

Observations on the Bolbitiaceae XVII

Volvate Species of *Conocybe*

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Abstract. *Conocybe corneri* and *C. vaginata* are described as new members of *Conocybe* subgenus *Conocybe*, in the new section *Singerella*. The species are characterised particularly by the volvate stipe-base. The North American *Galerula locellina* MURRILL is transferred to this new section. The history and nomenclature of the genera *Acetabularia* and *Locellina* are discussed, and pertinent observations on the unrelated *Conocybe cryptocystis* (ATKINSON) SINGER given.

Introduction

Through the kindness of Prof. E. J. H. CORNER I have been able to examine his material of the Bolbitiaceae from several parts of the world including South East Asia; amongst the material an agaric was located which was not only new to science but fitted an hypothetic but as yet undiscovered brown-spored volvate agaric, the possible existence which had been suggested by very early agaricologists. Observations on CORNER's material was supplemented by those on collections recently made by E. HORAK in New Guinea. In HORAK's material not only was CORNER's fungus found but also a second closely related new species.

Conocybe corneri nov. sp. WATLING (Plate 1 A—H; Plate 2 L & M; Plate 3 N—P).

Pileus 20—60 mm, e conico vel convexo-planus haud expansus interdum umbonatus, pubescens, purpureo-brunneus ad discum obscuriore coloratus, siccitate ochraceus vel fulvo-mellinus, jove pluvio ad discum striatus. Stipes 100—160/2—3 mm (5—7 mm ad basim) subaequalis ad basim leviter incrassatus, pubescens; volva albida, saepe bifida etiam irregulariter fissa. Lamellae ex albidoochraceo vel mellino luteolo-brunneae vel cinnamomeo-brunneae, subconfertae. Caro concolorata; odor nullus. Sporae ellipsoideae vel leviter angulatae, poro germinativo, $8.5-11 \times 6-6.5 \mu\text{m}$. Basidia 4-sporigera, $26-30 \times 11-12 \mu\text{m}$. Cystidia aciei lamellarum lecythiformia, $20-35 \times 10-20 \mu\text{m}$, capitula 4—6 μm lata. Ad fimum elephantis; in silvis. Johore, Malaya, v. 1940; legit E. J. H. Corner. Typus.

Pileus 20—60 mm, at first conic and 15—25 mm high, then umbonate, finally more or less plane, smooth, finely puberulous with whitish hairs, hygrophane, finely striate at first, intensely dark rich

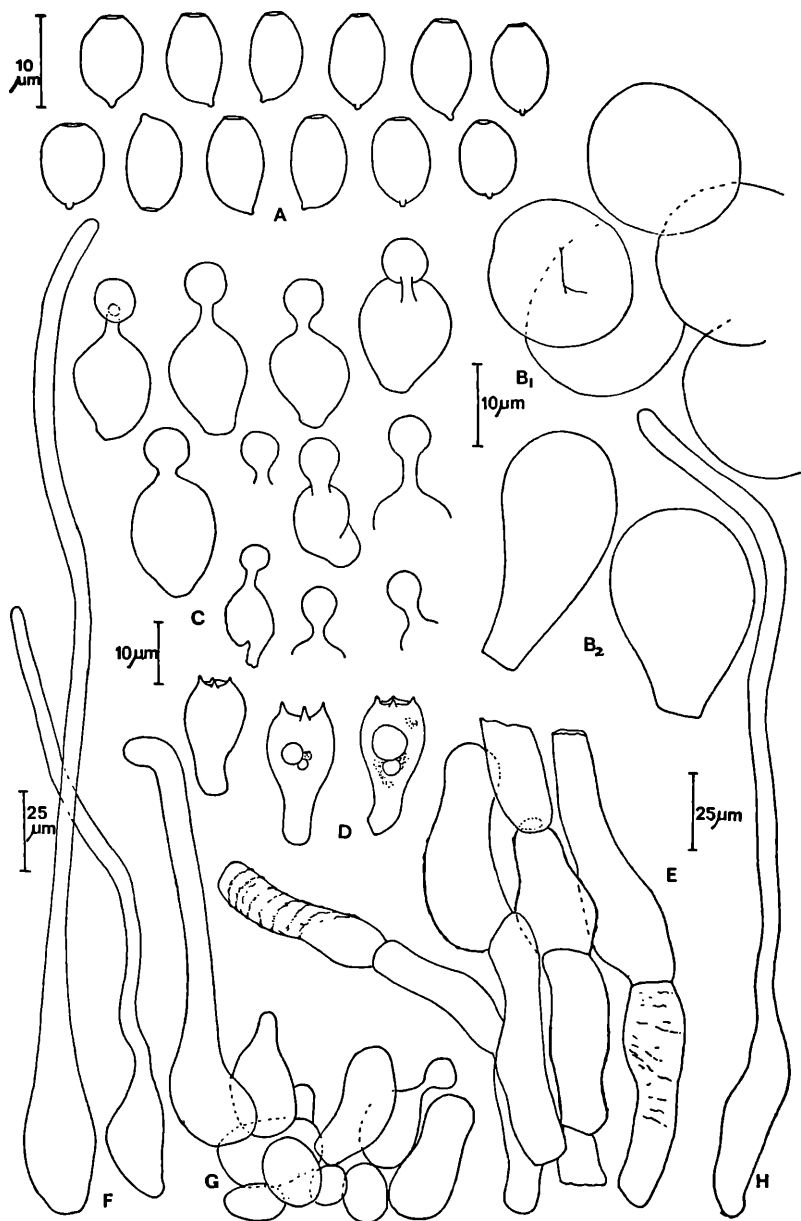


Fig. 1. *Conocybe corneri*. A: Basidiospores. B₁: Pileus-surface showing "cellular" cuticle. B₂: Spheropedunculate constituents of pileus-palisadoderm. C: Cheilocystidia. D: Basidia. E: Constituents of volva. F, Pilocystidia from stipe. G: Pilocystidium developing from cluster of cells on stipe. H: Pilocystidium from pileus-palisadoderm

purple then on expansion livid vinaceous to vinaceous drab or dingy pinkish grey with the centre fuscous, or becoming light fulvous fawn and drying fulvous melleous. Stipe 100–160 mm/2–3 mm (5–7 mm at the base), attenuate upwards, long, cartilaginous, wholly puberulous, finely spirally striate more or less concolorous, white towards the apex and base, with irregularly split or bifid, free, smooth, floccose-membranous, white volva, 8–12×7–9 mm. Gills free or very slightly adnexed, very crowded, thin, narrow, 3–4 ranks, 27–48 primaries, 1.5–2 mm wide, the secondaries nearly as long as the primaries, white turning pale ochraceous cinnamon from distal edge near the margin of pileus towards stem. Flesh 1–1.5 mm thick in the centre of the pileus, brittle, concolorous; smell none, negative reaction with HCl, KOH & NH₃ (from HORAK).

Spore-mass brown (from deposit on stipes in pickled specimens). Basidia 4-spored, 26–30×11–12 µm, clavate cylindric, hyaline in water and alkali mounts. Basidiospores 8.5–11×6–6.5 µm, smooth, broadly ellipsoid to distinctly angular in face-view, slightly flattened on one side in side-view, very distinct apiculus and very prominent germ-pore. Brachycystidia abundant; pleurocystidia absent. Cheilocystidia 20–35×10–20 µm, lecythiform with neck 1–3 µm long and head 4–6 µm broad, hyaline in water and alkali mounts, thin-walled, smooth. Pileipellis a compact palisadoderm of smooth, broadly clavate to vesiculose, thin-walled cells 25–55×12–30 µm, hyaline with pedicel darkened; pileocystidia replaced by thin-walled, filiform pilocystidia up to 300 µm long and 3–5 µm wide. Caulocystidia numerous in bunches in rows on the stipe, mixture of vesiculose, clavate and lecythiform elements, the last commoner towards the apical and basal zones. Pileus trama of only slightly inflated cells, Hymenophoral trama with distinct filamentous, little inflated hyphal strands forming central strand and more inflated subhymenial zone.

On elephant dung from the forest, Johore, Malaya east side near the Jemaluang Road. May 1940 (Holotype: CORNER CGE: *Locellina* 1; slide in E). — On floor of *Castanopsis* forest, Manki, Bulolo, New Guinea; 20. IV. 1972, HORAK (72/402, ZT).

Easily recognised by the vinaceous, puberulous pileus and ellipsoid to distinctly angular basidiospores.

This fungus was grown on elephant dung brought in from the forest and retained under bell-jars in the Singapore Botanic Gardens. CORNER reports “the primordia are wholly immersed at depths of 10–25 mm in the dung and not visible until the pileus breaks through, which happens about 8 am. The stem extends mostly in the evening and the pileus expands after dark” The volva remains immersed in the dung and is inconspicuous (Plate 3 N–P).

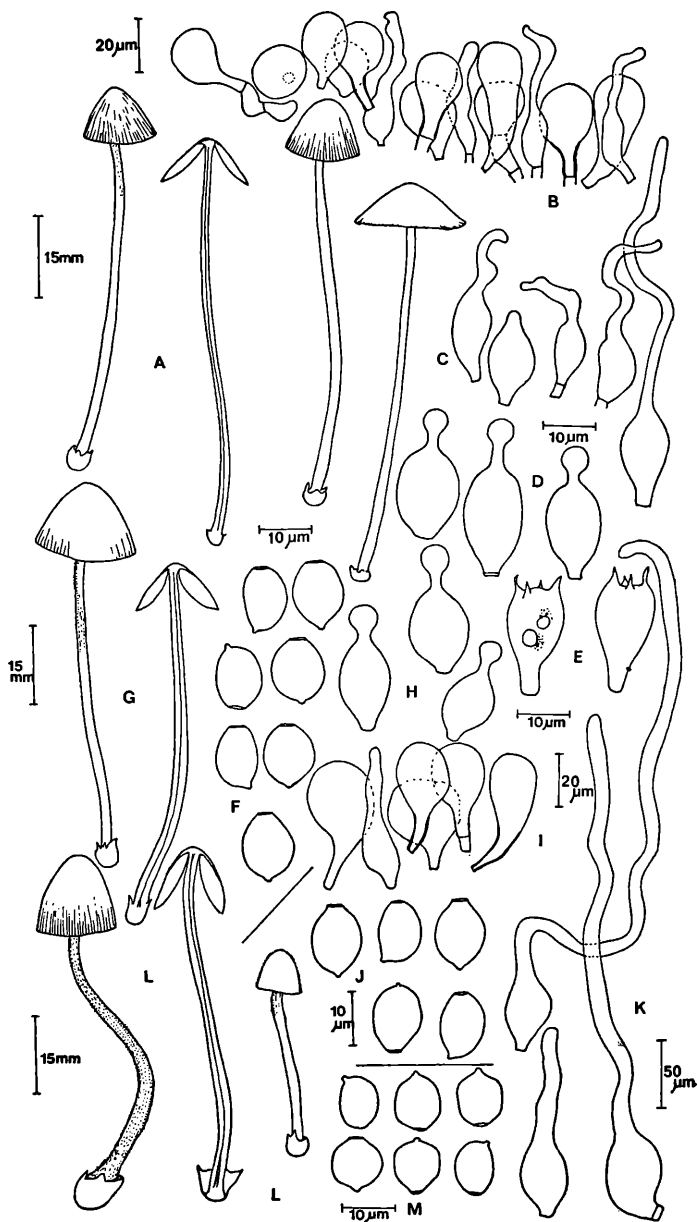


Fig. 2. *C. vaginata*. A & G: Mature basidiocarps & section from HORAK's field notes (A - 72/538 : G - 72/583). B & I: Pileus palisadoderm (B - 538 : I - 583). C: Caulocystidia - 538. D & H: Cheilocystidia (D - 538 : H - 583). E: Basidia - 538. F & J: Basidiospores (F - 538 : J - 583). K: Pilocystidia - 583. *C. corneri*. L: almost mature basidiocarp & section from HORAK's field notes 72/402. M: Basidiospores

Conocybe vaginata WATLING sp. nov. (Plate 2 A—K)

Pileus 14—20 mm, ex hemisphaerico ovoideus, subcampanulatus, expansus, striatus, hygrophanus, glabrus, helvolo-gilvus vel lividus. Stipes 70—76/1—2 mm, cylindricus, subaequalis ad basim leviter incrassatus, pubescens, volva albidanstructus, irregulariter fissus. Lamellae ex griseo-ochraceo luteolo-brunneae vel cinnamomeo-brunneae. Sporae ellipsoideae, poro germinativo, (11—)11.5—12.5(—13) × 8.5—10 × 6.5—8 μ m. Basidia 4-sporigera, (17.5—)20—24 × 12—15 μ m. Cystidia aciei lamellarum lecythiformia (15.5—)20—24(—26) × (8—)10—12(—15) μ m, capitula 3—5(—6) μ m lata. In silvis, Morobe District, New Guinea 23 vii 72, legit Horak: Typus 72/538 ZT.

Pileus 14—20 mm, hemispherical to ovoid or subcampanulate, expanded in age, strongly striate, dry, hygrophanous, glabrous, beige-brownish or grey beige. Stipe 70—76 × 1—2 mm, cylindrical, central, white, glabrous or indistinctly pubescent to pubescent over all, not striate, very fragile, hollow, with swollen base within a white persistent membranous volva. Gills free to adnexed, ventricose, narrow, grey beige to pale rust-colour then rust brown with concolorous even edge. Flesh lacking odour.

Basidia 4-spored, (17.5—)20—24 × 12—15 μ m, clavate, hyaline in both water and alkali solutions. Basidiospores pale rust-brown in mass, broadly ellipsoid with large germ-pore, smooth (11—)11.5—12.5(—13) × 8.5—10 × 6.5—8 μ m, rich yellow brown in water, red brown in alkali solutions, thick-walled. Cheilocystidia lecythiform, (15.5—)20—24(—26) × (8—)10—12(—15) μ m with head up to 6 μ m, mostly 3—5 μ m in diameter, hyaline in water and alkali solutions; pleurocystidia absent. Caulocystidia numerous especially at apex of stipe, fusiform or ovoid with apex drawn off into long variable neck 25—30 × 4—6 μ m some extending into flexuous aseptate apices to form pilocystidia up to 125 μ m long. Pileipellis a palisadoderm of pyriform cells with slightly thickened and slightly ornamented pedicels, 20—45 × 10—25 μ m, intermixed with some pilocystidia with flexuous neck 30—50 × 5—10 μ m, neck 2—3 μ m broad, hyaline slightly brownish at base in water but darker in alkali solutions.

Under bamboo under *Castanopsis* and *Araucaria*. New Guinea, Morobe District, between Wau and Bulolo; 23. VII. 1972, HORAK (72/538, ZT: Holotype in ZT, slide in E). — On rotten wood in *Castanopsis* forest. New Guinea, Morobe District, Bulolo, Manki; 24. IX. 1972, HORAK (72/583, ZT; slide in E).

The volvate base of these two fungi is very distinctive. It is obviously a protective mechanism by which the primordia can develop beneath the surface of the substrate. It is unfortunate that young specimens of *C. vaginata* were not available and that CORNER was unable to pickle unexpanded specimens of *C. corneri* (Plate 3 N—P). A search at the stipe-base of both taxa, and amongst the debris accompanying *C. corneri* failed to reveal any primordia. It is

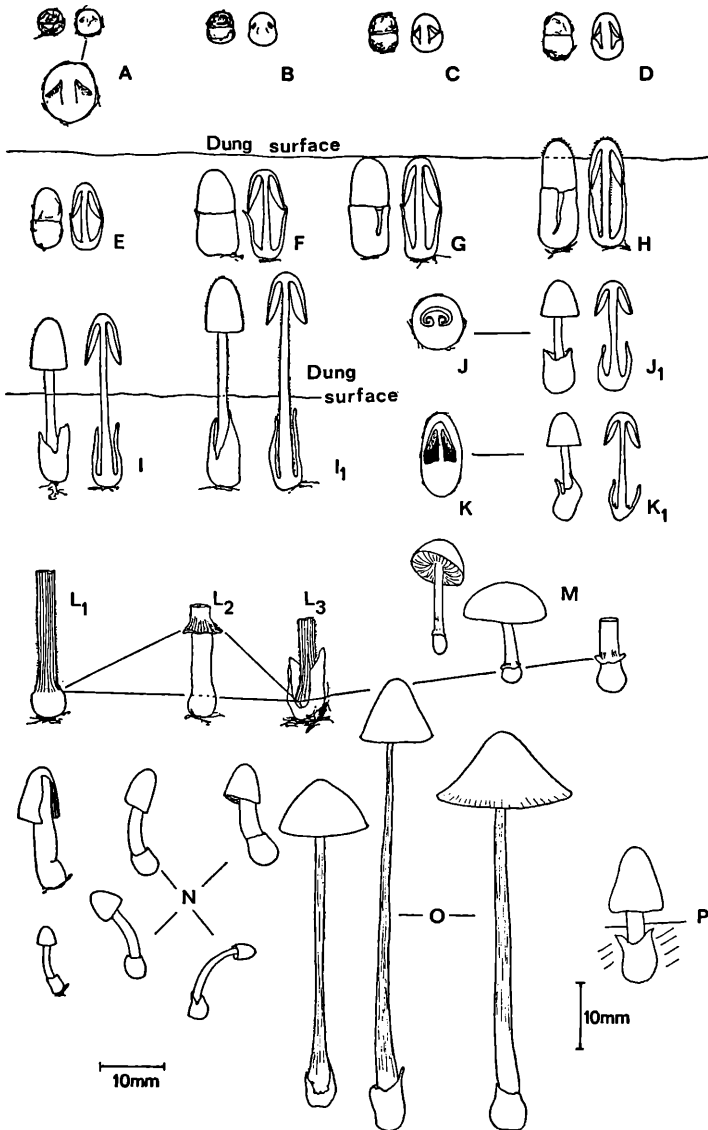


Fig. 3. A—I₁: Reconstruction of development of *C. corneri* (holotype) (Comparison with *Volvariella* J & J₁ & *Amanita* (*Amanitopsis*) K & K₁). L₁—L₃: Comparison of caulocystidia striae on *C. farinacea* (L₁), *C. aporos* (L₂) and *C. corneri* (L₃). M: Comparison with *C. peronata* from KÜHNER. *C. corneri* N, Immature basidiocarps. O: Mature basidiocarps (both from pickled material). P: Illustration from CORNER's field notes

therefore impossible to be definite about the type of development found in this section of *Conocybe* but a possible mechanism is reconstructed in the accompanying figures (Plate 3 A—I), and it is seen to be different to that found in *Volvariella* (Plate 3 J & J₁) and *Amanita* (*Amanitopsis*) (Plate 3 K & K 1) genera both possessing volvate stipe-bases.

Until now species of *Conocybe* have only been found with paravelangiocarpic development or its extension, gymnangiocarpic development. The presence of well-differentiated masses of caulocystidia in distinct lines which stretch from the base of the gills to the base of the stipe, i. e. within the volva (Plate 3 L₃), would support a paravelangiocarpic development if parallels can be made with *C. farinacea* and *C. aporos* (WATLING 1971a). In *C. farinacea* (Plate 3 L₁) and *C. pubescens* the apical part of the characteristically swollen stipe-base is equivalent to the upper part of the ring in *C. aporos* (Plate 3 L₂). Whereas caulocystidia are found all down the length of stipe in the first two species in *C. aporos* they are found only down to the apex of the ring. In those species which have an exannulate stipe but possess appendiculate velar remains, eg. *C. appendiculata* and *C. brunnea* the cystidia are found only at the top of the stipe down to a line where the veil would have been attached, and on the inner surface of the dentate veil. The same picture of development therefore emerges although the end product is slightly different in different species.

It has been indicated earlier (WATLING, 1971b) that the veil in *Conocybe* may be easily removed by abrasion with soil particles and leafy debris, or its position changed. Thus in the *C. aporos* group the ring becomes mobile, whilst that in *C. appendiculata* it may be removed from the margin and lost entirely. The development in "*C. peronata* KÜHNER & MAIRE" (Plate 3, M) is simply an extension of this same morphological series where the membranous lipsanenchyma is found as an annular structure at the base or on the lower part of the stipe. A further extension in this series is now exhibited by *C. corneri* and *C. vaginata* where the lipsanenchyma remains truly basal.

The majority of the species discussed above are members of *Conocybe* subgenus *Pholiotina* and so the question arises whether velar tissue is ever as prominent in other subgenera of *Conocybe*. In subgenus *Conocybe* section *Candidae* SINGER has described *C. velata* with velar remnants and therefore other species in the same subgenus with similar characters might be expected.

In order to emphasise the volvate basal stipe in *C. corneri* the following new section in subgenus *Conocybe* is proposed. It would fit close to sect. *Conocybe* which includes both *C. tenera* and *C. pubescens* (= KÜHNER's Sect. *Capitatae* and *Mixtae*, Le Genre *Galera* 1935).

Conocybe subgenus Conocybe Section Singerella Watling sectio nova.

? *Agaricus* ser. Dermini sect. Acetabularia BERK. in J. Linn. Soc. (Bot.) Lond. 18: 389, 1881

= ? *Acetabularia* (BERK.) MASS., Brit. Fungi. Fl. 2: 232, 1893 (non *Acetabularia* LAMOUROUX, 1812 (Dasycladaceae, Chlorophyta))

= ? *Cyphellopus* FAYOD, Ann. Sci. Nat. (Bot.), VII 9: 365, 1889

Type species: *Conocybe corneri* WATLING

Pileus hygrophanus, siccus, subinde paulum humidus, laevis vel subtiliter pubescens, propter pilocystidias. Annulus absens. Stipes cylindricus, laevis vel subtiliter pubescens. Pleurocystidia absentia; cheilocystidia lecythiformia.

Discussion

The distinctive feature of *Conocybe corneri*, other than the volvate stipe-base, is the colour of the pileus, which is caused by a purplish tinge to the walls of the hyphae immediately below the palisadoderm and in the pedicel-walls of the constituent cells of the pileipellis. Although uncommon in *Conocybe* a similar coloration is found in *C. incarnata* (SCHAEFFER) KÜHNER a species not infrequently found on the European continent in glass-houses. The colour is lost in the pickled material and Corner's material now uncannily resembles many other species of *Conocybe*.

The lecythiform cheilocystidia, and absence of pleurocystidia, in *C. corneri* are characteristic of *Conocybe* subgenus *Conocybe*; indeed the minute striae on the stipe caused by the regular disposition of bunches of caulocystidia, is in keeping with many members of this subgenus. *Conocybe pubescens* and its allies have similar mixtures of caulocystidia. The stature of the pickled material also is reminiscent of this same species, and of *C. bulbifera* (KAUFFMAN) ROMAGNESI as originally defined by KAUFFMAN (1918), although not as redescribed by ROMAGNESI (1942); material of both taxa has been examined. In this same group there is some development of brachycystidia by which DONK (pers. comm.) considered members of the Bolbitiaceae and Coprinaceae expanded their surface as some members of the Aphyllophorales achieve by secondary thickening. Pilocystidia-aseptate filiform cells, are found in the palisadoderm of both *C. corneri* and the *C. pubescens* group and are formed by the drawing out and prolongation of the apical area of cells in the pileipellis and those immediately below the suprapellis.

The structure of the hymenophoral trama of the new species diverges slightly from the general trend found in most common members of the genus *Conocybe* in that the constituent hyphae are not strongly inflated. The pileus trama is composed of only slightly inflated hyphae; however, this is not a drawback to inclusion in the genus *Conocybe* as several as yet undescribed species also possess this feature.

North American species

Whilst reviewing the Bolbitiaceae of North America my attention was drawn to a description of *Galerula locellina* MURRILL from Florida which included the statement “volva limb entire, small white, sometimes persisting”, a unique feature in *Conocybe* surely, and in the discussion MURRILL continues “In young stages the volva is very distinct but it usually becomes indistinct or disappears with age”. It was intriguing that the volva had been noted as no more than “odd” and had been missed by subsequent authorities. With the help of Professor L. HESLER, Univ. of Tennessee, it was possible to show that MURRILL’s fungus was a member of the genus *Conocybe* and I am indeed grateful to him for allowing me to use his notes. However, until the SE Asian material described above had been re-examined the position of *G. locellina* within *Conocybe* remained rather obscure, particularly as no recent collections had been made.

Apparently the fungus differs from *C. corneri* in the differently coloured pileus and much larger basidiospores; in the latter character it resembles *C. vaginata*. A full description with additional microscopic details is given.

Conocybe locellina (MURRILL) WATLING 1976, in Kew Bull. 31: 593

Bas.: *Galerula locellina* MURRILL 1946: Lloydia 9: 327. *Galera locellina* MURRILL 1946: Lloydia 9: 330 (alternative name).

Pileus 40 mm broad, conic at times upturned, dry, isabelline, darker at disc, closely striate at margin. Stipe 70–90×5–10 mm, hollow, white atomate, pubescent to mostly glabrous, tapering upwards from clavate base seated in small, white, sometimes persisting volva with entire limb. Gills adnate, close, narrow, pallid, entire. Flesh thin, dull-isabelline; taste mild; odour slightly unpleasant.

Basidiospores 11–13×7–9 μm , ellipsoid in face-view, slightly inequilateral in side-view, smooth, truncate, fairly thick-walled (0.4 μm), red brown in 2% aqueous solution of potassium hydroxide. Pleurocystidia absent; cheilocystidia 17–24×4–7 μm , lecythiform with long neck. Hymenophoral trama with central narrow zone of slightly interwoven hyphae. Pileipellis a palisadoderm of irregularly shaped swollen cells with scattered narrow pileocystidia with slightly enlarged base, 18–42×4–5 μm . Stipitipellis of repent hyphae with scattered tufts of hyphae-pileocystidia.

The type material (FLAS: F22477) grew on exposed sawdust from a stable in Gainesville but MURRILL indicates he had previously collected it on a manure-pile nearby.

Ecology

One collection of HORAK’s *C. vaginata* (72/583, ZT) was on rotten wood in *Castanopsis* forest but many Bolbitiaceae found on wood

even in temperate climates really grow on very rotten substrates usually in dense shade. In tropical rain-forest the decay of woody debris is very much more rapid and several genera typically terricolous in temperate zones can be found on trunks or stumps. This variability in habitat is reflected in the present study in the other collection of *C. vaginata* (72/538, ZT) which was found under bamboo in a *Castanopsis* and *Araucaria* community; in all other respects the variation found in the two collections comes within the range expected of a species of *Conocybe*.

The differences in habitat between the type of *C. corneri* and HORAK's collection (72/402, ZT) perhaps requires further field observation. Corner's collection from Malaysia was undoubtedly on dung but could HORAK's material have been from an area of defaecation since masked? Under humid conditions even in wet temperate woodlands dung quickly decomposes and frequently members of *Bolbitius* and *Conocybe*, normally considered coprophilous, can be found apparently mopping up the last nutrients. *Conocybe* species do not appear to be obligatory fimicoles but always prefer base-rich habitats often high in soluble nitrogen.

The coprophilous habitat of *C. locellina* is similar to that of CORNER's Malaysian fungus, although Murrill noted his original collection as being on a sawdust/dung mixture.

Agaricus acetabulosus SOWERBY: the genera *Acetabularia*, *Cyphelopus* and *Locellinia*.

Agaricus acetabulosus was described and illustrated by SOWERBY (1799) as having glandular gills, plicate pileus and stipe-base seated in a basal cup. COOK's plate 372 (345) in "Illustrations of British Fungi" is simply a copy of SOWERBY's original but during subsequent printing the colours have been rendered much paler. Many authors omitted or tried to explain away *Ag. acetabulosus* and it was left to BERKELEY (1881) to take up SOWERBY's name in a note following a paper on Australian fungi where he described *Agaricus* series *Dermini* sect. *Acetabularia*.

The original description reads: "*Velum universaliter a pileo discretum; hymenophorum discretum; lamellae liberae; sporae pallide v. brunnae*"

Two fungi were included in BERKELEY's section *Acetabularia*; Sowerby's fungus from Millbank, Westminster, London and his own *A. cygnopotamius* from Swan River, Australia.

Unfortunately, although the centre of conjecture, material of neither has been refound since the original account. Nevertheless even when Sowerby's fungus remained a mystery, in early classificatory systems the section *Acetabularia* took its place as a brown-spored parallel to *Vaginata* (= *Amanita*; white-spored), *Volvaria* (= *Vol-*

variella; pink-spored) and *Chitonina* (= *Macrometula*; purplish brown-spored).

Now with the description of *Conocybe corneri* and *C. vaginata* possessing certain characters in common with *Agaricus acetabulosus* it seems appropriate to re-examine the available information on this last fungus and the genus *Acetabularia*.

A collection of SOWERBY's original drawings for the plates of "English Fungi" is housed in the British Museum. Both the late J. B. EVANS and Mrs. LINDA IRVINE, to whom I am most grateful, have searched at different times through these sketches but have been unable to locate the original for Plate 303. W. G. SMITH (1905) was also unable to locate this drawing and it does not appear to be at Kew. The interest in the original drawing is not just to see whether the illustration had been annotated, although this would be of great interest, but whether the original specimen of Sowerby's is in existence attached to the drawing: a statement to this effect had been made by BERKELEY (1881). Under these circumstances one can only discuss possibilities based on the combined descriptions of SOWERBY and BERKELEY.

BERKELEY obviously considered, because his second species of *Acetabularia* had a veil similar to that in *Volvariella*, this was really what Sowerby was trying to depict. The range for the spore-colour given in the diagnosis is rather broad but can now be explained in that two separate elements were included, *Agaricus acetabulosus* and *A. cygnopotamius* the type of which according to SINGER (in DONK, 1962), and with whom I agree, is a species of *Volvariella*. As BERKELEY includes in the spore-colour the term "brunnae" one can only assume he actually examined SOWERBY's original figure or specimen.

BERKELEY's error in joining a bolbitiaceous agaric and a member of the Pluteaceae in a single genus probably arose because he only had dried material available. Frequently even today specimens are received from mycologists labelled *Bolbitius* which in fact belong to *Volvariella*. This apparently results from the slightly cinnamon-brown cast to the spore-print or gills on desiccation, and the slight to distinctly gelatinised pileus-surface of some species of Pluteaceae.

In gross morphology certain members of these two families might approximate one another but in anatomical detail they are very different. BERKELEY, however, made parallel errors. Thus the type material of *Agaricus leaiianus* BERKELEY (= *Pluteolus leaiianus* (BERK.) SACC.) and *Galera mucidolens* BERK. (= *Pluteolus mucidolens* (BERK.) EARLE) are nothing more than forms, or are at most close allies of *Pluteus cervinus* SCHAEFF. ex FR.

Bolbitius macowanii Kalch., of which no description was ever published by the author, but distributed as exsiccata, is a species of *Volvariella* with the stipe lacking its volvate base.

Although SOWERBY likened *Agaricus acetabulosus* to *Agaricus congregatus* (= *Coprinus micaceus* (BULL. ex FRIES) FR., SINGER (1962), considered that it could be *Pluteus semibulbosus* (LASCH) GILLET, a suggestion made earlier by BOUDIER (cf. REA, Brit. Basid. 97, 1922); FAYOD (1889), although placing it in a new genus, also suggested it could be a *Pluteus* species, possibly an abnormally developed form. The speculation as to the link between *Ag. acetabulosus* and the Pluteaceae cannot be supported however, on the colour of the spores.

FRIES took up SOWERBY's ideas and in *Systema Mycologicum* III suggested *Ag. acetabulosus* was possibly allied to *Coprinus domesticus* (BOLT. ex FRIES) S. F. GRAY. Much later, in PEARSON (1935), QUÉLET proposed the idea that SOWERBY's fungus was either *Hypholoma fatua* (FR.) K. & M. (= *Psathyrella*) or *Psathyrella torpens* (Coprinaceae), whereas MAIRE in the same paper suggested that it was *Bolbitius bulbillosus* (Bolbitiaceae). If a relationship is found linking *Agaricus acetabulosus* and the S. E. Asian agarics described in the present paper, MAIRE will have been nearer the truth than those other authorities who have considered the data; *B. bulbillosus* is usually synonymised with *Conocybe lactea*.

MASSEE (1893) elevated BERKELEY's section to generic rank although earlier it had been treated as a synonym of *Locellina* (SACCARDO, 1887). In so doing SACCARDO hinted at the need to accommodate SOWERBY's fungus in a separate genus but wished to avoid the necessity of creating a new genus; unfortunately, he linked *Agaricus acetabulosus* with what appears to be quite a different agaric.

Locellina was originally based on the single, controversial species *L. alexandri* GILLET, in many texts a name which has been dropped completely in its original sense. *L. alexandri* has been recorded from the British Isles but apparently in error. PEARSON & DENNIS (1948) note *A. acetabulosus* under *Locellina* simply stating "doubtful species". The Check List authors (1960) record "*acetabulosus*, *Locellina*, doubtful".

Regardless of the true identity of *Locellina alexandri* there appears after reading the original descriptions, to be little justification for SACCARDO's union of the two agarics. GILLET for instance describes his fungus as having an arachnoid veil as well as a volva, and in stature the two fungi are very different; can only agree with QUÉLET (1886) who considered *Locellina alexandri* a species of *Cortinarius*.

FAYOD (1889), MASSEE (1893) and W. G. SMITH (1905) were unable to accept SACCARDO's treatment; the first author even suggested, because of the earlier homonym of "Acetabularia", a new generic name to accommodate *Ag. acetabulosus*: *Cyphellopus* — a name derived from the character of the stipe-base. The status of this genus rests solely on the credibility of SOWERBY's fungus.

Glandular Gills

BERKELEY was very definite about the autonomy of section *Acetabularia*; *Agaricus acetabulosus* must be taken as type of the section and therefore of Massee's genus with the same name, and of FAYOD's *Cyphellopus*. BERKELEY emphasised the nature of the gills of this species by including in his description the term "lamellis hispidus".

With the finding of three species of *Conocybe* with volvate basidiospores it became more possible for *Agaricus acetabulosus* to be housed in the Bolbitiaceae, even to be congeneric or synonymous with one of these taxa. However before this is made convincing it is necessary to try and explain the presence of these glandular gills and also any habitat differences between *C. corneri* and its allies, and SOWERBY's fungus.

Could the glands have been pleurocystidia? Certainly lamprocystidia in *Phlebia* spp. can be observed with a $\times 10$ lens as can those of members of the Gomphidiaceae. Pleurocystidia are not unknown in the Bolbitiaceae but have not as yet been found in *Conocybe*; however even the large and complex cystidia of *Agrocybe arvalis* are insignificant to the naked eye. Brachycystidia are found in several members of this family also but they cannot be distinguished by the unaided eye.

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Although SOWERBY likened *Agaricus acetabulosus* to *Agaricus congregatus* (= *Coprinus micaceus* (BULL. ex FRIES) FR., SINGER (1962), considered that it could be *Pluteus semibulbosus* (LASCH) GILLET, a suggestion made earlier by BOUDIER (cf. REA, Brit. Basid. 97, 1922); FAYOD (1889), although placing it in a new genus, also suggested it could be a *Pluteus* species, possibly an abnormally developed form. The speculation as to the link between *Ag. acetabulosus* and the Pluteaceae cannot be supported however, on the colour of the spores.

FRIES took up SOWERBY's ideas and in *Systema Mycologicum* III suggested *Ag. acetabulosus* was possibly allied to *Coprinus domesticus* (BOLT. ex FRIES) S. F. GRAY. Much later, in PEARSON (1935), QUÉLET proposed the idea that SOWERBY's fungus was either *Hypholoma fatua* (FR.) K. & M. (= *Psathyrella*) or *Psathyrella torpens* (Coprinaceae), whereas MAIRE in the same paper suggested that it was *Bolbitius bulbillosus* (Bolbitiaceae). If a relationship is found linking *Agaricus acetabulosus* and the S. E. Asian agarics described in the present paper, MAIRE will have been nearer the truth than those other authorities who have considered the data; *B. bulbillosus* is usually synonymised with *Conocybe lactea*.

MASSEE (1893) elevated BERKELEY's section to generic rank although earlier it had been treated as a synonym of *Locellina* (SACCARDO, 1887). In so doing SACCARDO hinted at the need to accommodate SOWERBY's fungus in a separate genus but wished to avoid the necessity of creating a new genus; unfortunately, he linked *Agaricus acetabulosus* with what appears to be quite a different agaric.

Locellina was originally based on the single, controversial species *L. alexandri* GILLET, in many texts a name which has been dropped completely in its original sense. *L. alexandri* has been recorded from the British Isles but apparently in error. PEARSON & DENNIS (1948) note *A. acetabulosus* under *Locellina* simply stating "doubtful species". The Check List authors (1960) record "*acetabulosus*, *Locellina*, doubtful".

Regardless of the true identity of *Locellina alexandri* there appears after reading the original descriptions, to be little justification for SACCARDO's union of the two agarics. GILLET for instance describes his fungus as having an arachnoid veil as well as a volva, and in stature the two fungi are very different; can only agree with QUÉLET (1886) who considered *Locellina alexandri* a species of *Cortinarius*.

FAYOD (1889), MASSEE (1893) and W. G. SMITH (1905) were unable to accept SACCARDO's treatment; the first author even suggested, because of the earlier homonym of "Acetabularia", a new generic name to accommodate *Ag. acetabulosus*: *Cyphellopus* — a name derived from the character of the stipe-base. The status of this genus rests solely on the credibility of SOWERBY's fungus.

Glandular Gills

BERKELEY was very definite about the autonomy of section *Acetabularia*; *Agaricus acetabulosus* must be taken as type of the section and therefore of Massee's genus with the same name, and of FAYOD's *Cyphellopus*. BERKELEY emphasised the nature of the gills of this species by including in his description the term "lamellis hispidus".

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basidia 1—2 spored, hyaline in aqueous solutions; no pleurocystidia were observed.

There is little doubt ATKINSON mistook the very prominent monosporic basidia for clavate mucronate pleurocystidia. Is it possible that SOWERBY observed similar aberrant basidia and over-emphasised their presence? I think not; after examining SOWERBY's illustrations and discussion on other agarics eg. *Agaricus lachrymabundus* Plate 41 (= *Lacrymaria velutina* (PERS. ex FR.) KONRAD & MAUBLANC) it would appear the glands were larger than cystidia or even groups of cystidia. His draughtmanship in depicting the fungi he examined and his representation of the detail he saw under low magnification are superb. Alas the structures observed by SOWERBY must remain a mystery!

As for habitat, all members of *Conocybe* sect. *Singerella* are apparently tropical to sub-tropical and if *Agarius acetabulosus* is related it might also be expected to have a parallel distribution. RIDLEY in his paintings of Malaysian fungi, now housed at Kew, illustrated something which could also be referred to this group of *Conocybe* spp. again supporting this hypothesis. It might therefore be tentatively suggested that SOWERBY's fungus has not been collected in Europe again as it was an alien. Although the specimen was found "a little above high water-mark" it may have fruited there by accident. Perhaps material containing spores or mycelium was thrown out in the River Thames from a sea-going vessel and remained above high tide a sufficient time for growth and subsequent fructification.

Unfortunately even after extensive study a conclusive treatment of *Agaricus acetabulosus* has not been achieved. A further search by the library staff of the British Museum in their archives was unsuccessful, although there is now some tenuous evidence that some of the plates, hopefully including No 303, are in private hands. This line of investigation is being continued.

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Zeitschrift/Journal: [Sydowia Beihefte](#)

Jahr/Year: 1977

Band/Volume: [8](#)

Autor(en)/Author(s): Watling Roy

Artikel/Article: [Observations on the Bolbitiaceae XYII Yolvate Species of Conocybe 401-415](#)