

The Corticiaceae of North Europe

by

John Eriksson and Leif Ryvarden

with drawings by

John Eriksson

Volume 2

Aleurodiscus – Confertobasidium

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New taxa and combinations proposed in this volume.

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The Corticiaceae of North Europe by John Eriksson and Leif Ryvarden with drawings by John Eriksson. Volume 2, *Aleurodiscus* to *Confertobasidium*. Printing date: October 16, 1973.

Aleurodiscis Rabenh. ex Schroet. in Cohn
Krypt.-Fl. Schles. 3:429, 1888.

Syn.: *Acanthophysellum* Parm.
Acanthophysium (Pil.) Cunn.

Fruitbodies of variable appearances, discomycete-like, corticioid or stereoid. Margin variable, in some species distinctly delimited and \pm reflexed, in others not differentiated. The genus is primarily characterized by microscopic characters and the fruitbodies are not always recognized on sight. Spores always amyloid, smooth or ornamented (warted or echinulate), and medium (7-10 μ m long) to large (very large compared with most other genera of Corticiaceae). Basidia medium to large, with four prominent sterigmata. Besides basidia, the hymenium includes numerous sterile elements, such as acanthophyses, dendrohyphidia, pseudocystidia and paraphyoid hyphae. The pseudocystidia (also called gloecystidia) are thin-walled and \pm moniliform at the apex, and their protoplasm darkens in sulfovanillin (aldehyde-reaction).

Genotypus: *A. amorphus* (Fr.) Schroet.

The large amyloid spores and the characteristic sterile hymenial elements are the delimiting characters against other genera.

Lemke (1964) regards the hymenium as a catahymenium. At least for some species this is disputable. *A. cerussatus*, *A. lapponicus* and *A. lividocoeruleus* have a typical euhymenium, i.e., the basidia are developed in, or close to the surface of the fruitbody and when fully developed they form a coherent hymenium together with the other hymenial elements. Even for the remaining species it seems questionable to regard the hymenium as a catahymenium, if this term is to be of any value.

Even within Lemke's restricted concept of the genus it is doubtful if *Aleurodiscus* is sufficiently uniform. Species such as the mentioned *A. lapponicus*, *A. lividocoeruleus* and *A. cerussatus* (the latter have not yet been recorded in Fennoscandia) deviate from the more typical species because of their smooth, medium-sized spores and fruitbodies with normal hymenial thickness growth. In these characters they are close to *Gloeocystidiellum*. However, the occurrence of acanthophyses is decisive for the generic delimitation. It may be discussed whether it would be better to separate the species concerned into a genus of their own, (*Acanthophy-*

Aleurodiscus

sellum Parm.) between *Aleurodiscus* and *Gloeocystidiellum*. Having all *Aleurodiscus* and *Gloeocystidiellum* species in one genus raises greater and more difficult problems.

Corticium hiemale Laur. has not amyloid spores, but is otherwise similar to *Aleurodiscus* (large spores and basidia, similar shape of basidia, and sterile hyphal elements in the hymenium). The species was transferred to *Radulomyces* by Parmasto (1968), but has recently been transferred to a genus of its own, viz. *Globulicium* Hjortstam (Sv. bot. tidsskr. 67: 108, 1973).

Key to species

- | | | |
|----|--|-----------------------------|
| 1. | Spores warted or echinulate | 2 |
| 1. | Spores smooth | 5 |
| 2. | Fruitbodies rounded, discomycetelike, \pm ochraceous to orange-red, on branches of <i>Picea</i> and <i>Abies</i> | 1.A. <i>amorphus</i> |
| 2. | Fruitbodies more irregular, not discomycete-like, not on <i>Picea</i> or <i>Abies</i> | 3 |
| 3. | Acanthophyses present, moniliform cystidia present distinctly yellowish in Melzer's solution, small fruitbodies on dead branches of <i>Calluna vulgaris</i> . . | 8.A. <i>norvegicus</i> |
| 3. | Acanthophyses not present, moniliform cystidia not yellow in Melzer's solution | 4 |
| 4. | Moniliform cystidia of even thickness, fruitbodies greyish to white, <i>Stereum</i> -like with reflexed margin, on trunks of live <i>Quercus</i> sp. | 4.A. <i>disciformis</i> |
| 4. | Moniliform cystidia ovoid, fruitbodies yellowish, <i>Corticium</i> -like and adnate, on dead branches of <i>Rubus</i> , <i>Rosa</i> and <i>Taxus</i> | 2.A. <i>aurantius</i> |
| 5. | Fruitbodies \pm bluish, <i>Corticium</i> -like, on dead coniferous wood, spores about $7.5 \times 3\mu\text{m}$. . . | 7.A. <i>lividocoeruleus</i> |
| 5. | Fruitbodies light-coloured, white to greyish | 6 |
| 6. | Fruitbodies discomycete-like with slightly reflexed margin, on thin branches of <i>Picea</i> , spores ovoid, about $15 \times 8\mu\text{m}$ | 5.A. <i>fennicus</i> |
| 6. | Fruitbodies <i>Corticium</i> -like, effused and adnate, on branches and dead wood of <i>Salix</i> , <i>Betula</i> and <i>Juniperus</i> , in the subalpine zone, spores ellipsoid, about $10 \times 6\mu\text{m}$ | 6.A. <i>lapponicus</i> |

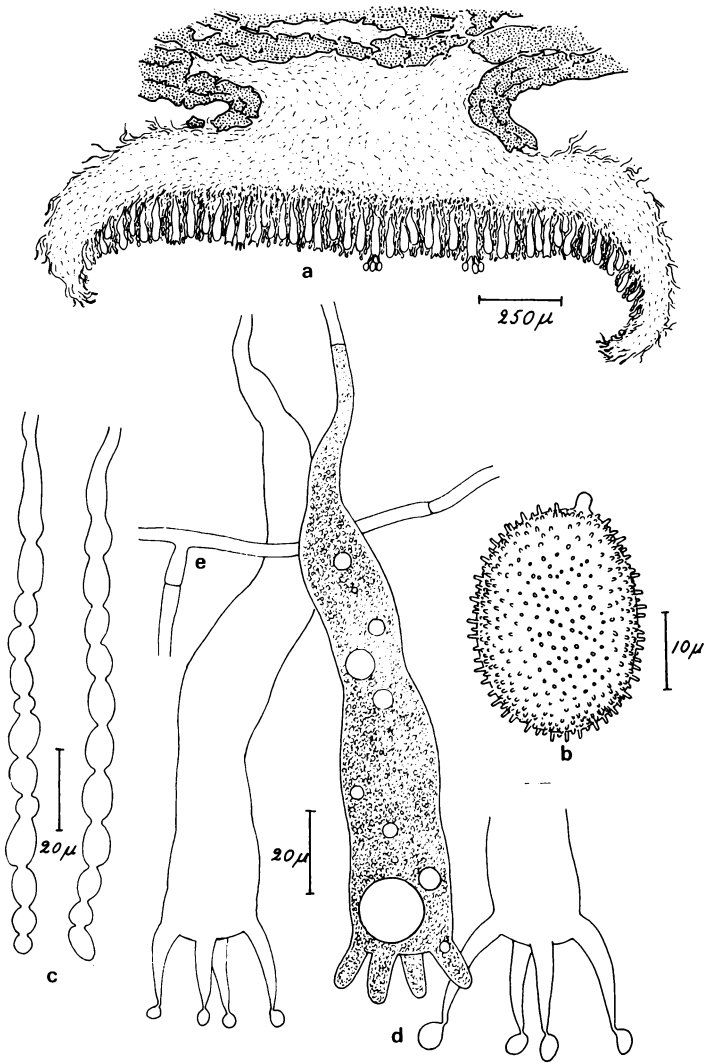


Fig. 21. *Aleurodiscus amorphus*. a) vertical section of fruitbody b) spore c) moniliform cystidia d) basidia e) hyphae. — Jeppson 22-1-1972 (herb. Eriksson).

Aleurodiscus

1. **Aleurodiscus amorphus** (Fr.) Schroet. Krypt.-Fl.
Schles. 3: 429, 1888. — *Thelephora amorphia* Fr.
Elench. fung. 1: 183, 1828.

Fig. 21
Pl. 1A, 4A, B

Fruitbody flat and rounded, slightly convex and discomycete-like, (0,5 — 1 mm thick), diameter 1 — 5 cm, edge narrow and distinctly determinate. Hymenial surface ochraceous, pinkish grey to orange-red. Consistency of mature fruitbodies firm, subcoriaceous.

Hyphal system monomitic with simple septate hyphae, 2-4 μm wide, in an open texture of distinct hyphae.

Basidia very large, about 100 x 25 μm or even larger, with four sterigmata, 15-25 μm long.

Paraphysoid hyphae present between the basidia, moniliform (like a string of pearls) and not projecting.

Spores subglobose to broadly ellipsoid, about 20 x 25 μm , amyloid, densely covered with fine, cylindrical to slightly conical and abruptly cut (not tapering) spines.

Habitat. Common on branches of *Abies* sp., but in Fennoscandia mainly on *Picea abies*. Usually it grows on nearly or recently dead, but still attached lower branches. The fruitbodies are annual, developing during humid periods, in S. Scandinavia usually in the winter-season.

Distribution. Locally common, but usually more or less rare, may be overlooked. During the last years it has been repeatedly collected on *Picea* in Västergötland and Dalsland (Sweden), leg. Linda Andersson and others.

Remarks. The discomycete-like appearance and the large, echinulate spores make *A. amorphus* easily recognized.

The small parasite *Tremella simplex* Jacks. & Martin is very often found on the hymenium.

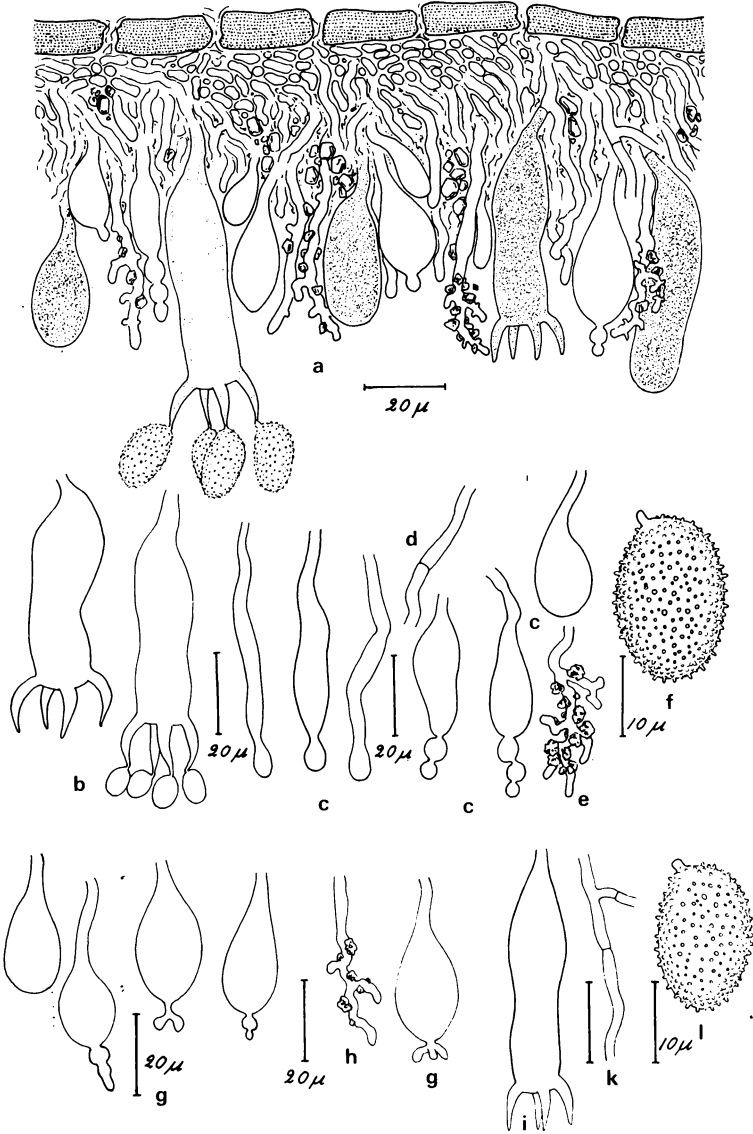


Fig. 22. *Aleurodiscus aurantius*. a) vertical section of fruitbody b,i) basidia c,g) pseudocystidia d,k) hyphae e,h) dendrohyphidia f,l) spores. — a-f Eriksson 1526, g-l Jørstad (on *Taxus baccata*).

Aleurodiscus

2. **Aleurodiscus aurantius** (Fr.) Schroet. Krypt. F-Fl. Fig. 22, Pl. 1B
Schles. 3:429, 1888. — *Thelephora aurantia* Fr., Syst.mycol.
1: 445, 1821.

Fruitbody effused (corticoid), usually smooth, without distinctly developed margin, closely adnate, 0,1 – 0,3 mm thick, palish with orange tinges, consistency subcoriaceous.

Hyphal system monomitic with simple septate, thinwalled hyphae, 2,5 – 4 μ m in diameter in an open texture.

Basidia about 60 x 15 μ m with four sterigmata approximately 15 μ m long.

Cystidia (pseudocystidia) present, variable in shape, narrowly paraphysoid with rounded apex, or wider and more rounded, tapering basally to a long shaft with a \pm moniliform apex, or even smooth to simply tapering. The protoplasm is yellowish (darkens in sulfovanillin) which makes it easy to separate the cystidia from the basidia.

Dendrohyphidia present and numerous, richly branched and covered with crystals — in some cases so abundantly that they are more or less hidden behind the crystal-layer.

Spores ellipsoid to subglobose, about 20 x 13 μ m, amyloid, finely echinulate.

Habitat. Usually on species of the Rosaceae, but also known from *Taxus*.

Distribution. A rare southern species recorded only a few times in Scandinavia: in Sweden from Båstad (on *Rosa*), in Norway from Solum and Jondal (on *Taxus*) and in Denmark from Skarup (on *Rubus*).

Discussion. The specimens from *Taxus* are somewhat different, being slightly thinner, with smaller, more numerous cystidia and fewer branched dendrohyphidia. These specimens may perhaps be regarded as a variety. Laurila's report from Finland (1939) of *A. aurantius* was based on a specimen of *Peniophora erikssonii*, which on sight is similar, but microscopically totally different.

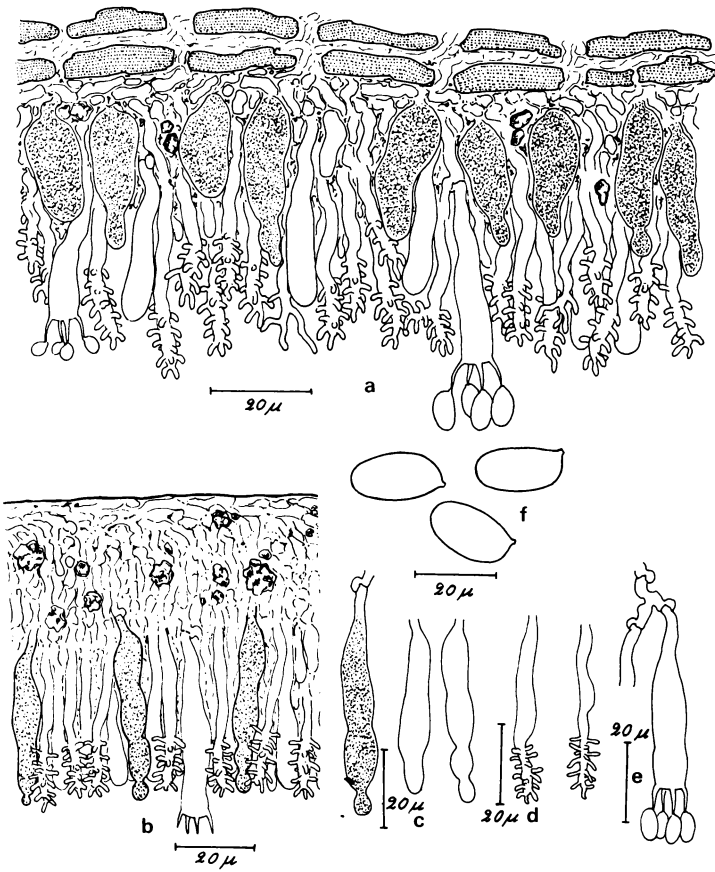


Fig. 23. *Aleurodiscus cerussatus*. a,b) vertical sections of fruitbodies c) pseudo-cystidia d) acanthohyphidia e) basidium f) spores. — a Bresadola (Gocciadoro, 1893), b-f type specimen.

Aleurodiscus

3. **Aleurodiscus cerussatus** (Bres.) v. Höhn. & Litsch. Fig. 23
 K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 116:807, 1907.
 — *Corticium cerussatum* Bres., Fung. Trid.II: 37, 1892.

Fruitbody corticioid, smooth, 0.05 – 0.2 mm thick, without distinct margin, whitish when young, darkening with age from yellowish to greyish, more or less ochraceous when dry. Consistency subcoriaceous to crustose.

Hyphal system monomitic with clamped, thinwalled hyphae, 2–4 μm in diameter.

Basidia about 40 – 50 x 7 – 8 μm , with four sterigmata.

Cystidia (pseudocystidia) numerous, more or less of the same size as the basidia, variable in form, but usually with a more or less moniliform apex. The protoplasm is colourless or slightly yellowish and finely granulate.

Acanthophyses numerous, with apical protuberances.

Spores about 10 x 6 μm , ellipsoid to subcylindrical, smooth and amyloid.

Distribution. Not recorded for Fennoscandia, known from Central and Southern Europe and North America.

Discussion. *A. cerussatus* is very close to *A. lapponicus* and is primarily distinguished from the latter by the far more prominent acanthophyses. For discussion see *A. lapponicus*.

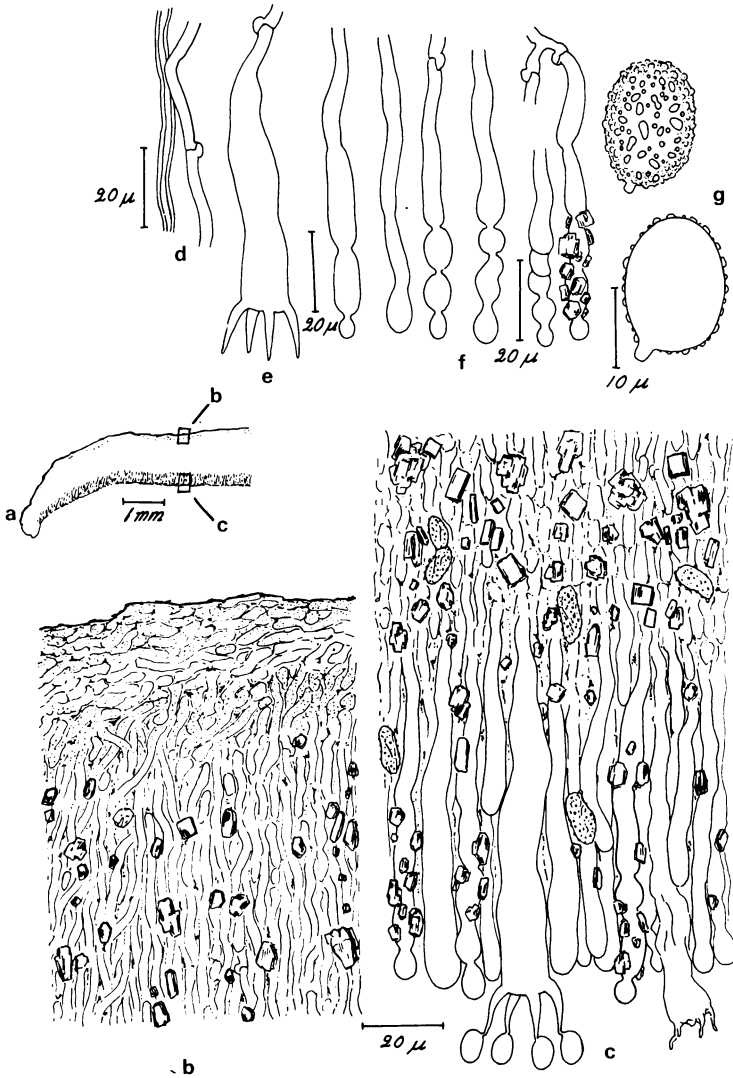


Fig. 24. *Aleurodiscus disciformis*. a) vertical section of fruitbody, showing the positions of sections b and c b) section through lower part of fruitbody c) section through part of hymenium d) hyphae e) basidium f) moniliform cystidia g) spores. — Gilsenius (Rossared 1971).

Aleurodiscus

4. *Aleurodiscus disciformis* (Fr.) Pat.

Bull.Soc. Mycol. Fr. 10:80, 1894. — *Thelephora disciformis* Fr., Syst. mycol. I: 443, 1821.

Fig. 24

Pl. 1C, 4C, D

Fruitbody *Stereum*-like, with the margin slightly loosened from the substrate, usually a few centimeters in diameter, more rarely coalesced into larger fruitbodies 1 – 1,5 cm thick. Hymenial surface more or less finely tuberculated, when dry often cracked, whitish to light grey, sometimes with yellow tinges. Consistency dense and hard.

Hyphal system monomitic with clamped, thin- to thickwalled hyphae, 2,5 – 3,5 μm in diameter. The hyphae in the basal layer have thickened walls and the clamps can be difficult to demonstrate. These hyphae may superficially be called skeletal.

Basidia about 75 x 10 μm , with four sterigmata.

Spores about 15 – 17 x 10 – 12 μm , amyloid, subglobose to ellipsoid, covered with rounded irregular warts (not spines as in *A. amorphus*).

Cystidia of about the same size as the basidia, paraphysoid with a moniliform apex, usually abundantly covered with crystals. No acanthophyses or dendrohyphidia present.

Habitat. On trunks of old *Quercus*, often 1 – 5 m above the ground, usually in southernly exposed, locally warm and sheltered localities.

Distribution. Southern species in Fennoscandia, in Sweden scattered in the S.W. part, locally common in the area around Göteborg, also known from Hunneberg and Halleberg (Västergötland) and Värmdö off Stockholm and in Denmark from Panhule skov (Sønder-Jylland). In Norway known only from Bamble in Telemark. The species seems to be favoured in costal areas, at least in Fennoscandia.

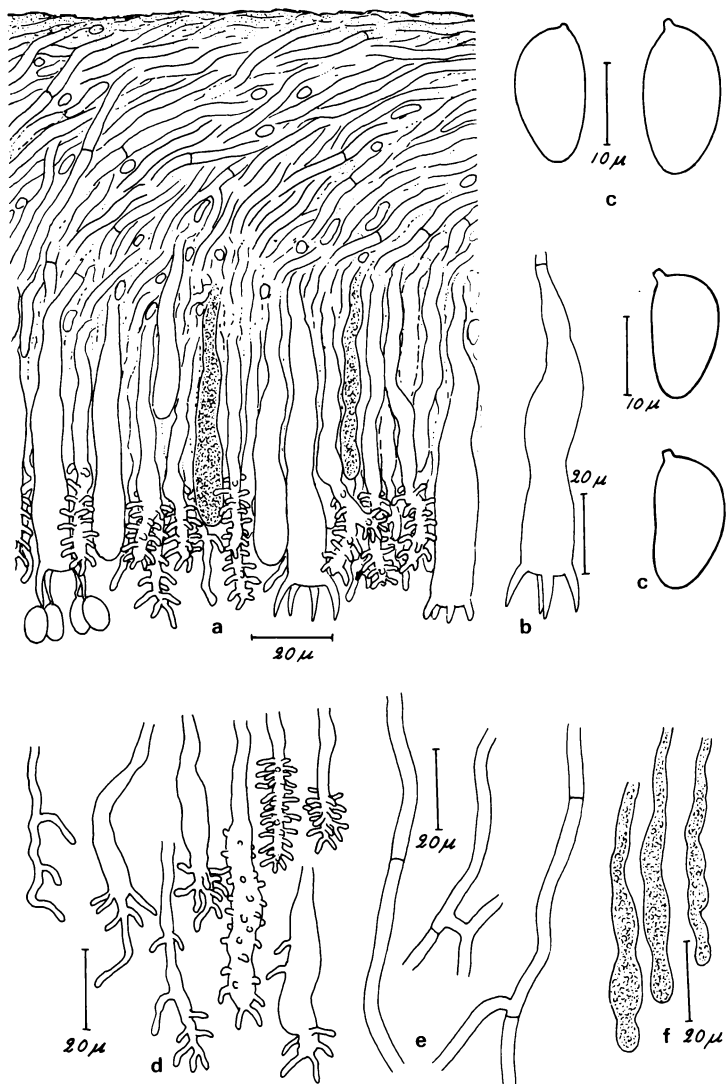


Fig. 25. *Aleurodiscus fennicus*. a) vertical section of fruitbody b) basidium
 c) spores d) acanthohyphidia and dendrohyphidia e) hyphae f) pseudocystidia.
 — Type specimen.

Aleurodiscus**5. *Aleurodiscus fennicus* Laur.**

Fig. 25, Pl. 2A

Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo 10,4:11, 1939.

Fruitbody rounded (almost discomycete-like) or effused to more irregular bodies, usually small, rarely more than 1 cm in diameter and up to 0,5 mm thick. The edge is sharp and somewhat reflexed, narrow, white and finely tomentose (lens!). Hymenium smooth, pale grey to greyish-rose. Consistency soft in young fruitbodies, firmer with age.

Hyphal system monomitic with intertangled, thinwalled and simple septate hyphae, 2 – 3,5 μm in diameter in an open texture.

Basidia 60 – 70 x 10 – 12 μm with four large sterigmata. The protoplasm is distinctly refractive in phase-contrast (as are the spores).

Acanthophyses very abundant, apically with numerous protuberances, in some cases somewhat more irregular and in extreme cases almost like dendrohyphidia.

Cystidia scattered, simple and paraphysoid in shape.

Spores ovoid, smooth and amyloid, about 15 x 8 μm .

Habitat. On dry and apparently quite thin (2 – 10 mm) branches of *Picea abies*.

Distribution. Very rare, recorded once in Sweden (Umeå) and once in Finland (Kankaanpää). and a few times in North America.

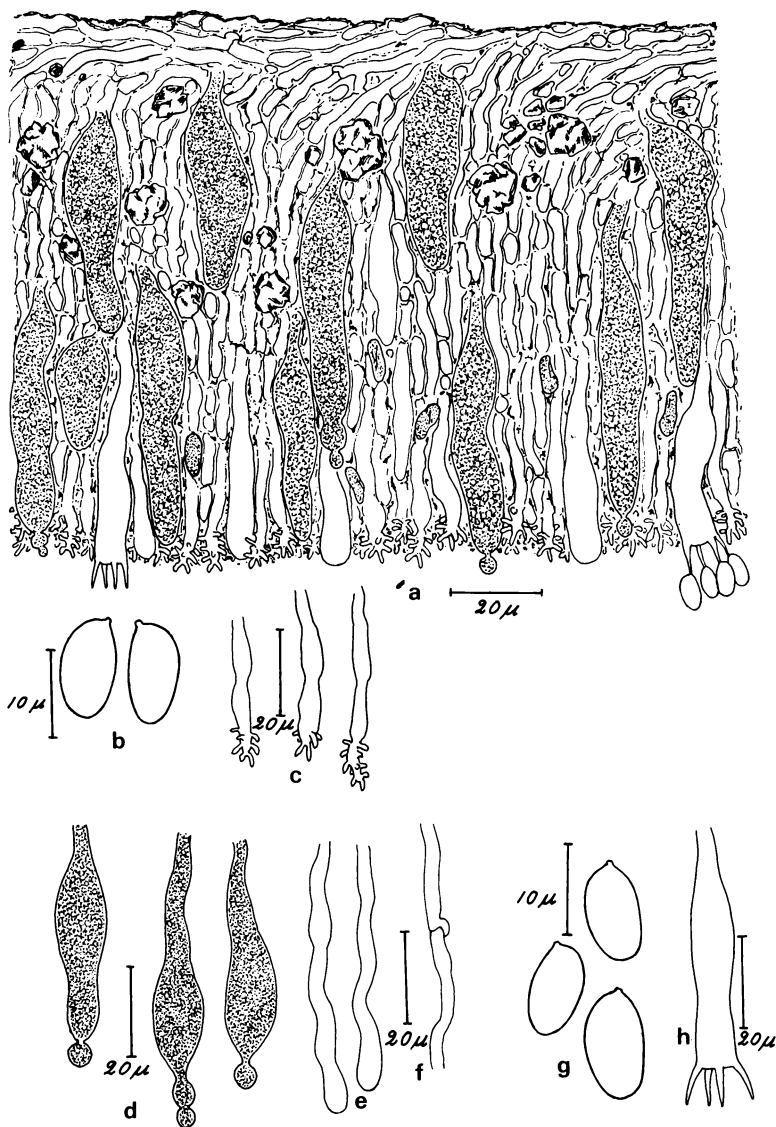


Fig. 26. *Aleurodiscus lapponicus*. a) vertical section of fruitbody b) spores c) acanthophyphidia d) pseudocystidia e) paraphysoid hyphae f) hyphae g) spores h) basidium. — a-c Eriksson 8815, d-h Ryvarden 7184.

Aleurodiscus

6. *Aleurodiscus lapponicus* Litsch.

Fig. 26, Pl. 2B, C

Ann. mycol. 42:11, 1944.

Fruitbody corticioid, variable but usually as longitudinally extended patches on the wood, often not more than about 1 cm long and 2 – 4 mm wide, more rarely coalesced into larger fruitbodies. Margin without distinct characters. Hymenial surface smooth to finely verrucose, greyish to ochraceous buff, when dry usually finely cracked or rimose. Consistency subcoriaceous to crustose.

Hyphal system monomitic with thinwalled, hyaline and narrow (2 – 4 μm) generative hyphae with clamps, usually in a dense structure.

Basidia clavate and scattered, about 60 x 10 μm , with four sterigmata.

Acanthophyses abundant, basally smooth, apically with numerous protuberances.

Cystidia (or pseudocystidia) usually numerous, embedded, up to 80 μm long, frequently moniliform at the apex, thin-walled, smooth, content granular. Paraphysoid hyphae often present.

Spores ellipsoid, thinwalled, hyaline, smooth and amyloid in Melzer's reagent, about 10 – 12 x 6 – 7 μm .

Habitat. Usually on dry, hard and naked wood, preferably on *Salix* spp., but also noted from *Betula* and *Juniperus*. On dry grey branches quite conspicuous and recognizable to the naked eye. It is also known from bark, but then more coalescing and more like *A. cerussatus*.

Distribution. Scattered and rare in the south-eastern continental part of Norway; in Sweden rare, except for Abisko National Park in Torne Lappmark where it is quite common. Not known from Finland and Denmark.

Discussion. *A. lapponicus* is closely related to *A. cerussatus* and the only character separating the two species seems to be the acanthophyses, which are slightly larger and more prominently spiny in *A. cerussatus* than in *A. lapponicus*. The former is not known from Fennoscandia and *A. lapponicus* may perhaps be interpreted as a boreal subalpine ecotype of *A. cerussatus*.

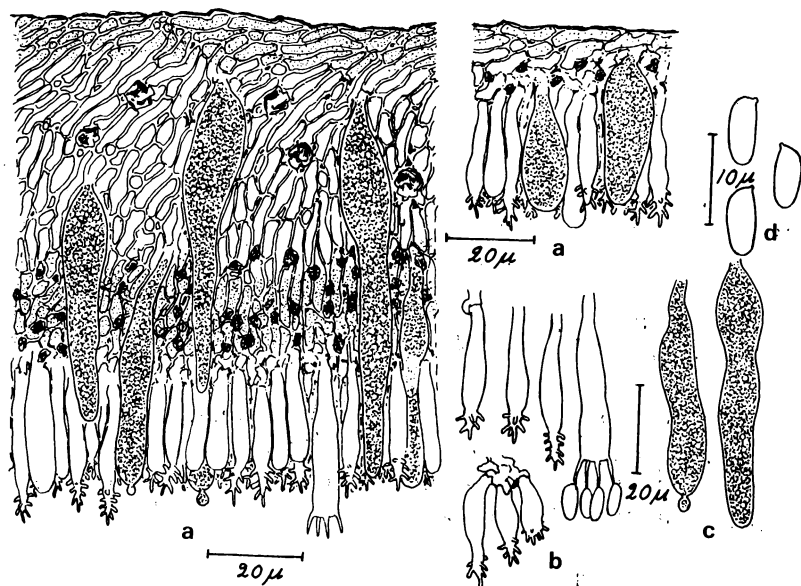


Fig. 27. *Aleurodiscus lividocoeruleus*. a) vertical sections of young and old fruitbodies b) acanthohyphidia and basidium c) pseudocystidia d) spores.
 — Eriksson 1352.

Aleurodiscus

7. **Aleurodiscus lividocoeruleus** (Karst.) Lemke Fig. 27, Pl. 3A
 Can. J. Bot. 42:252, 1964. — *Corticium lividocoeruleum*
 Karst., Not.Soc.Fauna Fl. Fenn.Förh.5:370, 1868.

Fruitbody corticioid, effused and without differentiated edge, adnate, when older somewhat loosened from the substrate. Hymenium smooth, dark blue to greyish blue, often somewhat more pale when dry or even yellowish with a bluish tinge or a few scattered bluish patches. Young specimens are often weakly pigmented. Consistency dense and firm.

Hyphal system monomitic with thinwalled hyphae, usually densely interwoven and fused to an almost pseudo-parenchymatic structure in which distinct hyphae may be difficult to demonstrate. Even elements in the hymenium (basidia and acanthophyses) may be fused. In between the hyphae irregular and amorphic grains of a dark blue pigment. *Ca*-oxalate crystals present in varying degrees.

Basidia, 20 — 25 x 5 μ m with four sterigmata.

Acanthophyses numerous, 15 — 25 x 4 — 5 μ m with short apical protuberances.

Cystidia (pseudocystidia) numerous, often apically \pm moniliform developed, 40 — 70 x 8 — 12 μ m, protoplasm granular.

Spores subcylindrical, about 7,5 x 3 μ m, smooth and amyloid.

Habitat. On coniferous wood (fallen trees, fencing a.s.o.), rarely on deciduous wood.

Distribution. Throughout Fennoscandia and locally common in more continental areas, esp. in the northern parts and on the highland of S. Sweden.

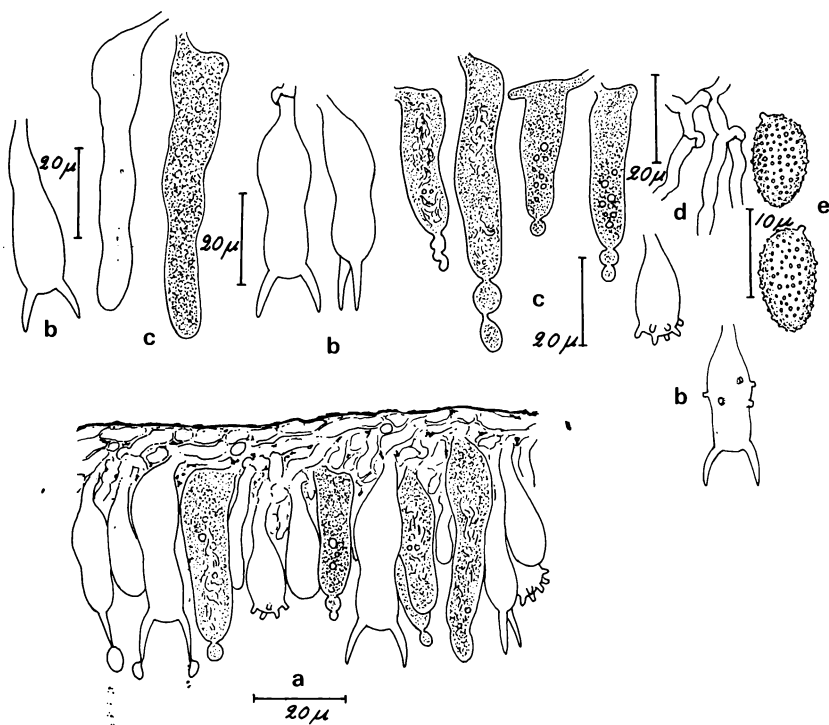


Fig. 28. *Aleurodiscus norvegicus*. a) vertical section of fruitbody b) basidia c) pseudocystidia d) hyphae e) spores. — Type specimen.

Aleurodiscus

8. *Aleurodiscus norvegicus*, Erikss. and Ryv.
 Norw. J. Bot. 20: 10, 1973.

Fig. 28, Pl. 3B.

Fruitbody corticioid without differentiated edge, adnate, somewhat elongated, up to 3 cm long, 2 – 4 mm wide and about 50 μm thick. Hymenium smooth and whitish. Consistency rather soft.

Hyphal system monomitic with a thin layer of intertangled hyphae next to the substratum, thinwalled, 2 – 4 μm in diameter and with clamps at all septa.

Basidia 30 – 40 x 8 – 10 μm with two sterigmata. A few basidia have lateral protuberances which indicate that acanthophyses and basidia are homologous elements and that acanthophyses probably will grow to basidia.

Acanthophyses scattered and sparse, clavate, and with a few apical protuberances, 15 – 20 x 5 – 8 μm .

Cystidia (pseudocystidia) numerous, variable in shape and size, 30 – 50 μm long, often moniliform at the apex. A few cystidia apparently develop laterally from basidia-bearing hyphae. The content is more or less granular or resinous yellowish to light brown in Melzer's solution, in KOH only pale yellowish.

Spores ovoid, finely warted, amyloid and 10 – 12 x 5 – 7 μm .

Habitat: On dead branches of *Calluna vulgaris*.

Distribution. Known from Western Norway (Hitra and Solund, leg. S. Sivertsen) and from Denmark (Rørvig, leg. K. Hauerslev).



Amphinema

Amphinema Karst.

Bidr. Känned. Finl. Nat. Folk 51:228, 1892

The genus is characterized by its loose consistency of intertangled yellowish hyphae with clamps at all septa, numerous cystidia (only weakly differentiated) and ellipsoid spores with slightly thickened walls, strongly coloured in cotton blue.

Genotypus: *Amphinema byssoides* (Fr.) John Erikss.

The relationship with other genera in the Corticiaceae seems unclear, but there are some similarities with *Hyphodontia*, above all in the hyphal characters, the shape of the clamps and also to some degree in the shape of the basidia. However, *Amphinema* is distinguished by its yellowish rhizomorphs and the thickened sporewall with its strong reaction to cotton blue. In *Hyphodontia* (and most other genera in the Corticiaceae) the hyphae are ramified both from the clamps and opposite the clamps, just behind the septum. In *Amphinema* the branching occurs some μm from the nearest septum.

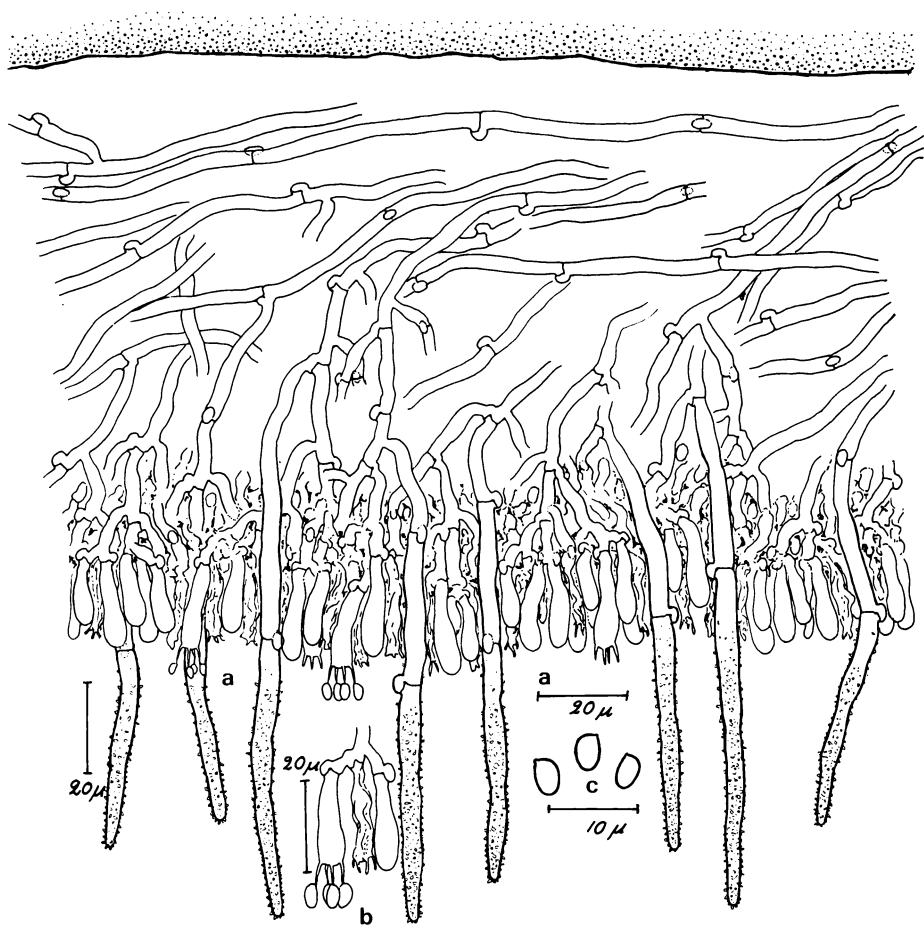


Fig. 29. *Amphinema byssoides*. a) vertical section of fruitbody b) basidia
c) spores. — Strid & Eriksson 10436.

Amphinema

Amphinema byssoides (Fr.) John Erikss.

Fig. 29, Pl. 5, 6

Symb. Bot. Upsal. 16:1 p. 112, 1958.

— *Thelephora byssoides* Fr., Syst. mycol. I:452, 1821.

Fruitbody resupinate, loosely attached to the substrate, in some cases almost athelioid (i.e. a \pm detachable pellicula), edge usually with hyphal strands and rhizomorphs, hymenium very finely velvety due to projecting cystidia, here and there interrupted by crater-like depressions, the whole fruitbody light ochraceous yellow, when young lighter, more creamy in colour.

Hyphal system monomitic with intertangled, pale yellowish hyphae, 3 – 4 μ m in diameter, with thin or somewhat thickened walls and distinct clamps.

Basidia clavate, rarely somewhat constricted, 20 – 25 x 4 – 5 μ m with four sterigmata.

Cystidia numerous, hyphal, projecting from 50 to 70 μ m, totally 75 – 125 x 4 – 6 μ m, with septa and clamps, finely encrusted with thin, flat, projecting crystals, and small angular grains.

Spores ellipsoid, smooth, with thickened walls, non-amyloid but stained in cotton blue (\pm red in phase-contrast), 4 – 4,5 x 2 – 2,5 μ m.

Habitat. On dead coniferous wood and debris, mainly in coniferous forests.

Distribution. Common and widespread in coniferous forests of *Cladina* or *Hylocomium*-type where it is one of the characteristic fungal species. It may also occur in poor deciduous forest. It is apparently not a genuine wood-inhabiting species, but, like the genus *Piloderma* actually belonging to humus and litter, such as needles, leaves, twigs, bark, etc., while the fruitbodies mostly develop on rotten wood.

Remarks. The species is easily recognized even by the naked eye, partly because of the colour and partly because of the characteristic crater-like holes in the hymenium. The holes are formed by the fruitbody excreting hanging drops where no hymenium is developed. With a lens, the species may be recognized by its numerous projecting, hairlike cystidia.

Amphinema tomentellum (Bres.) M.P. Christ. is according to Bourdot & Galzin (1928), who have seen authentic material, very close to *A. byssoides*. There is no material in the Bresadola herbarium in Stockholm. We suppose that it is only a form of *A. byssoides*. It is reported from Denmark (M.P. Christiansen 1960, p. 229) but not from the other Nordic countries.

Amylocorticium Pouz.

Ceska Mykol. 13: 11, 1959

The genus *Amylocorticium* is above all characterized by the smooth, distinctly amyloid spores and the fact that the hymenium includes no other sterile elements than slightly differentiated, almost hyphal-like, cystidia (no acanthophyses, dendrohyphidia or pseudocystidia with aldehyde-reaction). Basidia are club-like and have four sterigmata. Hyphae are distinct, loosely interwoven and with clamps at all septa, branches occurring mainly from the clamps. Young fruitbodies have a slight tendency to be athelioid. Spores are narrowly ellipsoid to allantoid, not more than 2,5 μm wide.

Genotypus: *Amylocorticium subsulphureum* (Karst.) Pouz.

Besides the species mentioned below, Pouzar also transferred to the genus some other species out of which "*Peniophora*" *mollis* (Fr.) Bourd. & Galz. occurs in Fennoscandia. The spores of this species appear light greyish in Melzers solution, and this has been interpreted as an amyloid reaction. However, this seems doubtful and does not at least correspond to the amyloid reaction in the spores of the genotype. *P. mollis* shows some similarities to *Amphinema byssoides*, but is probably better placed in *Leucogyrophana* as has been done by Parmasto and Jülich.

The relationship with other genera in the Corticiaceae seems unclear. The main reason is that it is difficult to evaluate the amyloidity of the spores. This property has apparently been evolved many times in the Aphyllophorales as well as in other groups of fungi. Amyloid spores represent apparently an unknown positive selective factor (a chemical protection against small animals, nourishing on hymenia?). Consequently, there is a chance that otherwise not related fungi are grouped together based on this single character. However, the three species mentioned below seem clearly to be interrelated. Exclusively on morphology it seems reasonable to place *Amylocorticium* in the vicinity of *Athelia*.

Amylocorticium

Key to species

- 1. Cystidia absent 1.A. cebennense
- 1. Cystidia present 2
- 2. Spores 5.5 — 7 μ m long, subcylindrical,
fruitbody yellow 3.A. subsulphureum
- 2. Spores 4.5 — 5.5 μ m long, ellipsoid, fruitbody
first yellowish, later more reddish 2.A. subincarnatum

Corticium canadense Burt. (Pl. 7A) from North America belongs here and will be transferred to this genus. It lacks cystidia like *A. cebennense*, the external characters are more like those of *A. subincarnatum* while the spores are like those of *A. subsulphureum*. Another species clearly belonging to this genus as defined here, is *A. suaveolens* Parm.

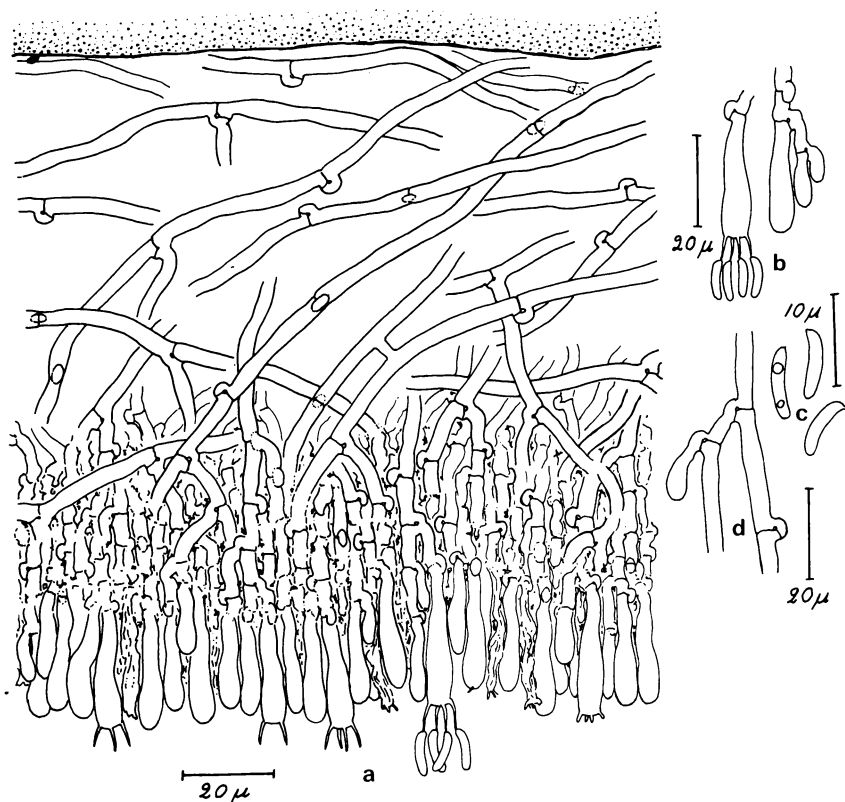


Fig. 30. *Amylocorticium cebennense*. a) vertical section of fruitbody b) basidia c) spores d) hyphae and young basidium. — Strid 8879.

Amylocorticium

1. **Amylocorticium cebennense** (Bourd.) Pouz. Fig. 30, Pl. 7B
 Ceska Mykol. 13: 11, 1959. — *Corticium cebennense* Bourd. Rev.
 Sci. Bourb. Centr. Fr. 23:7, 1910.

Fruitbody effused, more or less athelioid (i.e. like a loose pellicular membrane), soft, hymenium smooth, white when fresh, more light yellowish when dry, margin finely fibrillose (lens!), no rhizomorphs.

Hyphal system monomitic, consisting of loosely interwoven rather straight hyphae with clamps at all septa, 3 — 4 μm in diameter, the branches occurring almost exclusively from the clamps.

Basidia narrowly clavate, 25 — 30 x 4 — 6 μm with four sterigmata and with a basal clamp. The increase in thickness of the fruitbody results in a distinct subhymenium.

Cystidia not present.

Spores allantoid, 6 — 7.5 x 2 — 2.5 μm , smooth, amyloid and with 1 — 2 oildrops.

Habitat. On decayed coniferous wood (fallen trees, slash, fencing a.s.o.), rarely on deciduous wood.

Distribution, not common, but scattered throughout the area.

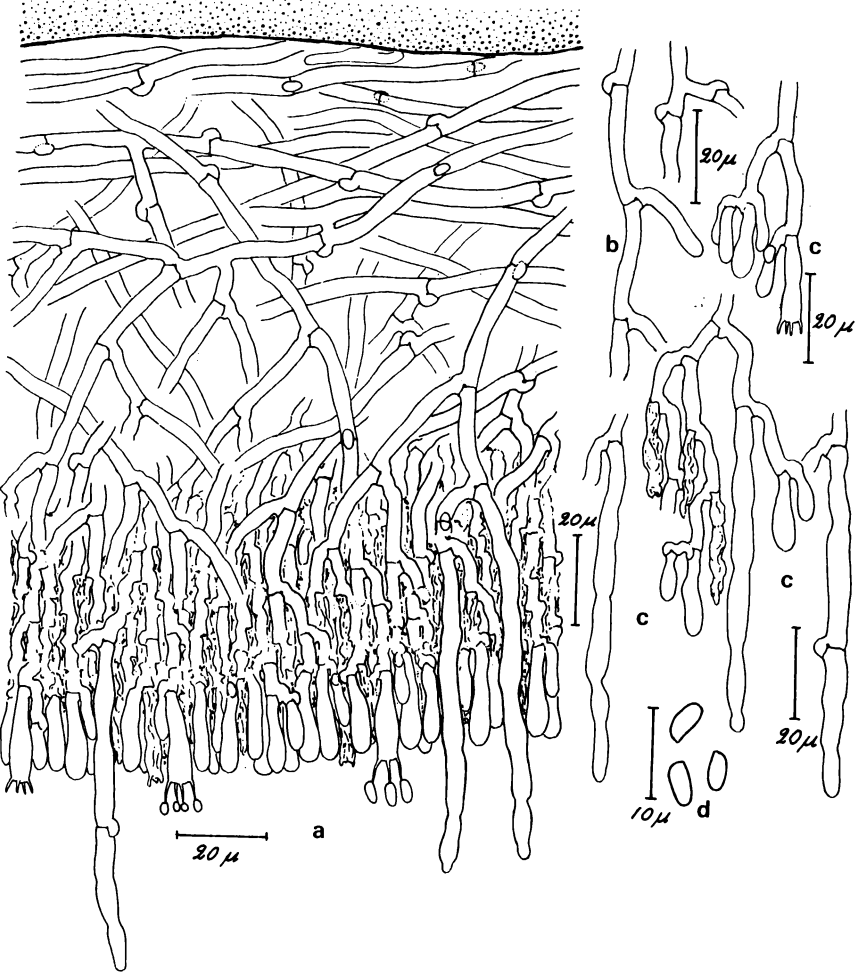


Fig. 31. *Amylocorticium subincarnatum*. a) vertical section of fruitbody
b) hyphae c) basidia and cystidia d) spores. — Eriksson 10-9-1966.

Amylocorticium

2. **Amylocorticium subincarnatum** (Peck) Pouz. Fig. 31, Pl. 8A, B
 Ceska Mykol. 13: 11, 1959. — *Corticium subincarnatum* Peck, N.Y.
 St. Mus. Ann. Rep. 42: 124, 1889.

Fruitbody effused, adnate and quite soft at first, with age firmer, subcoriaceous, hymenium smooth when young, slightly tubercular when old, first yellow, then more distinctly reddish, margin fibrillose (lens) and light yellowish, often not distinctly developed.

Hyphal system monomitic, consisting of loosely interwoven hyphae with clamps at all septa, 3 – 4 μm in diameter, when the fruitbody increases in thickness and a subhymenium is developed, the structure becomes somewhat more dense. Branching of hyphae occurs mostly from the clamps.

Basidia narrowly clavate, about 20 x 4 – 5 μm with four sterigmata and a basal clamp.

Cystidia hyphal, smooth, in a few cases with a clamped septum, 50 – 70 x 4 – 5 μm , projecting above the hymenium up to 30 μm .

Spores 4.5 – 5 x 2 – 2.5 μm , narrowly ellipsoid with slightly thickened walls, distinctly amyloid.

Habitat. On coniferous wood, mostly fallen trees.

Distribution. Very rare and only a few records are known from Sweden from N. Kvill Nat. Park (Småland) in the South to Muddus Nat. Park (Lappland) in the North. The species is conspicuous and should have been collected more often if it had been common. Not known from Norway and Denmark but found in Finland.

Taxonomic remarks. *A. subincarnatum* is very closely related to the following species, but according to the available material it is clear that they are two distinct taxa. Besides the sporeform they can be separated by the colour. In *A. subincarnatum* the hymenium with age develops a distinct reddish colour while in *A. subsulphureum* it remains yellow. Further, the fruitbodies of the former are distinctly larger than in the latter. Some uncertainty remains though, especially because of a considerable degree of variation in the spore size in *A. subsulphureum* even within the same fruitbody.

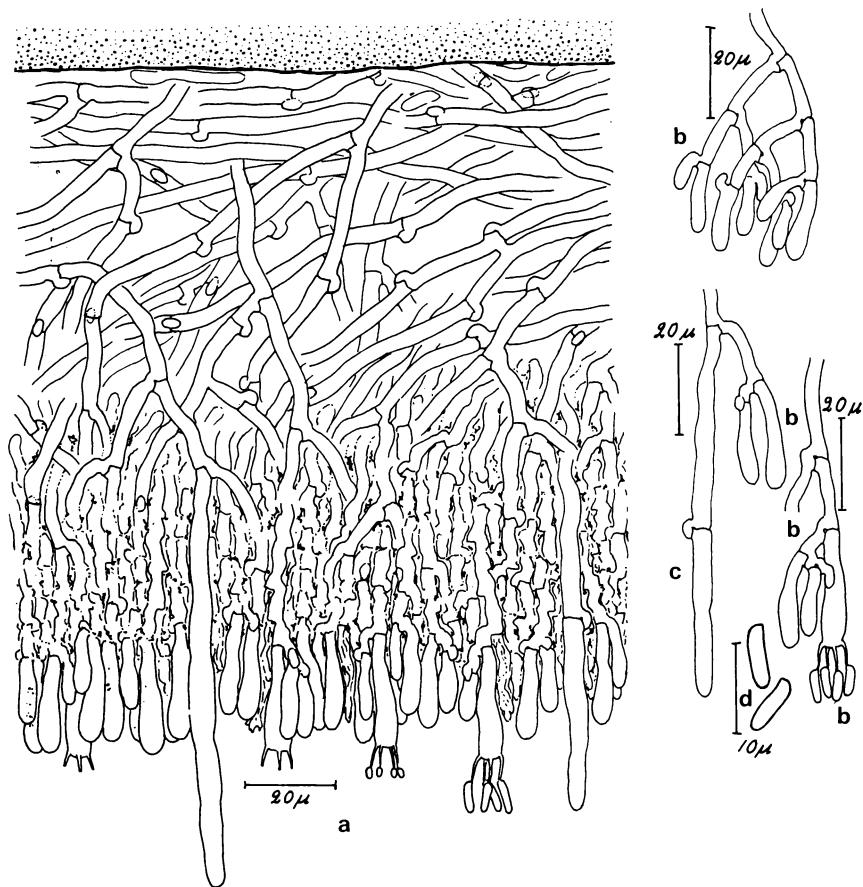


Fig. 32. *Amylocorticium subsulphureum*. a) vertical section of fruitbody
b) young and mature basidia c) cystidium d) spores. — Strid 6966.

Amylocorticium

3. **Amylocorticium subsulphureum** (Karst.) Pouz. Fig. 32, Pl. 8C
 Ceska Mykol. 13: 11, 1959. — *Corticium subsulphureum*
 Karst., Medd. Soc. Fauna Fl. Fenn. 6:12, 1881.

Fruitbody effused and adnate, quite soft, margin finely fibrillose, hymenium smooth and yellow.

Hyphal system monomitic, with rather straight hyphae with clamps at all septa. The branches occur mostly from the clamps. The hyphal structure is at first loose but becomes somewhat denser as the subhymenium is developed and the fruitbodies increase in thickness.

Basidia narrowly clavate, about $25 \times 4 - 5 \mu\text{m}$ with four sterigmata and basal clamps.

Cystidia slightly differentiated and hyphae-like, smooth, sometimes with a clamped septum, $60 - 90 \times 4 - 6 \mu\text{m}$.

Spores subcylindrical with slightly thickened walls, smooth and amyloid, $5 - 7 \times 2 - 2.5 \mu\text{m}$.

Habitat. On coniferous wood, usually free from bark.

Distribution. Not completely known and the species is apparently quite rare. Most collections have been made in the eastern part of Sweden, especially in Uppland. Eriksson's report of "*Peniophora subsulphurea*" from Muddus in Northern Sweden (Eriksson 1958) refers to *A. subincarnatum*. The northern-most record of *A. subsulphureum* is from Umeå where Å. Strid collected it in shoreforests where many species with a southernly inclination are recorded. The species has not the same degree of continental distribution as the preceding species.

Amylostereum Boid.
Rev. Mycol. 23: 345, 1958.

Fruitbodies resupinate to reflexed, or pileate, hymenium and context brownish with numerous light brown thickwalled and apically encrusted cystidia (in microscopic preparations yellowish brown).
Hyphae thinwalled and hyaline or thickwalled and brown, spores cylindrical or narrowly ellipsoid, smooth, thinwalled and distinctly amyloid.

Genotypus: *Amylostereum chailletii* (Fr.) Boid.

Key to species

- 1. Fruitbody resupinate, adnate, usually less than 1 mm thick, on *Juniperus*, *Taxus* or *Thuja* 2.A. laevigatum
- 1. Fruitbody 1 – 3 mm thick often with reflexed margin, on *Picea abies* and on cultivated *Abies* sp. 1.A. chailletii

Amylostereum**1. *Amylostereum chailletii* (Fr.) Boid.**

Fig. 33, Pl. 9A

Rev. Mycol. 23: 345, 1958 — *Thelephora chailletii* Fr. Elench.

fung. 1:188, 1828.

Fruitbody about 1 — 3 mm thick, small or widely effused, resupinate or reflexed with a narrow, dark brown, irregular and finely tomentose pileus, hymenium ochraceous to brown often somewhat patchy, when dry usually cracked in small squares, margin somewhat thickened and finely tomentose (lens).

Hyphal system dimitic, generative hyphae thinwalled and with numerous clamps, skeletal hyphae straight, thickwalled and light brownish, and with few clamps. The fruitbody is differentiated in two distinct layers with different hyphal structures, viz. a subicular or context layer with hyphae arranged more or less parallel to the substrate, and a subhymenial layer with vertical hyphae. The former consists of richly ramified, hyaline and clamped generative hyphae and of sparsely ramified, straight, brownish skeletal hyphae with few clamps. In this layer there is a more open texture next to the substrate where the skeletal hyphae are strongly dominating. In pileate specimens there is a tendency to duplex-structure as the upper tomentum is distinctly darker and of a more loose texture than the subicular layer below it. The subhymenial layer consists of more or less vertical hyphae which develop when the fruitbody increases in thickness. The hyphae are mainly thin- to thickwalled generative hyphae 3 — 4 μm in diameter and enclose numerous encrusted cystidia from previous hymenial levels. From these generative hyphae new basidia and cystidia will develop.

Basidia narrow and club-like, about 20 — 25 x 4 — 5 μm with 4 sterigmata and with a basal clamp.

Cystidia yellowish brown, thickwalled and apically encrusted, the encrusted part about 15 — 20 x 5 μm . Young cystidia subulate, thinwalled and smooth. A few larger, thinwalled, rounded to subulate cystidia often containing oily drops or resinous grains are seemingly of gloecystidial character, and apparently remain thinwalled.

Spores cylindrical or narrowly ellipsoid, 6 — 7,5 x 2,5 — 3 μm smooth and amyloid.

Habitat *A. chailletii* grows on *Picea* or cultivated species of *Abies*. It occurs mainly in somewhat richer spruceforests such as *Lastrea*-spruce forest

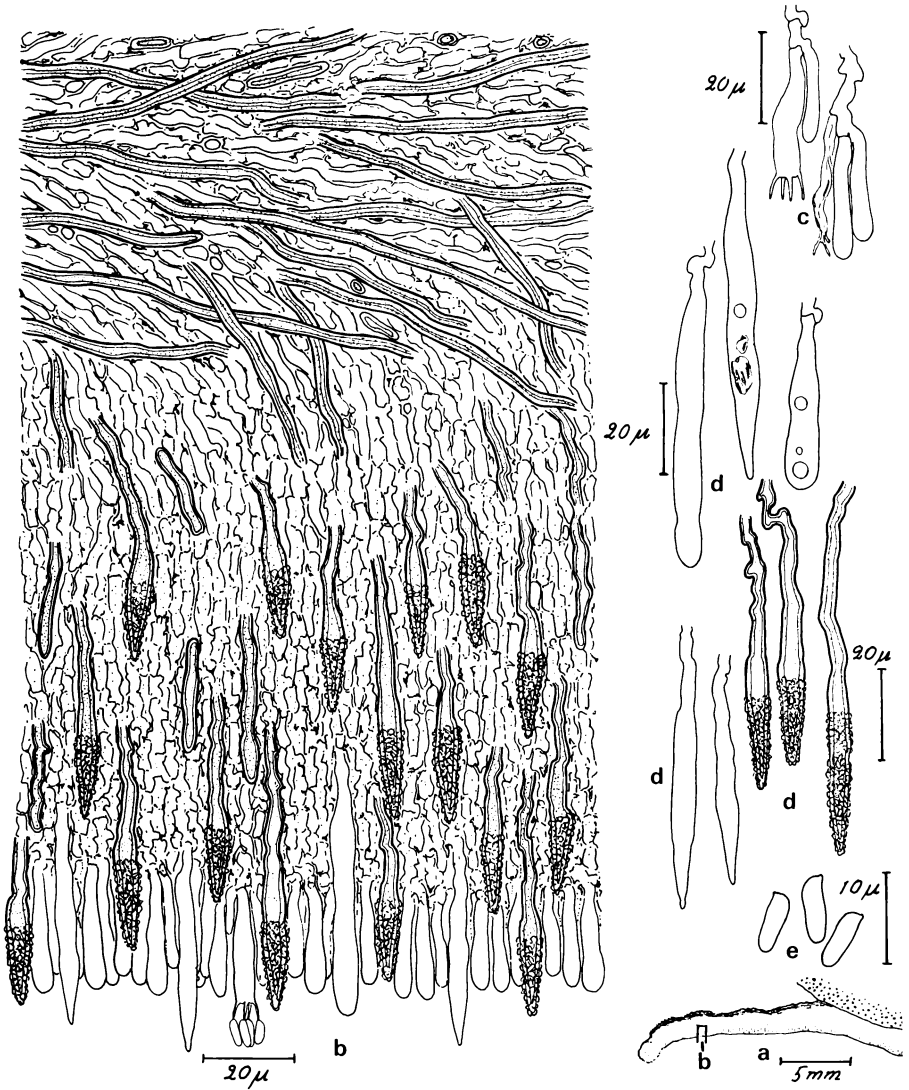


Fig. 33. *Amylostereum chailletii*. a) section of fruitbody showing position of section b. b) vertical section of fruitbody c) basidia d) cystidia e) spores. — Eriksson 7-7-1966.

Amylostereum

or in the richer *Myrtillus-Hylocomium*-spruce forest. Most collections have been made on not too much decayed trunks of a certain diameter (10 — 25 cm) but collections from thinner branches are known.

Distribution. It seems to follow the spruce in the area, but is nowhere common even if some local abundancy may occur. In the inner part of Norrland it is rarer than along the coast and in the southern part of Sweden. Where *Abies* is cultivated, *A. chailletii* is very often found on left logs.

Taxonomic remarks. The closely related species *A. areolatum* (Fr.) Boid, has a distinct duplex-structure and is in addition usually pileate. The upper layer is darker (in KOH almost black) and of an open structure. Between this and a lower denser layer, there is a thin very dense layer, in section almost like a black line. The hymenium in *A. areolatum* is darker than in *A. chailletii* and the fruitbodies usually thicker, i.e. about 2 — 3 mm.

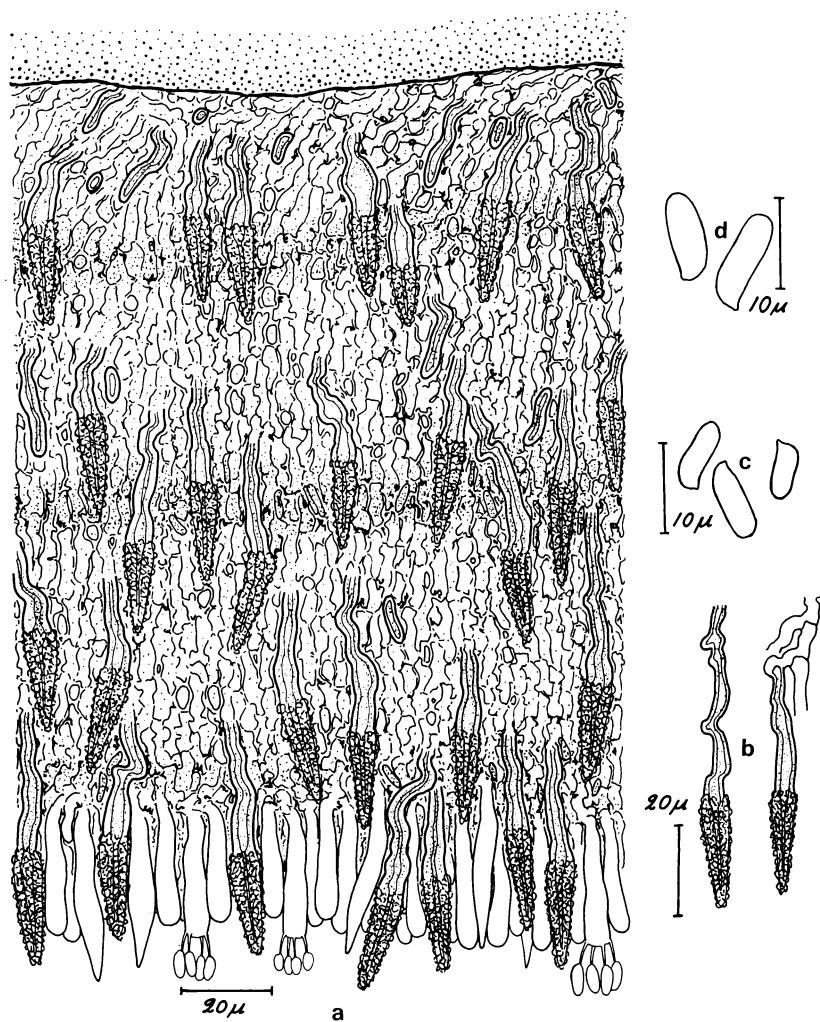


Fig. 34. *Amylostereum laevigatum*. a) section of fruitbody b) cystidia c,d) spores. — a-c Eriksson 147, d Nordin 3558 (on *Taxus*).

Amylostereum

2. *Amylostereum laevigatum* (Fr.) Boid. Fig. 34, Pl. 9B, 10
 Rev. Mycol. 23: 345, 1958. — *Thelephora laevigata* Fr. Elench.
 fung. 1: 224, 1828.

Fruitbody resupinate and adnate, but the margin together with the outer layer of the bark may loosen from the substrate. Hymenium smooth, when dry often finely cracked, light brownish to ochraceous or even greyish in older specimens.

Hyphal system monomitic, consisting of richly branched, thin to thick-walled hyphae with clamps, diameter from 3 – 4 μm .

Basidia narrowly clavate, 25 – 30 x 4 – 6 μm with 4 sterigmata and a basal clamp.

Cystidia numerous, thickwalled, brown or yellowish brown and apically encrusted. The encrusted part 20 – 30 x 5 – 6 μm . Young cystidia thin-walled and subulate.

Spores cylindrical or narrowly ellipsoid, 7 – 12 x 3 – 4 μm , smooth and amyloid.

Habitat. On *Juniperus communis* and *Taxus baccata*. Most common on dead, fallen stems of *Juniperus*, more rarely on erect stems or branches. On *Taxus* it grows on the bark of living, old trees and as *Taxus* is far rarer than *Juniperus*, it may be said to be relatively much more common on the former than on the latter. In Sweden it is also known from cultivated *Thuja occidentalis* (Göteborg).

Distribution. Widespread and common in most parts of Scandinavia but rarer in Western and Northern Norway and inner parts of N. Sweden.

Taxonomic remarks. The form on *Taxus* deviates somewhat by having larger spores (9 – 12 μm) than the form of *Juniperus* (7 – 9 μm) and may probably be regarded as a variety.

Fries' description of *Thelephora laevigata* is vague and he states "tenuissima" and "subfarinacea" about the fruitbody of this not particularly thin species and no substrate was given. In Hym. Europ p. 656 he reports it as rare on *Juniperus*. No authentic material is seen. The species epithet is therefore somewhat doubtful.

Athelia Pers. emend Donk

Mycol. Europ. 1: 83, 1822, Fungus 27: 1957.

Monograph: Jülich, Willd. Beih. 7, 1972.

Fruitbody thin, pellicular, white to whitish (when living often bluish white), easily separable from the substrate because of badly developed subiculum of cobwebby consistency, hymenial surface smooth when dry, often slightly wrinkled (*Merulius*-like) when fresh. Hyphae with or without clamps, the basal hyphae often somewhat wider and with more thickened walls than the basidia-bearing hyphae, in both cases often encrusted, rhizomorphs absent. Basidia relatively short, more or less clublike with 2 – 4 sterigmata. Spores smooth, non-amyloid, rounded, ellipsoid or cylindrical.

Genotypus: *Athelia epiphylla* Pers.

Discussion. An important character for the generic delimitation is the hymenial construction and the branching of the subhymenial hyphae. As in most species of Corticiaceae the hymenium in *Athelia* consists of separate bunches of basidia in which new basidia successively are developed from the sub-basidial cells. *Athelia* is characterized in that only a few (3 – 4) basidial generations are developed, resulting in a thin pellicular hymenium. In most corticioid species the basidial development continues for some time and the hymenium becomes thicker and membranaceous, finally more or less fleshy.

Jülich (1972) has in his monograph adapted to a somewhat more restricted concept than earlier authors. The most important generic characters are still the pellicular fruitbodies and the non-amyloid spores. Jülich has further emphasized the form of the basidia which should be short and clublike in contrast to the longer and narrower ones in his new genera *Leptosporomyces* and *Ceraceomyces*. While the basidial generations are very few in *Athelia*, they are more numerous in the very closely related *Fibulomyces*. In this genus the sub-basidial branches are more abundant and with age interwoven or intertangled with each other. This aspect can consequently be studied only in older fruitbodies.

Athelia

Athelia has hyaline hyphae even in the basal layer, this is in contrast to *Confertobasidium* which has brownish basal hyphae in the bottom layer of the pellicular fruitbodies.

Taxonomic remarks

The loose consistency and the negligible increase in thickness make microscopic preparations very easy to make and the appropriate characters are easy to demonstrate and measure. Nevertheless the genus has, for a long time, been in a confused state, mainly because of difficulties in the evaluations of the few available characters. In many herbaria most collections have therefore been filed under the name *A. epiphylla* or previously as "*Corticium centrifugum*".

Most species in *Athelia* have been separated on the basis of the number of sterigmata and of the size and shape of the spores. Another character of particular interest is the occurrence of clamps at the septa. The most commonly held opinion has been that the occurrence of clamps in *Athelia* is a variable character and consequently of restricted value. However, experience from other genera in the Corticiaceae indicates that clamps at the base of the basidia generally is a very important and constant character while the frequency of clamps at the basal hyphae is more variable. E.g. in *Phanerochaete* and *Coniophora* clamps are always missing at the base of the basidia, while rare clamps occur on the basal hyphae. Jülich has demonstrated that absence or presence of basidial clamps in constant and reliable. He has further emphasized the shape of the sub-basidial cells and the spores. Concerning the latter he adopts a more restricted species concept than earlier mycologists. After careful consideration of his text and microscopic examination of the Swedish material, partly used for his revision, we find it difficult in practical work in all cases to accept this species concept. Consequently, we find it convenient to give *A. epiphylla* a wider interpretation than Jülich, and place *A. alnicola*, *A. macrospora*, *A. nivea*, *A. ovata* and *A. tenuispora* in *A. epiphylla* as subordinate taxa. A few more collections of *A. arachnoidea* var. *sibirica* have on the other hand indicated that this taxon should be raised to specific level. Further *A. subsphaerospora* Jül. ined. is considered to be a species of its own, and so is a collection previously placed in *A. pyriforme*.

Cytological remarks. Nuclei can as a rule be made visible in herbarium specimens of *Athelia* in the following way. A small piece of hymenium is placed in a drop of acetocarmine and covered with a cover slip. After short heating over a flame, a new drop is added at the margin of the slip. The preparation is then crushed by light tapping on the slip and is then studied in phase contrast microscope. The visibility of the nuclei varies from species to species but also from collection to collection. The state

of the specimen and the circumstances under which it is dried seem to play a role. It is interesting to observe that in the species *A. pyriformis*, which seems to differ from the other species of the genus, the nuclei cannot be made visible with this method. All other species treated here appear to have dikaryotic hyphae and basidiols and after meiosis 4 nuclei in the basidia. This is the case also in species lacking clamps at the base of the basidia. Some species have normally only two sterigmata. In such cases 2 nuclei enter each spore and the spores are thus binucleate. In the new species *A. binucleospora* there are two nuclei also when there are 4 sterigmata. The direction of the meiotic divisions in the basidium seems to vary and the basidia of *Athelia* are not decidedly stichic nor chiasitic, but often something between. A character, which may be of interest for the circumscription of the genus, is the granular protoplasm of the young basidia, easily visible both in ordinary light microscope and in phase contrast. The granularity is best seen in KOH and Melzer.

The drawings

The drawings consist of separate hyphae, bunches of basidia and spores from crushed preparations. However, the details are laid out together as a hymenial layer and a basal layer. The hyphae in the latter have slightly thickened walls and this is indicated by using a somewhat broader pen (0,4 mm) than for the other hyphal elements (0,2 mm).

Athelia

Key to species

- | | |
|--|---------------------------|
| 1. Clamps at all septa | 2 |
| 1. Clamps missing at the base of the basidia | 5 |
| 2. Spores rounded, globose to spherical | 8.A. <i>neuhoffii</i> |
| 2. Spores oblong to ellipsoid | 3 |
| 3. Most basidia with 2 sterigmata, spores 12–13 µm long or even more | 10.A. <i>sibirica</i> |
| 3. Most basidia with 4 sterigmata, spores shorter than 10 µm | 4 |
| 4. Spores 4.5 – 6 µm long | 4.A. <i>bombacina</i> |
| 4. Spores 7 – 10 µm long | 7.A. <i>fibulata</i> |
| 5. Clamps totally absent | 6 |
| 5. Clamps scattered and few at the basal hyphae | 7 |
| 6. Spores ellipsoid, 5 – 6.5 µm long | 5.A. <i>decipiens</i> |
| 6. Spores pyriform, 7 – 10 µm long | 9.A. <i>pyriformis</i> |
| 7. Most basidia with 2 sterigmata | 2.A. <i>arachnoidea</i> |
| 7. Most basidia with 4 sterigmata | 8 |
| 8. Spores rounded or pyriform | 9 |
| 8. Spores oblong to ellipsoid | 10 |
| 9. Spores rounded 5.5 – 6 x 4 – 4.5 µm | 11. <i>Athelia</i> sp. |
| 9. Spores pyriform 4 – 6 x 2.5 – 3 µm | 3.A. <i>binucleospora</i> |
| 10. Spores 5 – 7 (9) x 2.5 – 3 µm with tapering base | 1.A. <i>acrospora</i> |
| 10. Spores 6 – 10 x 3 – 5 µm with rounded base | 6.A. <i>epiphylla</i> |

Athelia**1. *Athelia acrospora* Jül.**

Willdenowia, Beih. 7: 45, 1972.

Fig. 35 and 36

Fruitbody white, thin and pellicular.**Hyphal system**, subhymenial hyphae without clamps, 3 – 4 μm in diameter, basal hyphae with scattered clamps.**Basidia** about 15 x 5 μm with 4 sterigmata, the sub-basidial cells often somewhat widened as these may have two or more side branches.**Cystidia** absent.**Spores** narrowly ellipsoid, tapering towards the base 5 – 7 (9) x 2.5 – 3 μm , often glued together in groups of two or four.**Habitat.** On dead wood, both of coniferous and deciduous trees. Most of the Scandinavian collections are made in conifer forests.**Distribution.** Not completely known. Jülich reports only a few collections from Sweden (Västergötland and Uppland), later K. Hjortstam and K.-H. Larsson have collected it several times in Västergötland and Dalsland.**Taxonomic remarks.** *A. acrospora* is characterized by the scattered clamps at the basal hyphae and the shape and size of the spores. The spores are, however, variable and may approach those of *A. decipiens* and the species may then be separated on the basis of the scattered clamps at the basal hyphae. It is otherwise close to the *A. epiphylla*-complex and could be regarded as a narrow-spored type within this complex. Its circumscription needs further study. The type specimen has not been seen. The nuclei are easily visible in acetocarmine. Hyphae and basidiols are dikaryotic and the spores receive one nucleus each.

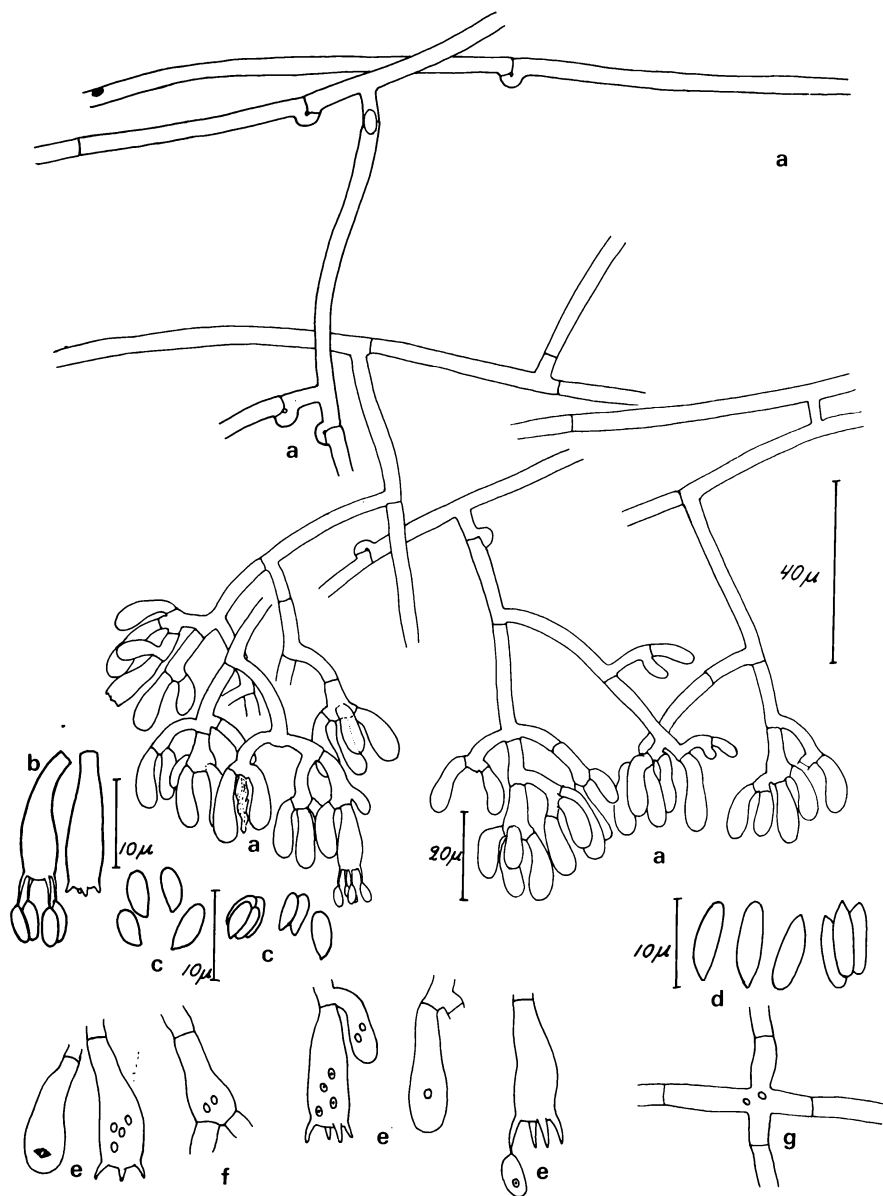


Fig..35. *Athelia acrospora*. a) crush preparation of hymenium and hyphae b) basidia c,d) spores e-g) acetocarmine prep. of dikaryons, haploid and diploid nuclei in hyphae, basidia and spore. — a-c Hjortstam 2855, det. Jülich, d Larsson & Hjortstam 6058 (form with larger spores), e-g) Nannfeldt 13496, det. Jülich.

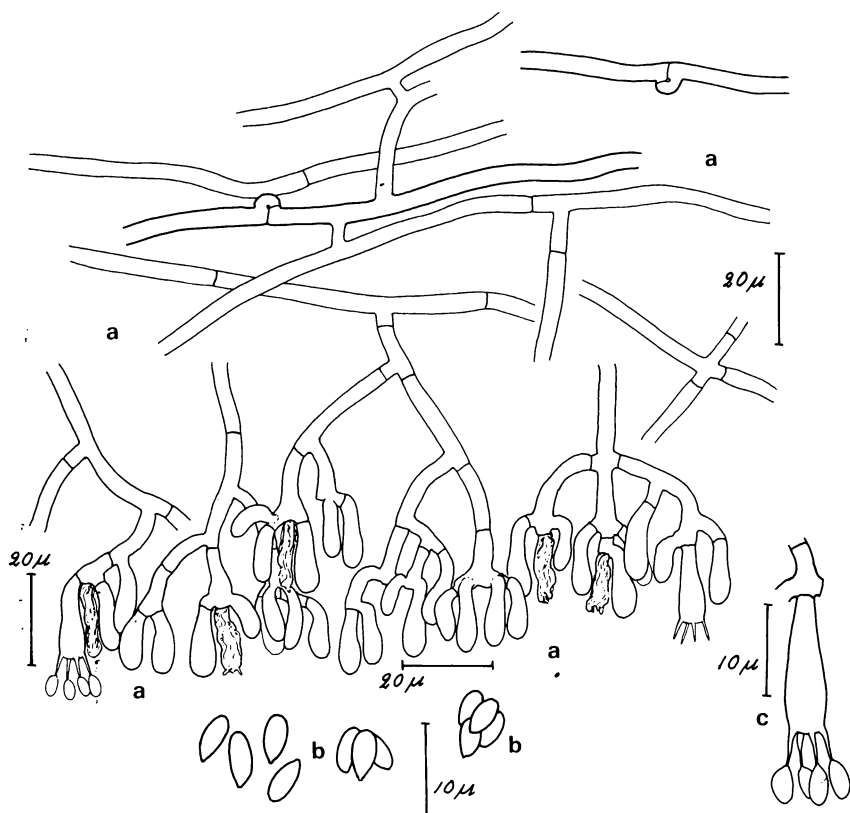


Fig. 36. *Athelia acrospora*. a) crush preparation of hymenium and hyphae b) spores c) basidium. — Hjortstam 5422, det. Jülich (broader spores than Hjortstam 2855, fig. 35).

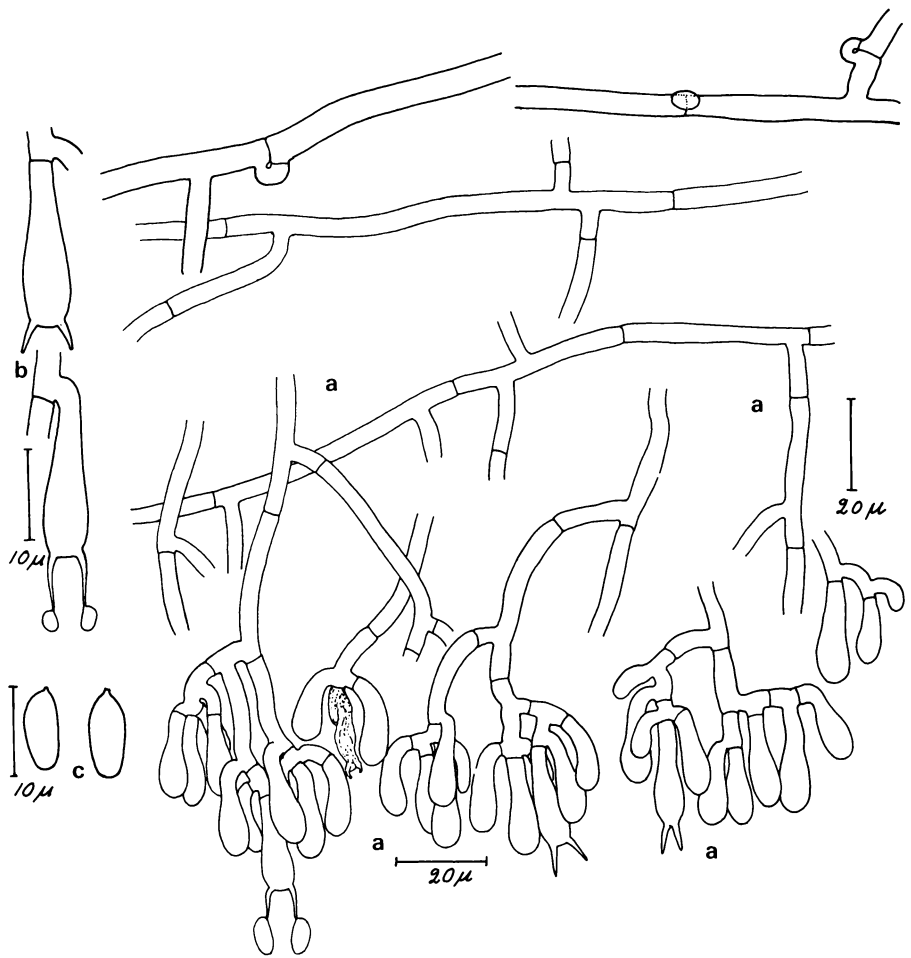


Fig. 37. *Athelia arachnoidea*. a) crush preparation of hymenium and hyphae
b) basidia c) spores. — Nannfeldt 16233, det. Jülich.

Athelia

2. ***Athelia arachnoidea*** (Berk.) Jül. Fig. 37
 Willdenowia Beih. 7: 53, 1972. — *Corticium arachnoideum* Berk.,
 Ann. Mag. Nat. Hist. 13: 345, 1844.

Fruitbody thin and white, when fresh bluish white and pellicular.

Hyphal system, subhymenial hyphae 3 – 5 μm in diameter and without clamps, basal hyphae somewhat wider, with slightly thickened walls and with scattered clamps.

Basidia 20 – 30 x 5 – 7 μm with normally 2 sterigmata, clamps absent at the base.

Spores narrowly ellipsoid to narrowly ovate, about 8 – 10 x 4 – 5 μm .

Habitat. Predominantly on deciduous wood but also as a parasite on lichens. The sclerotium stage reported from such lichens seems in most cases to belong to this species. However, also other *Athelia* species (of the type with four sterigmata) seem able to attack lichens, and the problem with the sclerotia is apparently not yet finally solved. Sterile *Athelia* species are common on humid tree trunks in towns and other polluted areas and apparently play a certain role in the disappearance of lichens from such areas.

Distribution. Quite common in Southern Sweden and Jülich reports even a few collections from Norrland (Jämtland, Gästrikland). Probably also common in the lower parts of Eastern Norway.

Remarks. *A. arachnoidea* is close to the *A. epiphylla*-complex and it is not definitely sure that it is distinguished from it, as it could be interpreted as an assemblage of 2-spored forms from this complex. Hyphae and basidiols are dikaryotic, after meiosis there are 4 nuclei in the basidium and the two spores receive two nuclei each.

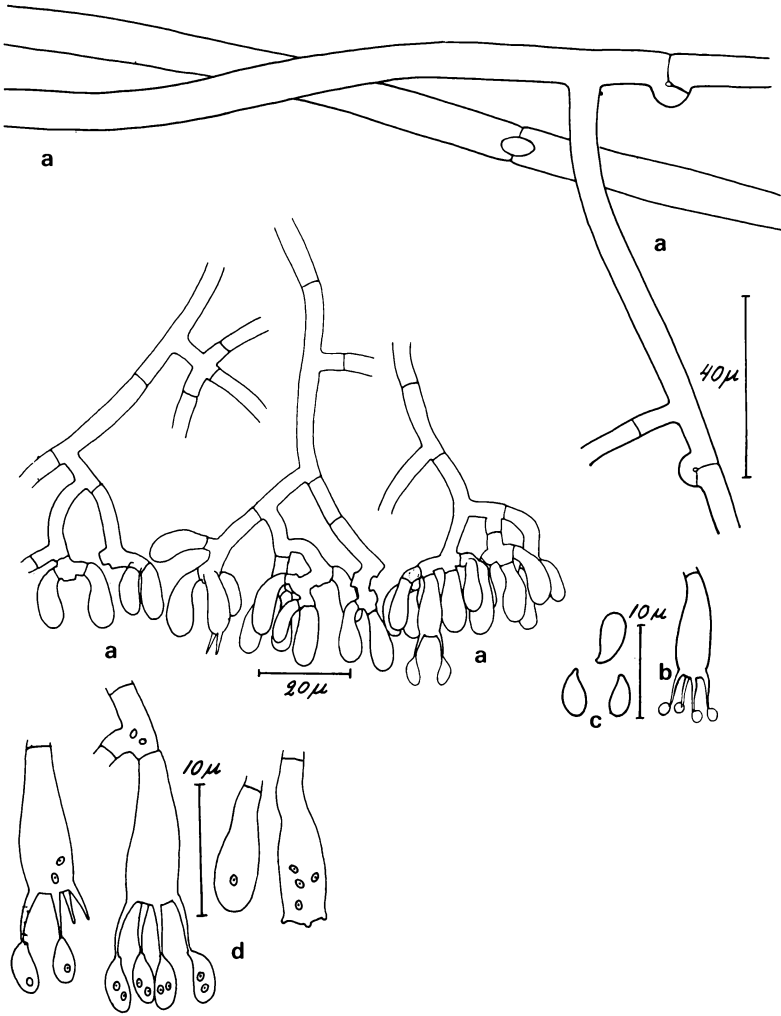


Fig. 38. *Athelia binucleospora*. a) crush preparation of hymenium and hyphae b) basidium c) spores d) acetocarmine prep. of hyphae, basidia and spores. — Eriksson 9096.

Athelia**3. *Athelia binucleospora* Erikss. & Ryv. sp. nov.**

Fig. 38, Pl. 11

Fructificatio tenuis, arachnoidea, poroso-reticulata deinde subpellicularis, albida-pallide ochracea, hyphae basales rectae, disperse fibulis instructae, $5 - 10 \mu\text{m}$ in diametro, tunicis modice incrassatis, hyphae aliae tenuitunicatae, non fibulatae, $3 - 5 \mu\text{m}$ in diametro, angulis rectis ramosae, basidia clavata $10 - 16 \times 4 - 5 \mu\text{m}$, $2 - 4$ sterigmatibus, sporae subpyriformes-subcylindricae, binucleatae, $4,5 - 6 \times 2,5 - 3 \mu\text{m}$.

Typus: Larsson & Hjortstam 5734 (herb. Eriksson and herb. Hjortstam).

Type locality: Sweden, Dalsland, Dalskog parish, West of lake Teåkersjön, near Lilla Yxesjön. 23.9.1973, on decayed trunk of *Alnus glutinosa*.

Fruitbody thin, first arachnoid, porose-reticulate, then subpellicular, whitish with a tint of ochraceous.

Hyphal system monomitic, basal hyphae conspicuously wide, $5 - 10 \mu\text{m}$ in diameter with somewhat thickened walls and sparse clamps, other hyphae thinwalled, mostly $3 - 4 \mu\text{m}$ wide, ramified at right angles, often cruciate.

Basidia clavate, $10 - 16 \times 4 - 5 \mu\text{m}$ with $2 - 4$ sterigmata, no clamps at the basidial base.

Spores pyriform, smooth, thinwalled and non-amyloid, $4,5 - 6 \times 2,5 - 3 \mu\text{m}$ with two nuclei.

Habitat and distribution. Known only from two localities. Besides the type locality also from: Sweden. Torne Lappmark, Tornehamn, near the lake Ruonajaurats, on fallen trunk of *Betula tortuosa* in subalpine meadow forest, 22.8.1960, Eriksson n. 9096.

Remarks. Jülich studied the specimen n. 9096 and determined it as *Athelia pyriformis*. However, it differs in several respects: the basal hyphae are wider and provided with sparse clamps while in *A. pyriformis* clamps are completely lacking, and the spores of the new species are decidedly smaller. There is also a difference in the macroscopic appearance, *A. pyriformis* being pure white and having a continuous hymenium, while *A. binucleospora* is at first porose to reticulate and pale ochraceous. The nuclei of hyphae, basidia and spores are in *A. binucleospora* easily made visible in phase contrast microscope with acetocarmine (they are even visible in Melzer). The spores have two nuclei even if there are four sterigmata, evidently as a result of a mitose in the young spores. When there are only two sterigmata, each spore receives two of the four haploid nuclei in the basidium. The same method does not give visible nuclei in dry herbarium material of *A. pyriformis*.

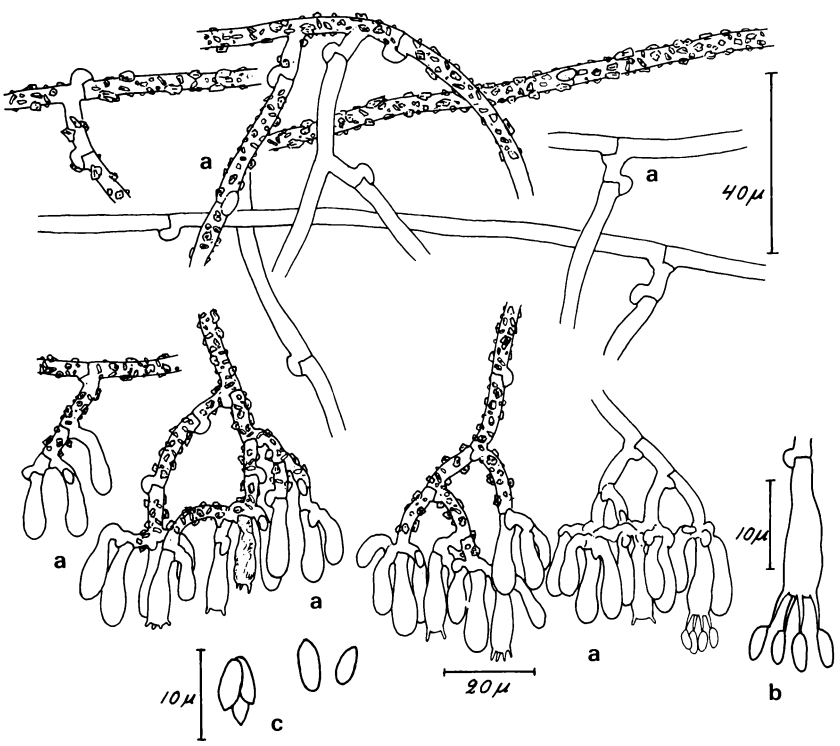


Fig. 39. *Athelia bombacina*. a) crush preparation of hymenium and basidia
b) basidium c) spores. — Kujala 205, det. Jülich.

Athelia**4. *Athelia bombacina* Pers.**

Fig. 39 and 40

Mycol. Europ. I: 85, 1822.

Fruitbody white, thin and pellicular.**Hyphal system**, monomitic with clamps at all septa, $3 - 4 \mu\text{m}$ in diameter, often encrusted with small angular crystals. The branching occurs from the septa or more commonly from their vicinity.**Basidia** relatively small, $12 - 15 \times 5 \mu\text{m}$ with 4 sterigmata.**Spores** narrowly ellipsoid with a tapering base, $4.5 - 6 \times 2.5 - 3 \mu\text{m}$ often glued together in groups of two or four.**Habitat.** Most of the Swedish collections have been made on fallen twigs of *Picea abies* resting on the ground, often partly buried in organic debris. Other species with the same type of habitat are *Sistotrema commune*, *Laeticorticum lundellii* and *Fibulomyces mutabilis*. *A. bombacina* seems to invade this material quite rapidly and fruitbodies are developed in humid periods from spring to autumn.**Distribution.** Not completely known, but locally common in the southern part of Scandinavia.**Taxonomic remarks.** *A. bombacina* has as its closest relative *A. fibulata* and the main differences are the size of the basidia and spores which are smaller in *A. bombacina*. However, doubtful specimens occur, as for example B. & J. Eriksson 2246 (*Athelia* aff. *bombacina* det. Jülich). Further, *Fibulomyces mutabilis* is apparently a close relative. Even in their ecology they are very similar. The delimitation of the species is somewhat doubtful, and experimental tests are needed.

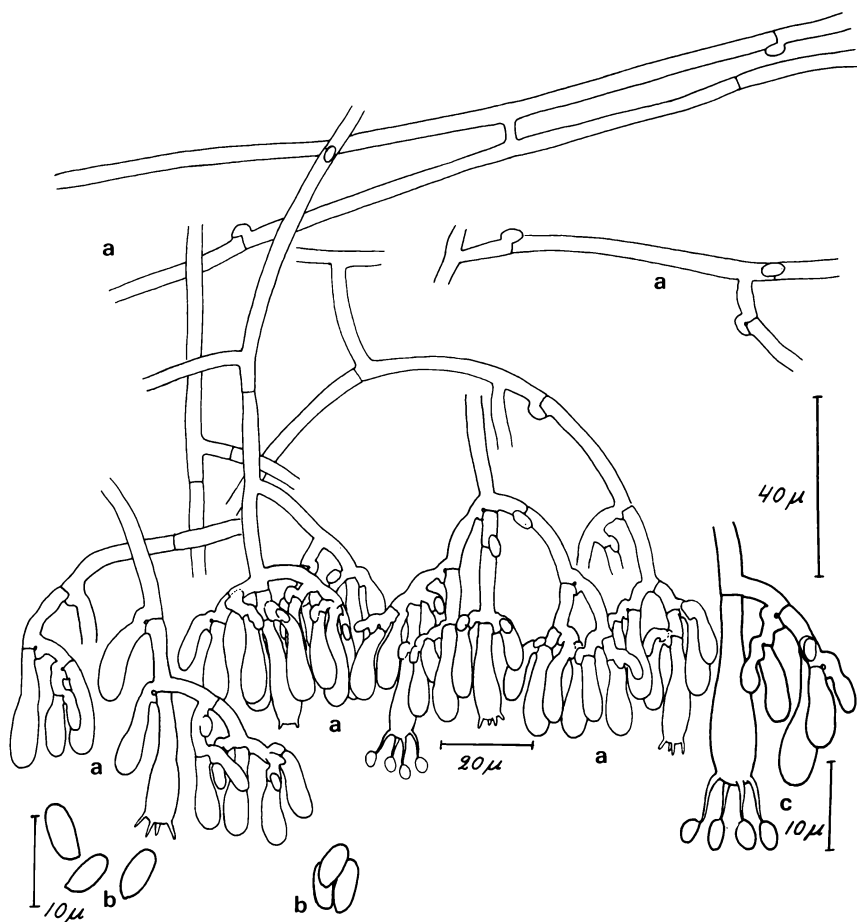


Fig. 40. *Athelia* aff. *bombacina*. a) crush preparation of hymenium and basidia
b) spores c) basidia. — Eriksson 2246, det. Jülich.

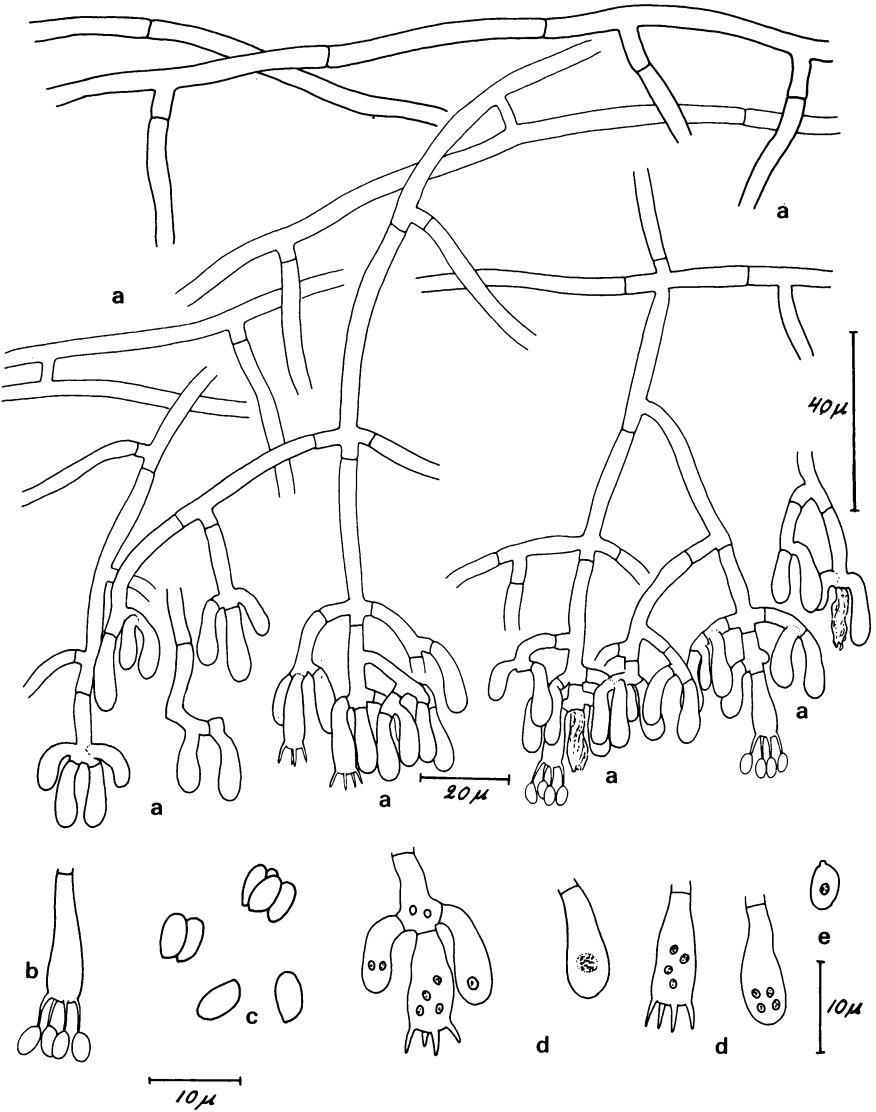


Fig. 41. *Athelia decipiens*. a) crush preparation of hymenium and hyphae b) basidium c) spores d) acetocarmine prep. of basidia e) do. of spore. Persson & Eriksson 1966, det. Jülich.

Athelia

5. ***Athelia decipiens*** (V. Höhn. & Litsch.) John Erikss. Fig. 41
 Symb. bot. Ups. 16: 86, 1958. — *Corticium decipiens* v. Höhn. & Litsch.
 Sitzber. Akad. Wiss. Wien, Math.-Nat. Kl. 117, part 1: 1116, 1908.

Fruitbody thin, white and pellicular.

Hyphal system monomitic and all hyphae without clamps at the septae, 3 – 5 μm in diameter, often with a grainy incrustation.

Basidia rather small, about 12 – 15 x 5 μm , the sub-basidial cells often somewhat widened or swollen because of sidebranches developing from them.

Spores ellipsoid to ovate, 4,5 – 5,5(6) x 3 – 3,5 μm , often glued together in groups of 2 or 4.

Habitat. Grows on decayed wood and other organic debris, both in drier forests (*Pinus*-lichen heath) and more humid ones (*Picea-Hylocomium* type).

Distribution. *A. decipiens* seems to be the most common *Athelia* species in the coniferous region, esp. in North Fennoscandia.

Remarks. *A. decipiens* can be recognized partly by its small ellipsoid spores which are smaller than those of the species in the *Athelia epiphylla*-complex, and partly because clamps are as a rule totally absent from the hyphae. According to Jülich clamps should be totally lacking, but both Hjortstam and Eriksson have found clamps in several specimens determined by him. Hjortstam found e.g. one (!) clamp in the specimen used for figure 41. The delimitation against the *A. epiphylla*-complex (*A. salicum*) needs further investigation. A demonstration of one single clamp should not be sufficient for a determination to *A. salicum* (*A. epiphylla* s. lato) instead of *A. decipiens*. The nuclei are easily visible in acetocarmine. Hyphae and basidiols are dikaryotic, the spores monokaryotic.

6. *Athelia epiphylla* Pers.*Athelia*

Mycol. Europ. I: 84, 1822.

Fig. 42 — 49, Pl. 12A

Fruitbody thin, white to light yellowish.**Hyphal system**, sub-hymenial hyphae 3 — 5 μm wide and without clamps, basal hyphae somewhat wider and with scattered clamps.**Basidia** 15 — 20 x 5 — 6 μm , usually with 4 sterigmata.**Spores** subcylindrical, narrowly ellipsoid or ovate, 6 — 10 x 3 — 5 μm .**Habitat.** Deciduous and coniferous wood, dead lichens, leaves, etc.**Distribution.** A southernly species in Fennoscandia, but recorded north to Muddus national park in Lappland.**Taxonomic remarks.** *A. epiphylla* is here given a wider concept than in Jülich's monograph. The reason for this is that there seem to be no really good morphological distinctions, nor are there any ecological differences of importance, rendering a splitting into smaller taxa desirable. The following of Jülich's species within this complex have been recorded from Scandinavia.*Athelia alnicola* (Bourd. & Galz.) Jül. Fig. 43. The species is characterized by wider (ellipsoid) somewhat larger spores than those of *A. salicum* which has similar spores. The fruitbodies should further have a distinct yellowish tinge. A few Swedish collections are known, all of considerable age (which could explain the yellow colour).*Athelia epiphylla* Pers. s. str. Fig. 42. The spores are more narrow than in the preceding species (about 3 μm wide). Most of the Scandinavian collections may be placed here.*A. macrospora* (Bourd. & Galz.) M.P. Christ. Spores ellipsoid or narrowly ellipsoid, 9 — 13,5 x 5 — 6,5 μm , larger than in other taxa of the complex. Jülich reports a few Swedish collections, all made by Romell between 1896 and 1910.*Athelia nivea* Jül. Fig. 44. From the few Swedish collections it seems that this species in spore-shape and size is very close to *A. alnicola* but should be separated by more narrow hyphae. The species seems very difficult to delimit. The encrustation of the hyphae, which often occurs, is of the same type as in *A. incrustata* M.P. Chr. which Jülich places in synonymy with *A. epiphylla*.

Athelia

Athelia ovata Jül. Fig. 45. This species is said to be separated from the preceding one in that the spores have a more or less pronounced tendency to be egg-shaped. The species has the same characteristic encrustation as *A. nivea* and other species, especially in the sub-hymenial hyphae.

Athelia salicum Pers. Fig. 46 and 47. This species has like *A. alnicola* and *A. nivea* ellipsoid spores but is separated from these by smaller spores. The Swedish material is heterogeneous. Most collections have the same characteristic encrustations as the preceding species. Some collections are similar to *A. decipiens* and the only difference is then whether the basal hyphae have scattered clamps or not. These latter collections seem also ecologically very close to *A. decipiens* and occur on decayed wood and debris in coniferous forest throughout Sweden and to Northern Finland. Jülich has provisionally given this ecotype the name *A. suecica* ined.

Athelia tenuispora Jül. Fig. 48—49. The species is said to be separated from the other taxa in the *A. epiphylla*-complex by its longer and relatively more narrow spores. The species is recorded within the same areas as *A. epiphylla* s. lato. Most of the specimens studied have the same type of encrustation as *A. ovata* and other species. However, in the type-material, the encrustation is negligible.

As a summary it may be said that within the *A. epiphylla*-complex there is a considerable variation which could motivate a splitting into several more restricted taxa. However, we are of the opinion that it is still very difficult to find good characteristics. The size of the spores may vary within the same fruitbody quite considerably and different spores from such fruitbodies could be referred to different taxa. In this complex there is a certain plant geographical difference between Southern and Northern Scandinavia. Seemingly the large-spored forms are more dominant in the south than in the north. Correspondingly there is an ecological difference between deciduous and coniferous forests. The small-spored forms seem to dominate in the latter. It is desirable that more detailed field studies of this group should be carried out and supplemented with cultural studies. The visibility of the nuclei in acetocarmine varies, but usually they are not so easily seen as in *A. acrospora*, *A. binucleospora* and *A. decipiens* a.o. In all cases studied, hyphae and basidiols are dikaryotic. In fourspored basidia the spores are uninucleate, while in bispored basidia they regularly are dikaryotic.

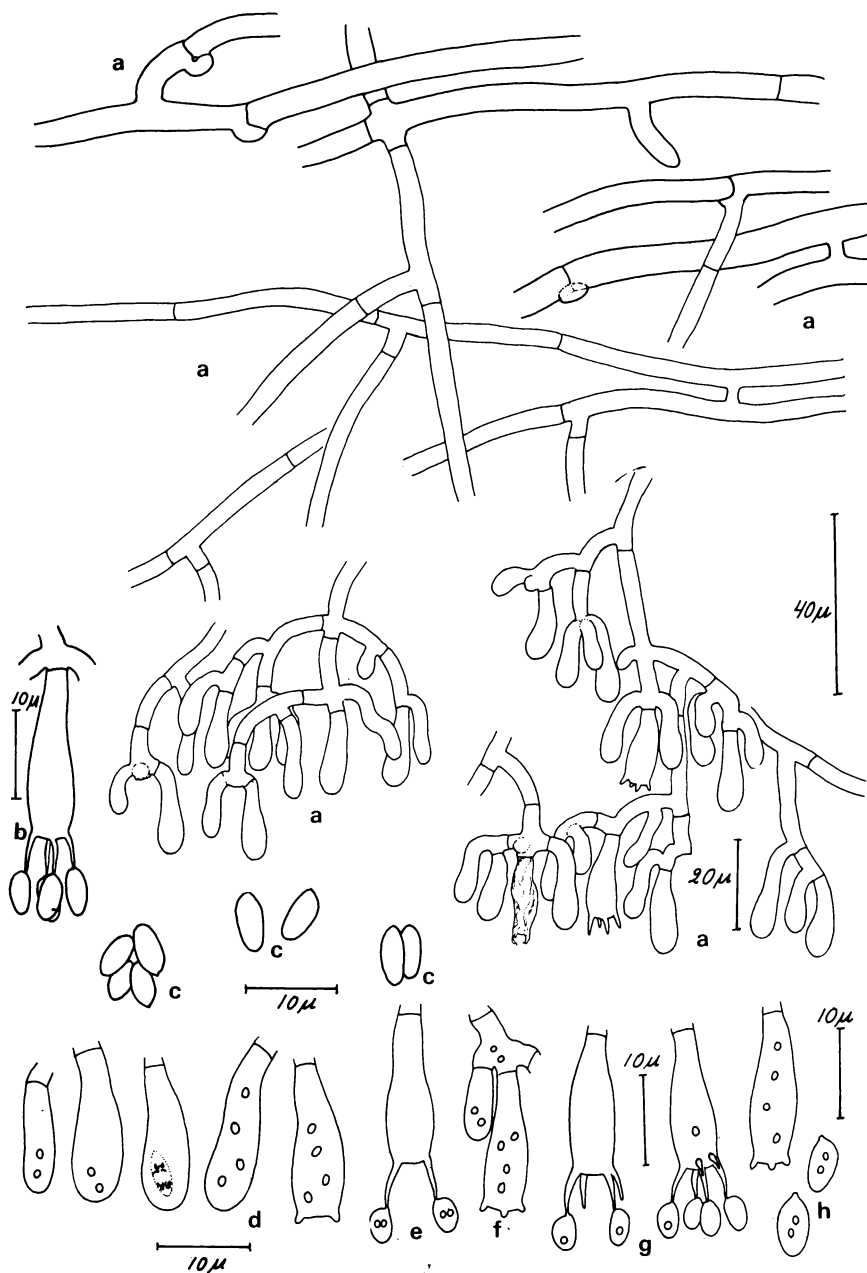


Fig. 42. *Athelia epiphylla*. a) crush preparation of hymenium and hyphae b) basidium c) spores d-h) acetocarmine prep. of hyphae, basidia and spores. — a-c Andersson & Eriksson 264, det. Jülich, d-f Eriksson 24-10-1965, det. Jülich, g-h Eriksson 7-4-1973.

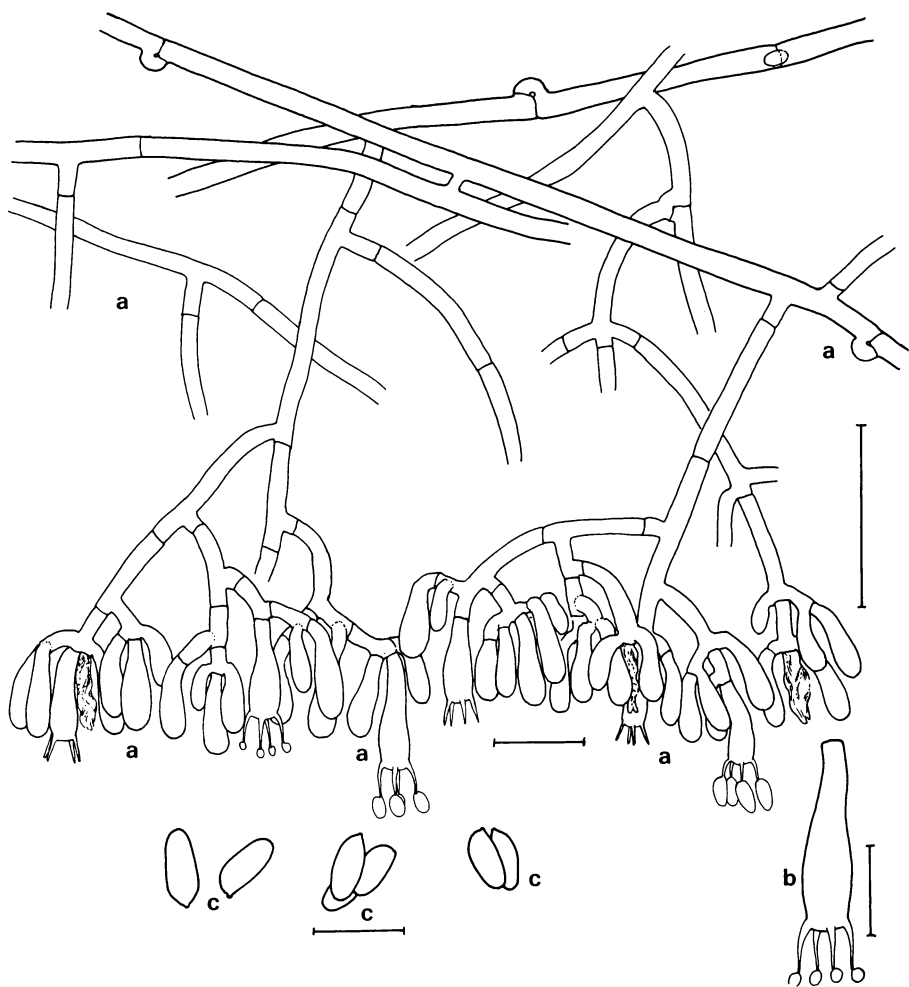


Fig. 43. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae
 b) basidium c) spores. — Eriksson 260, *A. alnicola*, det. Jülich.

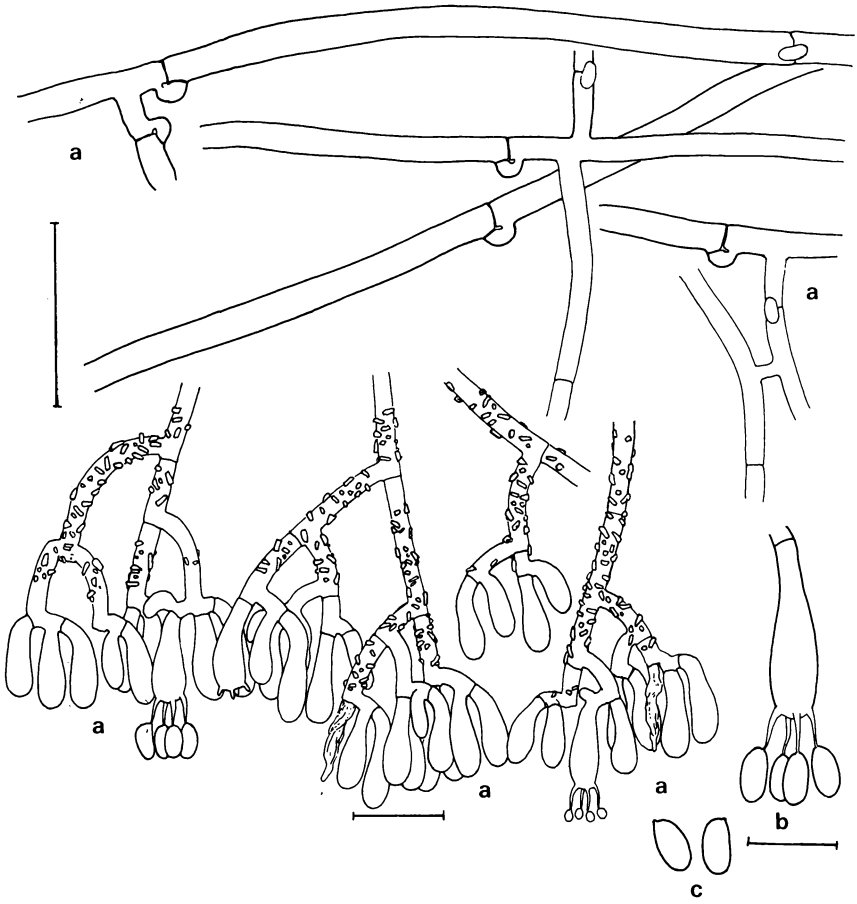


Fig. 44. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Eriksson 245, *A. nivea*, det. Jülich.

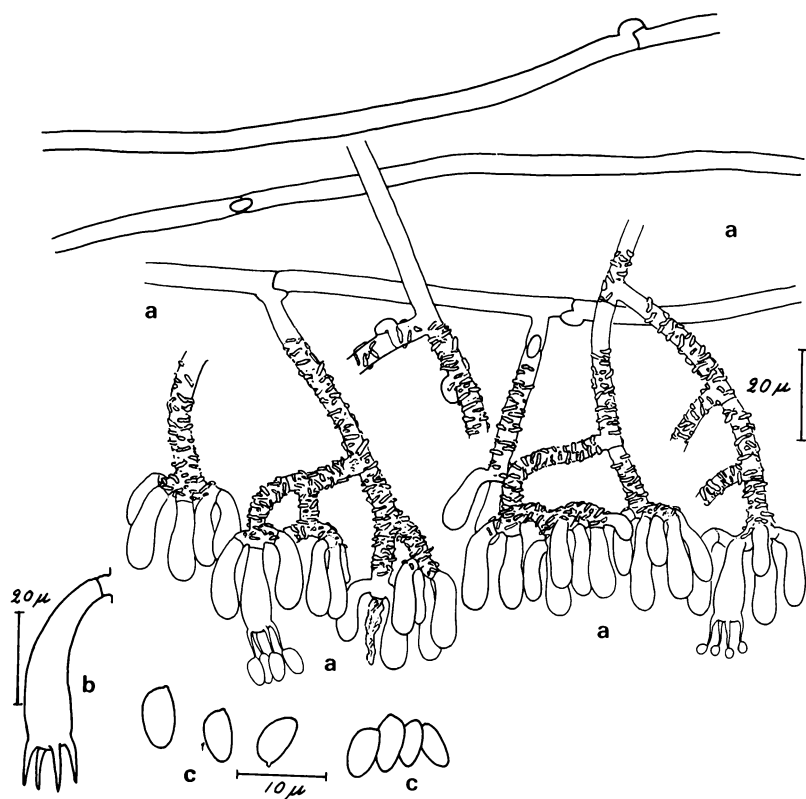


Fig. 45. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Hjortstam 3092, *A. ovata*, det. Jülich.

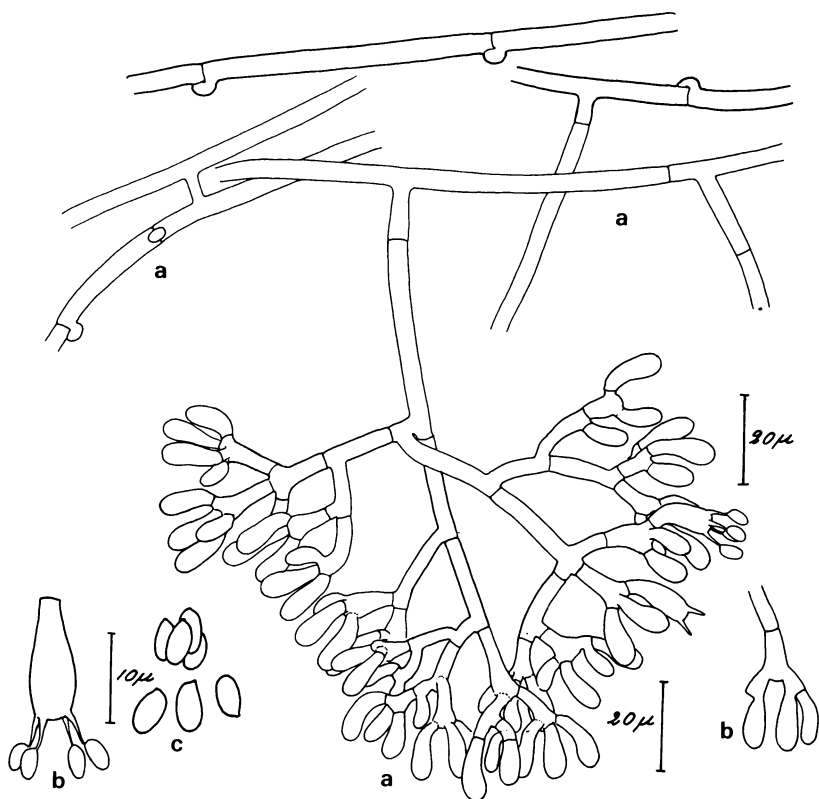


Fig. 46. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Eriksson 24-9-1966, *A. salicum*, det. Jülich, *A. suecica* Jül. ined.

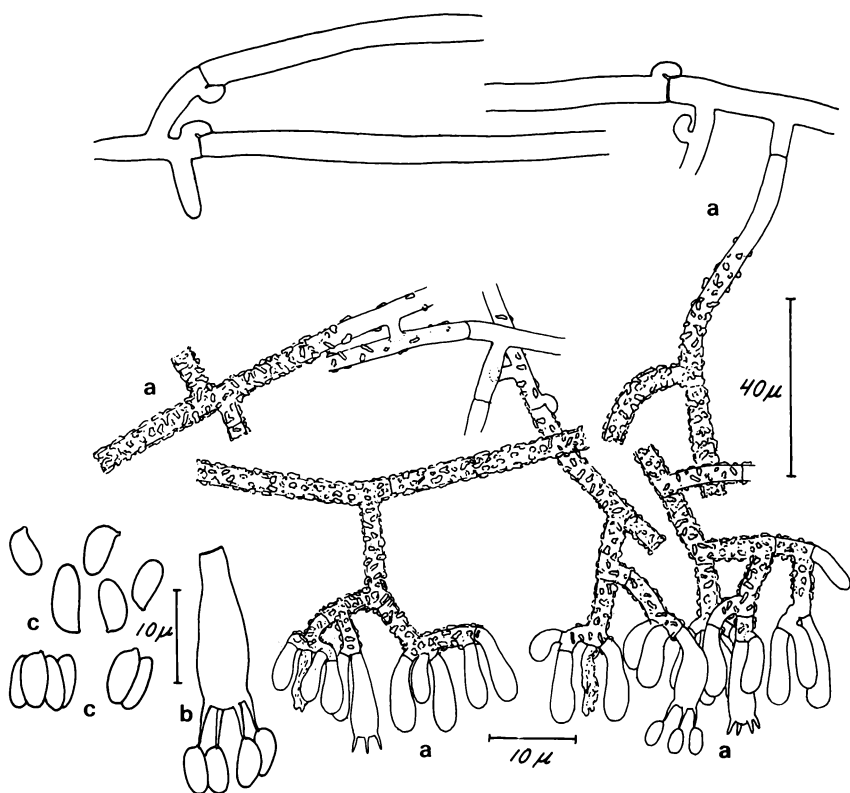


Fig. 47. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Andersson and Eriksson 241, *A. salicum*, det. Jülich.

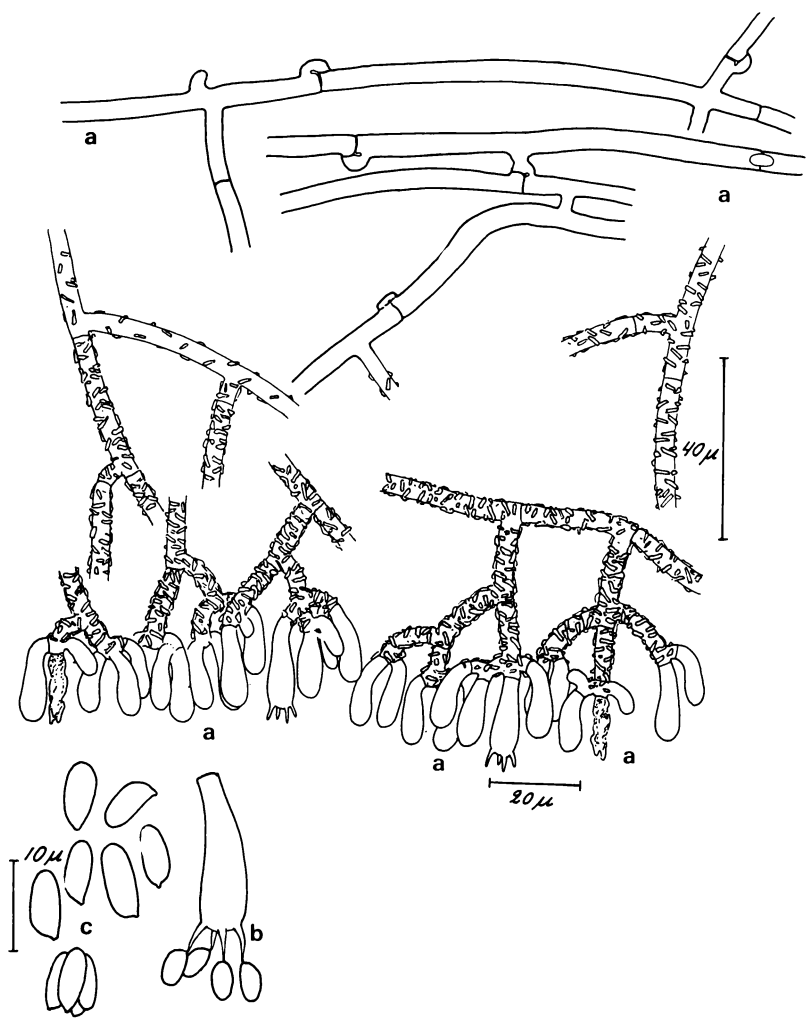


Fig. 48. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) hyphae. — Lundell 1941, *A. tenuispora*, det. Jülich.

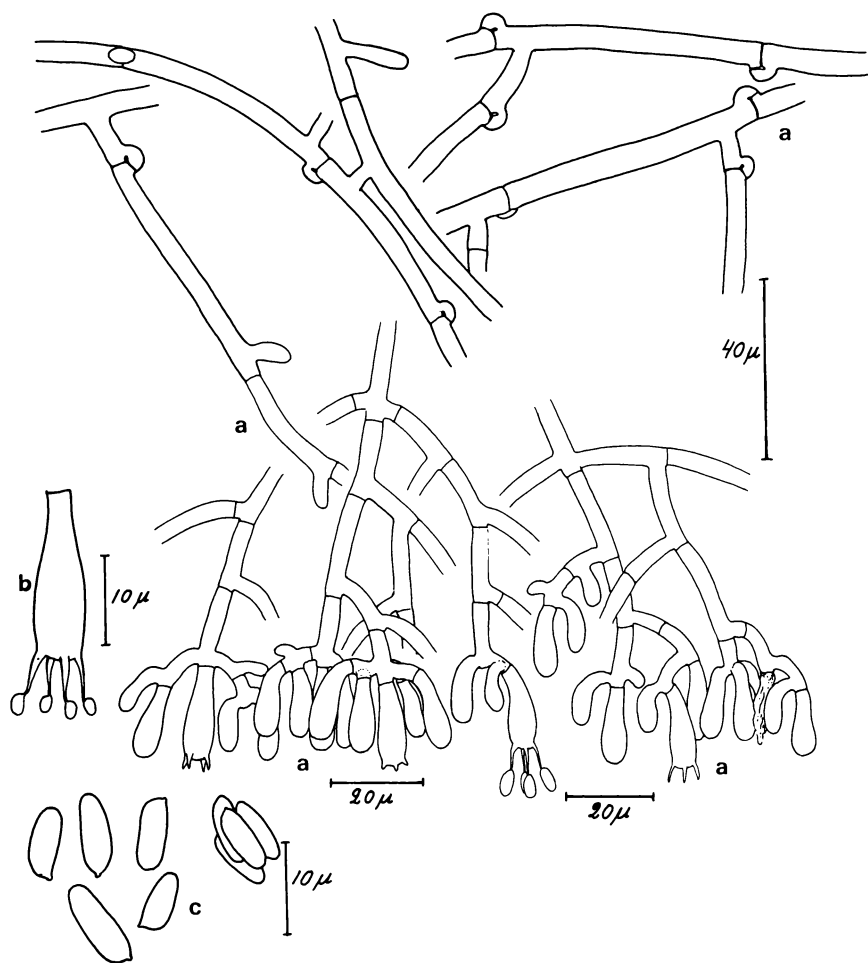


Fig. 49. *Athelia epiphylla* coll. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Type specimen of *A. tenuispora*.

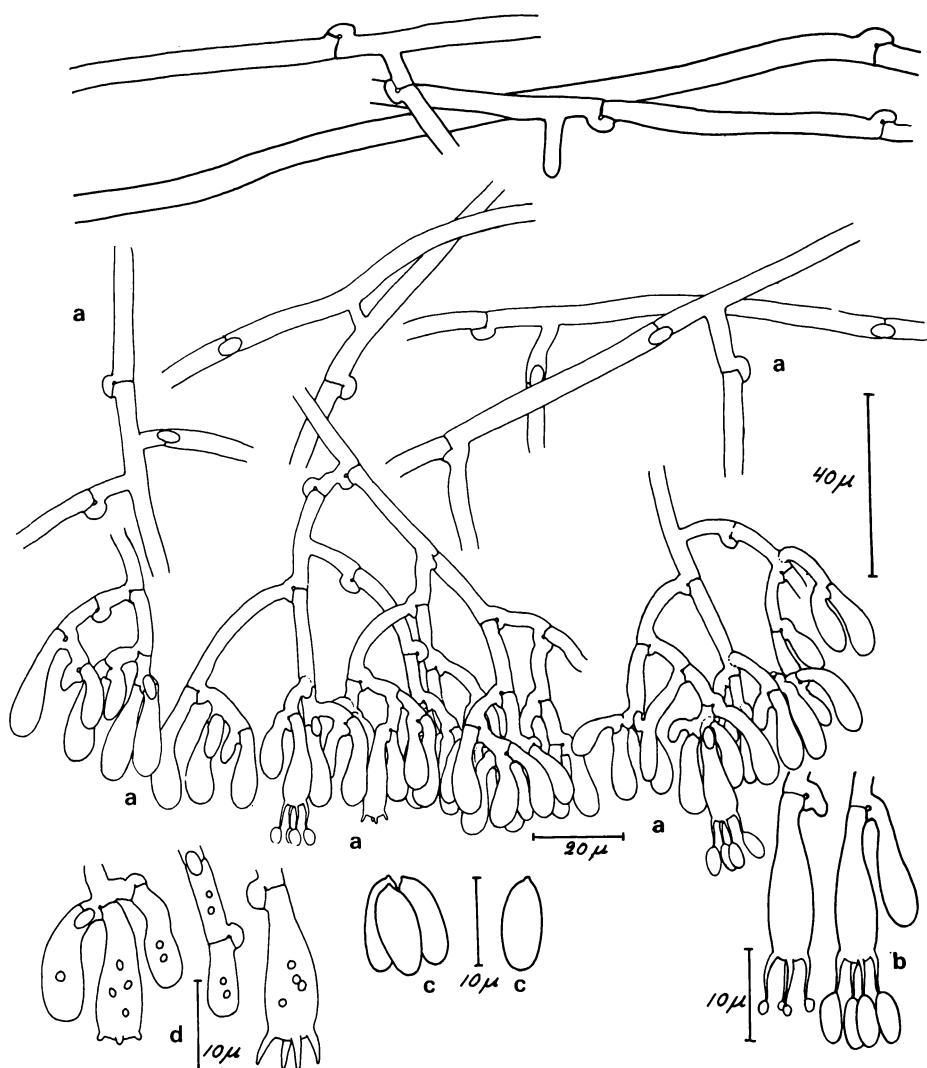


Fig. 50. *Athelia fibulata*. a) crush preparation of hymenium and hyphae b) basidium c) spores d) acetocarmine prep. of basidia with dikaryons, haploid and diploid nuclei. — a-c Eriksson 265, d Eriksson 20-9-1966.

Athelia

7. *Athelia fibulata* M.P. Christ.
Dansk Bot. Ark. 19: 148, 1960.

Fig. 50

Fruitbody thin and white, when dry often with a yellowish tinge.

Hyphal system monomitic, with clamps at all septa, the subhymenial hyphae $3 - 4 \mu$ in diameter, the basal ones somewhat wider and with slightly thickened walls.

Basidia $15 - 20 \times 5 - 6 \mu\text{m}$, normally with 4 sterigmata and basal clamps.

Spores narrowly ellipsoid to almost cylindrical, relatively large, $7 - 10 \times 3,5 - 5 \mu\text{m}$.

Habitat both on deciduous and coniferous wood, even on mosses and dead leaves.

Distribution. Quite common throughout the whole area even if it seems to be more frequent in the middle and northern parts than in the south.

Remarks. The species is recognized by the presence of clamps at all septa and by its large spores which separate it from the closely related *A. bom-bacina*. The limit between these two species needs further study.

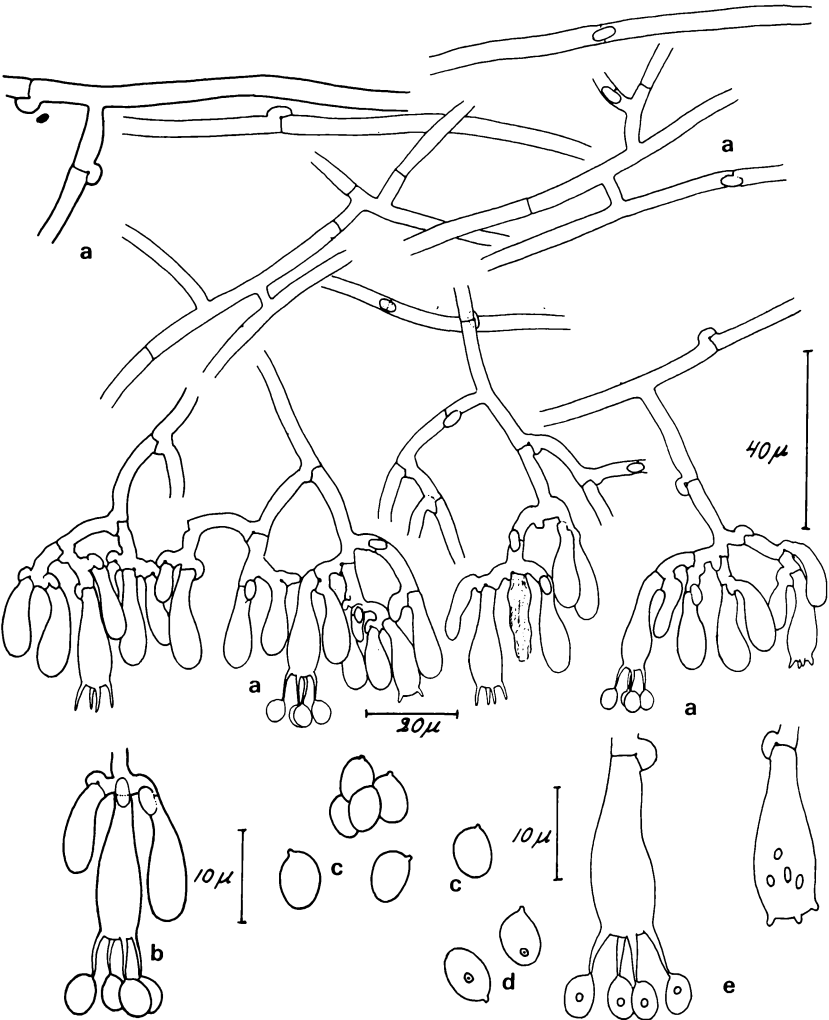


Fig. 51. *Athelia neuhoffii*. a) crush preparation of hymenium and hyphae b) basidia c) spores d,e) acetocarmine prep. of spores and basidia. — Hjortstam 8-4-1966.

Athelia

8. *Athelia neuhoffii* (Bres.) Donk. — Fungus 27:12, 1957. — *Corticium neuhoffii* Bres. in Neuhoff, Zeitschr.f. Pilzkunde 2:179, 1923.

Fig. 51

Fruitbody thin and white, when fresh often bluish white and with a meruroid hymenium.

Hyphal system monomitic, hyphae $3,5 - 5 \mu\text{m}$ in diameter (some basal hyphae may even be wider) and with clamps at all septa.

Basidia clavate, $20 - 25 \times 6 - 8 \mu\text{m}$, with 2 — 4 sterigmata.

Spores broadly ellipsoid to subglobose, $6 - 8 \times 4,5 - 5,5 \mu\text{m}$.

Habitat. On decayed deciduous or coniferous wood or woody debris. It is a common species, but is seen preferably in humid and mild periods during the winter and early spring as the fruitbodies die during dry periods in the summer. There are only a few collections from the autumn, but in mild years it may start to develop fruitbodies in October-November.

Distribution. The species is one of the most common *Athelia* species in Northern Europe and is widespread in the area, but most common in the southern parts.

Remarks. *A. neuhoffii* is recognized by its rounded spores and the constantly clamped hyphae. Hyphae and basidiols are dikaryotic, spores uninucleate.

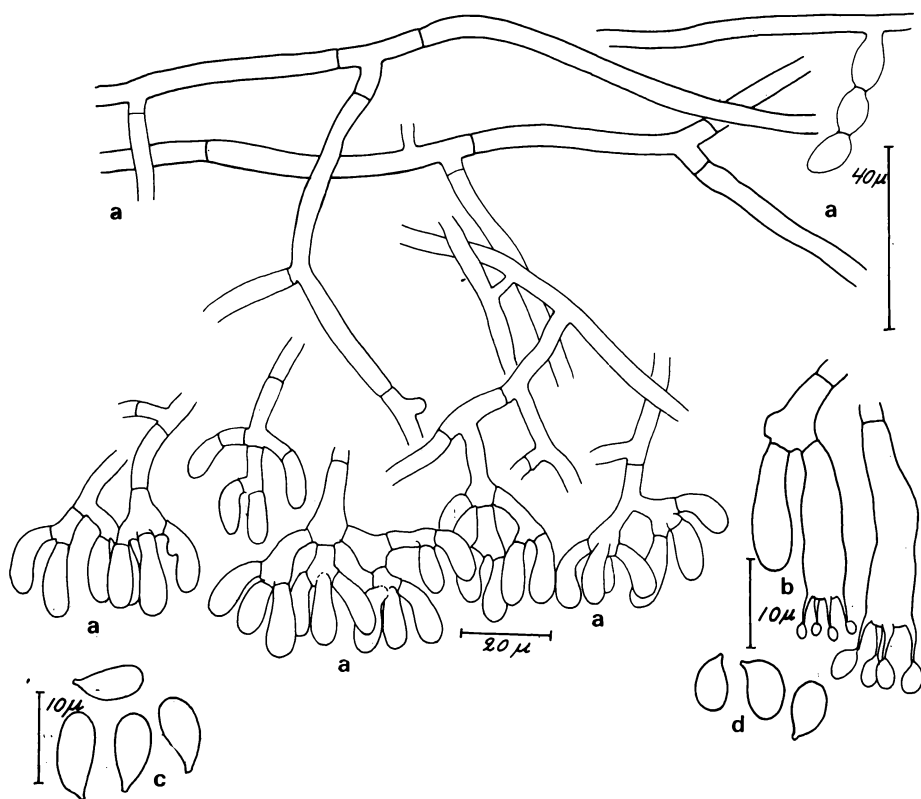


Fig. 52. *Athelia pyriformis*. a) crush preparation of hymenium and hyphae
 b) basidia c,d) spores. — a,b,d Nannfeldt 12664 c) type specimen.

Athelia

9. ***Athelia pyriformis*** (M.P. Christ.) Jül. Fig. 52
 Willdenowia Beih. 7: 110, 1972. — *Xenasma pyriforme* M.P. Christ.,
 Dansk Bot. Arkiv. 19: 108, 1960.

Fruitbody white, thin and less pellicular than other *Athelia* species.

Hyphal system monomitic, all hyphae without clamps at the septa, 4 – 7 μm in diameter, the sub-basidial cells often somewhat enlarged due to development of sidebranches. The basal hyphae may some times have moniliform sidebranches.

Basidia narrowly clavate to almost cylindrical, normally with 4 sterigmata, 17 – 22 x 5 – 7 μm .

Spores ellipsoid to pyriform with distinct apiculus, 7 – 10 x 4 – 5 μm .

Habitat. On dead or living ferns, herbs and grasses, in the type locality in Denmark on dead *Pteridium*, and in Sweden found on living *Poa annua* and *Arenaria serpyllifolia*.

Distribution. Known only from the type locality and from Gävle in Sweden. It is probably overlooked as corticiologists as a rule concentrate their collections on woody substrates. The other collection mentioned by Jülich (1972:112) is here referred to *A. binucleospora*.

Remarks. *Athelia pyriformis* is characterized by the hyphae being completely devoid of clamps and by the pyriform spores. It has been impossible to make nuclei visible with the acetocarmine method. It is possible that this species is not a true *Athelia*.

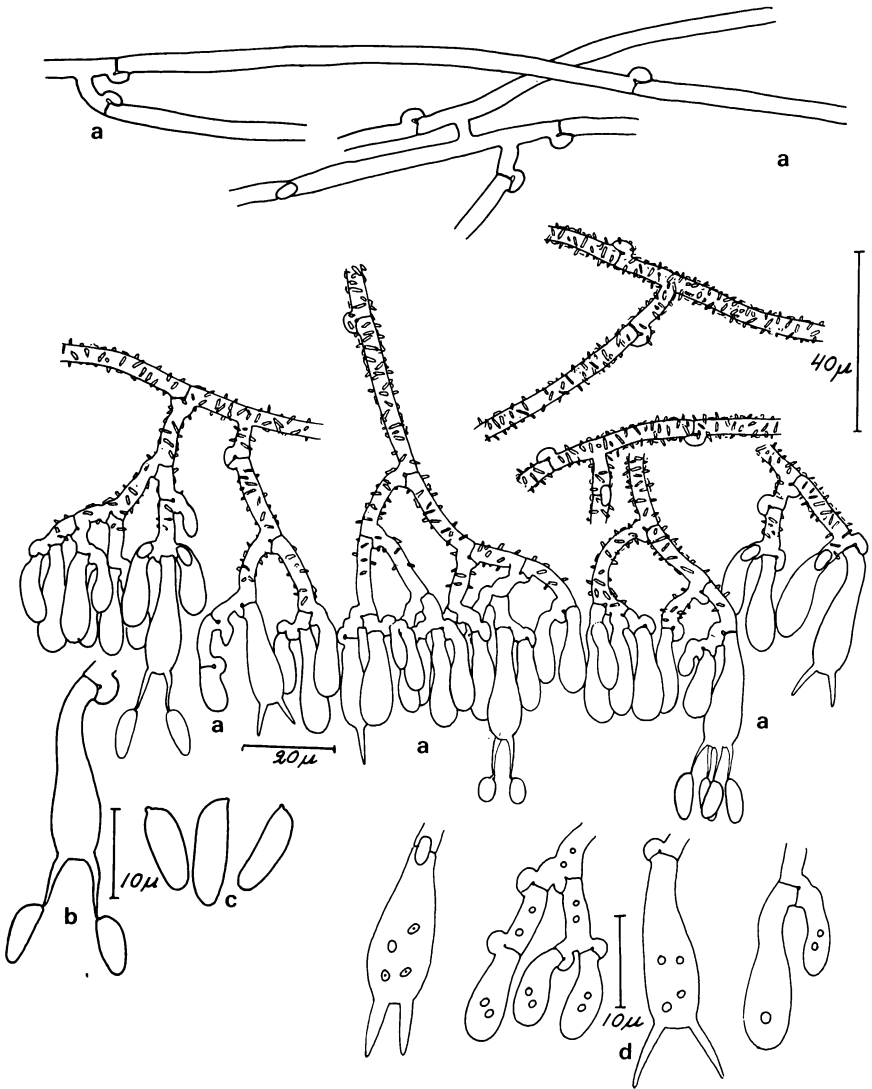


Fig. 53. *Athelia sibirica*. a) crush preparation of hymenium and hyphae
 b) basidium c) spores d) acetocarmine prep. of basidia and hyphae, showing
 dikaryons, haploid and diploid nuclei. — a-c Eriksson 2220, d Strid 9439.

Athelia

10. ***Athelia sibirica*** (Jül.) Erikss. & Ryv. comb. nov. Fig. 53
 Basionym: *Athelia arachnoidea* (Berk.) Jül. var *sibirica* Jül.,
 Willdenowia Beih. 7: 62, 1972.

Fruitbody white to yellowish white, thin and pellicular.

Hyphal system, all hyphae with clamps at the septa, 3 – 4 μm in diameter, more or less encrusted with small rod-like crystals often orientated at right angles on the hyphae, in older hyphae sometimes aggregated to small lumps of crystals, above all on the subhymental hyphae.

Basidia 17 – 25 x 6 – 7 μm with clamps at the base, usually with 2 sterigmata.

Spores unusually large, on average 12 – 13 x 4 – 5 μm though with a variation in length from 8 to 16 μm .

Habitat. Collected on *Betula* and *Alnus incana*.

Distribution. Only two collections known from the area, both from Lapp-land in Sweden: Muddus National Park by Muddusjavre on *Betula* 21.9. 1947, B. & J. Eriksson 2220 (*A. arachnoidea* var. *leptospora* det. Jülich) and Fredrika by the river Gide älv, on *Alnus incana*, 4.10.1971, Å. Strid 9439. The latter collection has somewhat larger spores and a more pronounced encrustation than the other, but this is certainly only within the normal variation of this species.

Remarks. The normally bispored basidia, the large spores and clamps at all septa make this species easy to separate from the other *Athelia* species treated here. The two collections cited above and Jülich's description of Krawtzev's Siberian material clearly give the impression that this is a good species. In its known distribution there is an indication that the species belongs to the so-called taiga-element which has many representatives among the wood-inhabiting fungi in Fennoscandia. The nuclei are visible in acetocarmine. Hyphae and basidiols are dikaryotic and after meiosis there are 4 nuclei in the basidia. Each spore receives two nuclei. *A. sibirica* seems to be close to *A. fibulata*.

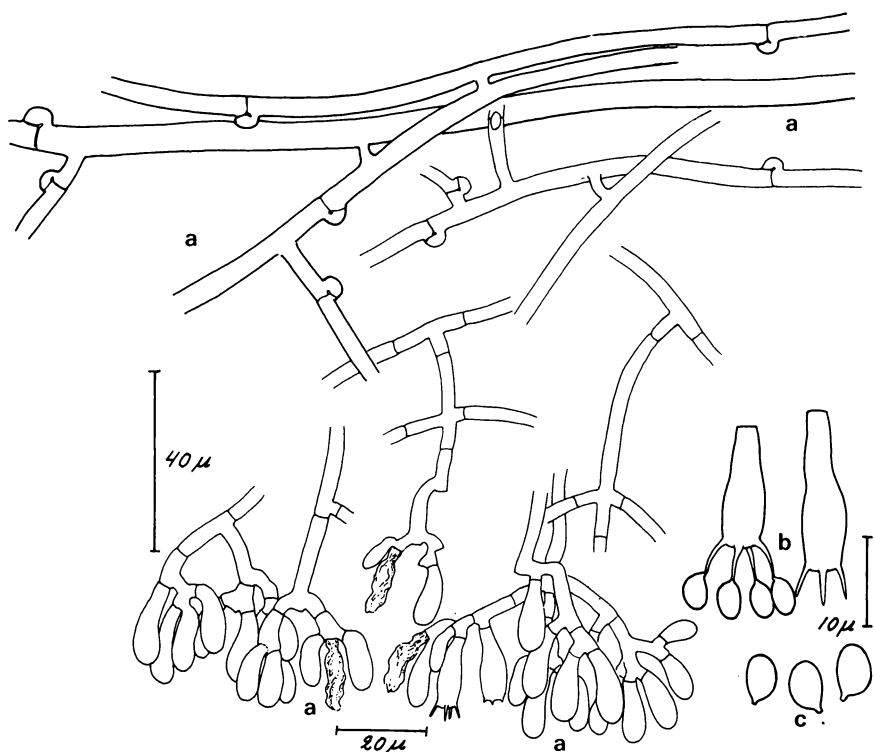


Fig. 54. *Athelia* sp., Hjortstam 5-3-1967. a) crush preparation of hymenium and hyphae b) basidia c) spores. *A. subsphaerospora* Jül. ined., *A. salicum*, rev. Jül.

Athelia

11. **Athelia** sp. Hjortstam 5.3.1967. — *Athelia subsphaerospora* Fig. 54
Jül. ined. in *Athelia salicum* Pers.

The spores of this collection (rounded, $5,5 - 6 \mu\text{m}$ in diameter) are too different from those of the *A. epiphylla*-complex to be included there. The spores are more like those of *A. neuhoffii* which however have clamps at all septa also at the base of the basidia, and clamps are absent in this collection. However, it should be observed that the collection was made in March, i.e. the season when the fruitbodies of *A. neuhoffii* are normally developed. Hyphae and basidiols are dikaryotic, spores uninucleate.

Locality: Västergötland, Hemsjö, Högelid, 5.3.1967, K. Hjortstam.

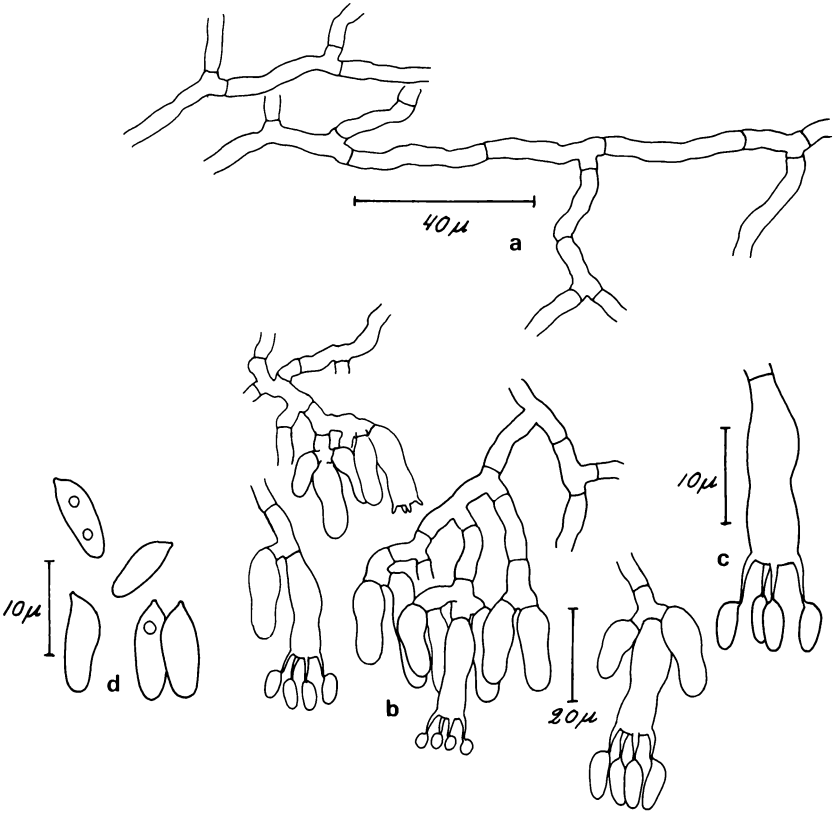


Fig. 55. *Athelidium aurantiacum*. a) hyphae b) hymenial details c) basidium d) spores. — Hauerslev 29-11-1959.

Athelidium Oberw.
Sydowia 19: 62, 1965.

Athelidium

Fruitbody thin, adnate, hypochnoid to membranaceous, yellow to ochraceous, hyphal system monomitic with thinwalled, hyaline, richly ramified hyphae without clamps, basidia more or less constricted with 4 sterigmata, spores hyaline, thinwalled, smooth and nonamyloid.

Genotypus: *Athelidium aurantiacum* (M.P. Christ.) Oberw.

Remarks. To this genus Oberwinkler referred two species, *A. aurantiacum* and *A. pyriforme*. The latter is by Jülich referred to *Athelia*, which seems to be a better solution. *Athelidium* is thus a monotypic genus. Its place in the system is very uncertain. The constricted basidia do not remind of *Athelia* and it is not looked upon as a satellite of this genus. The shape and size of basidia give it a place rather in the vicinity of *Hyphoderma*, but it differs in the absence of clamps. Material seen is very scarce.

1. **Athelidium aurantiacum** (M.P. Christ.) Oberw. Fig. 55, Pl. 13B-D
Sydowia 19: 62, 1965 — *Xenasma aurantiacum* M.P. Christ.,
Dansk bot. ark. 19: 107, 1960.

Fruitbody thin, more or less hypochnoid from the beginning but seems to develop a membranaceous hymenium, adnate, yellowish to ochraceous or even orange.

Hyphal system monomitic, rather loose, hyphae thinwalled, richly ramified, 3.5 — 5 μ m wide, without clamps, subhymenial hyphae more densely intertwined.

Basidia narrowly clavate to almost cylindrical, more or less constricted in a waist-like manner, about 17 — 22 x 6 μ m with 4 sterigmata.

Spores oblong to subfusiform, smooth, thinwalled, non-amyloid, 8 — 10 x 3.5 — 4.5 μ m.

Habitat. On decayed wood, hitherto found on *Alnus* and *Salix*.

Distribution. Very rare species, hitherto found twice in Denmark (Sjælland) and a few times in Germany (Oberbayern). The Danish material is extremely scarce.

Athelopsis

Athelopsis Oberw. ex Parm.

Sydowia 19:48, 1965 ex Parmasto, Consp. syst. Cort. p. 41, 1968.

Fruitbodies thin, pellicular (athelioid), smooth, pale yellowish, often with a faint tint of green; texture very loose; hyphae thinwalled, with clamps at all septa; basidia stalked, clavate, with 4 sterigmata; spores hyaline, non-amyloid, ellipsoid to cylindrical.

Genotypus: *Athelopsis glaucina* (Bourd. & Galz.) Oberw. ex Parm.

Athelopsis is a satellite genus of *Athelia*. The latter seems to be a reasonably natural genus, but is surrounded by a number of species which differ in one respect or another. *Athelopsis* has thin, pellicular fruitbodies, like those of *Athelia*. However, it differs in the colour, which as a rule is light yellowish or light greenish yellowish in the fresh hymenium. Many basidia are constricted and stalk-like towards the base, while they in *Athelia* gradually taper towards the base. The basidial character is not very evident and cannot be seen in all basidia, but is never the less used in the diagnosis of the genus. The hyphae are hyaline, the spores hyaline, smooth and non-amyloid.

Athelopsis in the sense of Oberwinkler is a very heterogenous taxon. Parmasto choose *Corticium glaucinum* as the genotype, but his genus also contains several different elements most of which are excluded here. The four species left seem to be reasonably related. *Grandinia lunata* Rom. ap. B. & G. transferred to *Athelopsis* by Parmasto is much more close to *Cristella* Pat., and the brown species (sect. *Brunneopsis* Parm.) are supposed to form a genus of their own.

Key to species

- | | |
|--|-------------------|
| 1. Spores ellipsoid | 2.A. hypochnoidea |
| 1. Spores cylindrical or allantoid | 2 |
| 2. Spores curved, allantoid | 3.A. lacerata |
| 2. Spores straight, cylindrical | 3 |
| 3. Spores 9 — 10 μ m long | 1.A. glaucina |
| 3. Spores 6 — 7.5 μ m long | 4.Athelopsis sp. |

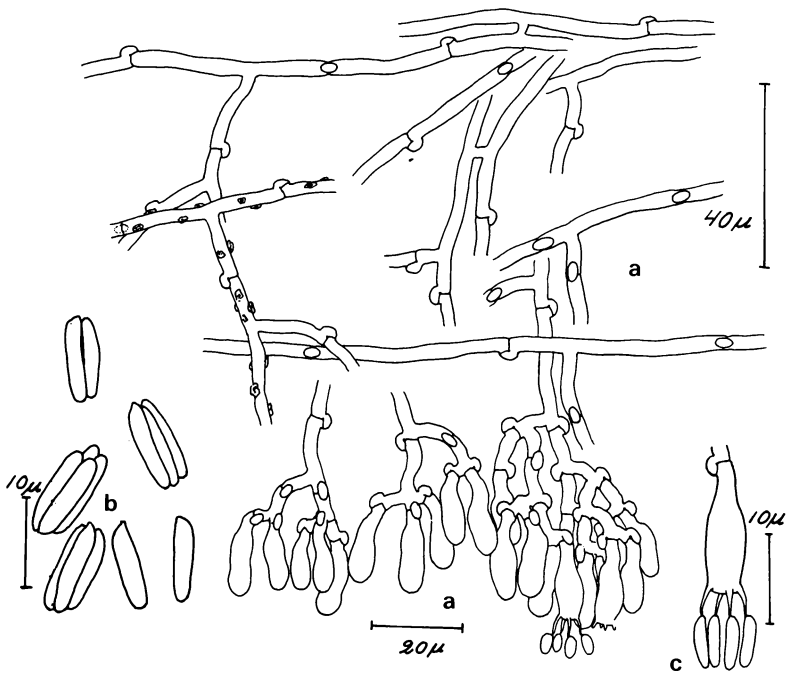


Fig. 56. *Athelopsis glaucina*. a) crush preparation of hymenium and hyphae
b) spores c) basidium. — Andersson and Eriksson 6380.

Athelopsis

1. **Athelopsis glaucina** (Bourd. & Galz.) Parm., Fig. 56, Pl. 13A
Consp. syst. Cort. p. 42, 1968. — *Corticium*
glaucinum Bourd. & Galz., Hym. France p. 207, 1928.

Fruitbody thin, pellicular, light yellowish, when fresh sometimes with a light tint of green. Consistency very loose.

Hyphal system monomitic, with distinct, thinwalled hyphae, with clamps at all septa; $1 - 3 \mu\text{m}$ in diameter, basal hyphae mostly straight and with sparse ramifications, the subhymenial hyphae more densely ramified; anastomoses frequent.

Basidia clavate, basally stalked, about $12 - 17 \times 15 \mu\text{m}$, with 4 sterigmata.

No cystidia or other sterile elements in the hymenium.

Spores non-amyloid, cylindrical, thinwalled, with oily plasmatic contents, $9 - 10 \times 2,0 - 2,5 \mu\text{m}$. The spores are as a rule glued together in groups of 2 or 4, often so closely that they may be mistaken for single ellipsoid spores.

Habitat. On decayed deciduous wood, mostly in humid fertile biotopes.

Distribution. Scattered and rather rare, and occurs preferably in S. Scandinavia.

Remark. The species is easily recognized by its yellowish, athelioid fruitbodies and characteristic spores.

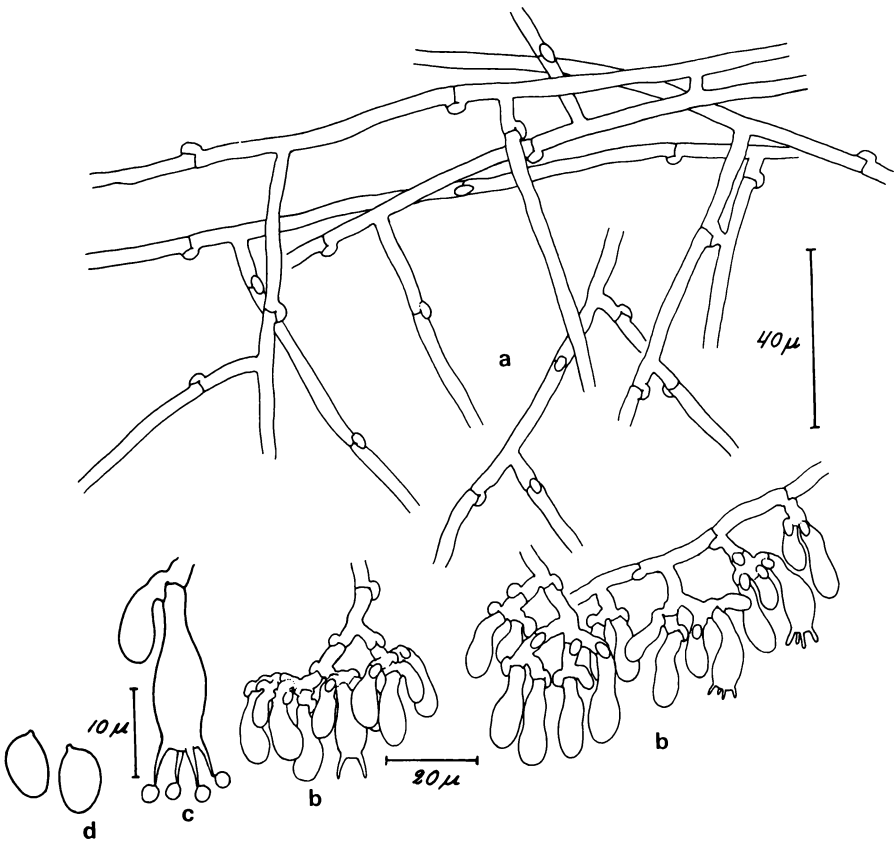


Fig. 57. *Athelopsis hypochnoidea*. a) hyphae of subiculum b) hymenial details c) basidium d) spores. — Eriksson 117.

Athelopsis

2. **Athelopsis hypochnoidea** Jül., Fig. 57, Pl. 12B
 Willdenowia 6:221, 1971. — Syn.: *Corticium viride* auctt.

Fruitbodies thin, pellicular, light yellowish and sometimes with a light greenish tint.

Hyphal system monomitic, very loose, composed of thinwalled, hyaline hyphae, $2.5 - 3.5 \mu\text{m}$ wide, with clamps at all septa. Basal hyphae straight, sparsely ramified at right angles. Subhymenial hyphae more abundantly ramified.

Basidia clavate, basally stalked, about $15 - 20 \times 5 \mu\text{m}$, with 4 sterigmata.

No cystidia or other sterile elements in the hymenium.

Spores ellipsoid, thinwalled, smooth, $6.5 - 8 \times 4 - 4.5 \mu\text{m}$, not glued together.

Habitat. On decayed wood, mostly of conifers but is also found on deciduous wood. In most cases it is found in *Picea-Myrtillus-Hylocomium* habitats.

Distribution. Scattered and rare, found in Sweden from Småland to North Lappland, in Norway north to Finnmark.

Remark. The species is characterized by yellowish (greenish) fruitbodies and ellipsoid spores. For a long time the name *Corticium viride* has incorrectly been used for this species (Jülich 1971).

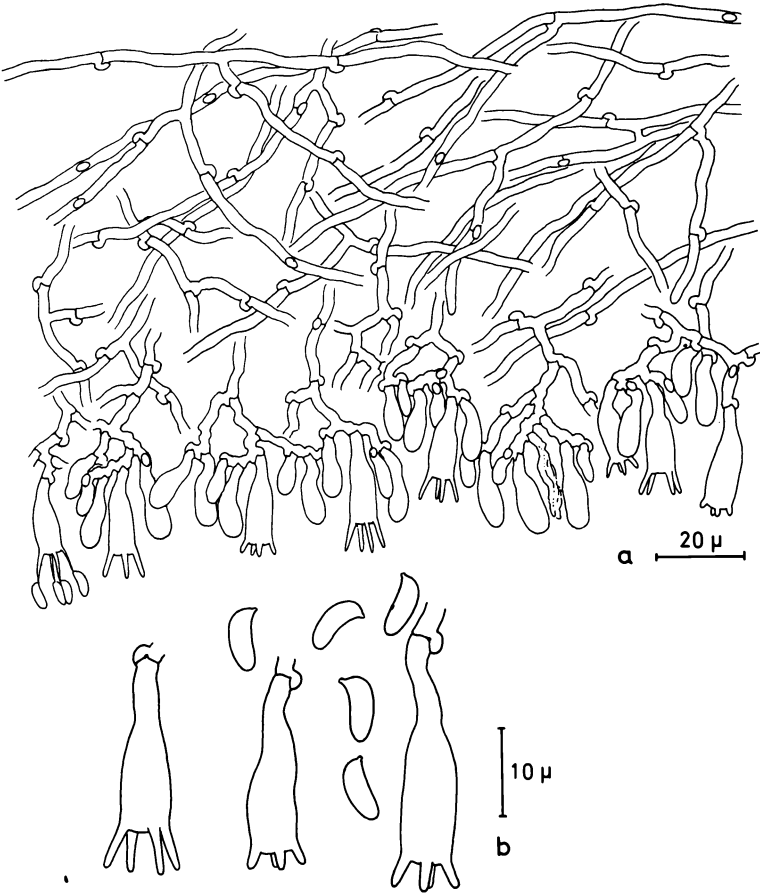


Fig. 58. *Athelopsis lacerata*. a) crush preparation of hymenium and hyphae
b) basidia c) spores. — Type specimen.

Athelopsis

3. **Athelopsis lacerata** (Litsch.) Erikss. & Ryv. comb. nov. Fig. 58
 Basionym: *Corticium laceratum* Litsch. Ann. mycol. 39:2–3, 1941.

Fruitbody pellicular, loosely adnate and separable in small pieces, hymenium thin, smooth, when dry \pm cracked, whitish to creme yellow.

Hyphal system monomitic, hyphae thinwalled, $1,5 - 2,5 \mu\text{m}$ wide, richly ramified from clamps or between septa, basal hyphae more straight and less ramified.

Basidia clavate, basally tapering to a more or less distinct stalk, $14 - 20 \times 5 - 6 \mu\text{m}$ with 4 sterigmata, sterigmata long and stout, when young more obtuse.

Cystidia none.

Spores allantoid, thinwalled, non-amyloid, $6 - 7 \times 2.5 \mu\text{m}$.

Habitat and distribution. Found only once in Sweden: Stockholm, Bromma, on decayed conifer wood 21.4.1918, L. Romell 3990.

Remarks. The material is very scanty but well developed and seems to be a typical *Athelopsis*. The species is well distinguished from other species of the genus by the shape of the spores. From *Athelia* it differs also in having a non-granular protoplasm in the basidiols.

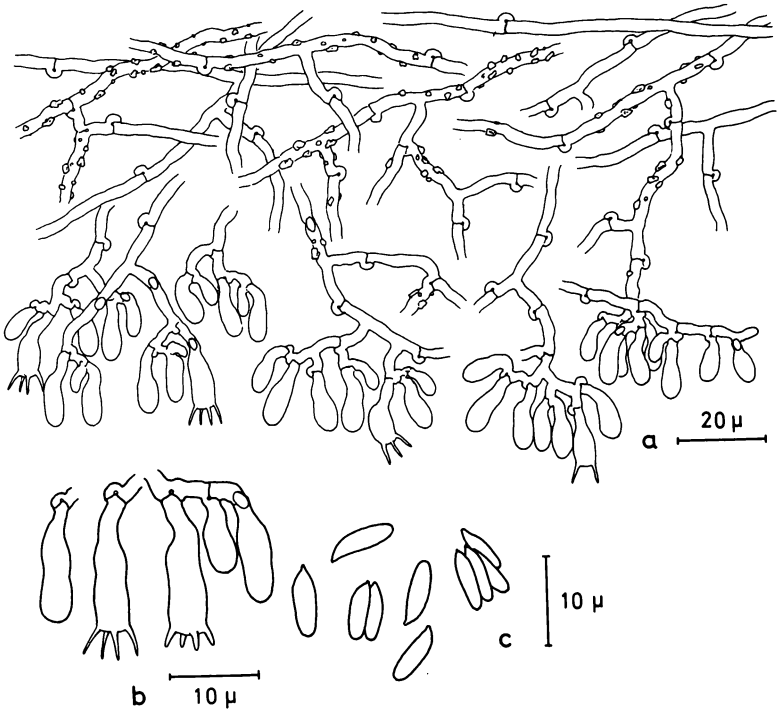


Fig. 59. *Athelopsis* sp., Eriksson 4274. a) crush preparation of hymenium and hyphae b) basidia c) spores. — Eriksson 4274.

Athelopsis

4. *Athelopsis* sp. John Erikss. n. 4274.

Fig. 59

Fruitbody thin, pellicular, separable in small pieces, hymenium thin, smooth and pure white.

Hyphal system monomitic, hyphae with clamps, richly ramified, more or less encrusted, $2.5 - 3 \mu\text{m}$ wide.

Basidia $12 - 15 \times 4 - 5 \mu\text{m}$, clavate, many of them tapering basally to a stalk, 4 sterigmata.

Cystidia none.

Spores cylindrical to subcylindrical, apically obtuse, basally tapering to a point (like the spores of *Athelia acrospora*), $6 - 7.5 \times 2 - 2.5 \mu\text{m}$, non-amyloid, often glued together in groups of 2 or 4.

Habitat and distribution. Hitherto very little known, seems to grow on conifer twigs on the ground in normal conifer forest (*Vaccinium-Hylocomium* forest). Swedish material: Uppland, Uppsala, Stadsskogen, twig of *Pinus* on the ground, 2.5.1950 Eriksson 4293. — d.o. twig of *Picea*, 30.4.1950. Eriksson 4274 (Herb. E).

Remarks. This species is well distinguished from the other species of the genus. Even if rather few basidia are typically stalked, it seems to match the genus *Athelopsis* sufficiently well.

Botryobasidium Donk**Botryobasidium**

Meded. Nederl. mycol. vereen. 18 — 20: 116, 1931.

Fruitbodies resupinate, loose, reticulate to hypochnoid (floccose or porose), hyphae distinct, broad, branching at right angles, basal hyphae more or less thickwalled, clamps present, lacking partly or totally; basidia originating in clusters on hymenial branches, short and rounded or longer and subcylindrical and often somewhat constricted, with 4 — 8 sterigmata; spores smooth, hyaline, non-amyloid, plasma of spores and basidia conspicuously stained by cotton-blue — the most stained parts appear red in phase-contrast microscope.

Characteristic conidial states (*Oidium*) in many species.

Genotypus: *Botryobasidium subcoronatum* (v. Höhn. & Litsch.) Donk.

The genus is as a rule easily recognized even by the naked eye. The thin fruitbody is, especially under the lens, reticulate or porose and does not as a rule form a continuous pellicular hymenium. The microscopic characters also allow a rather clear definition. As to its relations to other genera it seems on one side closely related to *Sistotrema*. This genus is characterized by its urniform basidia and in some *Botryobasidium* species basidia can be found which deviate rather little from this shape. This is true especially for *B. subcoronatum* and *B. angustisporum*. In the species described as *B. heteronemum* the basidia are in fact definitively of the *Sistotrema* model. This is why the species is here referred to *Sistotrema*, even if the basal hyphae simulate those of *Botryobasidium*. On the other side, *Botryobasidium* shows clear relations to such genera as *Uthastobasidium*, *Thanatephorus*, *Ceratobasidium* and *Cejpomyces*, in which as a rule spores grow by repetition, a character which is generally looked upon as Heterobasidiomycetous.

Many species of *Botryobasidium* are found in connection with a characteristic conidial state belonging to the imperfect genus *Oidium*. The conidial states are morphologically better differentiated and therefore taxonomically better known. They were monographed by Linder (*Lloydia* 5: 3, 1942), who knew 31 species. Only a few of these species are hitherto connected with basidial states. Several such connections are likely to be found. The existence of these conidial states makes it necessary to distinguish species that are very similar in the basidial states. In fact it does not always seem possible to see any difference at all between basidial states in some species.

To the list published by Eriksson & Hjortstam (*Friesia* 9 p. 13 — 14, 1969) *B. aureum* is now added while *B. heteronemum* is referred to *Sistotrema*.

Key to species

1. Hyphae with clamps 2
1. Hyphae without clamps 4
2. No conidia, spores less than $3.5\ \mu\text{m}$ wide 3
2. Conidia usually present,
Spores $5 - 6\ \mu\text{m}$ wide 8.B. medium
3. Clamps at all septa.
Spores $6 - 7.5 \times 2.5 - 3\ \mu\text{m}$ 11.B. subcoronatum
3. Clamps at the basidia and at some septa of the
basal hyphae, otherwise lacking. Spores $7 - 9$
 $\times 1.5 - 2.5\ \mu\text{m}$ 1.B. angustisporum
4. Broadest basal hyphae considerably wider (twice
or more) than the subbasidial branches 5
4. Broadest basal hyphae about 1.5 times the
width of the subbasidial branches 6
5. All hyphae smooth 7.B. laeve
5. At least basal hyphae rough 10.B. pruinatum
6. Spores navicular, distinctly biapiculate 7
6. Spores ellipsoid-allantoid, apically obtuse 8
7. Spores $6 - 7 (-8)\ \mu\text{m}$ long. Conidial state
Oidium candicans 4.B. candicans
7. Spores $(7-) 9 - 12\ \mu\text{m}$ long.
No *Oidium* state 3.B. botryosum
8. Spores obliquely ovoid-ellipsoid, $7.5 - 12\ \mu\text{m}$
long 9.B. obtusisporum
8. Spores cylindric, allantoid or almost so 9
9. Spores allantoid, $(10-) 12 - 14 (-17)\ \mu\text{m}$
long, no *Oidium* state 6.B. danicum
9. Spores $6 - 9\ \mu\text{m}$ long 10
10. Spores $6 - 7\ \mu\text{m}$ long, curved, no *Oidium*
state 13. Botryobasidium sp.
10. Spores $7 - 9\ \mu\text{m}$ long, not curved, *Oidium*
state usually present 11
11. Conidial state yellow-orange (*Oidium aureum*)..... 2.B. aureum
11. Conidial state greyish-brownish
(*Oidium conspersum*) 5.B. conspersum

Remarks to the key

There seems to be no reliable method for distinguishing the basidial states of *B. aureum* and *B. conspersum*. They are both however, much more common in the oidial states, and the basidial states are as a rule found in connection with them, thus the inconveniency is not too great. Another problem is the basidial state of *B. candicans* which does not seem to be distinguishable from the "small-spored forms of *B. botryosum*". It may be that true *B. botryosum* can be distinguished from this complex, using criteria found in spore, basidium, and hyphae. At the moment the "small-spored group" cannot with certainty be included in *B. candicans*, as it is quite possible that it includes basidial states of other species not yet found in Scandinavia (e.g. *B. simile*, *B. robustius*) or species not yet connected with *Oidium*.

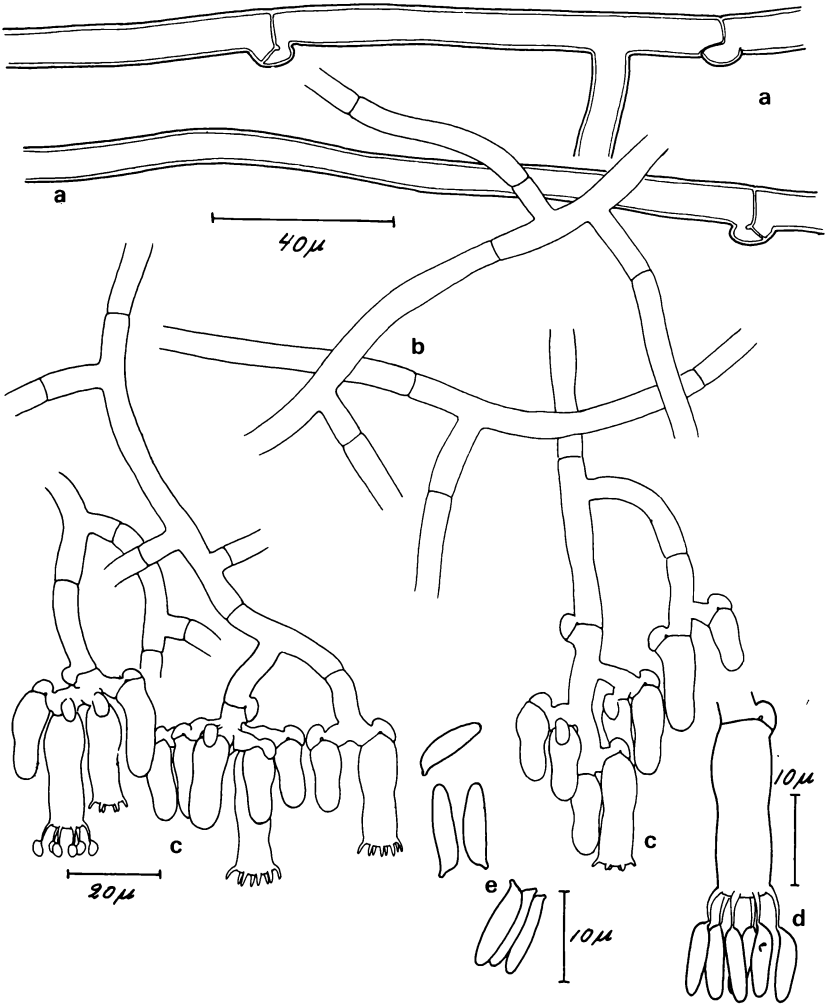


Fig. 60. *Botryobasidium angustisporum*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) basidium e) spores. — Eriksson 459.

Botryobasidium**1. Botryobasidium angustisporum Boid.**

Fig. 60

Publ. Mus. nat. d'hist. natur. 17: 119, 1957.

Fruitbody thin, first hypochnoid then subpellicular, whitish to cream-coloured, in old parts yellowish to pale ochraceous, and of a loose consistency.

Hyphal system monomitic, basal hyphae yellowish, $7 - 10\ \mu\text{m}$ wide, with thickened walls, with clamps at many but not all septa, intermediate hyphae (basal parts of hymenial branches) thinner, hyaline, without clamps, basidial branches $4 - 6\ \mu\text{m}$ wide, thinwalled, hyaline, with clamps.

Basidia subcylindrical, more or less constricted and somewhat urniform, $15 - 20 (-25) \times 6 - 8 (-10)\ \mu\text{m}$, with $6 - 8$ sterigmata.

Spores narrowly navicular to subcylindrical, $7 - 10 \times 1.5 - 2.5\ \mu\text{m}$, non-amyloid, often agglutinated in groups of 2 or more.

Conidial state not known.

Habitat. On decayed wood, mostly of conifers, in normal to humid (*Vaccinium-Hylocomium-Geranium-Equisetum*) *Picea* — *Pinus* forests.

Distribution. Not very common, but scattered from Småland to North Lapland.

Remarks. It is close to *B. subcoronatum* but easily distinguished by spore shape and the lack of clamps at septa of intermediate hyphae. It can also be recognized by sight by its thinner, more whitish fruitbodies.

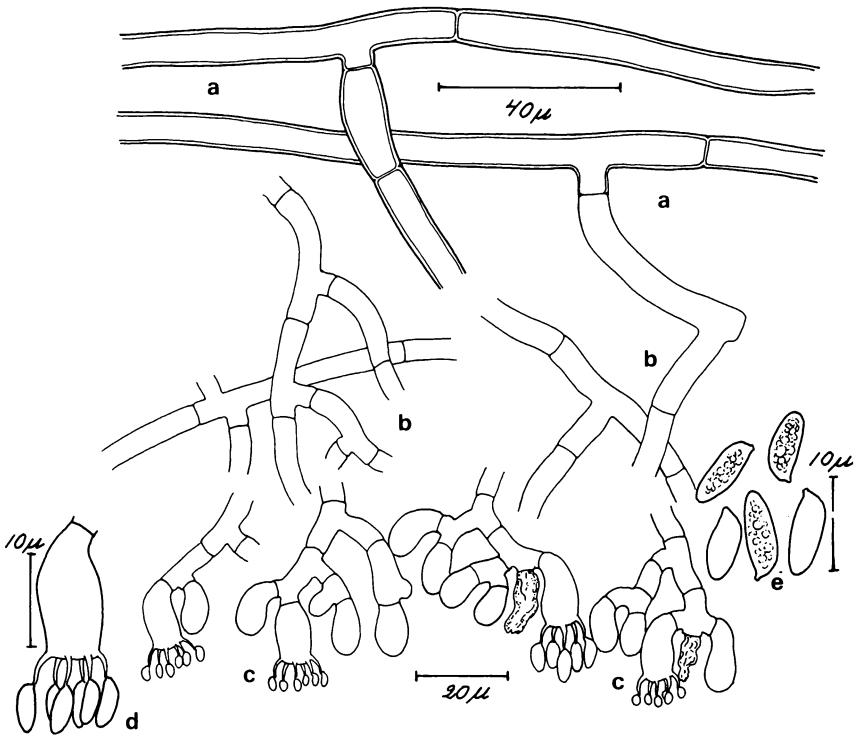


Fig. 61. *Botryobasidium aureum*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) basidium e) spores. — Strid 6797.

Botryobasidium**2. Botryobasidium aureum** Parm.

Fig. 61–62

Eesti NSV Tead. Akad. Toimet Biol. seer. 14: 220, 1965.

Fruitbody very thin, hypochnoid, greyish white to yellowish and of a loosely interwoven texture.

Hyphal system monomitic, hyphae without clamps, basal hyphae yellowish 6 – 9 μm wide with thickened walls, hymenial hyphae thinner, 4 – 5 μm wide, richly ramified.

Basidia short, mostly obovate, 12 – 16 x 7 – 8 μm , normally with 6 sterigmata.

Spores navicularly subcylindrical, thinwalled, with oildrops or oily granular material in the protoplasm, 6 – 9 x 3 – 3.5 μm .

Conidial state, *Oidium aureum* Fr. Oidia yellow, lemonshaped, mostly about 20 x 10 μm , originating in branched chains.

Habitat and distribution. This species which was described from USSR (material from Transcarpatia, Georgia, Armenia, Azerbaidzhan) has been found only once in Sweden. (Å. Strid, 1970, N.Sweden, Västerbotten, Täfteå parish.) Reported from Denmark (M.P. Christiansen).

Remarks. The basidial state seems to agree very closely with *B. conspersum* while the conidial states are clearly distinguished.

According to Parmasto (l.c. p. 220) the basidial state described by Christiansen as growing together with *Oidium aureum* is not identical with *B. aureum*.

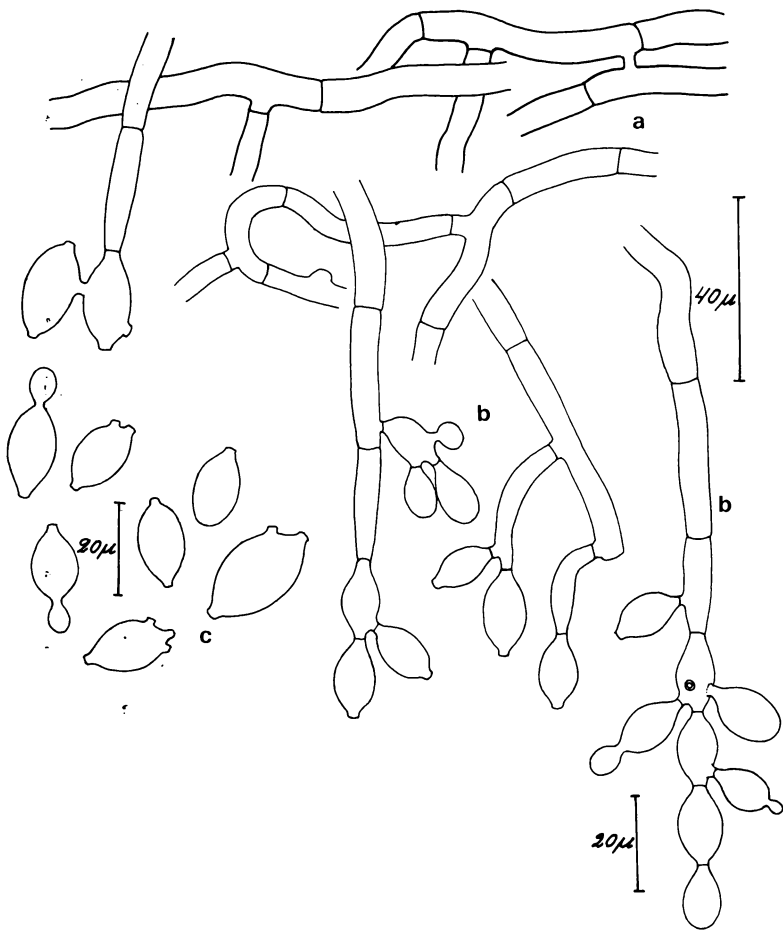


Fig. 62. *Oidium aureum*. a) basal hyphae b) conidiophores c) conidia. — Strid 6796.

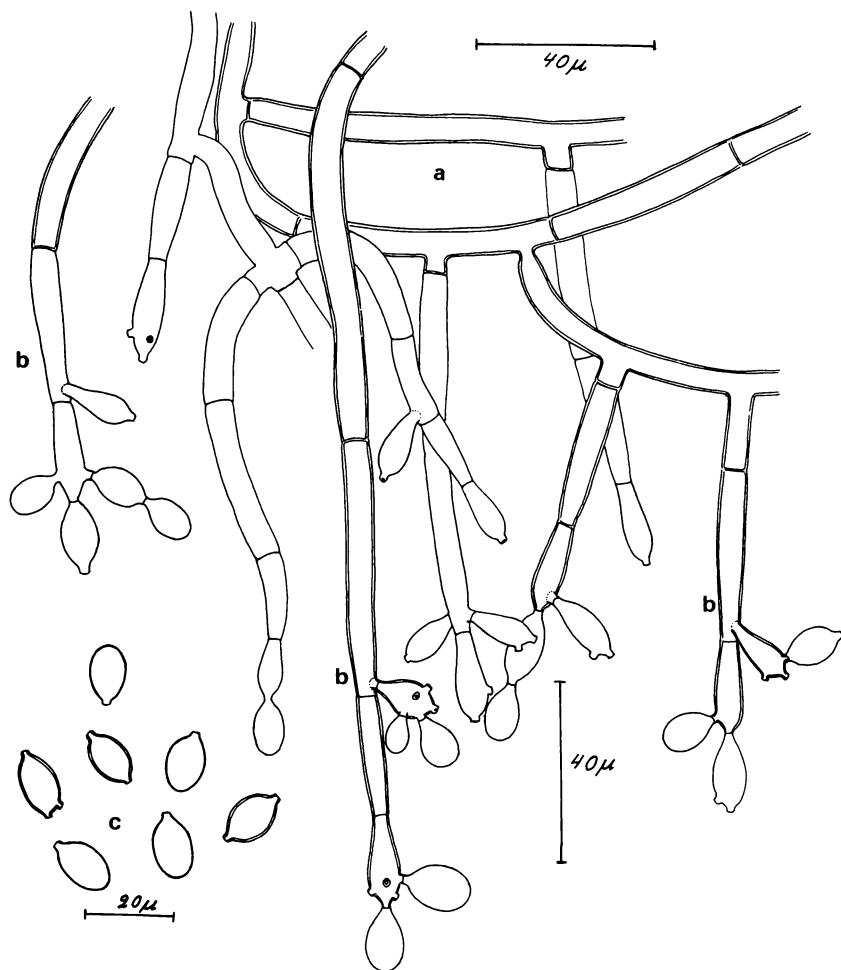


Fig. 63. *Oidium candidans*. a) basal hyphae b) conidiophore c) conidia. — Eriksson 595.

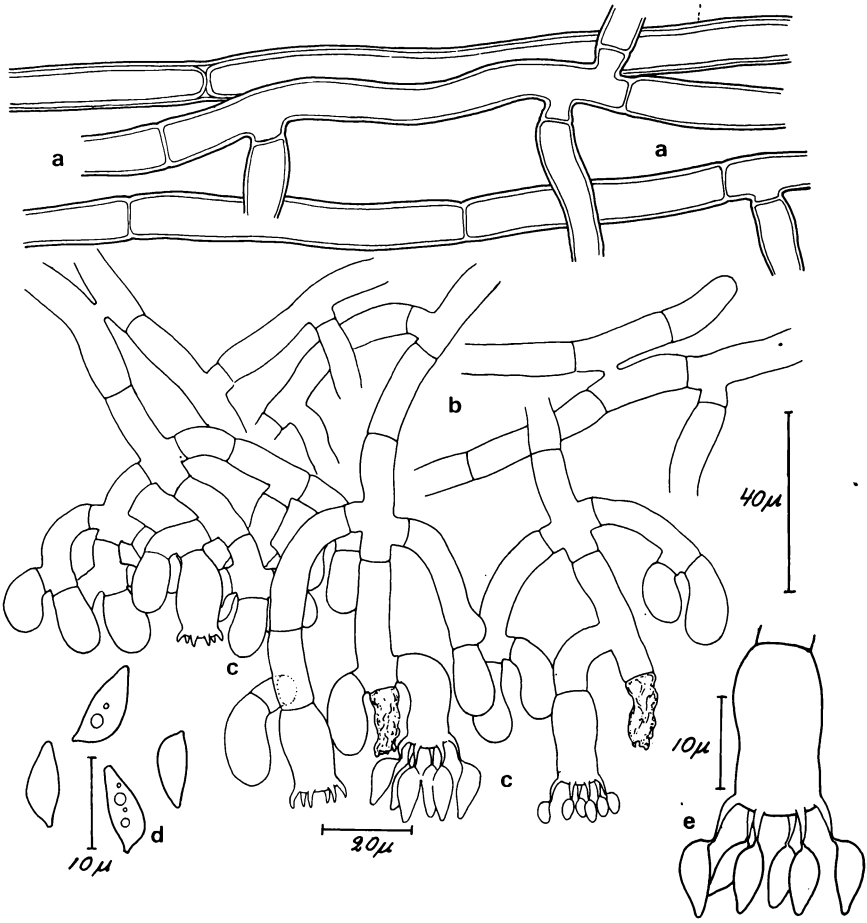


Fig. 64. *Botryobasidium botryosum*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) spores e) basidium. — Eriksson 482.

Botryobasidium

3. **Botryobasidium botryosum** (Bres.) John Erikss. Fig. 64
 Symb. bot. Ups. 16: 1 p., 53, 1958. — *Corticium botryosum*
 Bres. Ann. mycol. 1:99, 1903.

Fruitbody thin, reticulate to hypochnoid, finally subpellicular, greyish white to yellowish and of a loosely interwoven texture.

Hyphal system monomitic, all hyphae without clamps, basal hyphae yellowish, about $10\ \mu\text{m}$ wide, with thick, sometimes double walls, hymenial hyphae thinner, $5 - 7\ \mu\text{m}$ wide, richly ramified at right angles. All hyphae are more or less stained in Melzer's reagent (yellowish to brownish).

Basidia short, clavate to subcylindrical, sometimes somewhat constricted, $20 - 25 \times 9 - 12\ \mu\text{m}$, normally with 6 sterigmata.

Spores navicular (pip-shaped), thinwalled, normally $9 - 12 \times 4.5 - 6\ \mu\text{m}$.

Conidial state, connections with *Oidium* not observed. With *Constantinella michenerii* there is one case of suspected hyphal connection (Eriksson & Hjortstam, Friesia 9:13, 1969).

Habitat. *B. botryosum* grows on all kind of wood but seems to prefer conifers.

Distribution. The species is one of the most frequent corticioid fungi in North Europe, especially in conifer forests. It is dominant in the poorer heath forests (lichen — *Hylocomium* — conifer forests).

Remarks. There are forms with smaller spores ($6 - 8\ \mu\text{m}$ long), and somewhat thinner hyphae. These specimens probably do not belong to *B. botryosum* s.str. but rather to *B. candicans* or to some other, as yet unidentified species. The limitation of *B. botryosum* needs further studies.

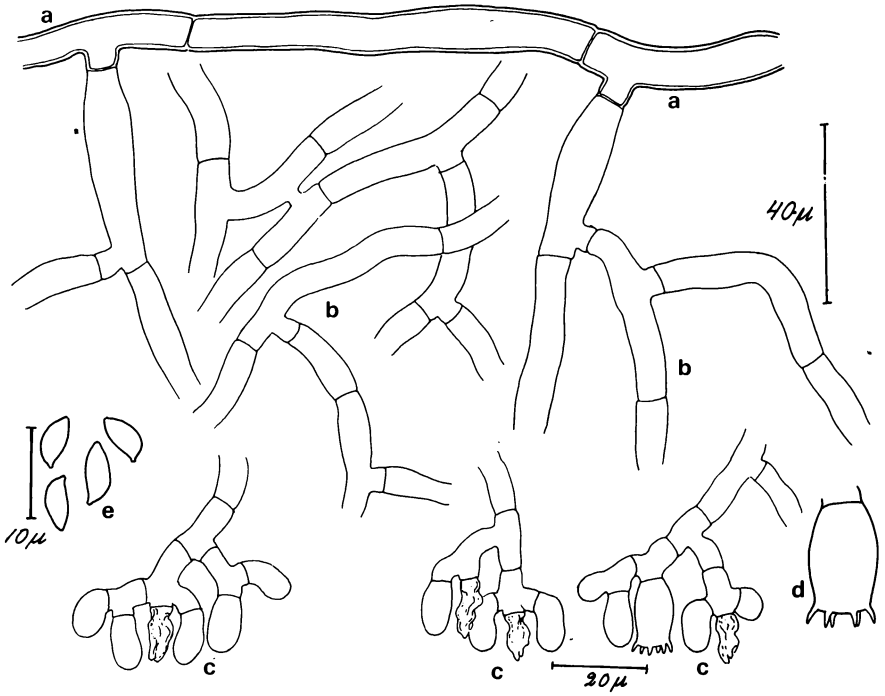


Fig. 65. *Botryobasidium candicans*. a) basal hyphae b) subhymenial details
d) basidium e) spores. — Eriksson 595.

Botryobasidium

4. **Botryobasidium candicans** John Erikss.
Svensk bot. tidskr. 52: 6, 1958.

Fig. 63 and 65

Fruitbody very thin, reticulate to hypochnoid, greyish white and of a loosely interwoven texture.

Hyphal system, monomitic, all hyphae without clamps, basal hyphae with thickened walls and sparse ramifications, $6 - 10 \mu\text{m}$ wide, hymenial hyphae thinner and more narrow, $4 - 5 \mu\text{m}$ wide.

Basidia, short, ellipsoid to obovate, $12 - 18 \times 5 - 7 \mu\text{m}$, as a rule with 6 sterigmata.

Spores obliquely subfusiform or navicular (pip-shaped), distinctly biapiculate, $6 - 8 \times 3 - 4 \mu\text{m}$.

Conidial state, *Oidium candicans* (Sacc.) Linder. Conidia pale yellow, about $15 \times 8 \mu\text{m}$, born on long, apically branched conidiophores.

Habitat. On deciduous wood in humid, fertile localities.

Distribution. Not exactly known, but it is probably not too common in good habitats in South Scandinavia and along the coasts further north.

Remarks. The species agrees in every essential character with *B. botryosum*. The only differences are the smaller spores and basidia and more narrow hyphae, and if no conidial state is present they are difficult to distinguish. Moreover, there are other species with similar basidial states (*B. simile* Pouz. & Jech., and *B. robustius* Pouz. & Jech.) which are not found in Scandinavia as yet.

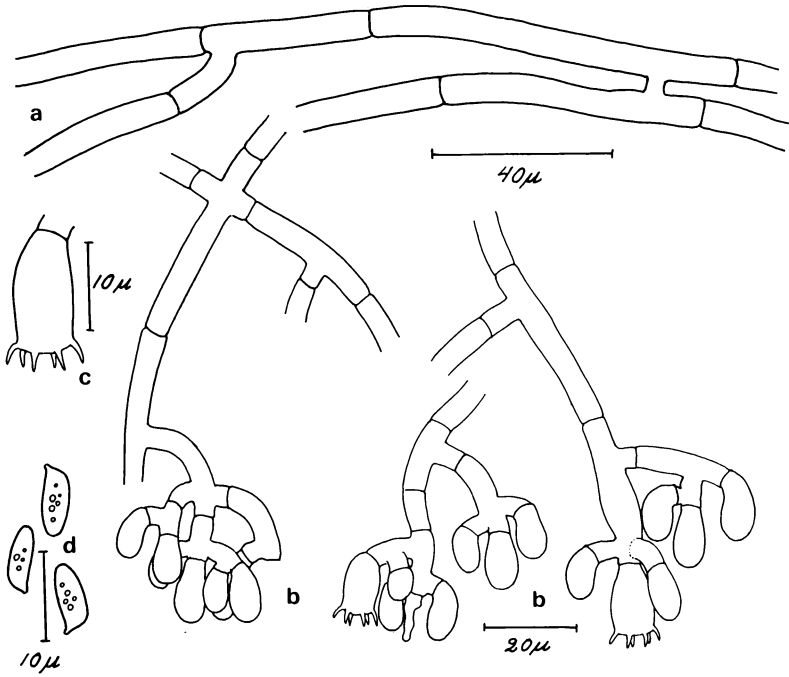


Fig. 66. *Botryobasidium conspersum*. a) basal hyphae b) hymenial details
c) basidium d) spores. — Nannfeldt 11434a.

Botryobasidium**5. Botryobasidium conspersum** John Erikss.

Fig. 66–67

Symb. bot. Ups. 16: 1 p. 133, 1958.

Fruitbody very thin, hypochnoid, greyish white and of a loosely interwoven texture.

Hyphal system monomitic. All hyphae without clamps, basal hyphae 5 – 7 μm wide, somewhat thickened walls, and sparse ramifications, hymenial hyphae thinner and more narrow, 4 – 5 μm wide.

Basidia short, ellipsoid to obovate, 12 – 15 x 6 – 8 μm , with 6 sterigmata.

Spores subcylindrical or narrowly navicular, apically obtuse, thinwalled, smooth, 7 – 9 x 2.5 – 3 μm .

Conidial state, *Oidium conspersum* (Link) Linder. Colonies effused, loosely downy, first whitish, then pale ochraceous and finally brownish, conidiophores of uniform thickness, unbranched, up to 250 μm long, 6 – 8 μm wide, straight in the distal part, basally curved or flexuose, the 1 – 7 distal cells bear sporogeneous teeth, most on the apical cell, in basal direction fewer, conidia 13 – 22 x 9 – 12 μm , ellipsoid, yellowish.

Habitat. On decayed wood of frondose or coniferous wood, preferably in good, humid localities.

Distribution. Rather common in S. Scandinavia, in the north rarer except in good, humid habitats, preferably along the coasts.

Remarks. The basidial state agrees with that of *B. aureum* and there seems to exist no reliable character to separate them without conidial states present.

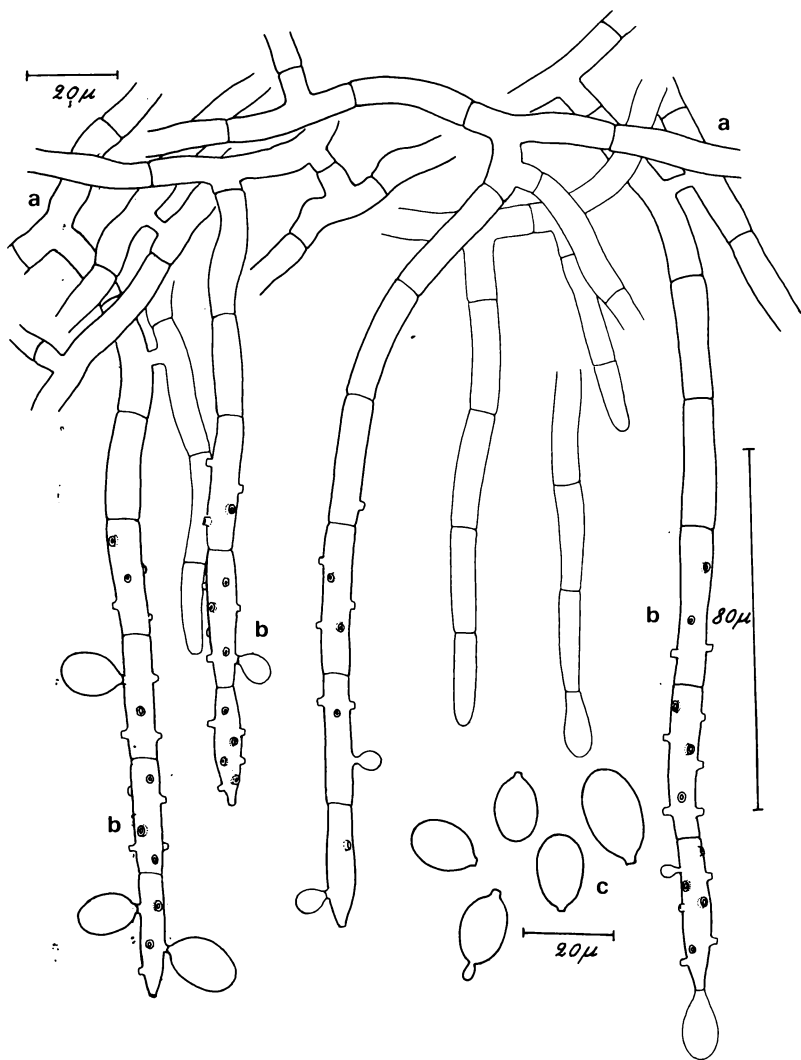


Fig. 67. *Oidium conspersum*. a) basal hyphae b) conidiophores c) conidia. — F.exs.suec. 2663.

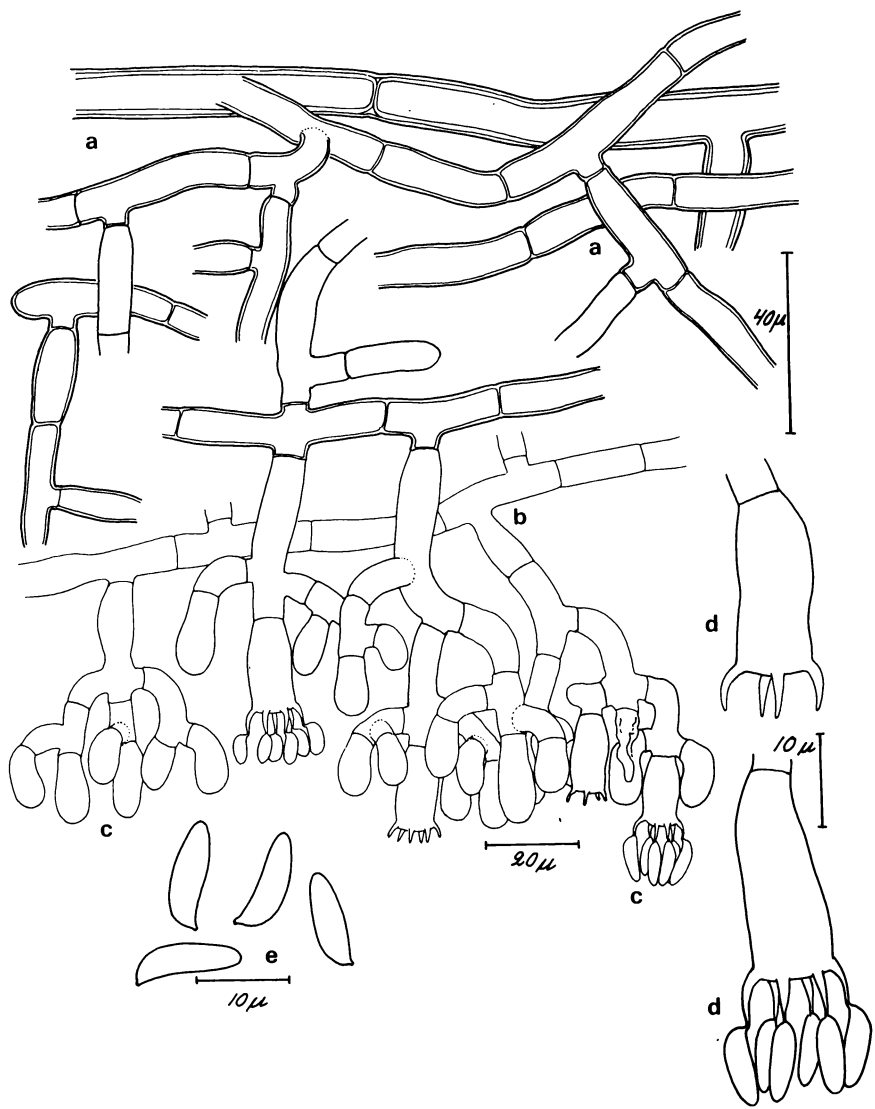


Fig. 68. *Botryobasidium danicum*. a) basal hyphae b) subhymenial details c) hymenial details d) basidia e) spores. — Hjortstam Sept. 1968.

Botryobasidium

6. **Botryobasidium danicum** Erikss. & Hjortst.
Friesia 9: 11, 1969.

Fig. 68, Pl. 14A

Fruitbody thin, reticulate to hypochnoid, greyish white or with age yellowish and of a loosely interwoven texture.

Hyphal system monomitic, all hyphae without clamps, basal hyphae 10 – 12 μm wide, thickwalled, the coarser hyphae with double walls, hyphal hyphae thinner and more narrow, hyaline, 6 – 8 μm wide.

Basidia first rounded to ellipsoid, then obovate, obconical to subcylindrical, 15 – 20 x 9 – 12 μm , with 4 – 6 sterigmata.

Spores narrowly navicular to almost allantoid, apically obtuse, (10) 12 – 14 (17) x 3 – 5 μm .

Conidial state unknown.

Habitat. Found on many kinds of substrate but seems to prefer coniferous wood and grows preferably in humid localities.

Distribution. Seems to be restricted to humid oceanic or suboceanic areas. It is collected in Denmark, Norway and several times in SW. Sweden where it is quite common. Besides, it is found to be frequent in Br. Columbia in NW. North America, especially in humid oceanic biotopes (e.g. *Pseudotsuga* forests).

Remarks. The size and shape of spores make this species easy to recognize.

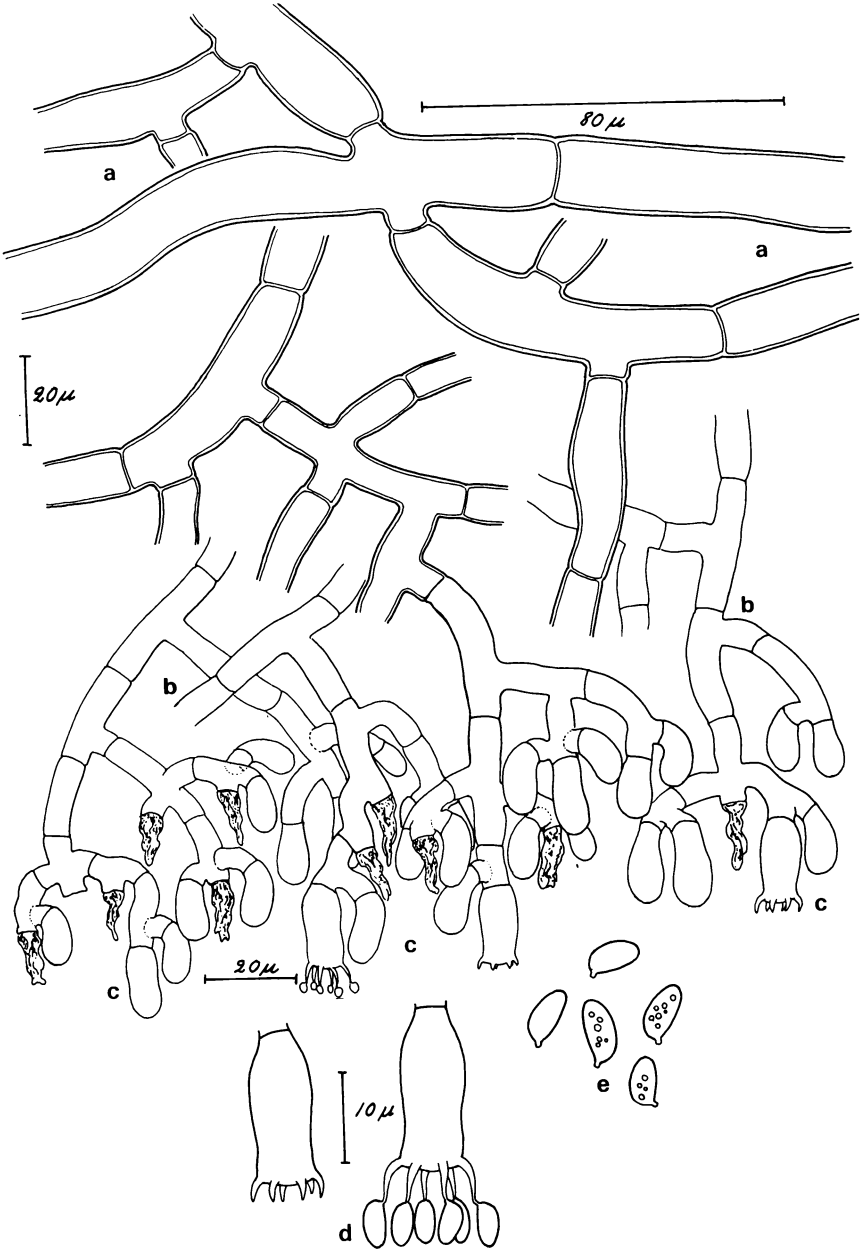


Fig. 69. *Botryobasidium laeve*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) basidia e) spores. — Hjortstam 24-10-1967.

Botryobasidium

7. **Botryobasidium laeve** (John Erikss.) Parm. Fig. 69
 Eesti NSV tead. akad. toimet. Biol. seer. 14: 220, 1965 –
Botryobasidium pruinaum (Bres.) John Erikss. var. *laeve*
 John Erikss. Sv. bot. tidskr. 52: 10, 1958.

Fruitbody thin, greyish white or in age yellowish, at first reticulate to hypochnoid, then more or less confluent and of a loosely interwoven texture.

Hyphal system monomitic, all hyphae without clamps, basal hyphae yellowish to yellowish brown, very wide, 15 – 20 μm (in some cases more) wide, thickwalled, smooth, with sparse ramifications, hymenial branches more narrow, 4.5 – 6 μm wide, richly ramified and almost hyaline.

Basidia, at first rounded, then ellipsoid to obovate or short cylindrical, mostly somewhat constricted, 17 – 22 x 7 – 9 μm , as a rule with 6 sterigmata.

Spores obliquely ovoid, apically obtuse with distinct apiculus, smooth and with somewhat thickened walls, 5 – 8 x 2.5 – 3.5 μm .

Conidial state unknown.

Habitat. The normal substrate is decayed frondose wood, but it is also found on conifers. It grows preferably in good, humid localities.

Distribution. Not too rare in S. Scandinavia, less common in the North where it is found only in fertile, humid localities. Such habitats can be found both in the subalpine zone and along the coasts.

Remarks. Smooth hyphae distinguish it from *B. pruinaum*. In some respects, e.g. shape of spores it is reminiscent of *B. obtusisporum*, but the broad basal hyphae are a reliable character, besides the spores are larger in *B. obtusisporum*.

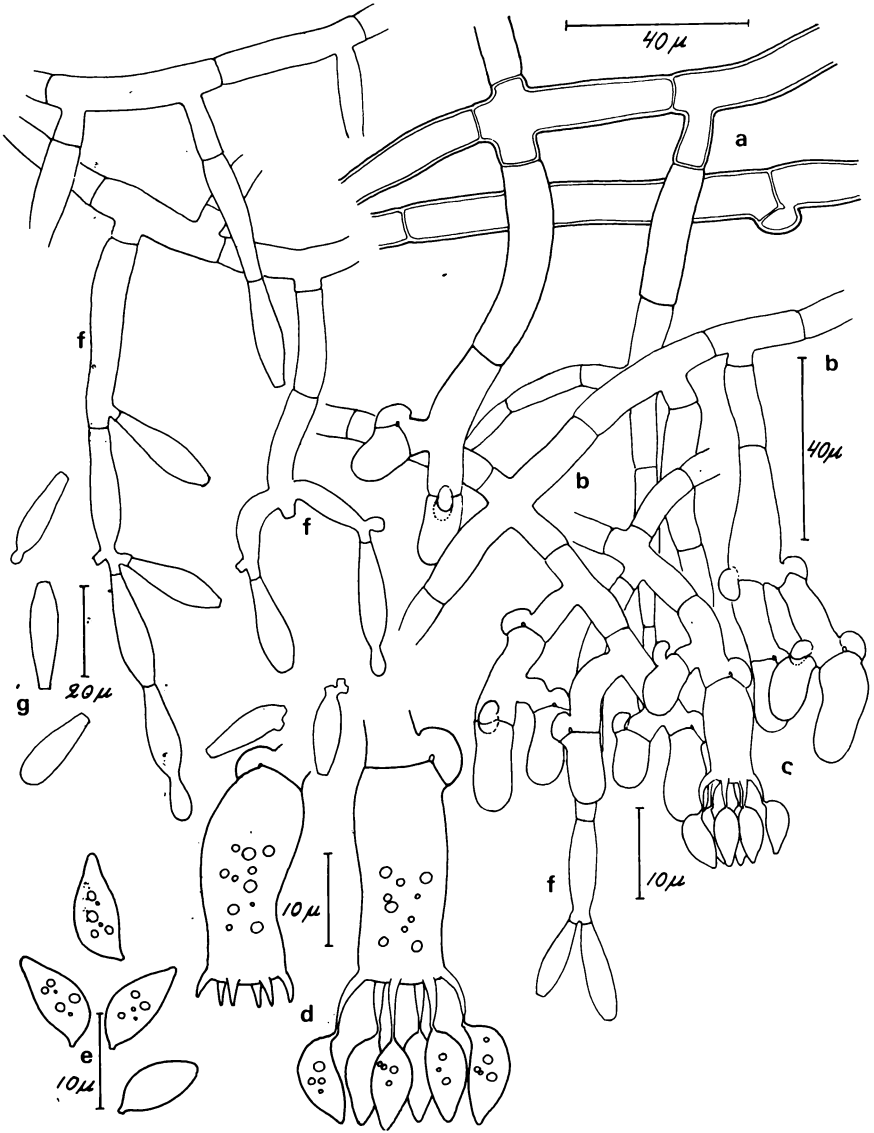


Fig. 70. *Botryobasidium medium*. a) basal hyphae b) subhymenial details c) hymenial details d) basidia e) spores f) conidiophores g) conidia. — Eriksson 21-9-1966.

Botryobasidium**8. Botryobasidium medium** John Erikss.

Fig. 70

Symb. bot. Ups. 16: 54, 1958.

Fruitbody thin, first hypochnoid then more confluent, greyish white to yellow or pale ochraceous in age and of a loosely interwoven texture.

Hyphal system monomitic, basal hyphae 7 – 10 μm wide, yellowish, without clamps, with thickened walls, hymenial hyphae thinner, 5 – 7 μm wide, hyaline, basidial branches with clamps.

Basidia first rounded, then obovate or shortly subcylindrical, 15 – 22 x 7 – 10 μm , with (4–) 6 sterigmata. Clamps at the bases of the basidia.

Spores broadly navicular (pip-shaped), 9 – 12 x 5 – 6 μm ,

Conidial state generally present. Conidia originate in simple chains, fusiform, 15 – 25 x 5 – 7 μm .

Habitat. On conifer wood in *Vaccinium* – *Hylocomium* – *Picea* (–*Pinus*) forests.

Distribution. Scattered in N. Scandinavia, rather scarce. In Sweden found in Västergötland and from Härjedalen northwards, besides collected in N. Finland and in Canada.

Remarks. Agrees in several respects (shape of basidia and spores) with *B. botryosum* but is distinguished by having clamps at the basidial base and in the presence of conidia.

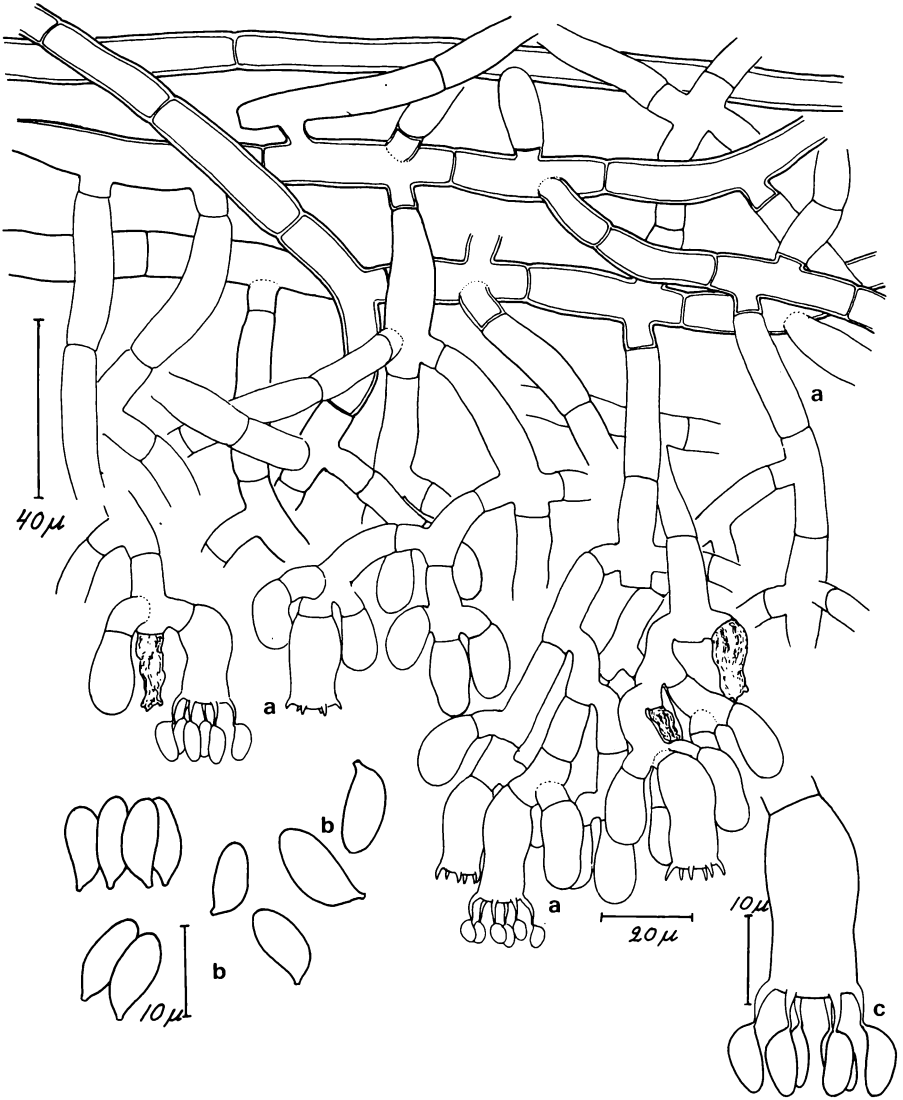


Fig. 71. *Botryobasidium obtusisporum*. a) crush preparation of fruitbody with basal and subhymenial hyphae and hymenial details b) spores c) basidium. — Eriksson 8-10-1966.

Botryobasidium**9. Botryobasidium obtusisporum** John Erikss.

Fig. 71

Symb. bot. Ups. 16: 57, 1958.

Fruitbody thin, at first hypochnoid, then more confluent, greyish white or with age yellowish to pale ochraceous and of a loosely interwoven texture.

Hyphal system monomitic, all hyphae without clamps, basal hyphae yellowish, more or less thickwalled, $7.5 - 10 \mu\text{m}$, with sparse ramifications, hymenial branches more narrow and more thinwalled, hyaline, $5 - 6 \mu\text{m}$ wide.

Basidia at first rounded, then obovate to subcylindrical, somewhat constricted, $17 - 25 \times 8 - 10 \mu\text{m}$, with (4–) 6 sterigmata.

Spores smooth, obliquely ovoid, apically obtuse, $7.5 - 12 \times 3.5 - 5 \mu\text{m}$.

Conidial state not known.

Habitat. On conifer wood, rarely on deciduous wood, in *Vaccinium* – *Hylocomium* – *Picea* – *Pinus* – forests.

Distribution. Not common but scattered in the conifer region of the whole of Fennoscandinavia.

Remarks. Reminds of *B. laeve* in shape of spores, but spores are larger and basal hyphae narrower. It is distinguished from *B. botryosum* by the spore shape (apically obtuse in *B. obtusisporum*).

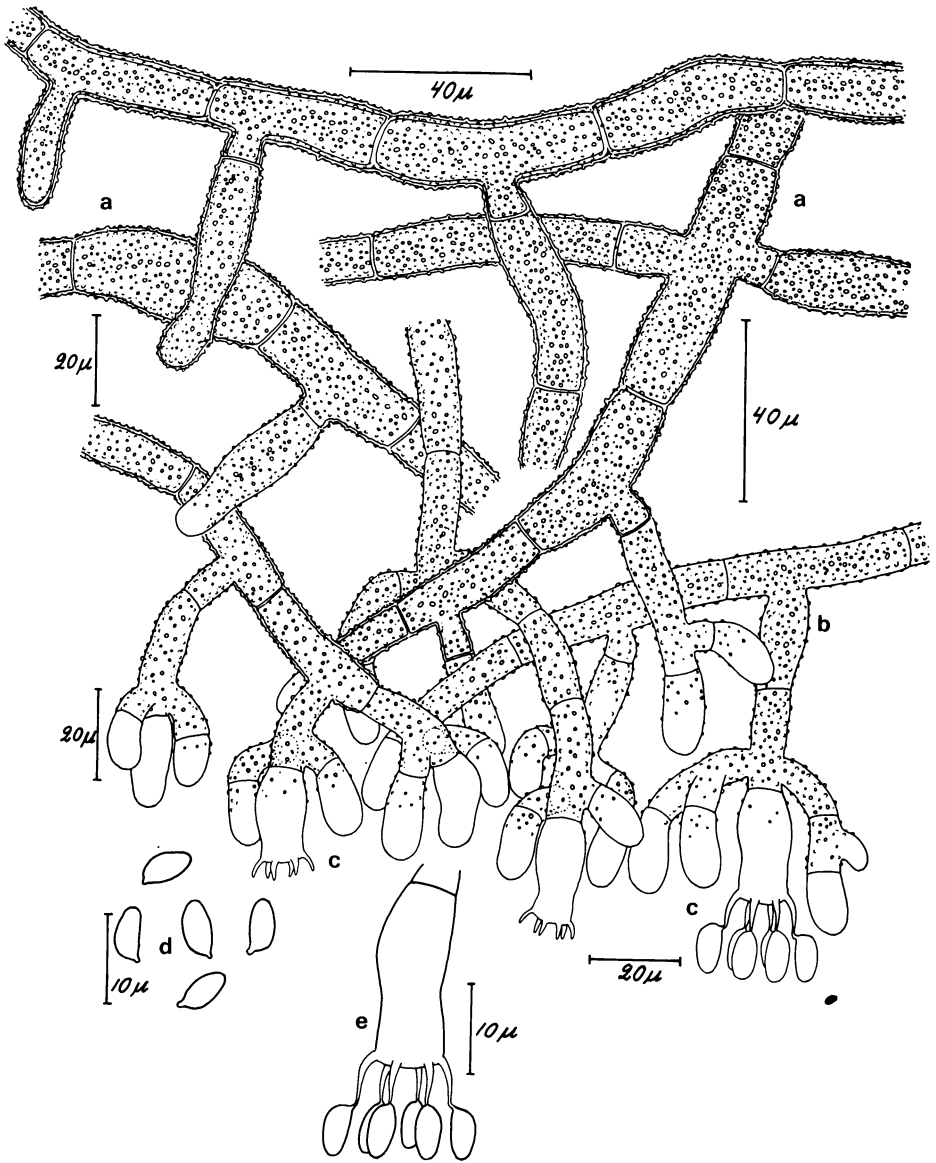


Fig. 72. *Botryobasidium pruinaum*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) spores e) basidium. — Eriksson 716.

Botryobasidium

10. **Botryobasidium pruinaum** (Bres.) John Erikss. Fig. 72, Pl. 14B, C
 Sv. bot. tidskr. 52: 9, 1958. — *Corticium pruinaum*
 Bres. Ann. mycol. 1: 99, 1903.

Fruitbody first reticulate hypochnoid, then more confluent, greyish white or with age yellowish or pale ochraceous and of a loosely interwoven texture.

Hyphal system monomitic, all hyphae without clamps, most of them, especially the basal ones, more or less asperulate, basal hyphae thickwalled, yellowish to brownish yellow, very wide $15 - 20 \mu\text{m}$ or sometimes more, with sparse ramifications, hymenial hyphae more narrow, the basidial branches thinwalled and hyaline, $4,5 - 6 \mu\text{m}$ wide.

Basidia at first rounded, then obovate to subcylindrical, more or less constricted, $17 - 25 \times 7 - 10 \mu\text{m}$.

Spores obliquely ovoid, with very distinct apiculus, with smooth, somewhat thickened walls, $5 - 8 \times 2,5 - 3,5 \mu\text{m}$.

Conidial state unknown.

Habitat. Mostly on deciduous wood, rarely on conifers, in humid, fertile biotopes.

Distribution. Preferably found in S. Scandinavia, scattered in good habitats in the north, e.g. in subalpine meadow forests with *Betula*, *Salix* a.o., and in the *Alnus* zone along the coasts.

Remarks. The asperulate hyphae distinguish it from all other species of the genus. Its closest relative is *B. laeve*.

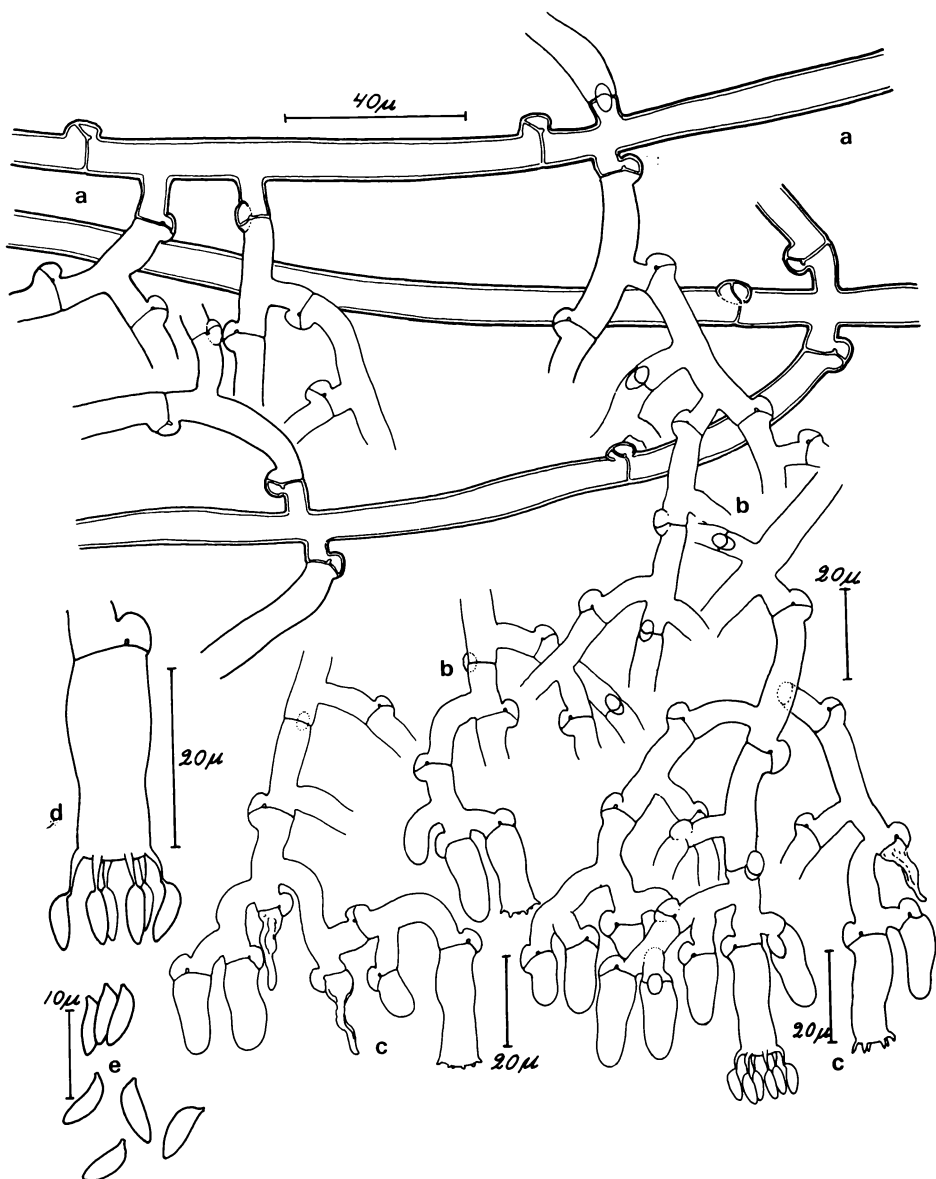


Fig. 73. *Botryobasidium subcoronatum*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) basidium e) spores. — Eriksson 31-10-1965.

Botryobasidium

11. **Botryobasidium subcoronatum** (v. Höhn & Litsch.) Fig. 73
 Donk. Meded. Nederl. mycol. vereen. 18–20: 117, 1931 –
Corticium subcoronatum v. Höhn & Litsch., Sitz.-ber.
 K. Ak. Wiss. Wien, Math.-nat. Kl. 116: 822, 1907.

Fruitbody thin, first reticulate to hypochnoid, with age more or less continuous and subpellicular, first whitish then more or less yellowish or ochraceous.

Hyphal system monomitic, loosely interwoven, hyphae with clamps at all septa, basal hyphae thickwalled, $7 - 10\ \mu\text{m}$ wide, hyaline, richly ramified.

Basidia at first rounded or ellipsoid, then longer and subcylindrical, more or less constricted, $20 - 25 (-30) \times 7 - 9\ \mu\text{m}$, with mostly 6 sterigmata.

Spores smooth, navicular with distinct apiculus, $6 - 7,5 \times 2,5 - 3\ \mu\text{m}$.

Conidial state not known.

Habitat. On decayed wood of conifers and deciduous trees in a wide variety of biotopes from poor lichen conifer heaths to fertile deciduous forests.

Distribution. One of the most common corticoid fungi in forests of all kinds, (maybe not in the richer herb forests) throughout whole of the Scandinavia.

Remarks. Characteristic species showing little variation well distinguished from all other species of the genus.

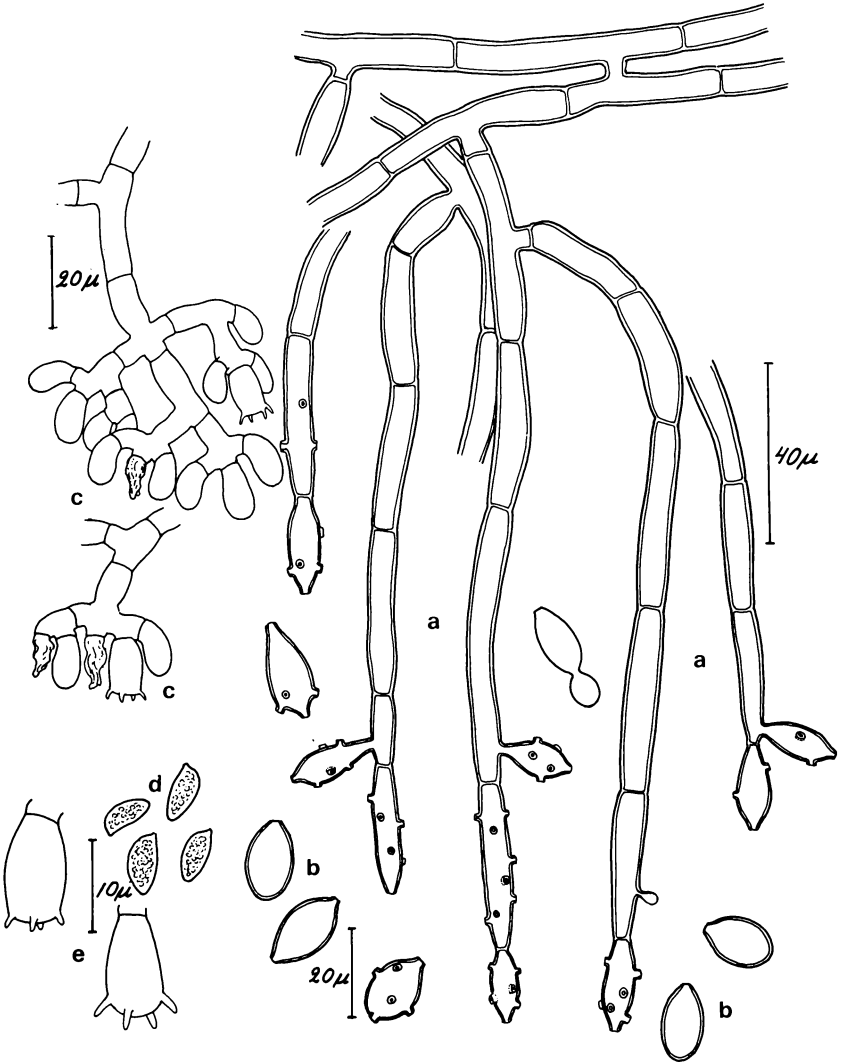


Fig. 74. *Botryobasidium* sp. M.P. Christ. 52. a) conidiophores b) conidia c) hymenial details d) spores e) basidia. — Hauerslev 3313.

Botryobasidium

12. **Botryobasidium** sp. M.P. Christ. 52.

Fig. 74

Fruitbody thin, hypochnoid, whitish.

Hyphal system monomitic, all hyphae without clamps, basal hyphae somewhat thickwalled, 7 – 9 μm wide, hymenial branches thinner and narrower.

Basidia short, ellipsoid, obovate, 12 – 16 x 6 μm , with mostly 4 (M.P. Christiansen: 6 – 8) sterigmata.

Spores amygdaliform – obliquely ovoid, apically obtuse, with oily granular contents.

Conidial state, close to *Oidium candicans*, but conidiophores and conidia seem to be more thickwalled, and sporogeneous teeth more numerous.

Remarks. Very close to *B. candicans* and differs preferably in the shape of spores which are not distinctly biapiculate but apically obtuse. Little material has been seen, but it may be a species of its own.

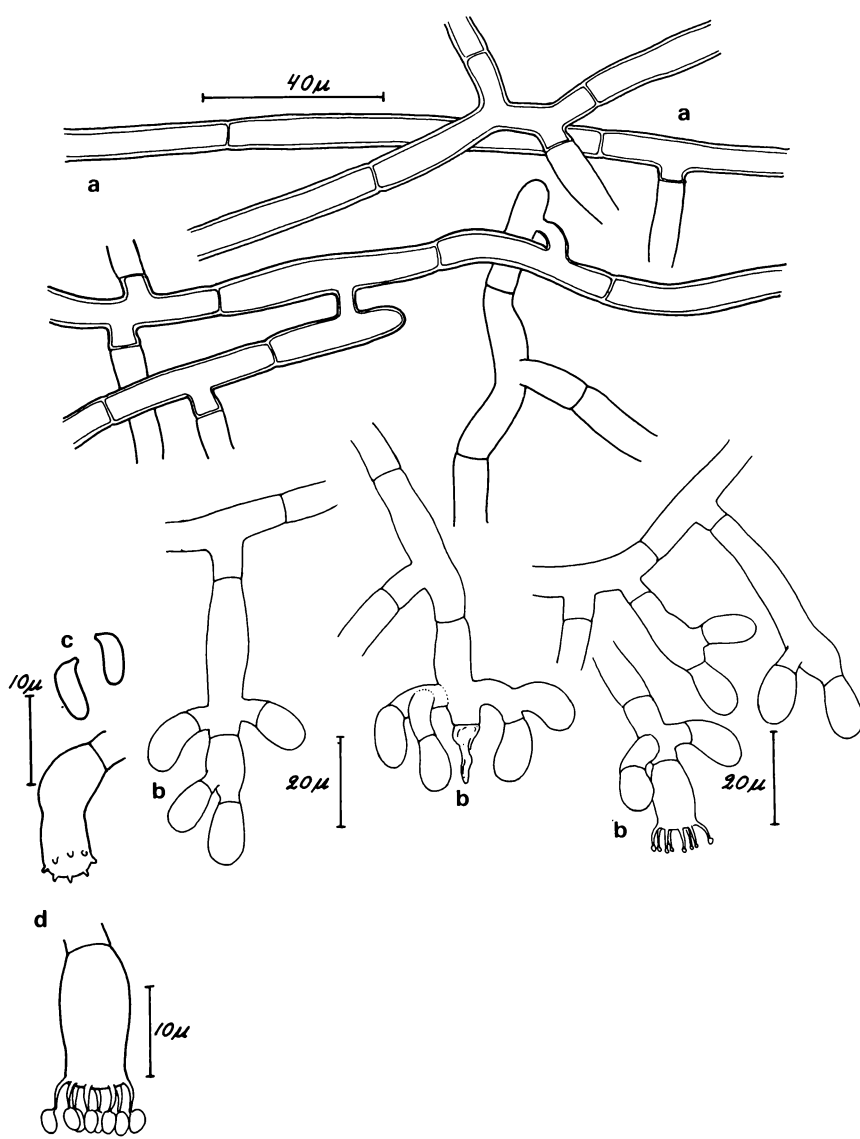


Fig. 75. *Botryobasidium* sp. a) basal hyphae b) hymenial details c) spores d) basidia. — Eriksson 9112.

Botryobasidium

13. **Botryobasidium** sp. John Erikss. n. 9112.

Fig. 75

Fruitbody very thin, reticulate to hypochnoid, yellowish.

Hyphal system monomitic, loosely and reticulately interwoven, hyphae smooth without clamps, basal hyphae thickwalled, yellowish, $6 - 9 \mu\text{m}$, wide, sparsely ramified, hymenial branches thinner, $5 - 7 \mu\text{m}$ wide.

Basidia rounded to ellipsoid to obovate, $13 - 15 \times 6 - 8 \mu\text{m}$, with mostly 8 sterigmata.

Spores subballantoid, apically obtuse, $6 - 7 \times 2.5 \mu\text{m}$. Only few spores seen.

Conidial state unknown.

Remarks. This description is based on a single, rather poor specimen. It does not agree with any known species.

Specimen: Sweden, Torne Lappmark, valley near the little lake Ruonajaurats, fallen trunk of *Betula tortuosa* in subalpine meadow forest, 22.8. 1962, J. Eriksson 9112.

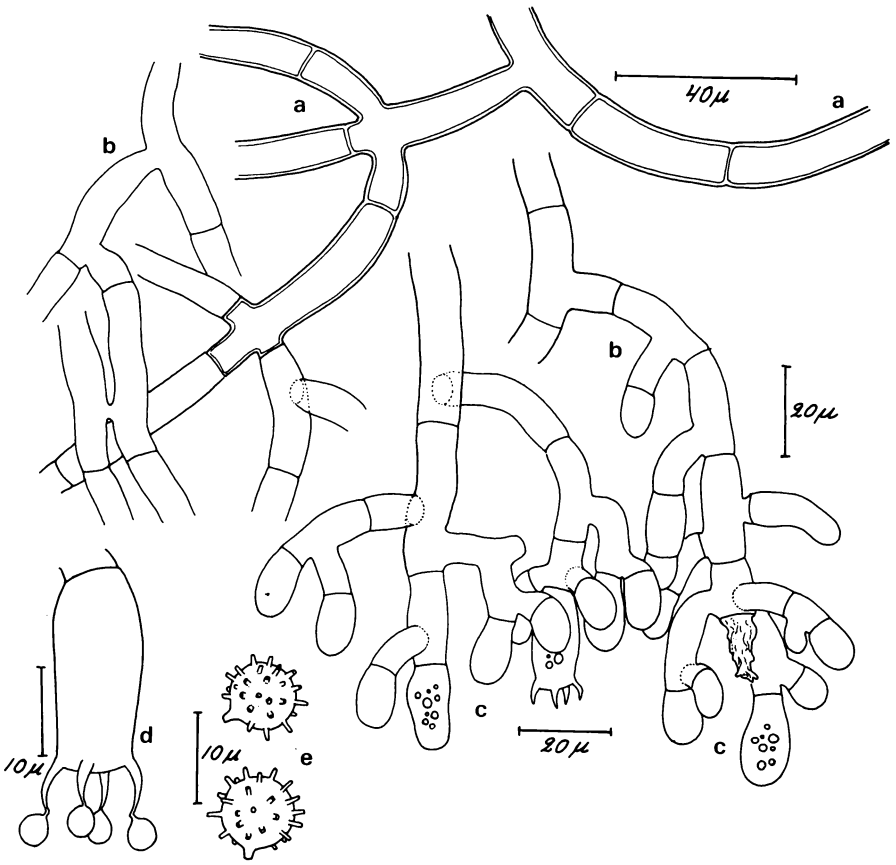


Fig. 76. *Botryohypochnus isabellinus*. a) basal hyphae b) subhymenial hyphae c) hymenial details d) basidium e) spores. — Eriksson 7297.

Botryohypochnus

Botryohypochnus Donk.

Meded. Nederl. mycol. vereen. 18–20: 118, 1931

Fruitbody hypochnoid, very loose, hyphae broad (about $10\ \mu\text{m}$) without clamps, ramified at right angles, basidia short, obovate to subcylindrical, with 4 sterigmata, spores round, echinulate, about $8 - 10\ \mu\text{m}$ wide. Protoplast of basidia and spores conspicuously stained by cotton-blue.

Genotypus: *Botryohypochnus isabellinus*. (Fr.) John Eriksson.

Botryohypochnus appears as a satellite genus to *Botryobasidium*. They agree in most respects (hyphae, basidia and in affinity to cotton-blue). However, as to morphology of spores, *Botryohypochnus* is close to species of *Tomentella* (fam. Thelephoraceae) and has therefore been included in this genus earlier. Its natural place is in our opinion in the vicinity of *Botryobasidium* but the case is one of many among the Corticiaceae, where taxa of higher rank are very often linked by species which are intermediate in one or more respects.

1. *Botryohypochnus isabellinus* (Fr.) Erikss.

Fig. 76

Sv. bot. tidskr. 52:2, 1958. — *Thelephora isabellina* Fr.

Epicr.p. 544, 1838.

Fruitbody loose, hypochnoid, at first whitish then yellowish to ochraceous.

Hyphal system monomitic, consisting of loosely interwoven simple septate hyphae, the basal ones yellow, about $10\ \mu\text{m}$ in diameter, sparsely ramified at right angles, hymenial hyphae thinwalled and hyaline, $6 - 8\ \mu\text{m}$ in diameter.

Basidia first rounded, then obovate to subcylindrical, $15 - 22 \times 8 - 10\ \mu\text{m}$ with 4 sterigmata, oildrops in the protoplasm.

Spores globose, yellowish $7 - 10\ \mu\text{m}$ in diameter, with distinct apiculus and numerous spines, $1 - 3\ \mu\text{m}$ long, non-amyloid, but well stained in cotton-blue.

Habitat. On decayed wood of conifers and deciduous trees, mostly in rich fertile localities.

Distribution. Mostly rather uncommon but found scattered throughout the area from Denmark to Finmark in Northern Norway. In rich vegetation locally quite frequent, especially in South Scandinavia (Skåne and Denmark).

Byssocorticium Bond. & Sing. ex Sing.
Mycologia 36:69, 1944.

Fruitbodies soft, byssoid, bluish-green or yellowish. Hymenium smooth or poroid, hyphae loosely intertwined, mostly narrow (2,5 – 3,5 μ m), the basal ones straight, with ramifications at right angles, with few or no clamps, hymenial hyphae densely branched, in most species with clamps, spores globose or subglobose with thickened, smooth walls, small (3,5 – 4,5 μ m), non-amyloid, conspicuously stained by cotton-blue (red in phase-contrast), basidia clavate, numerous oildrops or oily granular contents in the plasm, and with 4 sterigmata.

Genotypus: *Byssocorticium atrovirens* (Fr.) Bond. & Sing. ex Sing.

Byssocorticium is recognized by its globose thickwalled spores and narrow basal hyphae. Its closest relatives are found in the genus *Piloderma*. The main difference is the total lack of clamps in the latter genus. It is not quite clear if it really is a natural genus in the limitation given here. Three different elements can be distinguished. The first is formed by the two blue-green species *B. atrovirens* and *B. pulchrum*, which are closely related. *B. lutescens* lacks the blue-green pigment but agrees very well in other respects. From *B. lutescens* to *B. coprophilum* is a rather short step. The difference is mainly the wider basal hyphae of the latter. These two species form the second group. *B. terrestre*, at last, agrees as to basal hyphae very well with *B. coprophilum* but is distinguished by lacking clamps at the basidial bases. This character makes the species different from the rest of the genus (and brings it nearer to *Piloderma*). Moreover it has a poroid hymenium and is therefore often placed in "Polyporaceae". It is thus one of the many links joining corticioid and polyporoid fungi, but it cannot be doubted that its place must be in Corticiaceae, just as poroid species of *Cristella* and *Sistotrema* are placed here. Whether *B. terrestre* shall be kept in *Byssocorticium* or be placed in a genus of its own is an open question. Jülich (1972) is of opinion that it should not be included in *Byssocorticium*.

Key to species

- | | | | |
|----|---|----|---|
| 1. | Hymenium poroid | 4. | B. terrestre |
| 1. | Hymenium smooth | 2 | |
| 2. | Fruitbody blue or blue-green | 3 | |
| 2. | Fruitbody yellowish | 4 | |
| 3. | Spores 3 – 4 μ m in diameter | 1. | B. atrovirens |
| 3. | Spores 5 – 6 μ m in diameter | 2. | B. pulchrum |
| 4. | Basal hyphae 3 – 4 μ m, without clamps | | B. coprophilum , fig. 78, p. 183 |
| 4. | Basal hyphae 2.5 – 3 μ m, with scattered clamps . . | 3. | B. lutescens |

Byssocorticium

1. *Byssocorticium atrovirens* (Fr.) Bond & Sing. ex Sing. Fig. 77a-d
 Mycologia 36: 69, 1944. — *Thelephora atrovirens* Fr. Pl. 15A
 Elench. fung. I: 202, 1828.

Fruitbody soft, hypochnoid, byssoid, loosely attached to the substrate, blue or bluish green.

Hyphal system monomitic, hyphae narrow, light blue-green, mostly 2,5 — 3 μm , and with clamps, basal hyphae with somewhat thickened walls, straight and often joined to rhizomorph-like bundles of parallel hyphae, sparsely ramified at right angles, with numerous anastomoses and scattered clamps, hymenial hyphae usually branched from clamps, otherwise from the vicinity of septa.

Basidia clavate, mostly 15 — 20 x 4 — 5 μm , with numerous oildrops in the protoplasm, 4 sterigmata.

Spores globose, with distinct apiculus, 3 — 4 μm , with thickened walls, protoplasm with one large oildrop.

Habitat. On decayed wood of conifers and frondose trees, as well as on leaves and other kinds of litter on the ground. Like *Piloderma* and *Amphinema* it seems to belong more to the litter than to wood substrates even if fruitbodies are as a rule developed on decayed wood. It is generally found only in good, humid localities.

Distribution. Not very common, but scattered at least in most parts of Scandinavia. It is evidently more common in the southern parts, rarer in the north. As it is a conspicuous fungus it is comparatively often collected.

Remarks. Except for *B. pulchrum* there is no species of Corticiaceae with which *B. atrovirens* could be confused. There are species of *Tomentella* (Thelephoraceae) which may have a similar colour, but these species do not have smooth rounded spores.

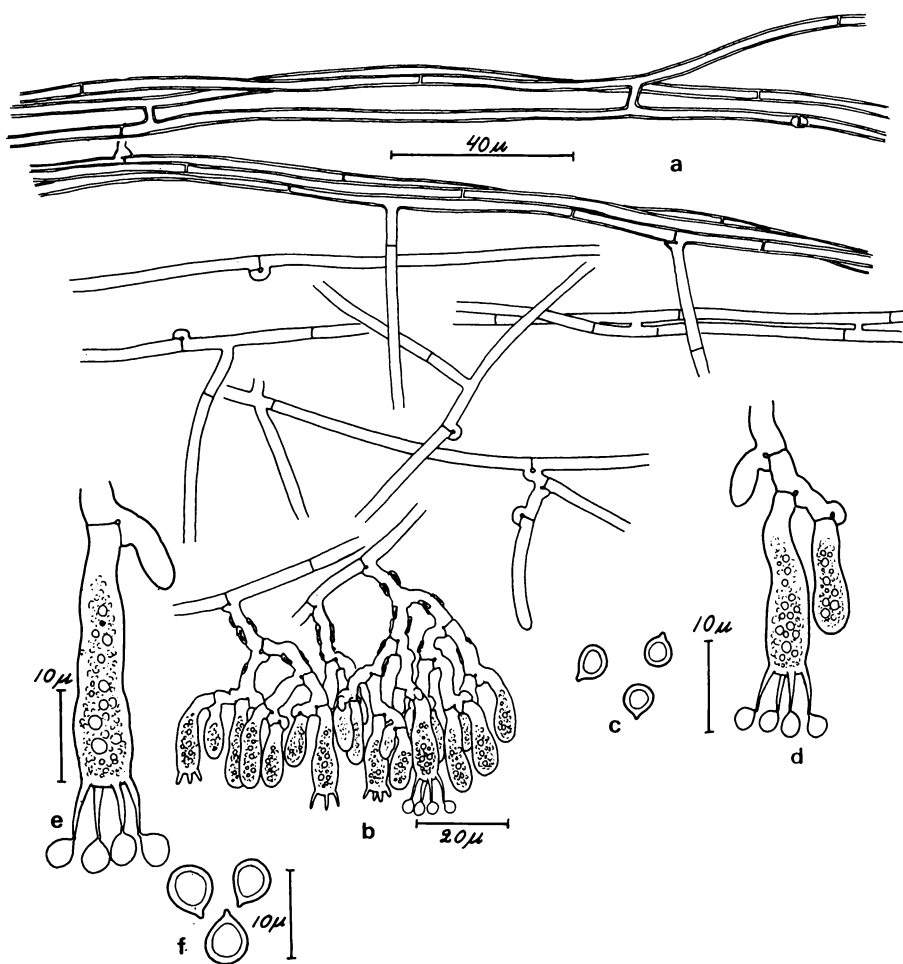


Fig. 77. *Byssocorticium atrovirens*. a) hyphae partly joined into cords b) part of hymenium c) spores d) basidium. — Strid 7911.

Byssocorticium pulchrum. e) basidium f) spores. — Eriksson 14-9-1966.

Byssocorticium

2. *Byssocorticium pulchrum* (Lund.) M.P. Christ.
 Dansk bot. ark. 19:158, 1960. — *Corticium pulchrum*
 Lund. in Lund. & Nannf., Fungi exs. suec. n. 1035, 1941.

Fig. 77e, f

Fruitbody and basal hyphae as in *B. atrovirens*. Basidia larger, mostly $25 - 30 \times 6 - 7 \mu\text{m}$. Spores also larger, $5 - 6.5 \mu\text{m}$ in diameter.

Habitat and distribution seem to agree with *B. atrovirens*, but it is evidently rarer.

B. pulchrum is so close to *B. atrovirens* that it must be somewhat uncertain whether it shall be looked upon as a separate species or as a variety of the former. It seems, however, to be very constant, which is our reason for keeping it as a separate species.

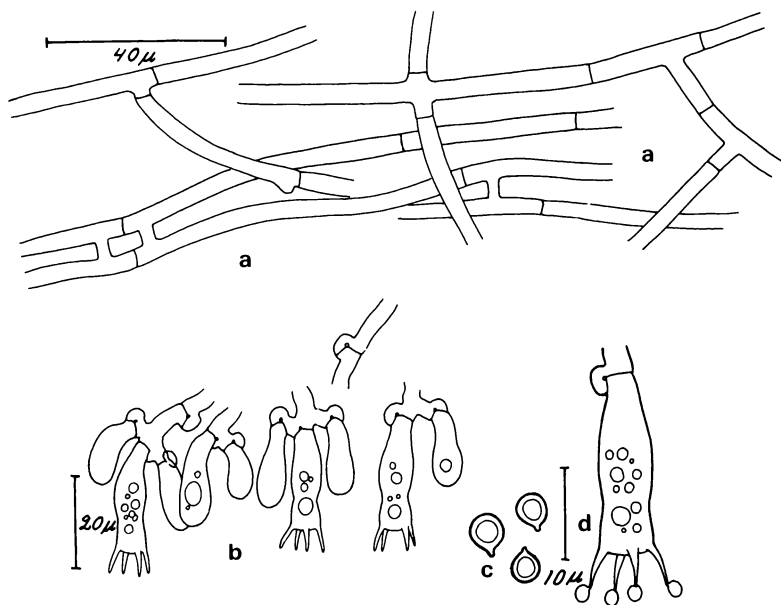


Fig. 78. *Byssocorticium coprophilum*. a) hyphae b) details of hymenium c) spores d) basidium. — Type specimen.

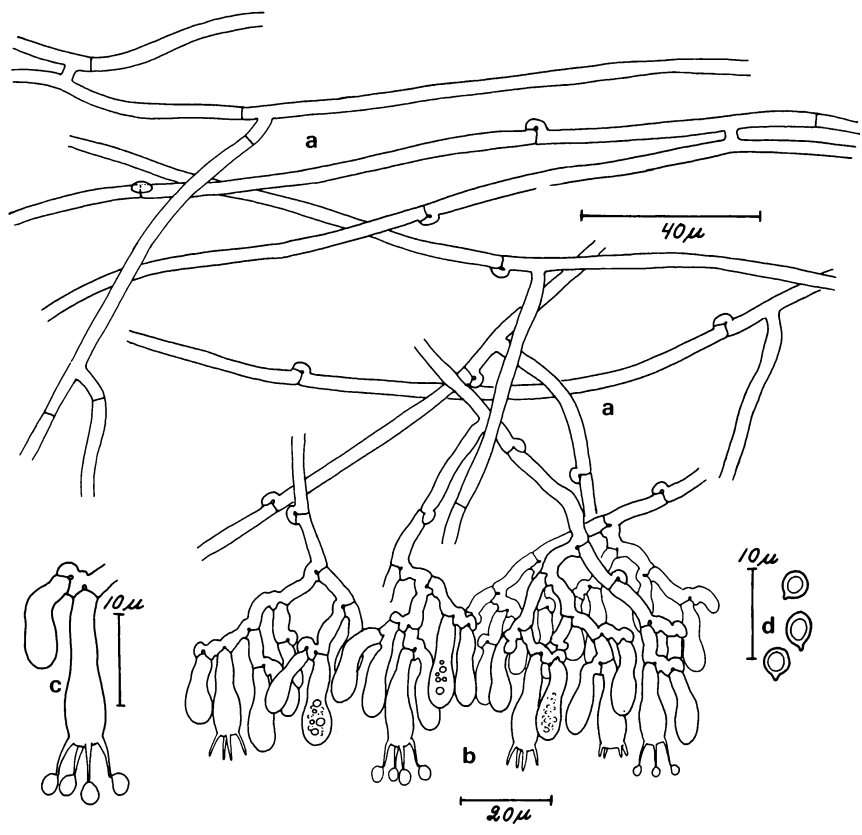


Fig. 79. *Byssocorticium lutescens*. a) hyphae b) part of hymenium c) basidia d) spores. — Type specimen.

Byssocorticium**3. *Byssocorticium lutescens* Erikss. & Ryv. nov. spec. Fig. 79, Pl. 15B**

Fructificatio byssoidea, luteoochracea, subiculum bene evolutum, hyphae basales tenuitunicatae, efibulatae, $2,5 - 3,5 \mu\text{m}$ in diametro, ramis angulis rectis. Basidia clavata, paulo constricta, $15 - 22 \times 4 - 5 \mu\text{m}$, 4 sterigmatibus. Sporae globosae, leves tunicis incrassatis, $3,5 - 4,5 \mu\text{m}$ in diametro.

Holotypus: S. Lundell n. 3094 (TRTC).

Type locality: Sweden, Småland, Almesåkra parish SE of Södratorp, 21.9. 1947. S. Lundell.

Fruitbody byssoid, with a rather thick and loose subiculum, yellowish to ochraceous yellow, with small rhizomorphs.

Hyphal system monomitic, hyphae of subiculum straight and narrow, $2,5 - 3 \mu\text{m}$ wide, with sparse ramifications at right angles, clamps at many but not all septa, hymenial hyphae $2 - 3 \mu\text{m}$ wide, richly ramified with branches from clamps.

Basidia clavate, $15 - 22 \times 4,5 - 5 \mu\text{m}$, with 4 sterigmata. Protoplasm with oildrops in some basidia (may have disappeared in the others while in herbarium). Clamps at the basidial bases.

Spores globose, with thickened walls, $3,5 - 4,5 \mu\text{m}$ in diameter, oildrops in the protoplasm.

Habitat and distribution. Grows on litter in conifer forests mixed with *Betula*. Found three times. Besides the type specimen also known from Sweden, Småland, N. Kvill nat. park, leg. N. Hallenberg and Denmark, Sjælland, Tisvilde Hegn, leg. K. Hauerslev.

Remarks. The type specimen was determined by Jülich (1972 p. 69) as *Athelia coprophila* (Wakef.) Jül. It is however, readily distinguished from this species (smaller spores, more narrow basal hyphae with clamps at many septa). It lacks the blue-green colour characteristic of the genotype of *Byssocorticium* but fits well in other respects. It is also reminiscent of *Piloderma*, in which however, there are no clamps at all. On sight *B. lutescens* reminds to some degree also of *Amphinema byssoides*.

For comparison the type specimen of *Corticium coprophilum* Wakef. was studied. It has somewhat larger spores, wider basal hyphae which lack clamps. Moreover, basidia are somewhat constricted. Jülich refers this species to *Athelia*, an opinion which we do not share. It is much more reminiscent of *Byssocorticium*, esp. in the nature of spores, and we are of the opinion that it should be placed in this genus: *Byssocorticium coprophilum* (Wakef.) Erikss. & Ryv. comb. nov. Basionym: *Corticium coprophilum* Wakef., Trans. Brit. Mycol. Soc. 6: 480, 1916.

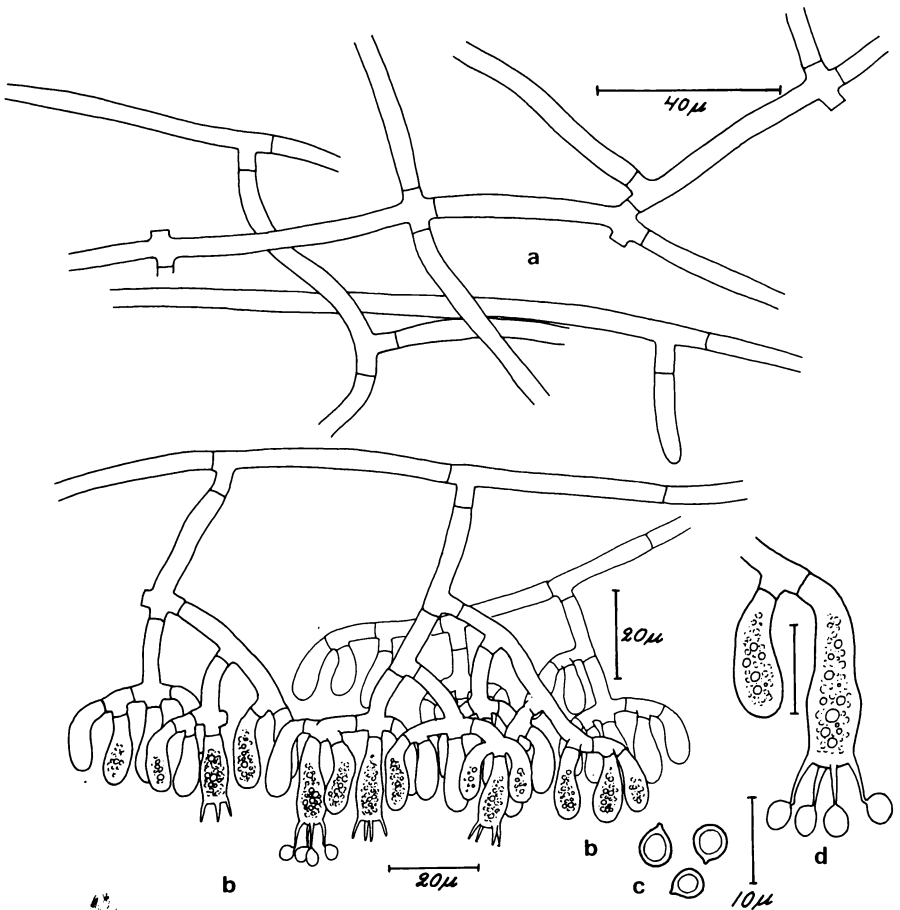


Fig. 80a. *Byssocorticium terrestre*. a) hyphae b) part of hymenium c) spores d) basidia. — Lundell & Eriksson 4040.

Byssocorticium

4. **Byssocorticium terrestre** (Fr.) Bond. & Sing. Fig. 80a, b
Ann. mycol. 39:48, 1941. — *Polyporus terrestris* Fr.,
Syst. mycol. I: 383, 1821.

Fruitbody resupinate, up to 3 mm thick, very soft and easily separable, hymenophore poroid, pore layer yellowish or ochraceous, tubes soft and spongy, pores irregularly angular, 2 — 3 per. mm. margin of the same colour, fibrillose, with some thin rhizomorphs.

Hyphal system monomitic, hyphae thinwalled, 3 — 4 μ m wide, branched at right angles, without clamps, hymenial branches thinner, richly ramified.

Basidia clavate, 15 — 20 x 5 μ m, with numerous oildrops in the protoplasm.

Spores more or less globose, smooth, with thickened walls, 3.5 — 4.5 μ m in diameter. One oildrop in the protoplasm.

Habitat. On litter and decayed wood. Like the other species of the genus it seems to be a litter fungus rather than a real wood decaying species.

Distribution. Very rare but scattered throughout the whole of Scandinavia.

Byssocristella

Byssocristella Christ. & Bregnh. Lars.

Byssocristella is based on *B. pallido-citrina* earlier known as *Athelia viridis* (Bres.) Parm. (nom. illeg.) (Jülich, Willd. 6: 219, 1971). In our opinion this species is closely related to *Tomentellopsis echinospora* (Ell.) Hjortst., why *Byssocristella* is a facultative synonym of the latter genus. These two genera were published on the same day (30/12 1970). As *Tomentellopsis* is based on a better known species and besides is more adequately described, we choose the genus name *Tomentellopsis* for these fungi. The relation between *Tomentellopsis* and *Tomentella* are no doubt close, why we consider *Tomentellopsis* as a genus of Thelephoraceae, why it is excluded from this treatment of the family Corticiaceae.

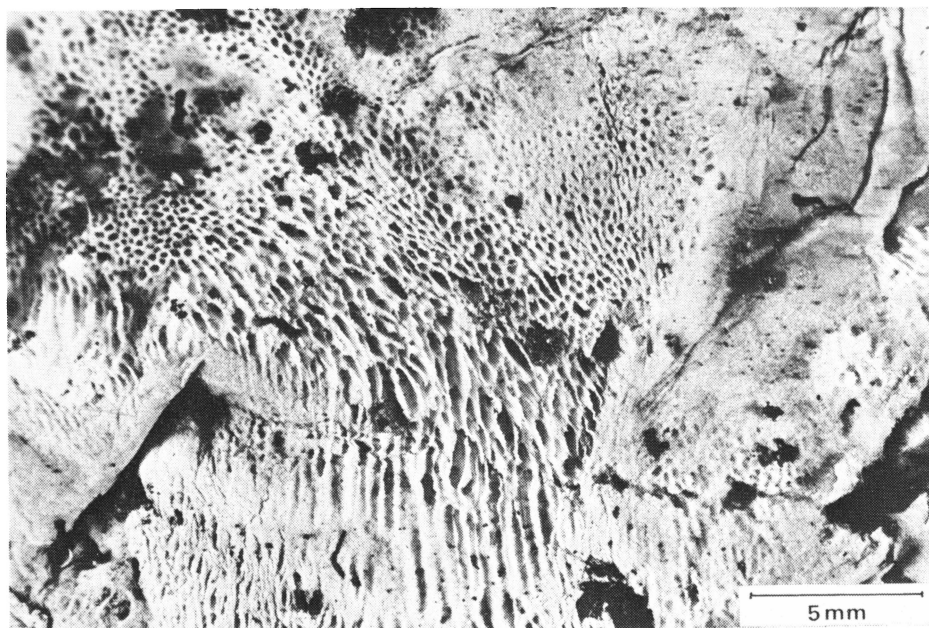


Fig. 80b. *Byssocorticium terrestre*. — Eriksson & Lundell 4040.

Byssomerulius

Byssomerulius Parm.

Eesti NSV Tead. Akad. Toimet. Biol. 16: 383, 1967

Fruitbodies resupinate to pileate, hymenium first smooth, then meruloid, white, with age changing to yellowish or light brown, margin remaining white, subhymenium thickening with age, hyphal system monomitic, hyphae thinwalled or slightly thickwalled without clamps, basidia narrowly clavate, about $30 - 35 \times 5 - 6 \mu\text{m}$ with normally 4 sterigmata, spores subcylindrical, smooth and non-amyloid.

Genotypus: *Byssomerulius corium* (Fr.) Parm.

Remarks: A meruloid hymenium is certainly no indication of a real natural relationship and seems to have developed several times in the evolution of the Basidiomycetes. However, it is difficult to find an acceptable arrangement where all the meruloid fungi can be placed in a natural connection with the smooth species. In the case of *Byssomerulius corium*, though, the problem does not seem to be too difficult. In several important characters it agrees with the genus *Phanerochaete* such as in nature of hyphae, shape of basidia and spores. For the other species referred to *Byssomerulius* by Parmasto the problems are worse. *Merulius serpens* is here referred to the new genus *Ceraceomerulius* which is related to *Ceraceomyces* (presence of clamps, rhizomorphs) and the same is done with *Merulius rubicundus*. This leaves *Byssomerulius* in Scandinavia with one species, viz. the genotype.

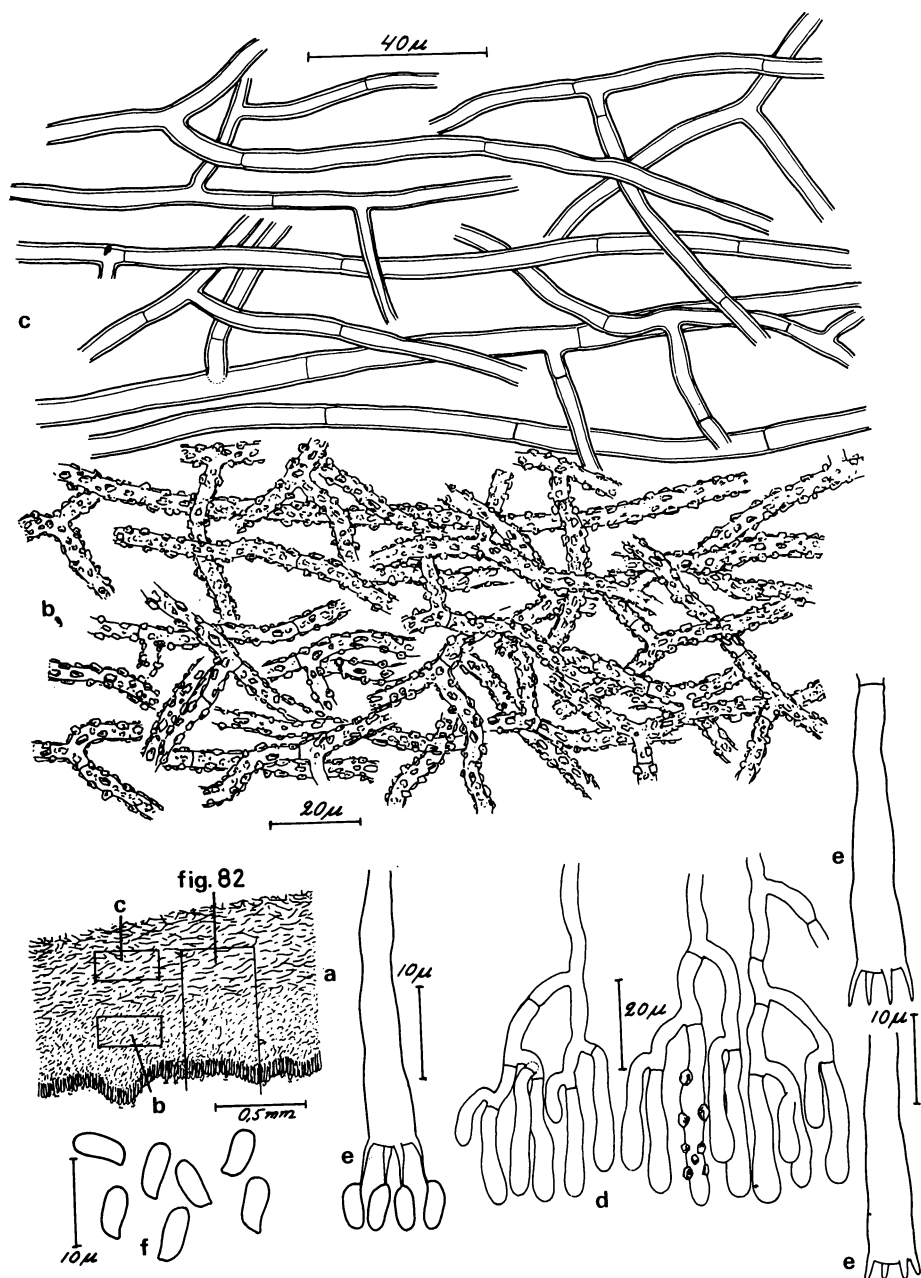


Fig. 81. *Byssomerulius corium*. a) section of fruitbody b) hyphae of lower tramal tissue layer c) hyphae of upper tramal layer d) details of young hymenium e) basidia f) spores. — a-d Degelius 5245, e, f Sunhede 5709.

Byssomerulius

1. **Byssomerulius corium** (Fr.) Parm. Fig. 81-82, Pl. 16
 Easti NSV Tead. Akad. Toimet, Biol. 16: 383, 1967. —
Merulius corium Fr. Elench, fung. p. 58, 1828.

Fruitbody about 0.5 — 1 mm thick, first resupinate, then with reflexed margin or even pileate, hymenium at first white then yellowish and finally more or less brownish, pileus usually remaining white, sometimes grey or even green, (from algae), finely tomentose, context white and very soft.

Hyphal system monomitic, all hyphae without clamps, subhymenial hyphae thinwalled, 2.5 — 3.5 μm wide, densely intertwined, more or less covered with fine crystals, basal hyphae with thickened walls, 3 — 5 μm wide, forming a loose context.

Basidia narrowly clavate, 30 — 35 x 5 — 6 μm with 4 sterigmata.

Cystidia none.

Spores subcylindrical, 5 — 6 x 2.5 — 3 μm , smooth, thinwalled, non-amyloid.

Habitat. On dead branches of deciduous trees, usually in humid localities.

Distribution. Rather common, locally very common in S.Scandinavia, less common in the inland northwards, but scattered throughout the area.

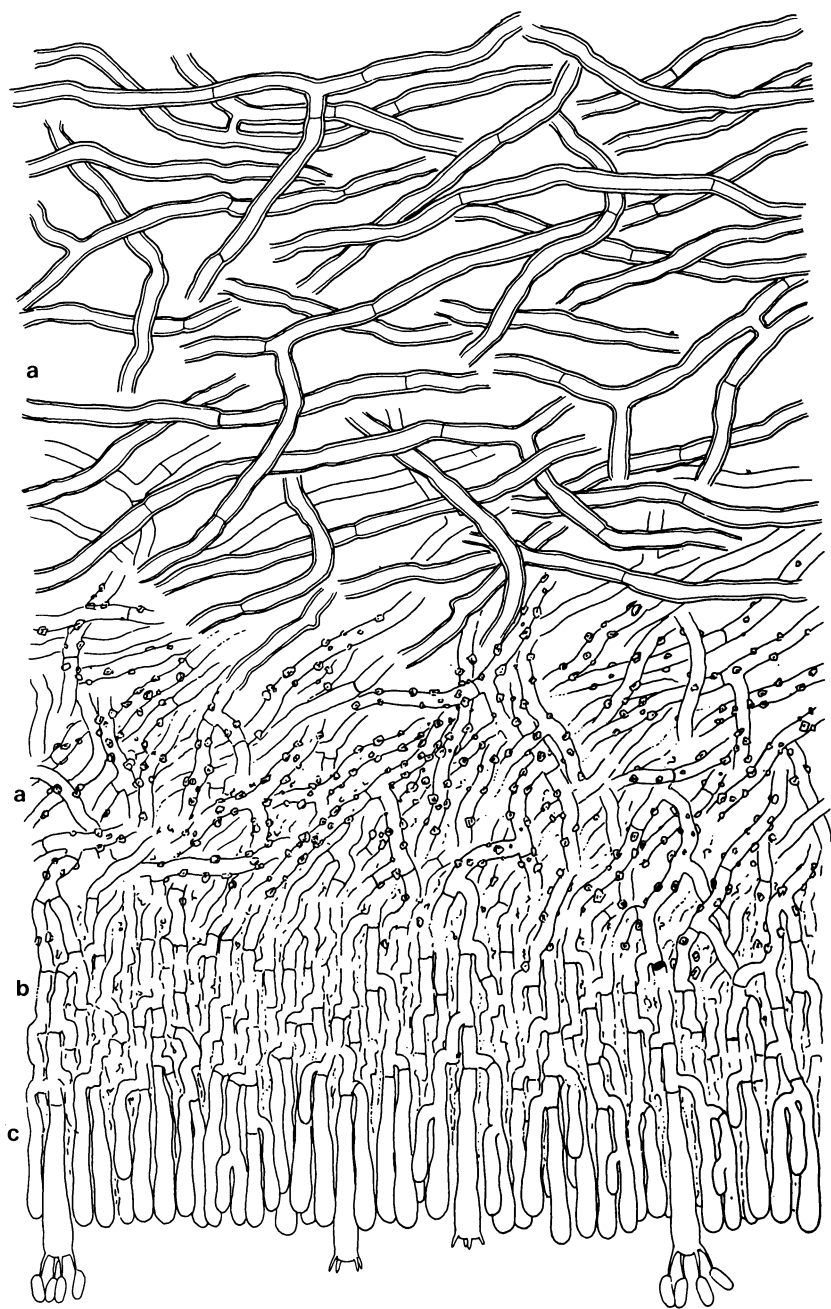


Fig. 82. *Byssomerulius corium*, section of fruitbody. a) tramal tissue layers b) subhymenium c) hymenium. — Sunhede 5709.

Cejpomyces

Cejpomyces Svrček & Pouz.

Ceska Mykol. 24: 5, 1970.

Fruitbody resupinate, thin, hyphae thin or somewhat thickwalled, diameter large (about $10\text{ }\mu\text{m}$) without clamps, light brown in Melzers reagent (dextrinoid), stained in cotton-blue (cyanophilous), basidia ellipsoid to short cylindrical with four large sterigmata, spores oblong, about $15\text{ }\mu\text{m}$ long, smooth, non-amyloid and cyanophilous.

Genotypus: *Cejpomyces terrigenus* (Bres.) Svrček & Pouz.

The monotypic genus *Cejpomyces* agrees in many respects with *Ceratobasidium* and *Uthatabasidium*. It differs in the absence of spore-repetition, i.e. that a spore germinates a second spore. It is also close to *Botryobasidium* from which it is distinguished by having much larger sterigmata and not more than 4 spores. *Cejpomyces* has, in addition, a dense subhymenium formed by wide, shortcelled and frequently branched hyphae. The basidia are arranged in a rather dense palisade, quite different from the clusters of basidia of e.g. *Botryobasidium*.

Hjortstam (Sv. bot. tidskr. 67:104, 1973) reports that in his material there are spores with repetition. An investigation of the material has, however, shown that the repeating spores do not belong to this species. His description is based on two specimens, one of which is *Cejpomyces* (without repetition), while the other is a species of *Thanatephorus* (close to *T. sterigmaticus*, but with 4 sterigmata and smaller spores).

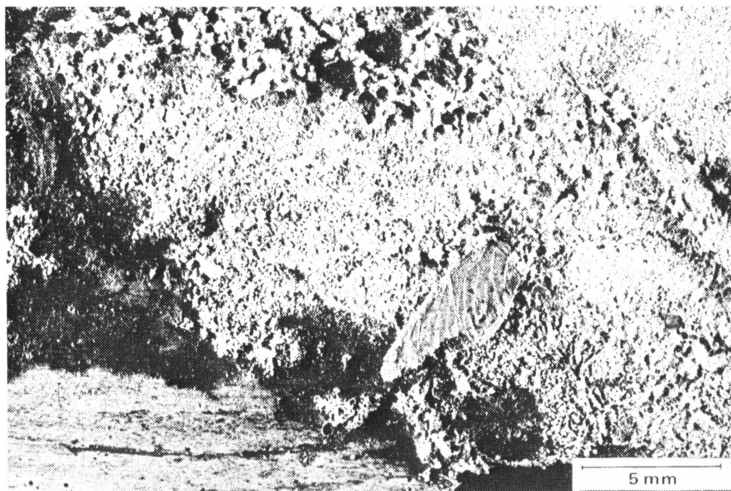


Fig. 83a. *Cejpomyces terrigenus*. — Larsson 1159.

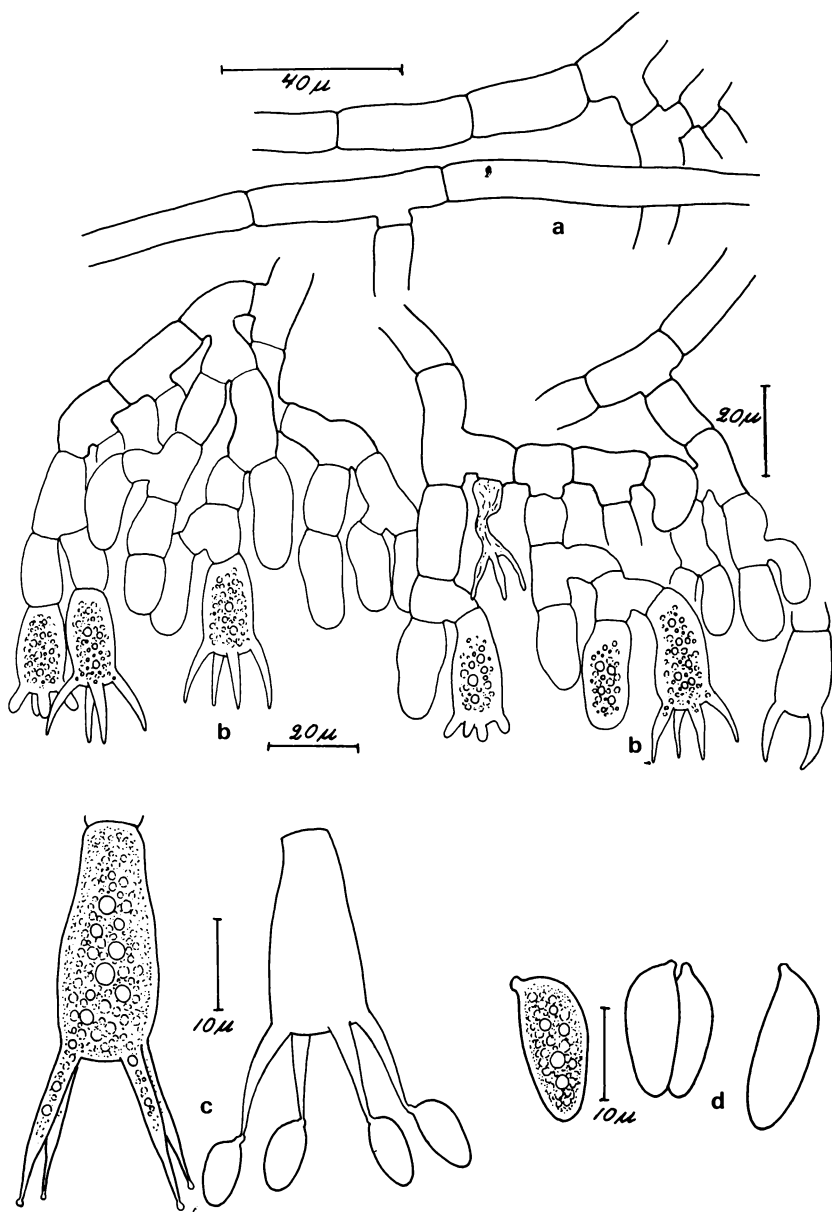


Fig. 83b. *Cejpomyces terrigenus*. a) basal hyphae b) hymenial details
c) basidia d) spores.— Hjortstam 5-9-1968.

Cejpomyces

1. **Cejpomyces terrigenus** (Bres.) Svrček & Pouz. Fig. 83a, b
Česka Mykol. 24: 5, 1970 — *Corticium terrigenum* Bres., Ann.
mycol. 1: 99, 1903.

Fruitbody thin, smooth, pale ochraceous and with indistinct margin.

Hyphal system monomitic, hyphae cyanophilous and without clamps, 8 — 10 μm in diameter, basal hyphae mostly parallel to the substrate and with somewhat thickened walls, dextrinoid in Melzer's reagent, hymenial hyphae thinwalled and non-dextrinoid.

Basidia ellipsoid to short cylindrical, mostly 20 — 25 x 8 — 10 μm with 2 — 6 (mostly 4) large sterigmata, 10 — 20 μm long, protoplasm with oil-drops and granular or grainy content.

Spores oblong, narrowly ovate to subcylindrical, apically obtuse 12 — 17 x 6 — 7 μm , smooth, non-amyloid, cyanophilous, protoplasm with oil-drops and granular consistency.

Habitat. Growing on soil and strongly decayed wood.

Distribution. Very rare and only a few collections are known from Poland, England, Czechoslovakia and Sweden. The Swedish material was collected by K. Hjortstam in Alingsås, (det. L. Weresub.), and by K.H. Larsson in Skepplanda parish, both in Västergötland and on strongly decayed wood of *Picea abies*. Larsson reports that his collection was made on moist ground among patches of *Sphagnum* in a steep, shady slope in a brook valley.

Ceraceomerulius (Parm.) Erikss. & Ryv. gen. nov.
Basionym: *Byssomerulius* Parm.subgen. *Ceraceomerulius* Parm.Consp.
syst. Cort. p. 80, 1968.

Fruitbody resupinate, first subpellicular, in age membranaceous, hymenium first smooth, then merulioïd, subhymenium thickening in age, hyphae with or without clamps, often parallely arranged forming hyphal strings in the subiculum and rhizomorphs under or in the periphery of the fruitbody, basidia mostly 20 – 25 x 4 – 5 µm, spores narrowly ellipsoid to allan-toid, about 5 µm long.

Genotypus: *Ceraceomerulius rubicundus* (Litsch. in Pilat) Erikss. & Ryv.

Remarks. *Ceraceomerulius* seems to have its closest relatives in the genus *Ceraceomyces* Jül. Thus we found it desirable to establish it as a genus of its own. While *Byssomerulius* subgen. *Byssomerulius* shows many fea-tures characteristic of *Phanerochaete* and similar genera, *Byssomerulius* sub.gen. *Ceraceomerulius* seems to have developed from athelioid fungi. Like *Ceraceomyces* it differs from *Athelia* preferably in the presence of a subhymenium. While in *Athelia* only a few basidia are produced from the hymenial hyphal branches, the basidial development in *Ceraceomeru-lius* and *Ceraceomyces* continues and results in a dense subhymenium with a more or less ceraceous consistency. This prolonged development of basidia gives the vertical subhymenial hyphae a characteristic sinuous appearance where sits of older basidia can be seen.

Key to species

- 1. Hyphae without clamps, cystidia present 1.C. *rubicundus*
- 1. Hyphae with clamps, cystidia absent 2.C. *serpens*

Ceraceomerulius

1. *Ceraceomerulius rubicundus* (Litsch. in Pilat) Erikss. Fig. 84, Pl. 17
& Ryv. comb. nov. — Basionym: *Merulius rubicundus*
Litsch. in Pilat, Bull. Soc. mycol. France 49:293,
1934.

Fruitbody resupinate, about 0.5 mm thick, first smooth then more or less reticulately wrinkled or folded, mostly bright orange to red, but often fading in the herbarium, margin white and fibrillose, subiculum white.

Hyphal system monomitic, all hyphae without clamps, subhymenial hyphae $2.5 - 4 \mu\text{m}$ in diameter, densely intertwined, basal hyphae loosely intertangled, $3 - 5 \mu\text{m}$ in diameter, ramified at right angles, often cross-wise, numerous small crystals in the subiculum, larger crystals or aggregates in the subiculum.

Cystidia thinwalled, clavate, obtuse, sometimes with a few apical crystals, $30 - 40 \times 5 - 6 \mu\text{m}$.

Basidia narrowly clavate, $18 - 25 \times 4 - 5 \mu\text{m}$ with 4 sterigmata, the protoplasm with oildrops.

Spores subcylindrical to allantoid with 2 — 3 oildrops, $4.5 - 6 \times 1.5 \mu\text{m}$

Habitat. On decayed wood of conifers.

Distribution. Rare and found only a few times in North-East Fennoscandia, viz. twice in Sweden and five times in Finland (for detailed information see Å. Strid, Sv.bot. tidskr. 66:330—334, 1972).

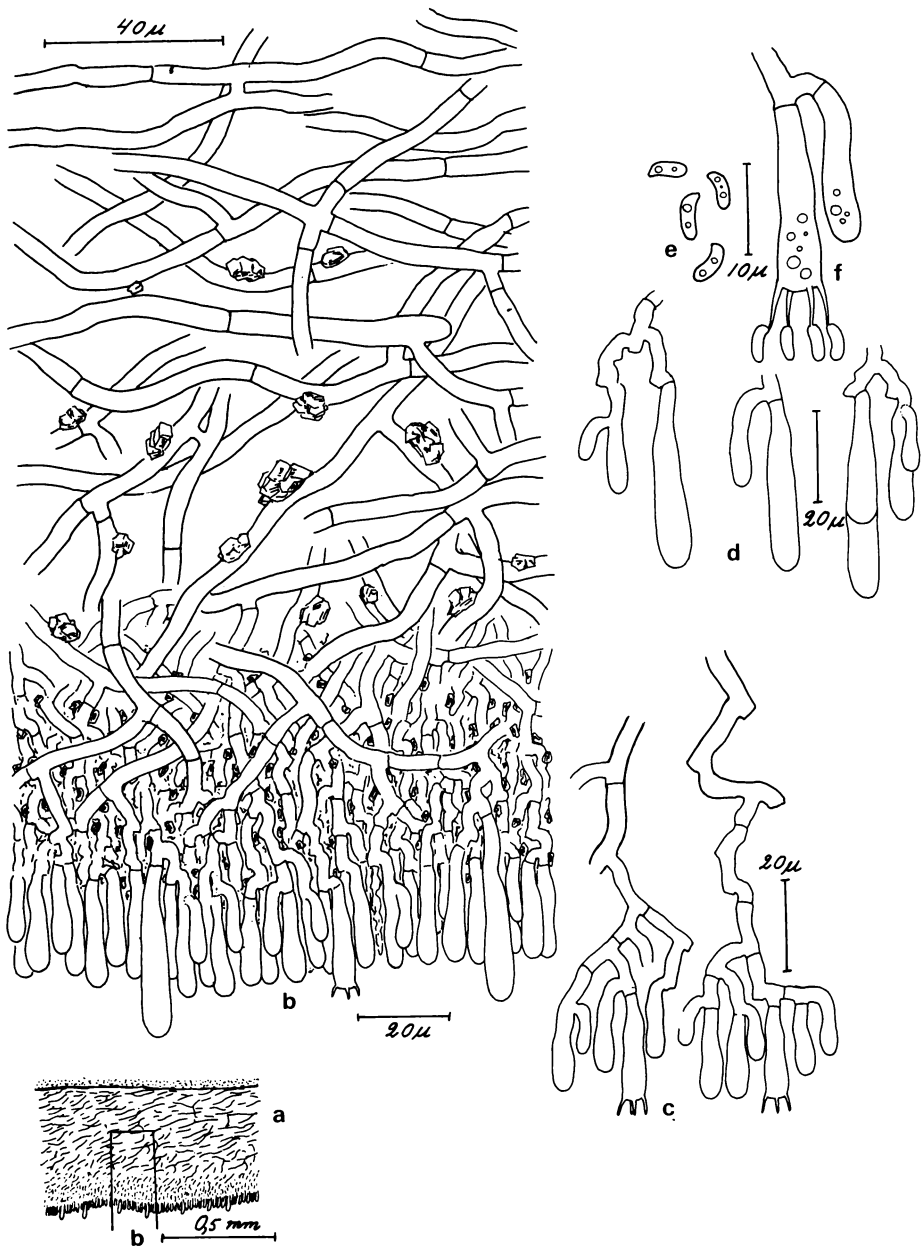


Fig. 84. *Ceraceomerulius rubicundus*. a) section through fruitbody indicating position of section b) vertical section through part of fruitbody c) hymenial details and subhymenial hyphae d) cystidia e) spores f) basidia. — Strid 6616.

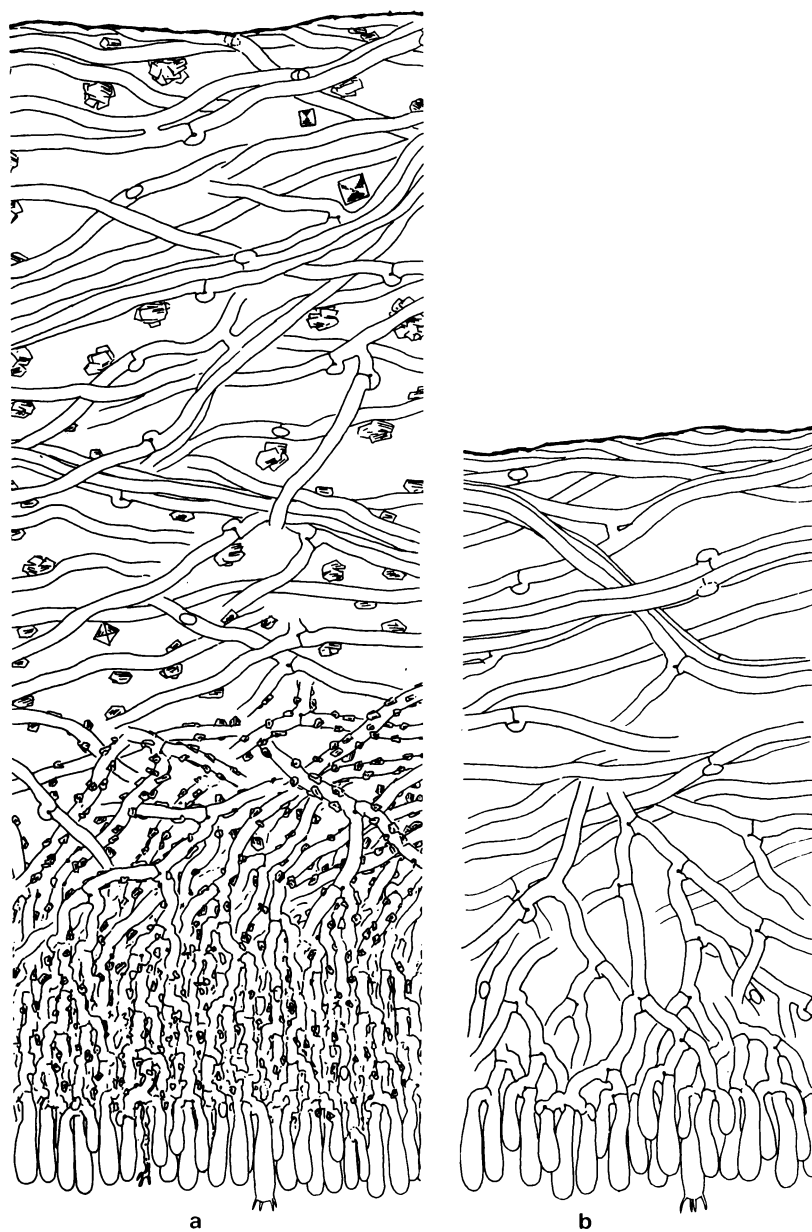


Fig. 85. *Ceraceomerulius serpens*. a) section of mature part of fruitbody
 b) section of young part of fruitbody. — Eriksson 9372.

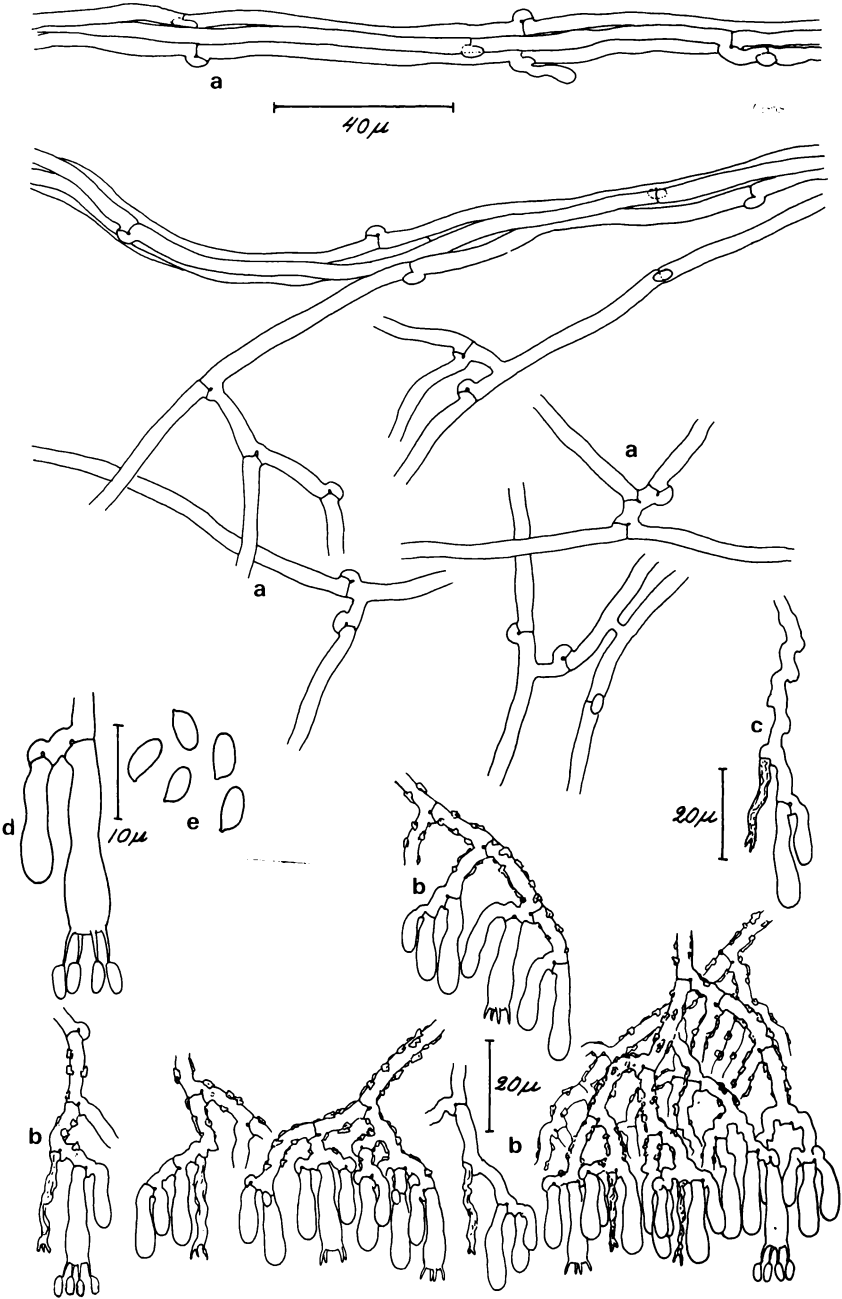


Fig. 86. *Ceraceomerulius serpens*. a) hyphae, partly forming cordons b) hymenial details c) subhymenial hyphae with basidioli, shrunk basidium and basidial "scars" d) basidia e) spores. — Eriksson 9372.

Ceraceomerulius

2. *Ceraceomerulius serpens* (Fr.) Erikss. & Ryv. comb. nov. Basionym: *Merulius serpens* Fr. Syst. mycol. 1: 327, 1821. Fig. 85–86, Pl. 18A

Fruitbody resupinate, about 0.5 mm thick, first smooth, then meruloid, first white, then more or less yellowish, orange, pale red or even greenish, margin white, finally fibrillose, subiculum white, small rhizomorphs often present in the decayed wood and in the periphery of the fruitbody.

Hyphal system monomitic, all hyphae with clamps, subhymenial hyphae $2.5 - 3.5 \mu\text{m}$ wide, densely intertwined, more or less covered with crystalline material, basal hyphae wider, $3 - 5 \mu\text{m}$ in diameter, more loosely intertwined and more sparsely ramified, often parallelly joined to hyphal strings. Abundant with crystalline material in the interhyphal spaces.

Cystidia none.

Basidia narrowly clavate, $18 - 28 \times 4 - 5 \mu\text{m}$ with 4 sterigmata.

Spores narrowly ellipsoid, $4 - 5.5 \times 2 - 2.5 \mu\text{m}$.

Habitat. On decayed wood, mostly conifers, but also on deciduous trees. It is generally found in *Hylocomium-Vaccinium* heath forests mixed with *Betula*, *Salix* and other frondose trees. It is not so common in richer herb localities, but has in general a wide ecological amplitude.

Distribution. Rather common and can be found in all forest biotopes in Scandinavia.

Remarks. *C. serpens* is similar to *C. rubicundus*, but is paler. Microscopically it is distinguished by the clamps and the absence of cystidia. Moreover the narrowly ellipsoid spores are clearly different from the allantoid spores of *C. rubicundus*.

Ceraceomyces Jül.

Willd. Beih. 7:146, 1972.

Fruitbody at first pelliucular (athelioid) with a thin hymenial layer and a loose subiculum, hymenium in age thickening and becoming ceraceous in consistency but still, at least when dried, separable from the substrate (or subiculum), hymenial surface smooth, or merulioid becoming smooth when dried, or distinctly merulioid both fresh and dried, hymenial layer usually more or less cracked in dried specimens, hyphae monomitic, always with clamps at the septa, thinwalled or with somewhat thickened walls, cystidia present or lacking, basidia narrowly clavate, with 4 (rarely 2) sterigmata, spores subglobose to narrowly ovate to ellipsoid, smooth, thinwalled, non-amyloid, usually with oildrops in the protoplasm.

Genotypus: *C. tessulatus* (Cooke) Jül.

Remarks. *Ceraceomyces* is derived from *Athelia*. The difference is found in the shape of the basidia and in the nature of the hymenium. In *Athelia* the fruitbodies are shortlived and a restricted number of basidia are produced from each hymenial branch. The basidia stand at about the same level and the hymenium does not significantly thicken. In *Ceraceomyces* the basidia are produced in prolonged series, new basidia being borne on short side branches, allowing them to project some μm beyond the old basidia. As a result, the hymenium becomes thicker in age and as the basidia increase in number, they become compacted into a palisade. The basidia are also narrower than in *Athelia* a characteristic which may be looked upon as an adaption to the limited space in the hymenium. In its hymenial development *Ceraceomyces* seems to be an intermediate between *Athelia* and e.g. *Phlebia* and *Phanerochaete*, where this thickening of the hymenium proceeds still further, the basidia become narrower, and their number still greater. *Ceraceomyces* is closely related to *Ceraceomerulius*. In this genus the fruitbody is athelioid only as very young whereas in *Ceraceomyces* it remains pellicular and has a detachable hymenial layer even when fully mature.

Ceraceomyces

Key to species

- | | | |
|----|--|---------------------|
| 1. | Hymenium violaceous, subiculum light brown. Red in KOH . . | 2 |
| 1. | Hymenium white to yellow, subiculum white. Not red in KOH | 3 |
| 2. | With cystidia | 2.C. cystidiatus |
| 2. | Without cystidia | 5.C. violascens |
| 3. | Spores about $2\text{ }\mu\text{m}$ wide | 4 |
| 3. | Spores $3\text{ }\mu\text{m}$ or more wide | 5 |
| 4. | Spores $7\text{ }\mu\text{m}$ long. Hymenium distinctly merulioid . . | 1.C. borealis |
| 4. | Spores $5\text{ }\mu\text{m}$ long. Hymenium smooth or inconspicuously merulioid | 6. Ceraceomyces sp. |
| 5. | Spores subglobose, $3 - 3,5\text{ }\mu\text{m}$ in diameter | 3.C. sublaevis |
| 5. | Spores obliquely ellipsoid, $6 - 8 \times 3,5 - 4,5\text{ }\mu\text{m}$. . | 4.C. tessulatus |

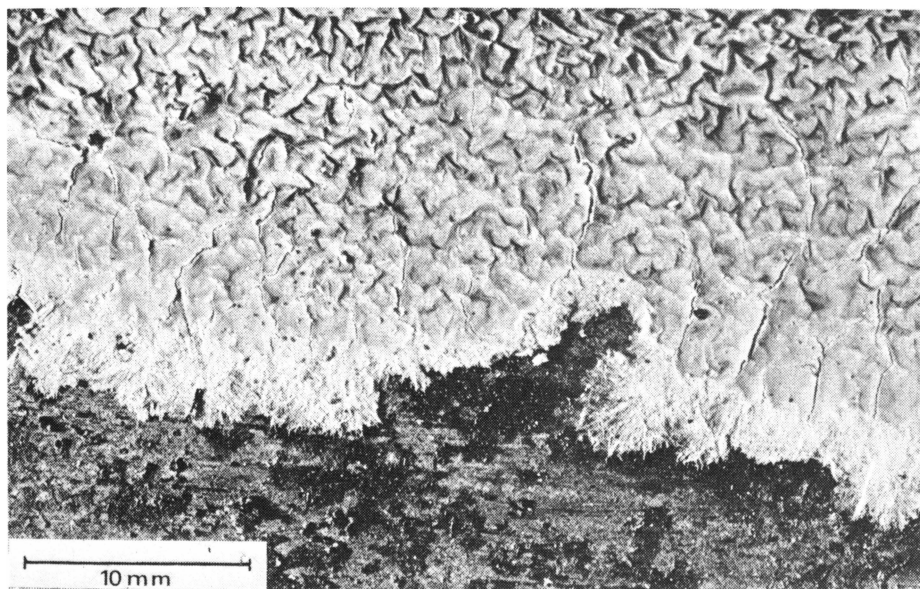


Fig. 87a. *Ceraceomyces borealis*. Fruitbody showing characteristic merulioid surface. — Olsson and Eriksson 8598.

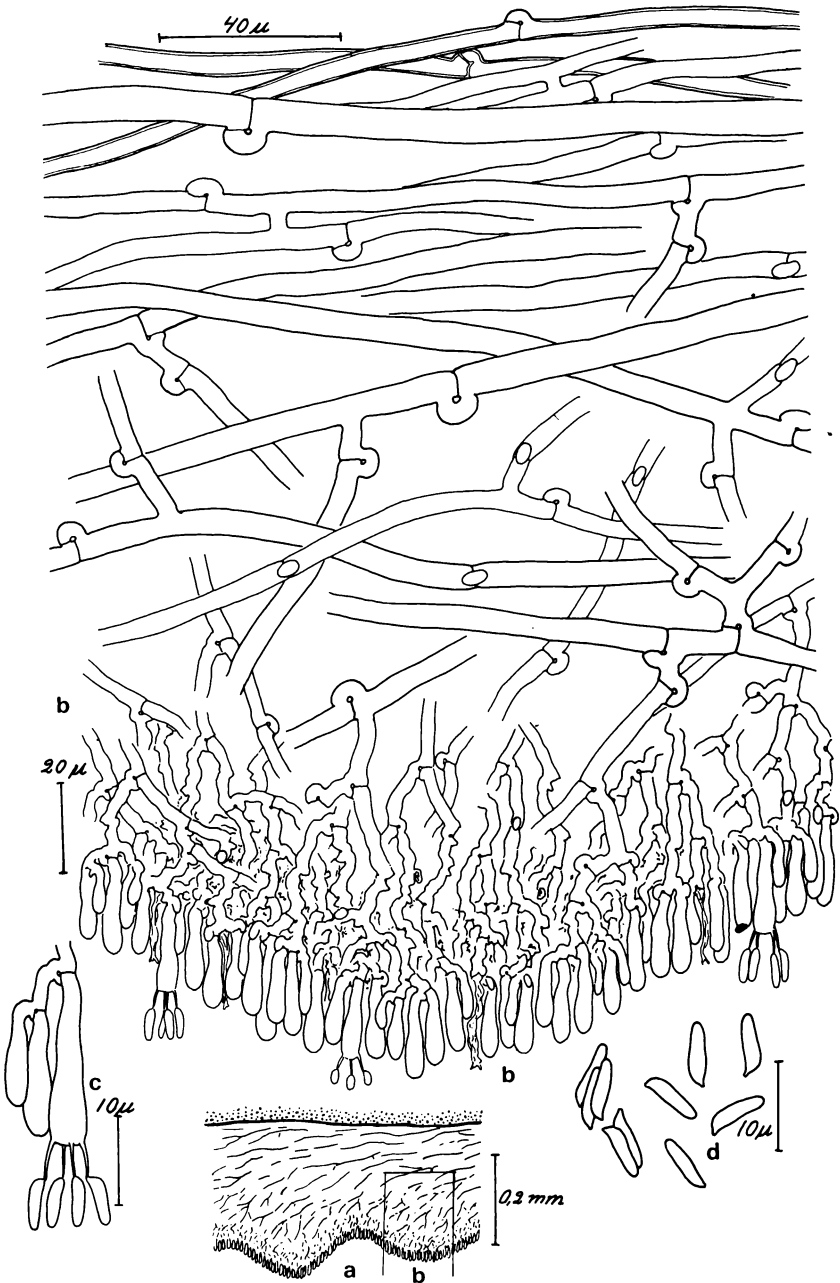


Fig. 87b. *Ceraceomyces borealis*. a) section of fruitbody, indicating position of section b) b) section of hymenium, subhymenium, and part of subiculum. — Eriksson 9690.

Ceraceomyces

1. **Ceraceomyces borealis** (Rom) Erikss. & Ryv. comb. nov. Fig. 87a,b
 Basionym: *Merulius borealis* Rom., Ark. f. botanik 11: 3 p. 27,
 1911.

Fruitbody large (often several dm in extent), loosely attached to the substrate, pellicular, at first thin and soft, purely white, with age developing a thickened somewhat ceraceous hymenium, turning yellowish or even pale ochraceous, at first smooth but soon much folded and wrinkled, subiculum white, soft and loose, rhizomorphs often present.

Hyphal system monomitic, hyphae of the subiculum with thin- or somewhat thickened walls, loosely interwoven, varying in width ($4 - 7 \mu\text{m}$), subhymenial hyphae more narrow ($2 - 3 \mu\text{m}$), richly ramified and densely interwoven, clamps — often very large and usually open — present at all septa, hyphal branches originating at the clamp cells or between septa.

Cystidia none.

Basidia clavate, $16 - 22 \times 4 - 5 \mu\text{m}$, with 4 sterigmata, always with basal clamps.

Spores cylindrical, with oblique apiculus, smooth, thinwalled, $6 - 8 \times 1.8 - 2 \mu\text{m}$.

Habitat. On much decayed wood of frondose and coniferous trees, trunks lying on ground etc., mostly in normal *Vaccinium-Hylocomium* forests.

Distribution. Mainly in N. Fennoscandia, where it is quite common. Found also once in S. Sweden (in Närke par. Västergötland by K. Hjortstam).

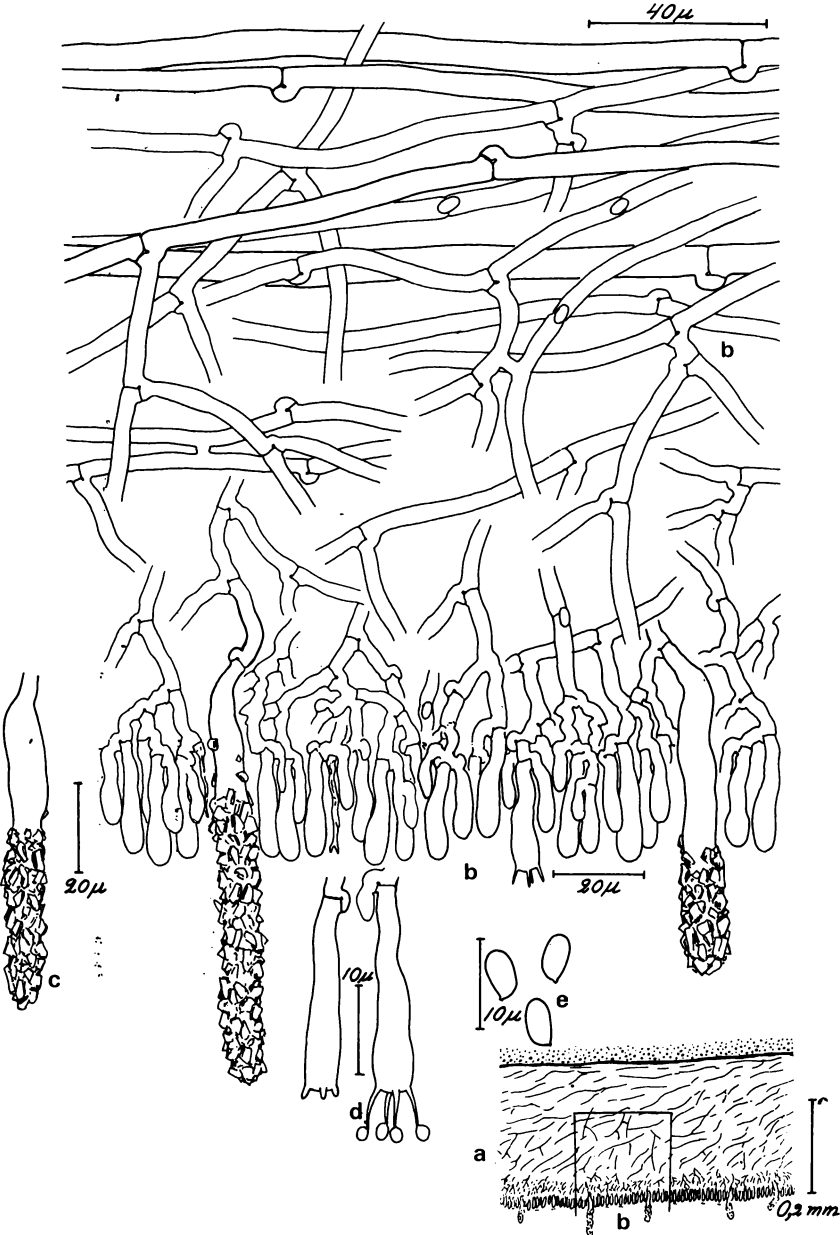


Fig. 88. *Ceraceomyces cystidiatus*. a) section of fruitbody indicating position of section b) b) section of hymenium, subhymenium, and parts of subiculum c) cystidium d) basidia e) spores. — Type specimen.

Ceraceomyces

2. *Ceraceomyces cystidiatus* (Erikss. & Hjortst. in Jül.) Fig. 88
 Hjortst., Sv. bot. tidskr. 67:105, 1973. — *Corticium violascens*
 (Fr.) var. *cystidiata* Erikss. & Hjortst. in Jül., Willd. Beih. 7:165, 1972.

Fruitbody broadly effused (1 – 2 dm), smooth, hymenium thickening with age, on drying cracking to polygons, more or less loosening from the subiculum, which is adnate to the substrate, hymenium at first light-coloured but eventually darkening to a dingy violaceous colour, subiculum light brown (Chamois), margin fibrillose, in young fruitbodies light-coloured but darkening with age to Chamois. The hymenium or subiculum turns red-violet with a drop of KOH solution.

Hyphal system monomitic, hyphae with clamps at all septa, in subiculum of varying widths 4 – 7 μm , with sparse ramifications and anastomoses, Chamois brown, hyphae of subhymenium hyaline, 2 – 3 μm wide, densely interwoven.

Cystidia 30 – 50 (–70) \times 5 – 7 μm , thinwalled, not septate, more or less encrusted (sometimes only apically), varying in number.

Basidia clavate, mostly 20 – 25 \times 4 – 5 μm , with 4 sterigmata.

Spores ellipsoid, thinwalled, smooth, 5 – 5.5 \times 2.5 – 3 μm .

Habitat. On decayed wood, mostly of conifers in humid (*Hylocomium-Myrtillus*) forest communities.

Distribution. Rare in N. Europe. Hitherto found in three localities in SW. Sweden (Hol par., leg. K. Hjortstam and Alingsås par., leg. K.-H. Larsson, in Västergötland, and Bredared par., leg. C.G. Lloyd, in Halland).

Remarks. *C. cystidiatus* was described as a variety of *C. violascens* and is certainly very close to this species. Judged from the Swedish material the difference is, however, striking, thus we follow Hjortstam and rank it as a species of its own.

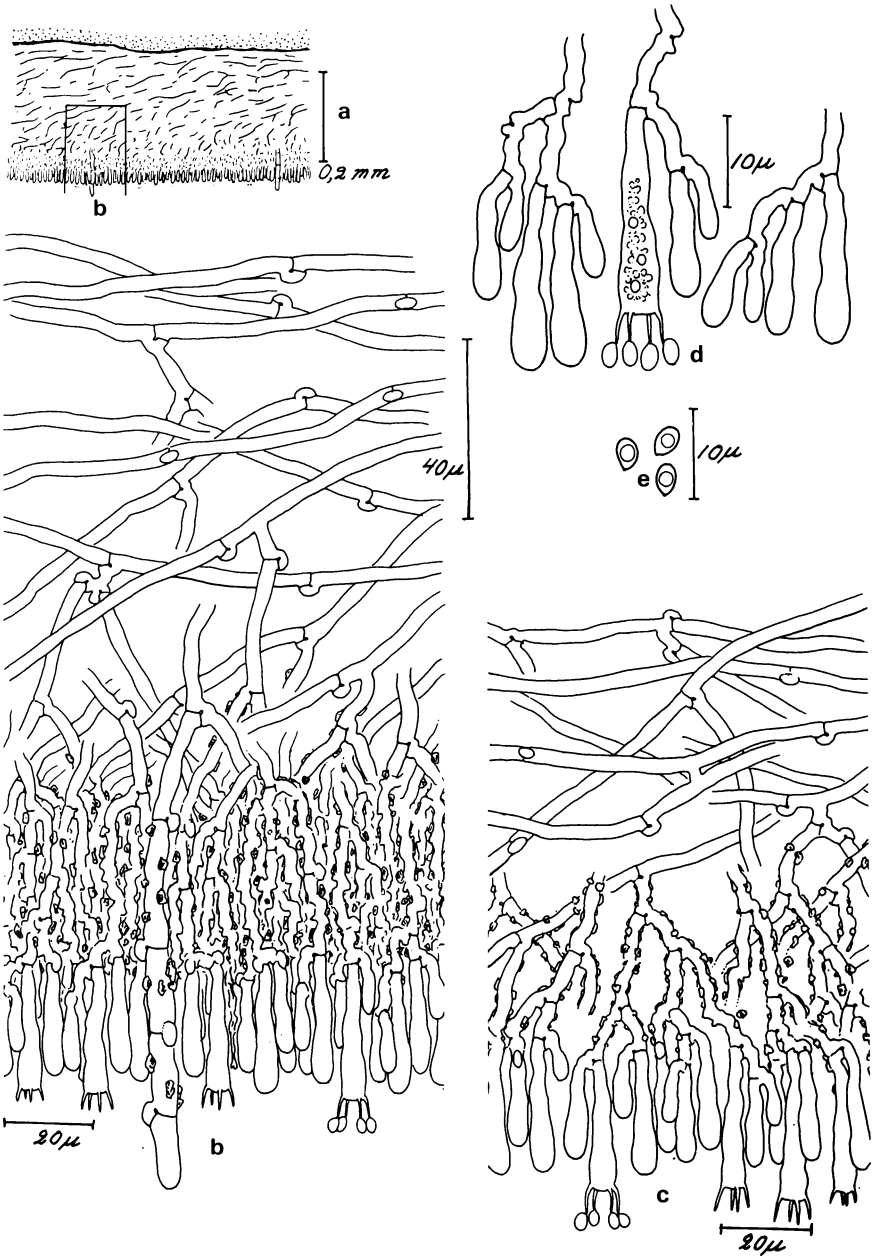


Fig. 89. *Ceraceomyces sublaevis*. a) section of fruitbody indicating position of section b) b) section of hymenium, subhymenium and part of subiculum of mature part of fruitbody c) do. of young part of fruitbody d) basidia e) spores. — Eriksson 24-9-1966.

Ceraceomyces

3. *Ceraceomyces sublaevis* (Bres.) Jül. Fig. 89, Pl. 19A
 Willd. Beih. 7:147, 1972. — *Corticium sublaeve* Bres.,
 Ann. mycol. 1:95, 1903.

Fruitbody moderately effused, white to cream coloured, at first thin and pellicular, hymenium thickening with age achieving a ceraceous consistency, surface smooth or in the fresh state sometimes meruloid, when dry cracked, mostly transverse to the wood grain, separable in small pieces, margin white, finely fibrillose under the lens.

Hyphal system monomitic, hyphae with clamps at all septa, hyphae of subiculum 3 – 4 μm , rather straight and with sparse ramifications and anastomoses, hyphae of subhymenium 2 – 3 μm wide and densely interwoven, as a rule with crystalline deposits.

Cystidia usually few, sometimes even lacking, hyphal, with septa and clamps, more or less encrusted, 40 – 60 (–100) \times 4 – 5 μm , projecting 10 – 30 μm .

Basidia narrowly clavate, mostly 20 – 25 \times 4 – 5 μm , with 4 sterigmata.

Spores ellipsoid to subglobose, smooth, with one oil drop, 3 – 3,5 \times 2 – 2,5 μm .

Habitat. On decayed wood, mostly of conifers.

Distribution. Rather common in the whole conifer region of Fennoscandia.

Remarks. Easily distinguished, especially by the very small, subglobose spores. These are like those of *Cristella confinis*, but the species differ in the shape of the basidia and nature of the hyphae.

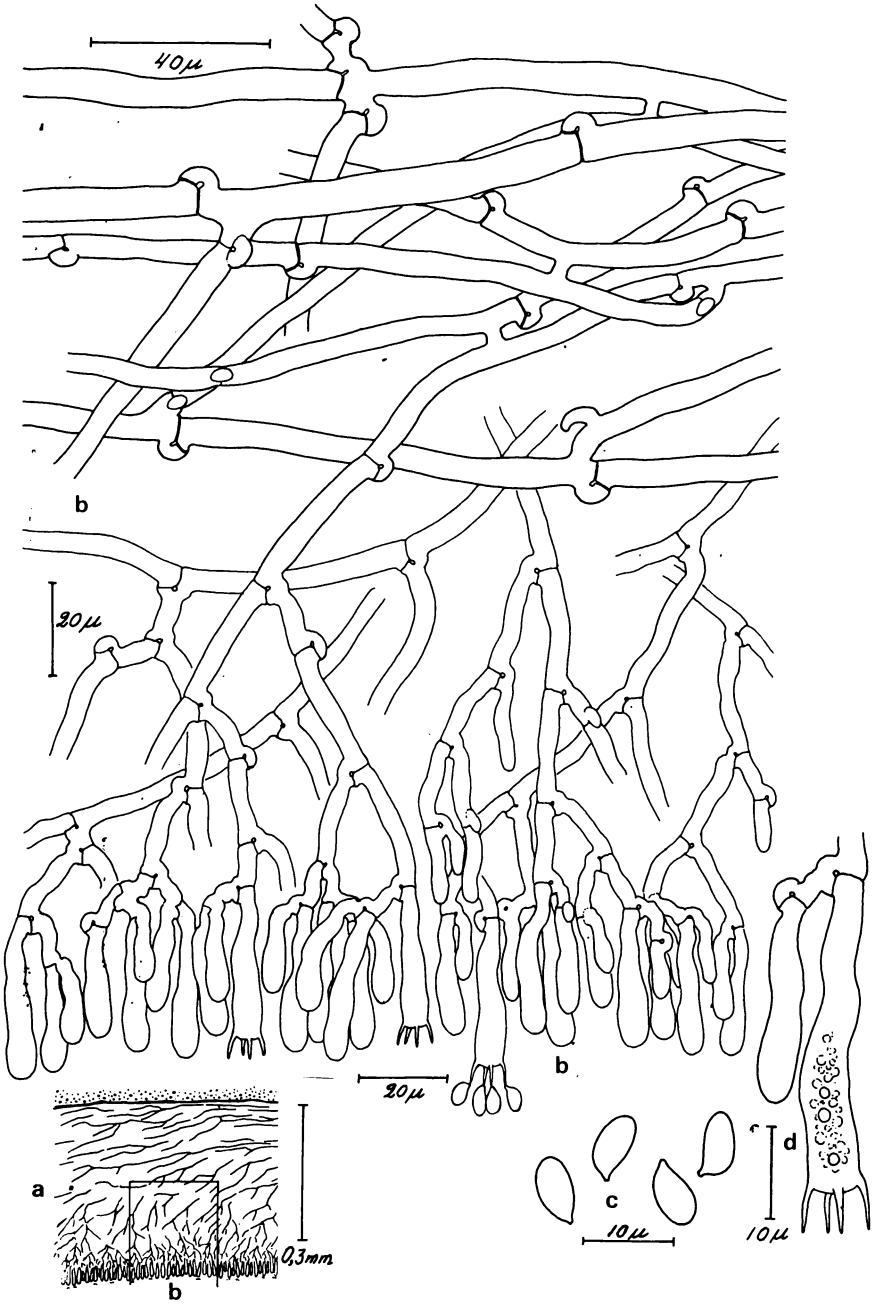


Fig. 90. *Ceraceomyces tessulatus*. a) section of fruitbody indicating position of section b) b) section of hymenium, subhymenium, and part of subiculum c) spores d) basidia. — Eriksson 437.

Ceraceomyces

4. *Ceraceomyces tessulatus* (Cooke) Jül. Fig. 90–91, Pl. 19B, C
 Willd. Beh. 7:154. — *Corticium tessulatum*. Cooke, Grev.
 6:132, 1878. Syn. *Corticium dovrense* Jørstad & Pilat.
 Kgl. Norske Vidensk. Selsk. Skr. 1936 nr. 10:7 (type examined).

Fruitbody moderate to rather large, smooth, white to yellowish, in old parts darker, detachable from the substrate, hymenium at first thin, pellicular, thickening with age and becoming ceraceous in consistency, brittle when dry, subiculum loose, white, rhizomorphs frequent in the periphery of the fruitbody, emerging from the subiculum.

Hyphal system monomitic, all hyphae with clamps, mostly thinwalled, subiculum composed of loosely interwoven, somewhat thickwalled hyphae of varying widths ($4 - 8 \mu\text{m}$) with sparse ramifications and anastomoses, subhymenial hyphae narrower, $3 - 4 \mu\text{m}$, densely ramified and interwoven.

Cystidia none.

Basidia narrowly clavate, $25 - 35 \times 5 - 6 \mu\text{m}$ with 4 sterigmata.

Spores obliquely ellipsoid to pip-shaped, $6 - 8 \times 3,5 - 4,5 \mu\text{m}$, smooth, thinwalled.

Habitat. On decayed frondose or coniferous wood, boards etc., in habitats of medium humidity, e.g. *Hylocomium-Myrtillus* communities.

Distribution, in all forested parts of Fennoscandia. In Sweden found from Skåne to N. Lappland. Rather common.

Remarks. Rather large, light-coloured species with conspicuous rhizomorphs and therefore readily observed. Shape of spores and nature of hyphae (wide and with large clamps) make it easy to recognize. The spores of *C. dovrense* are described and illustrated as being echinulate. This is, however, not the case. The description must be based on foreign spores.

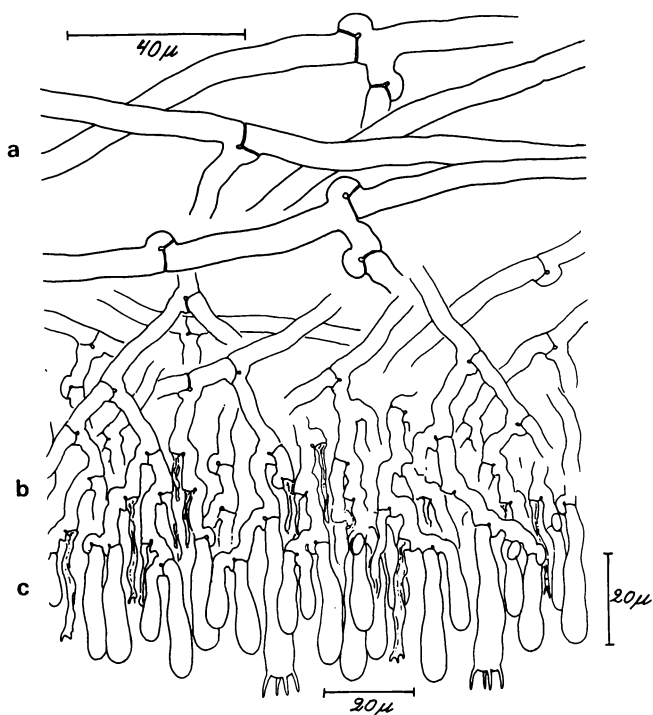


Fig. 91. *Ceraceomyces tessulatus*. Section of mature hymenial part of fruitbody.
 a) subiculum b) subhymenium c) hymenium. — Eriksson 437.

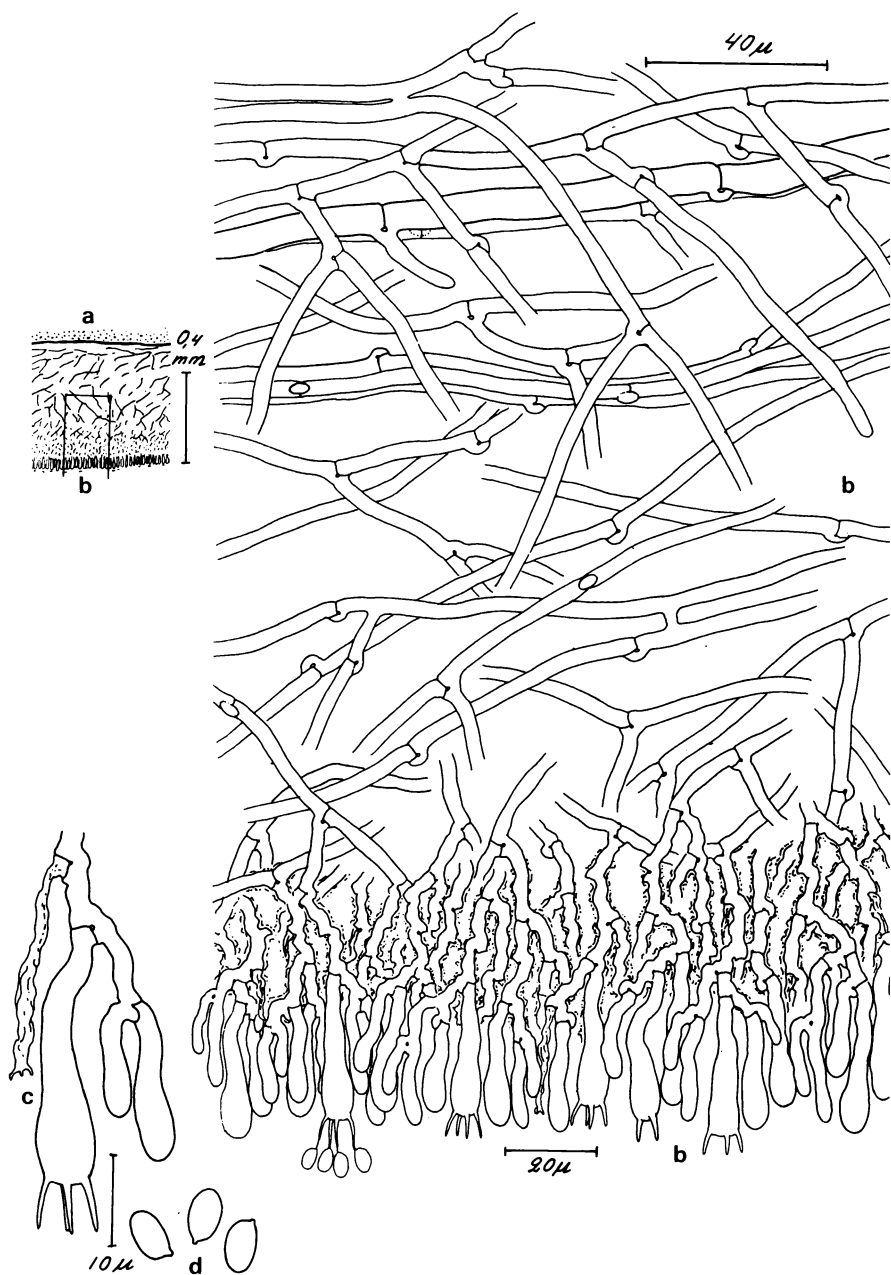


Fig. 92. *Ceraceomyces violascens*. a) section of fruitbody indicating position of section b) b) section of hymenium, subhymenium and part of subiculum c) basidia d) spores. — Eriksson 385.

Ceraceomyces

5. *Ceraceomyces violascens* (Fr.) Jül.

Fig. 92, Pl. 20

Willd. Beih. 7: 162, 1972. — *Thelephora violascens*

Fr., Elench, fung. 1:202, 1828.

Fruitbody mostly large, smooth, hymenium thickening in age, when dried cracking transversely to the wood grain or to irregular polygons, easily separable from the substrate, first light coloured, then darkening to dingy violaceous, subiculum light brown (Chamois), adnate, margin fibrillose, in the young fruitbody light-coloured but darkening to Chamois, small rhizomorphs often present in the periphery. A drop of KOH solution on the hymenium or the subiculum turns red-violet.

Hyphal system monomitic, hyphae with clamps at all septa, hyphae of subiculum of variable diameter, $4 - 7 \mu\text{m}$, with sparse ramifications and anastomoses, light brown (Chamois) on sight, but hyaline under the microscope, hyphae of subhymenium hyaline, thinwalled, $2.5 - 4 \mu\text{m}$, richly ramified and densely interwoven, interhyphal spaces of subiculum in living specimens filled with a gelatinous liquid, forming deposits on the hyphae on drying.

Cystidia none.

Basidia clavate, $20 - 35 \times 5 - 6.5 \mu\text{m}$, with 4 sterigmata.

Spores ellipsoid, with small apiculus, $5 - 6 \times 3 - 3.5 \mu\text{m}$, smooth, thin-walled.

Habitat. Mostly found in normal *Vaccinium-Hylocomium-Picea* (*Pinus*) forests. It is often seen on debris of old fallen wooden fences, slash from lumberings etc., in fertile and humid conifer forests.

Distribution. In Scandinavia two areas of distribution are known, in the elevated part of Southern Sweden (Småland and Västergötland) where it is locally rather common, and in Northern Sweden and Finland. It is remarkable that this rather conspicuous fungus has not been collected in the vast area between e.g. in the surroundings of Stockholm and Uppsala where collecting has been very intense for a long time.

Remarks. The species is very close to *C. cystidiatus*. Both species are easily recognized by the violaceous colour of the fully developed hymenium and the chamois colour of the subiculum, which turns reddish violet in KOH.

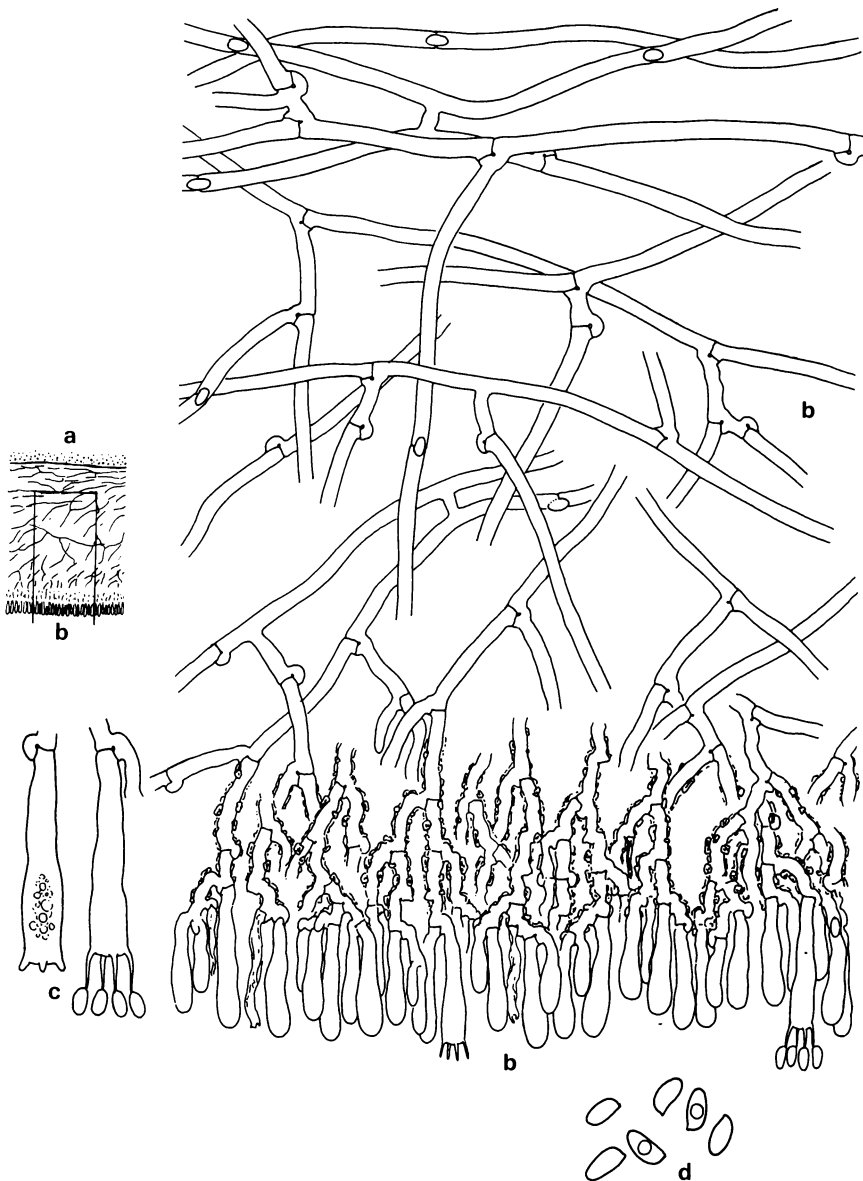


Fig. 93. *Ceraceomyces* sp. a) section of fruitbody indicating position of section b) section of hymenium, subhymenium and part of subiculum c) basidia d) spores. — Eriksson 3170.

Ceraceomyces

6. *Ceraceomyces* sp. John Erikss. 3170.

Fig. 93, Pl. 18B

Fruitbody thin, pellicular, as dry separable in patches, first smooth, older specimens more or less merulioid as fresh, after drying smooth, first whitish, then cream — pale orange — pale ochraceous, transversely and rather regularly cracked, margin white, finely fibrillose under the lens.

Hyphal system monomitic, all hyphae with clamps, hyphae of subiculum loosely interwoven and sparsely ramified, 3 — 4 μm wide, subhymenial hyphae 2 — 3 μm wide, densely interwoven and with crystalline deposits.

Cystidia none.

Basidia clavate, with oily contents in the protoplasm, normally 20 — 25 x 4 — 5 μm , with 4 sterigmata.

Spores narrowly ellipsoid to narrowly ovate or subcylindrical, often with one oil drop, 4 — 5 x 2 — 2,2 μm .

Habitat and distribution. Found only once, viz. Sweden, Lule Lappmark, Jokkmokk parish, Muddus national park, Stuor Tjåtekvare, on fallen trunk of *Picea abies* in mixed forest of *Picea*, *Populus tremula* and *Betula*, 3.10.1948. E. & J. Eriksson n. 3170.

Remarks. The collection has been examined by Jülich and accepted for his new genus *Ceraceomyces*, a disposition which to us seems to be a sound idea. There are, however, similarities in microscopical characteristics with young specimens of *Ceraceomerulius serpens*, why the problem cannot be looked upon as definitely settled.

Ceratobasidium Rogers

Univ. Iowa Studies 17: 4, 1935

Fruitbody very thin, smooth, when fresh waxy (ceraceous), when dry forming mostly not more than a greyish bloom on the substrate, hyphae without clamps, the basal ones with somewhat thickened walls, mostly about $5\text{ }\mu\text{m}$ wide, no cystidia, basidia from short perpendicular hyphal branches or directly from the basal hyphae, basidia mostly subglobose, with 2 – 4 stout, cornute sterigmata, 10 – 20 μm long, spores of the Scandinavian species ellipsoid to ovate to subballantoid, sometimes producing secondary spores from a sterigma of varying length.

Genotypus: *Ceratobasidium calosporum* Rogers.

Remarks. This genus is close to *Thanatephorus*, *Uthatobasidium*, *Cejpomyces* and *Botryobasidium*. The spore repetition distinguishes it from the two last genera. From the two others, it is recognized by the rounded shape of the basidia and by the nature of the hymenium. The basidia originate on the basal hyphae or on short sidebranches. They do not form a regular palisade as in *Thanatephorus* and *Cejpomyces*. The production of secondary spores (repetition) occurs in a minority of spores. This character is usually looked upon as systematically important, indicating a relationship with the Heterobasidiomycetes. The repetition is in itself easily interpreted as a delayed ability of the protoplasm to produce a sterigma. This ability is normally found only in the protoplasm of the basidium, but in some cases this ability remains even when the protoplasm has entered the spore. Some spores adhering to the hymenium (e.g. during the drying of a collected specimen) show repetition, but it is doubtful whether this is the normal procedure in nature. It has been suggested that the ability to repeat could be of importance for a redistribution of spores fallen on unfavourable substrate, but it is doubtful if this is really the case.

It cannot be excluded that the protoplasm of thinwalled spores sticking to the fruitbody, are induced to produce sterigmata by active substances excreted from the basidia. In gelatinous fruitbodies where spore repetition generally occurs, there are interhyphal liquids that may be of importance as carriers of such exudates.

In *Ceratobasidium* it is observed that adventitious septa sometimes occur in the sterigmata. This too has been regarded as an indication of relationship with the Heterobasidiomycetes. Comparison is made with the sterigmatic septum in *Tulasnella* or with the basidial septa in Tremellaceae and Heterobasidiomycetes in general. However, such adventitious septa can be found in many resupinate Hymenomycetes even in sterigmata if they

Ceratobasidium

are sufficiently large. Such sterigmatic septa can be seen in *Tomentella*, *Hyphoderma*, *Hypochnicium* a.o. As soon as there is a difference in plasm-density in a cell, such septation can be expected. Consequently, it cannot therefore be used as a criterion of a close relationship. The swollen sterigma of *Tulasnella* have been compared with the large and stout sterigma of *Ceratobasidium*, the reason for this genus being transferred to the Tulasnellaceae. The swollen sterigmata of *Tulasnella* seem rather to be a specialized character in which the protoplasm is prepared for the spore formation, just as in the four cells of the septated *Tremella* basidium. The *Ceratobasidium* sterigmata though larger, are more comparable with the normal sterigmata in the Corticiaceae, Thelephoraceae etc. For the time being it seems wiser to place *Ceratobasidium* in the Corticiaceae than in the Tulasnellaceae. However, there is no doubt that *Ceratobasidium* because of the shape of the basidium (probasidium) as well as sterigmata, belongs in the periphery of the family and rather close to the Tremellaceae. The borderline between this family and the Corticiaceae is vague, but to us it seems unnatural to place genera like *Ceratobasidium*, *Cejpomyces*, *Thanatephorus* and *Botryobasidium* in different families, why we place them all in Corticiaceae. A possible alternative could be to arrange them in a family of their own even if little is gained by this.

In Northern Europe only four species of *Ceratobasidium* are found. Three others are known, one of which is parasitical on higher plants (*C. anceps* (Bres. & Syd.) Jacks.), one has very long sinuous spores (*C. calosporum* Rogers) and one has subglobose spores (*C. obscurum* Rogers). *Corticium ter-rigenum* Bres., previously placed in *Ceratobasidium*, is referred to *Cejpomyces*, and *C. sterigmaticum* Bourd. to *Thanatephorus*.

Key to species

- | | | |
|----|--|-------------------------------|
| 1. | Parasitical on mosses, basidia with two sterigmata . . | 1. <i>C. bicornes</i> |
| 1. | Saprophytical, basidia with four sterigmata | 2 |
| 2. | Spores oblong to subcylindrical, length about three times the width | 3. <i>C. pseudocornigerum</i> |
| 2. | Spores ovate to ellipsoid, length about twice the width | 3 |
| 3. | Spores 6 — 7.5 x 3 — 3.5 μ m, spore sterigma from the apical end | 4. <i>C. stridii</i> |
| 3. | Spores 7 — 11.5 x 3.5 — 6 μ m, spore sterigma developed laterally | 2. <i>C. cornigerum</i> |

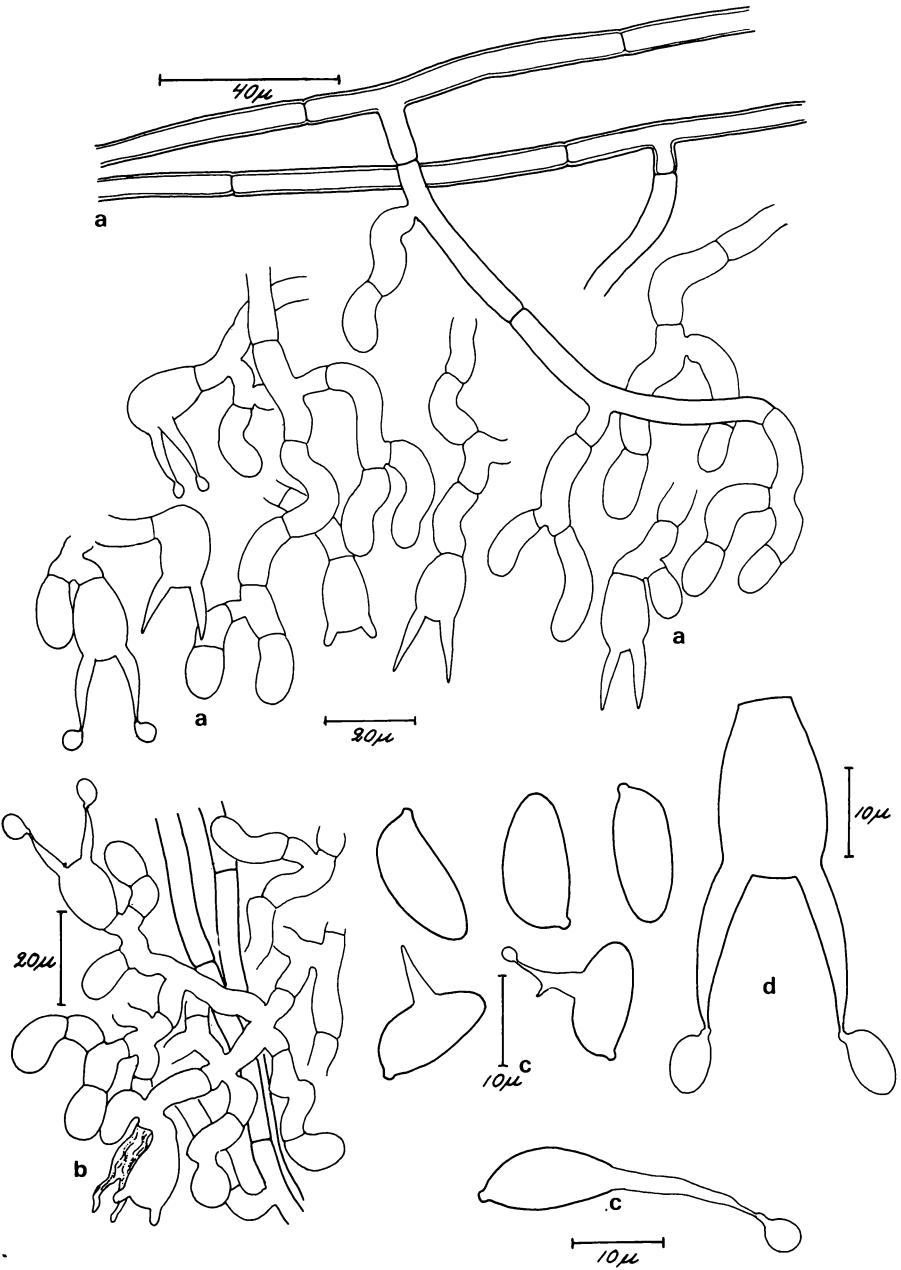


Fig. 94. *Ceratobasidium bicorne*. a) crush preparation of hymenium and hyphae of young fruitbody b) do. of a more mature fruitbody c) spores d) basidium. — Type specimen.

Ceratobasidium**1. *Ceratobasidium bicornе* Erikss. & Ryv. nov. spec.**

Fig. 94

Fructificatio albida, tenuis, hyphae basales strictae, ca. $5\text{ }\mu\text{m}$ latae ramis angulis rectis, basidia subglobosa vel obovata, $15 - 20 \times 8 - 10\text{ }\mu\text{m}$, 2 sterigmatibus $10 - 15\text{ }\mu\text{m}$ longis cornutis, sporae anguste ovoideae vel ellipsoideae, $13 - 16 \times 6 - 8\text{ }\mu\text{m}$. In *Polytricho attenuato* parasitico.

Holotypus: Eriksson & Nannfeldt no. 14236 (herb. Eriksson).

Type locality: Denmark, Sjælland, Grib Skov, on living specimens of *Polytrichum attenuatum*, 2.10.1955.

Fruitbody thin, smooth, whitish, when fresh ceraceous, adnate and covering the upper parts of specimens of *Polytrichum attenuatum*.

Hyphal system monomitic, all hyphae without clamps, the basal ones straight, glued to the substrate and ramified at right angles, the hymenial branches short, in young hymenium more or less curled, in older hymenium growing together to a continuous mat, bearing the basidia.

Cystidia none.

Basidia apically borne on the hymenial branches, subglobose to obovate, $15 - 20 \times 8 - 10\text{ }\mu\text{m}$, with 2 large and stout sterigmata (in one case 3 sterigmata were observed), $12 - 18\text{ }\mu\text{m}$ long about $3\text{ }\mu\text{m}$ wide at the base.

Spores narrowly ovoid to narrowly ellipsoid or subcylindrical, smooth, non-amyloid, $13 - 16 \times 6 - 8\text{ }\mu\text{m}$.

Habitat and distribution. Known only from the type locality.

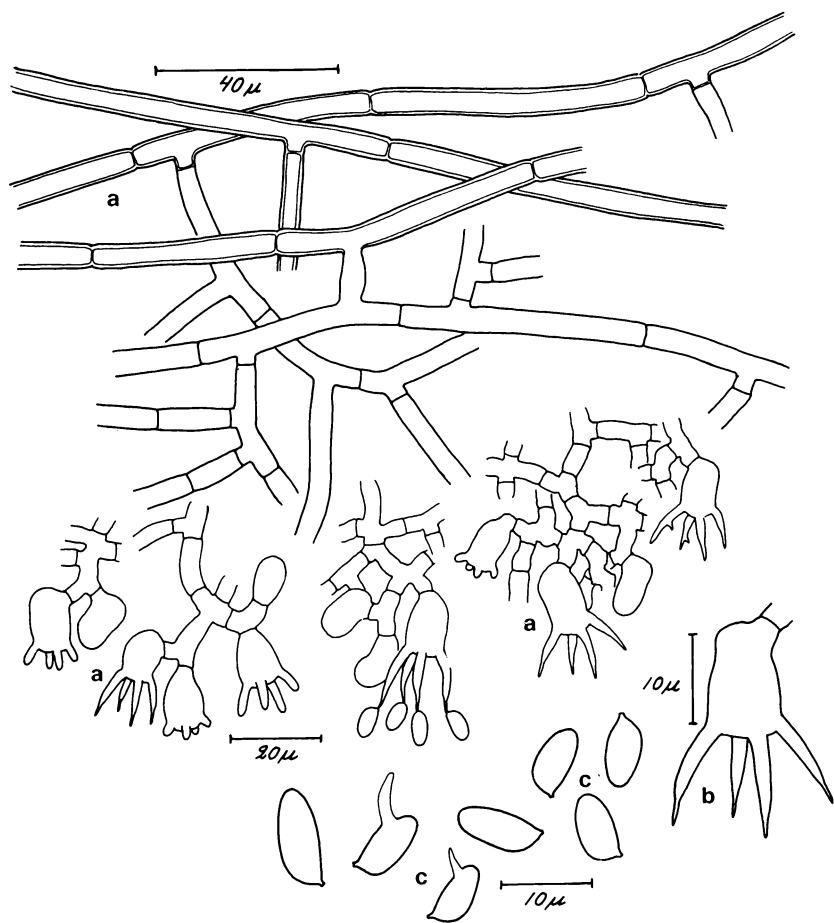


Fig. 95a. *Ceratobasidium cornigerum*. a) crush preparation of hymenium and hyphae b) basidium c) spores. — Eriksson 31-10-1965.

Ceratobasidium**2. *Ceratobasidium cornigerum* (Bourd.) Rogers.**

Fig. 95a, b

Univ. Iowa Studies 17: 5, — *Corticium cornigerum*

Bourd., Rev. Sci. Bourb. 35: 4, 1922.

Fruitbody very thin, smooth ceraceous when fresh, when dry like a greyish bloom on the substrate.

Hyphal system monomitic, all hyphae without clamps, basal ones straight, sparsely ramified at right angles, about $5\ \mu\text{m}$ wide and with somewhat thickened walls, hymenial branches more narrow, thinwalled and richly ramified especially in old hymenia, finally forming a pseudoparenchymatic structure.

Cystidia none.

Basidia rounded to obovate, $12-16 \times 7-10\ \mu\text{m}$ with 4 large sterigmata, $10-15\ \mu\text{m}$ long.

Spores narrowly ovate to ellipsoid, smooth, non-amyloid, $7-11.5 \times 3.5-6\ \mu\text{m}$. Spore repetition occurs laterally on the spores.

Habitat. On different kinds of substrate, but preferably on newly fallen branches with still fresh bark. It occurs both on conifers and deciduous trees, but seems to be most common on twigs of *Pinus* and *Picea* fallen to the ground.

Distribution. Not well known, but is probably common in the forests throughout Fennoscandia. Easily overlooked as it is a thin and inconspicuous fungus.

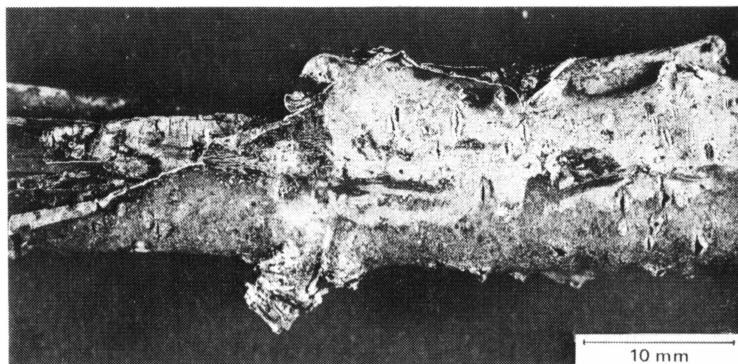


Fig. 95b. *Ceratobasidium cornigerum*. Eriksson 865.

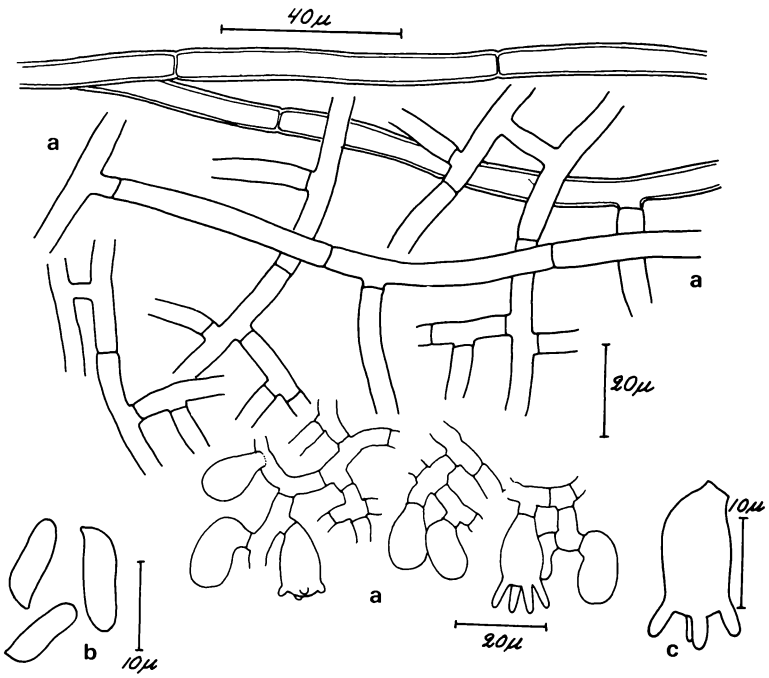


Fig. 96. *Ceratobasidium pseudocornigerum*. a) crush preparation of hymenium and hyphae b) spores c) basidium. — Eriksson 872.

Ceratobasidium

3. **Ceratobasidium pseuodcornigerum** M.P. Christ.
Dansk Bot. Ark. 19:46, 1959.

Fig. 96

Fruitbody very thin, smooth ceraceous when fresh, when dry like a greyish bloom on the substrate (usually smooth bark).

Hyphal system monomitic, all hyphae with simple septa, $5 - 7 \mu\text{m}$ wide, the basal ones straight, sparsely ramified at right angles and with somewhat thickened walls, hymenial branches more narrow, thinwalled, richly branched.

Cystidia none.

Basidia rounded to obovate, $14 - 16 \times 8 - 10 \mu\text{m}$, with 4 large sterigmata.

Spores oblong to cylindrical, smooth, non-amyloid, $9 - 12 \times 3 - 4 \mu$, repetitive by a laterally placed sterigma.

Habitat. On newly fallen branches of deciduous trees with still fresh bark, in good humid localities.

Distribution. Very little known. Hitherto found in Denmark (2 specimens cited by Christ. loc. cit.) and once in Sweden (Göteborg, Rya skog, 14 - 11 - 1961, J. Eriksson 872 & I. Grave).

Remarks. Distinguished from *C. cornigerum* only in the shape of the spores.

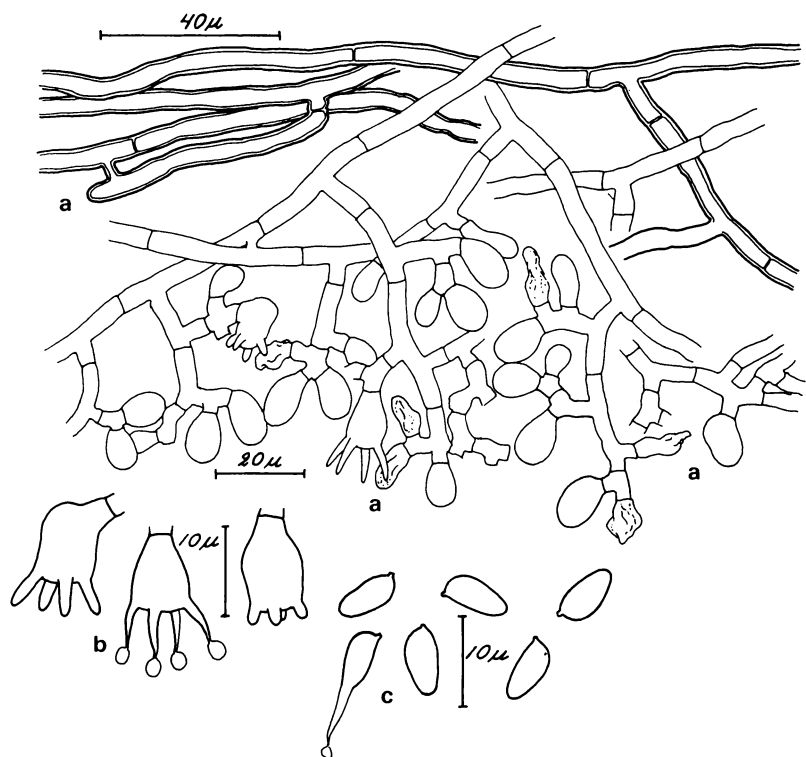


Fig. 97. *Ceratobasidium stridii*. a) crush preparation of hymenium and hyphae b) basidia c) spores. — Type specimen.

Ceratobasidium

4. *Ceratobasidium Stridii* Erikss. & Ryv. spec. nov.

Fig. 97

Fructificatio resupinata, tenuissima, albida vel cinera, hyphae 3 – 4,5 μm latae, fibulatae, hyphae basales partim incrassate tunicatae, flavidae, basidia subglobosa vel pyriformia 8 – 10 x 6 – 8 μm , 4 sterigmatibus crassis, sporae laeves, anguste ovatae vel ellipsoideae, 6 – 7,5 x 3 – 3,5 μm , cum repetitione apicali.

Typus: Å. Strid 10383 (herb. Strid and herb. Eriksson).

Type locality: Sweden, Norrbotten, Råneå parish, Yttre Aborrviken, on bark of fallen *Sorbus aucuparia*, 3.9.1972, Å. Strid.

Fruitbody very small and thin, when dry almost like a greyish bloom.

Hyphal system monomitic, all hyphae with simple septa, 3 – 4.5 μm wide the basal hyphae with somewhat thickened walls, more or less yellowish, other hyphae thinwalled, hyaline, both types stained by cotton-blue.

Cystidia none.

Basidia subglobose to pyriform, 8 – 10 x 6 – 8 μm , with 4 stout sterigmata.

Spores narrowly ovate to narrowly ellipsoid, 6 – 7,5 x 3 – 3,5 μm , smooth, non-amyloid, distinctly stained by cotton-blue. Spore repetition observed only in the apical end of the spores, while in *C. cornigerum* lateral repetition is the rule.

Habitat and distribution: Known only from the type locality.

Remarks: The collection deviates clearly from *C. cornigerum*, to which it no doubt is closely related, thus we dare describe it as a new species, in spite of having only one specimen.

Cerinomyces Martin

Mycologia 41: 82, 1949

Fruitbody resupinate, smooth or more or less tuberculate, ceraceous when fresh and wet, brittle when dry, hyphae thinwalled or lightly thickwalled and with clamps at the septa, young basidia ("probasidia") narrowly clavate, when mature with two very long sterigmata ("epibasidia"), spores ellipsoid to allantoid, smooth, non-amyloid.

Genotypus: *Cerinomyces pallidus* Martin.

Remarks. *Cerinomyces* is characterized and recognized by the nature of the basidia which bear two large sterigmata, thus looking forked in a manner so well known from the family Dacrymycetaceae. The genus has therefore previously been placed in this family. There are, however, several features in its morphology which are reminiscent of Corticiaceae. The fruit-body is ceraceous and not gelatinous as in Dacrymycetaceae. The thickening hymenium produces basidia in a way which is normal in Corticiaceae. The spores do not become septated in *Cerinomyces* nor do they produce conidia. The striking similarity as to the nature of the basidia between *Cerinomyces* and Dacrymycetaceae depend on two criteria — the number and size of the sterigmata. Two sterigmata occur in several species in the Corticiaceae and so do large sterigmata. Thus the remarkable characteristic for *Cerinomyces* is the combination of these two qualities. However, such a combination does not in itself necessarily indicate a close relationship.

Cerinomyces is in our opinion an intermediate between Corticiaceae and Dacrymycetaceae, just as *Ceratobasidium* links Corticiaceae and Tremellaceae and as *Botryohypochnus* joins Corticiaceae and Thelephoraceae.

An interesting detail was observed in a specimen of a *C. crustulinus* from Canada (Erikss. 8401). Some basidia were found with more than two sterigmata, viz. 3 to 4. One basidium with 3 sterigmata (cfr. fig. 98) was observed floating totally free in the preparation, why a mistake was impossible. Such a variation in the number of sterigmata is so far as we know, not seen in the Dacrymycetaceae.

Cerinomyces

1. *Cerinomyces crustulinus* (Bourd. & Galz.) Martin Fig. 98, Pl. 21A
 Mycologia 41: 85, 1949. — *Ceracea crustulina* Bourd. & Galz.,
 Bull. Soc. Mycol. Fr. 39: 266, 1924.

Fruitbody thin, resupinate, smooth (corticoid), greyish white to pale ochraceous, ceraceous, margin indistinct.

Hyphal system monomitic, all hyphae with clamps, basal hyphae with somewhat thickened walls, 3 – 4 μm in diameter, hymenial branches thinwalled, 2.5 – 3.5 μm .

Cystidia none.

Basidia narrowly clavate when young, 20 – 25 x 5 – 6 μm , then producing two large, first obtuse, then acute sterigmata, 10 – 15 μm long and about 2 μm wide at base.

Spores allantoid, 7 – 12 x 2.5 – 4 μm , non-amyloid.

Habitat. On coniferous wood in *Vaccinium-Picea-Pinus* forests.

Distribution. Rare, but found scattered throughout the conifer region from Småland and Västergötland in Sweden to Northern Finland.

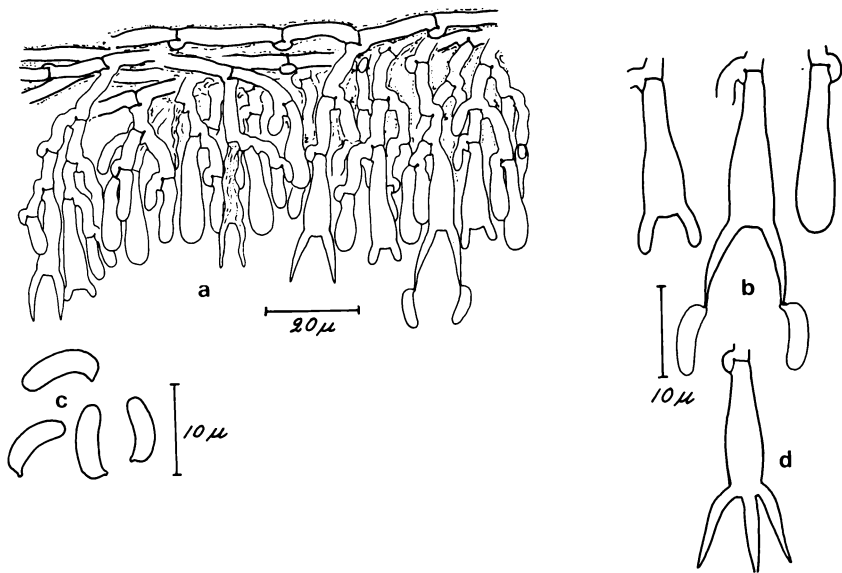


Fig. 98. *Cerinomyces crustulinus*. a) section of fruitbody b) basidia c) spores d) basidium with three sterigmata. — a-c Eriksson 8194, d Eriksson 8401.

Chaetoderma Parm.

Consp. syst. Cort. p. 86, 1968.

Fruitbody resupinate, perennial, rather thick, pale whitish or greyish, mostly small (1 — 2 cm in diameter), pulvinate, but sometimes confluent to larger fruitbodies, margin abrupt, hyphae clamped, hyaline, somewhat thickwalled, 2 — 4 μm wide, vertically interwoven, ramifications generally from clamps, basidia about 100 μm long, more or less sinuous with four sterigmata, young basidia apically with a grainy encrustation, spores about 15 μm long, fusoid and more or less arcuate, thinwalled, smooth and non-amyloid.

Genotypus and only species: *Chaetoderma luna* (Rom. ex Rog. & Jacks) Parm.

Chaetoderma

1. **Chaetoderma luna** (Rom. ex Rog. & Jacks) Parm. Fig. 99--100,
 Consp. syst. Cort. p. 86, 1968. — *Peniophora luna* Rom. Pl. 21B
 ex Rog. & Jacks., Farlowia 1:320, 1943.

Fruitbody whitish, pale greyish to pale ochraceous, resupinate, pulvinate, 0.5 — 2 mm thick, mostly small (1–2 cm), usually extended in the direction of the wood grain and sometimes confluent to longish fruitbodies, as dry more or less rimose, margin abrupt, finely fibrillose under the lens, consistency tough, almost suberose.

Hyphal system monomitic, consisting of vertical, densely interwoven hyphae, mostly 2 — 3 μm wide and with clamps at all septa, thinwalled or slightly thickwalled, old hyphae often with a fine grainy encrustation.

Cystidia very long, up to 300 μm , projecting 15 — 50 μm , thickwalled and finely encrusted or apically with some larger crystals.

Basidia very long and slender, about 100 μm long and 5 — 7 μm wide, usually with a fine, grainy encrustation, 4 sterigmata about 6 — 8 μm

Spores fusiform, more or less arcuate (crescent-shaped), smooth, non-amyloid, 12 — 16 x 4 — 6 μm .

Habitat. On dry and naked wood of conifers, mostly *Pinus silvestris*. Most collections have been made on hard, grey wood in open and sunny localities. It is a characteristic species on decorticated branches and trunks of pine in dry heaths and on sunny dry slopes.

Distribution. Common in dry continental areas in North Fennoscandia rarer southwards, but locally common in the strongly continental areas in Eastern Norway. Also found a few times in southern Sweden, preferably in forest reserves with old pine.

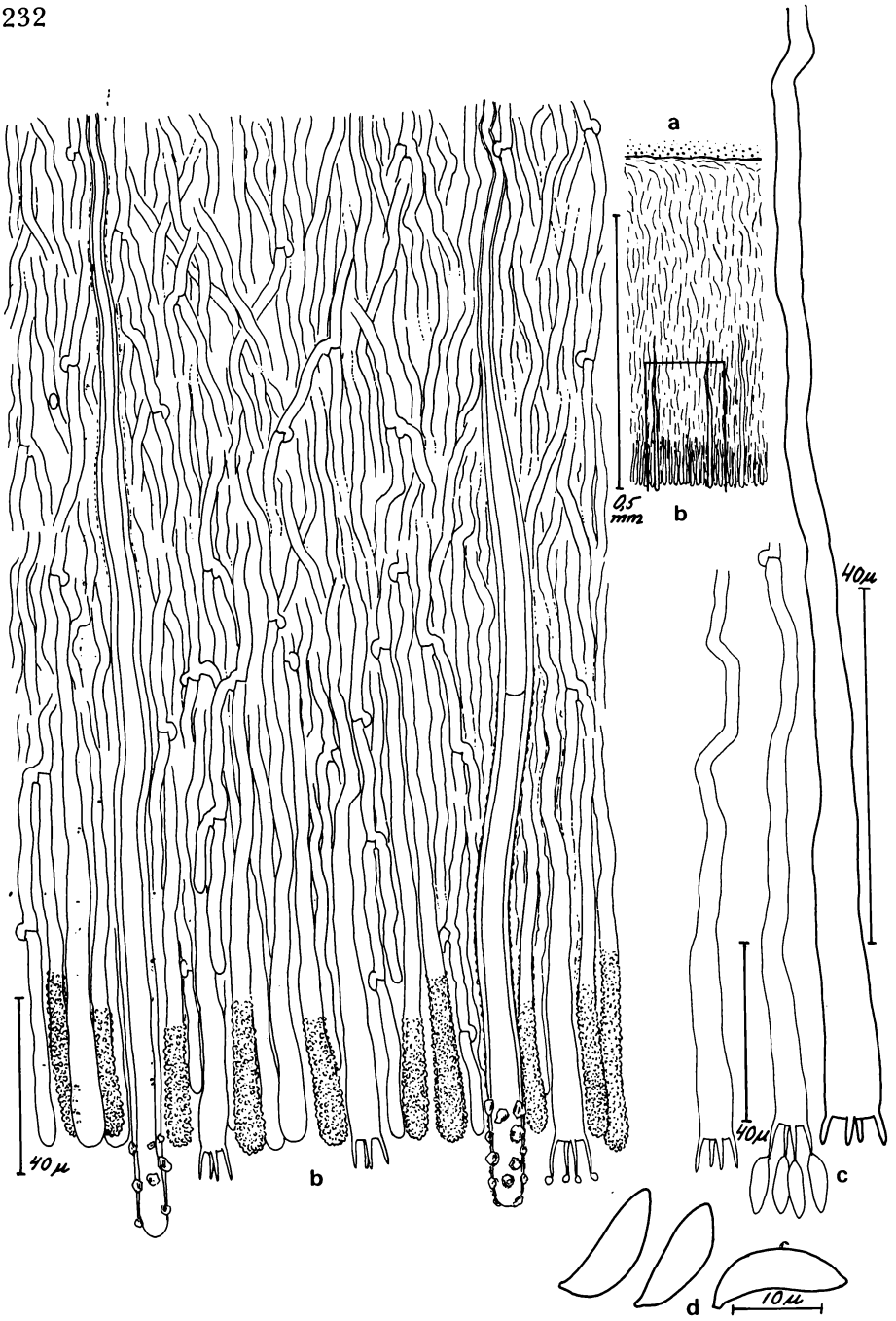


Fig. 99. *Chaetoderma luna*. a) section of fruitbody indicating position of section b) section of hymenium and subhymenium c) basidia d) spores.
— Eriksson 18-9-1966.

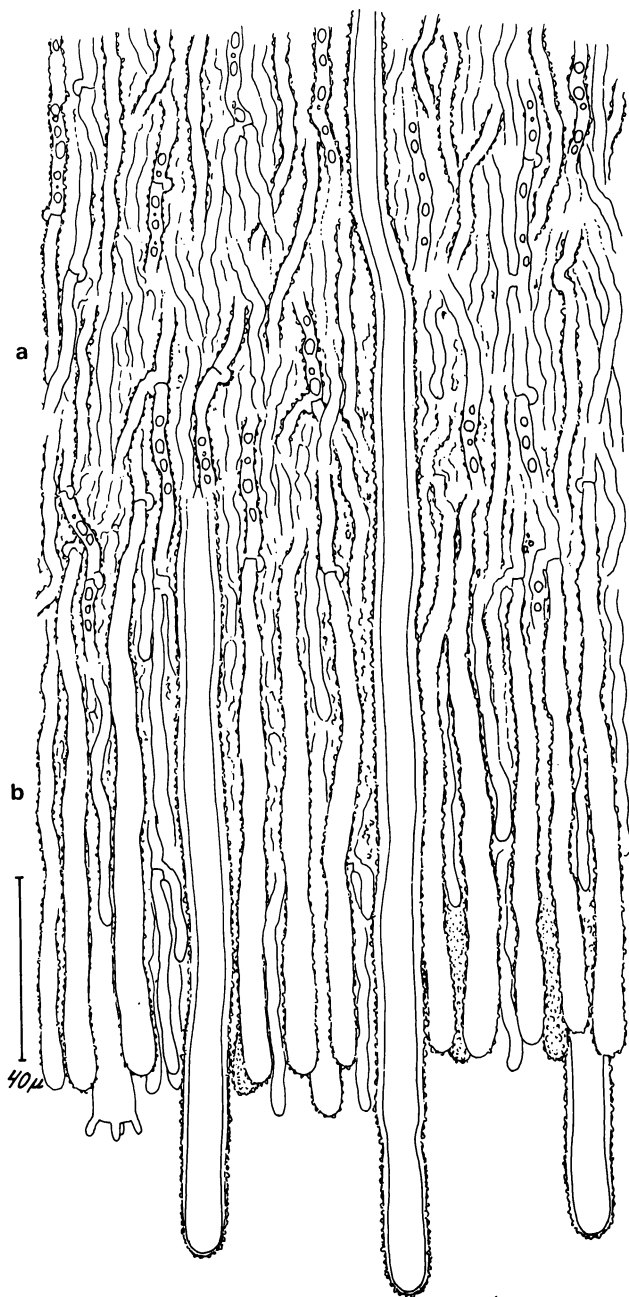


Fig. 100. *Chaetoderma luna*. Section of older hymenium. a) subhymenium
b) hymenium. — Eriksson 24-9-1966.

Chondrostereum

Chondrostereum Pouz.

Česká Mykol. 13: 7, 1959.

Fruitbody normally pileate, when fresh soft and flexible, when dry firm and brittle, composed of several distinct hyphal layers which are from above:

- 1) a whitish tomentum of hyphae with somewhat thickened walls.
- 2) a dark cartilaginous layer, in dry condition hard as horn and difficult to section, and composed of dense parallel hyphae,
- 3) a white layer also composed of dense parallel hyphae,
- 4) a vesicular layer composed of few hyphae and numerous vesiculae,
- 5) a subhymenial layer of densely interwoven vertical hyphae,
- 6) a hymenium of dense and narrow basidia and sparse cystidia.

Layers 2, 3 and 5 are very dense and without airfilled interhyphal space. All hyphae are provided with clamps at the septa. Cystidia and vesiculae seem to be homologous structures. Basidia are long and narrow and compacted in a dense palisade. Spores are cylindrical, thinwalled and non-amyloid.

Genotypus: *Chondrostereum purpureum* (Fr.) Pouz.

Remarks. *Chondrostereum* was derived from *Stereum* and it seems clear that *C. purpureum* is not related to other species of this genus. In some respects, especially with regard to the nature of the basidia and the hymenium, it is reminiscent of *Phlebia*. In Parmasto's system it is referred to Merulieae, but could just as well be placed in Phlebieae.

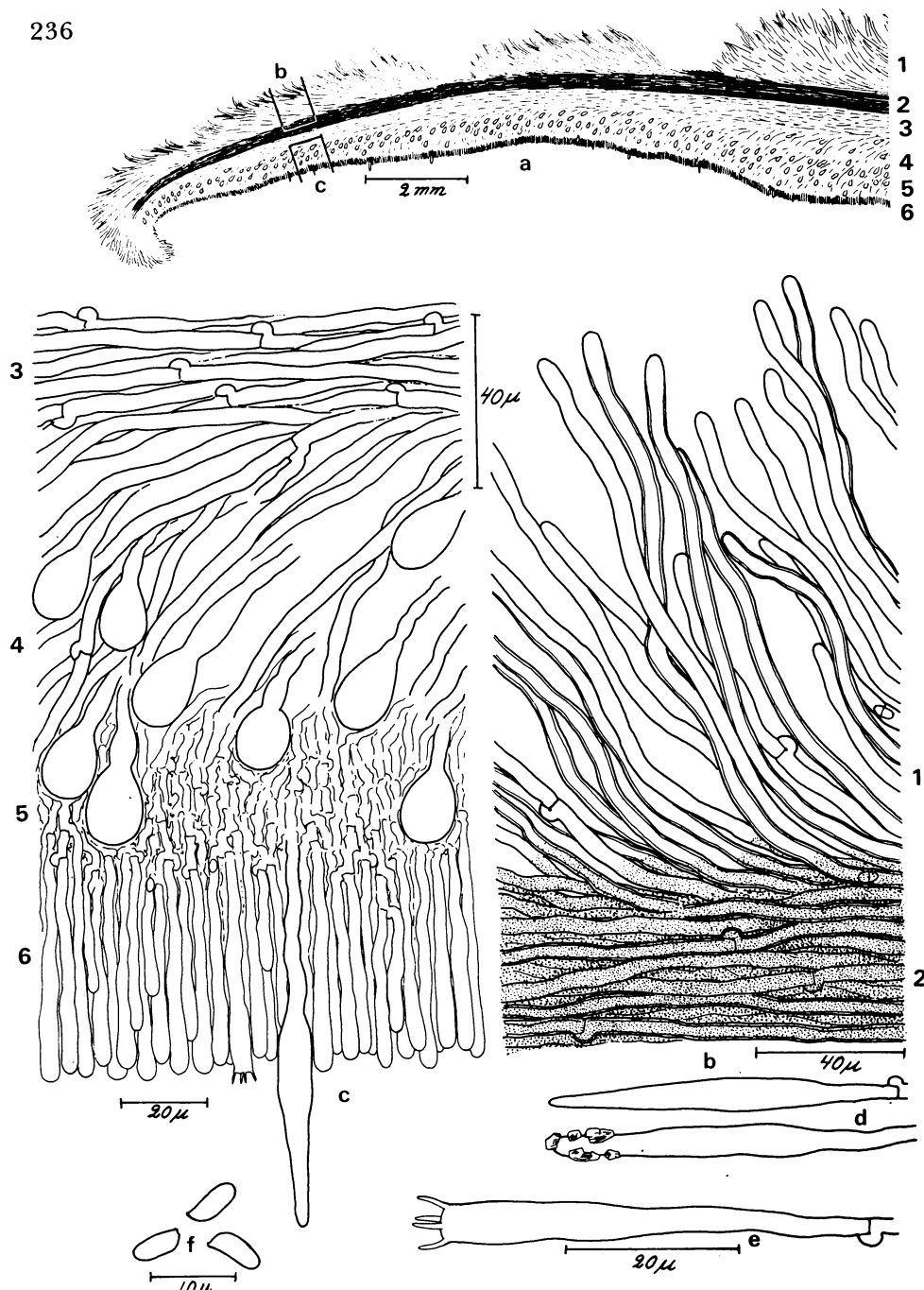


Fig. 101. *Chondrostereum purpureum*. a) section of fruitbody indicating position of sections b and c. Figures to the right indicate 1) tomentum 2) dense dark layer 3) dense hyaline layer 4) vesicular layer 5) subhymenium 6) hymenium. b) section of tomentum and part of dense dark layer c) section of hymenium, subhymenium, vesicular layer and part of dense hyaline layer d) cystidia e) basidia f) spores. — Eriksson 7277.

Chondrostereum

1. *Chondrostereum purpureum* (Fr.) Pouz.

Fig. 101, Pl. 22

Česká Mykol. 13: 17, 1959. — *Thelephora purpurea*Fr. Syst. mycol. 1:440, 1821. — *Stereum purpureum* (Fr.) Fr.

Fruitbody pileate or resupinate, white and tomentose above, hymenium smooth and dark violaceous, purplish or brown-violaceous as fresh and wet, paler after drying. In a vertical section the white tomentum of the pileus is separated from the lower layers by a dark line visible to the naked eye. Under a lens the fruitbody seems to be composed of 5 – 6 different layers. The consistency of the fungus is tough when fresh, brittle when dry. Dried fruitbodies are often hygroscopically rolled together.

Hyphal system monomitic with clamped hyphae, thinwalled in the sub-hymenium, more or less thickwalled in the other parts of the fruitbody. The diameter is from 3 μm .

Cystidia sparse, fusoid or obtuse, 60 – 80 x 6 – 8 μm , projecting 25 – 50 μm , thinwalled, smooth or with crystalline deposits.

Basidia long and narrow, about 50 x 5 μm with 4 sterigmata, and placed together in a very dense hymenium.

Spores allantoid to subcylindrical, smooth, non-amyloid, 5 – 8 x 2,5 – 3 μm .

Habitat. Saprophytic or parasitic on stumps, branches or trunks of deciduous trees, rarely on coniferous substrates. Infected living trees, e.g. fruit-trees, develop a characteristic change of the leaf-epidermis the so-called "silver leaf" decease.

Distribution. Common in South Scandinavia, in the North preferably along the coast, in the inland rarer and only in good fertile localities but reaches the sub-alpine zone.

Christiansenia

Christiansenia Hauerslev

Friesia 9: 43, 1969

Fruitbody gelatinous and hyaline when fresh and wet, forming small patches on the hymenium of corticioid fungi, drying to a subinvisible glossy film, hyphae with clamps at all septa, thin-walled, branching from and opposite to clamps, basidia suburniform, starting as a rounded vesicle, then extending to a tube of variable length, apically with 4 — 6 sterigmata, spores subglobose, thinwalled, non-amyloid, conidia from special hyphae.

Genotypus: *Christiansenia pallida* Hauersl.

Remarks

The systematic position is unclear. The gelatinous fruitbody together with the presence of conidia remind of Heterobasidiomycetes, but the shape of the basidia makes it a Homobasidiomycete. As to basidia it agrees to a certain degree with the genus *Sistotrema* and for the time being Corticiaceae seems to be the best position. It shows some interesting adaptations found in other gelatinous basidiomycetes, e.e. the variable length of the often much elongated basidia which may be compared with the length of the often extended sterigmata of the Tremellales. In both cases the dimensions are determined by the distance to the surface of the hymenium, where all spores are produced.

Key to species

1. Spores growing with sprout cells, on
Leucogyrophana mollis: 1.C. *mycophaga*
1. Spores without sprout cells, on
Phanerochaete cremea 2.C. *pallida*

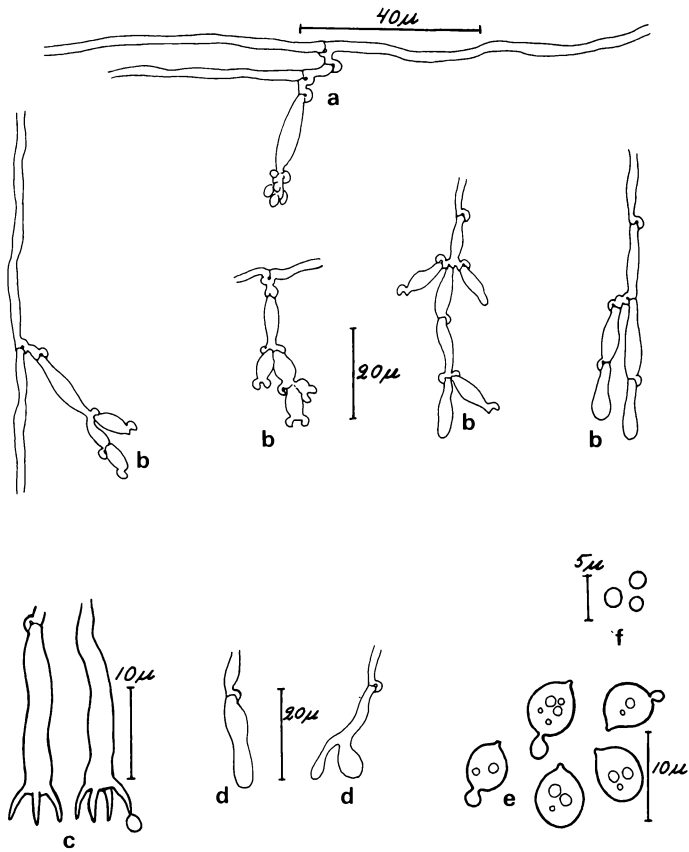


Fig. 102. *Christiansenia mycophaga*. a) hyphae with conidiophore, producing conidia b) young conidiophores c) basidium d) young basidia, to the right, a pleurobasidium e) spores with sprout cells f) sprout cells. — Type specimen.

Christiansenia

1. **Christiansenia mycophaga** (M.P. Christ.) Boid. Fig. 102
 Bull. Soc. Linn. Lyon 39: 136, 1970. — *Ceratobasidium*
mycophagum M.P. Christ., Dansk Bot. Arkiv 19:45, 1959.

Fruitbody very small and thin, forming rounded patches, 1 cm or less in diameter, light salmon-coloured and with a minutely floccose margin.

Hyphal system monomitic, all hyphae with clamps, thinwalled, $1.5 - 2 \mu\text{m}$ in diameter.

Basidia of variable length, $20 - 40 \times 5 - 7 \mu\text{m}$, normally with 4 sterigmata.

Spores subglobose, hyaline, thinwalled with oildrops in the protoplasm, $6.5 - 8 \times 4.5 - 6 \mu\text{m}$, germinating with globose yeastlike sprout-cells, $1.5 - 2 \mu\text{m}$ in diameter.

Conidiophores hyphal with widened fusoid cells. Conidia $5 - 7 \times 2 - 3 \mu\text{m}$, born from clamps or from projections arising from the clamps.

Habitat and distribution. Only known from the type, which was found parasitic on *Leucogyrophana mollis* in Denmark.

Remarks. The existing material is very scanty and does not allow a full examination and e.g. the formation of the conidia is still not fully known. It seems clear that the spores produce sprout-cells in a yeast-like manner, which makes the species different from all other corticioid fungi. The sprouting is certainly not comparable or analogous to the sporerepetition found in many corticioid species and many groups of Heterobasidiomycetes.

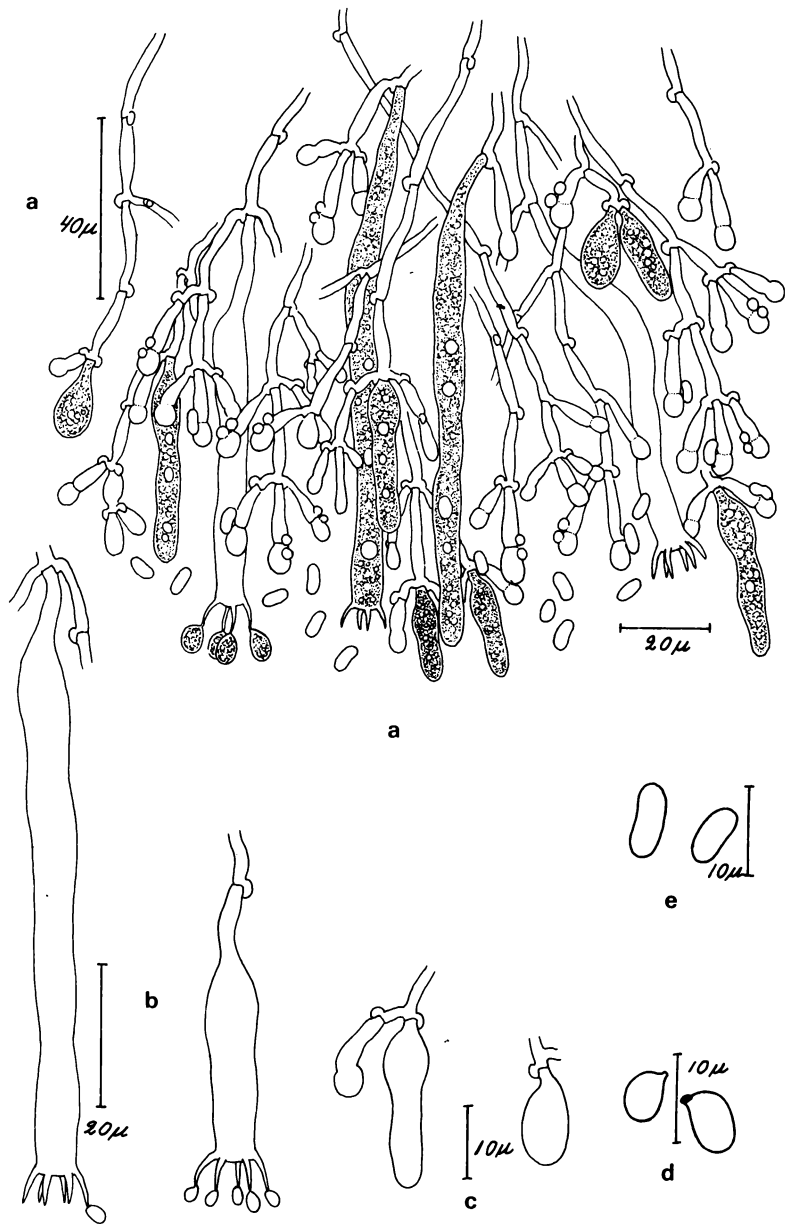


Fig. 103. *Christiansenia pallida*. a) crush preparation of fruitbody showing hyphae, basidia and conidiophores b) basidia of different lengths c) young basidia d) basidiospores e) conidia. — Hauerslev 2694.

Christiansenia**2. Christiansenia pallida** Hauerslev
Friesia 9: 43, 1969.

Fig. 103

Fruitbody gelatinous, hyaline and small (some mm i diameter), about 300 μm thick, after drying almost disappearing.

Hyphal system monomitic, consisting of thin-walled hyphae with clamps at all septa, 2 – 3 μm in diameter, ramified from or opposite clamps, with oildrops in the protoplasm.

Basidia first as rounded bladders, then extending to tubes of varying lengths, total length from 35 – 140 μm , 6 – 14 μm in diameter, 4 – 6 sterigmata. Oildrops and oily granular bodies present in the protoplasm.

Spores subglobose, thinwalled, non-amyloid 7.5 – 11 x 5 – 9 μm .

Conidia numerous, formed from two primordia, one on each side of the septum between the apical and subapical cells of the conidiophores. The primordia conjugate to one single conidium, which is subcylindrical or narrowly ellipsoid often slightly depressed on one side.

Habitat. Hitherto only known as a hymenial parasite on *Phanerochaete cremea* (Bres.) Parm.

Distribution. Not completely known, The type is from Denmark (leg. K. Hauerslev), otherwise the conidial state has been found a few times in South Sweden (leg. K.-H. Larsson).

Clavulicium

Clavulicium Boid.

Bull. Soc. d'Hist. Nat. Toul. 92: 280, 1957.

Fruitbody resupinate, smooth, subceraceous to membranaceous, hyphae thinwalled, densely interwoven, basidia clavate to subcylindrical, more or less sinuous with 2 — 4 stout sterigmata, spores ellipsoid, thin-walled, smooth and containing oil drops, which in herbarium specimens often coalesce to a rounded or irregular, bluegreen refractive body.

Genotypus: *Clavulicium macounii* (Burt) Erikss. & Boid. ex Parm.

Remarks. The basidia and spores remind very much of the clavarioid genus *Clavulina*. Especially the spores with their characteristic blue-green oily content are strikingly similar. Parmasto therefore, referred the genus to the Clavulinaceae, but we would prefer to keep it in the Corticiaceae and rather regard it as a possible link between the two families.

Key to species

- | | | |
|----|-----------------------------|------------------|
| 1. | Hyphae without clamps | 1.C. delectabile |
| 1. | Hyphae with clamps | 2.C. macounii |

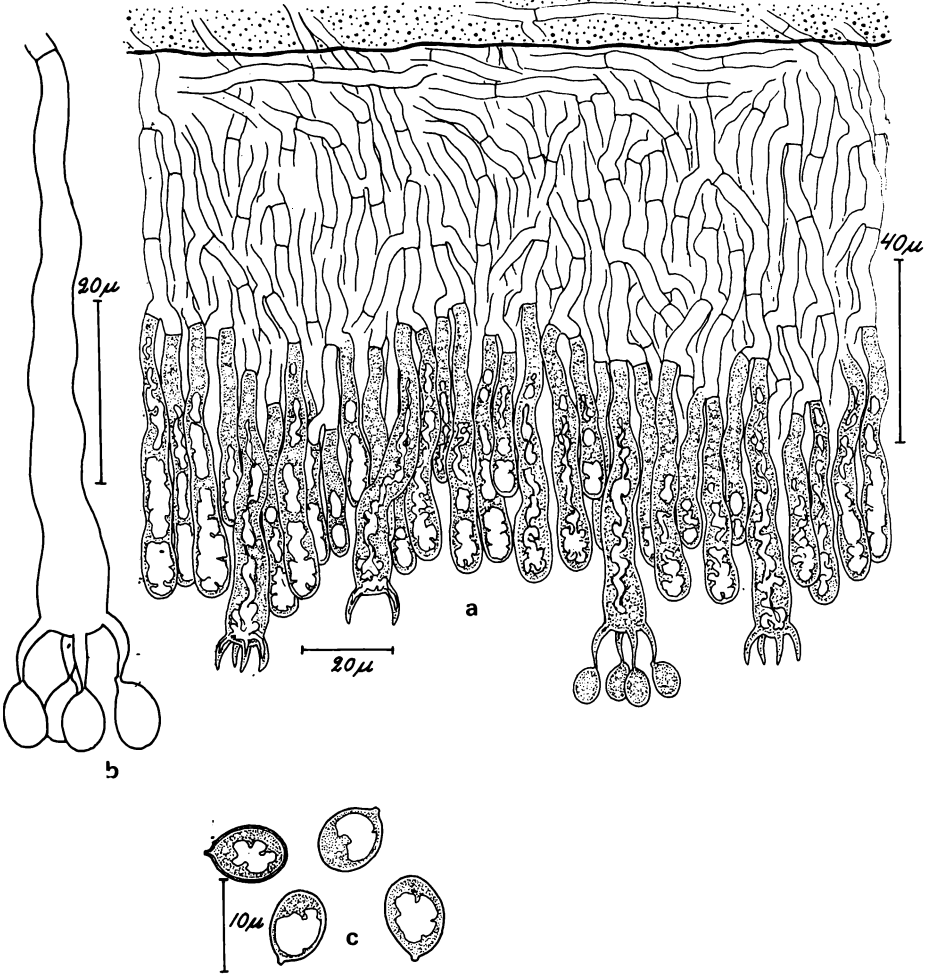


Fig. 104. *Clavulicium delectabile*. a) section of fruitbody b) basidium c) spores.
— Strid 8689.

Clavulicium

1. **Clavulicium delectabile** (Jacks) Hjortst. Fig. 104, Pl. 23A
 Sv. Bot. Tidskr. 67:107, 1973. — *Corticium delectabile*
 Jacks., Can. J. Res. Ser. C, 26: 145, 1948.

Fruitbody cream or lemon yellow, subceraceous, 100 – 150 μm thick, smooth, margin indistinct.

Hyphal system monomitic, all hyphae without clamps at the septa, thin-walled, hyaline, 3 – 4 μm in diameter, densely interwoven. Most hyphae vertical, only a few parallel to the substrate.

Cystidia none.

Basidia long, sinuous, narrowly clavate, 50 – 80 x 7 – 9 μm with mostly 4, more rarely 2, curved sterigmata. The protoplasm with large oildrops which in herbarium specimens coalesce to irregular or sinuous oil-bodies.

Spores subglobose, smooth, thinwalled or some spores with somewhat thickened walls, non-amyloid, 7 – 9 x 6 – 7 μm . Large oildrops or oily bodies in the protoplasm.

Habitat. On decayed wood of conifers.

Distribution. A rare species, collected three times in Sweden, Västergötland, Jämtland (J. Eriksson) and Västerbotten (Å. Strid), and once in Denmark, Sjælland (K. Hauerslev).

Remarks. Easily recognized by the yellow fruitbodies, the rounded spores and the absence of clamps. The shape of the basidia and the spores strongly suggest a relationship to *C. macounii*, but there are some uncertain points, and it may be that this generic arrangement is not the final one.

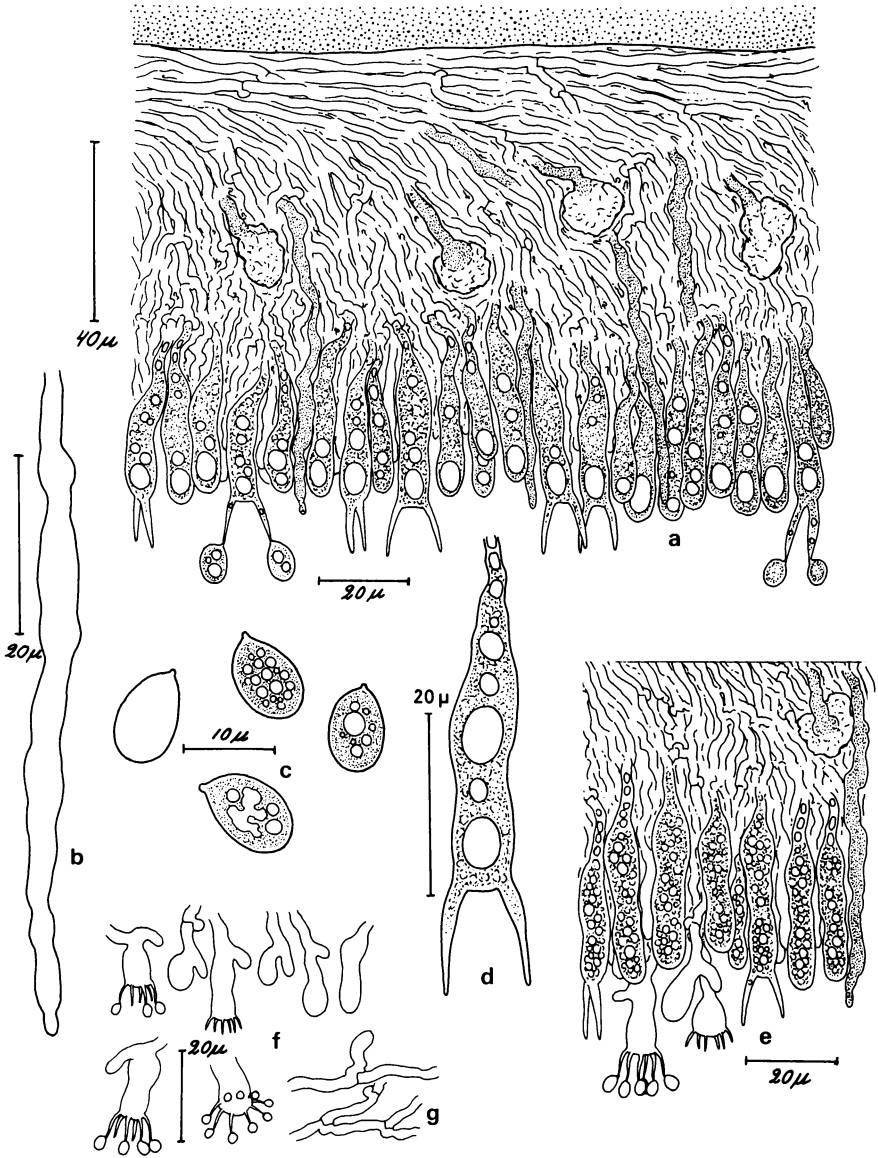


Fig. 105. *Clavulicium macounii*. a) section of fruitbody b) pseudocystidium c) spores d) basidium. — Larsson 1187.

Sistotrema sp., parasitic on *C. macounii*. e) section of fruitbody of *C. macounii* with parasite f) basidia and spores g) hyphae. — Hjortstam 2619 (*C. macounii*).

Clavulicium

2. **Clavulicium macounii** (Burt) Erikss. & Boid. ex Parm. Fig. 105,
 Consp. syst. Cort. p. 165, 1968. — *Corticium macounii* Pl. 23B
 Burt, Ann. Miss. Bot. Gard. 13: 256, 1926.

Fruitbody smooth, first adnate, eventually and especially when dry, rolling back and loosening from the substrate, margin white and somewhat fibrillose, hymenium grey to ochraceous (very similar to the colour of *Corticium evolvens*).

Hyphal system monomitic, all hyphae with clamps at the septa, thin-walled, 2 – 3 μm in diameter, richly ramified. Next to the substrate there is a distinct layer of horizontal, parallel hyphae from which vertical hyphae branch off forming a subhymenium.

Basidia clavate to subcylindrical, somewhat sinuate or constricted 35 – 50 x 6.5 – 8 μm with few or numerous oil drops in the protoplasm. Sterigmata normally 2, more rarely 4, straight or somewhat curved.

Gloeocystidia present, narrow, sinuous, thin-walled, passing through the subhymenium and into the hymenium but not projecting, walls stained in cotton blue. In the subhymenium there are irregular, but usually rounded bodies of yellowish material, probably excreted from widened hyphal ends. Both this hyphae, which remind of gloeocystidia, and the yellowish material, are well stained in cotton-blue.

Spores ellipsoid to obovate, smooth, thin-walled, non-amyloid, 9 – 12 (13) x 6.5 – 8 μm with few or numerous oil drops. Many spores are completely filled with oil and therefore strongly refractive, thus no internal structures are visible.

Habitat. On strongly decayed wood of conifers.

Distribution. The species which is widely distributed in the continental – montane parts of the northern temperate zone, is very rare in Fennoscandia. Two collections are known, both from Horla parish in Västergötland (K. Hjortstam and K.-H. Larsson) on dead logs of *Picea abies*.

Remarks. Readily recognized by the naked eye because of the characteristic colour. Microscopically it may be confused with *Radulomyces confluens*, but is distinguished by having only two sterigmata. The yellowish bodies in the subhymenium are unique.

In the hymenium of Hjortstam no. 2619 there is a hymenial parasite (fig. 105f). Its basidia have normally 6 (up to 9 have been observed) sterigmata in a whorl exactly as in the genus *Sistotrema*. However, it differs from all species known of this genus in having typical pleurobasidia. Its thin hyphae have clamps at all septa and the spores are small, ellipsoid and about 3 x 2 μm . It seems to represent an as yet undescribed species.

Columnocystis Pouz.

Ceska Mykol. 13: 17, 1959

Fruitbody perennial, coriaceous, stratose, pileate or resupinate, upper surface with dark brown tomentum, hyphal system dimitic, skeletal hyphae fuscous and thickwalled, generative hyphae hyaline, thinwalled and with clamps. Hymenium velutinous by numerous projecting cystidia, spores thinwalled and hyaline (or somewhat thickwalled when old), non-amyloid, smooth.

One species in North Europe.

Genotypus: *Columnocystis abietina* (Fr.) Pouz.

Remarks. The stereoid fungi are often placed together, e.g. in the family Stereaceae, but all species do not seem to be related. Their stereoid organisation may rather be regarded as a result of analogous and convergent development.

Columnocystis

1. *Columnocystis abietina* (Fr.) Pouz. Fig. 106–108, Pl. 24A
 Ceska Mykol 13: 17, 1959. — *Thelephora abietina*
 Fr. Syst. myc. 1: 442, 1821.

Fruitbody perennial, pileate or resupinate, stratose, 1 – 2 mm thick, first orbiculate then coalescing, margin light brown, fibrillose, upper surface of pileate specimens with dark brown, more or less zonate tomentum, in resupinate fruitbodies a black smooth cutis is formed by agglutinated hyphae (in pileate specimens this cutis is found below the tomentum), hymenium dark violaceous blue when wet, paler when dry. The degree of paleness is dependent on the thickness of the basidial layer. A well developed hymenium is as a rule pale in the herbarium.

In a section through a fruitbody several layers can be seen with a lens or microscope, and these are from above:

- 1) tomentum of brown, thickwalled hyphae, $2.5 - 4 \mu\text{m}$ wide,
- 2) cutis of brown agglutinated thickwalled hyphae,
- 3) intermediate layer consisting of skeletal and generative hyphae where the former bend downwards into the hymenium and usually end in smaller enclosed or larger projecting cystidia,
- 4) hymenium of basidia, cystidiols and cystidia.

Hyphal system dimitic, generative hyphae hyaline, thinwalled $2 - 3.5 \mu\text{m}$ wide and with clamps at septa from where ramifications occur, skeletal hyphae dark brown, thickwalled $2.5 - 4 (5) \mu\text{m}$ wide with very few simple septa.

Cystidia of two types:

- 1) projecting cystidia $150 - 200 \times 8 - 12 \mu\text{m}$, starting deep in the intermediate layer, very thickwalled and generally only slightly pigmented (yellow to light brown in the microscope), apically almost hyaline, externally with a generally thin and delicate crystalline crust, dissolving in Melzers reagent and in lactic acid.
- 2) enclosed cystidia, thickwalled and strongly pigmented often with several simple adventitious septa, $50 - 100 \times 3 - 6 \mu\text{m}$, starting from the skeletal hyphae in the intermediate tramal layer. This type of cystidia may also develop from thinwalled, slightly encrusted basidia-like cystidiols in the hymenium.

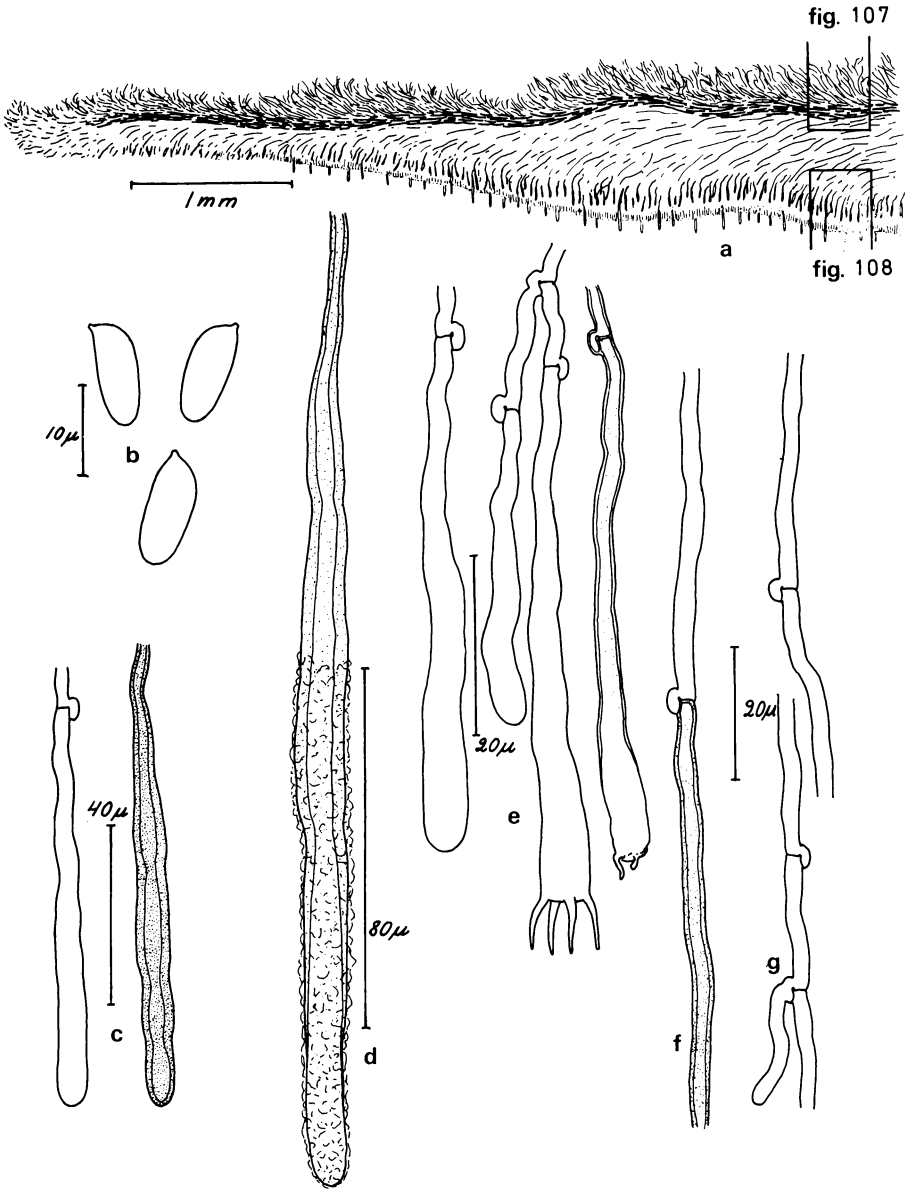


Fig. 106. *Columnocystis abietina*. a) section of fruitbody indicating position of section on fig. 107 and 108 b) spores c) young and mature enclosed cystidia d) projecting cystidium e) basidia in different states of development f) skeletal hyphae g) generative hyphae. — Eriksson 8127.

Basidia narrowly clavate, $50 - 70 \times 5 - 6 \mu\text{m}$, first thinwalled, with time with slightly thickened walls, 4 sterigmata.

Spores narrowly ellipsoid to subcylindrical or even slightly allantoid, thin-walled, hyaline or yellowish and with age with slightly thickened walls, smooth and non-amyloid $9 - 13 \times 4 - 5 \mu\text{m}$.

Habitat. On logs and branches of conifers, in North Europe usually on *Picea abies*.

Distribution. Rather common in the northern part of the spruce forests of North Europe. It is here one of the species characteristic of the so-called taiga-flora. Southwards it is less common, but is recorded several times as far south as Småland in Southern Sweden.

Remarks. The similar species *Columnocystis ambigua* (Peck) Pouz. (recently excellently described by H.H. Burdsall jr. J. Elisha Mitch. Scient. Soc. 87: 239, 1971) is distinguished by lack of clamps at the septa. It is not yet found in Scandinavia.

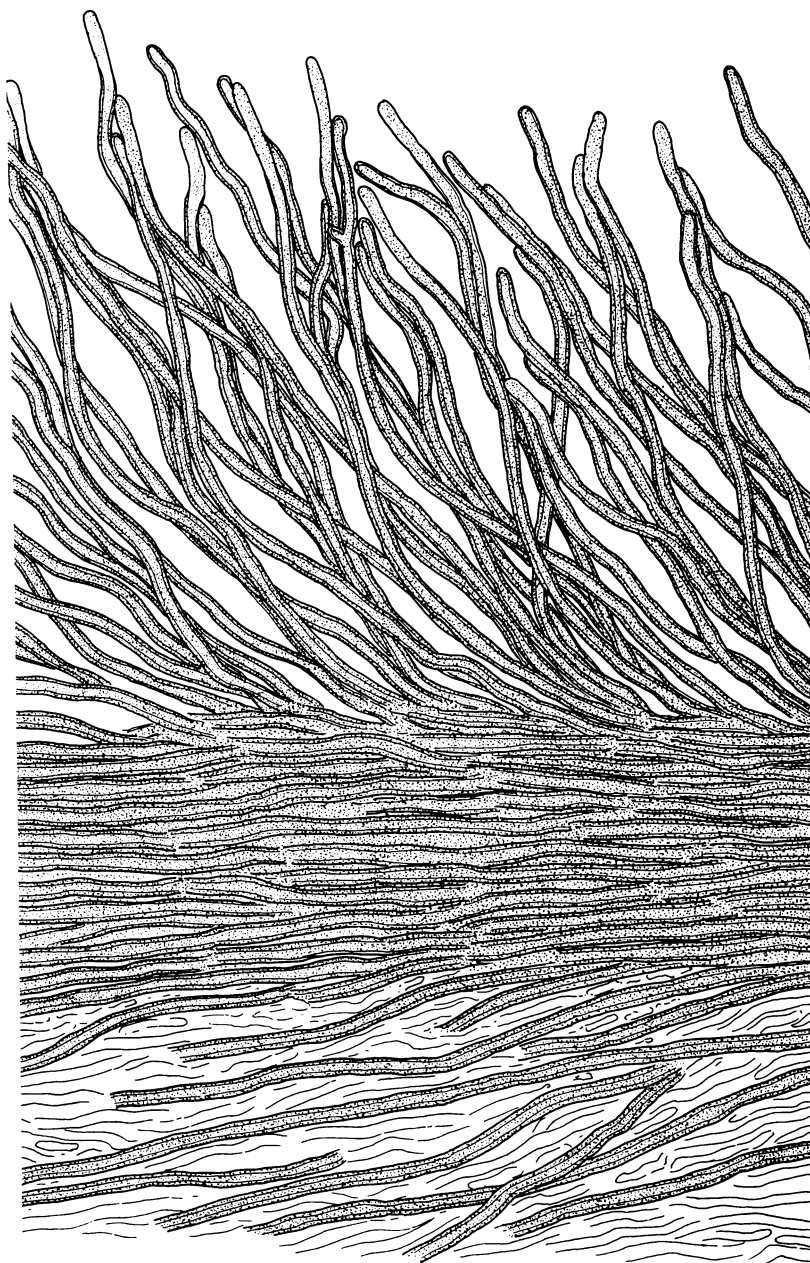


Fig. 107. *Columnocystis abietina*. Section of tomentum, agglutinated layer and intermediate layer. — Eriksson 8127.

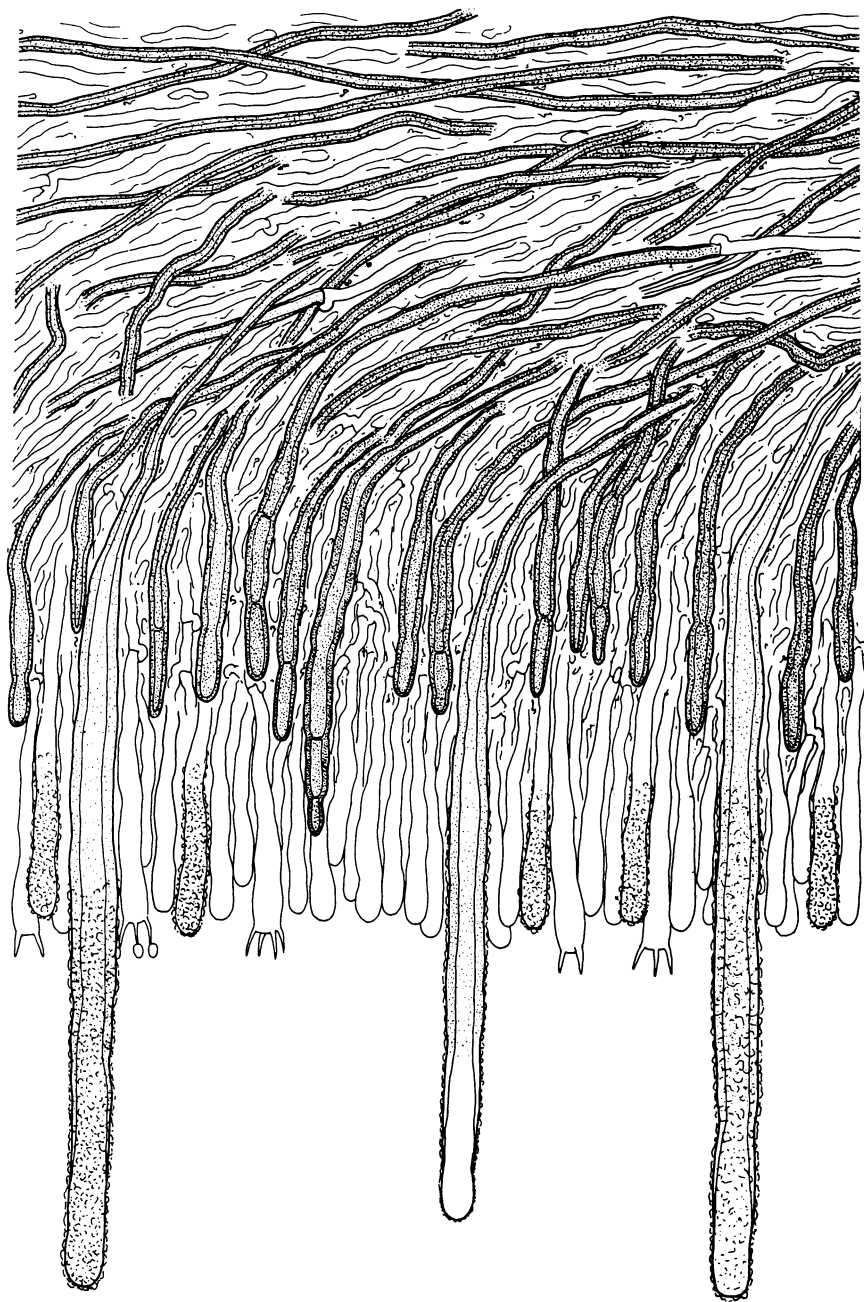


Fig. 108. *Columnocystis abietina*. Section of intermediate layer, subhymenium and hymenium. — Eriksson 8127.

Confertobasidium

Confertobasidium Jül.
Willd. Beih. 7: 167, 1972

Fruitbody resupinate, pellicular, with loose subiculum, hymenium separable, smooth, white or pale yellowish, hyphae in a loose texture, thinwalled or slightly thickwalled, basal hyphae light brown, thin rhizomorphs in subiculum and the periphery of the fruitbody, basidia narrowly clavate with four sterigmata, spores hyaline, thinwalled, non-amyloid.

Genotypus: *Confertobasidium olivaceoalbum* (Bourd. & Galz.) Jül.

Remarks. *Confertobasidium* is close to *Athelia* and other athelioid genera and is distinguished preferably by the brown pigmentation of the basal hyphae and the presence of rhizomorphs.

Key to species

1. Hyphae with clamps at all septa **C. olivaceoalbum**
1. Clamps only at a few septa of
the basal hyphae **Confertobasidium sp.**

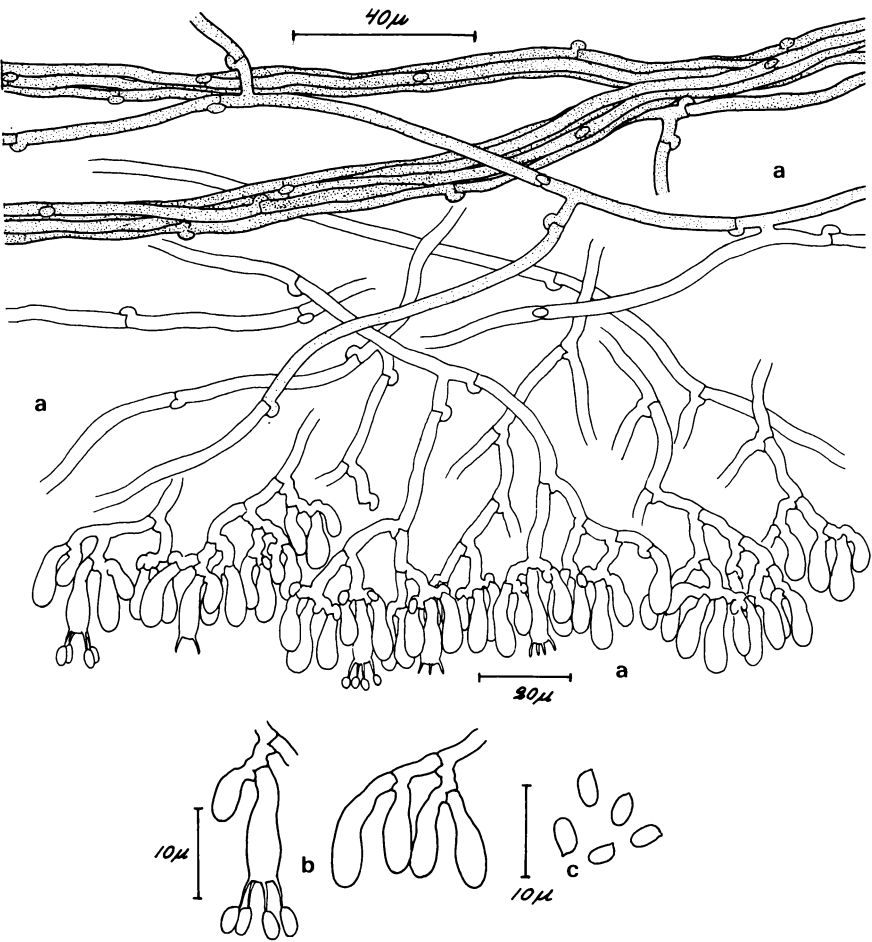


Fig. 109. *Confertobasidium olivaceoalbum*. a) crush preparation of hymenium and hyphae b) basidia c) spores. — Eriksson 7227.

Confertobasidium

1. **Confertobasidium olivaceoalbum** (Bourd. & Galz.) Jül. Fig. 109,
Willd. Beih. 7:167, 1972. — *Corticium olivaceo-* Pl. 24B
album Bourd. & Galz. Bull. Soc. Mycol. France 27: 239,
1911.

Fruitbody thin, pellicular, whitish or pale cream, when dry more or less cracked, with loose subiculum, and therefore easily separable with thin, light brownish rhizomorphs in subiculum and periphery.

Hyphal system monomitic, hyphae with clamps at all septa, thinwalled or slightly thickwalled more or less incrustated, 2 – 4 μm in diameter, basal hyphae and rhizomorphs light brown, other hyphae hyaline, subhyphal hyphae in old specimens somewhat nodulose, otherwise even, anastomoses especially in the rhizomorphs.

Basidia 10 – 15 x 3 – 4.5 μm , narrowly clavate with normally 4 sterigmata.

Spores about 4 x 2 μm , narrowly ellipsoid to subcylindrical, thinwalled, hyaline and non-amyloid.

Habitat. On wood and bark of conifers.

Distribution. Rather little known. In Sweden collected preferably in the northern part of the country. Jülich reports Swedish specimens from Södermanland and northwards.

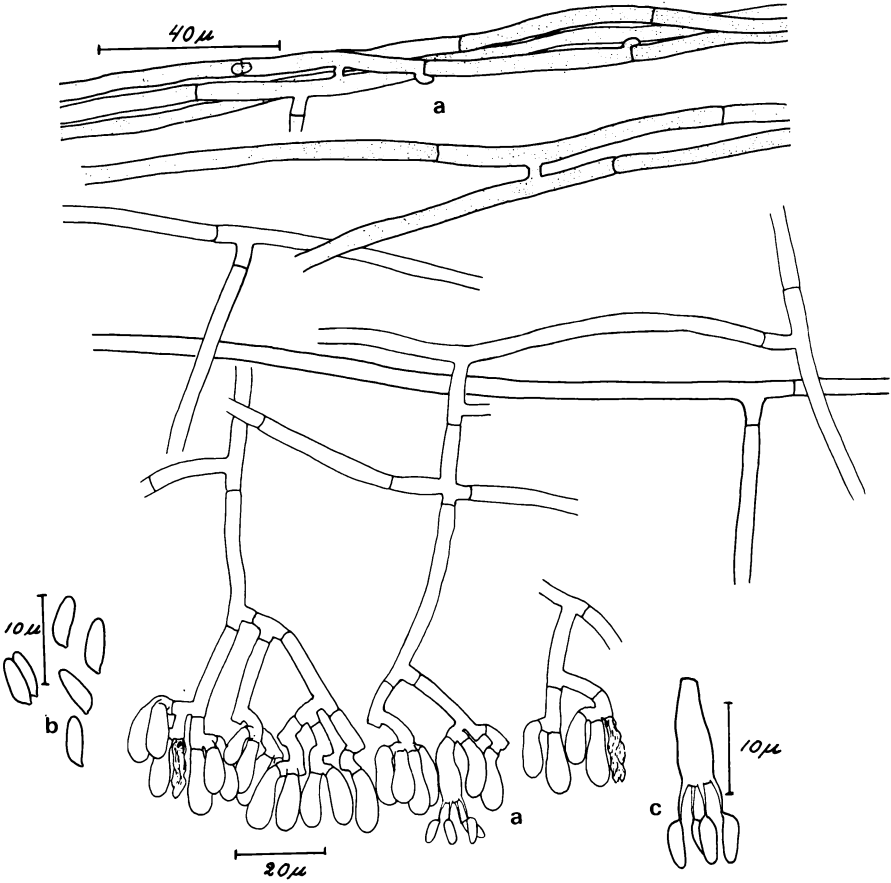


Fig. 110. *Confertobasidium* sp. a) crush preparation of hymenium and hyphae
b) spores c) basidium. — Hjortstam 4076.

Confertobasidium

2. **Confertobasidium** sp. no. 4076 (Hjortstam).

Fig. 110

Fruitbody thin, pellicular and whitish.

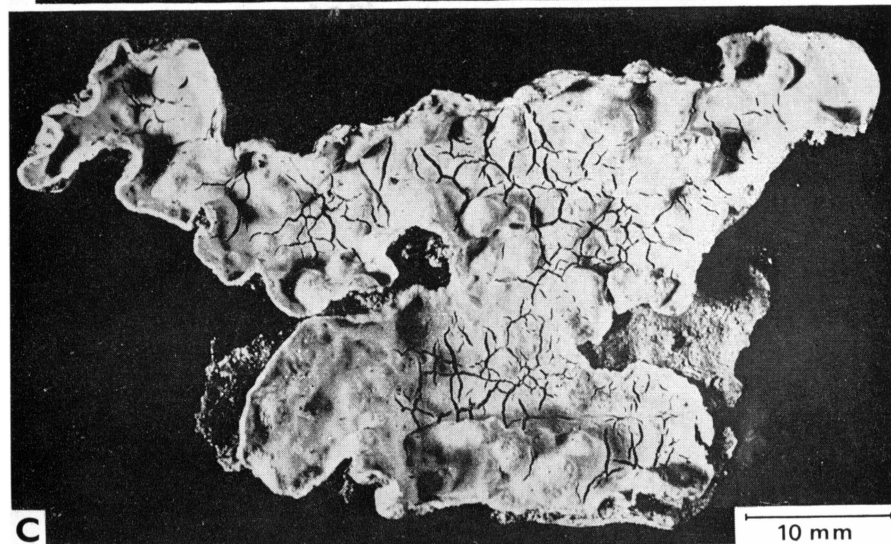
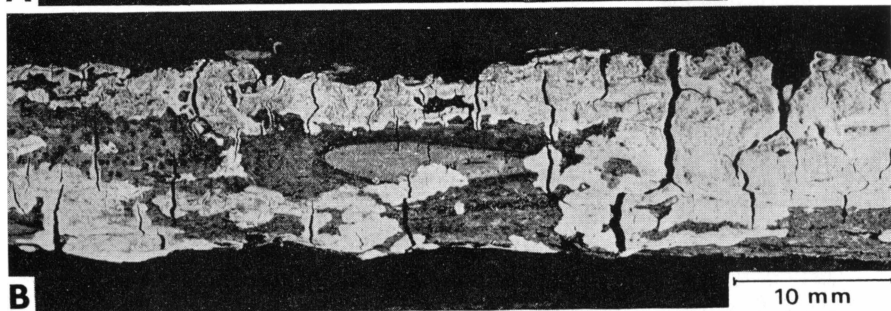
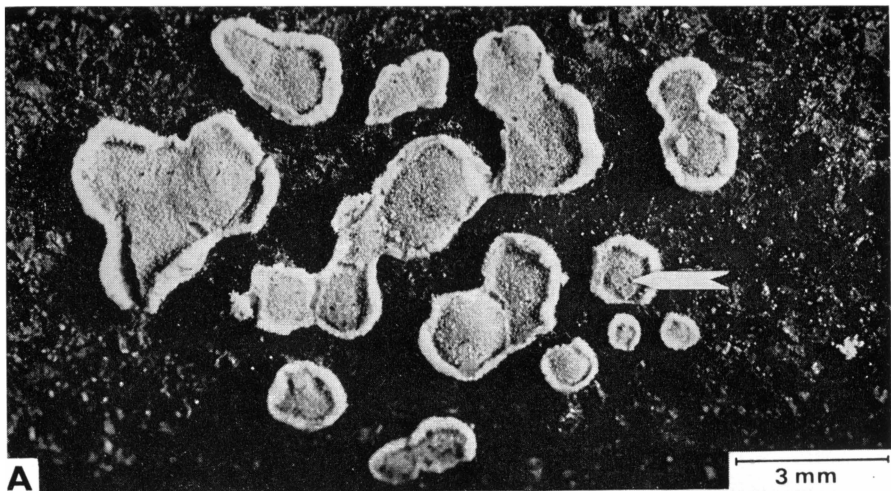
Hyphal system monomitic, hyphae thinwalled, 3 – 5 μm in diameter, parts of the basal hyphae light brown, other hyphae hyaline, in the subiculum some hyphae are joined together in rhizomorphic strings. Most hyphae simple septate, but basal hyphae with a few clamps, anastomoses preferably in the rhizomorphic strings.

Basidia 12 – 15 x 4 – 5 μm with 4 sterigmata.

Spores 6 – 8 x 2 – 2.5 μm subcylindrical and non-amyloid.

Habitat and distribution, found only once: Sweden, Ångermanland, Junsele parish, Åkerbränna, on dead *Populus tremula* on the ground, 19.9. 1970, K. Hjortstam n. 4076.

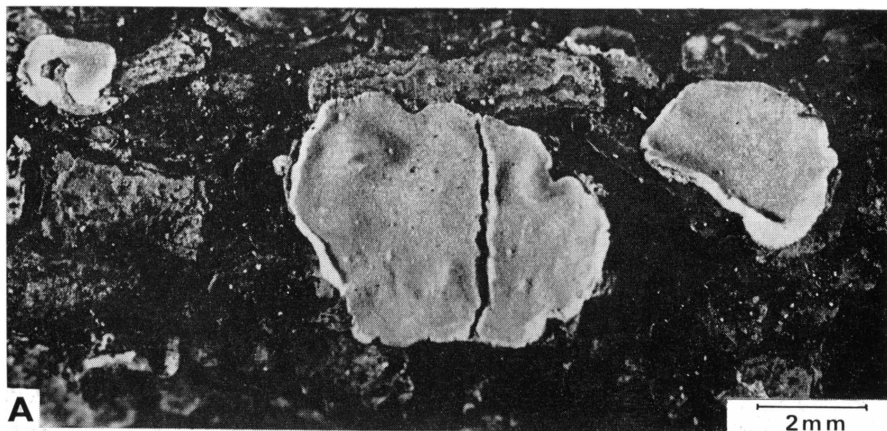
Remarks. The specimen mentioned above was reported as *Athelia* no. 4076 by Jülich (1972: 125). However, as the basal hyphae are pigmented light brown, it seems to be better placed in *Confertobasidium*. As to shape of the spores, it reminds of *Confertobasidium olivaceoalbum* var. *montanum* Jül., but there are clamps only at a few septa of the basal hyphae.



A. *Aleurodiscus amorphus*. At the arrow two fruitbodies of *Tremella simplex*.
Coll. Bohlin & Jeppson n. 247.

B. *A. aurantius*. Coll. Erikss. n. 1526.

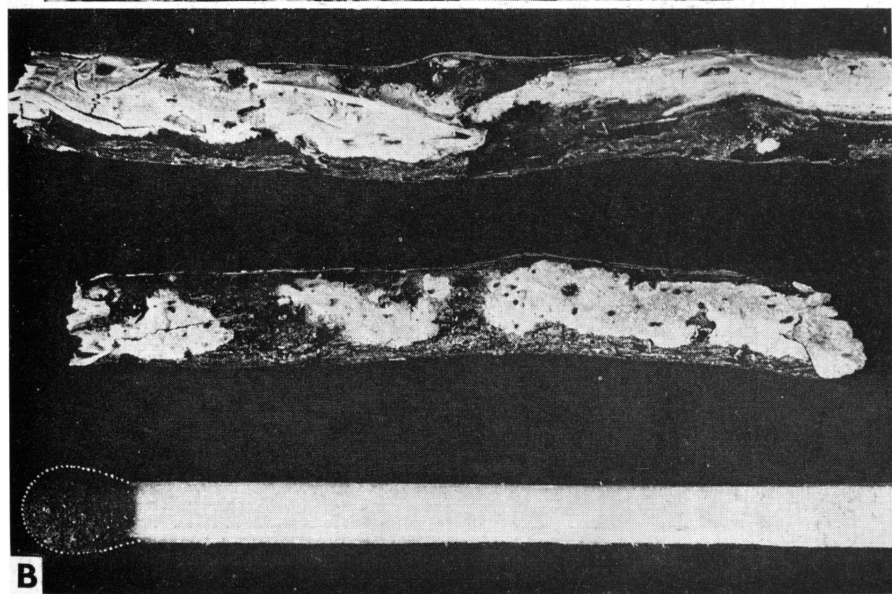
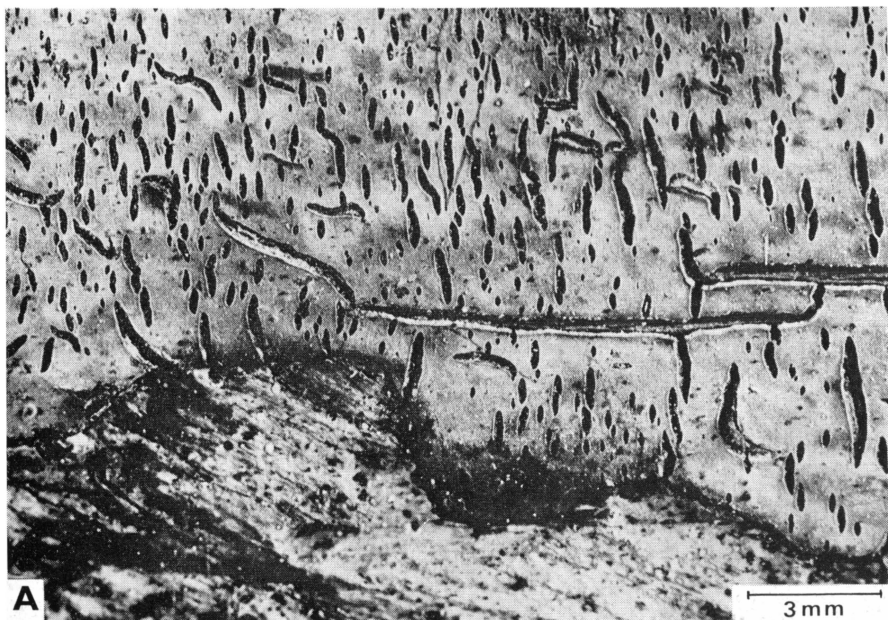
C. *A. disciformis*. Coll. Gilsenius n. 380.



A. *Aleurodiscus fennicus*. Coll. Laurila 1935-06-14.

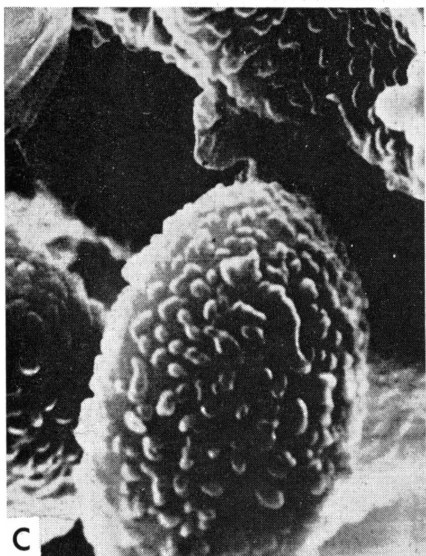
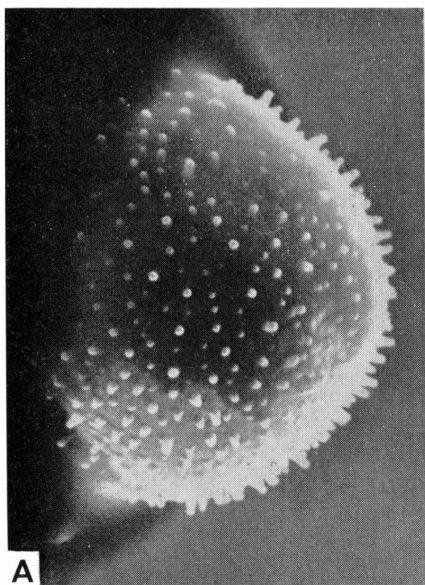
B. *A. lapponicus*. Coll. Erikss. n. 9043.

C. *A. lapponicus*. Coll. Erikss. n. 8815.



A. *Aleurodiscus lividocaeruleus*. Coll. Erikss. n. 9667.

B. *A. norvegicus*. Coll. Sivertsen 1966-09-25 (the match is ab. 2 mm thick).

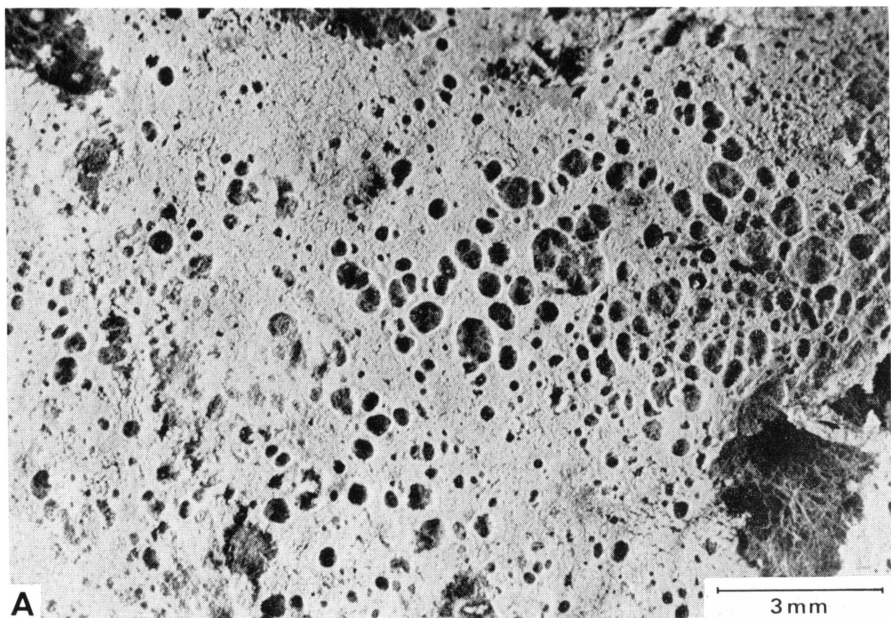


A, B. *Aleurodiscus amorphus*. Coll. L. Andersson.

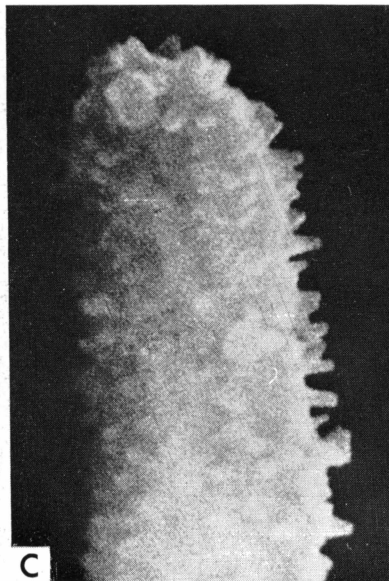
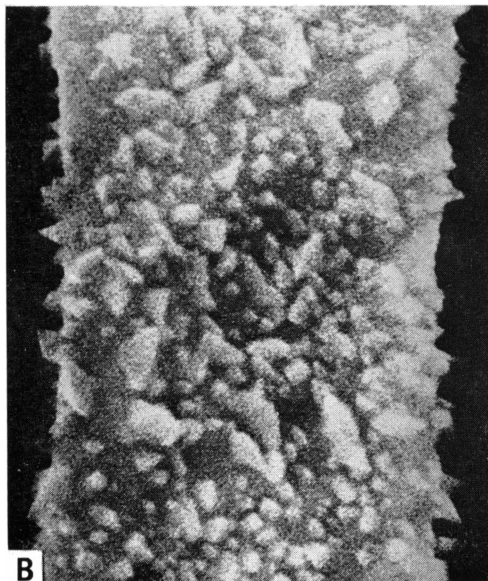
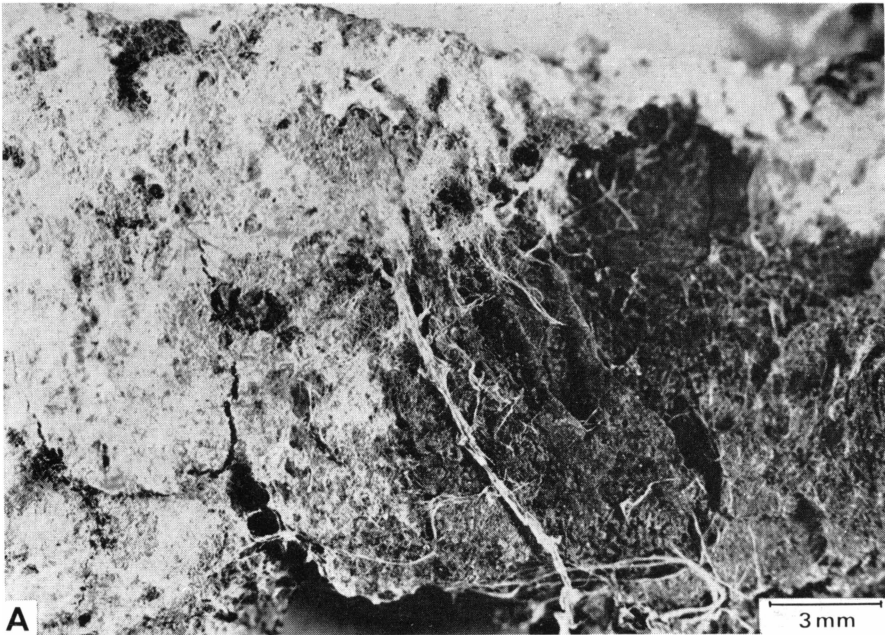
— A. Scan 3700 x. — B. Scan 19000 x.

C, D. *A. disciformis*. Coll. B. Gilsenius.

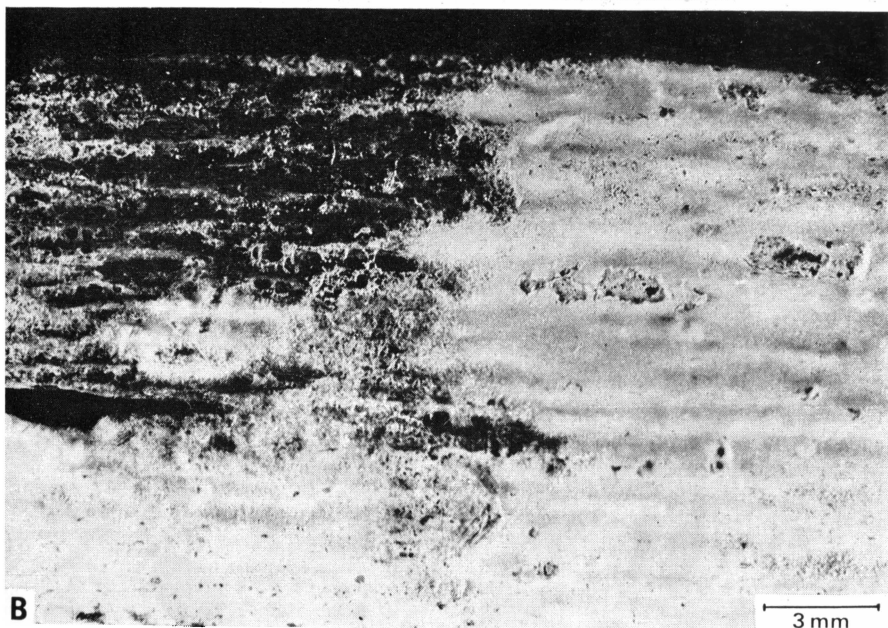
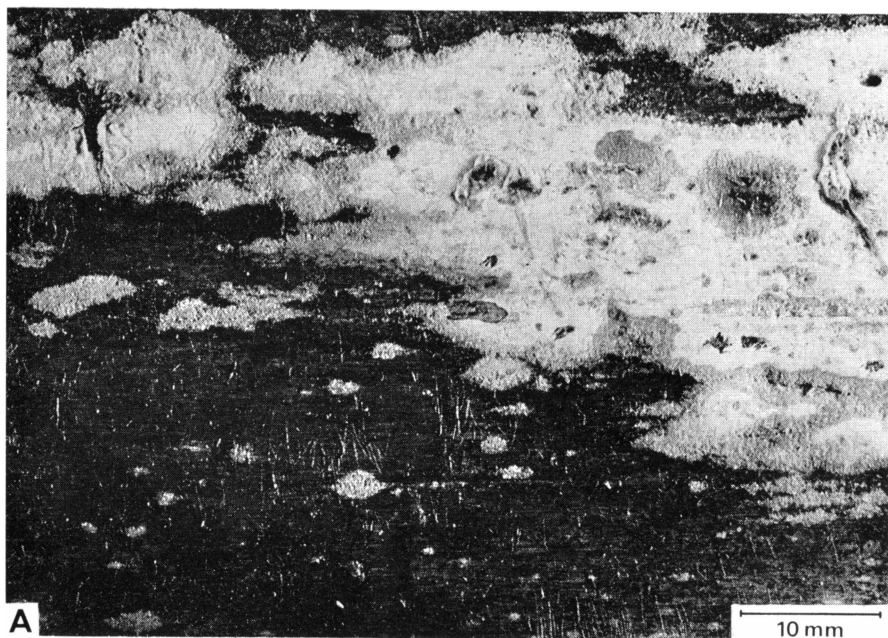
— C. Scan 5000 x. — D. Scan 9000 x.



A, B. *Amphinema byssoides*. — A. With numerous hymenium craters. Coll. Erikss. n. 80. — B. With few craters. Coll. Erikss. n. 8730.

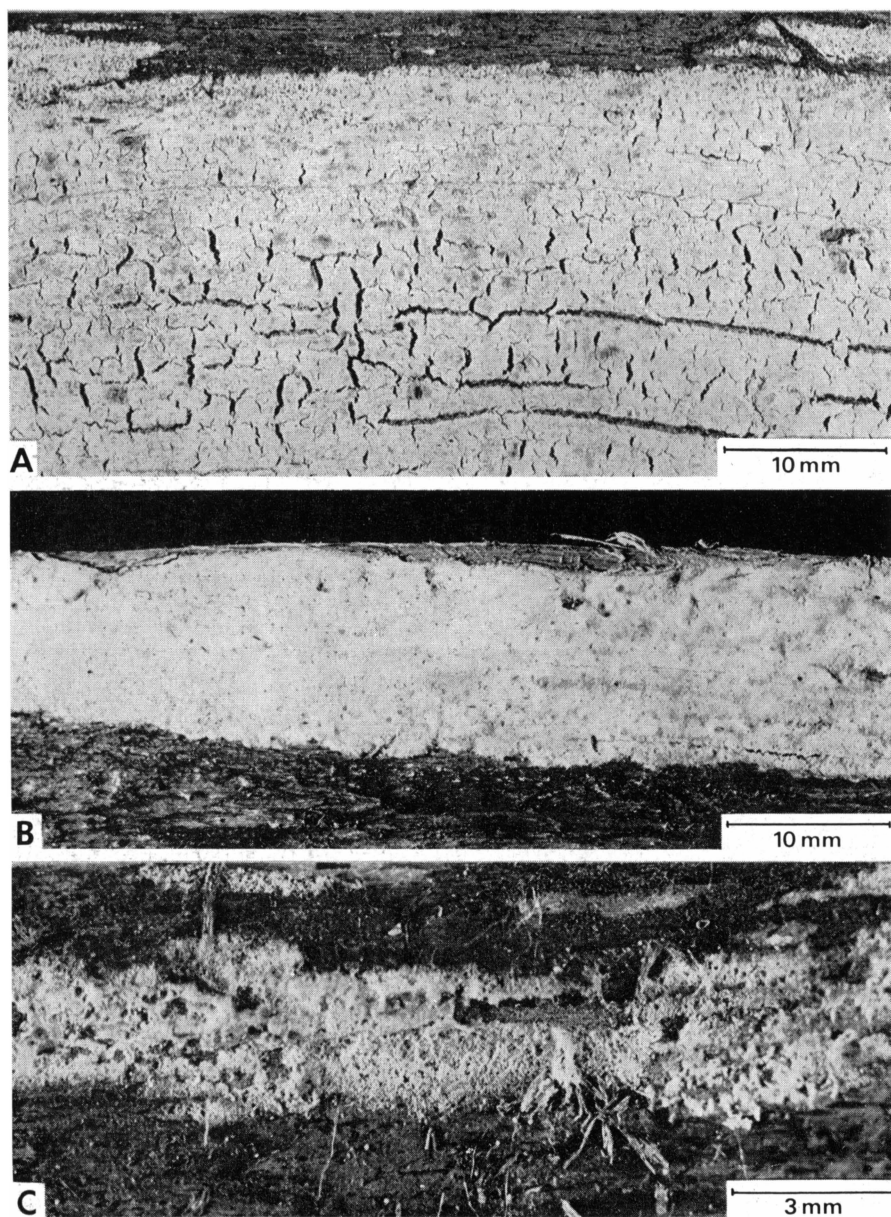


A, B, C. *Amphinema byssoides*. — A. With marginal rhizomorphs. Coll. Erikss. n. 9377. — B. Part of cystidium — C. Top of cystidium. B and C scan 1500 x. Coll. Strid 1274.



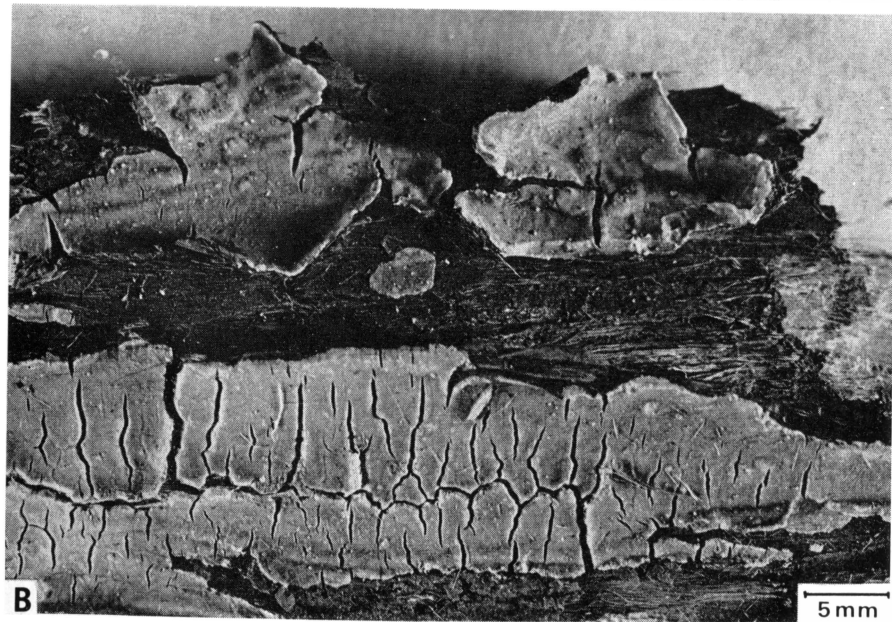
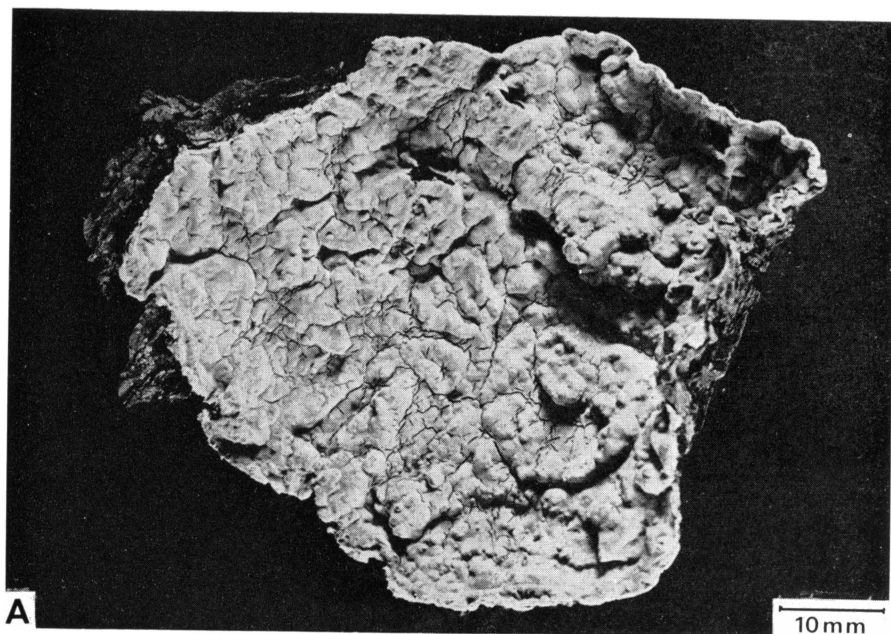
A. *Corticium canadense*. Coll. Erikss. n. 7096.

B. *Amylocorticiu* *cebennense*. Coll. Erikss. 1966-09-24.



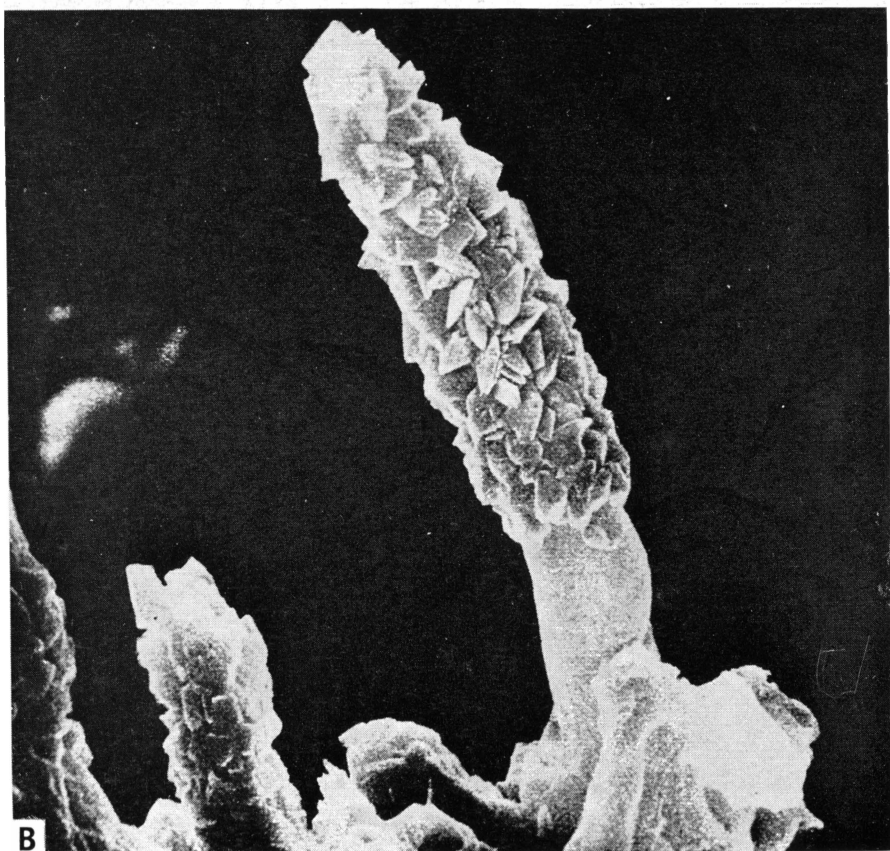
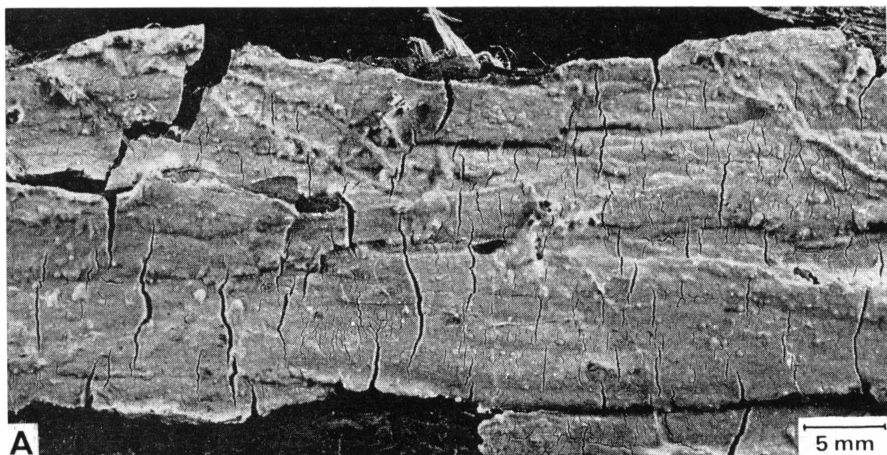
A, B. *Amylocorticum subincarnatum*. Coll. Erikss. 1966-09-10. — A. Old fruitbody. — B. Young fruitbody.

C. *A. subsulphureum*. Coll. Strid 6966.



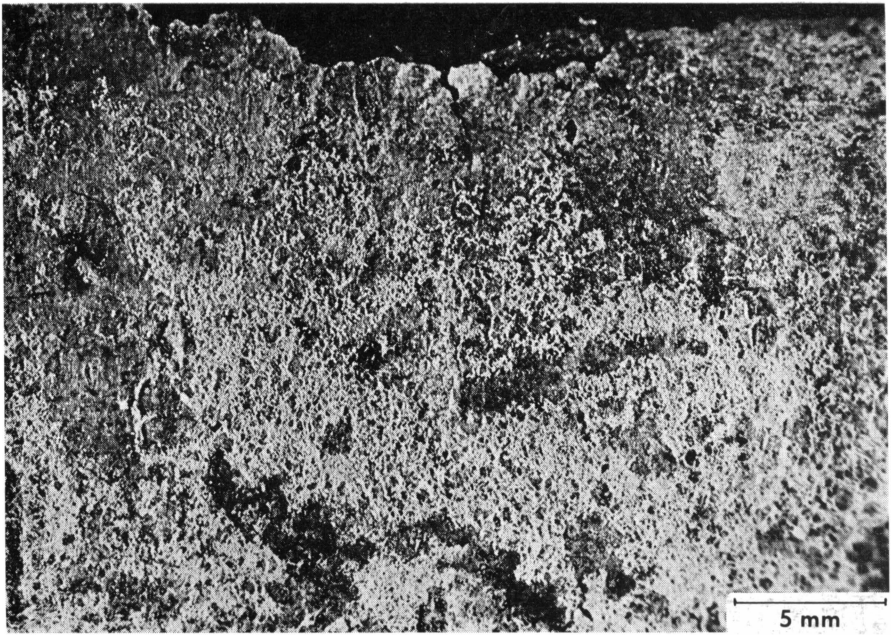
A. *Amylostereum chailletii*. Coll. Erikss. 1966-07-07.

B. *A. laevigatum*. On *Taxus*. Coll. Erikss. 1963-03-31.

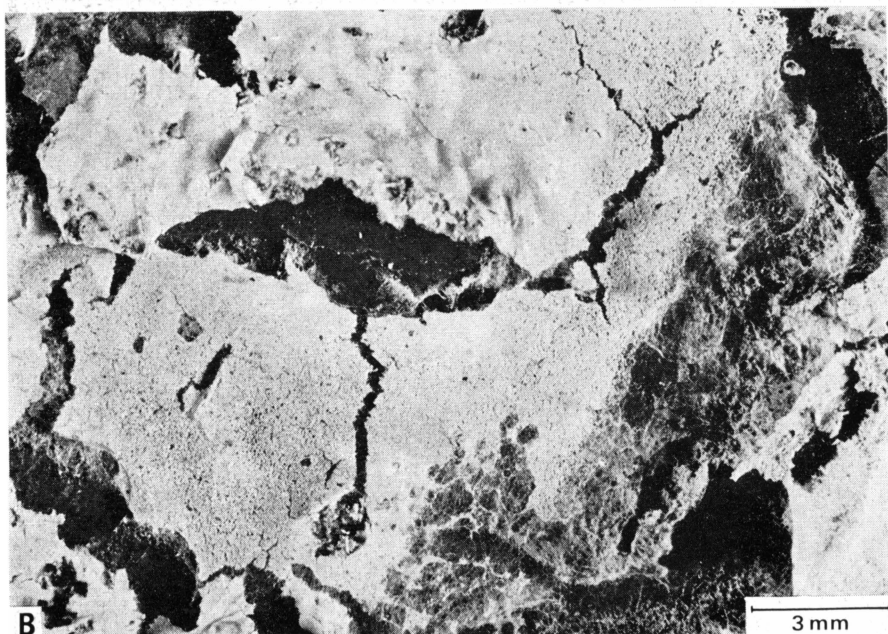
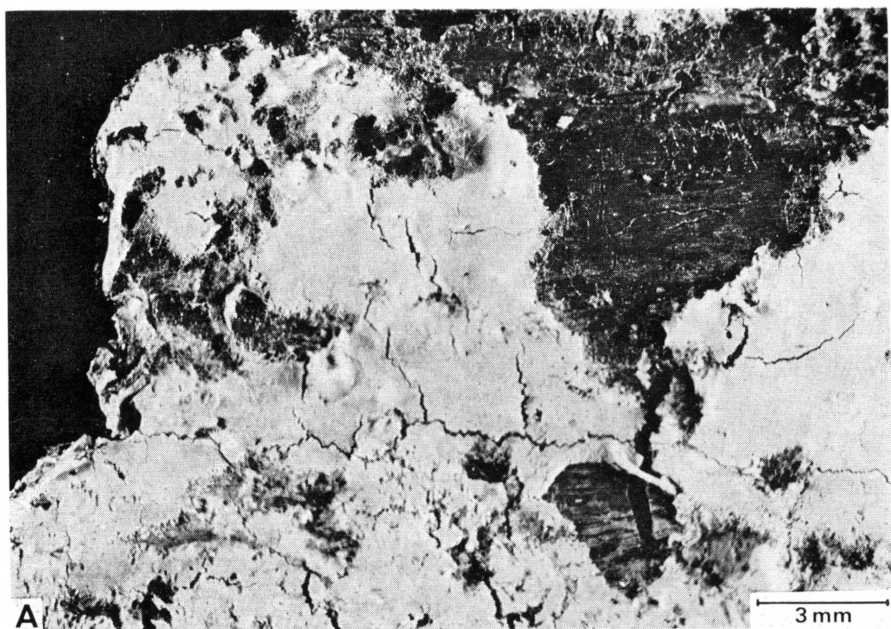


A. *Amylostereum laevigatum*. On *Juniperus*. Coll. Nordin 4894.

B. *A. laevigatum*. Cystidium. Scan 7000 x. Coll. Erikss. 147.

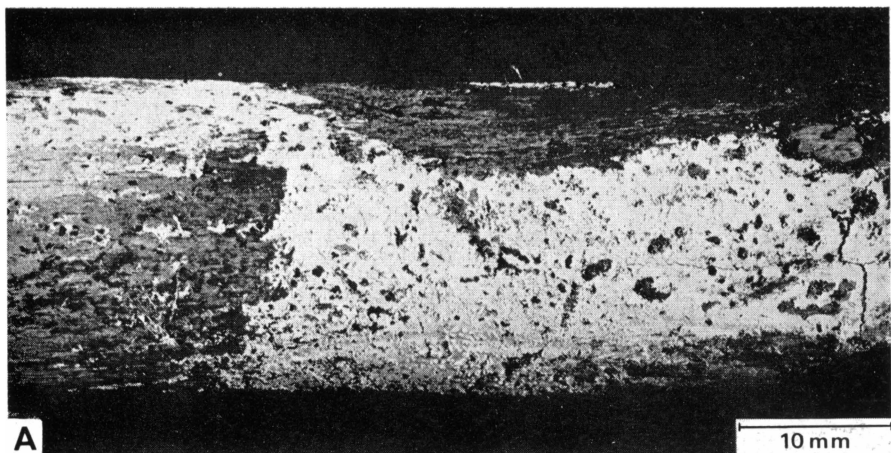


A. Athelia binucleospora. Coll. Hjortstam 5734. Typus.



A. *Athelia epiphylla*. Coll. Erikss. 248.

B. *Athelopsis hypochnoidea*. Coll. Erikss. 117.



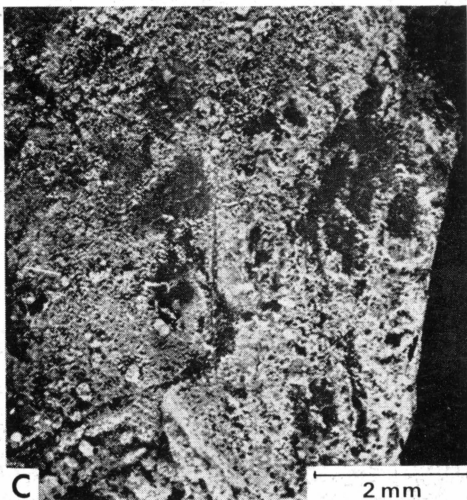
A

10 mm



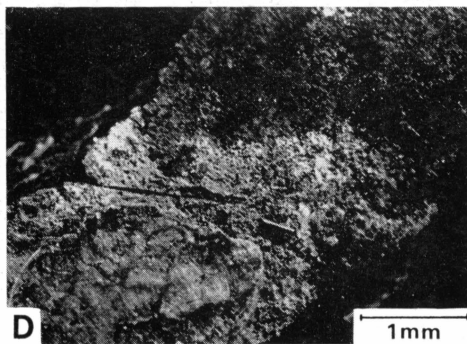
B

3 mm



C

2 mm

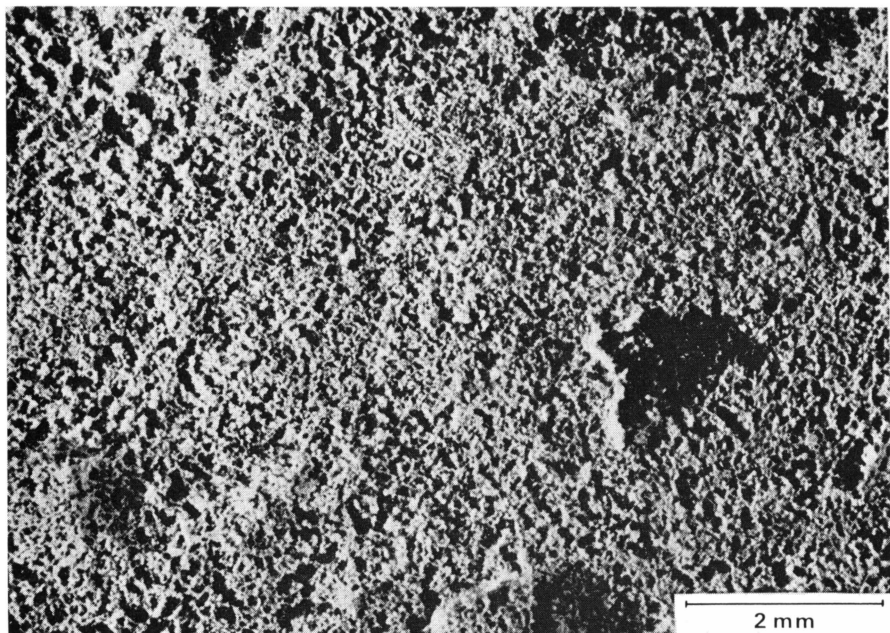


D

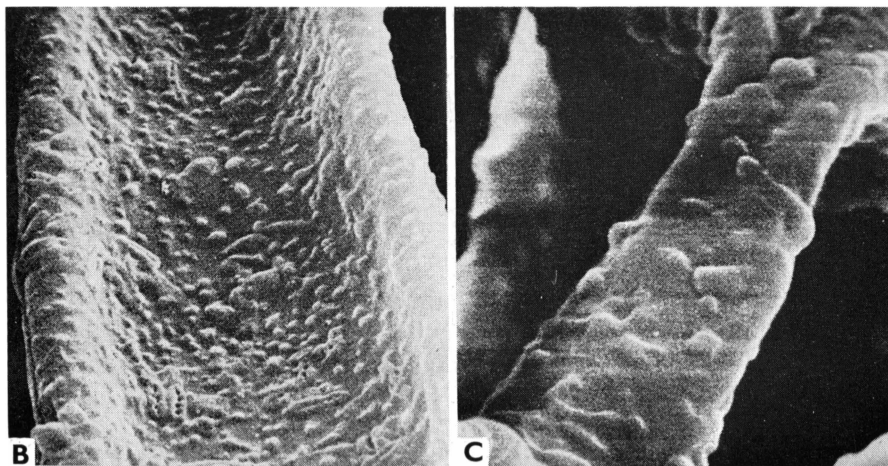
1 mm

A. *Athelopsis glaucina*. Coll. Erikss. 6380.

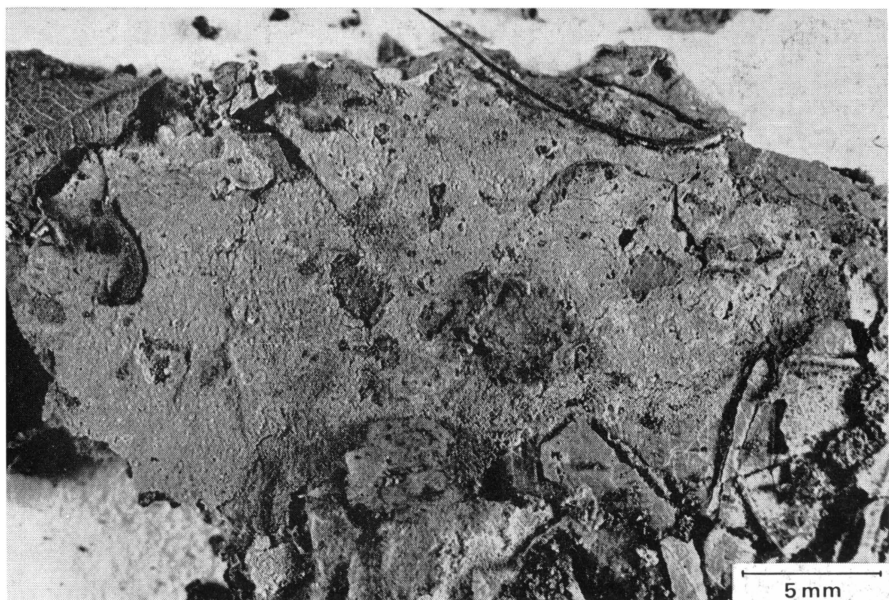
B.—D. *Athelidium aurantiacum*. — B, C. Coll. Hauerslev. — D. Coll. Christiansen.



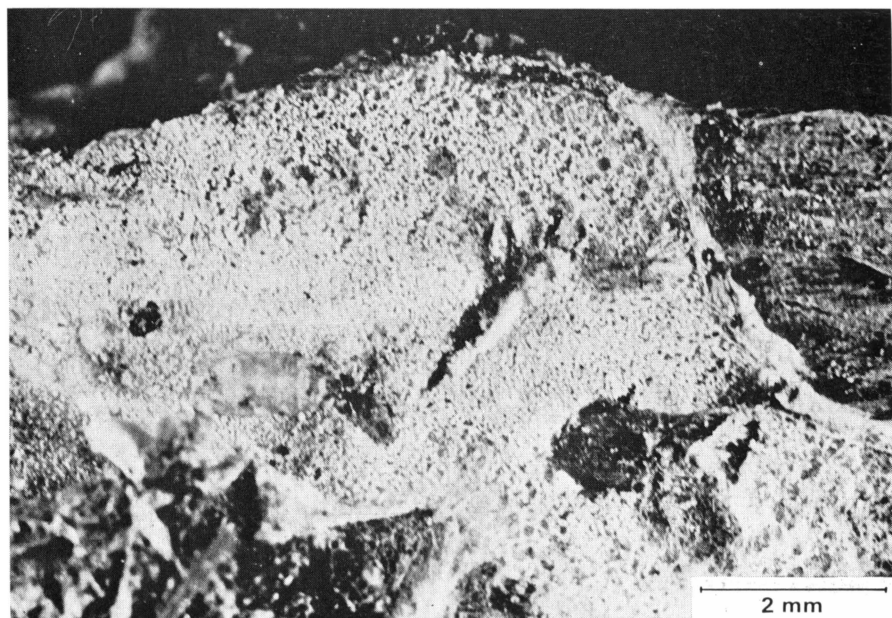
A. *Botryobasidium danicum*. Coll. Hjortstam 1967-09-11.



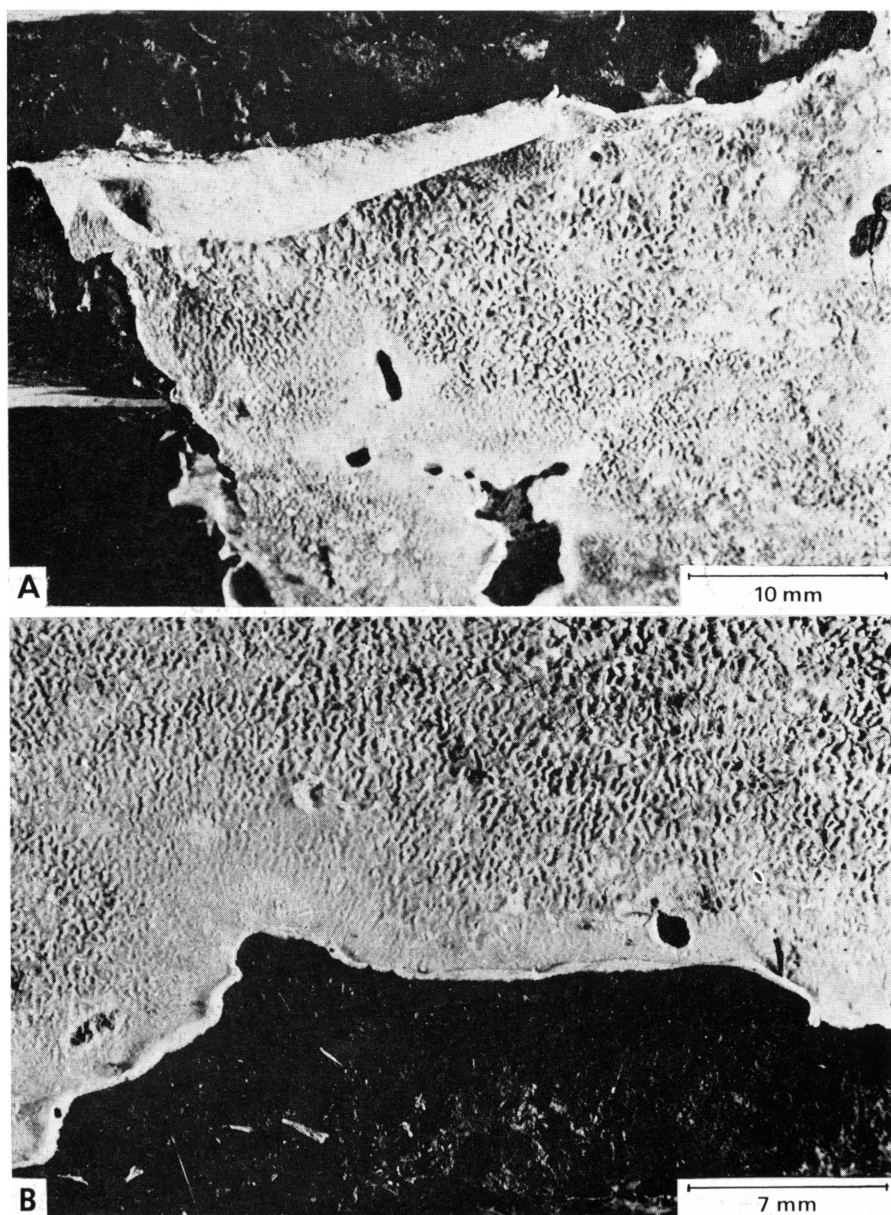
B. C. *B. pruinaum*. Coll. Erikss. 716. — A. Basal hypha. Scan 6000 x. — B. Subhymenial hypha. Scan 12000 x.



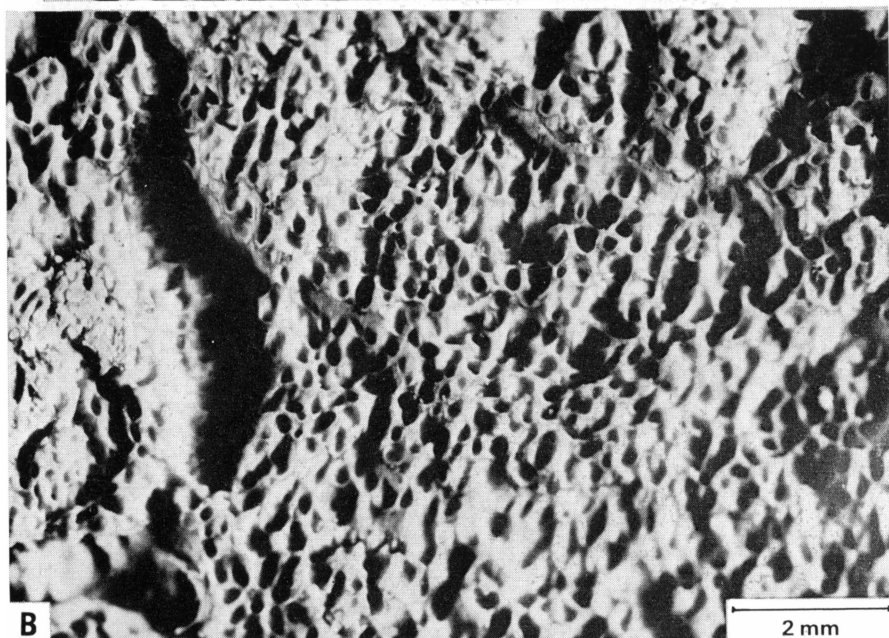
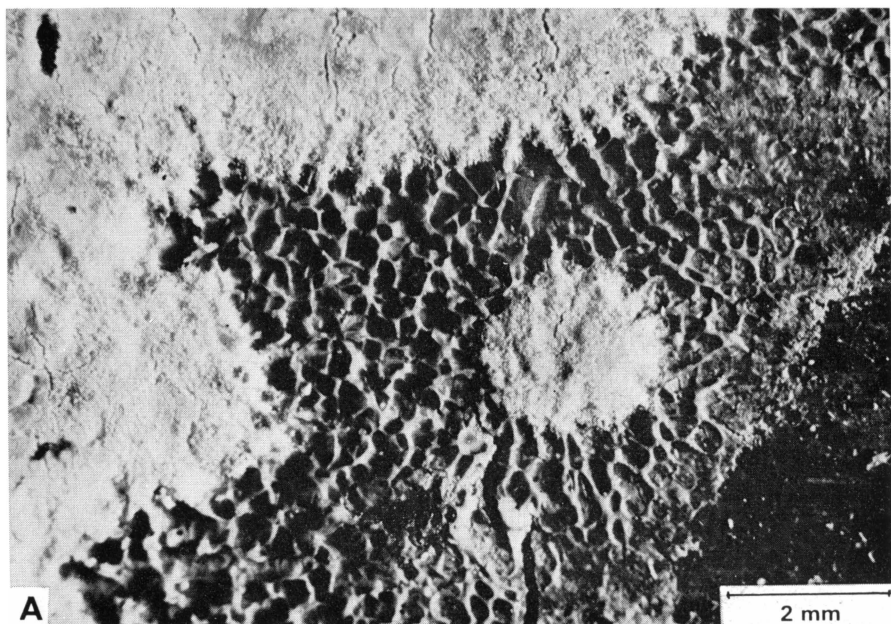
A. *Byssocorticium atrovirens*. Coll. Erikss. 852.



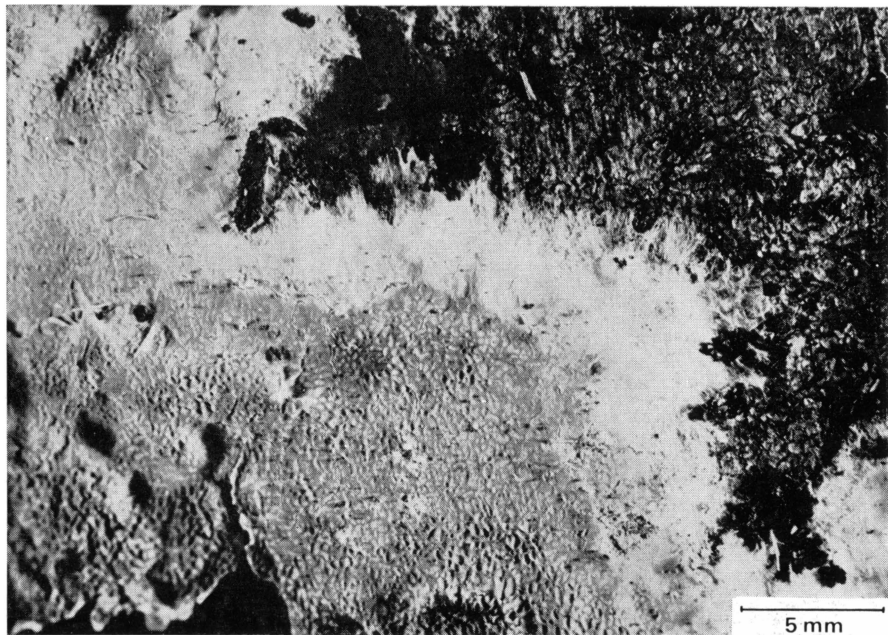
B. *B. lutescens*. Coll. Hallenberg 578.



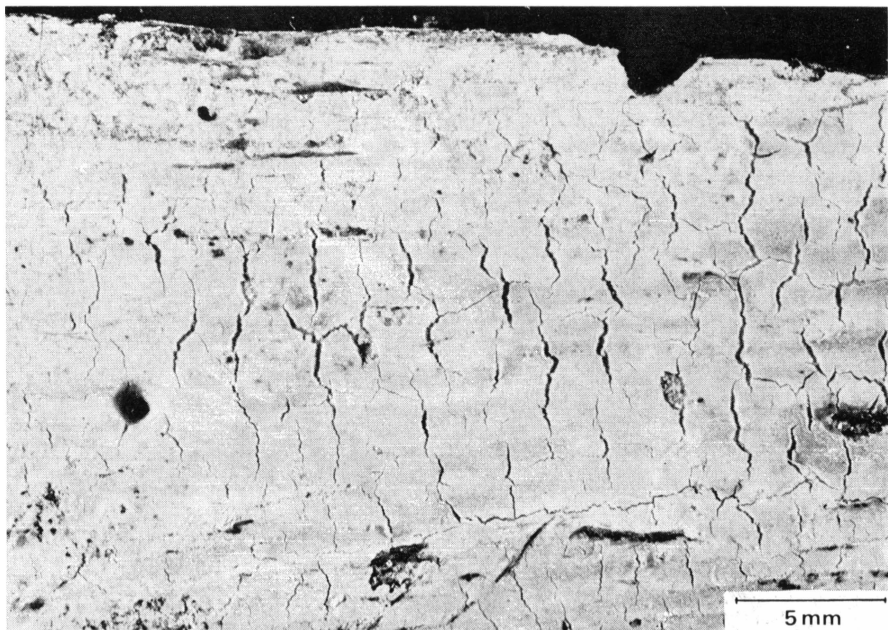
A, B. *Byssomerulius corium*. Coll. Erikss. 1965-10-24. — A. Reflexed fruitbody. B. Resupinate fruitbody.



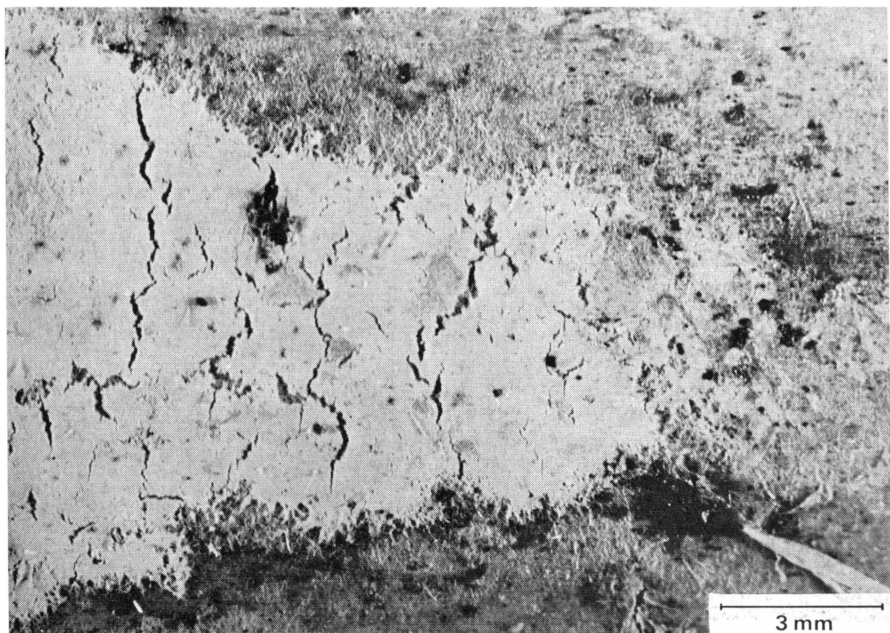
A, B. *Ceraceomerulius rubicundus*. Coll. Laurila 1937-06-03. A. Young hymenium overgrowing older one. B. Mature hymenium.



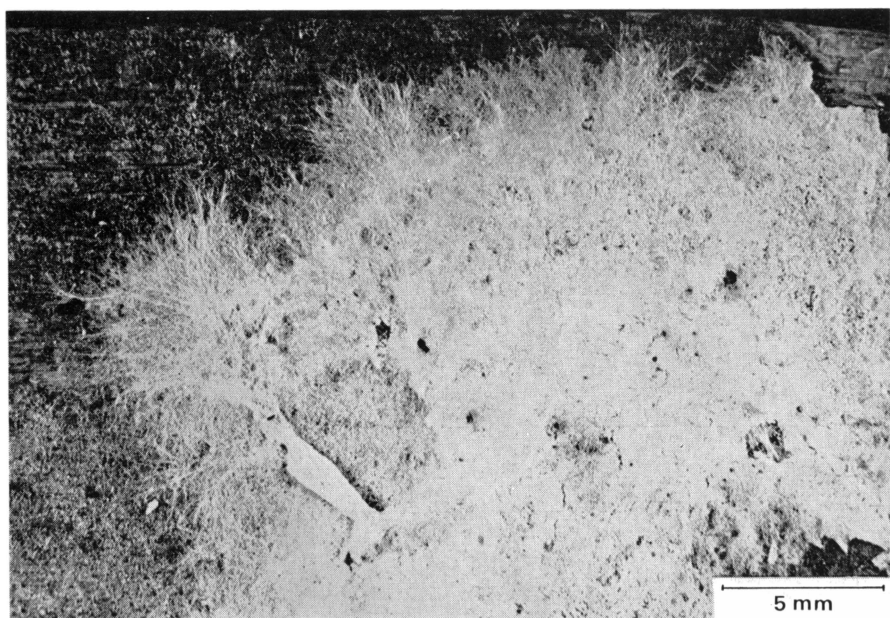
A. *Ceracomerulius serpens*. Coll. Erikss. 9633.



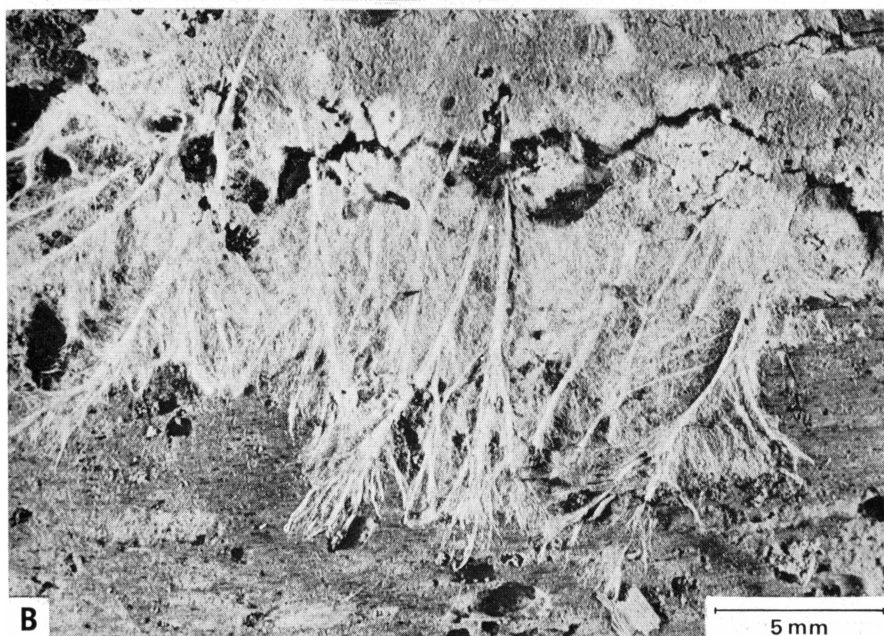
B. *Ceraceomyces* sp. Coll. Erikss. 3170.



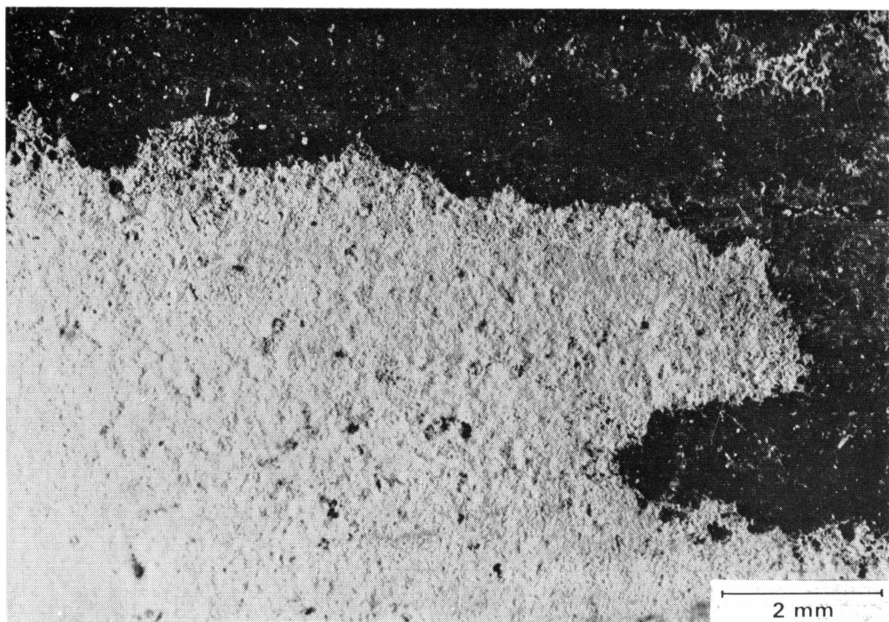
A. *Ceraceomyces sublaevis*. Coll. Erikss. 368.



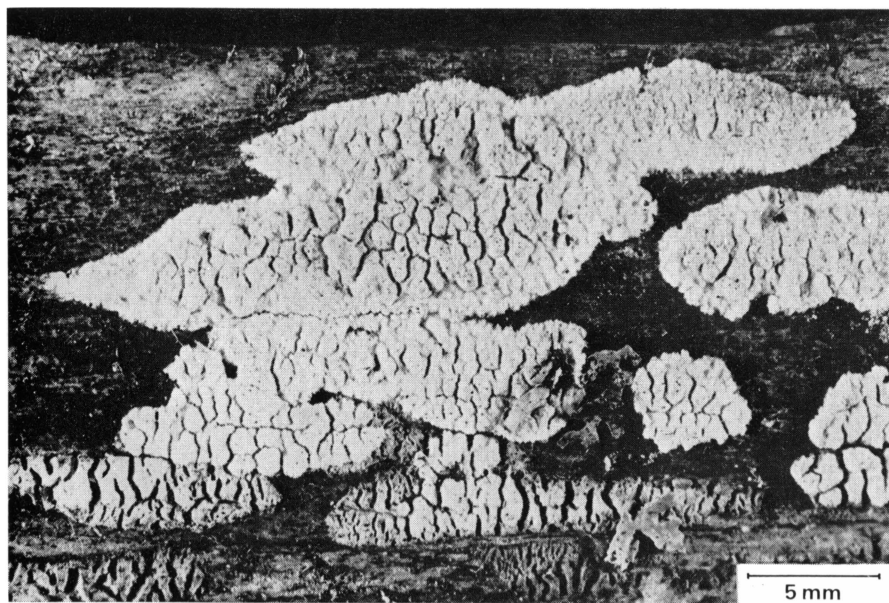
B. *C. tessulatus*. Coll. Erikss. 1966-09-24.



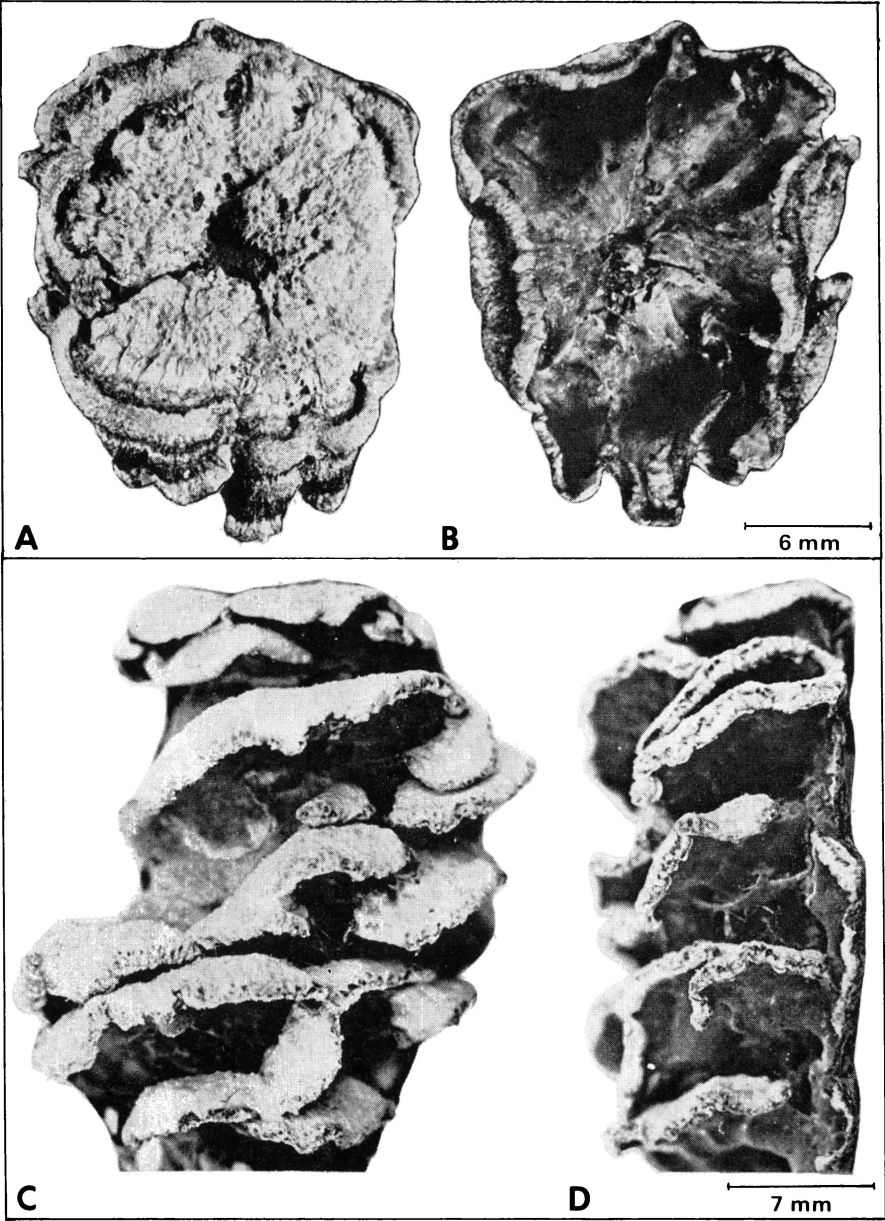
A, B. *Ceraceomyces violascens*. — A. Mature hymenium. Coll. Erikss. 389.
— B. Rhizomorphic margin of young specimen. Coll. Erikss. 7191.



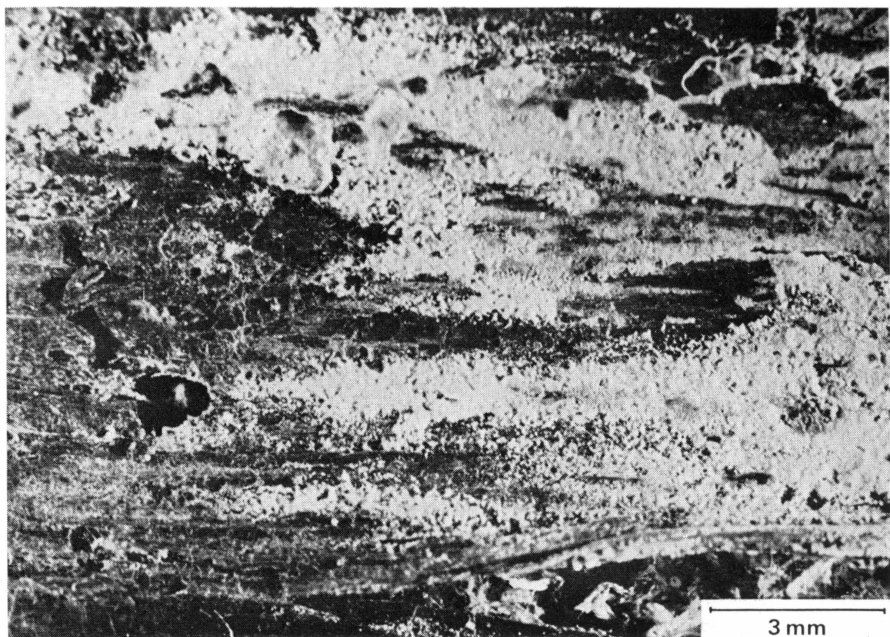
A. *Cerinomyces crustulinus*. Coll. Erikss. 873.



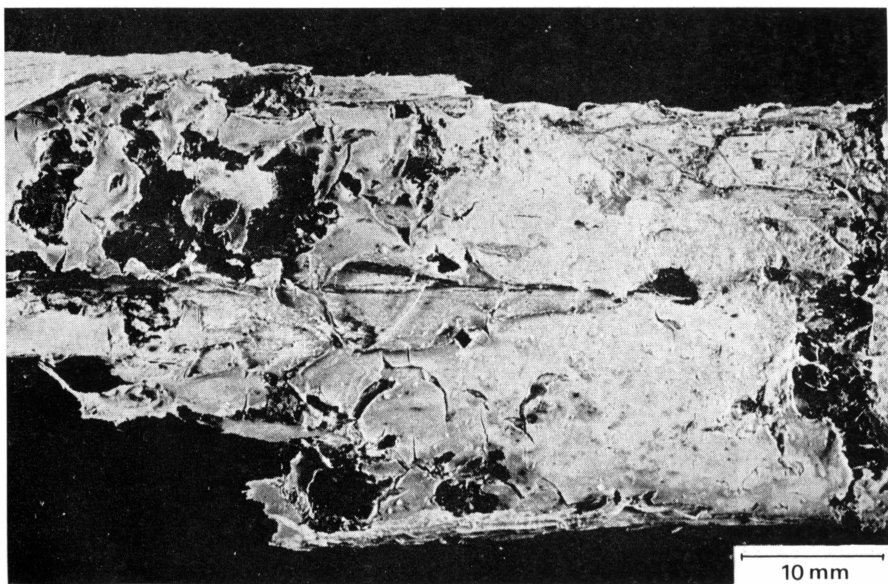
B. *Chaetoderma luna*. Coll. Erikss. 1969-10-14.



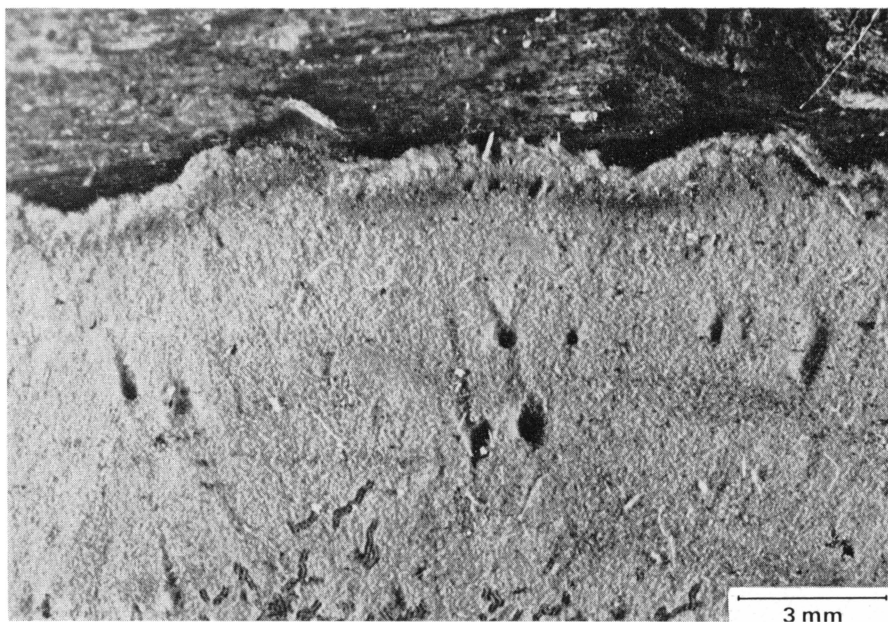
A—D. *Chondrostereum purpureum*. — A. Circular fruitbody from above. — B. The same from below. — C. Pileat specimen, front view. — D. The same, side view. Coll. Neuendorf 1971-09-19 (A. B), Degelius 5222 (C, D).



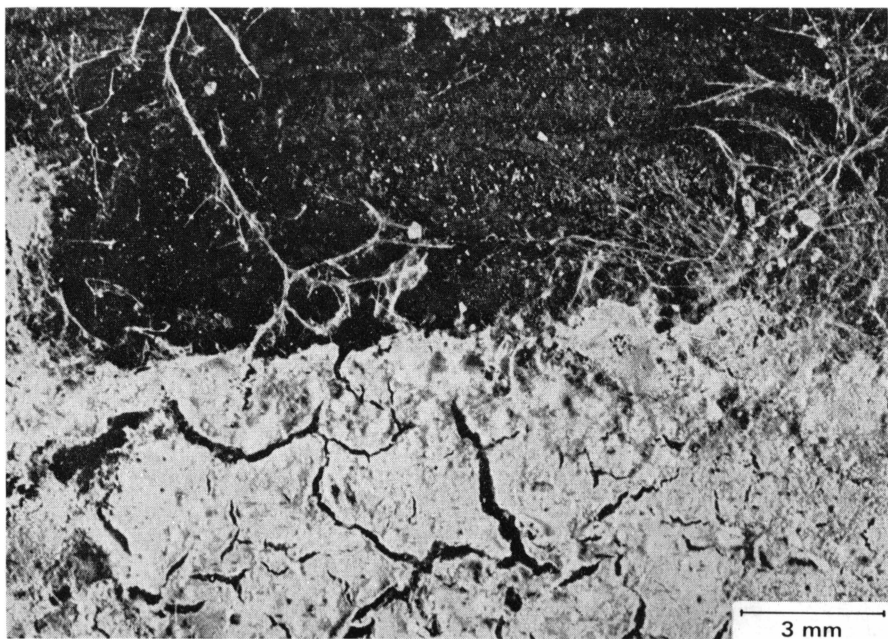
A. *Clavulicium delectabile*. Coll. Erikss. 5186.



B. *C. macounii*. K.-H. Larsson 1187.



A. *Columnocystis abietina*, resupinate. Coll. Erikss. 8127.



B. *Confertobasidium olivaceoalbum*, rhizomorphic margin. Coll. Parmasto 9768.