

P E R S O O N I A

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NOTES ON CUP-FUNGI—4
On two rare species of *Ascobolus*

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Ascobolus carletonii is recorded and studied from Brazil and *A. hawaiiensis* from Pakistan.
Both are described and compared with authentic collections.

Ascobolus carletonii Boud.—Fig. 1

Ascobolus carletonii Boud. in Trans. Br. mycol. Soc. 4: 62, pl. 2 fig. 1. 1913.

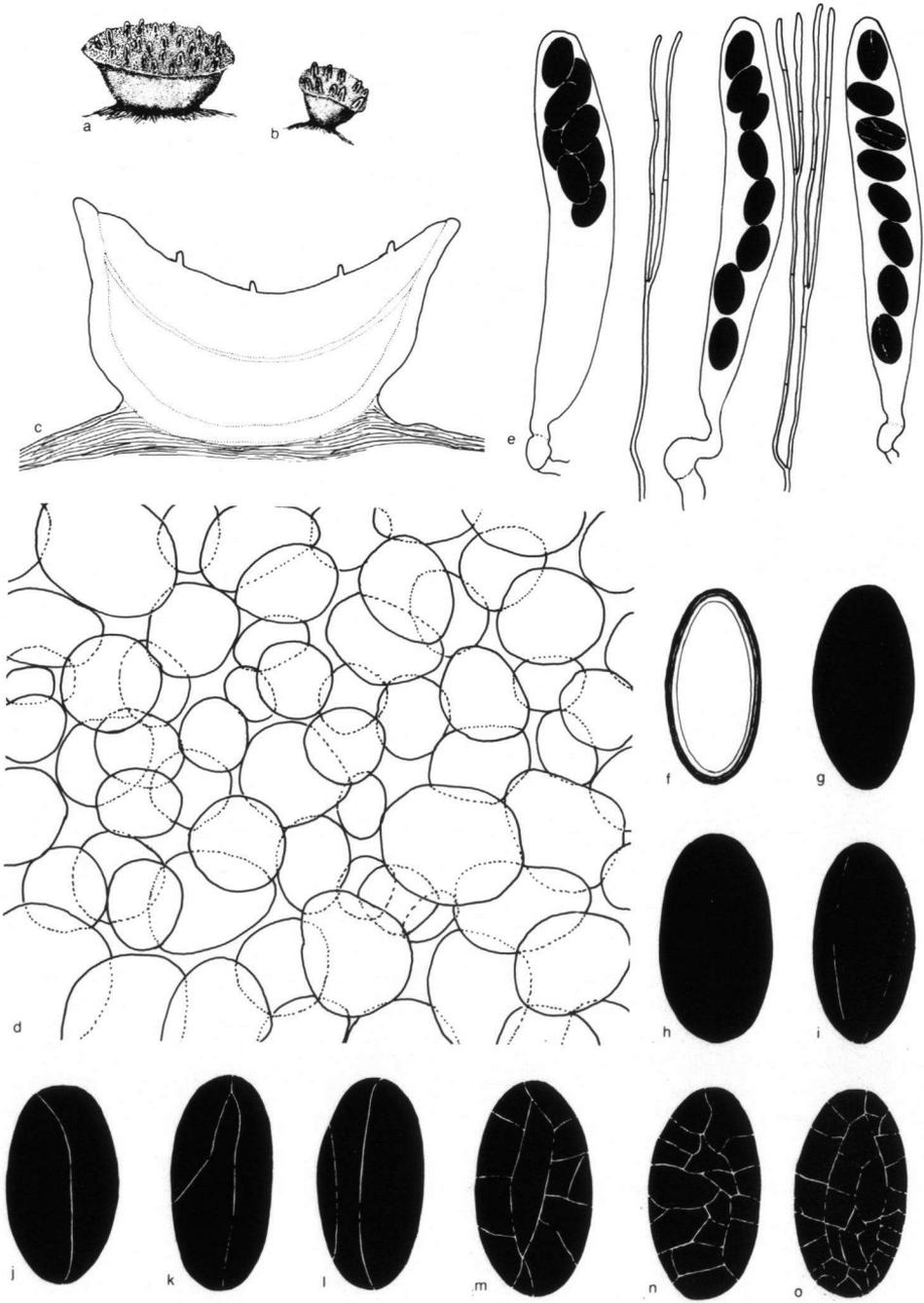
Apothecia solitary or in small groups, superficial, sessile, 0.5–2 mm wide, 0.5–1 mm high. Receptacle at first subglobular and closed, then opening and cup-shaped, finally expanded, white to pale brownish; surface rather smooth; margin narrow, rather inconspicuous. Disc concave, then flat, roughened by the protruding tips of ripe asci. Hymenium 160–200 μm thick. Hypothecium about 10 μm thick, of closely compacted thin-walled, hyaline cells and hyphae 4–8 μm wide. Medulla clearly differentiated, 130–200 μm thick of isodiametric thin-walled hyaline cells (*textura globulosa*) 7–20 \times 6–16 μm . Cortical excipulum clearly differentiated, 30–110 μm thick, near the base 55–110 μm thick, at the margin 30–50 μm wide, almost colourless to pale yellowish, consisting of subglobular and isodiametric, rather thick-walled (1–2.3 μm) cells 15–55(–70) μm (*textura globulosa*), in the lower part occasionally covered with somewhat protruding, small groups of subglobular cells; at the extreme base, in contact with the substratum, a layer up to 30 μm thick of closely intertwined thin hyphae 2.5–4.5 μm wide (*textura intricata*). Asci cylindrical-clavate with a short stalk, rounded above, with a large operculum, 150–185(–205) \times 16–20(–22) μm , 8-spored; the wall clearly blue with iodine. Ascospores obliquely uniseriate, at maturity often biseriata, ellipsoid (length/width ratio 1.7–2.0, average 1.86), at first hyaline, then violet, becoming purplish brown at maturity, 15–17.5 \times 7.5–8.5 μm (pigment layer not included), when hypertrophied up to 19 \times 9.5 μm , without oil globules, with a uniform thin smooth layer (0.5–1.0 μm thick) of pigment often with one or very few, more or less longitudinal, fine, rarely anastomosing fissures, but finally in hypertrophied spores usually with an irregular net-work of fine lines. Paraphyses frequent, septate, slender, filiform, sparsely branched, hyaline, 1.6–2.3 μm thick, not or scarcely enlarged upwards, towards the apothecial margin sometimes swollen up to 7 μm at the tip, embedded in yellowish green mucus.

H a b i t a t.—On dung of *Capybara hydrochaeris*. Also known from dung of capercaillie and grouse in Scotland.

S p e c i m e n s e x a m i n e d.—GREAT BRITAIN, Scotland, 'Inverness' (probably Perthshire according to Richardson (1972)), Dunkeld, on dung of capercaillie (*Tetrao urogalli*), 18.X.1912, C. Rea (type, PC). — BRAZIL, Pirai near Rio de Janeiro, on dung of *Capybara hydrochaeris* in moist chamber, 17.XI.1989, E. Jahn s.n. (L).

The above description is based on the collection from Brazil, kindly sent by Mr E. Jahn.

Ascobolus carletonii is a little known species and has not previously been recorded from



outside the British Isles (Ramsbottom & Balfour-Browne, 1951; van Brummelen, 1967; Cannon & al., 1985). Richardson (1972) made it clear that the Scottish localities of this species, among which that of the type specimen (Boudier, 1913), are all in a small region in the county Perthshire. Records from Yorkshire by Masson & Grainger (1937) could not be verified, because of the absence of preserved material.

The Brazilian collection agrees well with the concept of this species as described by van Brummelen (1967). This species is readily recognized by the small fruit-bodies and ascospores which are smooth or with one or two longitudinal striae in the beginning and often with an irregular net-work of cracks in the end.

The presence of warts on the lower part of the outer surface is rarely as prominent as described and illustrated by Boudier (1913). Even in the type specimen most fruit-bodies are rather smooth. The presence of a layer of closely intertwined thin hyphae at the extreme base of the receptacle seems to be a more constant character (cf. Fig. 1c and van Brummelen, 1967: fig. 34a).

The exposed surface of all fruit-bodies and the substratum was found rather densely overgrown with smoke-brown hyphae of varying thickness with phialids of an anamorph belonging to *Phialophora* Medlar. Although the contact of this anamorph with the fruit-bodies of *A. carletonii* was very close, the concrescence of both fungi is considered to be quite coincidental.

Ascobolus hawaiiensis Brumm.—Fig. 2

Ascobolus hawaiiensis Brumm. in *Persoonia* (Suppl.) 1: 87, fig. 17, pl. 3G, H. 1967.

Apothecia solitary or gregarious, superficial, sessile, 170–450 μm wide, 300–600 μm high. Receptacle at first subglobular to ovoid, then barrel-shaped to cylindrical, finally sometimes obconical, pale brownish to pale pinkish grey, smooth, without margin. Disc flat, then convex, white, dotted by far-protruding violet tips of ripe asci. Hymenium 200–260 μm thick, at maturity often far protruding beyond the receptacle. Hypothecium and medulla not clearly differentiated as layers. Cortical excipulum very thin, 10–15 μm thick, pale brownish to pinkish grey, consisting of one or very few layers of subglobular and angular cells 6–20 \times 6–12 μm (textura globulosa or angularis). Asci clavate, with a rather long narrow base, rounded above, with a large operculum, 210–250 \times 20–30 μm , 8-spored; the wall clearly blue with iodine. Ascospores at first more or less bi-seriate, at maturity irregularly arranged in the upper part of the ascus, ellipsoid (length/width ratio 1.8–2.3, average 2.0), at first hyaline, then purplish violet, purplish brown at maturity, 16.5–21.5 \times 9.2–10.5 μm , without oil-globules or granules, thick-walled (1–1.5 μm), ornamented with a uniform layer of isolated, fine, rounded warts 0.5–1.3 μm wide. Paraphyses abundant, sparsely septate, slender, filiform, simple, hyaline, 1.7–2.3 μm thick, not enlarged at the tip, without mucus. Mycelium especially near the base of the receptacles with numerous rather stout, straight hyphoid elements, arising from the outermost layer of the excipulum and connected with the substratum.

H a b i t a t.—On dung of donkey. Also known from sheep dung in Hawaii.

Fig. 1. *Ascobolus carletonii*. — a, b. Habit of fruit-bodies, \times 25. — c. Diagrammatic section of fruit-body, \times 63. — d. Texture of excipulum seen from outside, \times 400. — e. Asci and paraphyses, \times 400. — f. Ascospore in optical section, \times 1600. — g–o. Ascospores, \times 1600. (All from *E. Jahn*, 17.XI.1989.)

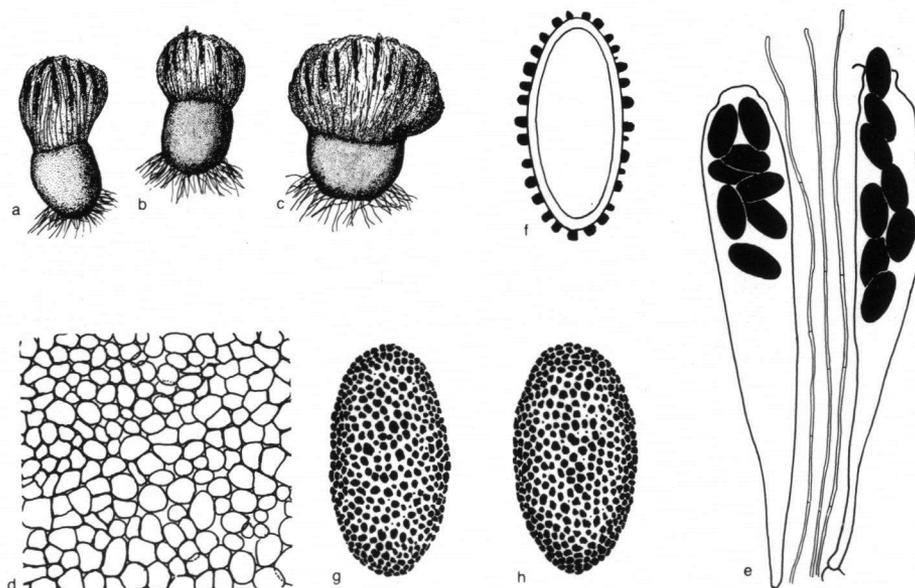


Fig. 2. *Ascobolus hawaiiensis*. — a–c. Habit of fruit-bodies in lateral view, $\times 40$. — d. Texture of excipulum seen from outside, $\times 400$. — e. Asci and paraphysis, $\times 400$. — f. Ascospore in optical section, $\times 1600$. — g, h. Ascospores, $\times 1600$. (All from E. Jahn, 12.IV.1990.)

Specimen examined:— PAKISTAN, Upper Kagahn-Valley, on dung of donkey (comm. Dr Hechler) in moist chamber, 12.IV.1990, E. Jahn s.n. (L).

The collection cited is the second record of *Ascobolus hawaiiensis*. The above description is based on a specimen sent by Mr E. Jahn and agrees well with that of the type specimen (van Brummelen, 1967).

The smaller measurements of the asci in the specimen from Pakistan are certainly due to the absence of high turgor in the ripe asci. On the other hand the hymenium as a whole has swollen considerably and is protruding far beyond the margin of the receptacle. This is a rather common feature among members of *Ascobolus* sect. *Dasyobolus*, where the excipulum shows only a very restricted growth.

The species is readily recognized by the very small fruit-bodies and the finely round-warted ascospores.

Ascobolus hawaiiensis must have been overlooked because of its minute fruit-bodies and will probably be found again from tropical regions on a closer examination of dung samples.

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