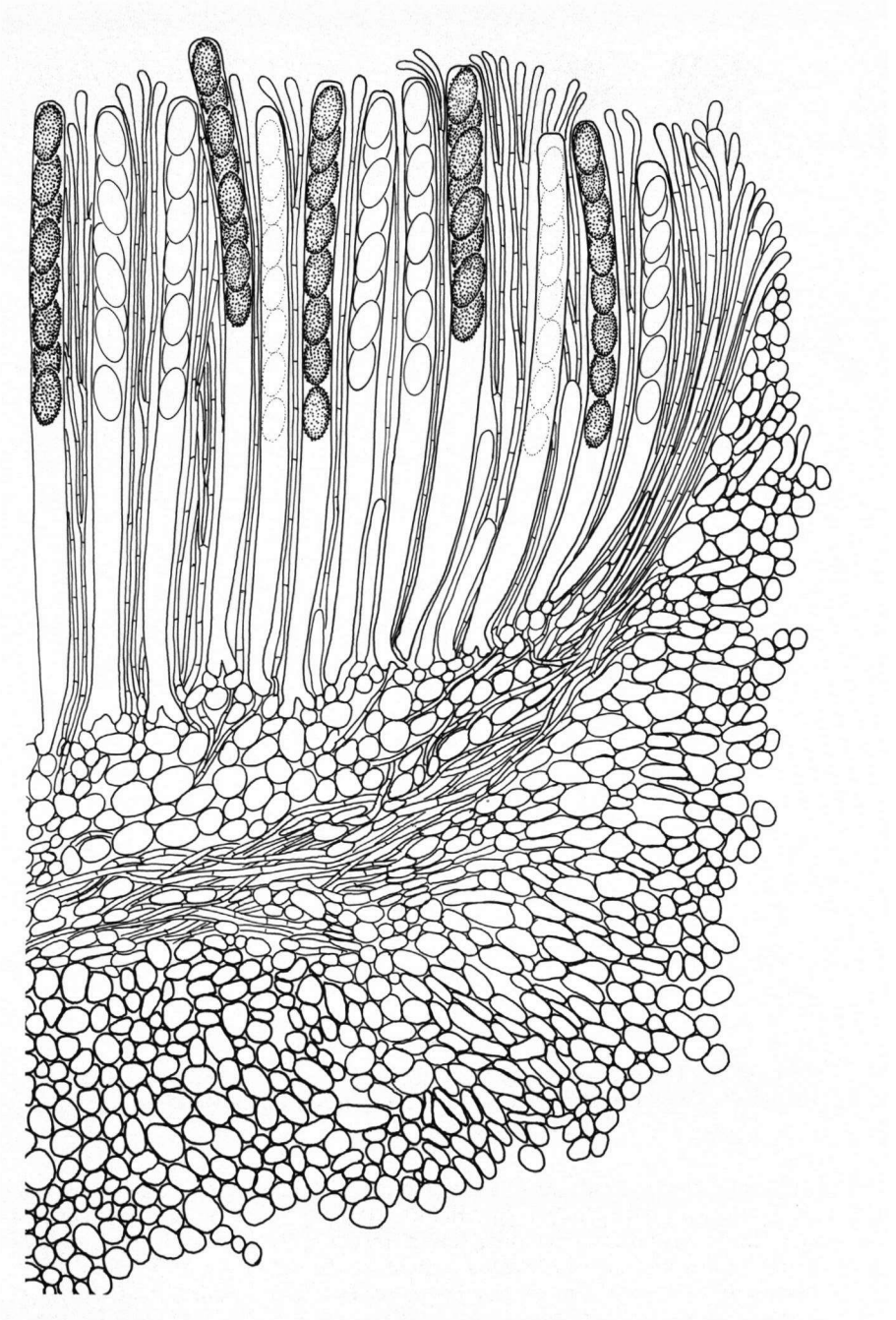

Fig. 2. *Ascobolus terrestris* (type), median section of margin of fruit-body × 400.

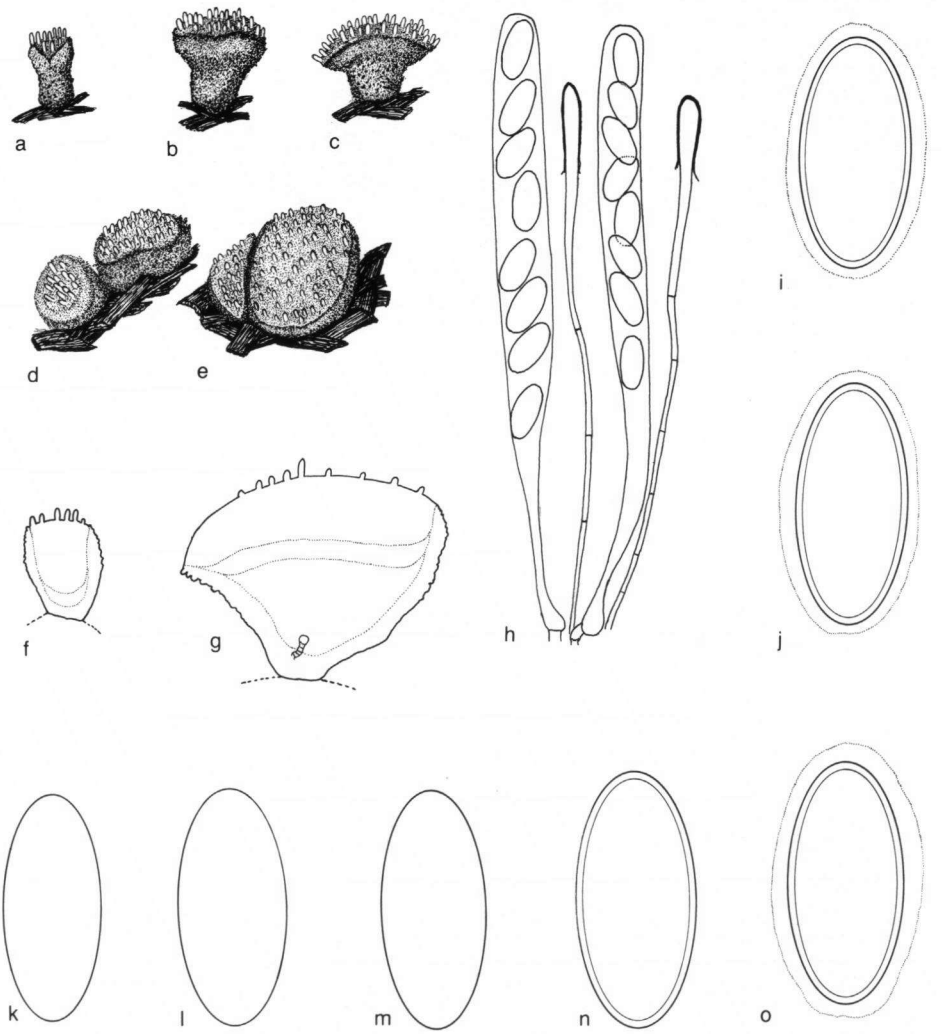

Fig. 3. *Thecotheus agranulosus, van Brummelen 6574.* — a–e. Habit of fruit-bodies × 25. — f, g. Diagrammatic sections of fruit-bodies × 40. — h. Asci and paraphyses × 400. — i, j, n, o. Ascospores in optical section × 1600. — k–m. Ascospores × 1600.

Excipulum clearly differentiated, 50–90 μm thick, at the margin 50–75 μm wide, consisting of subcylindric hyphae with subglobular or inflated terminal cells 9–14(–16) μm wide (textura globulosa) with intercellular amorphous purplish brown pigment. Asci cylindrical, narrower towards the base, with a somewhat truncate apex, 250–290 × 16.5–21.0 μm, 8-spored; the wall staining blue over the full length in iodine. Ascospores 1–2-seriate, irregularly arranged, ellipsoid (length/width ratio 1.9–2.2, average 2.07, rarely up to 2.4), (18.5–)19.0–21.0(–22.5) × (9.2–)9.5–10.0(–10.5) μm without oil globules,

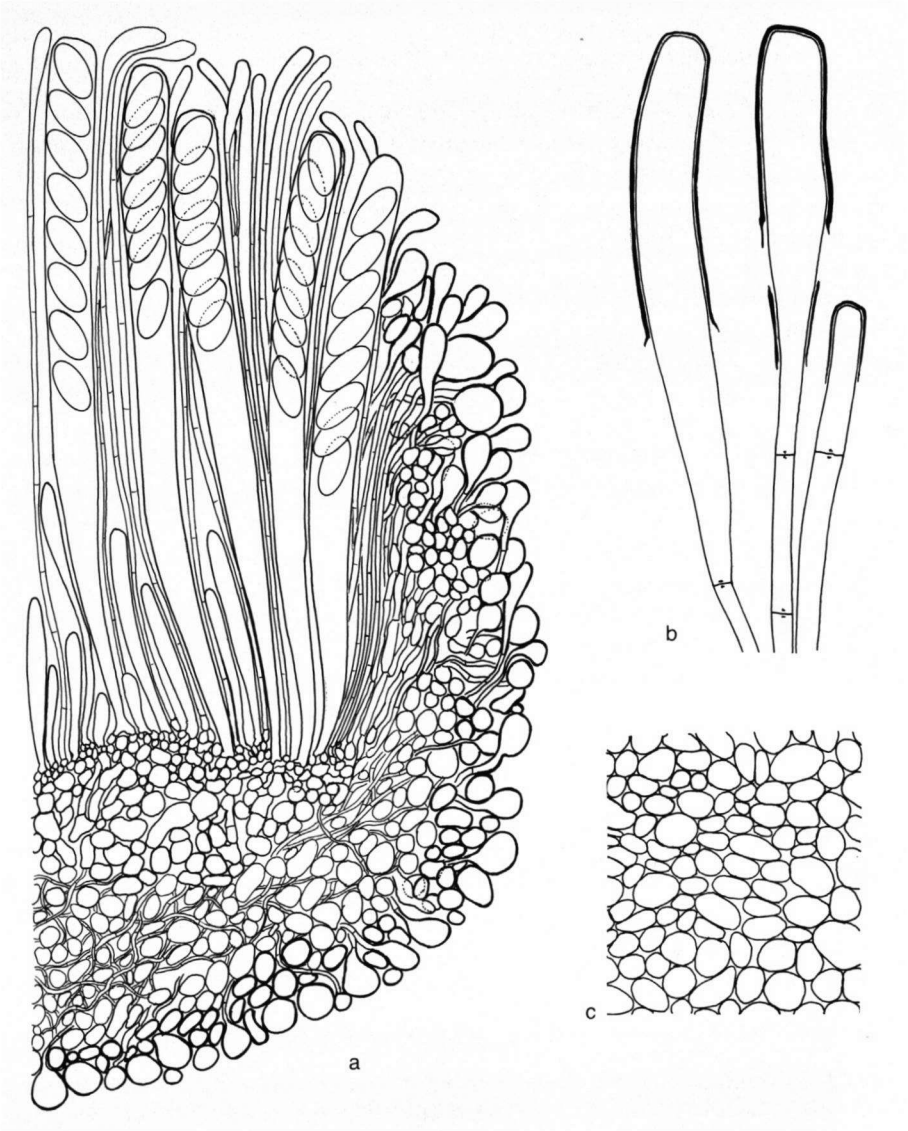

Fig. 4. *Thecotheus agranulosus, van Brummelen 6574.* — a. Median section of margin of fruit-body × 400. — b. Detail of tips of paraphyses × 1600. — c. Texture of excipulum seen from outside × 400.

smooth, with a uniform thin (0.2–0.3 μm) outer layer staining with methyl blue, and a thick gelatinous envelope surrounding each spore. Paraphyses filiform, septate, branched, about 2.0 μm thick, enlarged up to 4–6 μm at the tip, covered with a layer of amorphous purplish brown pigment.

Habitat.—On dung of donkey.

Specimen examined. — FRANCE. Dép. Var., Ile de Port-Cros, cultured on dung of donkey (comm. Dr. J.-C. Donadini No. 2.82), 5.III.–30.VI.1982, *van Brummelen 6574* (L).

In March 1982 Dr. J.-C. Donadini sent to Leiden some dung of a donkey from Port-Cros, which proved to be of considerable interest. On further culturing a rich growth of *Thecotheus agranulosus* developed.

As this species has not previously been recorded outside North America and the only (original) description (Kimbrough, 1969) was based on dried specimens, a full description is given above based on living material. The different origins of the material may explain some differences found between the two descriptions.

While Kimbrough (l.c.) described asci only 175–225 μm long and paraphyses with hyaline little-swollen tips, the fresh material showed strongly inflated and protruding asci 250–290 μm long and strongly swollen ends of paraphyses covered with a rather uniform layer of amorphous purplish brown pigment.

In several series of sections of fruit-bodies at different stages of development the excipulum was found to consist of subcylindrical hyphae with subglobular or inflated terminal elements. A textura angularis or an epidermoid arrangement in the superficial layer, as described by Kimbrough, could not be found.

Within the genus *Thecotheus* this species is distinguished by its smooth ascospores of which only eight are formed in an ascus. Although the ascospores are smooth, secondary wall material is deposited or condensed to form a relatively thick smooth and uniform layer on the epispore. This secondary wall material stains intensely with methyl blue or cotton blue. Such a smooth layer of secondary wall material is also found in species of *Peziza* with smooth ascospores, like *P. ammophila* and *P. vesiculosa* (cf. Merkus, 1975, 1976).

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