

On The Agaric Genera *Hohenbuehelia* and *Oudemansiella* Part I: *Hohenbuehelia*

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Abstract

The construction of the fruit-body and the affinity of the genus are discussed. It is considered that it comes between *Pleurotus* and *Oudemansiella*, having the basidia of the former and the pleurocystidia of the latter. Eighteen species are described for Malesia, of which 15 are new. Notes are given on several extra-Malesian species. New taxa: *H. concentrica*, *H. griseipendens*, *H. incarnata*, *H. lanceifera*, *H. malesiana*, *H. mellea*, *H. minutissima*, *H. pachyhyphata*, *H. pahangensis*, *H. perstriata*, *H. quadruplex*, *H. singaporensis*, *H. suppapillosa*, *H. vermiculata*. *H. bullulifera* Singer v. *brasiliensis*. New combinations: *H. cystidioides* (C.G.Lloyd), *H. subtorulosa* (Cke).

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General Account

A fruit-body with lateral pileus, an upper gelatinous layer to the flesh, and a farinaceous smell of meal is a sign of *Hohenbuehelia*. It is checked microscopically for the thick-walled pleurocystidia. However, there are specific variations in most features and what seems to be a uniform genus has ragged fringes.

Fruit-body. Two European species have mesopodal fruit-bodies, namely *H. longipes* (among moss in woodland) and *H. culmicola* (on remains of the coastal dune-grass *Elymus*). At the other extreme, there are fruit-bodies which are dorsifixed, more or less sessile, and at first cyphelliform, as *H. bullulifera*, *H. chevalieri*, *H. griseipendens*, *H. nigra*, and *H. singaporensis*. Such species resemble *Resupinatus* which lacks the thick-walled pleurocystidia.

Flesh. The upper gelatinous layer is usually thinner than the firm layer of the flesh but it may be as thick or thicker. In a few species the flesh is almost completely gelatinous. In contrast, the gelatinous layer is said to be poorly developed or little differentiated in the South American *H. roigii* and *H. spagazzinii*. Concerning the absolute thickness of the gelatinous layer, there must be some caution in comparing descriptions. I measure its maximum thickness at the base of the lateral pileus, as I do for the flesh, and this may be the customary procedure, but Singer measures it towards the margin of the pileus. In this case, it is necessary to state whether it is an old or young pileus because the old pilei become marginally attenuate and may give a narrower measure than the young. The gelatinous layer swells abnormally in material preserved in alcohol-formalin and, also, in sections mounted in dilute potash. Sections of dried material mounted in water give a more or less normal thickness.

Spores. Most species have smooth and thin-walled spores as seen under the light microscope but there is one exception with verruculose to echinulate and thick-walled spores, namely *H. bursaeformis*. For this, Singer (1969) made the subgenus *Reidia* and Horak (1981) has treated it as the distinct genus *Conchomyces* v. Overeem, while remarking oddly that *Hohenbuehelia* is characterised by allantoid cylindric spores. Singer added a second species, *H. dimorphocystis*, which Horak reduced to his *C. bursaeformis*. However, there are difficulties in accepting this genus. Donoso (1981) showed that the spores of some species of the genus have a thin mucilage sheath beneath which the endospore, under SEM, is subverrucose, e.g. *H. geogenia*, *H. heterosporica*, *H. petaloides* and *H. rickenii*: in the case of *H. bursaeformis*, the spines penetrate this sheath. Then, according to Donoso, *H. heterosporica* has both smooth and subverrucose spores (as seen under SEM), even on the same basidium. I find with Malesian material of *H. bursaeformis* that the spores under the light microscope vary from echinulate to merely asperulate and that these spines or warts contract in Melzer's iodine and disappear in dilute potash, thus unlike typical spines. In other words, there is a gradation from echinulate spores (of a sort) to truly smooth spores, which nullifies the main idea of a separate *Conchomyces*.

The spores of the genus are often said to be 1-guttate but, in my experience, fresh spores are usually aguttate and, on drying, the contents contract into a sort of gutta, though a few species have fresh spores with 1-2 minute guttulae.

Cheilocystidia. These make a sterile gill-edge and are nearly always thin-walled. They vary in different species from clavate to cylindric-moniliform and lecythiform, or ventricose. They would seem to supply useful specific features but they may vary considerably even in the same fruit-body.

Pleurocystidia. These are usually called metuloids because the thick wall is encrusted distally with granules or crystals. In most species they are not dextrinoid but Stevenson (1964) has described several species from New Zealand with

dextrinoid walls. In *H. bursaeformis* the wall is scarcely thickened and not or slightly encrusted. In two species, namely *H. horrida* and *H. incarnata*, the pleurocystidia are extremely abundant. The wall thickens from apex to base, young pleurocystidia being thin-walled. They are the first hymenial elements to develop and have, in consequence, a deep tramal origin in the mature gill. Their length may vary because the first to be formed are at the base of the gills and between them and are the longest, and they shorten towards the gill-edge where they may be almost hymenial and, even, mixed with the cheilocystidia.

Hyphae. These are short-celled and, usually, with little inflation though strongly inflated in the flesh of some species. In others they develop thickened walls and may become almost solid, as in *H. pachyhyphata*; this species has ampulliform swellings on some hyphae which resemble the inflated cells in *Chaetocalathus* (Corner, in ed.). The gelatinous layer begins to form almost as soon as the pileus. It separates a narrow superficial layer, one or two to ten hyphae thick in different species, from the tissue of the flesh (Fig. 12). The superficial layer develops a loose sterile hymenium with variously formed cells and, in most species, narrow hyphae grow slowly out to project vertically to form the villous surface; thus it is more evident in the proximal part of the pileus. In *H. quadruplex* (Fig. 9) the gelatinous layer is double. In a few species, such as *H. suppapillosa* (Fig. 11,12), there are many inflated cells in the gelatinous layer as well as the usual uninflated hyphae. The gill-trama is constructed from descending hyphae but in *H. angustata* there seems to be a vestige of the radial construction seen in *Panus* s.str.

Surface of pileus. The loose sterile hymenium on the surface may develop cells like cheilocystidia or pleurocystidia but in some species, especially those with the fruit-bodies at first cyphelliform, there is a more or less close hymenioderm of clavate cells, e.g. *H. bullulifera*, *H. griseipendens*, *H. nigra*, *H. singaporensis* and *H. subbarbatus* (Dennis, 1953). Such a hymenioderm is used in modern mycology to distinguish genera but has not aroused that attention in *Hohenbuehelia*.

Nematode-catching. This habit has been explained in detail by Thorn and Barron (1986). They associate 9 species of the mycelial genus *Nematoctonus* Drechsler, which has clamp-connections, with some 14 species of temperate *Hohenbuehelia*. The nematodes are caught by a viscous excretion from short hyphal processes, often lecythiform, and the mycelia may form solitary conidia or chlamydospores. Tropical species remain to be tested.

Classification of the Species

Several ways have been proposed to arrange or to ally the species, but none seems, as yet, to be satisfactory. Huijsman (1961) employed the relative thickness of the gelatinous and firm layers of the flesh and the direction of the hyphae in the gelatinous layer, whether it was ascending more or less vertically to the

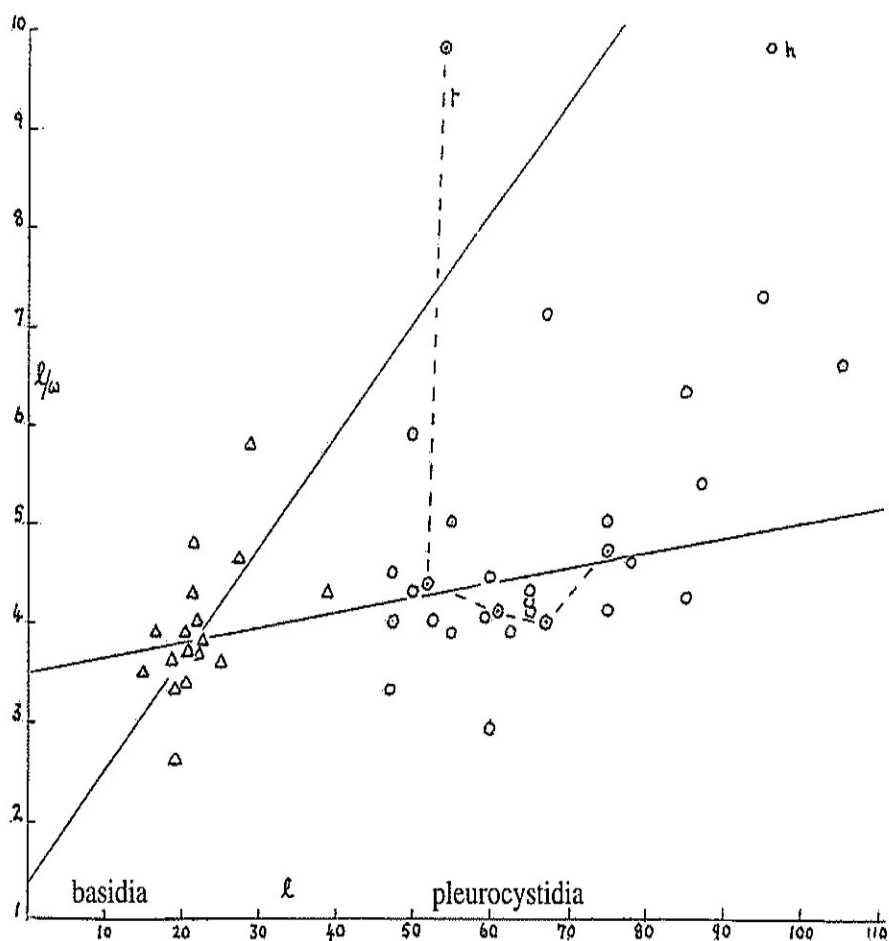
surface, longitudinal (radiating) parallel with the hyphae of the firm layer, or interwoven. His conclusions were drawn from rather few temperate species and, as Singer has remarked, need extension to those of the world. Singer (1975) distinguished subgen. *Reidia* with ornamented spores from subgen. *Hohenbuehelia* with smooth spores but, as Donoso (1981a,b) has shown, the distinction breaks down with SEM examination. For the Malesian species I have used primarily the presence or absence of thick-walled cystidia like pleurocystidia on the surface of the pileus because I find that it is a constant character. However, though I have perused descriptions of other species, there remain numerous doubts about its universal applicability.

Conchomyces was considered by Horak (1981) to be unrelated to any other agaric genus on account of the echinulate, subglobose and rather thick-walled spores, the large cheilocystidia, the rather thin-walled pleurocystidia and the inflated hyphae of the firm tissue of the flesh. It is difficult to follow this argument because all the points have their gradations in other species of *Hohenbuehelia* with which it agrees in colour and gelatinous upper layer to the pileus. The one species, *H. bursaeformis*, has been regarded as peculiar to the southern hemisphere of Australasia and Chile, but its occurrence in Malaya and north Borneo does not accord. Maybe it has traces of the stouter fruit-body of *Oudemansiella*.

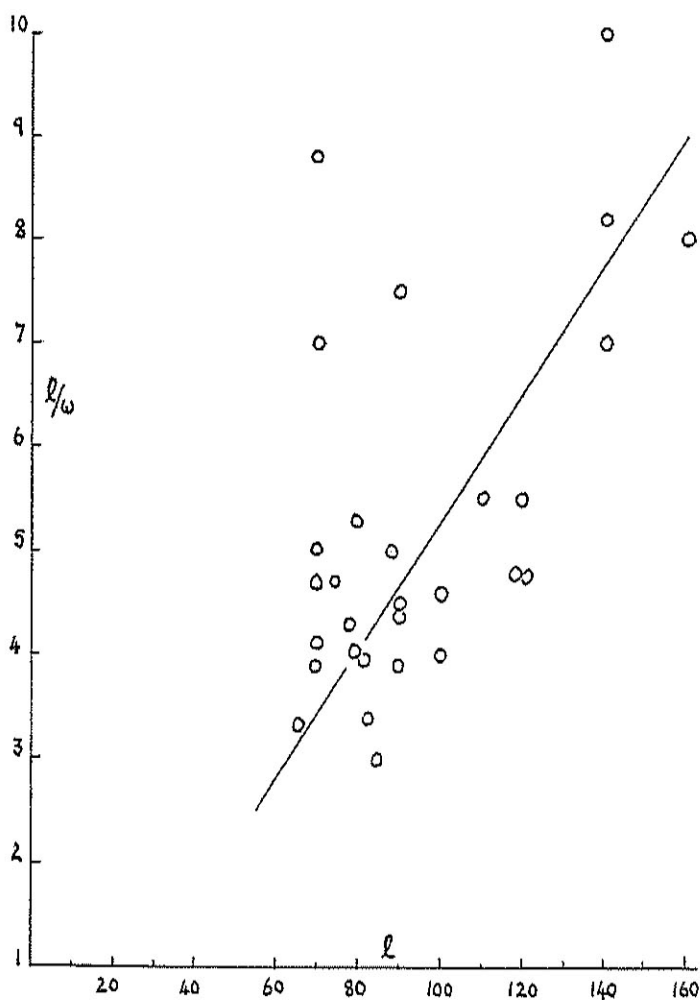
Basidiograph and Pleurocystidiograph

In Graphs 1 and 2, the ratio l/w for basidia and pleurocystidia is plotted against l , where l is the length and w the width of these structures as given in the following descriptions for their mean values. The result is peculiar. The basidia conform to a steep locus as drawn, roughly, by the line through the triangles, and the pleurocystidia conform to a more gradual locus shown, roughly, by the line drawn through the circles. However, there are two outstanding exceptions, for the pleurocystidia of *H. horrida* (point h) and for one of the measures for *H. testudo*.

In the equation to these loci $l/w = a + bl$, b is 0.112 for the basidium and 0.015 for the pleurocystidium; the reciprocal of b gives the maximum width as 8.9 μm for the basidium and 66.7 μm for the pleurocystidium. These values are based on mean measures; the widest basidium that I have recorded was 10 μm for *H. concentrica* (mean 9 μm); the widest pleurocystidium was 28 μm in *H. angustata*. Thus, the basidia of *Hohenbuehelia* are extremely narrow, even narrower than the clavarioid basidium with $b = 0.08$ ($1/b = 12.5 \mu\text{m}$). The pleurocystidia, however, conform to the wider basidium seen in *Amauroderma* and *Ganoderma* with $b = 0.013$ (Corner 1983). The hymenium of *Hohenbuehelia* seems to be influenced in two ways; one is primitive and retains the wide or massive expression and the other is far advanced towards the minimal narrowness of the uninflated hypha.



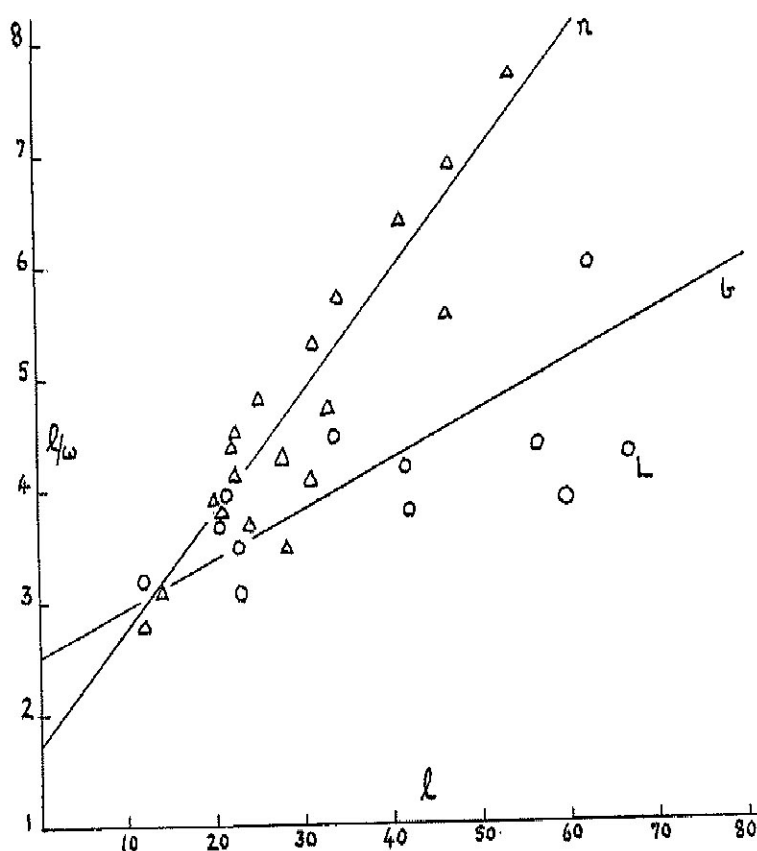
Graph 1. *Hohenbuehelia*, basidiograph (triangles) and pleurocystidiograph (circles); h, *H. horrida*; t, *H. testudo*. (Constructed from the data in this article).



Graph 2. *Hohenbuehelia*, pleurocystidiograph for the longest pleurocystidia.

The situation in *Pleurotus* is instructive. In dealing with the Malesian species, I distinguished species with narrowly ellipsoid to cylindric spores from those with broadly ellipsoid to subglobose spores (Corner 1981). Graph 3 gives the basidiographs of these two groups. That with narrow spores has the steeper slope for which, roughly, $b = 0.105$ ($1/b = 9.5 \mu\text{m}$) which is comparable with *Hohenbuehelia*; and that with broad spores has, roughly, $b = 0.045$ ($1/b = 22.2 \mu\text{m}$) which is intermediate to the large basidium of *Oudemansiella* with $b = 0.02$ ($1/b = 50 \mu\text{m}$). That is to say, in comparison with *Hohenbuehelia*, *Pleurotus* is progressing to the narrowness of the basidium with little tendency to retain the pleurocystidium as the larger unit. The basidiograph of both genera corresponds with that of the developing basidia of *Oudemansiella* with $b = 0.11$ (Corner, 1947).

These conclusions are tentative because they are based on mean measures and not on true averages of many individual basidia. Moreover, in the case of the pleurocystidium of *Hohenbuehelia* it is not always clear that the width refers to that between the outer walls or to the overall width including the incrustation. Nevertheless, it seems that the pleurocystidia of *H. horrida* conform with both loci. The genus is less advanced in this respect than *Pleurotus*.



Graph 3. *Pleurotus*, basidiograph. Species with narrow spores as triangles with locus n. Species with broad spores as circles with locus b. L, *Lampteromyces japonicus*. (Constructed from the data in Corner 1981).

Affinity

Modern taxonomy places *Hohenbuehelia* along with *Resupinatus* (without thick-walled pleurocystidia) in Tricholomataceae tr. Resupinateae. This classification emphasizes the gelatinous texture of the flesh. As regards *Resupinatus*, I have given reason to suppose that it is a mixture of marasmiod fungi with subaceroe basidioles and pleurotoid fungi without them (Corner, in ed.). Concerning *Hohenbuehelia*, there are several species which fail in one way or other the dual test of a gelatinous layer in the flesh and thick-walled pleurocystidia. That its species are mostly pleurotoid seems not to matter because *H. culmicola* and *H. longipes* are mesopodal.

Both diagnostic characters emphasize the difference from *Pleurotus*. An analogy, however, seems to dispose of a family distinction. *Polyporus* s. str. and *Echinochaete* have the same peculiar hyphal construction but *Echinochaete* has an upper gelatinous layer to the pileus and thick-walled pleurocystidia, both features lacking in *Polyporus* s. str. (Corner, 1984). *Echinochaete* has been regarded as a synonym of *Polyporus* subgen. *Asterochaete* by Singer (1975). Thus, the affinity of *Hohenbuehelia* may well concern *Pleurotus*, some species of which have thin-walled pleurocystidia (Corner, 1981); moreover, *Hohenbuehelia* has been regarded as a subgenus of *Pleurotus* by several authors. The faculty of nematode-catching has been found, also, in several species of *Pleurotus* (Thorn and Barron, 1986), but not reported for *Resupinatus*.

Another genus, in this connection, is *Agaricochaete* which has been re-established with a third species by Pegler (1977). The fruit-bodies are mesopodal and clitocyboid without gelatinous flesh but with the thick-walled pleurocystidia of *Hohenbuehelia*. Emphasizing these pleurocystidia, Pegler placed the genus in Resupinateae, and here enter two other species of South America, *H. roigii* and *H. spegazzinii*. Their fruit-bodies have no distinctly gelatinous flesh but they have the thick-walled pleurocystidia, and they are pleuropodal or sessile. If emphasis is laid on pleurocystidia, then it is difficult to see how these two can be separated from *Agaricochaete*, which would then become practically synonymous with *Hohenbuehelia*.

The contrast is shown by *H. bursaeformis* with the gelatinous upper layer to the flesh but with thin or but slightly thick-walled pleurocystidia. One is led to think of *Oudemansiella* with mesopodal fruit-bodies and large spores, as if antecedent, and it has a species with echinulate spores. *Agaricochaete* is evidently rare and, maybe, there are other tropical species of this general alliance to be discovered. The fourth species attributed to the genus, *A. indica* Natarajan et Raman (1986), without clamp-connections, is excluded by Thorn and Barron who think that it may be *Lactocollybia*.

Another alliance has been suggested with *Geopetalum* Pat. or *Faerberia*, as it seems it must now be called (Pouzar, 1981), but I use the old name as that of past

literature. The fruit-body of *G. carbonarium* has the stature and colour of mesopodal *Hohenbuehelia* and the thick-walled pleurocystidia, but it lacks the gelatinous layer to the flesh. It is dimitic in the manner of several species of *Pleurotus* and has cantharelloid gill-folds with thickening hymenium (Corner, 1966, 1968); moreover, it is not nematode-catching. A minor distinction may be that, instead of the prevailing farinaceous smell of *Hohenbuehelia*, it disengages HCN. Nevertheless, if the cantharelloid gill-fold preceded the agaric, *Geopetalum* could have led to *Pleurotus* and, so via *Agaricochaete* to *Hohenbuehelia*. Whereas *Cantharellus* is excluded from Agaricales by modern taxonomy, it consistently admits the cantharelloid *Geopetalum*. It has been ranked with *Hohenbuehelia* in Geopetalaceae, to the exclusion of *Resupinatus*, by Jülich (1981). The common character is the thick-walled pleurocystidium, not the gelatinous layer in the flesh; the other characters, given by Jülich, such as multiguttulate basidia and spores, do not occur in my experience in *Hohenbuehelia*.

Three other pleurotoid genera have, at least in some of their species, thick-walled pleurocystidia. Of these, *Chaetocalathus* and *Panus* lack the gelatinous upper layer to the flesh but it is present in some species of *Panellus*. This genus and *Chaetocalathus*, however, are marasmioid with subaceroise basidioles. *Panus* has, in the main, radiate gill-construction which may be a relic of the cantharelloid.

If one attempts to relate these genera, dispersed in various tribes or families, in a phylogenetic tree, it becomes obvious how much must have disappeared in the long course of evolution. I am forced to conclude that modern taxonomy still needs modernising.

***Hohenbuehelia* Schulzer (1866) - Generic Character**

Fruit-bodies pileate, mesopodal, pleuropodal or sessile to dorsifixed and at first cyphelliform, gymnocarpic. Gills decurrent or radiating from the point of attachment, thin, sometimes dichotomous. Flesh with an upper gelatinous layer and a firm lower layer, in a few species almost wholly gelatinous. Smell often farinaceous. Spores white, mostly smooth but varying verrucose to echinulate, inamyloid. Hymenium not thickening, without subaceroise basidioles; gill-edge sterile with thin-walled cheilocystidia. Pleurocystidia typically thick-walled and encrusted, usually not dextrinoid. Hyphae clamped, monomitic, short-celled, inflating or not, inamyloid. Surface of pileus often villosulous with excrescent, often faciculate, hyphae; pileocystidia thick-walled, present or not; in some species hymenioderm with clavate cell. Colour of pileus usually fuscous brown, grey or pallid subochraceous to whitish, either in the walls of the superficial hyphae or in the sap of the upper hyphae of the firm layer of the flesh. Lignicolous or on plant-remains, a few terricolous, associated (? always) with nematode-catching. Worldwide.

Keys to the Species of *Hohenbuehelia* in Malesia

1. Surface of pileus with thick-walled cystidia **Group 1**
1. Surface of pileus without such cystidia **Group 2**

Group 1

1. Flesh almost wholly gelatinous. Pileus -14 mm wide, with subdiscoid base. Spores 4.5-6 x 3.3-4.3 μm . Cheilocystidia mostly clavate. Solomon Islands *H. subdiscipes*
1. Flesh with a distinct firm layer below the gelatinous layer. Cheilocystidia mostly ventricose with short, often capitate appendage.
 2. Gills distant, -3.5mm wide. Pileus -22mm in radius, sessile, striate. Flesh -2mm thick. Spores 5-6 x 3.5-4 μm . Solomon Islands *H. perstriata*
 2. Gills crowded. Pileus sessile or pleuropodal.
 3. Pileus -7mm wide, greyish buff. Gills -0.7mm wide. Flesh with the gelatinous layer thicker than the firm layer. Spores 4-6.5 x 3-4 μm . Pileocystidia very heavily encrusted. Solomon Islands. *H. vermiculata*
 3. Pileus larger. Gills wider. Gelatinous layer thinner than the firm layer.
 4. Cheilocystidia clavate to obtusely ventricose. Spores 3.5-4.3 x 3-3.5 μm . Malaya *H. pahangensis*
 4. Cheilocystidia often ventricose with capitate apex. Spores 5-7 x 2.5-3.5 μm . S.E.Asia *H. testudo*
(Spores 3.5-5 μm wide. Malesia var. *glabra*)

Group 2

1. Hyphae of the firm layer of the flesh and of the gill-trama with walls 1-3 thick or more. Spores smooth.
 2. Firm layer of the pileus much thinner than the gelatinous.
 3. Pileus -3mm wide, grey. Spores 5-7 x 2.7-3.5 μm . New Guinea *H. minutissima*
 3. Pileus -45mm wide, greyish to brownish bistre, occasionally white. Gills waxy gelatinous. Spore 7-9 x 3-4 μm . Malesia *H. malesiana*
 2. Firm layer of flesh thicker than the gelatinous layer (at least in the proximal part of the pileus).
 4. Pileus -30mm wide, white to dingy yellowish or fuscous vinaceous. Stem short, thick. Smell farinaceous. Spores 6-7.5 x 3-3.5 μm . Hyphae of firm layer of flesh with ampulliform swellings. Borneo, Queensland *H. pachyhyphata*
 4. Pileus -13mm wide, white to greyish umber. Spores 4-5.5(-6) x 3.3-3.7 μm . No ampulliform swellings. Borneo var. *minor*
1. Hyphae with thin or scarcely thickened walls.
 5. Spores echinulate, subglobose. Pileus white to pale ochraceous. Malesia *H. bursaeformis*
 5. Spores smooth.
 6. Pileus dorsifixed, at first cyphelliform, expanding to 25mm wide or less, fuliginous grey. Flesh 1-2mm thick, gills -1.5mm, crowded. Cheilocystidia 15-30 x 6 -10(-15) μm , clavate. Surface of pileus more or less hymeniiform.
 7. Spores 6-7 x 4-4.5 μm . Pleurocystidia 12-25 μm wide. Clavate cells on pileus 8-20 μm wide, compact. Singapore *H. singaporensis*

7. Spores 4-5 x 3.5-3.7 μm . Pleurocystidia 7-14 μm wide. Clavate cells -7 μm wide, some lobulates scattered on pileus. Borneo *H. griseipendens*
6. Pileus pleuropodal or laterally sessile from the first.
 8. Pleurocystidia exceedingly numerous, lanceolate, 5-12(-14) μm wide. Gills more or less distant, 4-6mm wide. Pileus - 7cm wide, shortly pleuropodal.
 9. Wholly pinkish buff. Gelatinous layer of flesh - 150 μm thick. Spores 4-7 x 4.5-6 μm , subglobose, smell slight, of fenugreek. Solomon Islands *H. incarnata*
 9. White to brownish ochraceous or greyish. Gelatinous layer 250-600 μm thick. Spores 5-6.5 x 3-4 μm , ellipsoid. Smell farinaceous. Malesia *H. horrida*
 8. Pleurocystidia numerous but not crowded, ventricose-fusiform. Gills 1.5-3mm wide or -4mm.
 10. Pleurocystidia with long attenuate apex, 40-160 x 12-20 μm . Flesh almost wholly gelatinous, firm layer 100-200 μm thick. Gills pale ochraceous to brownish. Pileus -20mm wide. Inodorous.
 11. Gills crowded. Pileus white to pallid ochraceous. Spores 4-5.5 x 3.7-4.5 μm . Borneo *H. lanceifera*
 11. Gills distant. Pileus honey yellow to brownish, not villous. Spores ? 5-6.5 x 2.3-3 μm . Singapore *H. mellea*
 10. Pleurocystidia not long attenuate, shorter. Gills crowded.
 12. Gills - 4mm wide. Pileus -8cm wide, ochraceous to orange. Flesh more than 1mm thick
 13. Gills white. Pileus white to ochraceous and brownish, shortly stipitate. Flesh 1.5-4mm thick, gelatinous layer - 1mm thick. Spores 6-7 x 4-5 μm . Inodorous. Malaya, Sarawak *H. suprapilosa*
 13. Gills pale ochraceous buff. Pileus light orange to brownish ochraceous, with concentric ridges. Flesh 3-5mm thick, gelatinous layer 1-2mm thick. Spores 8-8.5 x 6-6.7 μm . Smell farinaceous. Singapore *H. concentrica*
 12. Gills -1mm wide, white to pale ochraceous buff. Spores 4-6.5 x 3-4 μm .
 14. Pileus -8mm wide, greyish, sessile. Firm layer of flesh 50-100 μm thick, gelatinous layer much thicker. Solomon Islands ...
..... *H. vermiculata*
 14. Pileus -30mm wide, pleuropodal, fuscous fawn, smooth. Flesh with two gelatinous layers. Solomon Islands .. *H. quadruplex*

Hohenbuehelia bursaeformis (Berk.) Reid

Figure 1

Kew Bull. 17 (1963) 304; Singer, Nova Hedwigia Beih. 29 (1969) 62.

Conchomyces bursaeformis (Berk.) Horak, Ann. Mycol. ser. II. 34 (1981) 109; New Zeal. J. Bot. 9 (1971) 458.

Pileus -6cm in radius, -8cm wide, sessile or with a short and more or less lateral stem, at first convex or cucullate, generally descending, then applanate, smooth except the shortly villous base, white to pale ochraceous bistre or drab fawn buff, striate towards the incurved, minutely scurfy margin. Stem 0-5 x 1-3 mm, lateral or nearly so, villous. Gills decurrent, very crowded and thin, very narrow, almost contiguous, 13-30 primaries 1-2mm wide, 5-7(-8) ranks, rarely

dichotomous, shining white, edge entire. Flesh 2-4mm thick at the base of the pileus, fibrous firm then rather spongy, with a thin gelatinous layer 200-500 μm thick (100 μm near the margin of the pileus). Smell sour or of fresh mushrooms (RSS 1799), or none (RSS 844).

On fallen branches and trunks of various trees, and on dead palm-trunks, in the forest. Malaya, Java, Borneo, New Guinea, Solomon Islands, New Caledonia, Australia, New Zealand, Chile.

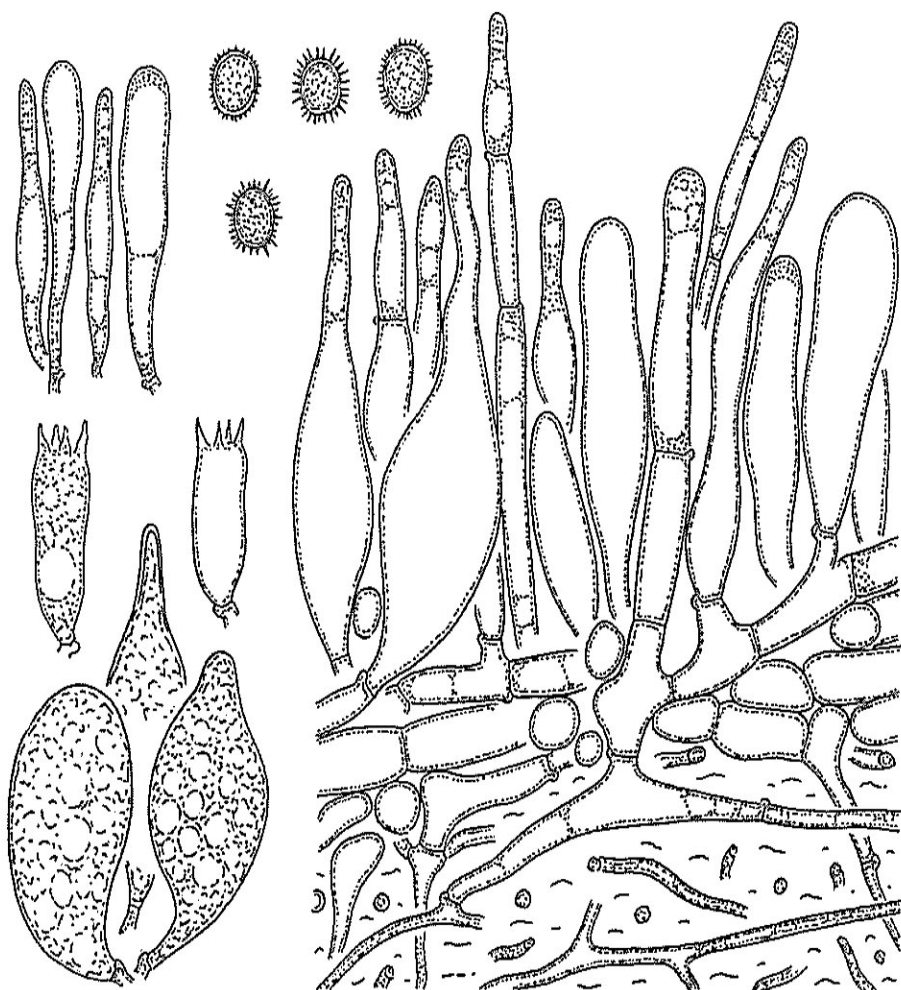


Figure 1. *Hohenbuehelia bursaiformis*. Spores, basidia, cheilocystidia and pleurocystidia, x 1000. Surface of pileus, x 500.

Spores 5-6.7 x 4.5-6 μm , 6-6.7 x 5-5.7 μm (RSS 844, 1799), 6-8 x 5-5.6 μm (RSNB 5168, 8039), white, broadly ellipsoid to subglobose, closely and finely echinulate with spines -1 μm long, or with shorter spines -0.7 μm (RSNB 5168, 8039), -0.5 μm (Tembeling), or -0.3 μm (RSS 1799), or merely asperulate (RSS 844), inamyloid, the spines often contracting in Melzer's iodine and dissolving in dilute potash. Basidia 17-22 x 7-8 μm ; sterigmata 4, 5 μm long; no acerose basidioles; subhymenium narrow, interwoven subgelatinous. Cheilocystidia 30-60 x 6-20 μm , subcylindric, clavate or ventricose, obtuse, not capitate, thin-

walled, smooth, as a sterille gill-edge but becoming disrupted or collapsing. Pleurocystidia -65 x 9-20 μm , clavate to ventricose with a short obtuse appendage -16 x 3-6 μm , thin-walled or the apex of the appendage with slightly thickened wall -0.5 μm , smooth, drying with reddish brown vitreous-vacuolate contents (dissolving and becoming colourless in KOH and Melzer's iodine, or persistently reddish brown in Melzer's iodine). Hyphae monomitic, with minute clamps (easily overlooked), inflating, with cylindric cells 16-105 (-140) x 3-23 μm , not or scarcely constricted at the septa, branching rather loosely at a wide angle, longitudinal and intewoven but more compact and 3-6 μm wide and strictly longitudinal in a thin layer 40-50 μm thick over the gills and below the gelatinous layer, the walls firm or thickened -0.5 μm ; in the gill-trama descending, short-celled, inflated; in the gelatinous layer of the pileus longitudinal and interwoven. Surface of pileus developing a villous layer -400 μm thick and composed of much entangled hyphae 3-8 μm wide, separate, sparingly branched, with smooth wall -0.5 μm thick, in the middle part of the pileus with clavate to subventricose thin-walled cells 30-80 x 7-30 μm (? as a palisade in the young pileus, collapsing in the villous part of old pilei).

Collections.- Malaya, Pahang, Tembeling, *Corner s.n.* 4 Nov. 1930.- Borneo, Mt. Kinabalu, 1100-1700m alt., on rotten wood, *RSNB 607, 5167, 5167A 5167C, 8039*.- Solomon Islands, Guadalcanal, Tsuva, on a rotten trunk of *Areca*, *RSS 1799*; San Cristobal, Warahito River, *RSS 844*, on a dead branch.

This is my description from Malesian material. It agrees well with that of other authors. Horak gives the pleurocystidia as merely 20-35 x 7-16 μm with the wall -1 μm thick in the distal part, and covered with resinous incrustation or, rather rarely, with crystals. *Conchomyces* is discussed on p. 2.

Hohenbuehelia concentrica sp. nov.

Pileus -6cm in radio, -8cm latus, sessilis flabelliformis convexo-planus, rugis concentris zonatus, aurantiocervinus vel pallide cervino-ochraceus, sicco albivillosulus. Lamellae confertae subtenaces, 11-19 primariae 2.5-3.5mm latae, ordinibus 6-8, pallide ochracei-alutaceae. Caro 3-5mm crassa, strato gelatinoso 1-2mm crasso, strato villosulo 0.3mm crasso, albida vel alutacea. Odor farinaceus fortis. Sporae 8-8.5 x 6-6.7 μm , laeves ovoideae, intus granuloso-opalescentes. Cheilocystidia vix evoluta, lamellae acie hyphis -70 x 1.5-3 μm haud vel laxe ramosis instructa. Pleurocystidia 30-80 x 7-15 μm , ventricosa, tunicis -5 μm crassis, haud incrustata, solum apicibus acutis breviter projicientibus, sparsa sed lamellae aciem versus numerosa. Subhymenium 15-20 μm crassum, cellulis 3-7 μm latae. Superficies pilei sine cystidiis. Ad truncum putridum *Lophopetalum* (Celastraceae) in silva. Singapore, Selitar, *Corner s.n.* 4 Feb. 1944; typus, herb. Corner.

Pileus -6cm in radius, -8cm wide, sessile, convexo-plane, with narrow raised concentric zones, wholly light orange fawn to pale fawn ochraceous, drying white villous with the raised zones as narrow concentric ridges closely developed towards the incurved margin. Stem practically none, as a finely villous pulvinus. Gills crowded, rather tough, thin, not gelatinous, 11-19 primaries 2.5-3.5mm wide, 6-8 ranks, entirely pale ochraceous buff. Flesh with the firm whitish to pallid buff layer 2-3.5mm thick at the base of the pileus, the brownish gelatinous

upper layer 1-2mm thick, the villous layer 0.3mm thick. Smell strong, of meal.

On rotten wood of *Lophopetalum* (Celastraceae) in the forest. Singapore, Seletar.

Spores 8-8.5 x 6-6.7 μm , white, smooth, ovoid, wholly finely opalescent granular. Basidia 35-43 x 8-10 μm , clavate, finely opalescent granular, 3-3.5 μm wide at the base; sterigmata (2-3-)4, 6-6.5 x 2.5-3 μm . Subhymenium 15-20 μm thick, composed of short-celled, rather regularly divergent hyphae 3-6 μm wide, at right angles to the descending hyphae of the gill-trama, distinctly corticate. Cheilocystidia not formed, the gill-edge with many narrow emergent hyphae -70 x 1.5-3 μm , not or sparsely branched, septate or not. Pleurocystidia 30-80 x 7-15 μm , ventricose with a short acute process, wall -5 μm thick, smooth, rather sparse but more abundant towards the gill-edge, the tip shortly projecting. Hyphae monomitic, clamped; in the firm layer of the flesh 3-7 μm wide with rather firm walls, longitudinal and interwoven, compact, 1.5-4.5 μm wide and ascending in the gelatinous layer; in the gill-trama 2-10 μm wide, descending with thin or scarcely thickened walls, not gelatinous. Surface of pileus with an often ill-defined layer c. 20 μm thick, composed of longitudinal hyphae 2-6 μm wide, overlain by a layer 20-40 μm thick, composed of laxly interwoven hyphae 1.5-3 μm wide, with excrescent and slightly thick-walled hyphae forming discrete or anastomosing subagglutinated fascicles -350 μm high at the base of the pileus; no pileocystidia.

This species is very distinct in the orange-tinted and zoned pileus, the large ovoid spores, the absence of cheilocystidia and the distinctly corticate subhymenium.

Hohenbuehelia griseipendens sp. nov.

Figure 2

Receptacula -20mm lata, sessilia cyphelliformia pendentia, pallide grisea. Lamellae confertae, 9-11 primariae -1.5mm latae, ordinibus 4-6. Caro 1-2mm crassa, ex integra gelatinosa firma. Odor nullus. Sporae 4-5 x 3.5-3.7 μm , laeves, late ellopsoideae. Cheilocystidia 15-30 x 6-10 μm , clavata sed nonnulla ut pleurocystidia intermedia. Pleurocystidia 25-70 x 7-14 μm , ventricosa breviter appendiculata, tunicis -2.5 μm crassis, vel clavata tunicis haud vel vix incrassatis, etiam hymenialia ut cheilocystidia. Hyphae in carne 1.5-3.5 μm latae, gelatinosae. Superficies pilei sine cystidiis et cellulis clavatis, aut cum cellulis clavatis paucis et saepe sublobatis. Ad lignum putridum in silva montana. Borneo, Mt Kinabalu, fl. Liwagu, 1300m alt., *RSNB* 2562, 29 Aug. 1961; typus, herb. Corner.

var. **nonsatisfacta** var. nov.

Differt sporis angustioribus 4-5 x 2-2.3 μm , pleurocystidiis tunicis vix incrassatis -0.5 μm , pilei superficie acystidiata. Ad lignum putridum in silva. Insulae Solomonenses, Guadalcanal, *RSS* 511; typus, herb. Corner

Fruit-bodies -20mm wide, sessile, cyphelliform pendent, pale grey, the upperside drying finely white villous. Gills diverging from the central point, crowded, thin, narrow, 9-11 primaries 1-1.5mm wide, 4-6 ranks, grey edge entire. Flesh 1-2mm thick at the base, wholly gelatinous-firm. Smell none.

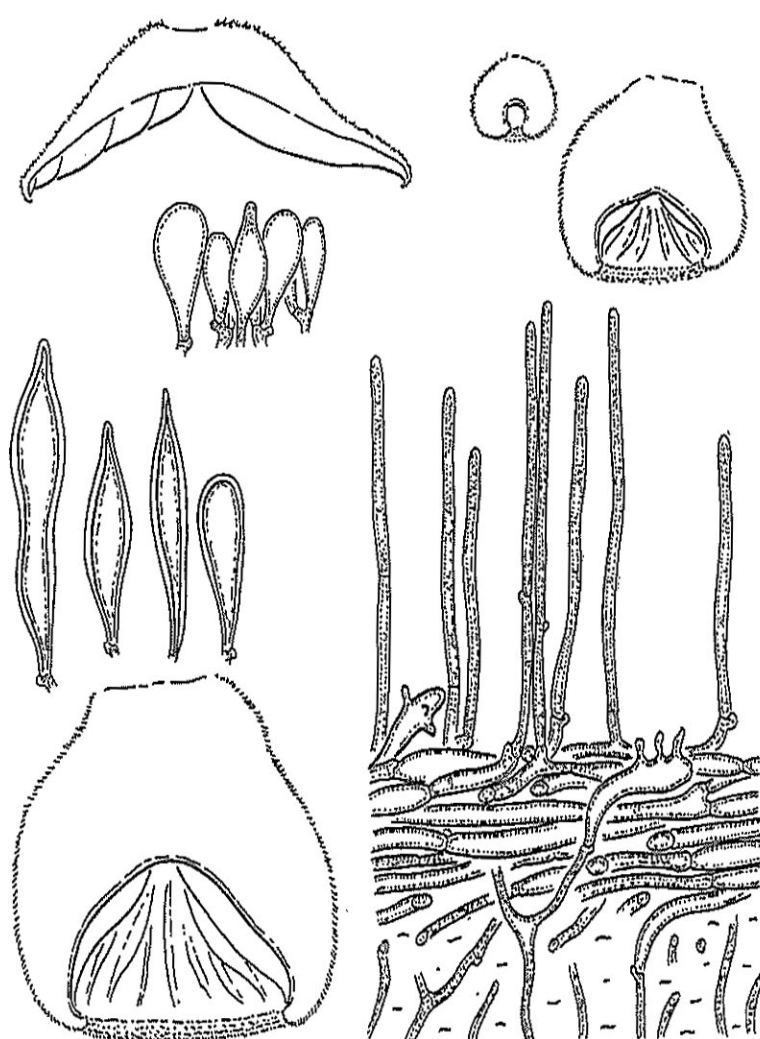


Figure 2. *Hohenbuehelia griseipendens*. Developing fruit-bodies in section, x 10. Mature fruit-body in section, x 2. Cheilocystidia, pleurocystidia and surface of pileus, x 500.

On rotten wood in montane forest. Borneo, Mt Kinabalu, Liwagu river 1300m alt.

Spores 4-5 x 3.5-3.7 μ m, white, smooth, broadly ellipsoid, thin-walled, inamyloid, (1-2 guttulate in material in alcohol-formalin). Basidia 5 μ m wide, 4-spored. Cheilocystidia 15-30 x 6-10 μ m, mostly clavate, thin-walled, as a sterile gill-edge, but with transitions to the pleurocystidia. Pleurocystidia 25-70 x 7-14 μ m, ventricose and rather shortly appendaged to clavate, walls 0.5-2.5 μ m thick in the ventricose cells, not encrusted or slightly in the distal part, abundant, with many smaller cystidia at the gill-surface like the cheilocystidia. Hyphae monomitic, clamped, 1.5-3.5 μ m wide, gelatinous; in the gill-trama 3-5 μ m wide with firmly gelatinous walls, descending. Surface of pileus with a layer 25-35 μ m thick, composed of radiating and interwoven hyphae 2-5 μ m wide with firm (not gelatinous) walls, some ending in a short subclavate cell -7 μ m wide and often with shortly lobed apex, but not as a hymenioderm and without thick-walled cystidia; this layer giving rise with excrescent hyphae 2-4 μ m wide, often

fasciculate, with slightly thickened walls, not or sparsely septate with clamps as the villous layer -300 μm thick.

var. **nonsatisfacta**

Pileus -9 mm wide, sessile, dorsifixed, unilaterally expanded and flabelliform resupinate, striate, fuliginous grey, drying white villous over the centre. Gills radiating from the excentric attachment, crowded, 8-10 primaries 1mm wide, 4-5 ranks, fuliginous grey. Flesh 1mm thick at the base, wholly gelatinous.

On rotten wood in the forest. Solomon Islands, Guadalcanal, Gallego, Monitor Creek, 2 July 1965, *RSS 511*.

Spores 4-5 x 2.2-3 μm , white, smooth, ellipsoid, inamyloid. Basidia 13-17 x 4-4.5 μm , 4-spored; no subacrose basidioles; subhymenium 15-25 μm thick, composed of 1.5-3 μm interwoven hyphae. Cheilocystidia 12-25 x 4-8 μm , clavate to ventricose, occasionally with a short appendage, not capitate, thin-walled, smooth, as a sterile gill-edge. Pleurocystidia 30-55 x 7-9.5 μm , base 3-4 μm wide, fusiform, acute, wall slightly thickened -0.5 μm , thinly encrusted distally, not dextrinoid, abundant, varying more or less immersed to subhymenial and projecting -18 μm . Hyphae monomitric, clamped; in the flesh 1.5-3 μm wide with gelatinous walls in the gill-trama 2-4 μm wide a discontinuous layer, 1-2 hyphae thick, of 2-4 μm hyphae with firm walls, developing the thinly villous layer at the base of the pileus, without cystidia or clavate cells.

This is close to *H. singaporensis* but it lacks the hymenioderm and the pleurocystidia are not so thick-walled or so wide.

Hohenbuehelia horrida (Boedijn) comb. nov.

Acanthocystis horrida Boedijn, *Bull. Jard. bot. Buitenz. ser. 3*, 16 (1940) 400, f. 9.

Pileus -7 cm in radius, -6cm wide, shortly pleuropodal to laterally sessile, spatulate to flabelliform and reniform, faintly striate, white then pale yellowish drab or greyish bistre, drying white to greyish and radially sulcate and closely white villous towards the base; margin becoming lobed and undulate in large specimens. Stem -18 x 3-12mm, lateral varying rudimentary or subdiscoid, occasionally absent, white villous. Gills decurrent, distant, rather thick, wide interstices smooth, 11-25 primaries 4-6mm wide, 4-7 ranks, pale cream buff then dingy pallid ochraceous, finally pinkish rufous (pale grey to greyish brown, Boedijn). Flesh 1-2.5mm thick at the base of the pileus, 0.5-1mm halfway to the margin, firm, subcoriaceous, with a gelatinous layer 250-600 μm thick, watery concolorous. Smell farinaceous, rather slight, or none (*RSS 1044*).

On fallen or standing dead trunks and rotten wood in lowland primary and secondary forest. Malesia.

Spores 5-6 x 3-4 μm , white in the mass, smooth, aguttate, inamyloid. Basidia 18-25 x 4-5 μm ; sterigmata 4, 4-5 μm long; subhymenium 20-30 μm thick, with compactly interwoven hyphae 2.5-8 μm wide, not gelatinous. Cheilocystidia unformed, as clusters of small sterile basidia, some with a slender process ending in an excreted globule -7 μm wide, scattered among emergent hyphae 1.5-3 μm wide, often fasciculate in flattened clusters, the gill-edge sterile. Pleurocystidia -140 x 12.5 μm with pale yellowish walls -5.5 μm thick, ventricose-lanceolate, acute, lumen becoming linear, not or thinly encrusted, the larger subhymenial or tramal and embedded or projecting -55 μm , the smaller 35-55 x 6-8 μm with thin to slightly thickened wall hymenial, smooth or little encrusted, with all intermediates, extremely abundant. Hyphae monomitic, clamped; in the firm tissue of the flesh 3-11 μm wide, with thin or slightly thickened walls, longitudinal; in the gelatinous layer 1.5-3 (-5) μm , ascending; in the gill-trama 4-22 μm wide, often unevenly inflated, with firm to slightly thickened walls, loosely interwoven and descending. Surface of pileus with a thin compact layer of longitudinal hyphae 3-8(-15) μm wide above the gelatinous layer and giving rise to a vague outer layer c. 20 μm thick of interwoven hyphae 1.5-3 μm wide, variously excrescent, septate, clamped, becoming aggregated or agglutinated into fascicles -300 μm long as the villous layer; pileocystidia absent.

Collections.- Malaya, Pahang, Tembeling, *Corner s.n.* Nov. 1930, common; Johore, Sedili River, *Corner s.n.* 22 Oct. 1939.- Krakatau, leg. Boedijn.- Solomon Islands, San Cristobal, Warahito river, 28 July 1965, RSS 855; Kolombangara, 24 Aug. 1965, RSS 1044.

This is my description of this striking and widespread species. It agrees with that of Boedijn except in the colour of the gills. The structure of the gill-edge without distinct cheilocystidia suggests nematode-catching. *H. incarnata* is allied and, perhaps, also the East African *H. aurantiocystis* Peglear (1977) though it has crowded narrow gills and pleurocystidia often with reddish incrustation at the apex.

Hohenbuehelia incarnata sp. nov.

Receptacula pallide incarnata-alutacea sessilia vel breviter pleuropadalia. Pileus -6 cm latus, spatulatus dein flabelliformis, substriatus, sicco tenuiter albidi-villosus vel subspiculosus. Lamellae subdistantes, 7-13 primariae -5 mm latae, ordinibus 4(-5), raro connexae. Caro -2 mm crassa, strato gelatinoso 100-150 μm crasso. Odor subaromaticus. Sporae 5-7 x 4.5-6 μm , laeves, subglobosae. Cheilocystidia 16-33 x 2-5 μm , subcylindrica vel submoniliformia. Pleurocystidia 45-90 x 7-12 μm , lanceolata attenuata, apicibus acutis vel aciculiforminus, tunicis, -3 μm crassis, apicem versus subincrustedata, copiosa conferta. Hyphae in carne firma 2-8 μm latae. Superficies pilei sine cystidiis. Ad lignum putridissimum, mycelio albo lignum infestanti. Insulae Solomonenses, Guadalcanal, 3 Jul. 1965, RSS 529; typus, herb, Corner.

Fruit-bodies wholly pale pinkish buff, sessile to shortly pleuropodal. Pileus -6 cm wide, spatulate to flabelliform, ascending then horizontal, flexuous, substriate, thinly white villous or spiculate on drying; margin incurved at first. Stem very short or none, white villous. Gills deeply decurrent, arising almost from the base of the fruit-body, subdistant, with smooth interstices, 7-13 primaries -5 mm wide,

4(-5) ranks, occasionally joined. Flesh -2 mm thick at the base of the fruit-body, rather firm, with a very thin gelatinous layer below the surface. Smell rather of fenugreek.

On very rotten wood, the spongy white mycelium incorporating the wood. Solomon Islands, Guadalcanal, Mt Gallego, frequent, RSS 529 and 529a.

Spores 5-7 x 4.5-6 μm , white, smooth, subglobose. Cheilocystidia 16-33 x 2-5 μm , subcylindric to submoniliform with slightly subcapitate apex. Pleurocystidia 45-90 x 7-12 μm , lanceolate with long tapered acute to almost acicular apex, wall -3 μm thick, thinly encrusted near the apex or smooth, very abundant and closely set. Hyphae monomitic, clamped; in the firm layer comprising most of the flesh 2-8 μm , thin-walled, longitudinal, compact; in the gelatinous layer 100-150 μm thick 1.5-3 μm wide; in the gill-trama as in the firm tissue of the pileus. Surface of pileus with more or less fasciculate cylindric hyphae 2-4 μm wide, septate, some with subclavate tips 3-5 μm wide, the fascicles -250 μm long, arising from a layer 20-70 μm thick of similar, more or less radiating, appressed hyphae; no pileocystidia.

This is close to *H. horrida* but with different colour and smell, thinner gelatinous layer and distinct cheilocystidia.

Hohenbuehelia lanceifera sp. nov.

Figure 3

Pileus -20 mm radio, sessilis lateralis spathulato-flabelliformis, rhizomorphis albis gracilibus affixus vel ad basim discoideum subvillosus 3-7 latus, albus dein pallide ochraceus, opacus, basim versus subvillosus. Lamellae confertae, 6-15 primariae -2.5 mm latae, ordinibus 4-5, albae dein pallide subochraceae, aetate brunneolae vel subincarnatae. Caro -1.5 mm crassa, fere ex integra aquosi-gelatinosa, subochracea. Inodora. Sporae 4-5.5 x 3.7-4.5 μm , laeves subgloboasae vel late ellipsoideae. Cheilocystidia ut pleurocystidia parva vel ut basidia sterilia. Pleurocystidia 30-90 vel -140 x 7-20 μm ad lamellarum basi, lamellae sciens versus 20-30 x 5-7 μm , ventricosolanceolata, tunicis incrassatis, apicem versus incrustedata, copiosa. Caro strato firmo 150-200 μm crasso, ex hyphis 3-7 μm latis instructo. Superficies pilei sine cystidiis. Ad ramos dejectos truncosque emortuos in silva montana. Borneo, Mt. Kinabalu, 1700m alt. RSNB 2891; typus, herb. Corner

Pileus -20 mm radius, lateral, sessile, spathulate to flabelliform, attached with white mycelial fibrils or with a discoid subvillosus base 3-7 mm wide, thinly villous towards the base, minutely cottony over the limb, white then dingy watery ochraceous; margin opaque, minutely fimbriate. Gills radiating from the base, crowded, thin, 6-15 primaries 2-2.5 mm wide, 4-5 ranks, white then pallid dingy ochraceous, finally brownish or pinkish. Flesh -1.5 mm thick at the base of the pileus, more or less wholly watery gelatinous, subochraceous. Smell none.

On fallen rotten branches and dead standing trunks in montane forest. Borneo, Mt Kinabalu 1700m alt.

Spores 4-5.5 x 3.7-4.5 μm , white, smooth, subglobose to broadly ellipsoid. Basidia 5-6 μm wide; atherigmata 4(-5), 3 μm long. Cheilocystidia small to fairly large, somewhat thick-walled as if immature pleurocystidia, with scattered sterile basidia, thinly enveloped in mucilage, as a sterile gill-edge. Pleurocystidia -140 x

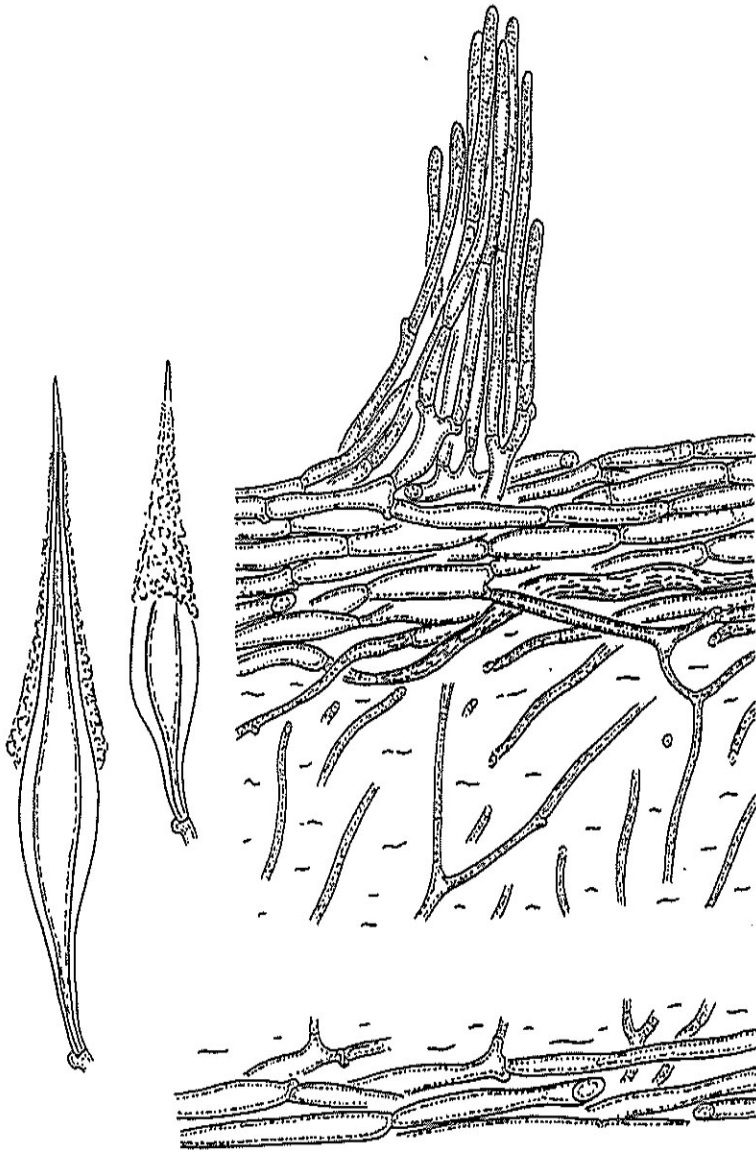


Figure 3. *Hohebuehelia lanceifera*. Surface of pileus and (below) firm layer of flesh, and pleurocystidia, x 500.

20 μm at the base of the gills, 30-90 x 7-14 μm over the surface, 20-30 x 5-7 μm near the gill-edge, ventricose-lanceolate with long attenuate apex, thick-walled, encrusted distally with crystals and towards the apex with granules, base more or less tramal, abundant. Hyphae monomitic, clamped; in a firm layer 150-200 μm thick over the gills 3-7 μm wide, compact, longitudinal; in the thick gelatinous layer 1.5-3 μm wide, longitudinal and ascending; in the gill-trama 3-10 μm wide, descending, short-celled, not gelatinous; oleiferous hyphae 3-7(-10) μm wide, sparse in the tissue below the surface of the pileus. Surface of pileus with a layer 20-50 μm thick composed of longitudinal, compact, rather short-celled hyphae 3-7 μm wide with firm walls, giving off fascicles 200 x 20-60 μm of similar hyphae forming the villous layer.

Collections.- Borneo, Mt Kinabalu, Tenompok, 8 Sept. 1961, *RSNB* 2891; Mesilau, 22 April 1964, *RSNB* 8408.

This is near *H. concentrica* which has larger spores and fruit-bodies.

Hohenbuehelia malesiana sp. nov.

Plate 1, Figure 4

Pileus -3 cm radio, -4.5 cm latus, lateralis, sessilis vel substipitatus, spatulatus dein flabelliformis, ultimo lobatus, substriatus, sordide alutaceus vel albus, sicco albivillosus. Stipes vix evolutus. Lamellae confertae vel subdistantes, nonnullae furcatae, ceracei-gelatinosae, 5-11 primariae 0.5-2 mm latae, ordinibus 3-7, albae vel concolores. Caro 0.3-1.5 mm crassa, fere ex integra gelatinosa. Inodora. Sporae 7-9 x 3.5-4 μ m, laeves subcylindricae, aguttatae vel 1-2 guttulatae (vivae). Cheilocystidia 15-25 x 5-10 μ m, clavata vel ventricosa, saepe capitulo 2-3.5 μ m lato substipitato praedita. Pleurocystidia 30-100 x 7-25 μ m, ventricoso-fusiformia, tunicis flavidulis crassis, apices versus tenuiter incrustata. Hyphae in strato firmo tenuissimo 3-8(-10) μ m latae. Superficies pilei sine cystidiis. Ad lignum emortuum ramulosque in silva. Peninsula Malayana, Borneo, Insulae Solomonenses. Typus Singapore *Corner s.n.* 17 March 1940: herb. Corner.

Pileus -3 cm in radius, -4.5 cm wide, sessile, lateral, spatulate then flabelliform, finally lobate, smooth, translucent, faintly striate, watery greyish to pallid dingy bistre, occasionally white, drying more or less wholly white villous and faintly sulcate-striate. Stem very slight, generally none. Gills decurrent, subdistant to

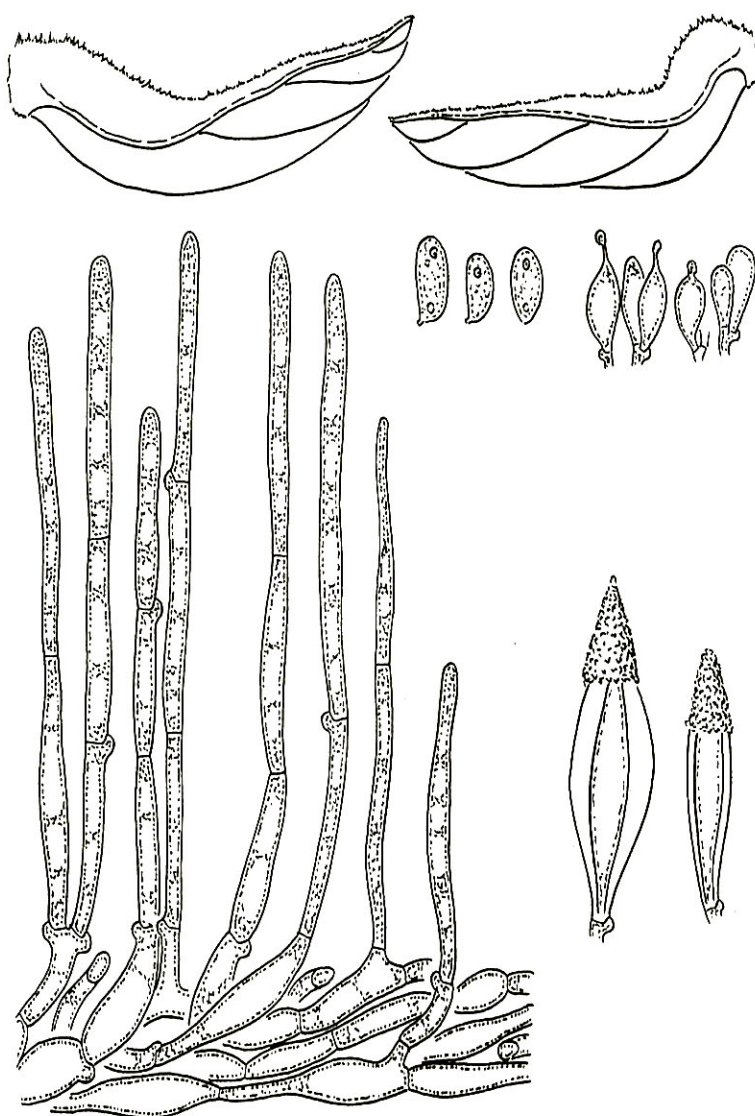


Figure 4. *Hohenbuehelia malesiana*. Fruit-body in section, x 10. Spores, x 1000. Cheilocystidia, pleurocystidia and surface of pileus, x 500.

crowded, sometimes dichotomous, 5-11 primaries 0.5-2 mm wide, 3-7 ranks, waxy gelatinous, watery white to pale concolorous. Flesh 0.3-1.5 mm thick at the base of the pileus, wholly and rather firmly gelatinous except a very thin layer over the gills. Smell none.

On sticks and dead wood in the forest. Malay Peninsula to the Solomon Islands.

Spores 7-9 x 3.5-4 μ m, white, smooth, subcylindric, often slightly curved, aguttate or with 1-2 minute guttulae at the ends of the spore (living), inamyloid. Basidia 20-30 x 6-8 μ m; sterigmata 4, 2.5 μ m long. Cheilocystidia 15-25 x 5-10 μ m, clavate or ventricose with a short apical stalk -2 μ m long and a globose head 2-3.5 μ m wide, thin-walled, hyaline, as a sterile gill-edge. Pleurocystidia 30-100 x 7-25 μ m, ventricose fusiform, walls thick and yellowish, roughened and minutely encrusted over the distal third or smooth, acute to subacute. Hyphae monomitic, clamped, not or scarcely inflated; firm layer of the flesh thinner than the gelatinous layer, composed of hyphae 3-8(-10) μ m wide, 2-3 μ m in the gelatinous layer; gill-trama as the firm layer of the flesh. Surface of pileus with a thin interrupted layer of longitudinal hyphae 1.5-6(-10) μ m wide, developing excrescent, short-celled, cylindric hyphae -300 μ m long at the base of the pileus, -50 μ m near the margin, 3-6 μ m wide, with firm walls, mostly unbranched, not or rarely fasciculate; no thick-walled cystidia.

Collections.- Malaya, Perlis, Bukit Chupeng, *Corner s.n.* 29 Nov. 1929; Johore, Mawai, *Corner s.n.* 21 Sept. 1934.- Singapore, Botanic Garden, *Corner s.n.* March 1935; Bukit Timah, *Corner s.n.* 17 Sept. 1939, 17 March 1940.- Borneo, Mt Kinabalu, 1700m alt., *RSNB* 5625 3 March 1964.- Solomon Islands, Kolombangara, *RSS* 1162, 30 Aug. 1965.

This may be the commonest species in South East Asia. In 1934 and 1935 I managed to raise some fruit-bodies from the log on which I had found them in Johore. Many primordia started but merely three developed satisfactorily. Measurements were begun when the primordial pileus was 2 mm in radius. In 6 days the largest reached its full size of 22 mm in radius, 25 mm wide, and then lasted for 9 days before collapsing. During the first four days of observation, the pileus increased in radius by 2, 3, 5 and 6 mm when it slowly declined in the next 2 days. The smallest pileus reached 8 mm in radius, 9 mm wide, in 3 days from the same initial state and lasted for a further 7 days. The third fruit-body of intermediate size, reaching 15 mm in radius, 20 mm wide, developed in much the same manner as the first and reached full size in 7 days; it collapsed 8 days later. I reckoned the primordium of this third fruit-body was 48 hours old because it developed near the other two but 2 days later. Thus the total life of the largest fruit-body was about 16 days, of which the last 8-9 days were at full size. The fruit-bodies eventually collapsed because they became sodden with water and failed under their own weight.

Hohenbuehelia mellea sp. nov.

Plate 1

Pileus -15 mm latus, sessilis spathulatus dein semiorbicularis, melleiflavus vel ochraceibrunneus, squamulis flavidulis ornatus, striatus. Lamellae subdistantes, 6-8 primariae 1.5-2 mm latae, ordinibus 3-4, ceraceimolles, pallide ochraceae dein pallide cinnamomei-ochraceae. Caro 1-2 mm crassa, fere ex integra gelatinosa, concolor. Inodora. Sporae 5-6.5 x 2.5-3 μ m, laeves ellipsoideae, paucis visis. Cheilocystidia 30-50 x 8-18 μ m, ventricosa, processu simplici vel 1-ramoso etiam subcapitato, tenuiter tunicata. Pleurocystidia 50-160 x 11-20 μ m, ventricosus-fusiformia, longe attenuate acuta, tunicis -5 μ m crassis flavidis, incrustata. Stratum carnis firmum 100-150 μ m crassum, ex hyphis 4-15 μ m latis instructum; in lamellae trama 5-18 μ m latae. Superficies pilei strato fere pseudoparenchymatico 15-20 μ m crasso oblecta, haud villosa, hinc inde cystidiis ut cheilocystidiis. Ad lignum emortuum in silva. Singapore, Bukit Timah, *Corner s.n.* 24 Dec. 1940; typus, herb. Corner.

Pileus -15 mm wide, sessile, broadly spathulate to semicircular, slightly convex becoming plane, honey yellow or ochraceous brownish, striate, with minute yellowish fleck-like scales, drying radially rugulose. Gills radiating from the base, subdistant, 6-8 primaries 1.5-2 mm wide, 3-4 ranks, waxy-soft, pale ochraceous then pale cinnamon ochraceous. Flesh 1-2 mm thick at the base, wholly gelatinous, waxy in the gills, concolorous. Smell none.

On dead wood in the forest. Singapore, Bukit Timah.

Spores 5-6.5 x 2.5-3 μ m, white, smooth ellipsoid, (few seen). Cheilocystidia 30-50 x 8-18 μ m, more or less ventricose with a simple or once branched, cylindric or subcapitate appendage 2-3.5 μ m wide, some with an excretory blob, rather irregular, thin-walled, colourless, as a narrow sterile gill-edge. Pleurocystidia 50-160 x 12-20 μ m, ventricose fusiform, long tapered, subacute to acute, the pale yellow walls 2-5 μ m thick, heavily granular encrusted over the greater part, abundant. Hyphae monomitic, clamped; in the very thin firm layer of the flesh,

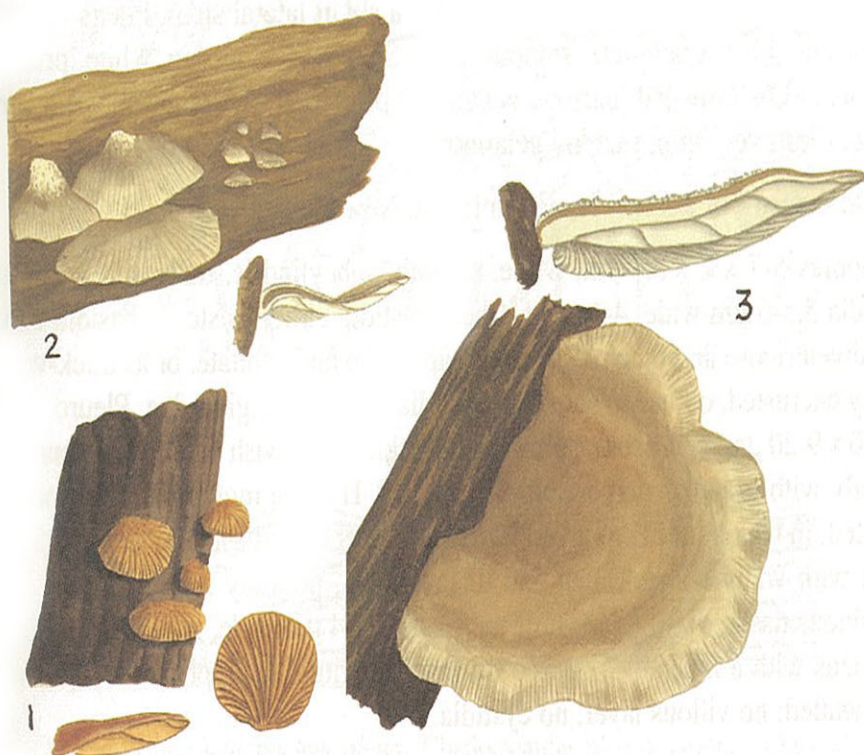


Plate 1. 1, *Hohenbuehelia mellea*. 2, *H. malesiana*.
3, *H. suppapillosa*.

100-150 μm thick, longitudinal 4-15 μm wide; in the gelatinous tissue composing most of the flesh, longitudinal and interwoven 3-5 μm wide; in the gill-trama 5-18 μm wide with firm yellowish walls. Surface of pileus with an almost pseudoparenchymatous layer 15-20 μm thick, composed of longitudinal hyphae with cells 20-45 x 4-16 μm , with scattered narrow hyphal ends shortly projecting and scattered cystidia like the cheilocystidia; no villous layer, no thick-walled cystidia, but at the base of the pileus numerous, shortly excrecent, slightly thick-walled hyphae -200 x 2-4.5 μm .

Superficially, this suggests *Crepidotus*. A sterile collection from Sarawak seems intermediate between this and *H. lanceifera*. It had the pale colour of *H. lanceifera* and the same structure to the pileus but the more distant gills and cheilocystidia of *H. mellea*. Thus:- Pileus -30 mm wide, drab white tinged pale ochraceous, thinly villous at the base. Gills distant, 7-9 primaries 2-3 mm wide, 4-5 ranks, pale ochraceous drab. Pleurocystidia -140 x 8-14 μm at the base of the gills, fusiform, long attenuate, thick-walled, heavily encrusted with granules between the swollen central part and the attenuate apex. Sarawak, Bako National Park, *Corner s.n.* 31 Jan. 1959.

Hohenbuehelia minutissima sp. nov.

Pileus -3 mm latus subsessilis lateralis spathulatus griseus. Stipes -0.5 mm longus vel nullus. Lamellae confertae, 7-9 primariae -0.5 mm latae, ordinibus 3-4, albae. Caro tenuissima, tenaciter gelatinosa. Sporae 5-7 x 2.7-3.5 μm , laeves subcylindricae. Cheilocystidia ut basidia sterilia clavata subventricosa, saepe capitulata, vel ut pleurocystidia. Pleurocystidia 40-80 x 9-20 μm , ventricosa subacuta, tunicis flavidulis, apices versus tenuiter incrustata. Hyphae in strato firmo angusto et in lamellis 2-5 μm latae, tunicis 1-2 μm crassis, lumine lineari, subgelatinosae. Superficies pilei sine cystidia. Ad rami delapsi corticem in silva. Nova Guinea, prope Lae, *Corner s.n.* 7 Sept. 1960; typus, herb. Corner.

Fruit-bodies very small, sessile or with a slight lateral stem. Pileus -3 mm in radius and wide, spathulate, smooth, grey. Stem -0.5 mm long, white, pruinose, or none. Gills crowded, narrow, acute, 7-9 primaries -0.5 mm wide, 3-4 ranks, white. Flesh very thin, toughly gelatinous.

On the bark of a fallen branch in forest. New Guinea, near Lae.

Spores 5-7 x 2.7-3.5 μm , white, smooth, subcylindric, thin-walled, aguttate. Basidia 5.5-6 μm wide, 4-spored. Cheilocystidia either as sterile basidia clavate to subventricose and then often shortly apiculate and capitate, or as thick-walled, thinly encrusted, obtuse to subacute cystidia, as a sterile gill-edge. Pleurocystidia 40-80 x 9-20 μm , ventricose, subacute, with thick yellowish walls, thinly encrusted distally with granular matter soluble in KOH. Hyphae monomitic, clamped, not inflated; in the narrow firm layer of the flesh over the gills and in the gills 2-5 μm wide with walls 1-2 μm thick and linear lumen, possibly subgelatinous; in the gelatinous tissue, forming most of the flesh, 1.5-4 μm wide, thin-walled. Surface of pileus with a layer, 1-2 hyphae thick, of longitudinal hyphae 1.5-3 μm wide, thin-walled; no villous layer, no cystidia.

This is distinguished by the very small size of the fruit-body and the thick-walled hyphae of the firm tissue.

Hohenbuehelia pachyhyphata sp. nov.

Figure 5

Receptacula ex integro alba dein alutacea vel pallide fuscivineae. Pileus 2-3 cm latus, breviter pleuropodalis, flabelliformis, ultimo revolutus, opacus, sicco villosulus. Stipes -3 x 4 mm, sursum dilatatus. Lamellae confertae, saepe furcatae vel prope stipitem reticulatae, 11-26 primariae 1-2 mm latae, ordinibus 4-7. Caro 2-4 mm crassa, strato gelatinoso 1 mm crasso. Odor farinaceus, fortis. Sporae 6-7.5 x 3-3.5 μ m, laeves, subcylindricae. Cheilocystidia -20 x 7 μ m, clavata vel ventricosa, saepe breviter capitulata, etiam ut pleurocystidia. Pleurocystidia 30-80 x 8-20 μ m, ventricosa, breviter acuta, tunicis crassis, apicem versus tenuiter incrustata, copiosa. Hyphae in carnis strato firmo et in lamellis 3-10 μ m latae, tunicis valde incrassatis, lumine quasi ocluso, et ampullis -20 μ m latis (-50 μ m in stipite). Superficies pilei sine cystidiis crasse tunicatis. Ad lignum emortuum in silva. Borneo, Queensland. Typus, Borneo, Corner s.n. 22 Jun. 1961; herb. Corner

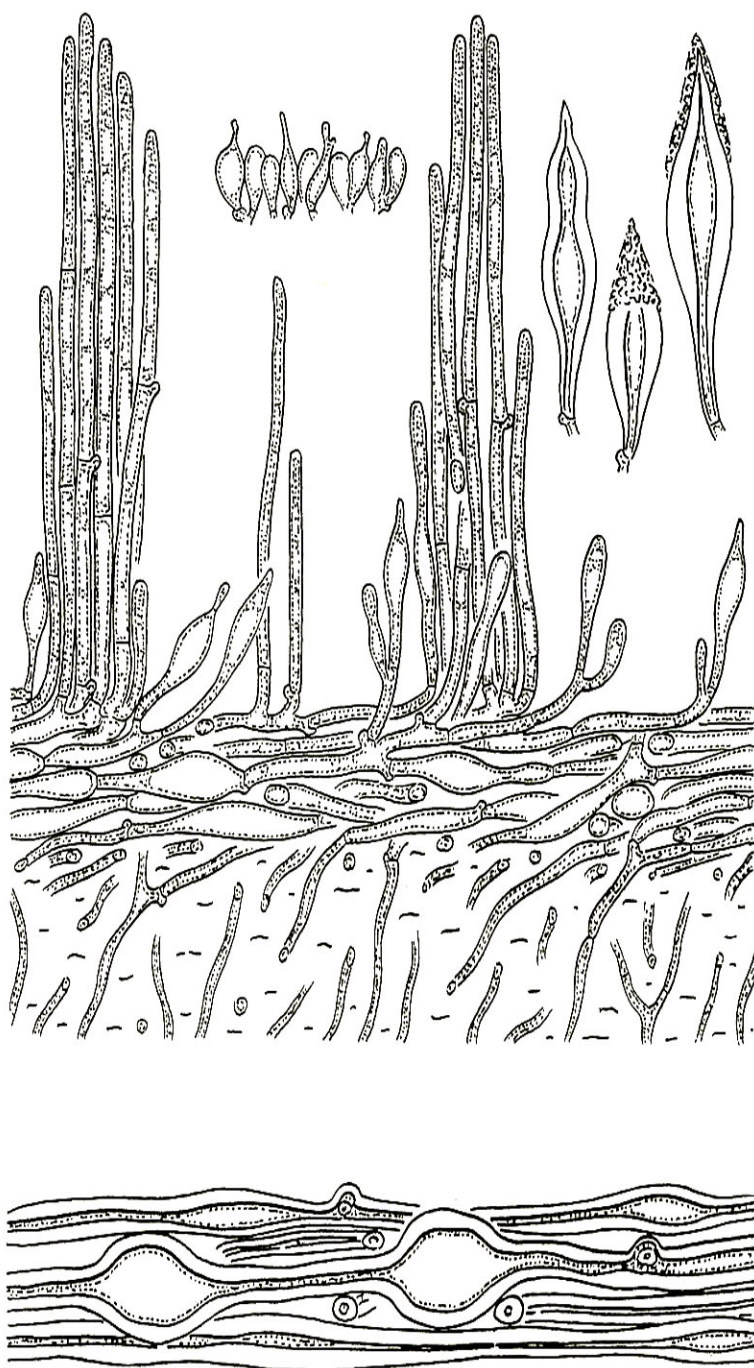


Figure 5. *Hohenbuehelia pachyhyphata*. Cheilocystidia, pleurocystidia, surface of pileus and hyphae of the firm layer of the flesh, x 500.

var. **minor** var. nov.

Differt pileo -13 mm lato, albo dein griseo-umbrino, strato gelatinoso 0.5 mm crasso, sporis 4.5-5.5(-6) x 3.3-3.7 μ m ellipsoideis, hyphis haud ampulliformibus. Ad truncum delapsus in silva. Borneo, Mt. Kinabalu, Mesilau 1700m alt., 26 Jan. 1964, *RSNB 5141*; herb. Corner.

Fruit-bodies wholly white, then pale yellowish buff to pale livid bistre or pale fuscous vinaceous (*RSNB 8691*). Pileus 2-3 cm wide, lateral, convex then plane to revolute, flabelliform, opaque, drying minutely villous or cottony flocculose; margin incurved. Stem -3 x 4 mm, lateral, short, stout, widened upwards, pruinoso-villosulous. Gills decurrent, crowded, thin, often forked or reticulate near the stem, 11-26 primaries 1-2 mm wide, 4-7 ranks, edge entire. Flesh 2-4 mm thick at the base of the pileus, the gelatinous layer 1 mm thick. Smell farinaceous, strong on cutting.

On dead wood in the forest. Borneo, Queensland.

Spores 6-7.5 x 3-3.5 μ m, white, smooth, subcylindric, inamyloid. Basidia 18-25 x 5 μ m, 4-spored. Cheilocystidia -20 x 7 μ m, clavate to subventricose, often with a short capitate process, thin-walled, also mixed with some thick-walled cystidia, as a sterile gill-edge. Pleurocystidia 30-80 x 8-20 μ m, ventricose with rather short acute apex, thick-walled, arising deeply from the trama, immersed or shortly projecting, the free part with thin incrustation (soluble in KOH), very abundant. Hyphae monomitic, clamped; in the firm layer of the flesh 3-10 μ m wide, becoming very thick-walled and nearly solid, but with ampulliform swellings -20 μ m wide, -50 μ m in the stem, longitudinal, compact; in the gelatinous layer 1.5-3.5 μ m wide, walls thin or slightly thickened, ascending, also with a few thick-walled hyphae; in the gill-trama as in the firm layer of the flesh, descending. Surface of pileus with a layer 15-40 μ m thick of rather closely interwoven hyphae 2-4 μ m wide, in places -10 μ m, with firm thin walls, producing fascicles -300 μ m long of hyphae 2.5-5 μ m wide with firm, often slightly thick-walled, often subagglutinated, 0-2 septate and clamped, with scattered ill-formed and thin-walled cystidia 4-8 μ m wide like the cheilocystidia, but no thick-walled cystidia.

Collections.- Borneo, Mt Kinabalu, 1100-1700 alt., east ridge, *Corner s.n.* 22 June 1961; Mesilau, 6 May 1964, *RSNB 8691*.- Queensland, Mary Cairncross Reserve, Maleng, *Corner s.n.* 20 June 1964.

var. **minor**

Pileus -13 mm wide, pleuropodal, flabelliform, white then clouded greyish umber towards the minutely villous base. Stem very short. Gills very crowded, narrow, 13-17 primaries 1-1.5 mm wide, 5-6 ranks, white. Flesh 1-1.5 mm thick at the base, the gelatinous layer 0.5 mm thick and generally thinner than the firm layer. Smell ?

On a fallen trunk in the forest. Borneo, Mt Kinabalu, Mesilau 1700m alt., 26 Jan. 1964.

Spores 4.5-5.5(-6) x 3.3-3.7 μm , white, smooth, ellipsoid, aguttate. Cheilocystidia 12-23 x 5-9 μm , clavate to ventricose with a short capitate process. Pleurocystidia 30-90 x 7-20 μm , ventricose-conical, acute, sometimes curved or waisted, with thick yellowish walls thinly encrusted distally. Hyphae of the firm layer of the flesh 2-8 μm wide, cylindric, clamped, with walls 1-3 μm thick, without ampulliform swellings. Surface of pileus as in var. *pachyhyphata* but the excrescent hyphae often fasciculate.

The pale colour, farinaceous smell and very thick-walled hyphae of the firm tissue distinguish this species.

Hohenbuehelia pahangensis sp. nov.

Figure 6

Pileus -4 cm radio, -7 cm latus, sessilis vel breviter pleuropodalis, ascendens, spathulatus flabelliformis opacus villosulus, fuscus dein pallide isabellinus. Stipes -5 x 2.5-4 mm, villosulus albidus. Lamellae alte decurrentes, confertissimae, 12-16 primariae 2 mm latae, ordinibus 6-7, albae, acie serrulata. Caro 2-2.5 mm crassa, strato gelatinoso c. 300 μm crasso. Odor farinaceus fortis. Sporae 3.5-4.3 x 3-3.5 μm , laeves, late ellipsoideae. Cheilocystidia 35-60 x 5-7 μm , clavata vel obtuse subventricosa. Pleurocystidia 55-120 x 10.5-22 μm , ventricosa, breviter acuminata, tunicis flavidulis 2-7 μm crassis, laevia vel apicem versus tenuiter incrustata. Hyphae in carnis strato firmo lamellisque 4-23 μm latae. Superficies pilei cystidiis 40-90 x 6-8 μm ut pleurocystidia praedita, etiam minoribus ut cheilocystidia. Ad terram muscosam in silva montana. Malaya, Pahang, Cameron Highland, *Corner s.n.* 1 Aug. 1934; typus, herb. Corner.

Pileus -4 cm in radius, -7 cm wide, sessile or very shortly pleuopodal, steeply ascending, spathulate-flabelliform, opaque, minutely villous from the base outwards, fuscous, paler drab bistre with age. Stem -5 x 2.5-4 mm, thinly villous, pallid white. Gills deeply decurrent, almost from the base of the fruit-body, very crowded, 12-16 primaries 2 mm wide, 6-7 ranks, shining white, edge serrulate. Flesh 2-2.5 mm thick at the base of the pileus, the gelatinous layer c. 300 μm thick. Smell farinaceous, strong.

On the ground among moss in montane forest, solitary, Malaya, Pahang, Cameron Highlands, 1 Aug. 1934.

Spores 3.5-4.3 x 3-3.5 μm , white, smooth, broadly ellipsoid, inamyloid. Basidia 14-19 x 4-4.5 μm ; sterigmata 4, 3 μm long. Cheilocystidia 35-60 x 5-7 μm , clavate or obtusely subventricose, thin-walled, smooth, as a broad sterile gill-edge. Pleurocystidia 55-120 x 10.5-22 μm , ventricose, shortly acuminate, walls 2-7 μm thick yellowish, smooth or thinly encrusted distally, smaller towards the gill-edge. Hyphae monomitic, clamped; in the firm layer of the flesh longitudinal with cells 40-120 x 4-23 μm , often rather constricted at the septa, thin-walled, in the gelatinous layer 2-4 μm wide and ascending; in the gill-trama as in the firm layer of the flesh, descending. Surface of pileus with a discontinuous pellicle, 1-2 hyphae thick, of 1.5-3 μm hyphae developing fascicles of the hyphae as the villous layer; pileocystidia either as thick-walled pleurocystidia 40-90 x 6-8 μm or as the cheilocystidia.

This is close to the American *H. angustata* (p. 39) and differs in the larger pileus, wider gills, thicker gelatinous layer in the pileus, the form of the

cheilocystidia, the strongly inflated hyphae in the firm layer of the flesh, the descending hyphae in the gill-trama, and the smaller spores. The terricolous habit, the fairly large fruit-body and the shining white gills are distinctive among the Malesian species.

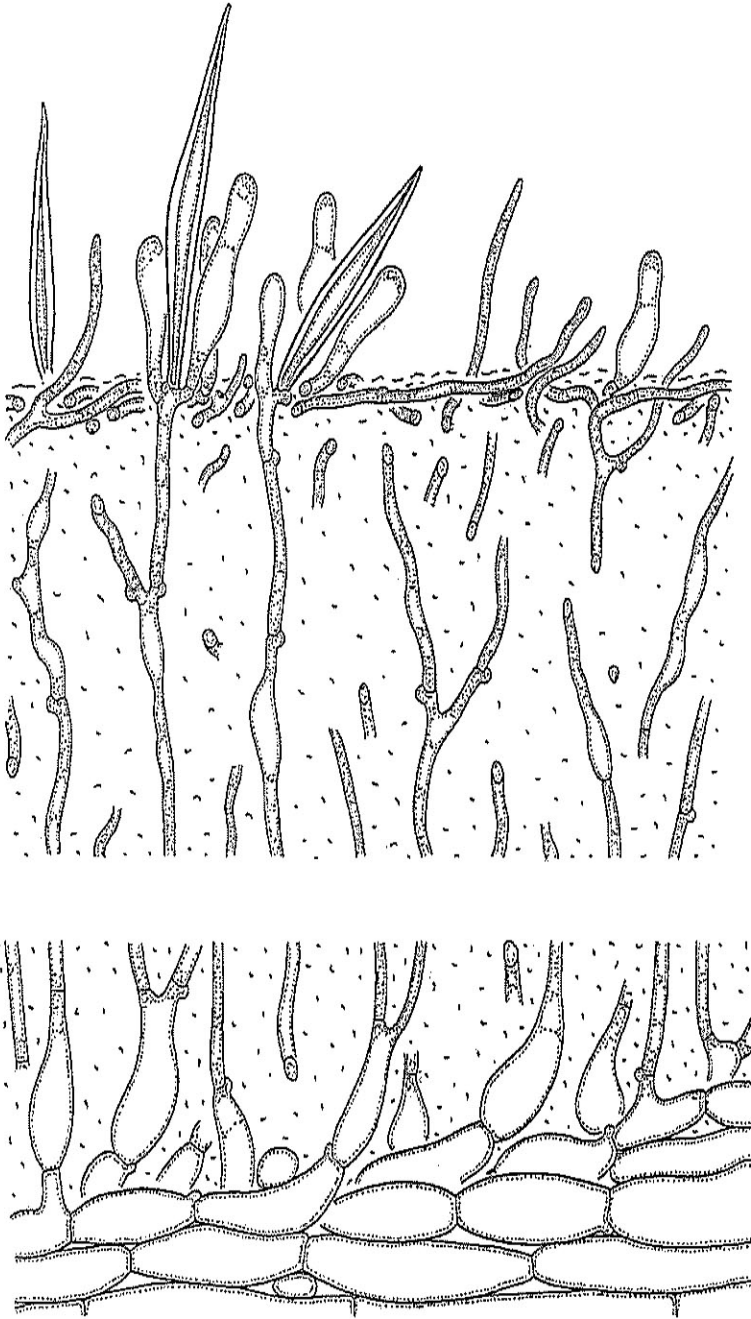


Figure 6. *Hohenbuehelia pahangensis*. Surface of pileus and (below) firm layer of flesh, x 500.

Hohenbuehelia perstriata sp. nov.

Pileus -22 mm radio, spathulatus dein subreniformis, lateralis subsessilis, ex integro striatus, pallide griseicervinus, sicco villosulus. Lamellae distantes, 4-9 primariae 2-3.5 mm latae, ordinibus 3-4, albae. Caro tenuis, strato firmo 100-400 μ m crasso, strato gelatinoso 60-200 μ m crasso. Odor farinaceus vel

nullus. Sporae 4.5-6 x 3.5-4.5 μm , laeves, late ellipsoideae vel subglobosae. Basidia 2-3-4 sporigera. Cheilocystidia 10-24 x 4-8(-10) μm , clavata vel ventricosa, nonnulla capitulo breviter stipitato praedita. Pleurocystidia (30-)50-140 x 9-17 μm , fusiformia acuta, tunicis -6 μm crassis, apices versus haud vel vix incrustata. Hyphae in carnis strato firmo 3-8 μm latae Pileocystidia -85 x 4-7 μm ut pleurocystidia sed angustiora, immersa vel superficialia erecta vel in tomenti fasciculis; superficies pilei basim versus cellulae clavatae -26 x 10 μm . Ad dejectamenta Aracearum Palmarumque. Insulae Solomonenses. Typus, Kolombangara, RSS 1275; herb. Corner.

Pileus -22 mm radius, spathulate to subreniform, slightly ascending or descending (RSS 1104), lateral, sessile, wholly striate, pale fawn greyish, drying finely villous-scurfy towards the base. Gills decurrent, distant, 4-9 primaries 2-3.5 mm wide, 3-4 ranks, interstices smooth, white. Flesh with a thin upper gelatinous layer. Smell none or of meal (RSS 1104).

On dead remains of aroids and palms (*Caryota*) in the forest. Solomon Islands.

Spores 4.5-6 x 3.5-4.5 μm , white, smooth, ellipsoid to subglobose. Basidia with 2-3-4 sterigmata (RSS 1104). Cheilocystidia 10-24 x 4-8(-10) μm , clavate or subventricose, some with a shortly stipitate subcapitate swelling. Pleurocystidia (30-)50-140 x 9-17 μm , fusiform, acute, wall -6 μm thick, smooth or slightly encrusted distally. Hyphae monomitic, clamped; firm layer of the flesh 100-400 μm thick, with thin-walled longitudinal hyphae, the cells -130 x 3-8 μm ; gelatinous layer 60-200 μm thick hyphae ascending; gill-trama with hyphae as in the firm layer of the flesh. Surface of pileus with a thin interrupted layer of narrow, short-celled hyphae 2-5 μm wide with thin or slightly thickened walls, developing cylindric, septate, projecting hyphae -160 μm long and becoming more or less fasciculate; pileocystidia -85 x 4-7 μm , as the pleurocystidia, immersed or free and appressed or erect, becoming incorporated in the excrescent fascicles, also with a few thin-walled clavate cells -26 x 10 μm near the base of the pileus.

Collections.- Solomon Islands, Kolombangara, RSS 1104 on dead sheaths and trunk of *Caryota*, 27 Aug. 1965; RSS 1275 on a dead aroid stem, 5 Sept. 1965.

The two collections differ slightly but are evidently conspecific.

Hohenbuehelia quadruplex sp. nov.

Figure 7

Pileus -30 mm latus, pleuopodalis, spathulatus dein flabelliformis, laevis fuscicervinus, marginem denticulatum versus substriatus pallidus. Stipes 3-10 x 2-4 mm, applanatus, concolor. Lamellae decurrentes confertae hispidulosae, 15-26 primariae -1 mm latae, ordinibus 4-6, albae. Caro 1-2 mm crassa, strato gelatinoso -250 μm crasso, concolor. Odor farinaceus, haud fortis. Sporae 4.5-6 x 3.3-4 μm , laeves ellipsoideae. Cheilocystidia 12-24 x 5-14 μm , clavata, nonnulla processu -7 μm longo, saepe subcapitato, praedita. Pleurocystidia 40-90 x 11-20 μm , ventricosa acuta, tunicis flavidulis -6 μm crassis, apicibus saepe granuloso-incrustata, haud conferta. Hyphae in carnis strato firmo 3-14 μm latae. Stratum gelatinosum duplex, superius 50-60 μm crassum, inferius -250 μm , strato quasi firmo 20-30 μm crasso separatum. Superficies stipitis cystidiis crassitunicatis ut pleurocystidia in strato villosa immersis. Superficies pilei sine cystidiis. Ad lignum putridum in silva. Insulae Solomonenses, San Cristobal, fl. Warahito, 1 Aug. 1965, RSS 905; typus, herb. Corner.

Pileus -3 cm wide, pleuopodal, spathulate-flabelliform, smooth, fuscous fawn, paler to the whitish substrate, incurved, minutely denticulate margin. Stem 3-10

x 2-4 mm, more or less flattened in the plane of the pileus, concolorous. Gills decurrent, crowded, narrow, 15-26 primaries -1 mm wide, 4-5 ranks, hispidulous, white. Flesh 1-2 mm thick at the base of the pileus, hygrophanous, concolorous, with a thin gelatinous layer. Smell slight, farinaceous.

On rotten wood in the forest. Solomon Islands, San Cristobal.

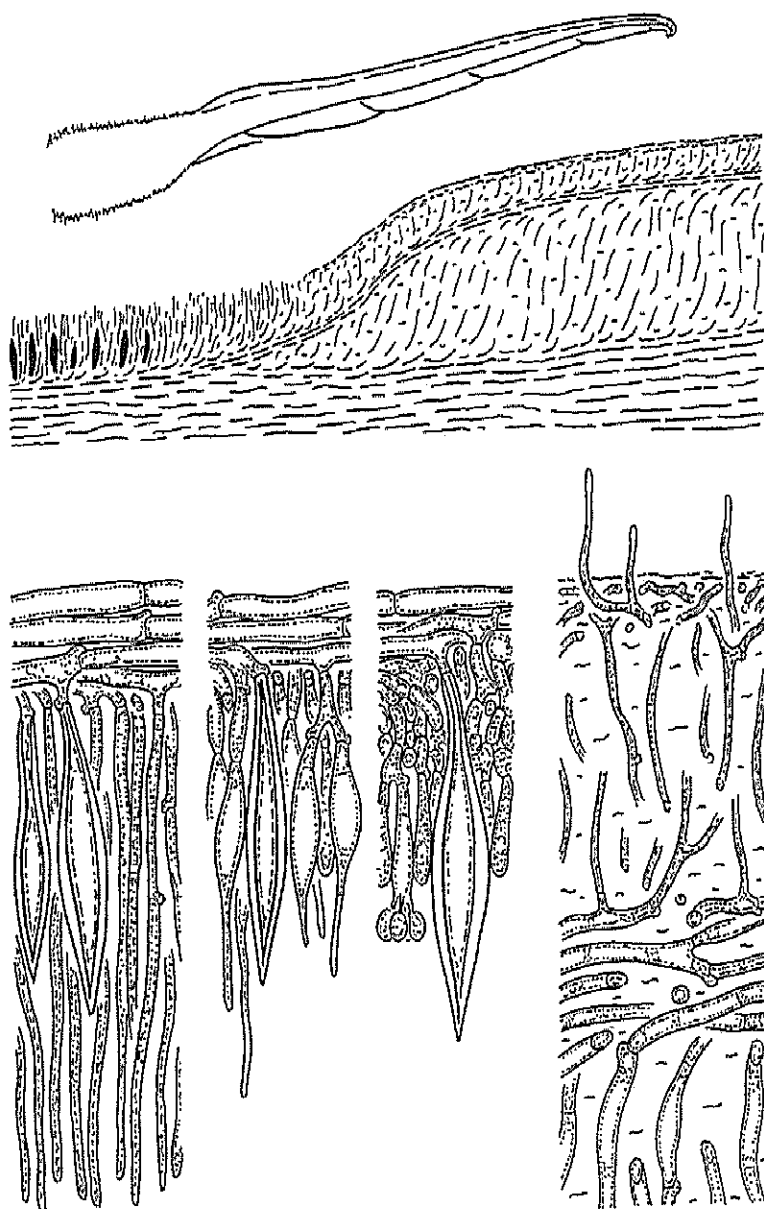


Figure 7. *Hohenbuehelia quadruplex*. Fruit-body in section, 2. Diagram of the junction of stem and upper side of pileus, to show the origin of the tissues in the pileus, x 50. Lower figure (from left to right), lower surface of stem near its junction with the pileus, hymenium, and surface of pileus, x 500.

Spores 4.5-6 x 3.3-4 μ m, white, smooth, ellipsoid. Basidia 17-20 x 5 μ m, 4-spored. Cheilocystidia 12-24 x 5-14 μ m, clavate, some with a short, often

subcapitate, process -7 μm long, thin-walled, as a sterile gill-edge. Pleurocystidia c. 40-90 x 11-20 μm , ventricose, acute, apex often granular encrusted, walls yellowish -6 μm thick, not crowded. Hyphae monomitic, clamped; in the firm layer of the flesh with cells -200 x 3-12 μm , in the stem with thin or slightly thickened walls and the cells often unevenly inflated; in the gill-trama with thin-walled hyphae 3-8 μm wide, not mucilaginous; gelatinous layer of the pileus double, consisting of an inner layer -250 μm thick with ascending hyphae 3-5(-7) μm wide, and a thinner upper layer 50-60 μm thick of ascending hyphae 1-2 μm wide, some of the hyphal ends projecting -60 μm , the two layers separated by a thin subgelatinous layer 20-30 μm thick of longitudinal hyphae 2-5 μm wide, all layers devoid of thick-walled cystidia. Surface of stem covered by a thin villous layer of 2-4 μm hyphae -130 μm long, 0-2 septate with clamps, often flexuous, with many erect thick-walled cystidia 40-65 x 9-14 μm embedded in the layer. Surface of the pileus with the upper gelatinous layer pierced here and there by the shortly exrescent hyphal tips -60 μm long; no thick-walled cystidia.

This species is distinguished by the double gelatinous layer of the pileus, which needs microscopic examination to ascertain, and by the thick-walled caulocystidia which do not seem to encroach on the surface of the pileus.

Hohenbuehelia singaporensis sp. nov.

Receptacula ex integro fulgineigrisea dein fulgineifusca. Pileus -25 mm latus, sessilis cyphelliformis dein orbicularis vel unilateraliter flabelliformis, striatus, sicco albidivillosulus. Lamellae subconfertae, 9-12 primarie -1.5 mm latae, ordinibus 5-7. Caro 0.5-2 mm crassa, ex integra gelatinosa. Sporae 6-7 x 4-4.5 μm , laeves, late ellipsoideae. Cheilocystidia 18-26 x 8-15 μm , clavata, tenuiter tunicata, laevia. Pleurocystidia 45-85 x 12-25 μm , ventricosa acuta, tunicis -5 μm crassis brunneis, plerumque immersa, apicibus liberis incrustatis, etiam hymenialia breviora tunicisque tenuioribus. Hyphae 3-5 μm latae, hinc inde 12 μm . Superficies pilei plus minus hymeniidermis, cellulis clavatis -30 x 18 μm ut cheilocystidia, sine cystidiis crasse tunicatis. Ad lignum in silva. Singapore, Bukit Timah, *Corner s.n.* 18 April. 1940; typus, herb. Corner.

Fruit-bodies wholly dark fuliginous grey, becoming fuliginous fuscous. Pileus -25 mm wide, sessile, at first cyphelliform, becoming subcircular and plano-resupinate or laterally flabelliform, striate, drying finely whitish villous. Gills radiating from the origin of the pileus, rather crowded, 9-12 primaries 1-1.5 mm wide, 5-7 ranks. Flesh 0.5-2 mm thick at the base, wholly gelatinous.

On a dead log in the forest. Singapore, Bukit Timah.

Spores 6-7 x 4-4.5 μm , white, smooth, ellipsoid, aguttate. Basidia 18-23 x 5-6 μm ; sterigmata 4, 4 μm long. Cheilocystidia 18-26 x 8-15 μm , clavate, smooth, thin-walled, with opalescent contents, as a narrow sterile gill-edge. Pleurocystidia 45-85 x 12-25 μm , ventricose, acute, wall-5 μm thick and brownish, mostly immersed, some hymenia 38-50 x 11-18 μm with thinner walls, the emergent tip thinly encrusted. Hyphae monomitic, clamped, 3-5 μm wide, walls rather toughly gelatinous, longitudinal but shortly ascending near the surface of the pileus, some cells inflated -12 μm wide, not forming a dry layer over the gills; in the gill-trama

similar. Surface of pileus more or less hymenioderm as a fairly compact palisade of clavate cells $-30 \times 18 \mu\text{m}$, similar to the cheilocystidia, seated on a thin layer of compact, short-celled, longitudinal hyphae $3-5 \mu\text{m}$ wide; no thick-walled cystidia.

This fungus is very like *H. bullulifera* of South America (p. 40) in the clavate cheilocystidia and the hymenioderm on the pileus, but it had no thick-walled cystidia on the pileus. It is also like the American *H. nigra* (Schw.) Singer for which an initial cyphelliform habit is figured by Waldo (1984), but *H. nigra* has differently shaped cheilocystidia and lacks the hymenioderm (Singer and Digilio, 1952, Singer, 1969, Pegler, 1983). I describe the Singapore fungus as a different species in the hope that further collections will establish its identity.

Hohenbuehelia subdiscipes sp. nov.

Pileus -14 mm latus, reniformis flabelliformis, ad basim subdiscoideum sessilis, pallide cervinibrunneus vel cervinisubochraceus, tenuiter subtomentosus. Lamellae confertae, primariae 5-7, -1 mm latae, ordinibus 5-6, pallide cervinae. Caro 1-1.5 mm crassa, fere ex integra gelatinosa. Odor farinaceus fortis. Sporae $4.5-6 \times 3.3-4.3 \mu\text{m}$, laeves late ellipsoideae. Cheilocystidia $10-18 \times 5-8 \mu\text{m}$, clavata, nonnulla subconica. Pleurocystidia $35-70 \times 8-18 \mu\text{m}$, ventricosa lanceolata acuta, tunicis $-4 \mu\text{m}$, crassis, apices versus incrustata. Hyphae in carnis strato firmo $60-100 \mu\text{m}$ crasso $3-7(-9) \mu\text{m}$ latae, tenuiter tunicatae. Superficies pilei cystidiis $25-55 \times 4-12 \mu\text{m}$ ut pleurocystidiis, copiosis, haud immersis, praedita. Ad lignum delapsus in silva. Insulae Solomonenses, Ysabel, Tetamba, 28 Sept, 1965, RSS 1466; typus, herb. Corner.

Pileus -14 mm wide, sessile to a short subdiscoide base, reniform flabelliform, convex then plane, pale fawn brown or fawn subochraceous, drying thinly white subtomentose. Gills crowded, narrow, 5-7 primaries -1 mm wide, 5-6 ranks, pale fawn. Flesh 1-1.5 mm thick at the base of the pileus, almost wholly gelatinous. Smell farinaceous, strong.

On a dead log in the forest. Solomon Islands, Ysabel, Tetamba.

Spores $4.5-6 \times 3.3-4.3 \mu\text{m}$, white, smooth, ellipsoid. Cheilocystidia $10-18 \times 5-8 \mu\text{m}$, mostly clavate, some subconic, not appendaged, thin-walled, smooth. Pleurocystidia $35-70 \times 8-18 \mu\text{m}$, ventricose-lanceolate acute, wall $-4 \mu\text{m}$ thick, granular encrusted at least distally, the incrustation insoluble in KOH, copious. Hyphae monomitic, clamped; firm layer of flesh $60-100 \mu\text{m}$ thick, with thin-walled longitudinal hyphae $3-7(-9) \mu\text{m}$ wide; gelatinous layer much thicker; in the gill-trama as in the firm layer but more or less descending, yet at the gill-edge parallel with the edge. Surface of pileus with a thin layer 2-3 hyphae thick composed of narrow, more or less longitudinal hyphae with cells $20-60 \times 2-7 \mu\text{m}$, walls thin or slightly thickened, some thinly encrusted, with divergent ends $-250 \mu\text{m}$ long near the base of the pileus; pileocystidia $25-55 \times 4-12 \mu\text{m}$ as the pleurocystidia, encrusted, copious in the superficial layer, not immersed.

This could be regarded as a small or young state of *H. testudo* but I prefer to distinguish it at this stage of exploration on account of the fuller colour, the firm layer of the flesh thicker than the gelatinous layer, and the shorter wider spores.

Hohenbuehelia suppapillosa sp. nov.

Plate 1, Figure 8-10

Pileus -5 cm radio, -8 cm latus, pleuropodalis flabelliformis, albus dein pallide fuscibrunneus, marginem substriatum versus subochraceus, sicco basim versus albivillosus et papillis gelatinosis -0.5 mm altis sparsim ornatus. Stipes 1-7 mm longus latusque, villosulus concolor. Lamellae confertae, 9-17 primariae -4 mm latae, ordinibus 4-6, albae. Caro 1.5-4 mm crassa, strato gelatinoso c. 1 mm crasso. Indodora. Sporae 6-7 x 4-5 μ m, laeves ellipsoideae. Cheilocystidia (10-)15-30 x 6-10 μ m, ventricosa, processu filiformi -20 x 1.5-2 μ m saepe subcapitato. Pleurocystidia (23-)55-100 x 12-22 μ m, ad lamellarum basim -130 μ m, ventricosa acuta, tunicis flavidis vel brunneolis 1.5-6 μ m crassis, copiosa. Hyphae in carnis strato firmo 3-16 μ m latae. Superficies pilei sine cystidiis. Ad lignum emortuum in silva. Malaya, Sarawak, Typus, Malaya, Pahang, Fraser's Hill, 1300m alt., *Corner s.n.* 24 Sept. 1940.

Pileus -5 cm in radius, -8 cm wide, slightly ascending, pleuropodal, flabelliform, hygrophanous, white then pale fuscous brownish, subochraceous towards the whitish substriate margin, smooth or slightly papillose when moist, drying thinly white villous especially near the base with scattered gelatinous papillae -0.5 mm high. Stem 1-7 mm long and wide, short, thick, pale fuscous ochraceous, drying wholly finely white villous. Gills decurrent, crowded, 9-17 primaries -4 mm wide, 4-6 ranks, white. Flesh 1.5-4 mm thick at the base of the pileus, the gelatinous layer c. 1 mm thick, concolorous drying whitish. Smell none.

On dead logs in the forest and on dead stilt-roots. Malaya, Pahang, Fraser's Hill; Sarawak, Bako National Park.

Spores 6-7 x 4-5 μ m, white, smooth, ellipsoid to pip-shaped, aguttate. Basidia 18-23 x 5-5.5 μ m; sterigmata 4, 2.5-3 μ m long. Cheilocystidia (10-)15-30 x 6-10

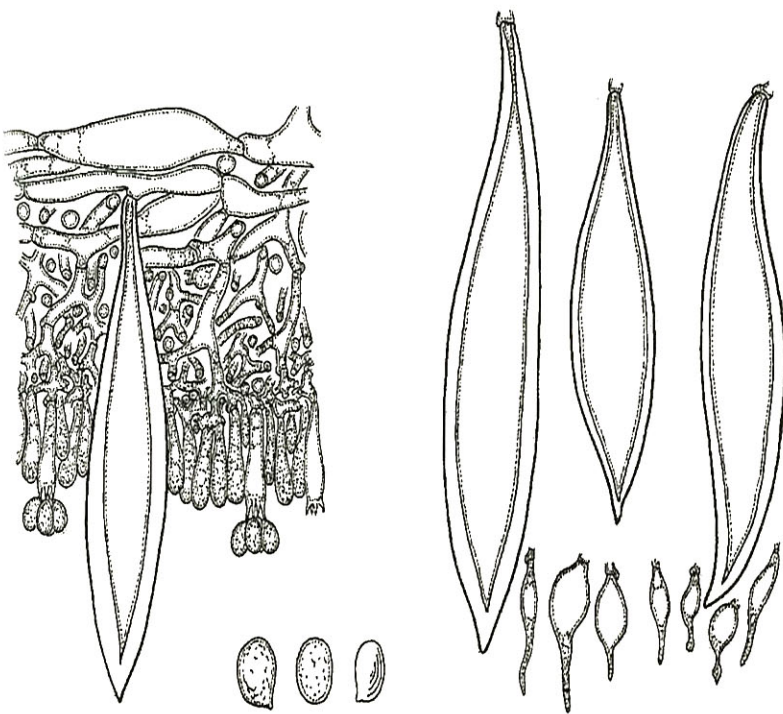


Figure 8. *Hohenbuehelia suppapillosa*. Spores, x 1000. Hymenium, pleurocystidia and cheilocystidia, x 500.

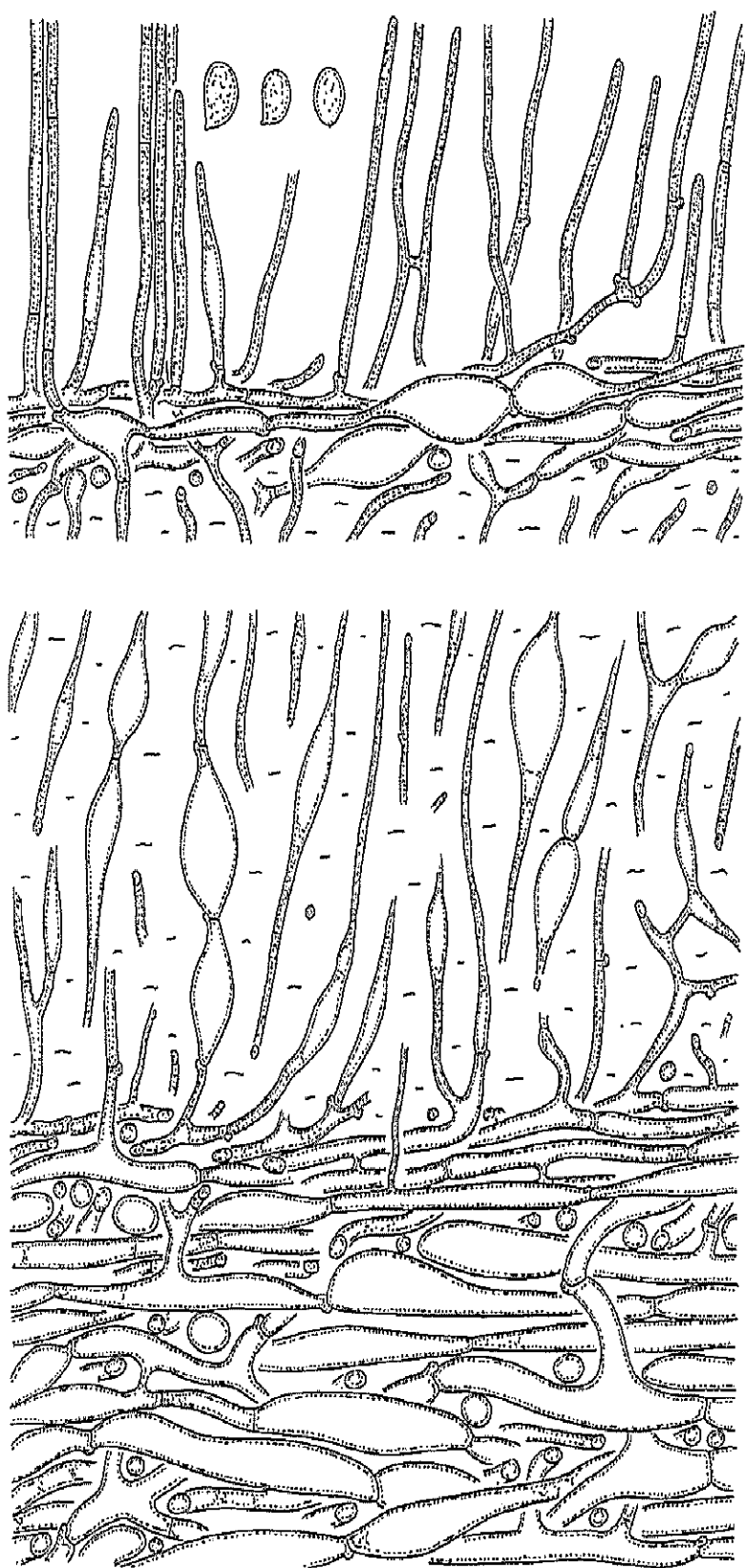


Figure 9. *Hohenbuehelia suppapillosa*. Upper part of young pileus in section, x 500.
Spores, x 1000.

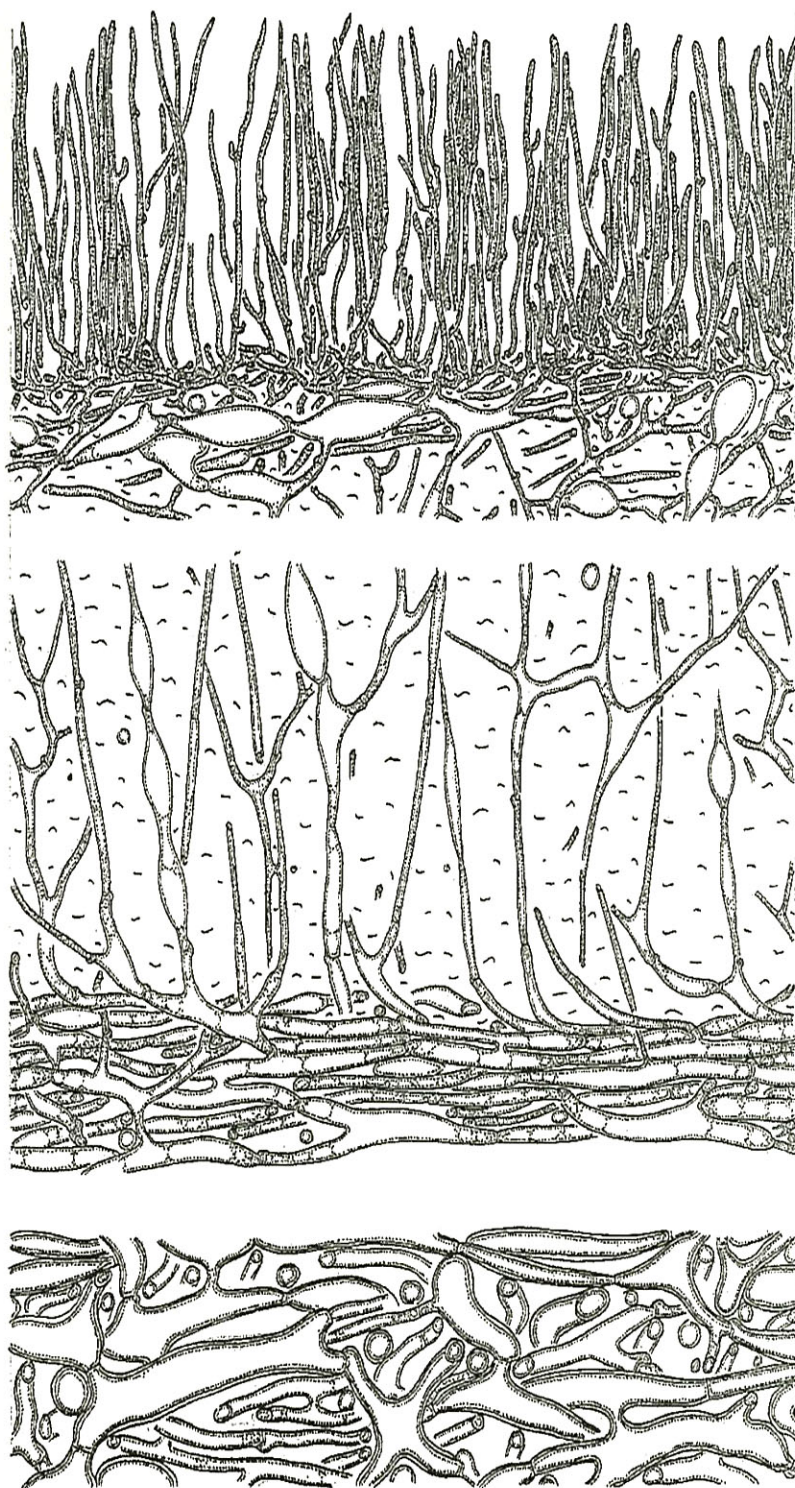


Figure 10. *Hohenbuehelia suppapillosa*. Basal part of mature pileus in section, x 250.

μm , more or less ventricose with a short or long filiform, flexuous or subcapitate appendage $20 \times 1.5\text{--}2 \mu\text{m}$, thin-walled, as a narrow sterile gill-edge. Pleurocystidia (23-)55-100 \times 12-22 μm , -130 μm at the base of the gills, ventricose, acute, with very thick yellowish to brownish walls -6 μm thick, arising deeply in the trama and projecting -50 μm , sometimes slightly curved at the apex, smooth, abundant. Hyphae monomitic, clamped; in the firm layer of the flesh 3-16 μm wide, often branched at a wide angle, longitudinal and interwoven with numerous H-connections, compact near the gelatinous layer, thin-walled; in the gelatinous layer mostly 2-5 μm wide, some with a few cells 10-20 μm wide, mostly ascending; in the gill-trama as in the firm tissue of the pileus, descending and interwoven, not gelatinous, the subhymenium rather thick with hyphae 2-4 μm wide but not corticate. Surface of pileus with a narrow, fairly compact, layer of longitudinal and interwoven hyphae 3-5 μm wide but some cells 8-20 μm wide, giving rise to narrow excrescent hyphae in fascicles -250 μm high as the villous layer; no thick-walled cystidia.

Collections.- Malaya, Pahang, Fraser's Hill 1300m alt., *Corner s.n.* 24 Sept. 1940.- Sarawak, Bako National Park, on dead stilt-root, 27 Aug. 1972, *Corner P-178* (immature).

This has the tendency to inflate the hyphae in the pellicle of the pileus as in *H. mellea*.

Hohenbuehelia testudo (Berk.) Pegler

Agaric Flora of Sri Lanka (1986) 173.

Acanthocystis testudo (Berk.) Boedijn, Bull. Jard. bot. Buitenz. ser. 3, 16 (1940) 402, f. 10.

Pileus 1-3(-6) cm wide, sessile or shortly pleuropodal, spatulate to flabelliform, nearly white becoming dirty brown, paler to the whitish margin, finely villous especially towards the base. Gills subdistant, 1-2 mm wide, 3-4 ranks, white. Flesh c. 2 mm thick, the gelatinous layer 130-390 μm thick. Smell farinaceous.

On dead wood. Ceylon, Malaya, Borneo, Krakatau.

Spores 5-6.5 \times 3-3.5 μm (6-7 \times 2.5-3.5 μm , Petch; 9-12.5 \times 3.7-4.5 μm , Pegler). Basidia 20-24 \times 5-6 μm , 4-spored (20-25 \times 5-6 μm , Pegler). Cheilocystidia 15-25 \times 4-7 μm , narrowly ventricose, often shortly attenuate with or without a subcapitate apex 1-2 μm wide, thin-walled (Pegler). Pleurocystidia 44-78 \times 12-18 μm , ventricose, acute, with thick yellowish walls, shorter towards the gill-edge, the protruding part encrusted (Boedijn); 40-70 \times 10-15 μm , fusoid ventricose, wall -7 μm thick and deep yellowish brown (Pegler); 40-70 \times 3-8 μm , fusiform, more or less encrusted, (Corner). Hyphae of the firm layer of the flesh 4-8 μm wide, in the gelatinous layer 1-4 μm wide, vertically arranged; in the gill-trama as in the firm layer of the pileus. Villous hairs of the pileus as fascicles -200 \times 100 μm of encrusted hyphae 3-5 μm wide, most of the hyphae ending in encrusted ventricose-lanceolate pileocystidia 70-80 \times 6-12 μm ; (pileipellis a disrupted repent

epicutis of non-gelatinised hyphae 2-4 μm wide, sometimes forming short erect fascicles, Pegler).

This description is taken mainly from that of Boedijn, with additions from that of Pegler and observations of mine from a collection which I made at Kandy, Ceylon. The most remarkable difference is the large size of the spores given by Pegler who found them on the type-material. It is not clear that they were seen attached and there is always the possibility that they were a deposit from another fungus during collection. In recording the species from Malaya and Borneo, Pegler does not mention the spores of these collections. He gives the basidia as the same size as found by Boedijn, which seems unlikely with spores nearly twice as big as Boedijn and I found.

A collection which I made in Brunei (Ulu Belalong 15 Feb. 1959), with pilei - 5 cm wide, differed macroscopically in the crowded white gills (1.5-2 mm wide in c. 5 ranks). It had, also, the strong farinaceous smell which I noted in the specimen from Kandy. There were also slight microscopic differences, thus:-

Spores 5-6 x 3.3-3.7 μm . Basidia 20-24 x 6 μm , 4-spored. Cheilocystidia small, clavate to ventricose-capitate. Pleurocystidia 45-90 x 14-20 μm , not or slightly encrusted. Hyphae of the firm layer of the flesh -10 μm wide, short-celled, longitudinal in a narrow compact layer below the gelatinous layer, the rest of the firm layer composed of laxly interwoven and longitudinal hyphae, with walls -1 μm thick in the layer just over the gills; in the gill-trama 3-7 μm wide, with submucilaginous walls -0.5 μm thick. Surface of the pileus consisting of a thin superficial layer 8-15 μm thick, composed of longitudinal hyphae 2-3.5 μm wide with scattered processes 2.5-4 μm wide as if sterile basidia; fascicles of excrescent hyphae -200 x 70-100 μm , with narrow lanceolate, thick-walled, more or less encrusted pileocystidia -80 x 5-7 μm towards the tips of the fascicles, with rather thin-walled cystidia like the cheilocystidia sparsely set on the sides of the fascicles.

var. **glabra** var. nov.

Differt pileo glabro, raro ad basim subvillosus; lamellis confertis, ordinibus 3-6, albis dein pallide ochraceis vel pallide cervino-ochraceis. Typus, Borneo, *RSNB 3011*; herb. Corner.

Pileus 1-4 cm in radius, 1-6 cm wide, sessile or attenuate to a short lateral stem, spatulate to flabelliform, at first descending then horizontal and finally more or less ascending, undulate, smooth, subviscid, generally glabrous, sometimes thinly subvillosus or spiculose-villous at the base, white then pallid ochraceous to pale fawn ochraceous, varying pale umber, greyish or fuscous bistre, opaque or striate towards the margin. Stem -10 x 1.5-5 mm, lateral, minutely villous. Gills decurrent, crowded, narrow, not dichotomous, 12-40 primaries (5-9 in small fruit-bodies) 1-3 mm wide, 3-6 ranks, white then pale cream ochraceous to concolorous with the pileus, edge entire. Flesh 0.5-3 mm thick at the base of the pileus, with a very thin gelatinous layer at the surface.

Smell farinaceous, slight or strong, or none (*P-165*, *RSS 1671*), or slightly fragrant (New Guinea 1 Oct. 1960).

On rotten wood, fallen trunks, and on the ground under rotten wood. Malaya, Borneo, New Guinea, Solomon Islands.

Spores 5-6.5 x 3.5-4.5 μ m, white, smooth, ellipsoid to lacrymiform, aguttate but drying 1-2 guttulate, inamyloid. Basidia 20-25 x 5-7 μ m or 18-22 x 5-7 μ m; sterigmata 4; subhymenium 12-20 μ m thick, composed of 2-3 μ m interwoven hyphae. Cheilocystidia -25 x 4-8 μ m, clavate or subventricose or subcylindric, often with a short process with or without a subglobose head 1.5-2.5 μ m wide. Pleurocystidia 30-90 x 7-20 μ m in some collections -120 x 25 μ m, ventricose with acute apex, wall -6 μ m thick, thinly encrusted or smooth, abundant. Hyphae monomitic, clamped; in the firm layer of the flesh with cells 20-150 x 3-14 μ m with wall thin or 0.5-1 μ m thick near the base of the pileus, longitudinal and interwoven; gelatinous layer 100-250 μ m thick, with ascending hyphae 2-4(-6) μ m wide; in the gill-trama 3-8 μ m wide, thin-walled, descending; in the stem with cells 30-150 x 3-20 μ m, often with ampulliform swellings at one end of the cell, walls 0.5-1 μ m thick. Surface of stem with a sterile hymenium, becoming finely villous with 2-3 μ m hyphae. Surface of pileus with a rather compact but thin layer, 20-30 μ m thick, of appressed radiating hyphae 3-6(-8) μ m wide, with firm or slightly gelatinous walls, not developing excrescent hyphae except in some cases at the very base of the pileus; pileocystidia 60-150 x 4-10 μ m, narrowly fusiform, often with long stalk, acute, smooth or slightly encrusted, thick-walled, generally immersed in the superficial layer and some arising from the outer hyphae of the firm layer of the flesh and embedded in the gelatinous layer, not projecting from the surface.

Collections.- Sarawak, Bako National Park, *Corner P-165*, 26 Aug. 1972.- North Borneo, Mt Kinabalu, 1300-3300m alt., *RSNB 3011*, 5183, 5226, 5226B, 5728 and *Corner s.n.* 30 June 1961, apparently throughout the year.- New Guinea, Oomsis, *Corner s.n.* 1 Oct. 1960.- Solomon Islands, Guadalcanal *RSS 1671*; Kolombangara *RSS 1060*; San Cristobal *RSS 738*, 971.

I treat this as a variety because I think that the whole complex about *H. testudo* needs much more investigation, especially in regard to the size of the spores, pleurocystidia and pileocystidia. Though the fruit-bodies usually smell strongly of new meal, the smell may be weak or absent, and those of the New Guinea collection were slightly fragrant. This collection also had the pilei becoming slightly villous-spiculose at the base with the pileocystidia embedded in the excrescent fascicles. Compare the Brazilian *H. testudo* (p. 45).

Hohenbuehelia vermiculata sp. nov.

Figure 11

Pileus -8 mm radio, -7 mm latus, breviter pleuropodalis, vel sessilis, primo conchiformis fere cyphelliformis, dein unilateraliter extensus, spatulatus griseo-alutaceus striatus, siceo basim versus

subvillosus. Stipes -1 x 2 mm. Lamellae subconfertae, primariae 5-7, -0.7 mm latae, ordinibus 3-4, pallide subochraceae. Caro 1 mm crassa, fere ex integra gelatinosa, strato firmo 50-200 μm crasso. Odor farinaceus. Sporae 4-6.5 x 3-4 μm , laeves subcylindricae. Cheilocystidia 9-23 x 4-7 μm , clavata vel ventricosa, nonnulla capitulo breviter stipitato praedita. Pleurocystidia 25-70 x 7-17 μm , ventricosa acuminata, dense incrustata. Hyphae in carnis strato firmo 2-6 μm latae. Pileocystidia 40-130 x 3-5(-6) μm , dense incrustata, in toto -200 x 12-20 μm vermiformia. Ad ramulos truncosque delapsos in silva. Insulae Solomonenses. Typus RSS 1160; herb. Corner.

Pileus -8 mm in radius, -7 mm wide, sessile or shortly pleuropodal, at first convex-conchiform and almost cyphelliform, then unilaterally extending and spathulate, pale greyish buff, translucent striate, drying thinly villous at the base and pale bistre. Stem -1 x 2 mm, very short or none. Gills decurrent to the attachment, rather crowded, 5-7 primaries -0.7 mm wide, 3-4 ranks, pale buff ochraceous. Flesh 1 mm thick at the base of the pileus, mostly gelatinous, the firm layer 150-200 μm thick, or merely 50-100 μm (RSS 681). Smell farinaceous.

On a fallen trunk in the forest, on sticks and on dead inflorescences of *Ficus subcongesta*. Solomon Islands.

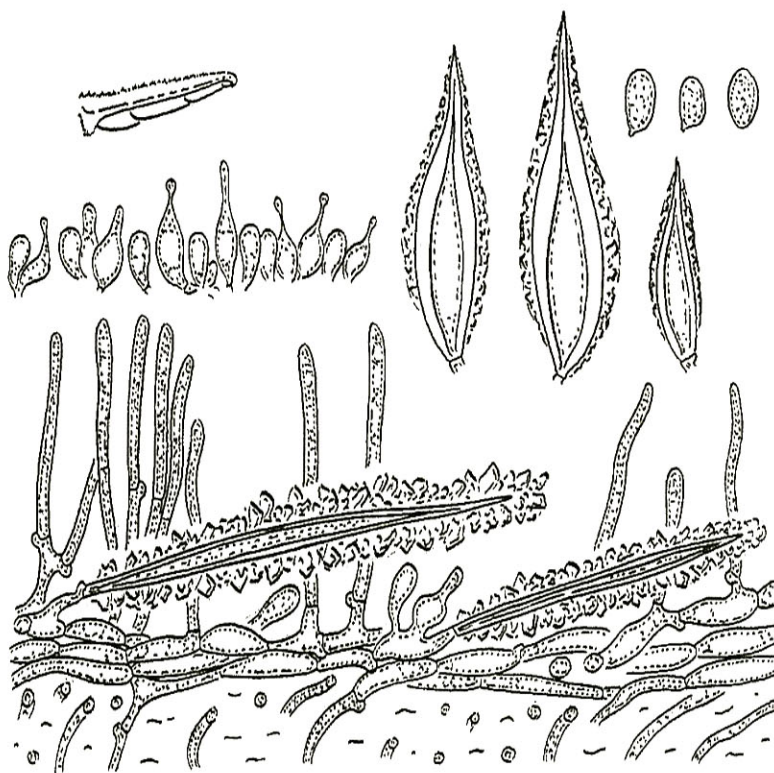


Figure 11. *Hohenbuehelia vermiculata*. Fruit-body in section, x 2. Spores, x 1000. Cheilocystidia, pleurocystidia and surface of pileus, x 500.

Spores 4-6.5 x 3-4 μm , white, smooth, subcylindric. Basidia 18-20 x 5-5.5 μm , 4-spored; no subaceroe basidioles; subhymenium thin, with 2-3 μm hyphae. Cheilocystidia 9-23 x 4-7 μm , clavate to ventricose with a short, often capitate, appendage, smooth, thin-walled, as a sterile gill-edge. Pleurocystidia 25-70 x 7-17 μm , the smaller towards the gill-edge, ventricose, acuminate, heavily encrusted

(at least distally), wall $-6\ \mu\text{m}$ thick. Hyphae monomitic, clamped; in the pileus mostly gelatinous $1.5\text{--}2.5\ \mu\text{m}$ wide and ascending, in the firm layer $2\text{--}6\ \mu\text{m}$ wide with slightly thickened walls, longitudinal; in the gill-trama as in the firm layer, $2\text{--}4\ \mu\text{m}$ wide. Surface of pileus with a thin layer of longitudinal hyphae $3\text{--}6\ \mu\text{m}$ wide bearing scattered subclavate processes $-25 \times 4\text{--}7\ \mu\text{m}$, and erect hyphal ends $-70 \times 3\text{--}6\ \mu\text{m}$, often 1-3 septate; pileocystidia $40\text{--}130 \times 3\text{--}5\text{--}(6)\ \mu\text{m}$, appearing as vermiform, often curved ropes of granular and crystalline material $-200 \times 12\text{--}20\ \mu\text{m}$ overall, thick-walled.

Collections.- Solomon Islands, Guadalcanal, 4 July 1965, RSS 681; Kolombangara, 30 Aug. 1965, RSS 1160.

This is close to the alliance of *H. testudo* v. *glabra* and may be a depauperate state.

Hohenbuehelia horakii Courtecuisse species incertae sedis

Doc. mycol. 14 (1984) 82.

Claudopus griseus Mass., Kew Bull. 1899, 169.- *H. grisea* (Mass.) Horak, Nova Hedwigia Beih. 65 (1980) 315, non *H. grisea* (Pk) Singer.

Massee gave: pileus 3-5 cm wide, conchiform with lateral stem, grey, often corrugate; gills distant, narrow, connected by veins, grey; spores $8 \times 5\ \mu\text{m}$, rough; cystidia $65\text{--}70 \times 14\text{--}15\ \mu\text{m}$, fusoid; on dead wood, Malay Peninsula, Perak, Ridley 11.

Horak gave: spores $4.5\text{--}6 \times 2.5\text{--}3\ \mu\text{m}$, reniform, inamyloid; cystidia $30\text{--}50 \times 12\text{--}18\ \mu\text{m}$, fusiform, metuloid, wall $-7\ \mu\text{m}$ thick, hyaline, partly encrusted with crystals.

I do not recognise this fungus.

Notes on Extra-Malesian Species

The species here mentioned can be arranged according to my classification of the Malesian species in the following way:

Species with thick-walled pileocystidia.

H. angustata, *H. bullulifera* (with hymenioderm), *H. carbonaria*, *H. cystidioides*, *H. petaloides*, *H. testudo*.

Species without such pileocystidia.

- a. With thick-walled hyphae in the firm layer of the flesh. *H. atrocaerulea*, *H. myxotricha*, *H. aff. reniformis*.
- b. Hyphae thin-walled - *H. subtorulosa*.

Hohenbuehelia angustata (Berk.) Singer

Lilloa 25 (1950) 109.

Pileus -3.5 cm in radius, 4.5 cm wide, pleuropodal, spatulate-flabelliform, finely villous in the proximal half, striate near the margin, grey, pallid fuscous or pale livid bistre. Stem 3-30 x 2-5 mm, lateral, fibrous, firm, finely villous, paler concolorous. Gills deeply decurrent, very crowded, narrow, thin, 15-40 primaries 0.3-1 mm wide, 5-6 ranks, sometimes dichotomous especially near the stem, white, edge entire. Flesh fibrous, firm, white, with a very thin gelatinous layer c. 50 µm thick. Smell farinaceous, strong.

On the ground and on rotten wood in forest. North and South America.

Spores 6.5-8 x 4-5 µm, ellipsoid, or 4-4.5 x 3-3.5 µm, broadly ellipsoid to subglobose (Manaus collection), white, smooth, thin-walled. Basidia 17-23 x 6 µm, 4-spored.

Cheilocystidia 15-30 x 4-8 µm, cylindric, clavate or subventricose with a short obtuse to subacute, rarely capitate, apex, smooth, thin-walled, as a narrow sterile gill-edge. Pleurocystidia 35-85 x 14-28 µm, stoutly ventricose with short acute apex, with thick yellowish walls, not or slightly encrusted, abundant. Hyphae monomitic, clamped, 2-10 µm wide in the firm tissue of the pileus, mostly longitudinal; in the gill-trama 2-6 µm, wide, thin-walled, not gelatinous, mostly radiating and parallel with the gill-edge; gelatinous layer of pileus 20-50 µm thick. Surface of pileus with a compact layer c. 20 µm thick composed of longitudinal and interwoven appressed hyphae 2-4 µm wide, with few excrescent ends in fascicles -120 µm wide of hyphae 2-8 µm wide; pileocystidia 28-70 x 6-10 µm, fusiform with prolonged acute apex and short, often subtruncate, base, becoming overgrown by the villous layer, sometimes with thin-walled pileocystidia in the fascicles of hyphae and hyphal ends like irregular, often lobate and contorted, cheilocystidia and often with pale fuscous sap.

Collections.- Bolivia, Santa Cruz de la Sierra, on the ground, scattered or 2-3 together, 17 Jan. 1948, *Corner* 41/48. - Brazil, Amazonas, Manaus, on rotten wood, *Corner s.n.* 24 Oct. 1948.

The stipitate pileus, very crowded narrow gills and the very thin gelatinous layer on the pileus distinguish this species. Singer gave the spores as equally variable, 3.5-6.7 x 3-4.5 µm, ellipsoid to subglobose. Noteworthy is the radiate construction of the gills, as in *Panus*, which probably explains why they are so narrow. The limits between this species and *H. testudo* seem rather uncertain. Thorn and Barron (1986), however, give the gelatinous layer as 180-250 µm thick.

Hohenbuehelia bullulifera Singer

Lilloa 25 (1952) 119.

var. **brasiliensis** var. nov.

Figure 12

A typo differt pileo majori -20 mm lato, lamellis confertis, odore farinoso, sporis minoribus $4.5-5.5 \times 3-3.5 \mu\text{m}$. Typus, Brazil, *Corner 296*; herb. Corner.

Pileus -15 mm in radius, 20 mm wide, sessile, dorsally attached, at first cyathiform then unilaterally spatulate to flabelliform, sometimes with a small resupinate foot, wholly dark fuscous fuliginous, at first paler to the whitish and persistently incurved margin, opaque or faintly striate near the margin, drying white villous at least in the proximal part. Gills radiating from the base, crowded, narrow, thin, tough, 7-11 primaries -1 mm wide, 4-6 ranks, concolorous; sometimes with minute gills on the resupinate foot. Flesh 1-1.5 mm thick at the base, wholly toughly gelatinous. Smell farinaceous, rather strong.

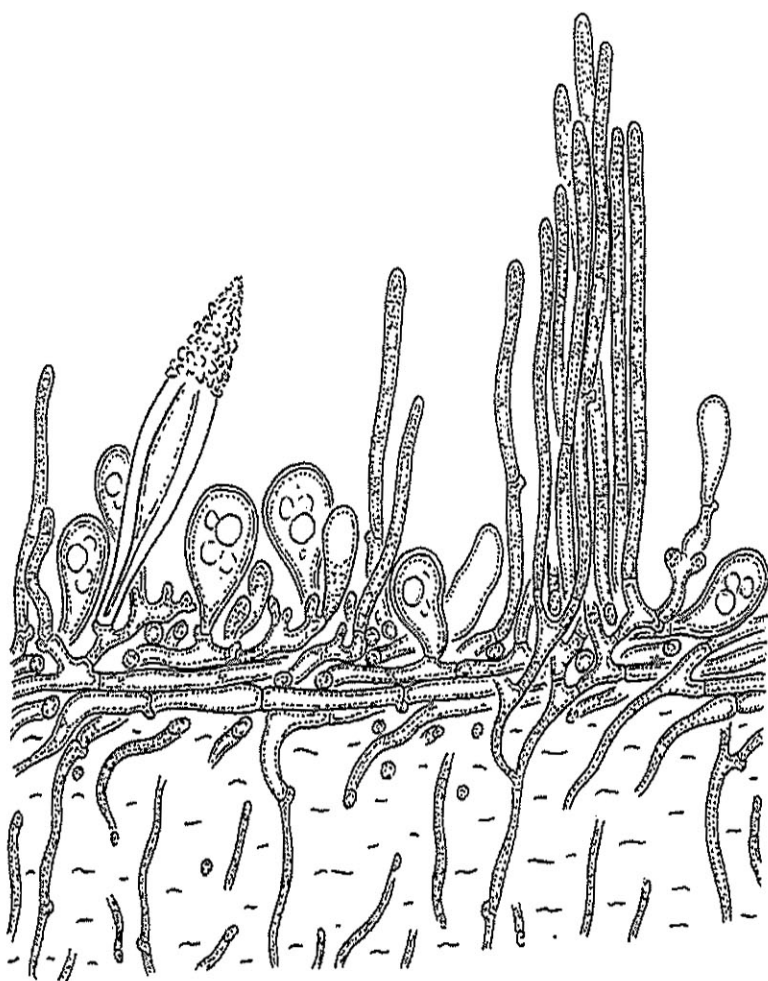


Figure 12. *Hohenbuehelia bullulifera* v. *brasiliensis*. Surface of pileus, x 500.

On dead wood in forest. Brazil.

Spores $4.5-5.5 \times 3-3.5 \mu\text{m}$, white, smooth, aguttate. Basidia $18-23 \times 5.5-6.5 \mu\text{m}$; sterigmata 4, $3 \mu\text{m}$ long. Cheilocystidia $15-30 \times 7-16 \mu\text{m}$, clavate, pyriform

to subglobose, with thin, colourless to pale fuscous walls, smooth, with a few colourless plastid-like inclusions, as a broad sterile gill-edge. Pleurocystidia (20-)40-90 x (6-)12-18 μm , fusiform to ventricose, with fuscous brown walls 2-5 μm thick, often with a more or less distinct neck leading to the acute apex, arising deeply in the subhymenium, thinly encrusted distally; the largest with deepest origin near the bases of the gills, shorter towards the gill-edge, the shortest 20 x 6 μm mixed sparsely with the cheilocystidia; also with thin-walled cystidia like the cheilocystidia on the gill-surface especially towards the gill-edge. Hyphae monomitic, clamped; in the flesh 2-5 μm wide with rather toughly gelatinous walls, longitudinal but shortly ascending near the surface, some with inflated cells 8-16 μm wide, compact but not forming a firm dry layer over the gills; in the gill-trama similar. Surface of pileus more or less hymenioderm with cells -30 x 20 μm like the cheilocystidia, some with pale fuscous walls, seated on a compact layer of longitudinal hyphae 3-5 μm wide with fuscous walls; pileocystidia like the pleurocystidia but not so large, sometimes only near the base of the pileus; excrescent hyphae 3-6 μm wide in fascicles.

Collections.- Estado do Rio, Niteroi, *Corner s.n.* 7 Sept. 1947; Rio de Janeiro, Corovado 500m alt., 21 Nov. 1948, *Corner 296*.

This agrees essentially with Singer's description for *H. bullulifera* with spores 5.5-6.8 x 3-4 μm . Compare the very similar *H. singaporensis* (p. 29) without thick-walled pileocystidia.

Hohenbuehelia atrocaerulea (Fr.) Singer

I give the following notes on an English collection.

Spores 7-9 x 3.5-4 μm , subcylindric, aguttate. Basidia 25-30 x 5.5-6.3 μm , 4-spored. Cheilocystidia as sterile basidia, subclavata to ventricose and then often with a short apical and sometimes capitulate process. Pleurocystidia -110 x 10-17 μm , encrusted, smaller towards the gill-edge. Hyphae in the firm layer of the flesh 3-7 μm wide, walls 0.5-1 μm thick and pale brown near the gelatinous layer 0.5-1 mm thick with hyphae 1-3 μm wide ascending in the upper part but longitudinal in the lower part of the layer; in the gill-trama as in the firm layer of the flesh but with thickened walls only in the central part of the trama, descending. Surface of pileus without pileocystidia.

Hohenbuehelia carbonaria (Cke et Mass.) Pegler

Austral. J. Bot. 13 (1965) 327.

Panus carbonaria Cke et Mass., *Grevillea* 15 (1887) 94; Cooke, *Handbook Austral Fungi* (1892) pl. 7, fr. 46.

Spores 7-9 x 4.5-5 μm (Pegler), 8-10 x 5-5.5 μm (Corner). Pleurocystidia 55-80 x 9-14 μm (Pegler), 60-100 x 9-16 μm (Corner), fusiform acute, thick-walled, distally encrusted. Pileocystidia -120 x 4-7 μm , fusiform, acute. Australia.

When studying *Panus* some years ago, I examined the type at Kew and noted that it had the construction of *H. geogenia* from which it differed in the larger spores. However, I failed to note the direction of the hyphae in the gelatinous layer of the pileus.

***Hohenbuehelia cystidioides* (C.G. Lloyd) comb. nov.**

Cantharellus cystidioides C.G. Lloyd, Myc. Writ. 7 (1923) 1227, f. 2534, 2535.

Pileus sessile, dimidiate, smooth, brown (about the colour of *Auricularia auricula-judae*). Gills dichotomous, thick, crowded, pruinose from the cystidia. Flesh wholly gelatinous. Spores 4-5 x 2 µm, hyaline, smooth, oblong ellipsoid, thin-walled. Basidia c. 25 x 5 µm. Cheilocystidia not seen, the gill-edge fertile. Pleurocystidia 55-120 x 15-25 µm, ventricose, the acute apex projecting 8-40 µm and rather thinly encrusted with crystals (often tetrahedral) insoluble in KOH, walls 3-8 µm thick, base attenuated and deeply inserted in the gill-trama, often curved ascending, abundant. Hyphae monomitic, clamped, 2-4 µm wide, the gelatinous walls thin or slightly thickened, branched at a wide angle but with many blind, secondarily septate, endings; in the gill-trama similar but not gelatinous. Surface of pileus with densely interwoven, more or less contiguous, hyphae with firm (not gelatinous) walls, in a layer 70-100 µm thick; pileocystidia as the pleurocystidia but shorter, scattered.

This was described from Japan, collected by J.E.A. Lewis. I examined the collection at Kew, when I was studying cantharelloid fungi, and have added the microscopical details. The species is remarkable for the dichotomous gills with fertile edge, the wholly gelatinous flesh and the unusually thick pellicle.

***Hohenbuehelia myxotricha* (Lév.) Singer**

The following are my notes on an English collection

Spores 9-14 x 4-5.5 µm, cylindric, often slightly curved, aguttate or with a few minute guttulae. Basidia 25-33 x 4-6 µm; sterigmata 2, 5.5-7 µm long. Cheilocystidia -50 x 3.5-8 µm, mostly ventricose with an apical cylindric appendage -30 x 1.5-2.5 µm, some with a slightly swollen tip, others merely clavate as sterile basidia even with 2 sterigmata, with all transitions to emergent hyphae 1.5-2.5 µm wide, as a sterile gill-edge. Pleurocystidia 30-70 x 7-10 µm, subclavate, fusiform or cylindric, thick-walled, encrusted with a distal conical cap of compact crystals. Hyphae monomitic, clamped; in the stem, the firm layer of the flesh and in the gill-trama 2.5-8 µm wide, with thick walls; in the gelatinous layer 1-2 µm wide. Surface of pileus without cystidia.

***Hohenbuehelia petaloides* (Fr.) Singer**

Figures 13,14

Huijsman (1961); Murata (1979); Singer and Kuthan (1980); Doneso (1981); Watling (1985).

This is the north temperate complex of *H. petaloides* (type-species of the genus), *H. geogenia* (Fr.) Singer, and *H. repanda* Huijsman. Its southerly allies are *H. angustata* and *H. testudo*; all have the farinaceous smell. For *H. geogenia*, I note the following points.

Hyphae in the firm layer of the flesh with cells $40\text{--}130 \times 3\text{--}12\ \mu\text{m}$, thin-walled but in the stem with walls $0.5\text{--}1\ \mu\text{m}$ thick; in the gelatinous layer (up to $700\ \mu\text{m}$ thick) $3\text{--}6\ \mu\text{m}$ wide, ascending; in the rhizomorphs monomitic, clamped, $1.5\text{--}3.5\text{--}(5)\ \mu\text{m}$ wide, thin-walled but the outer hyphae with slightly thickened and slightly encrusted walls; in the gill-trama $3\text{--}7\ \mu\text{m}$ wide, descending. Surface of pileus with pileocystidia $50\text{--}110 \times 4\text{--}7\ \mu\text{m}$, narrowly fusiform, with thick brownish walls, thinly encrusted.

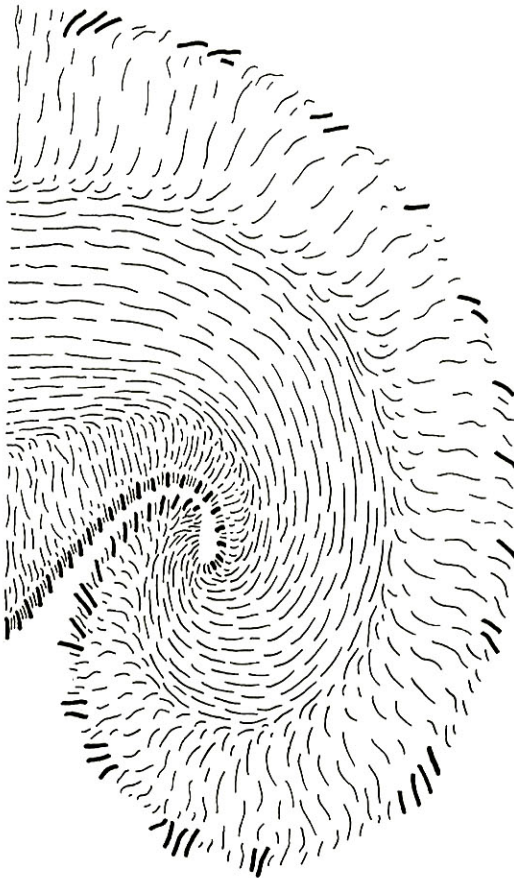


Figure 13. *Hohenbuehelia geogenia*. Margin of pileus in section, to show the upper gelatinous layer of the flesh with ascending hyphae and thick-walled pileocystidia (thick lines), and the pleurocystidia (thin lines); $\times 45$.

***Hohenbuehelia* aff. *reniformis* (Fr.) Singer**

Pileus -12 mm in radius, sessile or with a very short vague stem attached by a thin white narrow byssoid mycelium, reniform semicircular, fuscous cinereous, paler and substriate near the margin, drying pallid fuscous and shortly white

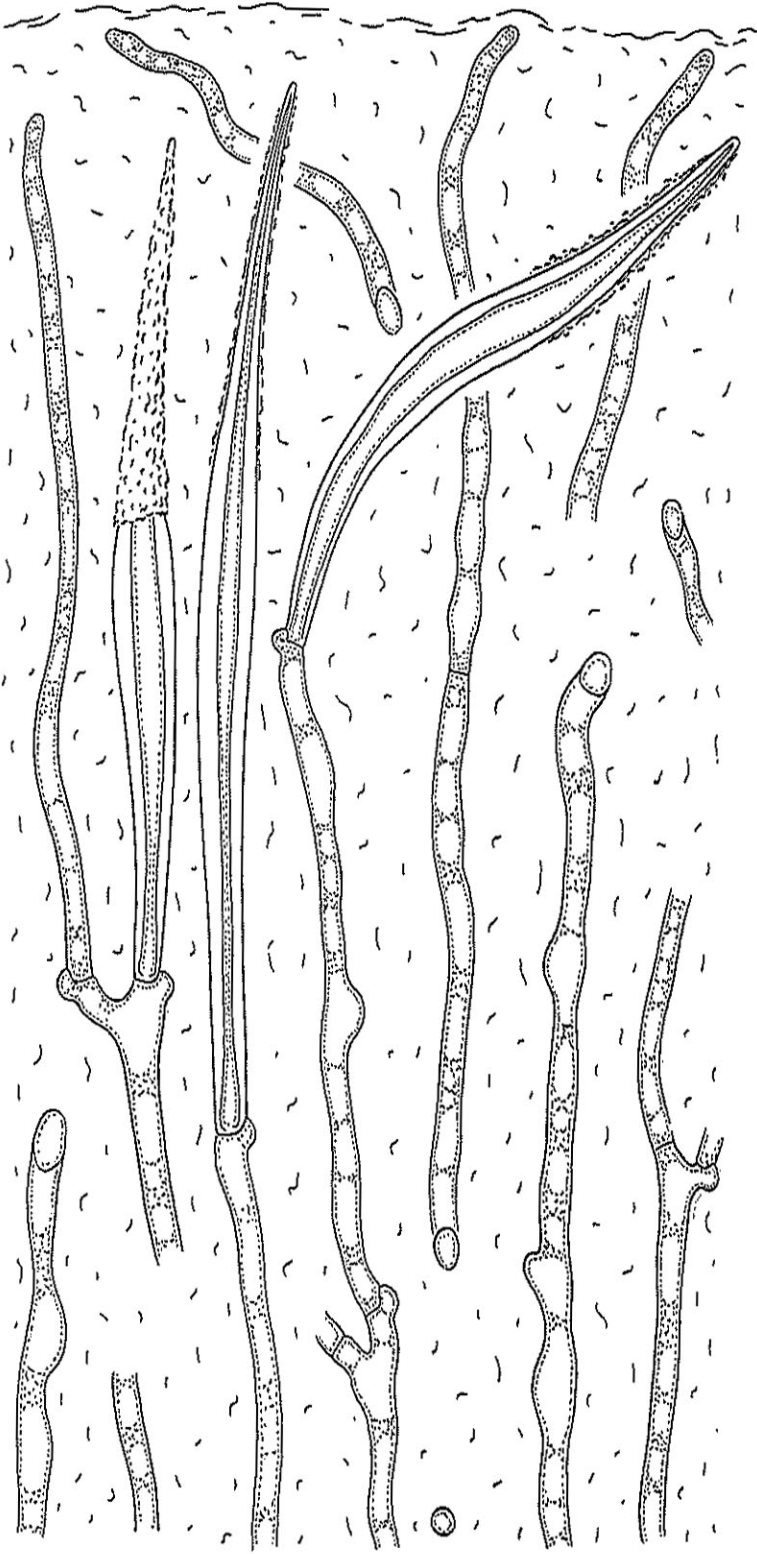


Figure 14. *Hohenbuehelia geogenia*. Surface of pileus with thick-walled pileocystidia arising in the gelatinous layer; x 1000.

villous, pruinose towards the margin, strigose near the base. Gills decurrent, crowded, narrow, tough, 8-13 primaries -1 mm wide, 4-6 ranks, white, in age yellowish. Flesh 0.3-0.5 mm thick, gelatinous except a layer c. 100 μ m thick over the gills. Inodorous.

On a dead branch in forest. Brazil, Estado do Rio, Niteroi, *Corner s.n.* 31 Aug. 1947.

Spores 8-10 x 4-5 μm , white, smooth, subcylindric, aguttate, inamyloid. Basidia 22-30 x 7-8 μm ; sterigmata 4, 3-4 μm long. Cheilocystidia 16-32 x 5-10 μm , ventricose with a subcapitate, mostly subhastiform, appendage 2-3 μm wide on a stalk 1.5-3 μm long, thin-walled, as a sterile gill-edge, mixed with pleurocystidia. Pleurocystidia 25-75 x 7-16 μm , lanceolate fusiform, some waisted, walls 1-3.5 μm thick and colourless, rather thinly encrusted at the acute apex, abundant and also on the gill-edge. Hyphae monomitic, clamped; in the firm layer of the flesh and in the gill-trama 3-7 μm wide with walls 0.5-1.5(-2.5) μm thick, descending in the gills; in the gelatinous layer 1-3 μm wide. Surface of pileus with subclavate processes -35 x 4-10 μm in a loose layer, with pale fuscous sap, arising from a loose pseudoparenchyma of cells 12-25 x 7-12 μm with fuscous walls and fuscous granular incrustation; villous layer composed of loose fascicles of excrescent hyphae; without thick-walled cystidia.

This fits the description of the temperate *H. reniformis*, yet it fits also diminutive *H. malesiana*. I describe it because too little is yet known of these fungi.

Hohenbuehelia subtorulosa (Cke) comb. nov.

Panus subtorulosus Cke; Pegler, *Kew Bull. Add. Ser. X* (1983) 258.

I give the following notes from my examination of the type-specimen at Kew, namely *Glaziou 9153*, Dec. 1878, Rio de Janeiro.

Fruit-bodies closely caespitose-merismatoid from a short thick common trunk, dried wholly fuliginous fuscous and horny. Pileus -25 mm in radius, often with a prolonged lateral stem, finely villous over the central part. Gills crowded, very narrow, 0.5 mm broad. Spores 4-5 x 2.5-3 μm , colourless, smooth. Pleurocystidia 35-48 x 9-16 μm , ventricose, subacute to acute, short, very thick-walled, apparently smooth, very abundant. Hyphae of the flesh wholly agglutinated, no structure discernible. Surface of pileus with the villous layer -80 μm thick, composed of 3-5 μm hyphae, clamped, more or less erect; no pileocystidia seen.

Hohenbuehelia testudo

The following description refers to a fungus that I found in Brazil and seems almost identical with the Asian *H. testudo* (p. 34). Both *H. testudo* and *H. angustata* relate to the complex of *H. petaloides*.

Pileus -5 cm in radius, -7 cm wide, sessile, lateral, ascending, spatulate to flabelliform, pale watery ochraceous to pale fuscous brownish, whitish towards the substratum margin, drying white villous. Gills decurrent, crowded, narrow, 14-20 primaries 2 mm wide, 5-6 ranks, subreticulate at the base, white to dingy

cream. Flesh 5-6 mm thick at the base, with a thin gelatinous layer above the softly floccose firmer flesh, white. Smell farinaceous.

On fallen trunks in forest. Brazil.

Spores 5-6 x 3-3.5 μ m, white, smooth, broadly ellipsoid, thin-walled. Basidia 16-21 x 5-5.7 μ m, (adherent in mucilage), 4-spored. Cheilocystidia -23 x 5-9 μ m, subventricose with a more or less prolonged apex, as a sterile gill-edge but collapsing. Pleurocystidia 35-90 x 9-23 μ m, with thick yellowish walls, smooth or slightly encrusted, ventricose acute. Hyphae monomitic, clamped; in the firm layer of the flesh with cells 20-140 x 3-24 μ m, thin-walled; in the gelatinous layer 2-7 μ m wide but some -18 μ m wide, ascending or vertical, some of the wider hyphae with a secondary septum; in the gill-trama as in the firm layer of the flesh but with slightly thickened walls, descending. Surface of pileus with a more or less disrupted pellicle of longitudinal and interwoven hyphae 2-6 (-12) μ m wide, 1-3 hyphae thick, developing excrescent clamped hyphae 4-7 μ m wide in fascicles -100 x 10-50 μ m; pileocystidia -90 x 7-11 μ m as smooth thick-walled pleurocystidia, becoming decumbent, scattered.

Collections.- Rio de Janeiro, Corcovado, 2 Dec. 1948, *Corner 316*; Amazonas, Manaus, near Flores, 3 Oct. 1948, *Corner 125*.

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