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ON SOME APHYLLOPHORALES FROM AUSTRALIA

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(With 13 Text-figures)

A collection of Aphyllophorales from Australia and Tasmania has been studied. Fifteen species have been identified and the following new taxa are described: *Amaurohydnum flavidum* gen. et spec. nov., *Amauromyces pallidus* gen. et spec. nov., *Hyphoderma cinnamomeum*, *Lindtneria pellicularis*, *Resinicium luteum* spp. nov. The new combination *Radulodon calcareus* (Cooke & Massee) is proposed.

The Aphyllophorales of Australia are far from being well known. The main source of information, of course, is the monograph of Cunningham (1963) who studied many collections from Australia although he dealt more in particular with the species of New Zealand. In a series of interesting papers Reid (1955–1963) described and figured many basidiomycetes, the greater part of which are Aphyllophorales. Mention should further be made of the important publication by Talbot who paid special attention to the more inconspicuous species of that group. Valuable information is also found in the other literature cited at the end of the paper but which is not mainly devoted to the species of Australia.

If, however, all information available is put together and the question is asked how much is actually known about Australian Aphyllophorales, then the astonishing gaps in our knowledge become evident. The obvious reason is the deplorable lack of collections from Australia, which makes it practically impossible to judge the number of indigenous species. Only very few people have been interested in the said group of fungi and the main work has still to be done, so that every additional collection of Aphyllophorales from Australia is most welcome. It was therefore with great interest that I looked into part of the Aphyllophorales recently collected there by Maas Geesteranus. Although on a private visit he managed to bring back many interesting species, a number of which are dealt with in this paper. In the collector's opinion his output can by no means be considered to be representative since the collecting was done in only a few restricted areas and during a dry spring following a winter which, according to local people, had also been exceptionally dry.

Some of the species mentioned are probably typical of a dry climate (e.g. *Radulodon calcareus*), whereas others like *Lindtneria pellicularis* certainly grew under microclimate conditions with a higher relative humidity. All specimens were very well preserved, which greatly facilitated the microscopic analysis of hyphal structures.

In order to allow a better comparison of the size of the microscopical characters, all structures are shown with the same magnification.

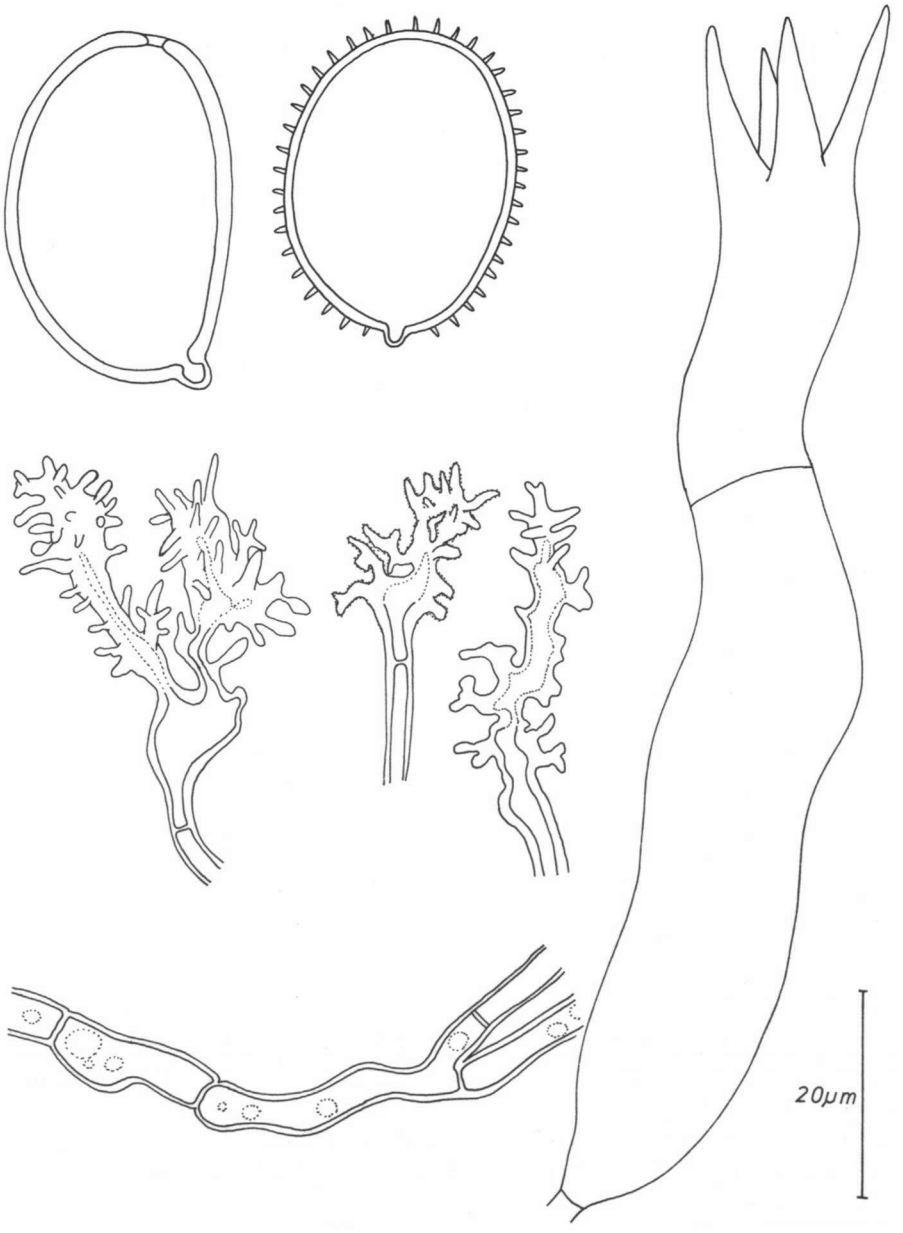


Fig. 1. *Aleurodiscus sparsus* — *Maas Geesteranus 15548*: spores, basidium, acanthophyses, basal hyphae.

ALEURODISCUS SPARSUS (Berk.) Höhn. & Litsch.—Fig. 1

Stereum sparsum Berk. *in* J. Linn. Soc., Bot. **14**: 72. 1873. — *Aleurodiscus sparsus* (Berk.) Höhn. & Litsch. *in* Sber. K. Akad. Wiss. Wien Math.-Nat. Kl. **116**: 809. 1907.

Basidiocarp annual, resupinate, effused, several cm large, membranaceous, closely adnate, separable in small pieces; context homogeneous; hymenial surface white, even, slightly to strongly cracked when dry; margin white, indistinct, determinate, narrow, somewhat pruinose; rhizomorphs and hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, flexuous-cylindrical, 3–4 μm wide and rather thin-walled in subhymenium (0.2–0.4 μm), 3–6 μm in diam. and somewhat thick-walled (0.6 μm) in trama, clamps always lacking, contents with yellow oil guttules. Acanthophyses present, abundant, of hymenial to subhymenial origin, hyaline, 30–80 μm long, thick-walled, in basal part smooth, in upper part often branched and with irregular, spine-like outgrowths the surface of which often appears granulose; basal clamp lacking; contents homogeneous; not protruding; some weakly amyloid. Basidia hyaline, broadly cylindrical to somewhat clavate when mature, 60–110 × 13–20 μm, thin-walled, smooth; basal clamp lacking; contents homogeneous; with four, large, subulate sterigmata (c. 15 × 5 μm). Spores hyaline, broadly ellipsoid, with large, relatively thin-walled apiculus, 24–30 × 16–20 μm, thick-walled (1–1.5 μm), spiny in Melzer (smooth in KOH and lactophenol), contents oily, becoming yellow in Melzer, strongly amyloid, not dextrinoid or cyanophilous.

REACTIONS.—Spores strongly, some acanthophyses weakly amyloid, no other part of basidiocarp being amyloid, dextrinoid or cyanophilous.

SUBSTRATE.—In Australia found on wood of Eucalyptus.

DISTRIBUTION.—Australia, New Zealand.

SPECIMEN STUDIED.—AUSTRALIA: Victoria, Warburton, Mt Donna Buang, ±1000 m alt., 2 Nov. 1977, *R. A. Maas Geesteranus 15548* (L).

The spores are smooth in KOH and show an apical porus; sometimes also the apiculus dissolves, which creates a second porus at this place.

Amaurohydnum Jülich, *gen. nov.*

Fructificatio resupinata, effusa, circa 200 μm crassa, adnata, membranacea, pallide colorata. Systema hypharum monomiticum. Hyphae hyalinae, cylindraceae vel torulosae, distinctae vel indistinctae, fibulatae, circa 2–4 μm latae. Basidia distincte clavata, parva, fibulata, tetraspora. Sporae hyalinae, tenui-tunicatae, laeves, parvae, inamyloideae. Typus: *Amaurohydnum flavidum* Jülich.

Etymology: ἀμαυρός — inconspicuous; hydnum.

Basidiocarp annual, resupinate, effused, about 200 μm thick, adnate, membranaceous, pale coloured. Hyphal system monomitic. Hyphae hyaline, cylindrical to torulose, distinct to indistinct, about 2–4 μm wide, with clamps. Basidia distinctly clavate, small, 4-spored, with a basal clamp. Spores hyaline, thin-walled, smooth, small, inamyloid.

SCOPE.—Monotypic.

Amaurohydnum flavidum Jülich, *sp. nov.*

Fructificatio resupinata, effusa, usque ad 20 cm longa, ad 200 μm crassa, membranacea, adnata, ochracea vel flavida, minute hydnoidea; margo alba. Systema hypharum monomiticum. Hyphae hyalinae, cylindricae vel torulosae, 1.5–3.5 μm diametro, tenui-tunicatae vel

basales paulo incrassate-tunicatae, laeves, fibulatae. Cystidia desunt. Basidia hyalina, distincte clavata, 12–14 × 5.3–5.8 μm, fibulata, tetraspora, sterigmata circa 2.5 × 0.8 μm. Sporae hyalinae, ellipsoideae, 3.8–4.2 × 2.4–2.6 μm, tenui-tunicatae, laeves, inamyloideae. Habitat: in ligno Eucalypti. Typus: Australia, Victoria, Warburton, Mt Donna Buang, ±1000 m alt., 2.XI. 1977, *R. A. Maas Geesteranus 15549* (L).

Basidiocarp annual, resupinate, effused, up to 20 cm large, up to 200 μm thick (except the teeth), membranaceous, adnate, separable in small pieces; context homogeneous; hymenial surface ochraceous to yellow, minutely hydnoid, strongly cracked when dry; margin white, indeterminate, thinning out; rhizomorphs and hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, cylindrical to torulose, densely arranged, branching from or near clamps, 2–3 μm wide and thin-walled in subhymenium, slightly thick-walled and 1.5–3.5 μm diam. in trama, smooth; clamps present; contents homogeneous. Cystidia lacking. Basidia hyaline, distinctly clavate, 12–14 × 5.3–5.8 μm, smooth, thin-walled, with clamp, with homogeneous contents, with four subulate sterigmata (c. 2.5 × 0.8 μm). Spores hyaline, ellipsoid, with small apiculus, 3.8–4.2 × 2.4–2.6 μm, thin-walled, smooth, with homogeneous contents, inamyloid.

SUBSTRATE.—On wood of *Eucalyptus*.

DISTRIBUTION.—Australia.

SPECIMEN STUDIED.—AUSTRALIA, Victoria, Warburton, Mt Donna Buang, ±1000 m alt., 2 Nov. 1977, *R. A. Maas Geesteranus 15549* (L).

Amauromyces Jülich, *gen. nov.*

Fructificatio resupinata, effusa, adnata, tenuis, crustata, ceracea, pallide colorata. Systema hypharum monomiticum. Hyphae hyalinae, basales incrassate tunicatae, latae (5–10 μm), fibulatae, parietibus in KOH crescentibus vel solventibus. Cystidia hyalina, incrassate tunicata, fibulata. Basidia hyalina, circa 10–20 μm longa, clavate vel flexuoso-cylindracea, tetraspora, fibulata. Sporae hyalinae, tenui-tunicatae, laeves, ellipsoideae, parvae, inamyloideae. Typus: *Amauromyces pallidus* Jülich.

Etymology: ἀμαυρός — inconspicuous, μυκης — fungus.

Basidiocarp resupinate, effused, adnate, thin, crust-like, ceraceous; hymenial surface pale coloured.

Hyphal system monomitic. Hyphae hyaline, thin-walled in subhymenium, thick-walled and very wide (5–10 μm) in trama, with clamps at all primary septa; wall of basal hyphae swelling and partly dissolving in KOH. Cystidia hyaline, thick-walled, smooth, clamped. Basidia hyaline, about 10–20 μm long, clavate to flexuous-cylindrical, 4-spored, with clamp. Spores hyaline, thin-walled, smooth, ellipsoid, small, inamyloid.

SCOPE.—Up to now monotypic.

The genus is characterized by its very broad and thick-walled basal hyphae, which remind one of *Phanerochaete*. Contrary to that genus clamps are developed at all primary septa. The wall of the basal hyphae swells and dissolves partly in KOH. The basidia are rather small.

Amauromyces pallidus Jülich, *sp. nov.*—Figs. 2, 3a

Fructificatio resupinata, effusa, 30–80 μm crassa, circa 10 cm lata, ceracea, valde adnata, laevis. Systema hypharum monomiticum. Hyphae hyalinae, cylindraceae vel paulo torulosae,

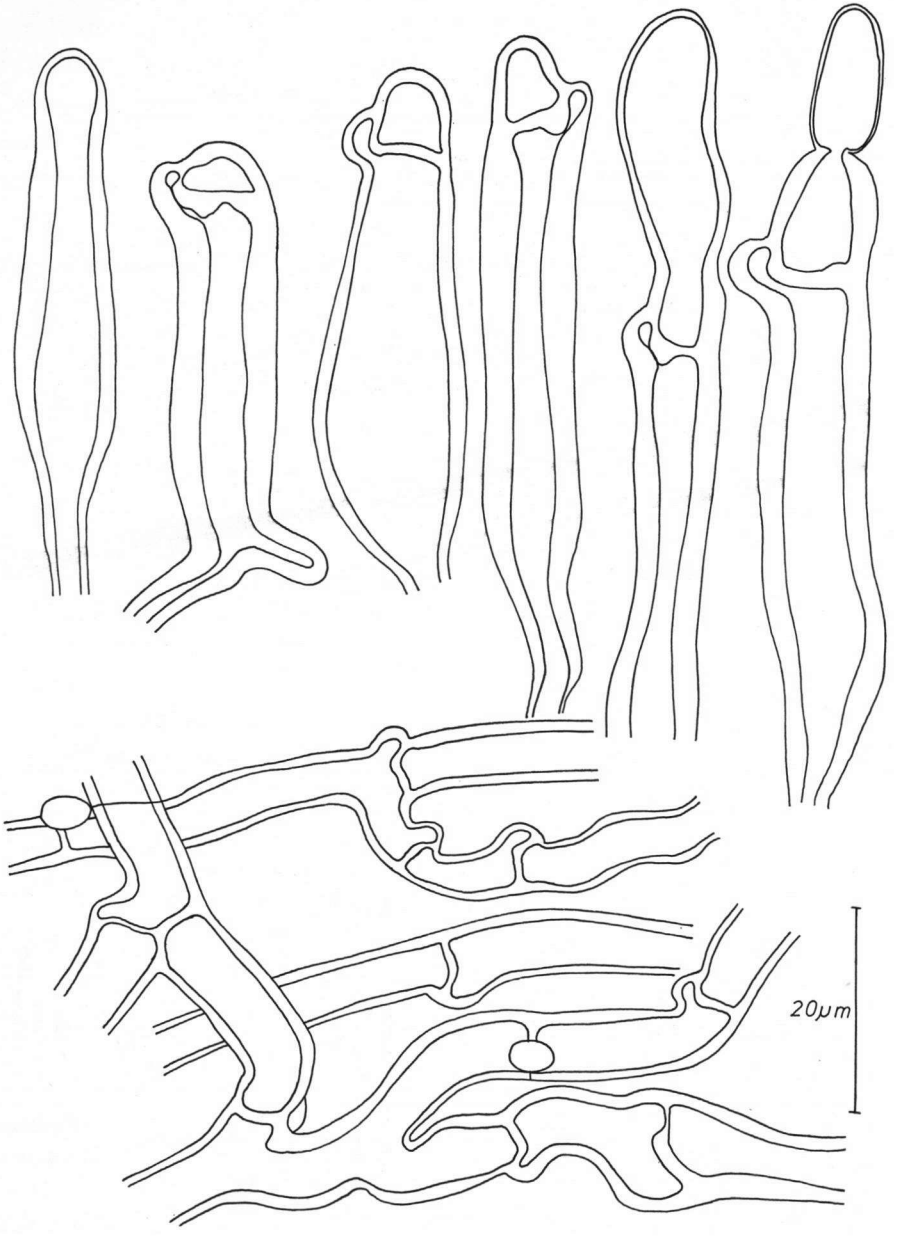


Fig. 2. *Amauromyces pallidus.* — Type: cystidia (above), basal hyphae (below).

fibulatae, basales latae (5–10 μm), parietibus in KOH crescentibus vel solventibus. Cystidia (lamprocystidia) hyalina, plus minusve cylindracea vel clavata, crasse-tunicata, saepe cum septo fibulato in regione apicis, Basidia hyalina, clavata vel flexuoso-cylindracea, tenui- vel incrassate-tunicata, laeves, fibulata, 10–20(–25) × 4.6–5.0 μm. Sporae hyalinae, late ellipsoideae, tenui-tunicatae, laeves, parvae, 3.5–4 × 2.2–2.4 μm, inamyloideae. Habitat: in ligno Eucalypti. Typus: Australia, Victoria, Mt Bride, S. of Warburton, 3.XI.1977, *R. A. Maas Geesteranus 15550* (L).

Basidiocarp annual, resupinate, effused, about 10 cm large, 30–80 μm thick, ceraceous, closely adnate; context homogeneous; hymenial surface pale greyish, even, not cracked when dry; margin concolorous, indistinct, thinning out; rhizomorphs or hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, cylindrical to somewhat torulose, indistinct in subhymenium, densely interwoven in trama, branching from or opposite to clamps, 4–6 μm wide and thin- to slightly thick-walled in subhymenium, 5–8(–10) μm in diam. and thick-walled in trama, smooth; clamps always present, although sometimes difficult to observe; contents homogeneous; walls of basal hyphae strongly swelling (and partly dissolving) in 5–10% KOH, yellow in Melzer. Cystidia (lamprocystidia) present, abundant, of subhymenial origin, mostly cylindrical to clavate, often 2-celled with rather small apical cell delimited by clamped septum, 40–80 × 10–12–16 μm, thick-walled (1–4 μm), smooth (i.e. without crystals) or apical part somewhat scaly; basal clamp probably present; contents homogeneous, in 2-celled stages the plasma often concentrated in the apical cell; protruding up to 30 μm;

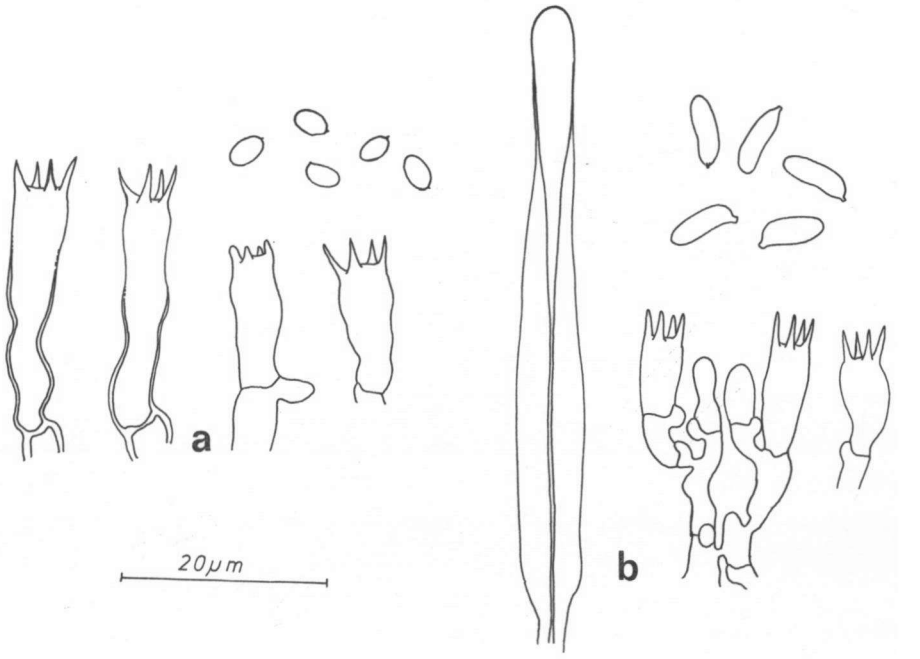


Fig. 3a. *Amauromyces pallidus*. — Type: basidia, spores.
Fig 3b. *Tubulicrinis glebulosus*. — *Maas Geesteranus 15542*: lyocystidium, basidia, spores.

no reaction in Melzer or with cotton blue. Basidia hyaline, clavate or flexuous-cylindrical, 10–20(–25) × 4.6–5.0 μm, in upper part thin-walled, in basal part often somewhat thick-walled, smooth; clamp present; contents homogeneous, with four, subulate sterigmata (c. 4 × 0.8–1 μm). Spores hyaline, broadly ellipsoid, with small apiculus, 3.5–4 × 2.2–2.4 μm, not glued together, thin-walled, smooth, with homogeneous contents, neither amyloid, nor dextrinoid or cyanophilous.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—Saprophytic on wood of *Eucalyptus*.

DISTRIBUTION.—Australia.

SPECIMEN STUDIED.—AUSTRALIA, Victoria, Mt Bride, S. of Warburton, 3 Nov. 1977, *R. A. Maas Geesteranus 15550* (type;L).

The basal hyphae immediately begin to swell in 5–10% KOH, some parts (especially near the clamps) of the hyphal walls becoming almost invisible after several minutes. The swelling of the wall of the lamprocystidia is less conspicuous and only conspicuous after about 30 minutes.

The fungus of the type collection partly overgrows a *Botryobasidium* spec. (probably *B. botryosum*) with similar basal hyphae, which differ in being clampless and strongly cyanophilous.

BOTRYOBASIDIUM BOTRYOSUM (Bres.) J. Erikss.—Fig. 4

Botryobasidium botryosum J. Erikss. *in* Symb. bot. Upsal. **16** (1): 53. 1958.

Basidiocarp annual, resupinate, effused, several cm large, c. 150 μm thick, hypochnoid, adnate, easily separable; context homogeneous; hymenial surface greyish or greyish ochraceous, even, not cracked when dry; margin whitish, indistinct, thinning out; rhizomorphs or hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, cylindrical, loosely arranged, 5–7 μm wide and thin-walled in subhymenium, 5–10 μm in diam, and thick-walled (0.4–1.6 μm) in trama; clamps always lacking; contents homogeneous; walls yellow in Melzer, distinctly cyanophilous in cotton blue. Cystidia lacking. Basidia hyaline, broadly cylindrical to somewhat clavate when mature, more or less ellipsoid when young, 10–15 × 7.5–9 μm, thin-walled, smooth, a basal clamp lacking; contents homogeneous; with six subulate sterigmata. Spores hyaline, fusiform or navicular, with distinct apiculus, 8–10 × 3.5–4 μm, not glued together, thin-walled, smooth, contents guttulate, not amyloid or dextrinoid, slightly cyanophilous.

REACTIONS.—Walls of hyphae and basidia distinctly (spore wall weakly) cyanophilous, but no part of basidiocarp amyloid or dextrinoid.

SUBSTRATE.—In Australia collected on wood of *Eucalyptus*.

DISTRIBUTION.—Temperate regions, Australia.

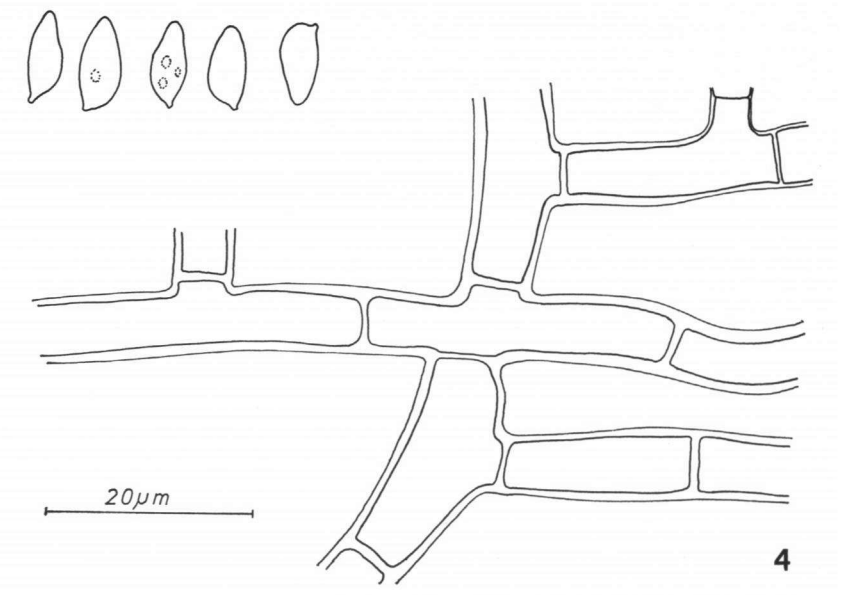
SPECIMENS STUDIED.—AUSTRALIA: Victoria, Warburton, Mt Donna Buang, ±1000 m, 2 Nov. 1977, *R. A. Maas Geesteranus 15546* (L.) — Victoria, Gippsland, Morwell, Morwell National Park, 22 Nov. 1977, *R. A. Maas Geesteranus 15566* (L).

The species delimitation is not quite clear in *Botryobasidium*. The Australian specimens deviate from European material in having somewhat smaller spores and basidia.

This species is not mentioned in Cunningham.

BOTRYOBASIDIUM OBTUSISPORUM J. Erikss.—Fig. 5

Botryobasidium obtusisporum J. Erikss. *in* Symb. bot. Upsal. **16** (1): 57. 1958.



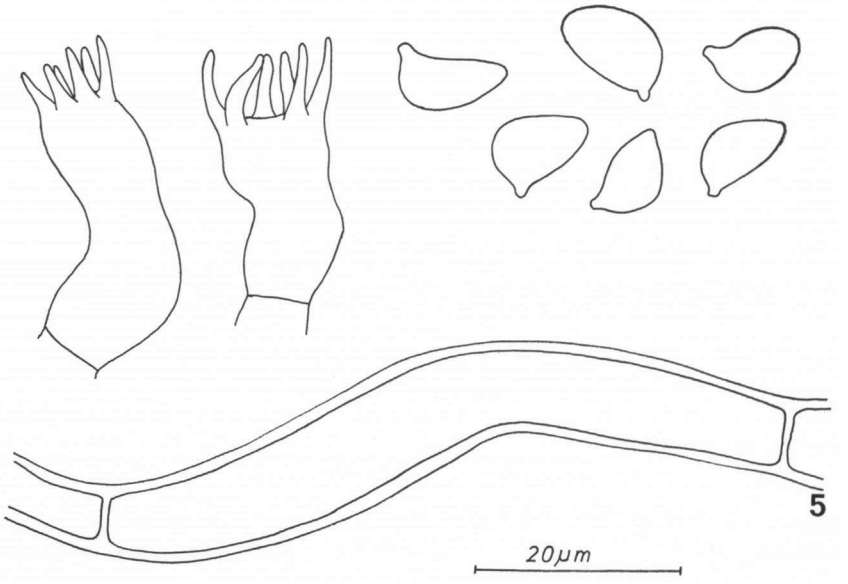


Fig. 4. *Botryobasidium botryosum.* — *Maas Geesteranus 15546*: spores, basal hyphae.

Fig. 5. *Botryobasidium obtusisporum.* — *Maas Geesteranus 15539*: basidia, spores, basal hypha.

Basidiocarp annual, resupinate, effused, several cm large, 150–200 μm thick, hypochnoid, adnate, easily separable; context homogeneous; hymenial surface ochraceous, even, not cracked when dry; margin whitish, indistinct, thinning out; rhizomorphs and hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline (subhymenium) to yellow (trama), cylindrical, loosely arranged, branching at right angles, 5–8 μm wide and thin-walled in subhymenium, 8–10 μm in diam. and thick-walled (0.4–0.8 μm) in trama, smooth; clamps always lacking; contents homogeneous; walls becoming yellow in Melzer. Cystidia lacking. Basidia hyaline, broadly cylindrical when mature, ellipsoid when young, 20–28 × 9–10 μm, thin-walled, smooth, clamp lacking, with six subulate sterigmata. Spores hyaline, obliquely ovoid, with large apiculus, 9–11 × 4.5–6 μm, not glued together, thin-walled, smooth, with homogeneous contents, neither amyloid, nor dextrinoid or cyanophilous.

SUBSTRATE.—In Australia collected on wood of *Eucalyptus*.

DISTRIBUTION.—Europe (type collection), Australia.

SPECIMEN STUDIED.—AUSTRALIA: Victoria, Dom Dom Saddle, ±500 m alt., 7 Nov. 1977, *R. A. Maas Geesteranus 15539* (L).

The spores are slightly wider (4.5–6 μm) than those of the type collection (3.5–5 μm), otherwise there seems to be no difference.

Not mentioned in Cunningham.

CORTICIUM TULASNELLOIDEUM Höhn. & Litsch. —Fig.6

Corticium tulasnelloideum Höhn. & Litsch. *in* Sber. K. Akad. Wiss. Math.-nat. Kl. Wien **117**: 1118. 1908.

SPECIMENS STUDIED.—AUSTRALIA: Victoria, Hurstbridge (Melbourne), on underside of fallen *Eucalyptus* branch, 15 Nov. 1977. *R. A. Maas Geesteranus 15557* (L). — TASMANIA: Launceston, Punch Bowl Reserve, on underside of fallen *Eucalyptus* branch, 13 Nov. 1977, *R. A. Maas Geesteranus 15563* (L).

This species is easily recognized by its small, warted spores, small basidia, clamped hyphae, and the greyish-cream coloured hymenial surface. It is known from Europe, North America, Australia, and New Zealand. Its systematic position is still unclear: according to its spores it should be placed in *Trechispora*, but it forms pleurobasidia, a character separating it from most species of *Trechispora*.

Hyphoderma cinnamomeum Jülich, *sp. nov.*—Fig. 7

Fructificatio resupinata, effusa, molle membranacea, adnata, hymenio cinnamomeo, laeve vel minute odontioideo. Systema hypharum monomiticum. Hyphae hyalinae, cylindraceae, incrassate tunicatae, fibulatae, 4–5 μm latae. Leptocystidia hyalina, tenui-tunicata, subulata, 25–40 × 4–6 μm. Basidia suburniformia, tetraspora, 18–25 × 4.0–5.5 μm. Sporae hyalinae, late ellipsoideae, laeves, tenui-tunicatae, 5.5–5.8 × 3.8–4.0 μm, inamyloideae, Habitat: in ligno Eucalypti. Typus: Australia, Tasmania, Launceston, Punch Bowl Reserve, 13.XI.1977, *R. A. Maas Geesteranus 15561* (L).

Basidiocarp annual, resupinate, effused, about 10 cm large, soft-membranaceous, adnate, separable in small pieces; context homogeneous; hymenial surface cinnamon, even to slightly odontioid (lens!), not cracked when dry; margin pale yellowish-cinnamon, indistinct; rhizomorphs and hyphal strands lacking.

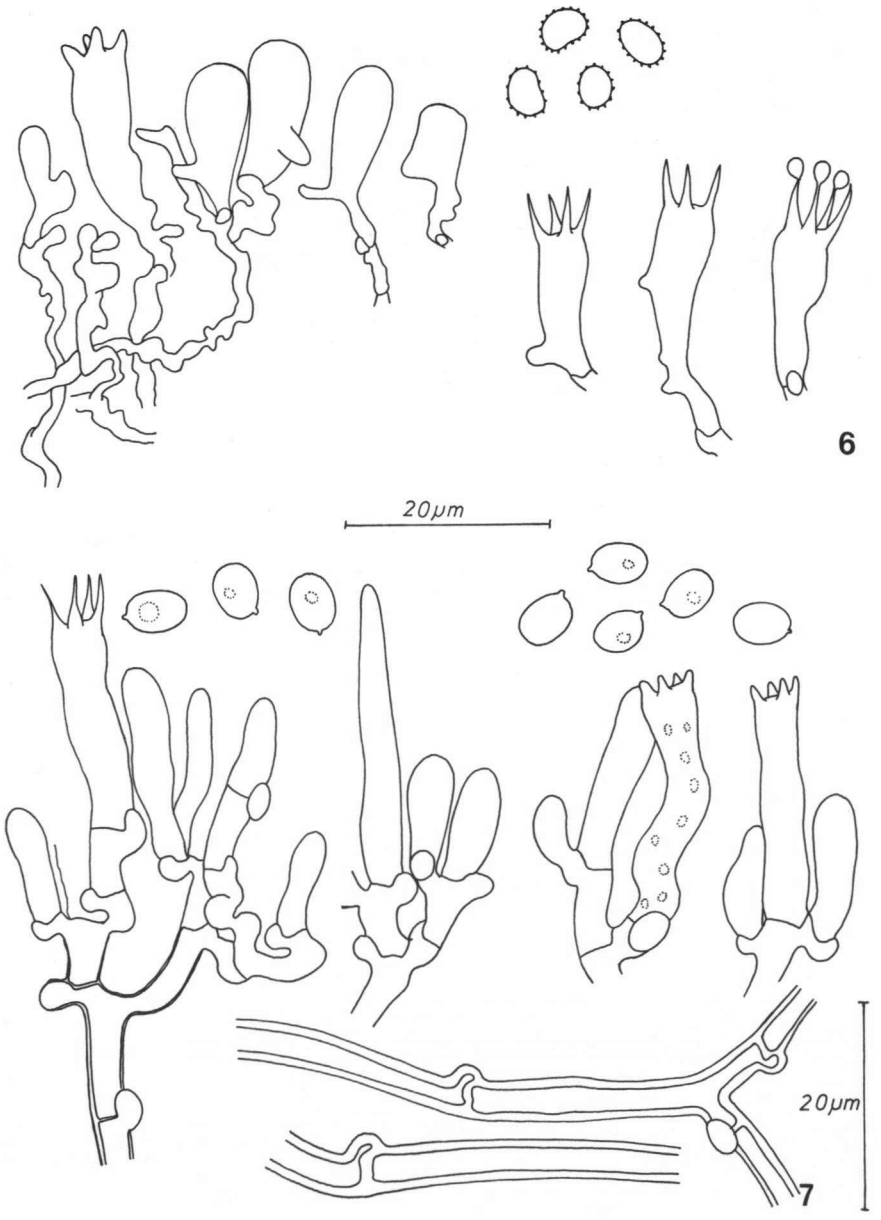


Fig. 6. *Corticium tulasnelloideum.* — *Maas Geesteranus 15557*: basidia, spores.

Fig. 7. *Hyphoderma cinnamomeum.* — Type: leptocystidium, basidia, spores, basal hyphae.

Hyphal system monomitic. Hyphae hyaline, cylindrical, loosely arranged in subhymenium and trama, branching from or opposite to clamps, 4–5 μm in diam., thin- to slightly thick-walled in subhymenium (0.2–0.4 μm), thick-walled in trama (0.5–1.0 μm), smooth; clamps always present; contents homogeneous. Cystidia (leptocystidia) abundant, hyaline, of hymenial origin, subulate, 25–40 × 4–6 μm, thin-walled, smooth; clamp present; contents homogeneous; protruding up to 15 μm. Basidia hyaline, clavate to suburniform when mature, clavate when young, 18–25 × 4.0–5.5 μm, thin-walled, smooth; clamp present; contents homogeneous; with four, subulate sterigmata (4–4.8 × 1–1.2 μm). Spores hyaline, broadly ellipsoid, with small apiculus, 5.5–5.8 × 3.8–4.0 μm, not glued together, thin-walled, smooth, neither amyloid, nor dextrinoid or cyanophilous.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid or cyanophilous.

SUBSTRATE.—Saprophytic on wood of *Eucalyptus* spec.

DISTRIBUTION.—Tasmania.

SPECIMEN STUDIED.—AUSTRALIA, Tasmania, Launceston, Punch Bowl Reserve, 13 Nov. 1977, *R. A. Maas Geesteranus 15561* (type; L).

The species differs from other species of *Hyphoderma* in the colour of the basidiocarp and the rather small spores. The basal hyphae are distinct and somewhat thick-walled like those of *Hyphoderma setigerum* (Fr.) Donk, the generic type of *Hyphoderma*. The mycelium on or in the wood is yellow and reminds one of **Hyphoderma flagellatum** (Cunn.) Jülich, *comb. nov.* (basionym: *Corticium flagellatum* Cunn. 1963, The Thelephoraceae of Australia and New Zealand, p. 52), a species described from New Zealand, differing in microscopical characters.

Lindtneria pellicularis Jülich, *sp. nov.*—Fig. 8

Fructificatio resupinata, effusa, tenuis (c. 50 μm), pellicularis, laevis, pallide ochracea, rhizomorphis tenuissimis (cum 5–10 hyphae). Systema hypharum monomiticum. Hyphae hyalinae, tenui-tunicatae, fibulatae, 5–6 μm latae. Cystidia desunt. Basidia hyalina, clavata, guttulis cyanophilis, 28–32 × 8–9 μm, tetraspora. Sporae hyalinae, globosae, apiculis distinctis, incrassate-tunicatae (0.4 μm), 5–5.6 μm diametro, dense aculeatae, valde cyanophilae (praecipue aculei). Habitat: in ligno Eucalypti. Typus: Australia, Victoria, Mt Bride, S. of Warburton, 3.XI.1977, *R. A. Maas Geesteranus 15551* (L).

Basidiocarp annual, resupinate, effused, several cm large, c. 50 μm thick, pellicular, very loosely adnate, separable, context homogeneous; hymenial surface cream-coloured to ochraceous, even, not cracked when dry; margin whitish, indistinct, thinning out, hyphal strands present, white, very thin, composed of 5–10 hyphae.

Hyphal system monomitic. Hyphae hyaline, cylindrical, loosely arranged in subhymenium and trama, branching from or opposite to the clamps, 5–6 μm in diam., thin-walled throughout, smooth, clamps always present, contents homogeneous. Cystidia lacking. Basidia hyaline, clavate when mature and young, 28–32 × 8–9 μm, thin-walled, smooth; basal clamp present; contents with oily material, part of which stains distinctly blue in cotton blue. Spores hyaline, globose, with prominent apiculus, 5–5.6 μm in diam., somewhat thick-walled (0.4 μm), densely covered with short and thin spines, contents with oil guttules, neither amyloid nor dextrinoid but strongly cyanophilous.

REACTIONS.—Walls of hyphae and basidia yellow in Melzer, spore wall pale brown; the greater part of the 'oil' guttules in basidia and spore wall is distinctly cyanophilous; not other parts of the basidiocarp are amyloid, dextrinoid, or cyanophilous.

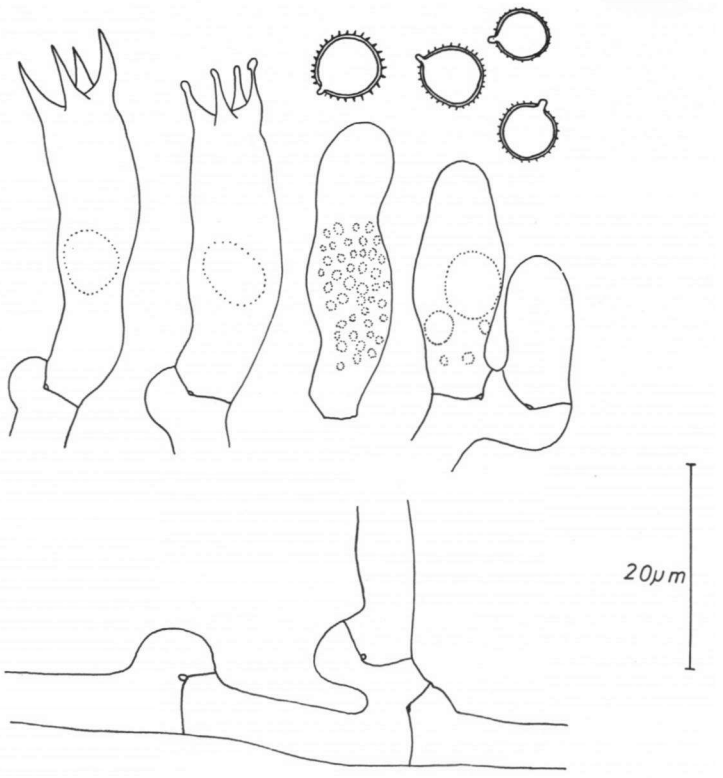


Fig. 8. *Lindtneria pellicularis*. — Type: basidia, spores, basal hyphae.

SUBSTRATE.—Saprophytic on wood of fallen *Eucalyptus*.
DISTRIBUTION.—Australia.
SPECIMEN STUDIED.—AUSTRALIA, Victoria, Mt Bride, S. of Warburton, 3 Nov. 1977, *R. A. Maas Geesteranus 15551* (type; L).

The genus *Lindtneria* has recently been emended by Jülich (1977) to include not only poroid species but also such with a smooth hymenophore. The genus is characterized by its aculeate and strongly cyanophilous spores, the reaction to cotton blue of the guttules in the basidial contents and the mostly soft-membranaceous (pellicular only in *L. pellicularis*) basidiocarp. The genus now comprises five species, three in the northern hemisphere, one in Africa, and now one from Australia. The species may be distinguished as follows:

1a. Hymenial surface smooth 2
b. Hymenial surface poroid 3
2a. Basidiocarp pellicular, with thin hyphal strands; spores globose, 5–5.6 µm in diam.; basidia 28–32 µm long; Australia . . . . . *L. pellicularis* Jülich
b. Basidiocarp membranaceous, hyphal strands lacking; spores ellipsoid, 7–9 × 5.5–6.5 µm; basidia 35–55 × 6–12 µm; Europe . . . . . *L. leucobryophila* (Henn.) Jülich

3a. Spines on spore surface in wing-like crests; Africa . . . . . *L. pterospora* Reid
b. Spines on spore surface separated (except for the hilum region) 4
4a. Spores globose, 6–8 μm in diam.; basidia 25–35×9–12 μm; Europe, North America *L. trachyspora* (Bourd. & Galz.) Pilát
b. Spores ellipsoid, 6–9×5–6 μm; basidia 25–40×8–11 μm; Russia . . . *L. flava* Parm.

MERULIOPSIS CORIUM (Fr.) Ginns

Meruliopsis corium Ginns *in* Can. J. Bot. **54**: 126. 1976.

SPECIMEN STUDIED.—AUSTRALIA: Tasmania, Launceston, Punch Bowl Reserve, on the underside of a fallen *Eucalyptus* branch, 13 Nov. 1977, *R. A. Maas Geesteranus 15556* (L).

This is the most common merulioid fungus growing in temperate to tropical areas. The basidiocarp may be completely resupinate, but is mostly distinctly reflexed. Contrary to many other merulioid fungi the folds remain even after drying. The hymenial surface is cream-coloured or of an orange to medium brown colour. In striking contrast to the colour of the hymenium is the pure white trama. The species is recognized microscopically by its distinct, rather wide, clampless hyphae and the ellipsoid, adaxially slightly depressed and inamyloid spores. This species has often been collected in New Zealand, seldom in Australia.

PENIOPHORA CRUSTOSA Cooke—Fig. 9

Peniophora crustosa Cooke *in* Grevillea **8**: 56. 1879.

Basidiocarp annual, effused up to 10 cm, about 500 μm thick, adnate, ceraceous; context homogeneous or layered; margin determinate; rhizomorphs or hyphal strands lacking; hymenial surface even, pruinose under a lens, whitish to greyish to pale brownish.

Hyphal system monomitic. Hyphae 2–3 μm wide and thin-walled in subhymenium, 2–4 μm in diam. and somewhat thick-walled (0.5–0.8 μm) in trama, more or less cylindrical, branching near septa; clamps lacking; contents homogeneous; with many loosely arranged crystals in trama. Cystidia (lamprocystidia) numerous, of subhymenial origin, thick-walled, heavily incrusted, 40–60×8–14 μm, enclosed or protruding up to 25 μm. Basidia hyaline, narrowly clavate when mature, flexuous-cylindrical when young, thin-walled, (16–)20–25×4–5 μm; clamp lacking; contents homogeneous; with (2–)4 subulate sterigmata (4–4.5×0.8 μm, in two-spored basidia c. 8×1.4 μm). Spores hyaline, ellipsoid, at adaxial side slightly curved, thin-walled, smooth, 6–7.2×2.8–3.4 μm, with small apiculus, with homogeneous contents, neither amyloid, nor dextrinoid or cyanophilous.

SUBSTRATE.—In Australia found on wood of *Eucalyptus*.

SPECIMEN STUDIED.—AUSTRALIA: Victoria, Dom Dom Saddle, ±500 m alt., 7 Nov. 1977, *R. A. Maas Geesteranus 15541* (L).

This species is known from New Zealand (type locality) and Australia and seems to be not rare. It is a typical member of the genus *Peniophora* sensu stricto with its dense hyphal context, heavily incrusted lamprocystidia and narrowly ellipsoid spores.

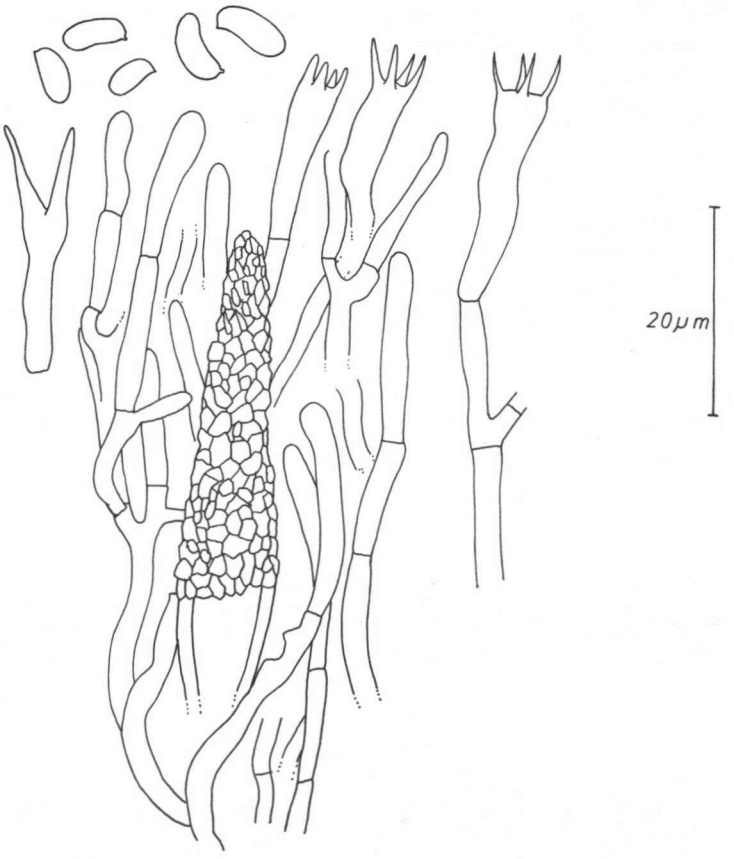


Fig. 9. *Peniophora crustosa.* — *Maas Geesteranus 15541*: lamprocystidium, basidia, spores.

Radulodon calcareus (Cooke & Mass.) Jülich, *comb. nov* —Fig. 10

Hydnum calcareum Cooke & Massee *in* Grevillea **21**: 38. 1892 (basionym).

Basidiocarp annual, resupinate, effused, 15 cm large, 100–200 µm thick (except for the spines), membranaceous, adnate; context homogeneous; hymenial surface greyish, hydnoid, with conical, up to 2 mm long spines; surface of basidiocarp cracked when dry; margin white, determinate; rhizomorphs or hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, more or less cylindrical, loosely arranged in subiculum, densely interwoven but distinct in trama, branching from or opposite to clamps, 3–4 µm in diam., thin-walled in subhymenium, thin- to somewhat thick-walled in trama of spines, smooth; clamps present at all septa; contents homogeneous. Leptocystidia (or gloeocystidia) present, abundant also in the sterile parts of spines, of hymenial origin, hyaline, more or less clavate, in younger parts of hymenium with lateral projections, 50–80 × 8–10 µm, thin-walled, smooth, with clamp always present, with homogeneous contents, enclosed or protruding

up to 20 μm; no reaction in Melzer or with cotton blue. Basidia hyaline, clavate when mature and young, 18–20 × 5–5.5 μm, thin-walled, smooth; clamp always present; contents homogeneous; with four, subulate sterigmata (c. 3.2 × 1 μm). Spores hyaline, broadly ellipsoid, with small apiculus, 4.8–6 × 3.2–4 μm, not glued together, thin-walled, smooth, with homogeneous contents or seldom with some guttules, neither amyloid, nor dextrinoid or cyanophilous.

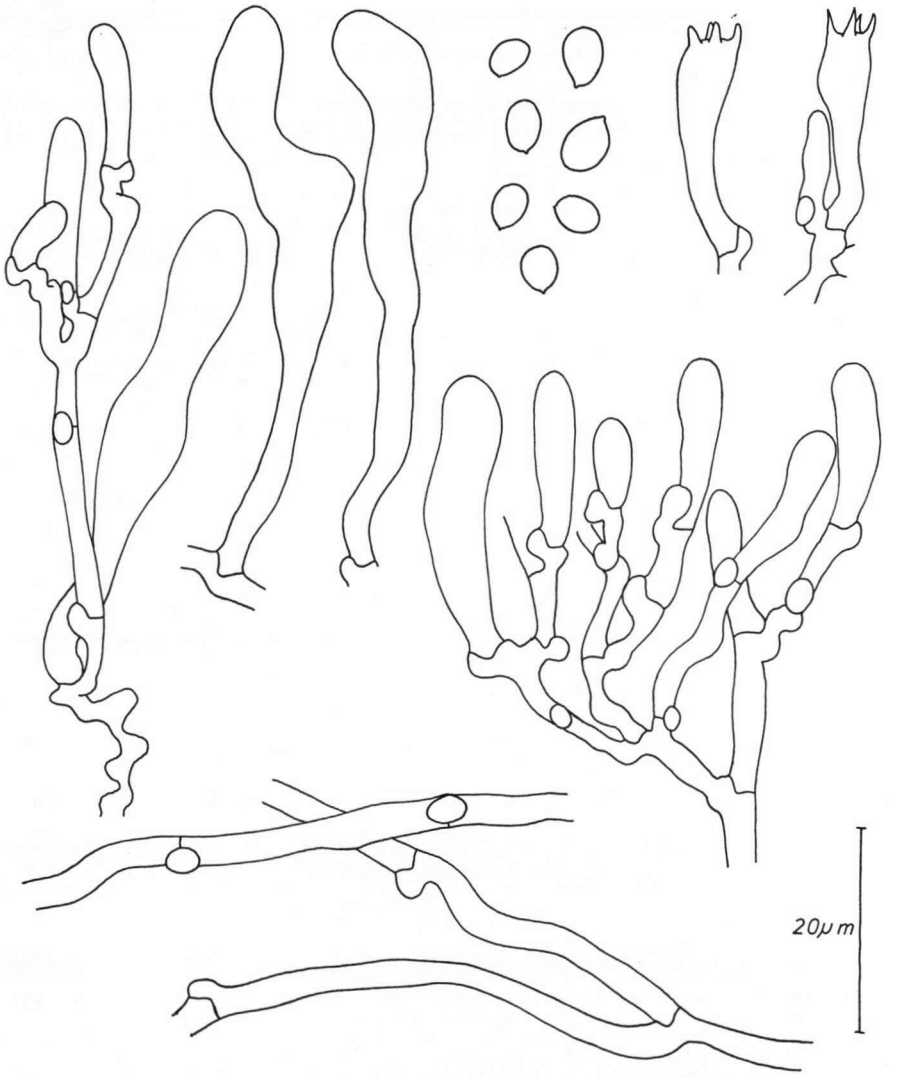


Fig. 10. *Radulodon calcareus*. — *Maas Geesteranus 15552*: gloeocystidia, basidia, spores, basal hyphae.

REACTIONS.—No part of the basidiocarp is amyloid, dextrinoid, or cyanophilous.
SUBSTRATE.—Saprophytic on bark of *Eucalyptus* species.
DISTRIBUTION.—Australia, New Zealand.
SPECIMEN STUDIED.—AUSTRALIA: Victoria, Mt Bride, S. of Warburton, 3 Nov. 1977, *R. A. Maas Geesteranus 15552* (L).

The spores of this species are thin-walled and broadly ellipsoid, whereas other species of *Radulodon* have globose to subglobose and slightly thick-walled spores. The gloeocystidia are very similar to those of *R. erikssonii*.

Resinicium luteum Jülich, *sp. nov.*—Fig. 11

Fructificatio resupinata, effusa, 50–100 μm crassa, membranacea, adnata, flavida, minute odontioidea. Systema hypharum monomiticum. Hyphae hyalinae, cylindraceae vel saepe torulosae, tenui-tunicatae, 1.5–3 μm latae, fibulatae. Cystidia adsunt, tenui-tunicata, clavata, 15–20 × 4–6 μm, cum capite oleifero (usque ad 9 μm in diametro), fibulata. Basidia hyalina, clavata, 12–20 × 4–5 μm, tenui-tunicata, fibulata, tetraspora. Sporae hyalinae, late ellipsoideae, 4.4–5.0 × 2.4–2.5 μm, tenui-tunicatae, laeves, inamyloideae. Habitat: in ligno Eucalypti in silva. Typus: Australia, Victoria, Gippsland, Morwell, Morwell National Park, 22.XI.1977, *R. A. Maas Geesteranus 15572* (L).

Basidiocarp annual, resupinate, effused, several cm large, 50–100 μm thick, soft-membranaceous, loosely adnate, separable; context homogeneous; hymenial surface yellow, not cracked when dry, odontioid; the teeth conical, c. 80–150 μm long; margin whitish, thinning out; rhizomorphs or hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, cylindrical to mostly torulose, loosely or densely arranged in subhymenium, densely arranged in trama, branching from or opposite to clamps, 1.5–3.0 μm in diam., thin-walled, smooth; clamps present at all septa; contents homogeneous. Cystidia present, abundant, especially on spines, hyaline, clavate, 15–20 × 4–6 μm, with globose cap up to 9 μm in diam., thin-walled, smooth, with clamp, protruding up to 15 μm; cap filled with large oil guttules; plasma of cystidial body homogeneous. Basidia hyaline, clavate when mature, flexuous cylindrical to narrowly clavate when young, 12–20 × 4–5 μm, thin-walled, smooth; clamp present; contents homogeneous; with four subulate sterigmata. Spores hyaline, broadly ellipsoid, at adaxial side straight, with small apiculus, 4.4–5.0 × 2.4–2.5 μm, not glued together, thin-walled, smooth, with homogeneous contents, neither amyloid, nor dextrinoid or cyanophilous.

REACTION.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.
SUBSTRATE.—Saprophytic on very rotten wood of *Eucalyptus* species.
DISTRIBUTION.—Known only from Australia.
SPECIMENS STUDIED.—AUSTRALIA, Victoria, Gippsland, Morwell, Morwell National Park., 22 Nov. 1977, *R. A. Maas Geesteranus 15572* (type; L).

The genus *Resinicium* is well characterized by its clavate basidia together with the peculiar cystidia, the cap-like apical part of which is filled with large guttules of oily material. The type species, *R. bicolor*, very common in the northern hemisphere, has also been reported from India and New Zealand. The genus *Resinicium* comprises now four species which can be distinguished as follows:

1a. Hymenial surface even; cystidia rather small, 2–4 μm wide (the cap up to 6 μm); spores 4–5 × 2–3 μm; northern hemisphere . . . . . *R. furfuraceum* (Bres.) Parm.
b. Hymenial surface odontioid to hydnoid 2

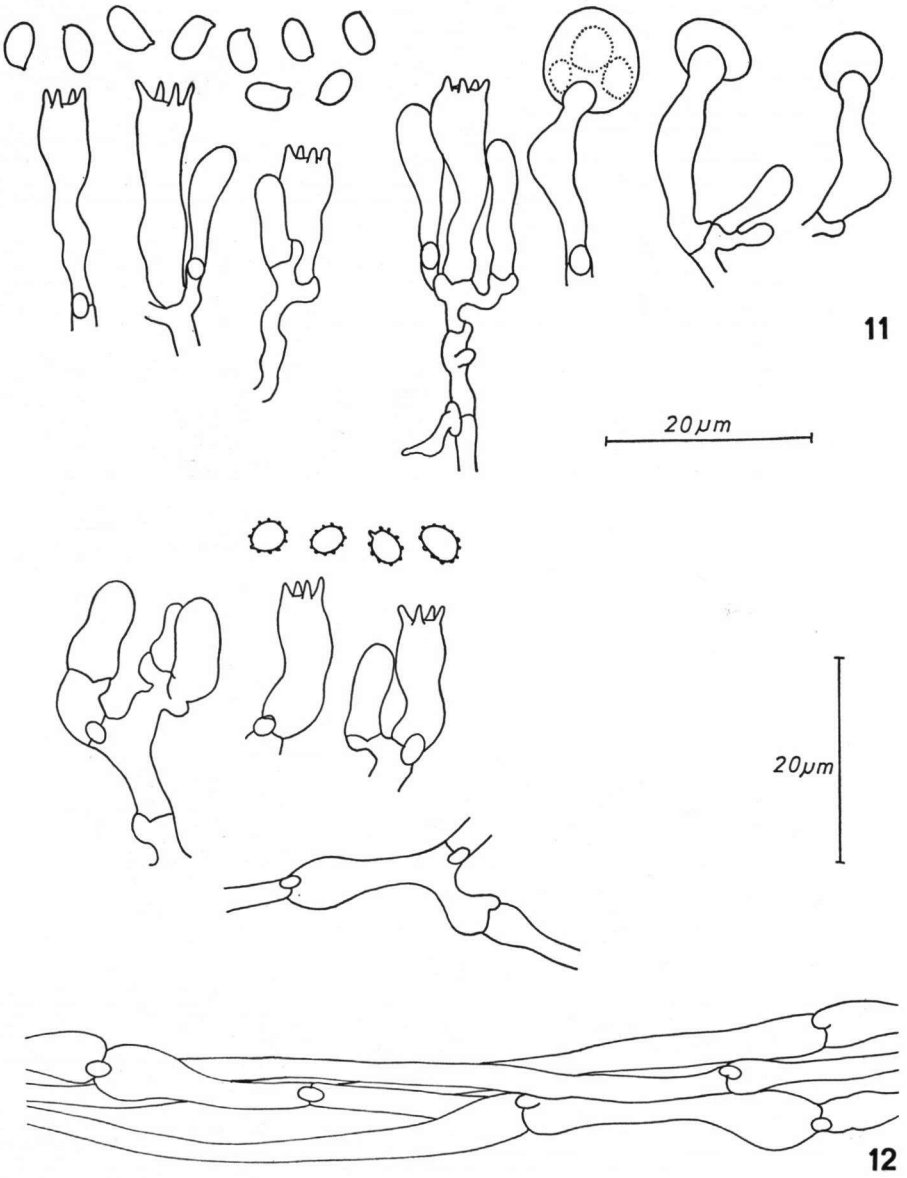


Fig. 11. *Resinicium luteum.* — Type: spores, basidia, cystidia.

Fig. 12. *Trechispora farinacea.* — *Maas Geesteranus 15540*: basidia, spores, hyphal strands.

2a. Hymenial surface distinctly hydnoid; cystidia 3–5 μm wide (the cap up to 9 μm); spores allantoid, 4–7 × 1.5–2 μm; North America . . . *R. chiriahuaense* Gilberts. & Budington
b. Hymenial surface odontioid; spores shorter and broader 3
3a. Hymenial surface whitish to pale cream-coloured; two kinds of cystidia: (*i*) clavate, with oil-filled cap up to 12 μm in diam., (*ii*) small and clavate, with an apical tuft of crystals; spores 4–6 × 2.5–3 μm; northern hemisphere, India, New Zealand *R. bicolor* (Fr.) Parm.
b. Hymenial surface yellow; one type of cystidia: clavate, 4–6 μm wide, with oil-filled cap up to 9 μm in diam.; spores 4.4–5 × 2.4–2.5 μm; Australia . . . . . *R. luteum* Jülich

TRECHISPORA FARINACEA (Pers. ex Fr.) Liberta—Fig. 12

Trechispora farinacea Liberta *in* Taxon **15**: 318, 1966.

Basidiocarp annual, resupinate, effused, several cm large, c. 100 μm thick (except for spines), soft-membranaceous, adnate, easily separable; context homogeneous; hymenial surface ochraceous, even to distinctly hydnoid, with soft, narrowly conical or flattened teeth (up to 2 mm long), not cracked when dry; margin whitish, indistinct, thinning out; rhizomorphs or hyphal strands sometimes present, especially in substrate.

Hyphal system monomitic. Hyphae hyaline, cylindrical, often with ampulliform swellings near septa, in trama often torulose, densely arranged in subhymenium and trama, branching from or near clamps, thin-walled throughout, 3–6 μm in diam. in subhymenium, 1.6–6 μm in diam. in trama; surface smooth; clamps present at all septa; contents homogeneous. Cystidia lacking. Basidia hyaline, clavate to suburniform, some distinctly urniform when mature, clavate when young, 10–16 × 4.5–5 μm, thin-walled, smooth; clamp present; contents homogeneous; with four subulate sterigmata (c. 5.6 × 0.6 μm). Spores hyaline, broadly ellipsoid, with small apiculus, 3.5–4 × 2.8–3.0 μm, not glued together, slightly thick-walled, densely warted, with homogeneous contents, neither amyloid, nor dextrinoid, not or only weakly cyanophilous.

SUBSTRATE.—Saprophytic on all kinds of plant material, in Australia collected on wood of *Eucalyptus*.

DISTRIBUTION.—Known from Europe, North America, Russia, southern parts of South America, West Indies, and West Australia. Not mentioned in Cunningham.

SPECIMENS STUDIED.—AUSTRALIA: Victoria, Dom Dom Saddle, ±500 m alt., 7 Nov. 1977, *R. A. Maas Geesteranus 15540* (L). — Victoria, Gippsland, Bulga National Park, NW of Yarram, 24 Nov. 1977, *R. A. Maas Geesteranus 15573* (L).

TUBULICRINIS GLEBULOSUS (Bres.) Donk—Fig. 3b

Corticium glebulosa Bres., Fungi trident. **2**: 61. 1898. — *Tubulicrinis glebulosus* (Bres.) Donk *in* Fungus **26**: 14. 1956.

Tubulicrinis gracillimus (Ell. & Ev.) G. H. Cunningham, Thelephoraceae of Australia and New Zealand: 141. 1963.

Basidiocarp annual, resupinate, effused, several cm large, c. 100 μm thick, membranaceous, closely adnate; context homogeneous; hymenial surface yellow-ochraceous, even, hairy under a lens owing to long, protruding cystidia, not cracked when dry; margin whitish, indistinct, arachnoid; rhizomorphs or hyphal strands lacking.

Hyphal system monomitic. Hyphae hyaline, cylindrical to mostly torulose, compactly arranged in subhymenium and trama, branching from or near clamps,

2–4 μm in diam., thin-walled in subhymenium, thin- to slightly thick-walled in trama, smooth; clamps present at all septa; contents homogeneous. Cystidia (lyocystidia) present, abundant, of tramal origin, hyaline, cylindrical, 50–120 × 5.5–9 μm, at basal part very thick-walled (up to 3 μm), leaving only a capillary lumen gradually expanding towards thin-walled apex, smooth; clamp probably present; contents homogeneous; protruding, not or only very slightly amyloid; (except outer and inner membrane) rapidly dissolving in 5–10% KOH. Basidia hyaline, clavate when mature and young, 10–14 × 4.5–5 μm, thin-walled, smooth; clamp present; contents homogeneous; with four subulate sterigmata (4–5.5 × 0.7–0.8 μm). Spores hyaline, cylindrical to slightly allantoid, with distinct apiculus, 6–7 × 1.8–2.2 μm, not glued together, thin-walled, smooth, with homogeneous contents, neither amyloid, nor dextrinoid or cyanophilous.

REACTIONS.—Cystidia dissolving in 5–10% KOH; no part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—In Australia found on wood of *Eucalyptus*.

DISTRIBUTION.—Europe, North America, South Africa, Australia, New Zealand.

SPECIMEN STUDIED.—AUSTRALIA: Victoria, Warburton, Mt Donna Buang, ±1000 m alt., 2 Nov. 1977, *R. A. Maas Geesteranus 15542* (L).

Cunningham cites eleven specimens from New Zealand, two from Australia. In the list of substrates he does not mention wood of *Eucalyptus*. The species seems to be widely distributed in temperate and perhaps subtropical areas of both the northern and southern hemisphere.

XYLOBOLUS ILLUDENS (Berk.) Boidin—Fig. 13

Xylobolus illudens Boidin *in* Revue Mycol. **23**: 341. 1958.

SPECIMENS STUDIED.—AUSTRALIA: Victoria, Warburton, Mt Donna Buang, on wood of fallen *Eucalyptus*, ±1000 m alt., 2 Nov. 1977, *R. A. Maas Geesteranus 15543, 15544* (L).

The species can be distinguished from other species of *Stereum* and *Xylobolus* by the effuso-reflexed (seldom resupinate and then only in young stages) basidiocarps, dimitic hyphal system, yellow hyphae, presence of acanthophyses and at the same time absence of gloeocystidia and/or vesicles in the trama, and strongly amyloid spores. The basidiocarp is more or less brown and resembles a *Hymenochaete*; the hymenial surface is greyish to violaceous.

The well developed specimen depicted by Cunningham shows (apart from some clavate hyphal endings) two distinct elements in the hymenium, viz. acanthophyses and basidia. In young specimens, however, the hymenium appears to be built up only of acanthophyses, the basidia being formed at a much later stage. In an intermediate stage as depicted here acanthophyses are found, the apical part of which has grown out to form (2–)4 sterigmata and the same number of spores. Thus the thin-walled apical part of a basidium is found to surmount a thick-walled, spiny acanthophyse. This phenomenon of such sterile hymenial structures like acanthophyses or dendrophyses growing out in young specimens to form basidia and spores is also known in some species of *Aleurodiscus* and *Pulcherricium caeruleum* (Jülich 1974).

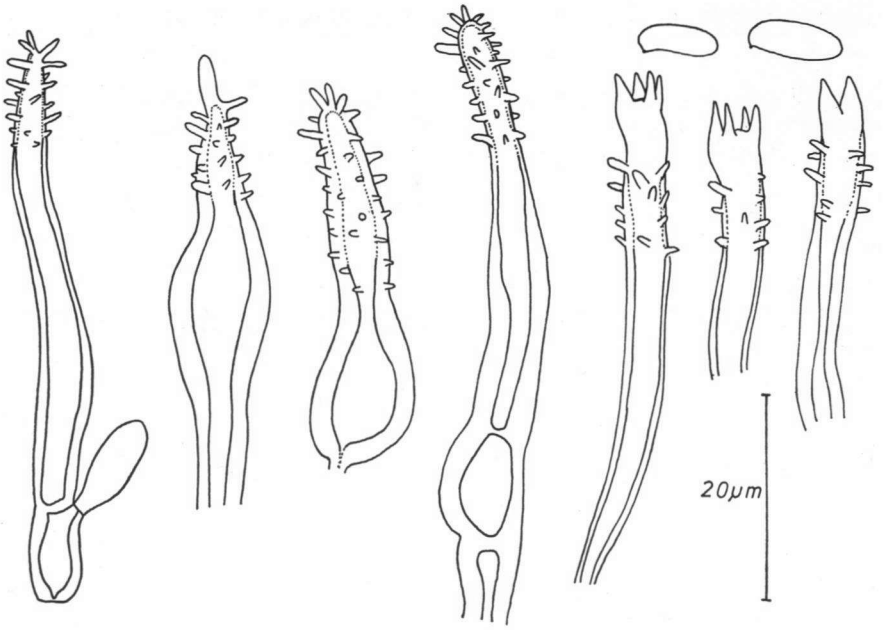


Fig. 13. *Xylobolus illudens*. — *Maas Geesteranus 15544*: acanthophyses, basidia, spores.

This then seems to be the normal development: first a hymenium made up only of acanthophyses, some of which later grow out apically to form basidia, and in fully mature specimens many basidia, all thin-walled throughout and originating from side-branches of the hyphae or acanthophyses.

The type locality of *X. illudens* is Swan River, West Australia. It has been collected many times in Australia, Tasmania, and New Zealand.

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