

The Corticiaceae of North Europe

By

John Eriksson, Kurt Hjortstam and Leif Ryvarden

with drawings by

John Eriksson

Volume 6

Phlebia — Sarcodontia

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New taxa and combinations proposed in this volume:

<i>Clavulicium spurium</i>	comb.nov.	p. 1059
<i>Laeticorticium expallens</i>	comb.nov.	p. 1069
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<i>Resinicium pinicola</i>	comb.nov.	p. 1271

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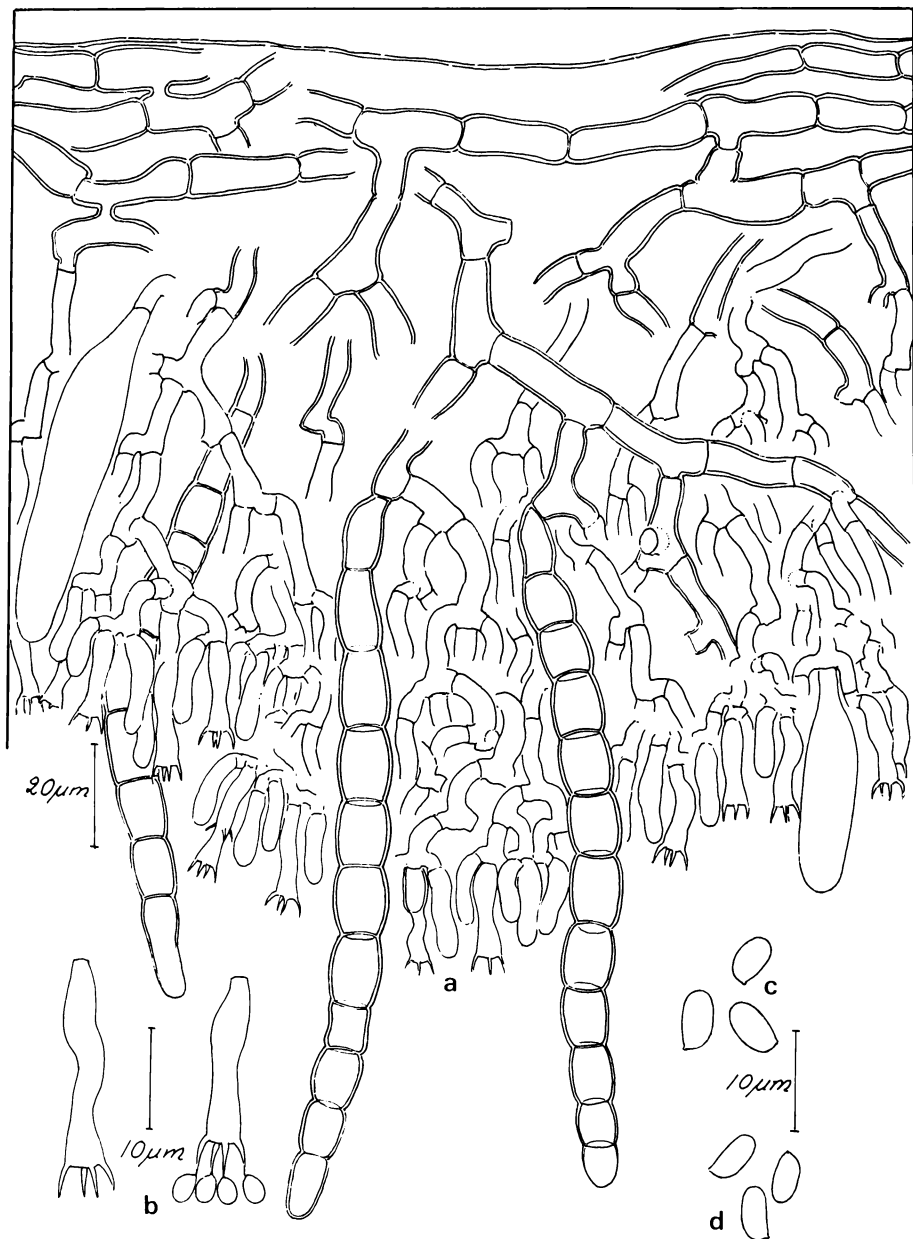


Fig. 535. *Candelabrochaete africana*. a) section through part of fruitbody b) basidia c,d) spores. — a-c) Ryvarden 17652/B, d) Type specimen.

Candelabrochaete

Candelabrochaete Boid., Cahiers
Cahiers Maboké 8:1, p. 23, 1970.

Fruitbody resupinate, adnate, smooth or under a lens more or less odontoid, of fragile consistency in the dry state; hyphae wide, short-celled, branched at right angles, without clamps, basal hyphae with thickened (double) walls; cystidia (pseudocystidia) more or less projecting, at first thin-walled, not septate, when fully-developed septate with thickened walls; basidia sub-cylindrical – constricted – sub-urniform, often with linear repetition, even several times renewed; spores oblong – ellipsoid, thin-walled, smooth, non-amyloid, non-cyanophilous.

Type species: *Candelabrochaete africana* Boid.

Remarks. The genus reminds of *Phanerochaete* by the lack of clamps, nature of spores, and in the presence of cystidia, but well distinguished by the short-celled hyphae and the shape and linear repetition of the basidia. Together with *Repetobasidium* and *Repetobasidiellum* they are the only genera known with renewed repetition. *Phanerochaete septocystidia* (Burt) Erikss. & Ryv. reminds very much of *Candelabrochaete* in the septation of the cystidia and to some degree also in the nature of the basal hyphae but in this species the basidia are narrowly clavate and packed together in a palisade as they normally are in *Phanerochaete*, nor does linear repetition occur.

Hitherto two species are referred to *Candelabrochaete*, the type species and *C. langloisii* (Pat.) Boid.

Candelabrochaete africana Boid., loc. cit.

Fig. 535-38

Fruitbody resupinate, adnate, effuse, of moderate size and almost smooth but becoming granular or finely odontoid (lens), when dried fragile, margin not especially differentiated.

Hyphal system monomitic; all hyphae without clamps, short-celled, branched at more or less right angles, non-cyanophilous, subbasidial hyphae thin-walled, 3 - 4 μm wide; basal hyphae 8 - 15 μm wide, with thickened to very thick walls. In young, empty hyphae the dolipore apparatus is as a rule easily visible. In old tissues there is a resinous, yellow-brown encrustation, which may be abundant, giving the whole fruitbody a brown colour.

Cystidia 70 – 140 x 8 – 12 μm , as a rule arising from the basal hyphae (pseudocystidia), septate, finally thick-walled, smooth, young cystidia thin-walled, not septate, with homogenous contents, thus looking like gloeocystidia of e.g. *Hyphoderma*.

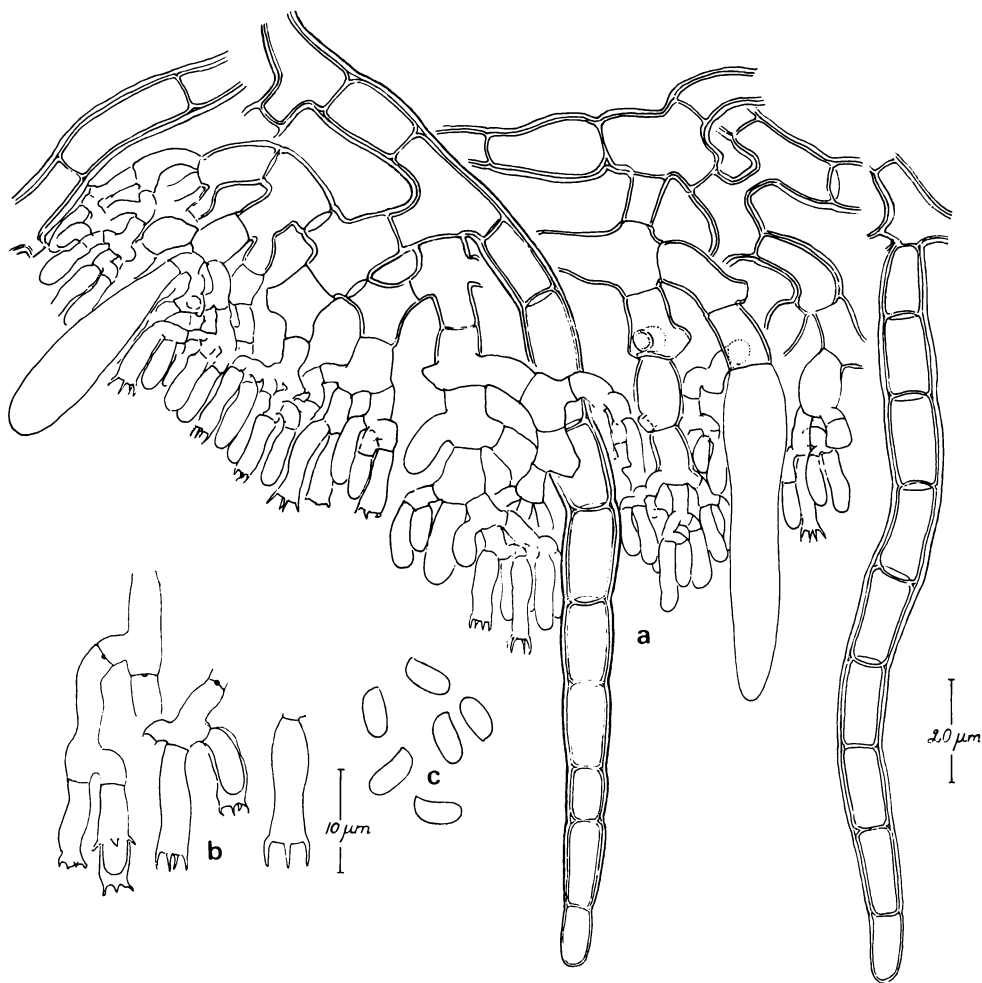


Fig. 536. *Candelabrochaete africana*. a) part of fruitbody b) basidia, two repeating ones c) spores. — Type specimen.

Candelabrochaete

Basidia $12 - 18 \times 3 - 4.5 \mu\text{m}$, sub-cylindrical, as a rule apically widened, more or less constricted in the middle (suburniform), with 4 sterigmata and without basal clamps. Linear repetition frequent (esp. in the Norwegian material but seen also in the type) and results in structures which could be interpreted as apical growth of basidia with several sets of sterigmata, but the repetition is evidently the same as in *Repetobasidium*, only more difficult to observe as there are no clamps present.

Spores $4.2 - 6 (-7) \times 2 - 3 (-4) \mu\text{m}$, sub-cylindrical to ellipsoid, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat and distribution. On decayed wood of coniferous trees. In N. Europe found only once, viz. in Norway. Hedmark, Folldal, Holen near Grimsa, on wood of *Pinus sylvestris*. 1979-08-25. Ryvarden No. 17652/B.

Remarks. The Norwegian material agrees with the type of *C. africana* and is definitely a *Candelabrochaete*. There are, however, some differences, making it questionable if they really are conspecific. The basidia of the type are shorter, the spores narrower, and the basal hyphae wider. Besides there is a difference in the shape of the cystidia, which in the Norwegian material are composed of barrel-shaped cells, while in the type the walls of the cystidia are more parallel and also more clearly two-layered. We have further studied one specimen of *Odontia modesta* Rick (illegitimate name, the nomenclatural type was not indicated in the protologue) from Brazil (Rick 17630) which also clearly belongs to *C. africana* s.l. It agrees more with the Norwegian material, esp. in the shape of the spores, but the fruitbody is young and the majority of the numerous cystidia are still in the thin-walled, non-septate state. There are finally two specimens collected by Ryvarden in Africa, one from Malawi (Ryv. 11300/F) and one from Kenya (Ryv. 9056). These two collections differ from the others in several respects. The Malawi specimen is in the prime of its development while the Kenya spec. is older, a large specimen, but they are no doubt conspecific. They differ from *C. africana* in the shape of the hymenium, which is more distinctly odontoid, the hyphae are narrower and — as are also the cystidia — more thin-walled. The subicular tissue becomes filled with some resinous, yellow-brown matter, which gives the fruitbody a buff to ferruginous colour. The cystidia are fewer, less projecting. The shape and size of the spores are about the same as in the Norwegian material. Thus, it seems possible, from the material studied, to separate *C. africana* s.l. in three taxa: the type, the Norwegian-S. American material, and those from Kenya and Malawi.

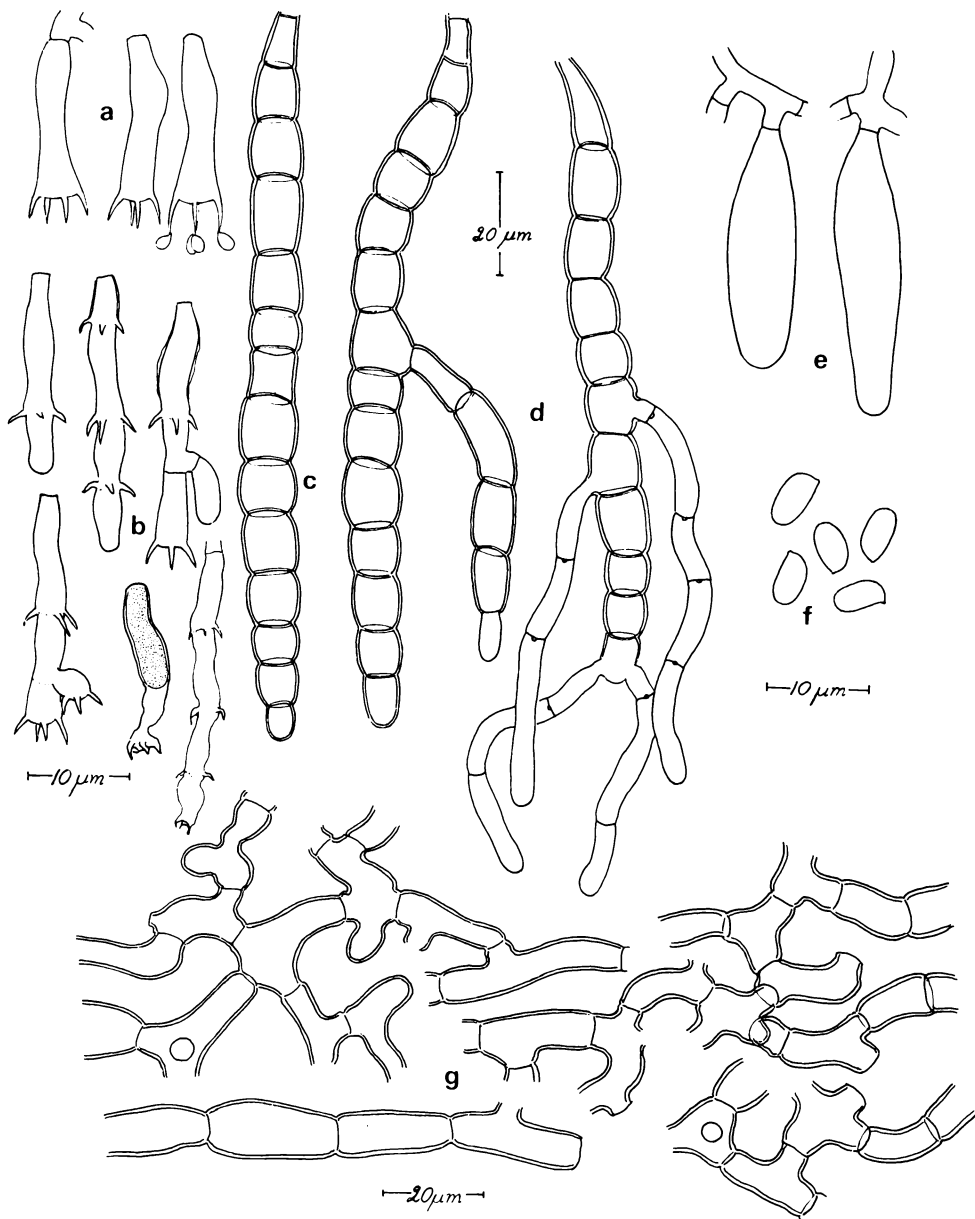


Fig. 537. *Candelabrochaete africana*. a) simple basidia b) repeated basidia c) simple cystidium d) cystidia with side-branches e) young non-septate cystidia f) spores g) basal hyphae. — Ryvarden 17652/B.

Candelabrochaete

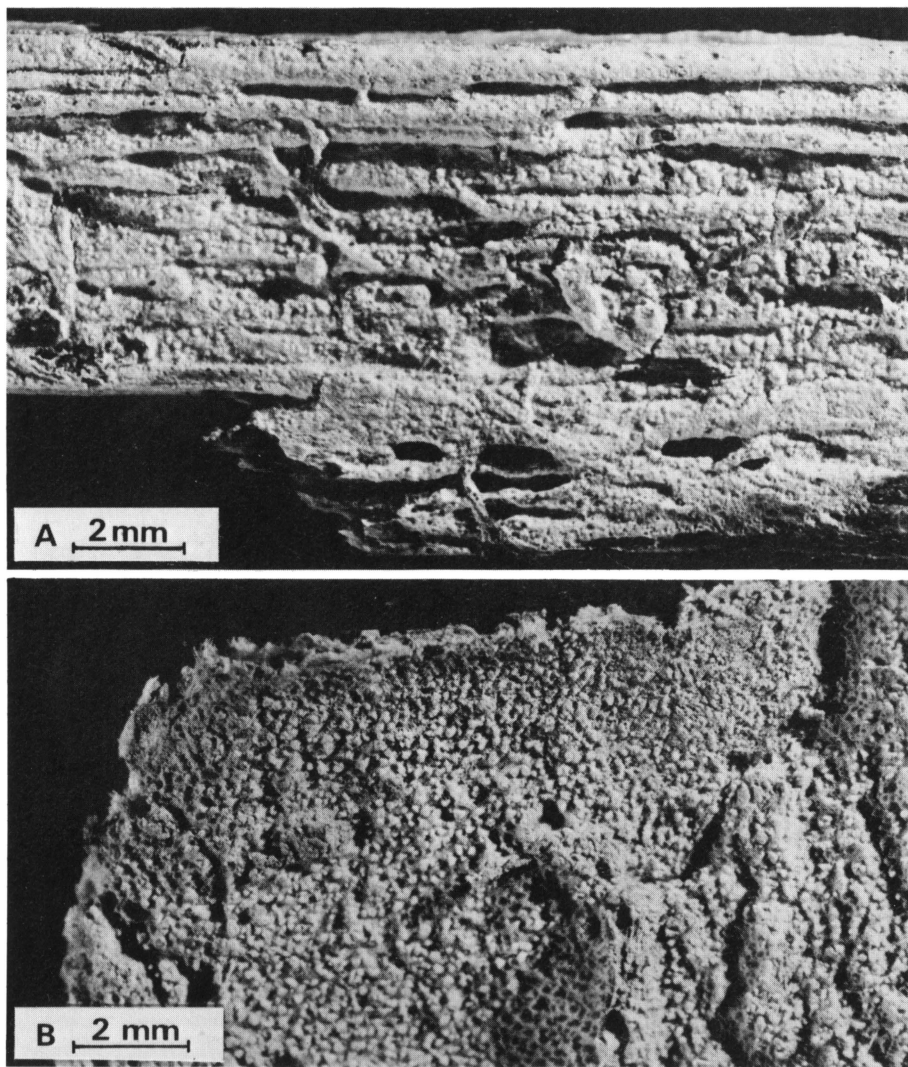


Fig. 538. a) *Candelabrochaete africana*. Part of fruitbody. — Ryvar den 17652.
b) *Candelabrochaete* sp. Part of fruitbody. — Ryvar den 9056. — Photo T. Hallingbäck.

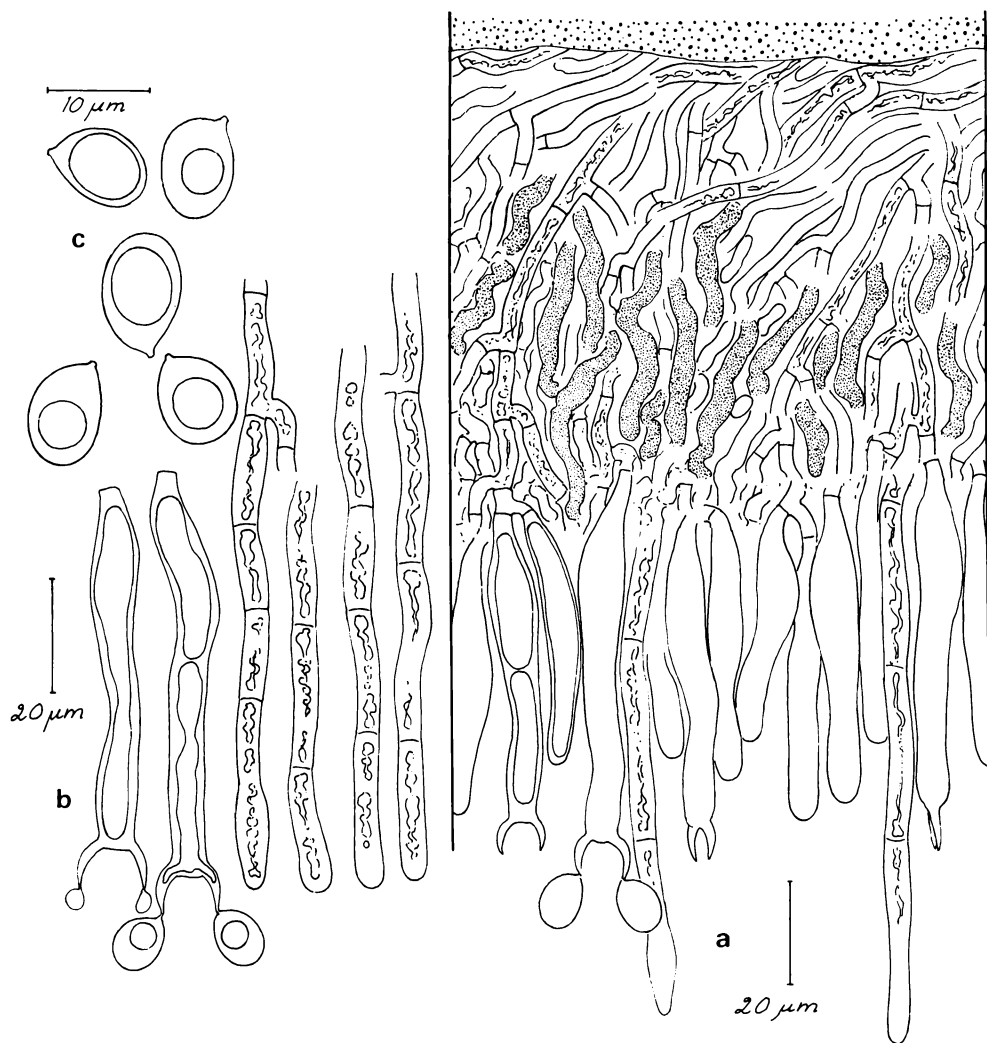


Fig. 539. *Clavulicium spurium*. a) section through fruitbody b) basidia and cystidia c) spores. — Bakke 2358.

Clavulicium

Clavulicium spurium (Bourd.) Erikss. & Hjortst. n. comb. Fig. 539
 - *Corticium spurium* Bourd., Revue scient. du Bourb.
 1922 p. 15. - *Membranomyces spurius* (Bourd.) Jül.,
 Persoonia 8 p. 296, 1975.

Fruitbody resupinate, adnate, effused, 0.1–0.2 mm thick, when young porulose - hypochnoid and ceraceous when wet, finally continous, in the dry state membranaceous; margin not especially differentiated.

Hyphal system monomitic; hyphae without clamps, 3–5 μm wide, hyaline or in old tissue yellowish - pale brown, densely branched and intertwined in all directions; old hyphae and embedded old basidia filled with a brown, oily or resinous substance, finally forming irregular brown bodies in the context.

Cystidia or rather cystidioid, hair-like hyphae frequent in the hymenium, projecting beyond the basidia, 70–110 μm long and 3–5 μm wide, thin-walled, with several septa, in the dry material with irregular oily inclusions in the cells, in the living material probably with oil-drops.

Basidia sub-cylindrical, tube-like, somewhat widened in basal direction, 6–7 μm wide in the apical part, 8–11 in the base, 55–70 μm long, more or less filled with an oily substance, with 2–4 (in the Nordic material with 2) sterigmata and without basal clamp.

Spores broadly ellipsoid - subglobose, 7–12 x 6–7.5 μm , smooth, with slightly thickened walls when mature, with a large central oil-drop, non-amyloid, non-cyanophilous.

Habitat and distribution. On much decayed wood, litter, mosses a. s. o. Earlier known only from France but in 1979 found in Norway (Oppland, Kvam) on wood of *Picea abies*.

Remarks. In vol. 2 pp. 245 – 50 *Cort. delectabile* Jacks. was referred to *Clavulicium*, the genus thus containing 2 species. Jülich (loc. cit.) joined *C. delectabile* with *C. spurium* and described the new genus *Membranomyces* with *C. spurium* as generic type. In vol. 4 p. 858 *C. delectabile* was reestablished as being well distinguished from *C. spurium*, but it was stated that *C. delectabile* was closer to *C. spurium* than to *Clavulicium macounii*, the generic type. The material available of *C. spurium*

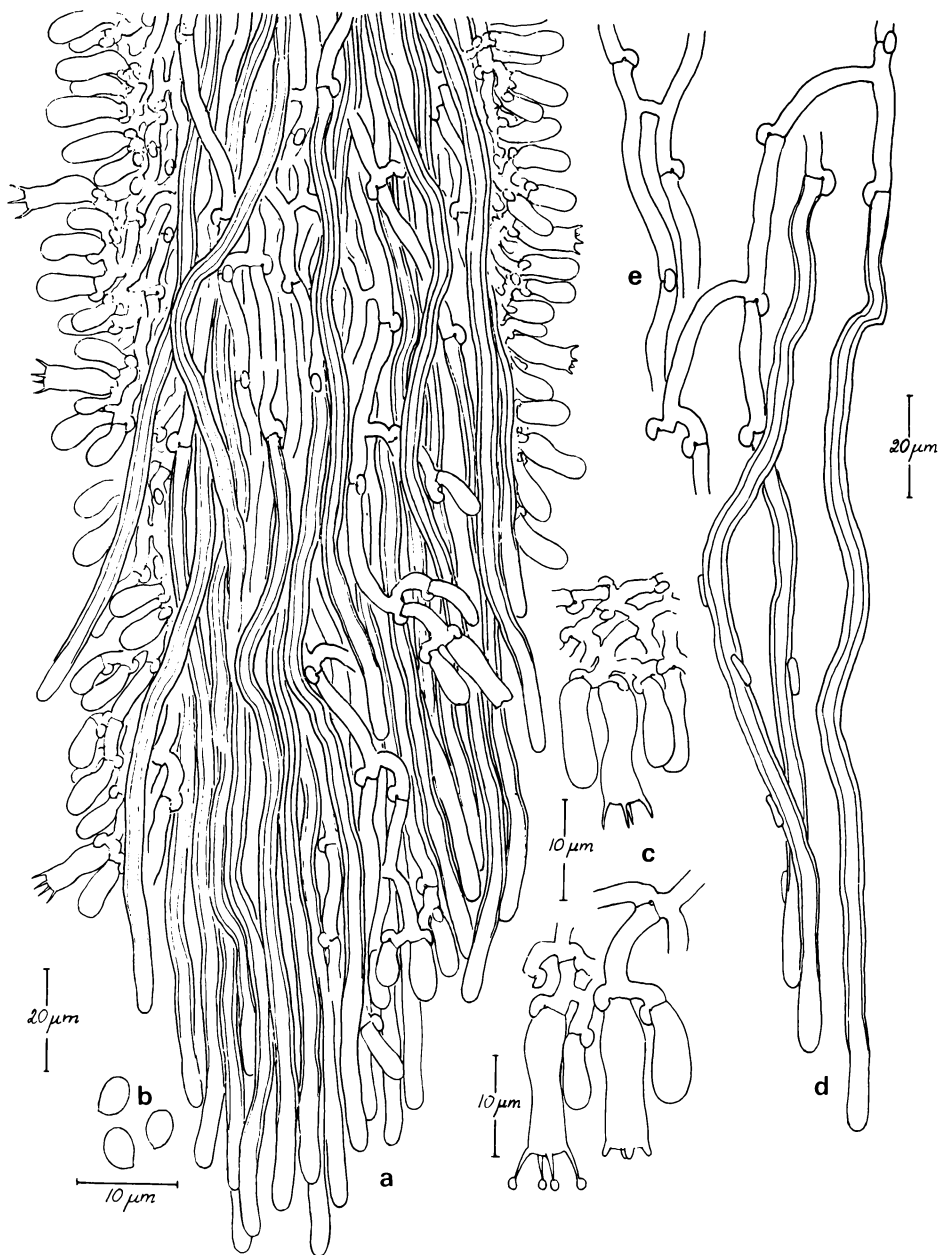


Fig. 540. *Fibrodontia gossypina*. a) section through apical part of aculeus b) spores c) basidia d) cystidial hyphae e) generative hyphae. — S. Sunhede.

Fibrodontia

from herb. Bourdot at that time was scanty. The material then found in Norway is well developed and gives better information of the species than before. The Norwegian material differs from typical *C. spurium* in having 2 sterigmata (only occasionally 3 - 4) while Bourdot reports 2 - 4 and 4 seems to be the normal number in his material. The fact that 2-sterigmatic specimens occur, as also the presence of resinous inclusions in the context and cystidioid hyphae in the hymenium, makes *C. spurium* a link between *C. delectabile* and *C. macounii*, and we have therefore chosen to place them together in *Clavulicium*.

The main difference is the presence of clamps in *C. macounii*, a characteristic which is difficult to evaluate without knowledge of the caryology. Whether the three species here referred to *Clavulicium* shall be placed together or separated in two genera is still a matter of opinion. As the new material gives us the impression that *C. spurium* ties *C. macounii* and *C. delectabile* together, we choose to join the species in one genus.

Fibrodontia Parm., Consp. system. Cort.,
p. 174, 1968.

Fruitbody totally resupinate, rather loosely adnate, easily detached in pieces, white to pale ochraceous-isabellinous, ceraceous when alive, in the dry state soft but fibrous; hymenophore odontoid, with short and dense, usually cylindrical aculei, apically hairy (lens 50x) by projecting hyphae; cystidia absent; hyphal system dimitic, all hyphae with clamps, generative hyphae thin-walled, 2 - 3 μm wide, skeletal hyphae 2.5 - 3.5 μm ; basidia sub-urniform, with 4 sterigmata and basal clamps; spores ellipsoid, thin-walled, non-amyloid, non-cyanophilous.

Type species: *Fibrodontia gossypina* Parm.

Fibrodontia is close to and intermediate between *Hyphodontia* and *Schizopora*. It differs from the former genus in having a dimitic hyphal system but as the skeletal hyphae forming the core of the aculei very much agree with the cystidia of many *Hyphodontiae* (e.g. *H. floccosa*) the difference is not very striking. In both cases they develop from generative hyphae of the trama. The only difference is that in *Fibrodontia* these hyphal elements are narrower and more numerous. *Fibrodontia* differs from *Schizopora*, which has much firmer, more or less poroid fruitbodies. In the type species of the latter there is a variation in the nature of the skeletal hyphae and especially if the young states are considered, the difference is not always very great in this case either.

Monotypic genus.

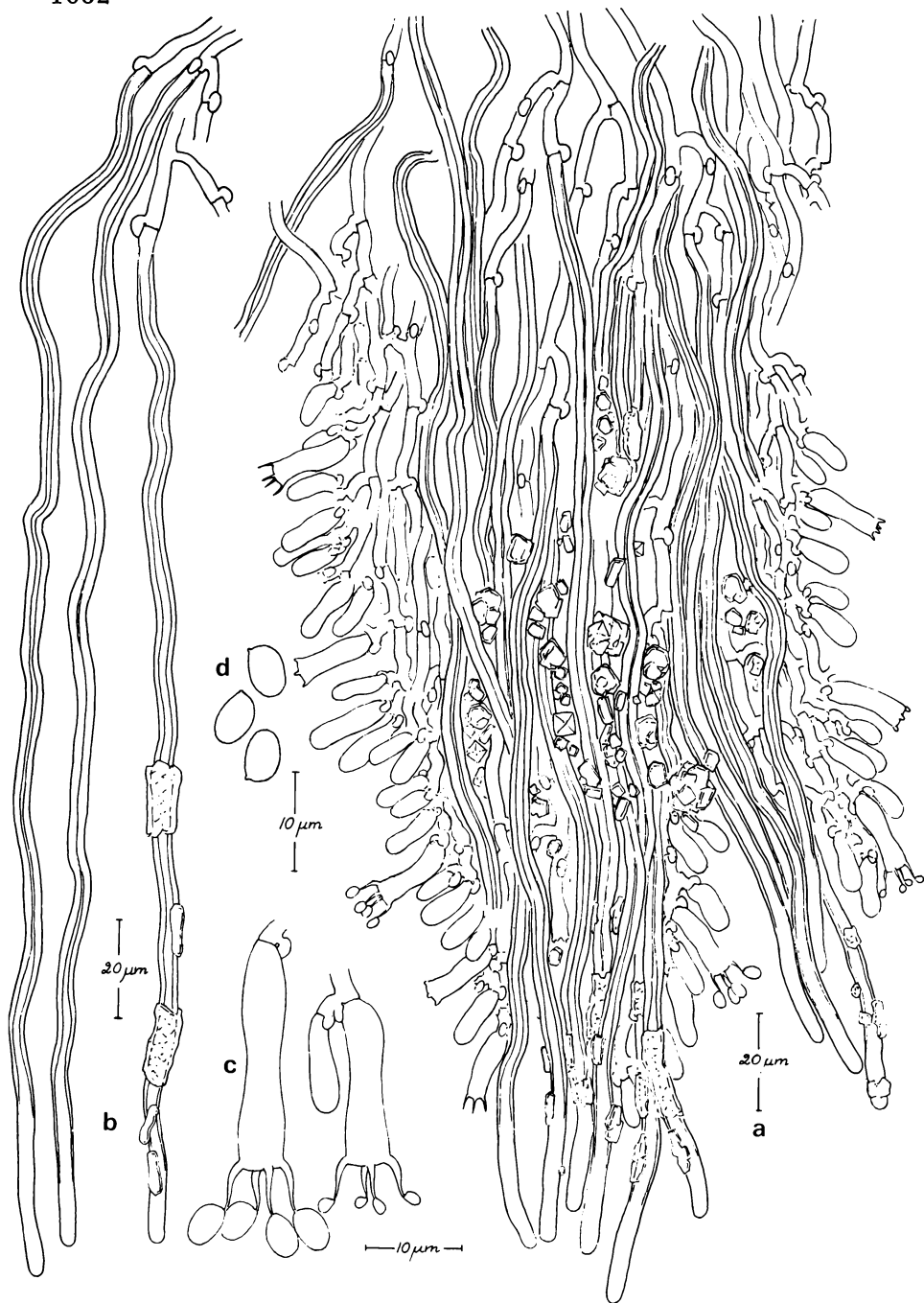


Fig. 541. *Fibrodontia gossypina*. a) section through apical part of aculeus b) cystidial hyphae c) basidia d) spores. — H. Grosse — Brauckmann.

Fibrodonia

Fibrodonia gossypina Parm., loc. cit. p. 207. —

Fig. 540-43

Odontia stipata (Fr.) sens. Bourd. & Galz., Hym. de Fr. p. 424, 1928.

Non *Hydnum stipatum* Fr., Syst. mycol. 1, p. 425, 1821.

Fruitbody totally resupinate, closely adnate, effuse, detachable in small pieces, white to pale ochraceous, pale buff or isabellinous brown in KOH, in the wet and living state ceraceous, when dried soft but fibrous, resistant to tapping in microscope slides; hymenophore odontoid, with dense and short (usually less than 1 mm), as a rule cylindrical aculei, apically hairy from projecting hyphae (lens 50X); margin not especially developed but sometimes fimbriate, rarely continuing into a mat of sterile hyphae, downy at first but becoming more villose with increasing quantity of skeletal hyphae.

Hyphal system dimitic (or pseudodimitic) with fibulate, generative hyphae, 2 – 3 μm wide, richly-branched, and thick-walled skeletal hyphae, 2.5 – 3.5 μm wide, without septa and branches. The skeletal hyphae in the centre of the hymenial aculei emanate from generative hyphae in the subiculum, which is thin and consists of loosely intertwined generative and skeletal hyphae.

Cystidia none.

Basidia suburniform, 10 – 20 x 3.5 – 5.5 μm , with 4 sterigmata and basal clamp.

Spores 3.5 – 4.5 (– 6) x 2.5 – 3.5 (– 4) μm , ellipsoid, smooth, thin-walled, non-amyloid.

Habitat. On much decayed frondose wood on the ground in fertile, deciduous forests. Parmasto states that it occurs mainly in dry localities. The single Swedish collection grew on *Ulmus*, other known substrates: *Alnus*, *Fagus*, *Fraxinus*, *Parrotia*, *Populus*, *Salix*, and *Ulmus*.

Distribution. Found only once in N. Europe (Gotland, Klinte par., leg. S. Sunhede). Evidently fairly common in S. Europe and has been collected several times by Bresadola in Italy and Bourdot in France. We have also seen material from W. Germany (H. Grosse-Brauckmann), E. Germany (Doll), and Czechoslovakia (Cejp, S).

Remarks. Quélet, Bresadola, and Bourdot & Galzin named this species *Odontia stipata* (Fr.). What Fries meant with *Hydnum stipatum* is not quite clear, but certainly not this species. In the Swedish tradition (Fries – Romell) *H. stipatum* should be identical with *H. argutum* Fr.,

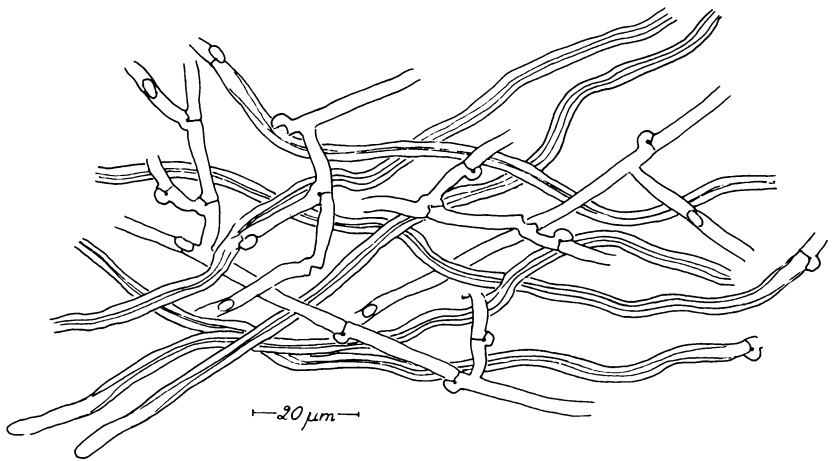


Fig. 542. *Fibrodontia gossypina*. Sterile hyphal texture. — H. Grosse-Brauckmann.

Fibrodontia

for which Romell therefore used the name *Odontia stipata*. There are also specimens named *H. stipatum* seen by Fries, which are *Hyphodontia breviseta*. Evidently *Hydnum stipatum* is a case for rejection (Art. 69) and we have found no other name than *F. gossypina* Parm. Whether or not it should be placed in a genus of its own, in *Hyphodontia* or in *Schizopora* it is too early to decide.

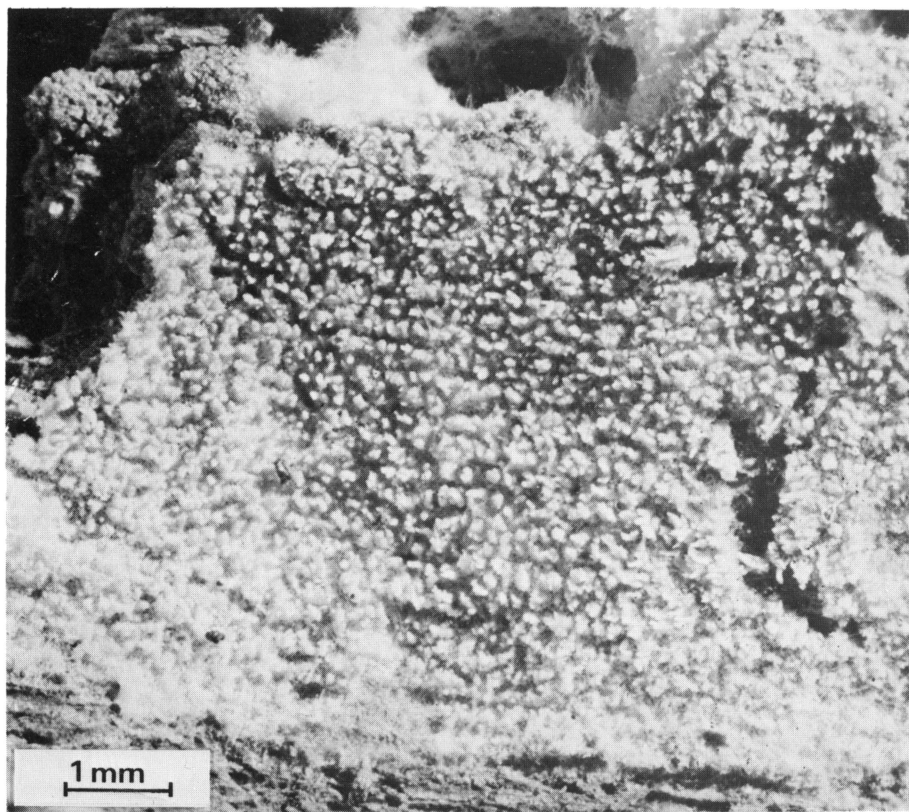


Fig. 543. *Fibrodontia gossypina*. Dried fruitbody. — Sunhede 7415. Photo T. Hallingbäck.

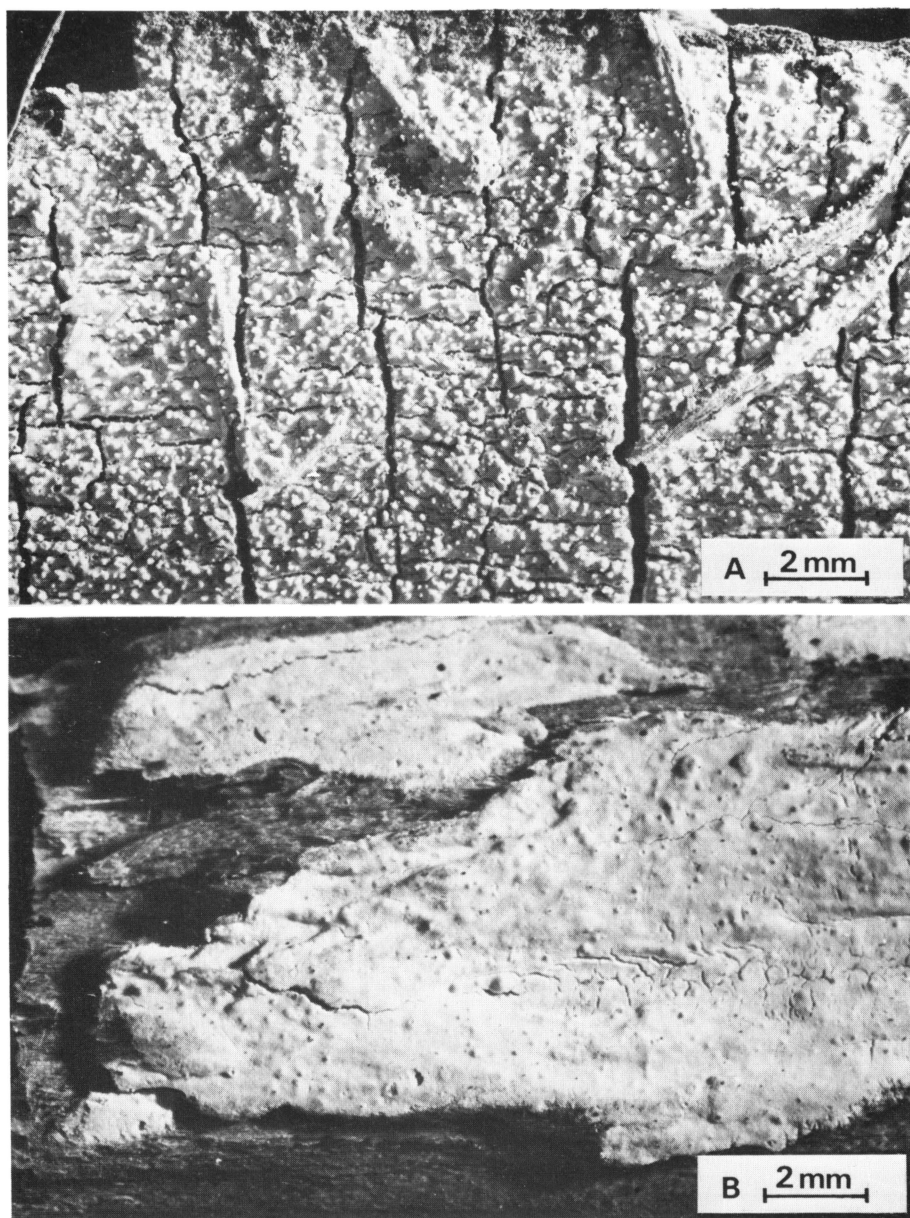


Fig. 544. Dried fruitbody of A) *Hyphodontia crustosa* ("jacutica"), B) *Hyphodontia juniperi*. — A) Parmasto 56324, B) Sunhede 5854. Photo T. Hallingbäck.

Hyphodontia

Hyphodontia juniperi (Bourd. & Galz.) Erikss. & Hjortst., Cort. N. Eur. 4, p. 666, 1976. — *Corticium serum* var. *juniperi* Bourd. & Galz., Bull. Soc. Mycol. Fr. 27, p. 246, 1911. Fig. 544-45

Fruitbody resupinate, closely adnate, orbicular-confluent, crustaceous, white-cream-coloured, thickening to about 0.5 mm; hymenium almost smooth in the beginning but becoming more or less tuberculose; margin abrupt but not especially differentiated in the mature specimens, sometimes partly fimbriate in young specimens.

Hyphal system monomitic; hyphae 2 – 3 μ m wide, fibulate, thin-walled, richly-ramified and densely intertwined, in older texture with abundant crystalline encrustations.

Cystidia (cystidioles) usually numerous, 25 – 30 x 2 – 3 μ m, hypha-like, tapering to the acute apex, often with attached crystals.

Basidia 15 – 25 x 3.5 – 5 μ m, with 4 sterigmata and basal clamp.

Spores 4.5 – 6 x 3 – 4 μ m, ellipsoid, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat and distribution. Mainly occurring on dry branches of *Juniperus*, but also found on hard deciduous wood. It seems to occur in dry summer-warm localities. In N.Europe found only in Sweden (Rute and Söndre parishes in Gotland) where it has so far been collected three times (S. Sunhede). Bourdot and Galzin report it as a frequent species on *Juniperus* in C. France (Les Causses) but should also be found on *Pyrus* and *Robinia*. It is known from Crete (*Cupressus*, T. Hallingbäck) Spain (*Juniperus*, L. Ryvarden) and Iran (*Buxus*, N. Hallenberg).

Remarks. *H. juniperi* was placed in connection with *Hyphoderma sambuci* ("Corticium serum") by Bourdot and Galzin on account of the ellipsoid spores and the white fruitbody, but it belongs into the *H. crustosa*-complex. It differs from the common *H. crustosa* in having whiter, thicker, less odontoid fruitbodies and broader (ellipsoid) spores. There is a form of *H. crustosa* (or possibly a species of its own) collected by E. Parmasto in E. Siberia (Jakutia) on *Larix* (Parmasto Nos. 56324, 56801, and 56887), which has the same ellipsoid spores, but in the colour and shape of the hymenium, is a typical *H. crustosa*. For a better knowledge of the taxonomy within the complex, fertility tests are necessary.

Like both normal *H. crustosa* and the Jakutian variety, the fruitbodies of *H. juniperi* often contain living, single-celled, green-algae abundantly, making the sections through the fruitbody look green. Linear basidial repetition occurs in *H. juniperi* as well as in normal *H. crustosa*.

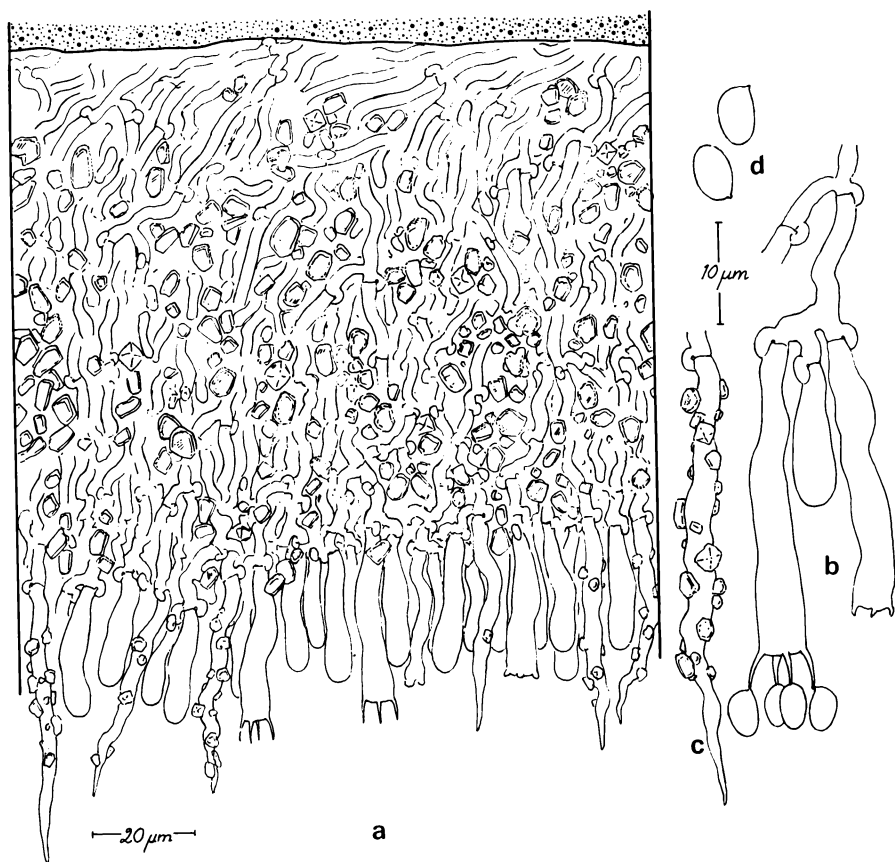


Fig. 545. *Hyphodontia juniperi*. a) section through fruitbody b) basidia c) cystidium d) spores. — S. Sunhede 5230.

Laeticorticium

Laeticorticium. The studies in *Phlebia* has shown us that there is another Nordic species of this genus.

Laeticorticium expallens (Bres.) Erikss. & Hjortst.
n. comb. - *Corticium expallens* Bres., Ann. mycol. 6
p. 43, 1908. - *Phlebia expallens* (Bres.) Parm., Eesti NSV
Tead. Akad. Toim. 16 p. 390, 1967. - *Corticium*
salicicola M. P. Christ., Friesia 5 p. 209, 1956.
- *Hyphoderma salicicola* (M.P. Christ.) M.P. Christensen
Dansk bot. ark. 19 p. 210, 1960.

Fig. 546

Holotype: France, St. Priest, ad truncum *Salicis*
albae, 1907.07.03. Herb. Bourd. n. 4268 (S).

Fruitbody resupinate, closely adnate, effused and often large, 0.1–0.4 mm thick, hymenium layer in the living state ceraceous and when wet watery subhyaline, greyish, sometimes with a violaceous or rosaceous tint, when dried crustaceous, hard, smooth, whitish - greyish - yellowish or in older parts more or less ochraceous; margin determinate, in young, vividly growing specimens pubescent.

Hyphal system monomitic; hyphae thin or in the basal part with slightly thickened walls, 2–3.5 μm wide, richly branched and forming a tough context; clamps present; in older parts of the fruitbody often hyphal encrustations together with lumps of larger crystals; subhymenium thickening; subiculum usually well developed.

Cystidia varying in number, sometimes numerous and as a rule easily found, enclosed or somewhat projecting, 50–100 x 5–9 μm , cylindrical but tapering towards the base, apically obtuse, rounded, thin-walled, with continuous, non-granular contents, not reacting to sulfoaldehyde.

Dendrohyphidia present but often few and difficult to find, not projecting, at the base 2–3 μm wide; lateral branches varying in shape, 1–2 μm wide, and as a rule 2–5 μm long.

Basidia narrowly clavate, when mature 30–50 x 5–7 μm , with 4 sterigmata and basal clamp.

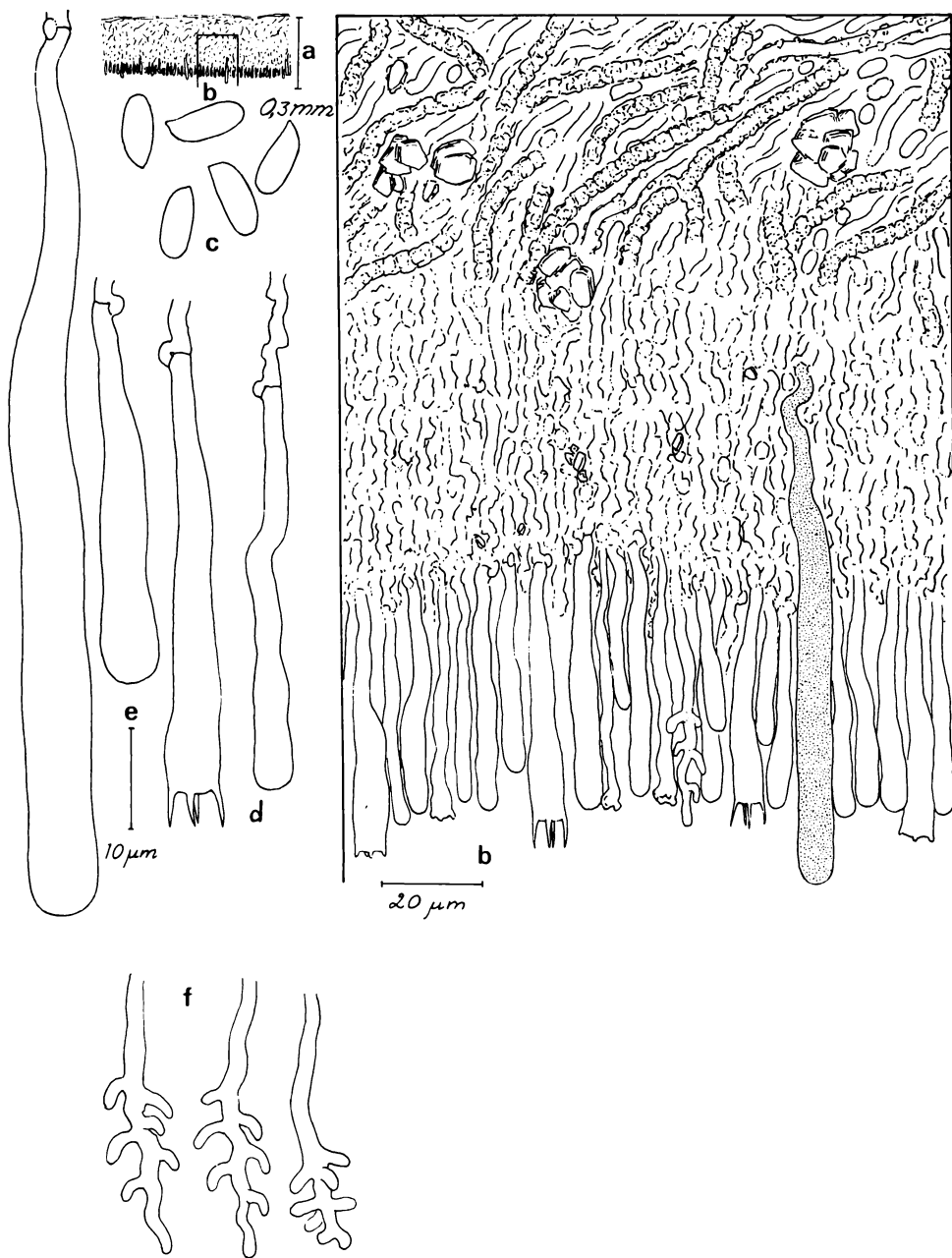


Fig. 546. *Laeticorticium expallens*. a) schem. section b) section through part of fruitbody c) spores d) basidia e) cystidia f) dendrohyphidia. — M.P.Christiansen.

Laeticorticium

Spores narrowly ellipsoid - oblong, more or less obliquely acute towards the apiculus, 6–8 x 2.5–3 μ m, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On bark or decayed wood of deciduous trees (stumps, fallen trunks, and branches) or on living trees in humid localities. In N. Europe found only on *Salix* (as the holotype) but reported by Bourdot & Galzin from many other trees (*Alnus*, *Populus*, *Corylus*, *Prunus*, *Fraxinus*).

Distribution. In North Europe found only in one locality in Denmark (Sjaelland, Ermelunden) and is evidently very rare. The collections from other parts of the world are also few, except in France (Aveyron) where Bourdot & Galzin collected it many times. They report it from all times of the year, esp. summer and autumn on stumps and trunks felled 4 - 5 years earlier. We have further seen material from C. and E. Siberia and from Canada (Br. Columbia and Ontario).

Remarks. The correct place for this characteristic species is evidently *Laeticorticium*. Already Bresadola noticed the resemblance with *Corticium ionides*, now referred to *Laeticorticium*. The presence of dendrohyphidia, the sometimes lilaceous colour, the toughness of the fruitbody as well as the shape of the spores point to this genus. The generic type has no cystidia, but the presence of them must evidently be accepted within *Laeticorticium* as well as in many other genera.

The resemblance with *Hyphoderma* (spores and cystidia) is only superficial.

Together with the type specimen in herb. Bresadola (S) there is another specimen with the same number (4268) but with another date (XII.07) and substrate ("in Alno, vel Populo?").

In the key to *Laeticorticium* (p. 761) *L. expallens* can be found if a third choice is put in under entry 2 as follows:

- | | | | |
|-----|---------------------------------|-------|-----------------------|
| 2 a | With cystidia, spores allantoid | | L. macrosporum |
| 2 b | With cystidia, spores oblong | | L. expallens |
| 2 c | No cystidia, spores ellipsoid | | 3. |

Phanerochaete Karst.

In addition to the earlier treatment of the genus three more species are reported, *Ph. avellanea*, *Ph. chrysosporium* and *Ph. jose-ferreirae*, the latter a result of the *Phlebia*-studies.

Phanerochaete avellanea (Bres.) Erikss. & Hjortst. n. comb. - *Corticium avellaneum* Bres. in Bourd. & Galz., Bull. Soc. Myc. Fr. 27 p. 236, 1911.
- *Corticium lacteum* Fr. ssp. *avellaneum* Bres. in Bourd. & Galz. Hym. de Fr. p. 188, 1928.

Fig. 547

This species differ from *Ph. tuberculata* mainly in having a much thinner subiculum, consisting of wide hyphae, 5–8 μm . The hymenium is pale buff to avellaneous. When dried it is dense and characteristically transversely cracked. The spores are more oblong than in *Ph. tuberculata* with more parallel sides, 5–7 x 2.5–3.5 μm . Basidia as in this species. It seems to grow preferably on dead, fallen stems of big herbs and branches of bushes, preferably during the spring. Not yet found in N. Europe. Specimens determined *C. avellaneum* Bres. by L. Romell do not belong here (see *Phlebia bresadolae*).

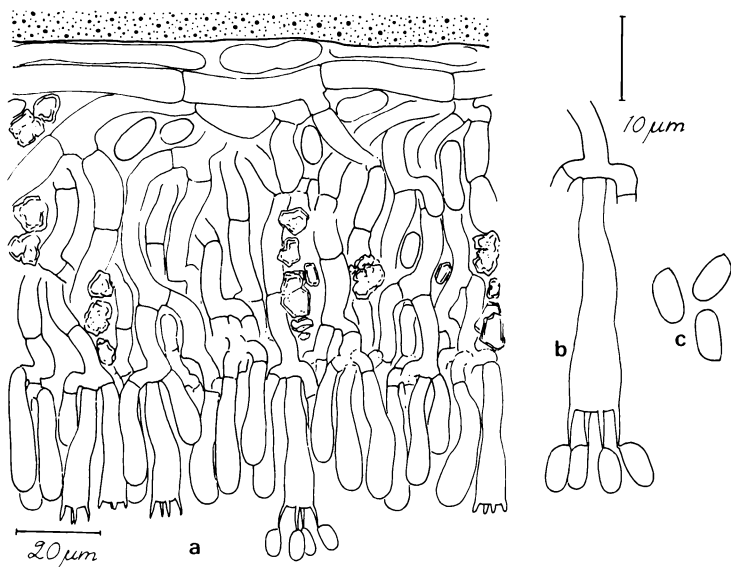


Fig. 547. *Phanerochaete avellanea*. a) section through fruitbody b) basidia c) subicular hyphae d) spores. — Galzin 6977.

Phanerochaete

Ph. chrysosporium Burds. The species is said on p. 993, not to be a member of the Corticiaceae flora of N. Europe. However, H.H. Burdsall has told us in a letter that material of the conidial stage *Chrysosporium* received from chip piles in Sweden at cultural tests appears to be identical with the American material of *Ph. chrysosporium* and the species thus belongs to the Nordic flora.

Phanerochaete flabelliradiata Erikss. & Hjortst. nov. sp. Fig. 548-49

Fructificatio resupinata, effusa, alba vel albida, e principiis granuliformibus formata, dein confluentibus; hymenium subleve — granulatum — subodontioides; margo fibrillosus, ex hyphis flabellate crescentibus formatus; omnes hyphae effibulatae, hyphae basales 3 — 4 μm latae, parallelae, tenuitunicatae, hyphae sub-hymeniales 2.5 — 3 μm latae, perpendiculariter intertextae., tenuitunicatae sed in siccis collapsae, pro parte specie crassitunicatae; cystidia cylindracea, \pm sinuoso-constricta, 60 — 130 x 6 — 12 μm , parietibus subgelatinosis, incrassatis, apicibus tenuitunicatis, in siccis saepe marcidis vel invaginati; basidia clavata, basi saepe collapsa, 17 — 22 x 4 — 5 μm , sine fibulis basalibus; sporae anguste ellipsoides — subobovatae, adaxialiter \pm depressae, 4.5 — 5.5 x 2 — 2.5 μm , tenuitunicatae, glabrae, non-amyloides, non-cyanophilae.

Holotype: L. Ryvarden 17494 (0).

Etymology: flabellum = fan, radiatus = radiate

Fruitbody totally resupinate, adnate, effuse, of medium to fairly large size, pure white or in mature hymenium pale cream-coloured, especially when dried, 0.1 — 0.5 μm thick; hymenium starting from granular primordia but then more or less confluent with a granular surface (subodontioid) as a result; margin very varying, often irregular, usually formed by radially growing hyphae, forming fan-like structures of hyphal strands on the substrate.

Hyphal system monomitric, all hyphae lacking clamps, 2 — 3 μm wide, the basal ones parallel, forming a distinct subicular layer, from which the hymenial part of the fruitbody can easily be detached; subhymenial hyphae mainly vertically intertwined, in the dry material, more or less collapsed and then easily mistaken for thick-walled hyphae.

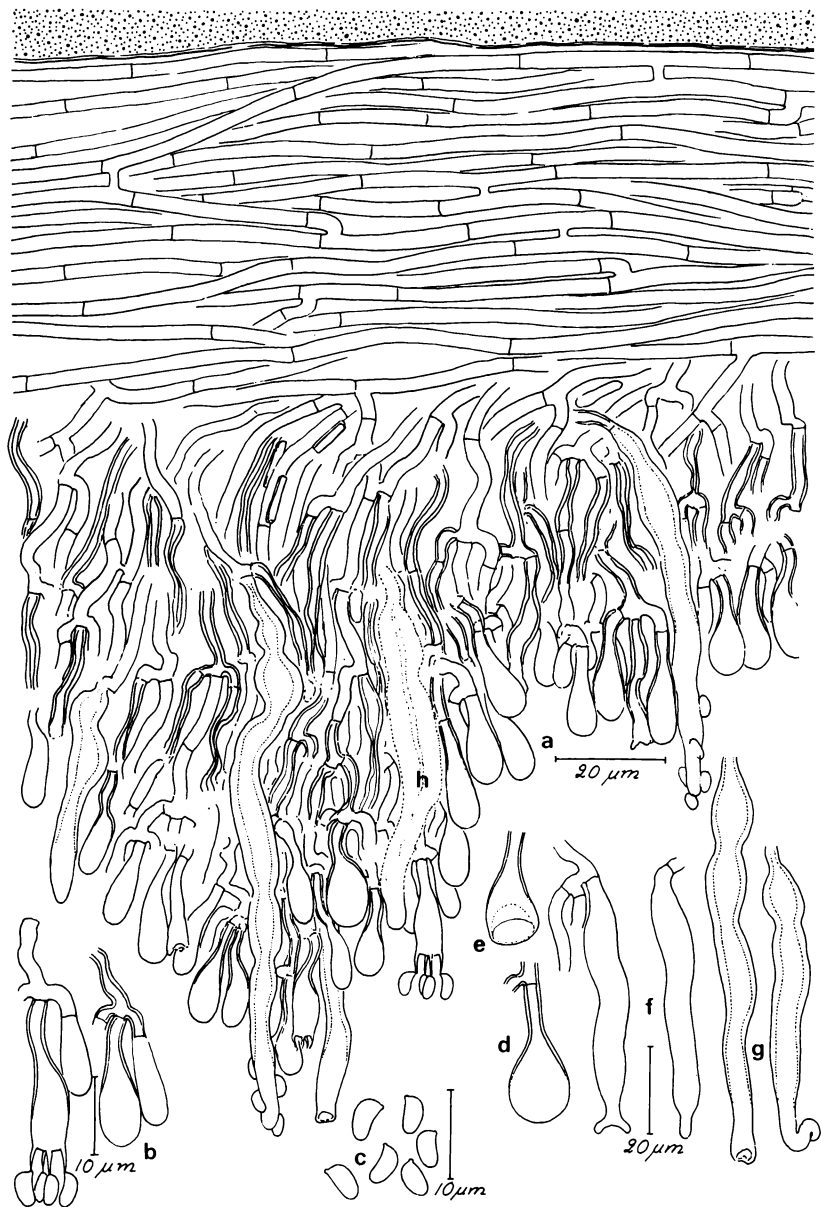


Fig. 548. *Phanerochaete flabelliradiata*. a) section through part of the fruitbody b) basidia c) spores d) cystidioid basidium e) invaginated basidium f) young thin-walled cystidia g) mature cystidia h) old, gelatinized cystidium. — Høgholen 945/77.

Phanerochaete

Cystidia. 60 – 130 x 6 – 12 μm , sometimes difficult to find, in other cases numerous, especially in the apical part of the hymenial grains where they normally can already be seen through a lens (50x), apically thin-walled but in other parts more or less thick-walled, walls of old cystidia swelling both in KOH and Melzer, the apical end in dry material often shrunken or invaginated, quite often with adhering spores.

Basidia 17 – 22 x 4 – 5 μm , clavate, narrow in the basal part, which in old basidia often is empty of protoplasm and more or less collapsed, seemingly with thickened walls, 4 sterigmata, no basal clamps.

Spores 4.5 – 5.5 x 2 – 2.5 μm , narrowly and obliquely ellipsoid – sub-ovate, with the adaxial side straight or more often somewhat concave, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On decayed frondose wood, especially on heaped branches of *Alnus*, *Corylus*, and *Salix*, mostly in humid biotopes.

Distribution. Hitherto found only in Norway and Sweden.

Specimens: Norway: Akershus, Tømte farm, W of Hurdal Lake, 250 m.s.m. 1978-09-28. L. Ryvarden 17494 (holotype). — N. end of Mari-dalvannet. 1979-10-15. E. Johannesen. Hedmark. Flotta. 1977-09-03. E. Høgholen 491/77, — Ringsaker. Dompidal. 1978-05-15. E. Høgholen 30/78; do. 1978-07-19. 341/78; Mariondal. 1978-07-23. 442/78. — Stange, Nordsveodden. 1977-05-14. E. Høgholen 26/77; do. 1977-11-12. 983/77 and 995/77. Telemark. Porsgrunn, Grenland. 1969-10-05. L. Ryvarden. — Selfjord, E. side of Flatdalsvannet. 1970-07-27. L. Ryvarden 6352.

Sweden: Västergötland. Alingsås, Bolltorp, S of Dammsjön. 1968-03-30. K. Hjortstam 14660; Östad par., Djurgården. 1979-09-22. A. Hjortstam 79/399. — Medelpad. Selånger par., Siljeberget. 1980-07-06. S. Sunhede 7413.

The species though quite conspicuous is still rarely found and remarkably with only a few finds from the best investigated parts of Scandinavia. The northernmost locality in Medelpad, is a climatically favoured S. slope with i.a. *Corylus*.

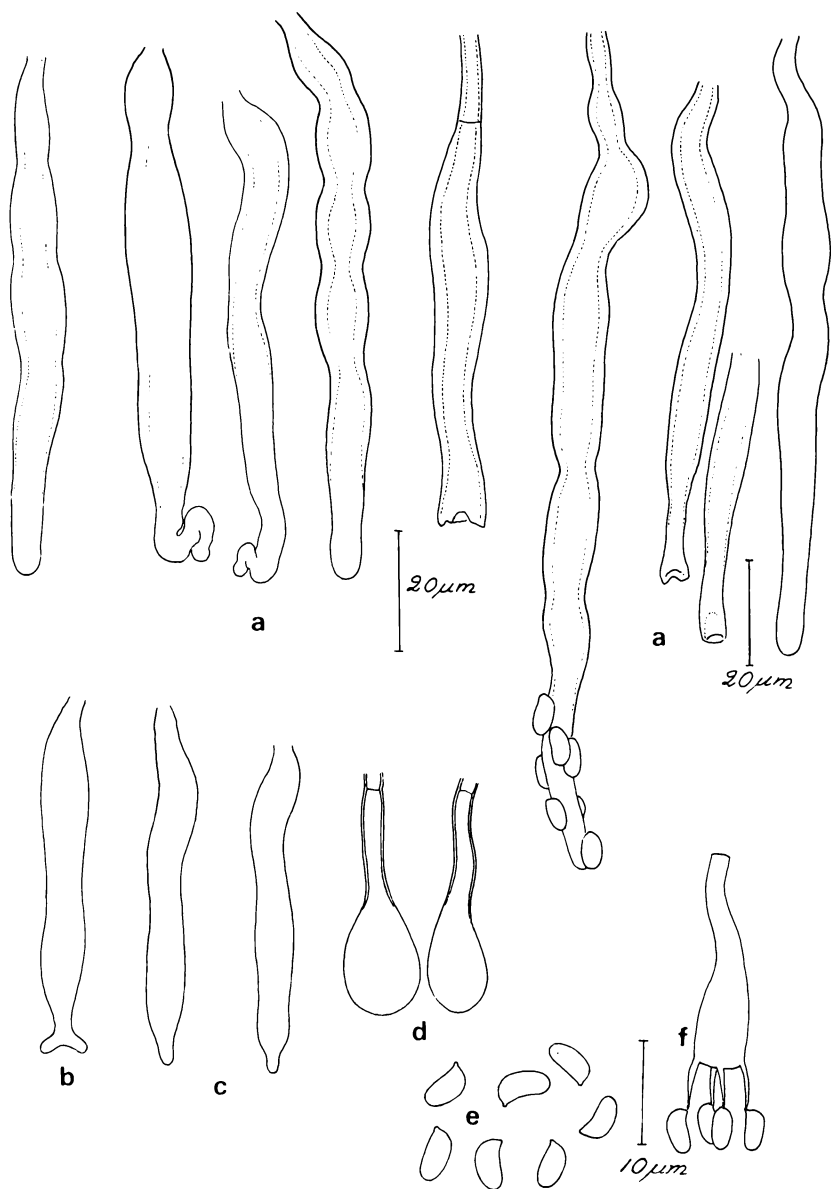


Fig. 549. *Phanerochaete flabelliradiata*. a) cystidia from mature hymenium, some with shrunk or invaginated apicis, and the spores glued to it b, c) cystidia from young hymenium d) cystidioid basidium e) spores f) basidium. — Type specimen.

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Remarks. Even if it is quite characteristic and easily recognized even with the naked eye, the generic position of the new species is not fully clear. It agrees in some respects with *Hyphoderrella*, preferably in the shape of the basidia and the nature of the subodontioid hymenium. The main difference from the type species of this genus is the occurrence of cystidia and the morphology of the spores. At present we prefer to adopt *Phanerochaete* as a somewhat better place instead of the alternative of describing a genus of its own.

Phanerochaete jose-ferreirae (Reid) Reid,

Fig. 550

Acta Bot. Croat. 34 p. 135, 1975.

- *Corticium jose-ferreirae* Reid, Rev. de Biol.

p. 140, 1965. - *Phanerochaete pallida* Parm.,

Eesti NSV Tead. Akad. Toim. 16, p. 388, 1967.

Fruitbody resupinate, orbicular - confluent, adnate or with a slight tendency to separate in the margins, 0.1–0.3 mm thick, smooth, continuous in the wet stage, on drying cracking at least in older parts of the hymenium, varying in colour from white or pale ochraceous to pale orange, fawn or even pale brown in old hymenia; margin abrupt or thinning out, depending on growth circumstances.

Hyphal system monomitic; hyphae without clamps, 2–2.5 μm wide and thin-walled in the hymenium and subhymenium, 3–4(–5) μm and more or less thickened walls in the subiculum; subhymenium thickening, subiculum well developed, composed of mainly horizontal hyphae.

Cystidia none.

Basidia clavate, 25–38 x 4.5–5.5 μm , with 4 sterigmata and without basal clamp.

Spores subcylindrical, 7–9(–11) x 2.3–3(–3.5) μm , hyaline, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On twigs of deciduous trees, mainly on *Salix* but according to Parmasto also of *Aralia*, *Betula*, *Juglans*. In N. Europe collected on *Alnus*, *Betula* and *Salix*.

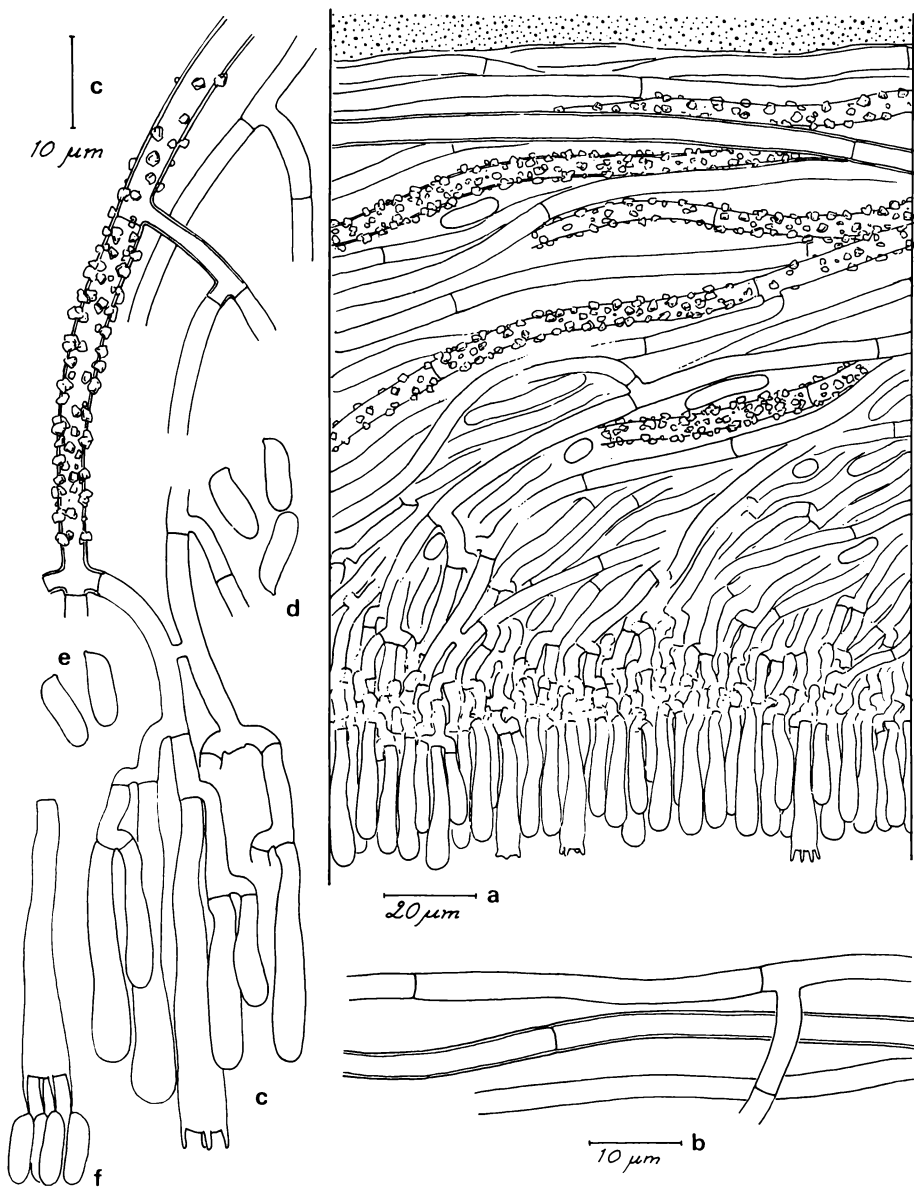


Fig. 550. *Phanerochaete jose-ferreirae*. a) section through fruitbody b) basal hyphae c) hymenial hyphae with encrustation and basidia d-e) spores f) basidia. — a-d) Type of *P. pallida* e-f) type of *P. jose-ferreirae*.

Phanerochaete

Distribution. Reported from Portugal and Yugoslavia by Reid, from Siberia (reg. Chabarovsk and Primorsk) by Parmasto; in N. Europe found 4 times in Norway (Oppland: Øyer and Gausdal, on *Alnus*, *Betula*, and in Poland (Bialowieza and Augustow) on *Salix*).

Remarks. The material is fairly uniform in the micromorphological characteristics, varying only in the density of the texture, thickness of hypha walls and the amount of crystals and encrustation, but to the naked eye it can be divided in three groups a) the Portuguese material of *Ph. jose-ferreirae* b) the Nordic and the Polish material and c) the material of *Ph. pallida*.

The collections differ in colour and in the nature of the margins. The Portuguese material has a white fruitbody and an abrupt, somewhat separating margin; the material from Norway and Poland has a pale buff to light brown hymenium and the margin thins out, and the Siberian material has a pale orange hymenium and the margin is partly abrupt and slightly separating, partly thinning out. The material is too restricted to allow conclusions as to the taxonomical importance of the macro-characters (esp. the colour). The whiteness of the Portuguese material is mainly caused by a richer encrustation than in others, which in its turn is connected with the age of the fruitbody and with the humidity of the locality. Judging from the description the material of *Ph. jose-ferreirae* from Yugoslavia deviates in several respects from the type of the species. In the colour of the hymenium and the nature of the margin it seems to agree quite well with the Nordic and the Polish material.

If *Ph. jose-ferreirae* and *Ph. pallida* should be accepted as different species, it will no doubt be necessary to describe the Nordic - Polish material as a third species. For other species of *Phanerochaete* a rather wide species concept has been necessary and if the same variation in the macro-morphology is allowed in this case, the material studied must be placed in one species.

Phlebia Fr.

Syst. myc. 1 p. 426, 1821; emend. Donk,
Fungus 27 p. 8, 1957.

Fruitbody normally completely resupinate, rarely more or less pileate; hymenium smooth, tuberculate, phlebioid, odontoid, meruloid or poroid; consistency of fruitbodies in the living state ceraceous - subgelatinous esp. in the subhymenial part, in the dried specimens firm membranaceous to corneous; subhymenium growing in thickness; hyphae normally with clamps, thin-walled or with only slightly thickened walls, as a rule embedded in a gelatinous interhyphal matrix; cystidia lacking or present and then thin- or thick-walled, not to strongly encrusted with crystalline or resinous encrustation; basidia normally narrowly clavate, standing in a dense palisade; spores smooth - allantoid to ellipsoid, thin-walled, non-amyloid, non-cyanophilous.

Type species: *Phlebia radiata* Fr.

Remarks. The type species of *Phlebia* Fr. is *Ph. radiata*, and the genus was originally described for species with a radiately folded (phlebioid) hymenium. However, the close relationship between this species and *Corticium lividum* with smooth or tuberculate hymenium, make it necessary to include in the genus also species which do not have the phlebioid hymenium but agree in other respects with *Ph. radiata*. Such characteristics are a waxy-gelatinous consistency, combined with narrow basidia in a dense palissade.

When these lines of relationships are followed up the result is a rather vague circumscription of the genus. This is what was done by Donk (1.c.) and followed by Christiansen (1960), Parmasto (1968), and also with some changes here. The problem gets even worse when cystidial characteristics are involved. *Ph. radiata* and *livida* have now and then thin-walled tubular or subulate cystidia respectively, and such cystidia are quite common in the genus, but then there are species with thick-walled, encrusted (metuloid) or other kinds of cystidia, still agreeing in the consistency, the denseness of the texture and the nature of basidia. The delimitation of the genus is therefore hitherto merely provisional. In this wide sense it includes, besides the original *Phlebia*, mainly *Corticium* sect. *Ceraceae* Bourd. & Galz. and parts of *Peniophora* sect. *Ceraceae* Bourd. & Galz. Non fibulate species are included in cases when there are species which cannot be placed in better defined

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genera, e.g. *Phanerochaete*, such as *Ph. deflectens* and *Ph. viridosalebrosum*, which agree with species of *Phlebia* in all other characteristics.

To subdivide the genus in species groups, such as has been done with some other large genera in this flora, is very difficult and not with certainty possible. *Ph. radiata* could be grouped together with *Ph. rufa* and *Ph. livida*, one group could be formed by *Ph. cretacea*, *georgica*, *phlebioides*, *segregata*, *subcretacea*, and *subulata*, one by *Ph. diffissa* and *firma*, one by *Ph. cornea* and *longicystidia*, one by *Ph. bresadolae*, *centrifuga*, and *nitidula*, while *albida*, *cremeoalutacea*, *deflectens*, *femsioeensis*, *griseo-flavescens*, *lindtneri*, *martiana*, *queletii*, *serialis*, *subserialis* and *tristis* stay more or less isolated. For *Ph. queletii* a position in *Myoacia* could even be discussed, for *Ph. tristis* maybe in *Hyphoderma*.

Key to the species:

1. Hymenium meruloid — poroid 2
1. Hymenium smooth, tuberculate, phlebioid, odontoid 3
2. With numerous encrusted cystidia 15. *Ph. lindtneri*
2. Without or with few smooth hymenial cystidia 24. *Ph. rufa*
3. Hymenium distinctly phlebioid 4
3. Hymenium smooth or tuberculate — odontoid 7
4. Cystidia with crystalline encrustation 18. *Ph. martiana*
4. Cystidia without or with resinous encrustation 5
5. Cystidia obtuse with abundant, resinous encrustation 10. *Ph. femsioeensis*
5. Cystidia none or few, tubular 6
6. Cystidia few, fruitbody red — violaceous, spores 4,5 — 5 x 1,5 — 2 μ m 23. *Ph. radiata*
6. Cystidia none, fruitbody grey — brown, spores 7-9 x 2,5 — 3 μ m 4. *Ph. centrifuga*
7. Hyphae without clamps except some on basal hyphae 8. *Ph. deflectens*
7. All hyphae with clamps 8
8. With cystidia 9
8. Without cystidia 27
9. Cystidia with crystalline encrustation 10
9. Cystidia naked or with resinous encrustation 12

- 10. Hymenium smooth 11
- 10. Hymenium odontoid 22. *Ph. queletii*
- 11. Cystidia cylindrical, encrustation mainly resinous,
spores $6 - 9 \times 4 - 4.5 \mu\text{m}$ 17. *Ph. longicystidia*
- 11. Cystidia conical, encrustation solely crystalline,
spores $3 - 4.5 \times 2 - 2.5 \mu\text{m}$ 6. *Ph. cremeo-alutacea*
- 12. Old cystidia with abundant resinous encrustation 13
- 12. All cystidia naked or with sparse encrustation 14
- 13. Spores ellipsoid, $2 - 2.5 \mu\text{m}$ wide 10. *Ph. femsioeensis*
- 13. Spores allantoid, $1.5 - 1.8 \mu\text{m}$ wide 26. *Ph. serialis*
- 14. Cystidia subulate 15
- 14. Cystidia obtuse 22
- 15. Spores subglobose — ellipsoid 30. *Ph. subulata*
- 15. Spores (sub)allantoid 16
- 16. Cystidia $6 - 10 \mu\text{m}$ wide 17
- 16. Cystidia $3 - 4 \mu\text{m}$ wide 19
- 17. Cystidia thick-walled, spores cylindrical, fruitbody
whitish — greyish 25. *Ph. segregata*
- 17. Cystidia thin-walled, spores narrowly ellipsoid,
fruitbody not whitish 18
- 18. Hyphal texture rather loose with \pm distinct
hyphae 28. *Ph. subochracea*
- 18. Hyphal texture dense with indistinct
hyphae 20. *Ph. ochraceofulva*
- 19. Spores $6 - 8 \mu\text{m}$ long, fruitbody ochraceous ... 29. *Ph. subserialis*
- 19. Spores $4.5 - 5.5 \mu\text{m}$ long 20
- 20. Fruitbody whitish 21. *Ph. phlebioides*
- 20. Fruitbody reddish — violaceous — brown 21
- 21. Fruitbody \pm tuberculate, reddish — violaceous,
cystidia few 16. *Ph. livida*
- 21. Fruitbody smooth, brown, cystidia numerous 3. *Ph. cacao*
- 22. Cystidia capitate or at least subcapitate 23
- 22. Cystidia not capitate 24
- 23. Spores $6 - 9 \times 1.3 - 2 \mu\text{m}$ 7. *Ph. cretacea*
- 23. Spores $4.5 - 5 (-6) \times 1.8 - 2.2 \mu\text{m}$ 12. *Ph. georgica*
- 24. Cystidia thick-walled when mature 25
- 24. Cystidia thin-walled 26

Phlebia

- 25. Spore length less than 2 x width, no chlamydospores,
cystidia not encrusted 5. *Ph. cornea*
- 25. Spore length more than 2 x width, chlamydospores
in old fruitbodies, cystidia as a rule encrusted 27. *Ph. longicystidia*
- 26. Spores allantoid, ab. 2 μm wide 31. *Ph. tristis*
- 26. Spores subfusiform, ab. 3 μm wide 13. *Ph. griseoflavescens*
- 27. Spores cylindrical — allantoid, adaxial side
straight or concave 28
- 27. Spores narrowly ellipsoid — subfusiform, adaxial side
straight or slightly convex 33
- 28. Spores less than 2 μm wide, distinctly
curved 27. *Ph. subcretacea*
- 28. Spores more than 2 μm wide, straight or slightly
curved 29
- 29. Fruitbody more or less pileate, white or whitish —
yellowish 1. *Ph. albida*
- 29. Fruitbody totally resupinate 30
- 30. Spores ab. 5 μm long, fruitbody when dry corneous 16. *Ph. livida*
- 30. Spores 6 — 8 μm long, fruitbody not corneous 31
- 31. Spores straight, on *Salix* branches (see also
Ph. albida) 19. *Ph. nitidula*
- 31. Spores \pm curved 32
- 32. Fruitbody whitish, no spores sigmoid 9. *Ph. diffissa*
- 32. Fruitbody ochraceous, some spores sigmoid 11. *Ph. firma*
- 33. Spores less than 5 μm long 14. *Ph. lilascens*
- 33. Spores 7 — 8 μm 34
- 34. Spores fusiform, tapering towards the base 13. *Ph. griseoflavescens*
- 34. Spores ellipsoid, with rounded base 2. *Ph. bresadolae*

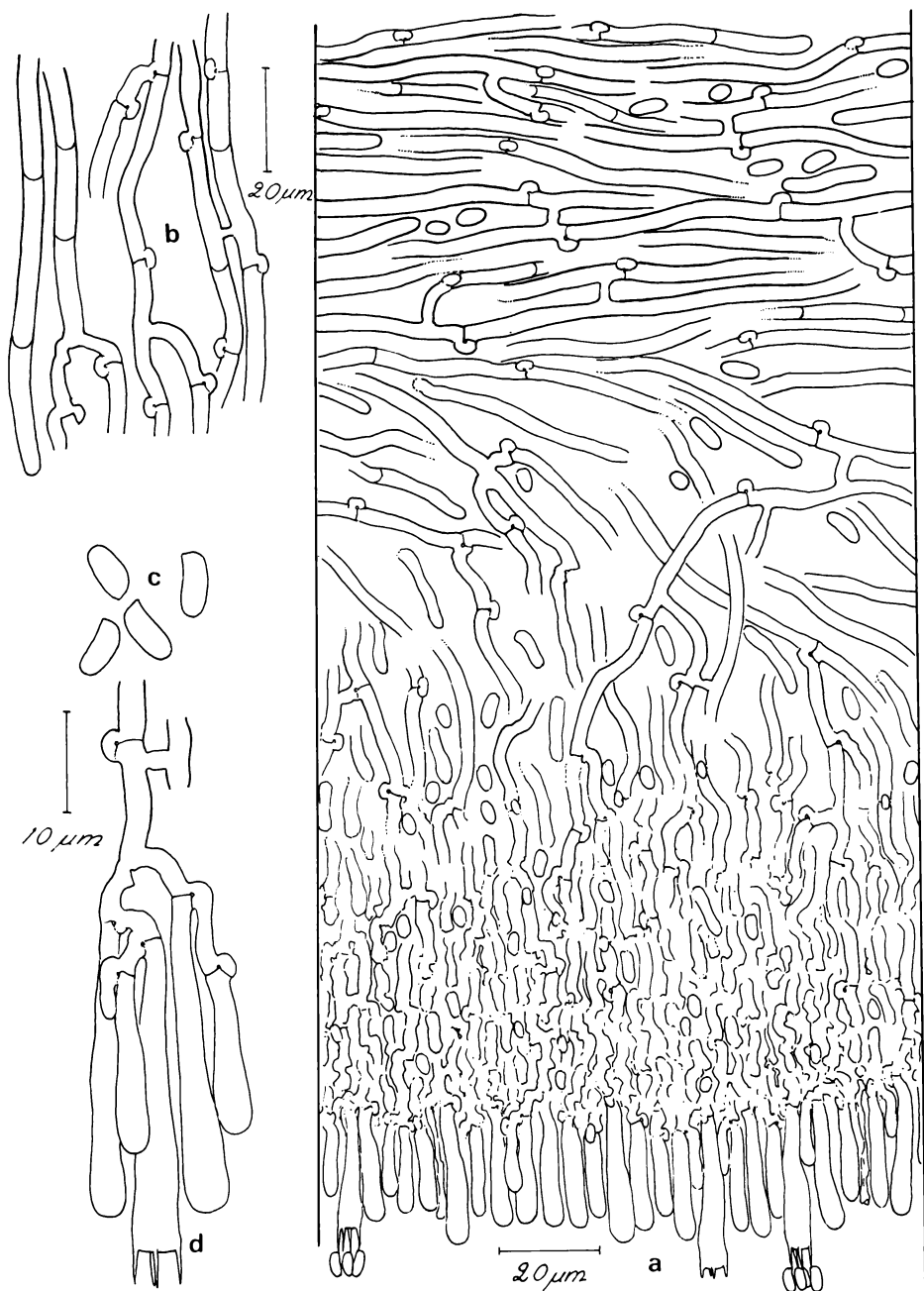


Fig. 551. *Phlebia albida*. a) section through fruitbody b) hyphae c) spores d) basidia. — Ryvarden 17498.

Phlebia**1. *Phlebia albida* v. Post in Fr.**

Fig. 551-53

Monogr. Hym. Suec. II p. 280, 1863.

- *Stereum subcostatum* Karst., Hedw. 20 p. 178,
1881; Bidr. Känned. Finl. Nat. Folk 37 p. 124,
1882.

Type specimens: *Phlebia albida* v. Post; Östergötland,
Skedevi par., Rejmyra, 1862.11.05. H.v. Post (S).

- *Stereum subcostatum* Karst.; Tavastia austr.,
Tammela, Mustiala, ad ram. deject. arbor. frond.,
1881.10.10. P.A. Karsten (herb. Karst. 1367, H).

Fruitbody normally resupinate, orbicular and then rather small, 2–4 cm in diameter, often confluent and larger, with finely fimbriate margin and radially venose or more or less tuberculate hymenium, when fresh apparently white or yellowish but in the herbarium often darkening to yellow, orange, brownish or even violaceous; sometimes subpileate or even pileate with whitish, smooth or uneven to radiate-stri-gose upperside; the living fungus soft, pliable, when dried brittle.

Hyphal system monomitic; hyphae thin-walled or in the subiculum with slightly thickened walls, 3–4 μm wide, with anastomoses and clamps, in the subhymenium vertical, densely united into a ceraceous tissue, in the subiculum (trama) horizontal, more loosely intertwined.

Cystidia none.

Basidia clavate, 25–32 x 4.5–5 μm , with 4 sterigmata, 4–5 μm long, and basal clamp.

Spores (5)6–7(8) x 2.5–3.5 μm , narrowly ellipsoid to suballantoid, adaxial side straight to slightly concave, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. In deciduous woods, on fallen or sometimes on still attached, dead branches, several finds on *Alnus*, *Betula*, *Corylus*, *Fagus*, *Quercus*, *Salix*, *Sorbus* but rarely on coniferous wood (*Pinus*, *Picea*).

Distribution. Collected several times in Sweden and Finland, and seems to be more or less continental in Norway, but doesn't seem to be known from Denmark. In Sweden it is found from Skåne (Hallands Väderö) to N. Lapland where it reaches the subalpine deciduous forest. It doesn't

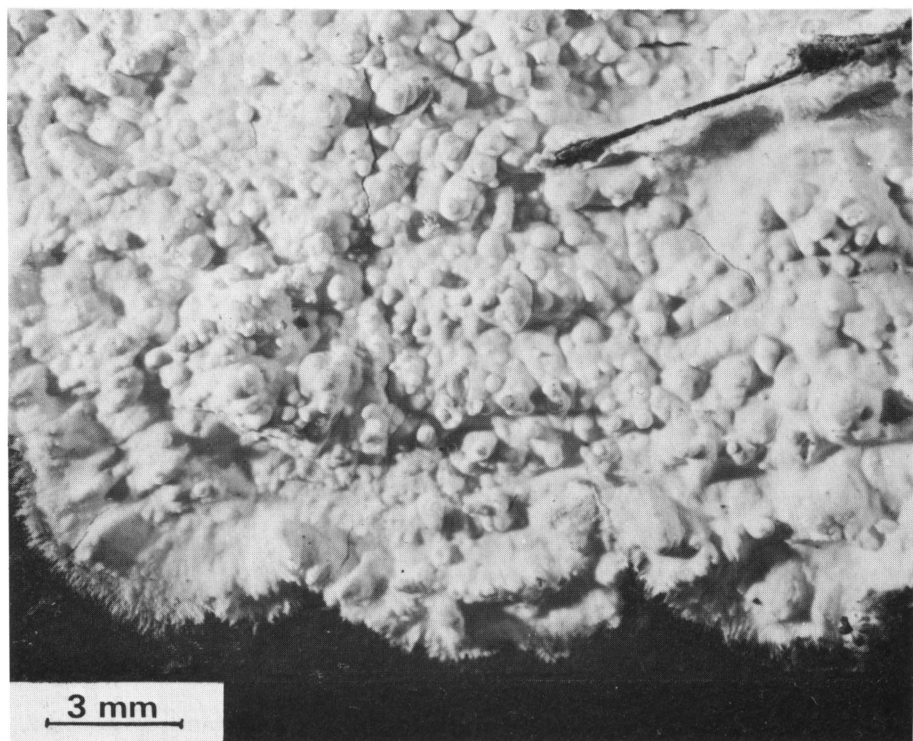


Fig. 552. *Phlebia albida*. Part of freeze-dried fruitbody. — Ryvarden 17498. Photo T. Hallingbäck.

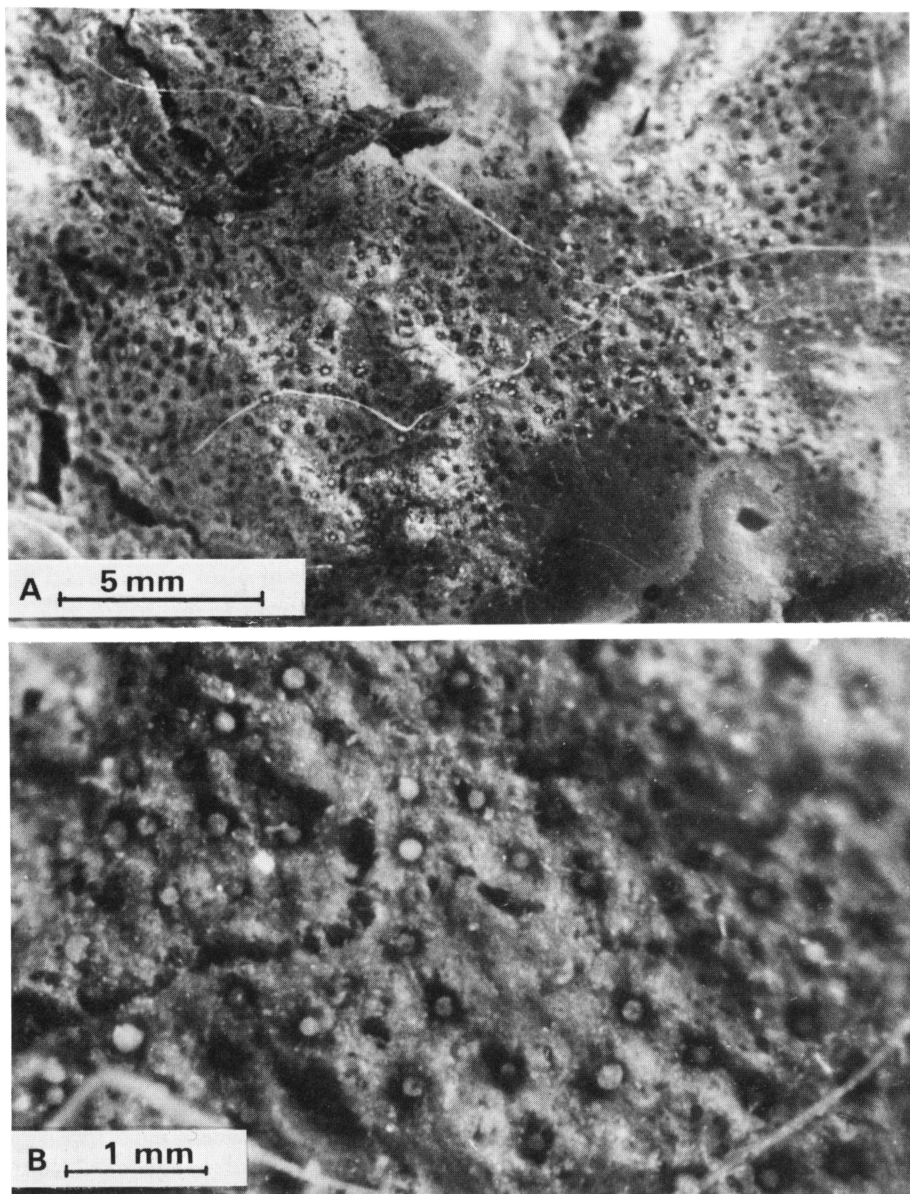


Fig. 553. *Phlebia albida*. Part of type, showing the parasite *Nectriella queletii*.
Photo T. Hallingbäck.

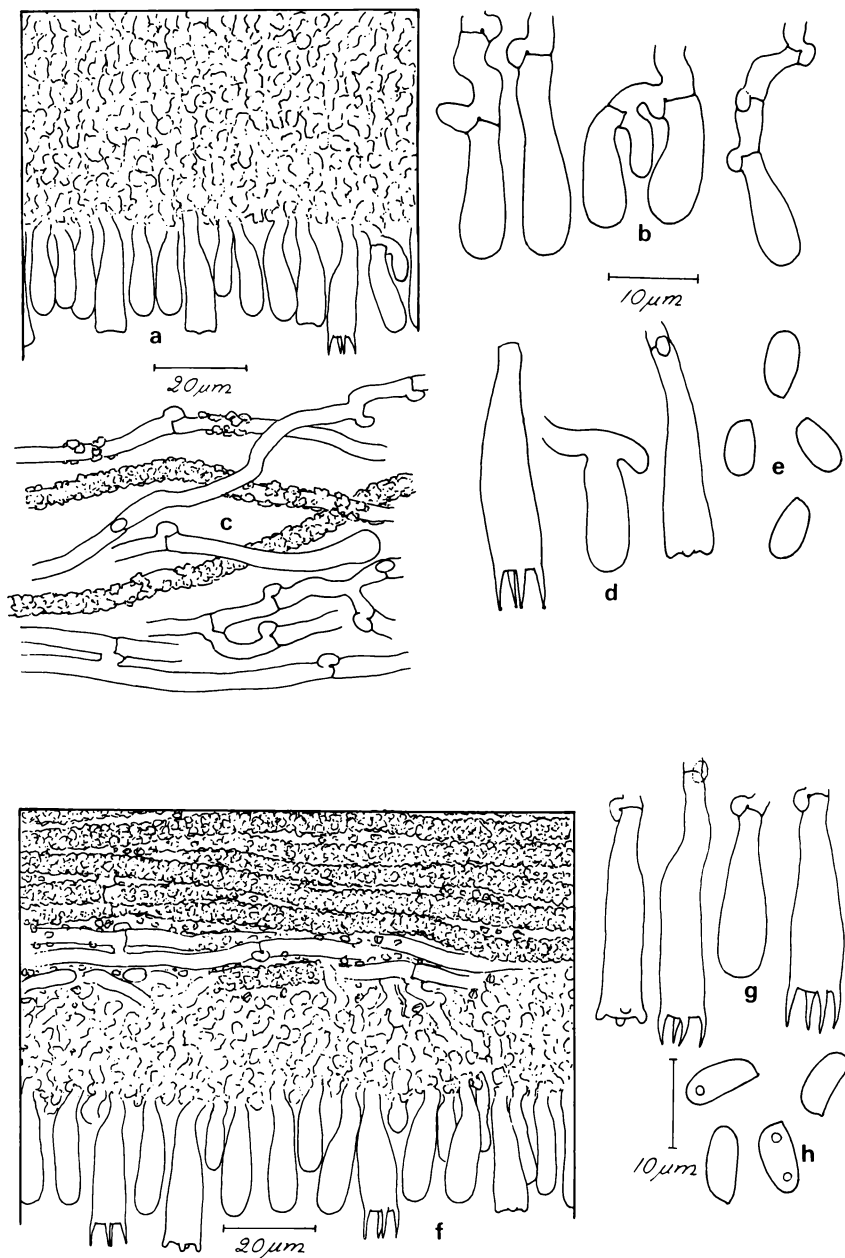


Fig. 554. *Phlebia bresadolae*. a, f) sections through fruitbody b, d, g) basidia c) hyphae e, h) spores. — a-d) Hallenberg 22650, f-h) P.A. Karsten 773.

Phlebia

seem to be common anywhere. Most of the Swedish collections are from the E. and N. parts. Outside Scandinavia it is reported from France, but has very likely a wide distribution.

Remarks. The species name *Ph. albida* has often been used in a confusing way, e.g. for *Ph. centrifuga*. Bourd. & Galzin knew the species well under the name *C. subcostatum*. Type material shows that *Ph. albida* is the correct name for the species as it is here described. It is easily recognized thanks to its light-coloured fruitbody, the lack of cystidia and its subiculum not being gelatinous. The colour of the hymenium is very variable, at least in the herbarium material. Old specimens with gelatinized subhymenium may even, when dried resemble *Ph. radiata*.

Both the type of *Ph. albida* and that of *C. subcostatum* bear fruitbodies of a parasitic pyrenomycete, *Nectriella queletii* Karst. Its small fruitbodies are seen first as small dots, then as small pits with central ball of spores, which are 2-celled. In this characteristics it agrees with the genus *Hypochrea* and its relatives. Karsten reports (Känned. Finl. Nat. Folk 47 p. 397, 1889) that he had not found a single specimen of *Stereum subcostatum* without the parasite. In the Swedish material we have seen it only in the type of *Ph. albida*.

The holotype of *Phlebia canadensis* W. Br. Cooke, Mycologia 48 p. 398, 1956, agrees with *Phlebia albida* in all respects but for the size of the spores, which are somewhat smaller (4.5 x 2-2.5 μ m). It seems to be conspecific.

2. *Phlebia bresadolae* Parm.

Fig. 554

Eesti NSV Tead. Akad. Toim. Biol. 16, 1967: 4 p. 390. - *Corticium deflectens* s. Bres., Ann. mycol. I p. 94, 1903. Not *C. deflectens* (Karst.) Karst., Bidr. Känned. Finl. Nat. Folk 48 p. 414, 1889.

Fruitbody resupinate, closely adnate, in the dry state membranaceous, hymenium uneven, somewhat pruinose, cracked in pieces on drying, sordidly yellow - greyish - pale ochraceous, 0.1–0.2 mm thick; when wet and alive apparently ceraceous, more or less tuberculate; margin indeterminate or finely fimbriate.

Hyphal system monomitic; hyphae 2–4 μ m wide, thick-walled, with clamps at all septa; subhymenial hyphae vertical, richly branched and

densely united into a ceraceous tissue; subicular hyphae parallel to the substrate, more or less encrusted.

Cystidia none.

Basidia clavate, normally apical, in young hymenia few lateral ones observed, 20–30 x 5–6 μm , with 4 sterigmata, 4–5 μm long, and basal clamp.

Spores ellipsoid, 6–8.5 x 3–3.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On bark and decayed wood of fallen trunks and branches, in N. Europe found only on *Populus tremula*.

Distribution. Rare species with few localities in S. Finland (Tavastia austr.), S., C. and E. Sweden (Skåne, Närke, Stockholm) and inner Norway (Hedmark). The specimens from Stockholm were found under the name *Corticium avellaneum* Bres., det. Litschauer.

Remarks. In the microscope quite close to *Ph. centrifuga* and differs mainly in the thinner subiculum, the shorter basidia and the broader spores. *Ph. centrifuga* is a much bigger and thicker species and grows on *Picea*, while in N. Europe *Ph. bresadolae* is, so far known, restricted to *Populus tremula*.

There remain some problems as to the nomenclature. Bresadola, who had received two specimens collected in Poland by Eichler, identified them with a specimen of *Grandinia deflectens* Karst., which P.A. Karsten had sent to him. Karsten had, however, used *G. deflectens* for at least three different species, and the specimen sent to Bresadola was not the original *G. deflectens*. Parmasto, aware of this misapplication, made the new name *Ph. bresadolae* for Eichler's species. Eriksson had earlier (1950) observed the heterogeneity of Karsten's collections and made the provisional name *Corticium fennicum* for this species. Parmasto did not make a new description of the new species, why the protologue still is Bresadola's description of Eichler's material and the lectotype should therefore be chosen among the two specimens (syntypes) mentioned by Bresadola (one on *Salix* and one on *Rhamnus frangula*). None of these specimens exist in the Bresadola herbarium (S). It is therefore not quite sure that they really are identical with the Nordic species on *Populus*. A solution of the problem could be to choose as lectotype the Karsten material in herb. Bresadola, which also is a syn-

Phlebia

type. This is, however, a small duplicate and it would be still better to choose the original collection in herb. Karsten (n. 773, 774, H.). This solution should fix the name, even if Eichler's material, when refound, should prove to belong to a different species, which in such case should be given a new name. Bresadola very likely sent Eichler's specimen on *Salix* to Bourdot, who (in Hym. de France p. 217, 1928) recognized the species as different from *G. deflectens* s. str. and refers to specimens from Karsten and Eichler, but also to collections from France (on *Populus*, *Salix*, *Corylus*, *Quercus*, *Fagus*, *Genista*). We have not studied the French material and don't know if it really is the same species.

As this material may solve the question if there is one or two species involved, we must refrain from definite choice of lectotype, until it is examined. If the French material appears to be identical with the Nordic specimen on *Populus*, it is very likely that the Polish material also was the same. Also in this case Karsten's material as a lectotype for *Ph. bresadolae* gives the desired stability to the name.

3. *Phlebia cacao* (Karst.) Erikss. & Hjortst.

Fig. 555

nov. comb. - *Xerocarpus cacao* Karst.,
Hedw. 29 p. 271, 1890.

Fruitbody resupinate, closely adnate, elongate-effused, 0.1–0.2 mm thick, dark cocoa-coloured, smooth, transversely cracked; margin indeterminate, thinning out.

Hyphal system monomitric; hyphae ab. 2 μ m wide, with clamps, thin-walled; vertically arranged in the subhymenium, densely united and with a rich resinous, yellow-brown encrustation; subicular hyphae few, forming a thin layer next to the wood, 3–5 μ m wide, partly with slightly thickened walls; similar hyphae in the wood.

Cystidia subulate, thin-walled, 50–60 x 3–4 μ m, projecting 30–40 μ m, often bearing an apical, rounded, yellow-brown, resinous encrustation.

Basidia subclavate, 20–25 x 4–5 μ m, with 4 sterigmata and basal clamp.

Spores thin-walled, smooth, allantoid, 5–6 x 1.5–2.5 μ m.

Habitat and distribution. Found only once. in Finland: Tavastia austr., Tammela, Mustiala, in trunco Pini. 1890.10.31. P.A. Karsten (herb. Karsten n. 1394, H).

Remarks. As it has only been found once it could be supposed that the species is only an aberrant form of some other taxon, but it doesn't seem to agree fully with any, and therefore we have to report it as a species of its own.

It is close to *Ph. livida* but differs in the colour of the fruitbody, in the somewhat narrower, more allantoid spores, more numerous cystidia, the rich resinous encrustation of the hyphal tissue as well as the resinous encrustation of the cystidia.

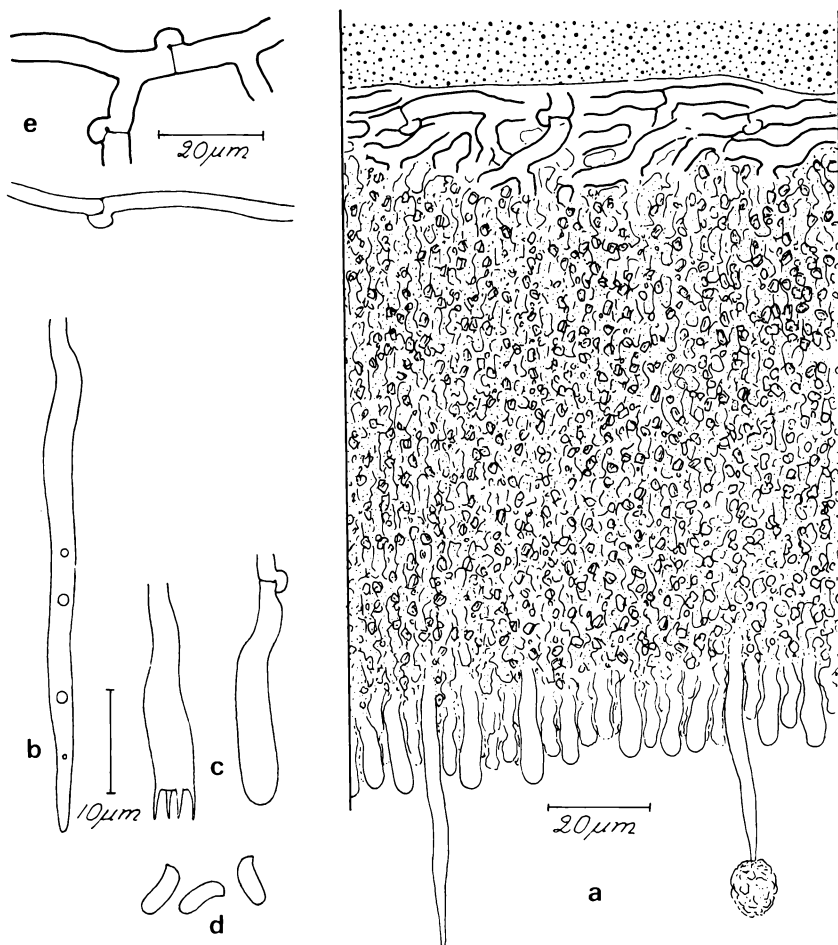


Fig. 555. *Phlebia cacao*. a) section through fruitbody b) cystidium c) basidia d) spores e) hyphae. — Karsten (holotype).

Phlebia

Fig. 556-58

4. *Phlebia centrifuga* Karst.

Medd. Soc. Fauna Fl. Fenn. 6 p. 10, 1881.

— *Phlebia mellea* Overh., Mycologia 22 p. 241, 1930— *Phlebia macra* Litsch in Pilat, Bull. Soc. Myc. France 49 p. 288, 1933; Litsch. & Lohwag; Fungi sel. exs. eur. n. 169. — *Phlebia sub albida* Wm. B. Cooke, Mycologia 48 p. 395, 1956.

Fruitbody resupinate, adnate, orbicular - confluent and finally widely effused, in the living state first ceraceous and whitish, then gelatinous, watery grey and with age darkening to violaceous-grey, often with patches of rose or brownish colours, hymenium densely and irregularly papillose and partly radially or unevenly wrinkled; margin whitish, fibrillose-stri-gose; the dried fruitbody darkening to brownish with an irregular yellow-ish or ochraceous pattern, smooth, brittle and sometimes loosening from the margins; fruitbody rarely reflexed - subpileate with whitish upperside.

Hyphal system monomitic; all hyphae provided with clamps, hyaline except portions of hyphae in old fruitbodies, esp. next to the wood, which may be brown, those of the subhymenium 2–3 μm wide, thin-walled, richly branching and forming a densely conglutinate tissue; those of the subiculum wider, 3–5 μm , parallel to the substrate, often forming two discernible layers, as in the part next to the subhymenium the hyphae use to be provided with a grainy encrustation which is not the case with the hyphal layer next to the substrate; lumps of crystal matter often occur in the tissue of old fruitbodies; on the underside, next to the substrate, there is as a rule a tomentum of loosely and irregularly intertwined hyphae, slightly thick-walled, 4–5 μm wide, often with a brown pigmentation; the presence of these hyphae explain the tendency of the fruitbody, when dried, to be detachable, at least in pieces.

Cystidia none.

Basidia narrowly clavate, 25–35 x 5–6 μm , with 4 sterigmata and basal clamp.

Spores narrowly ellipsoid - sub-cylindrical, adaxial side straight or only slightly concave, 6.5–9 x 2.5–3 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

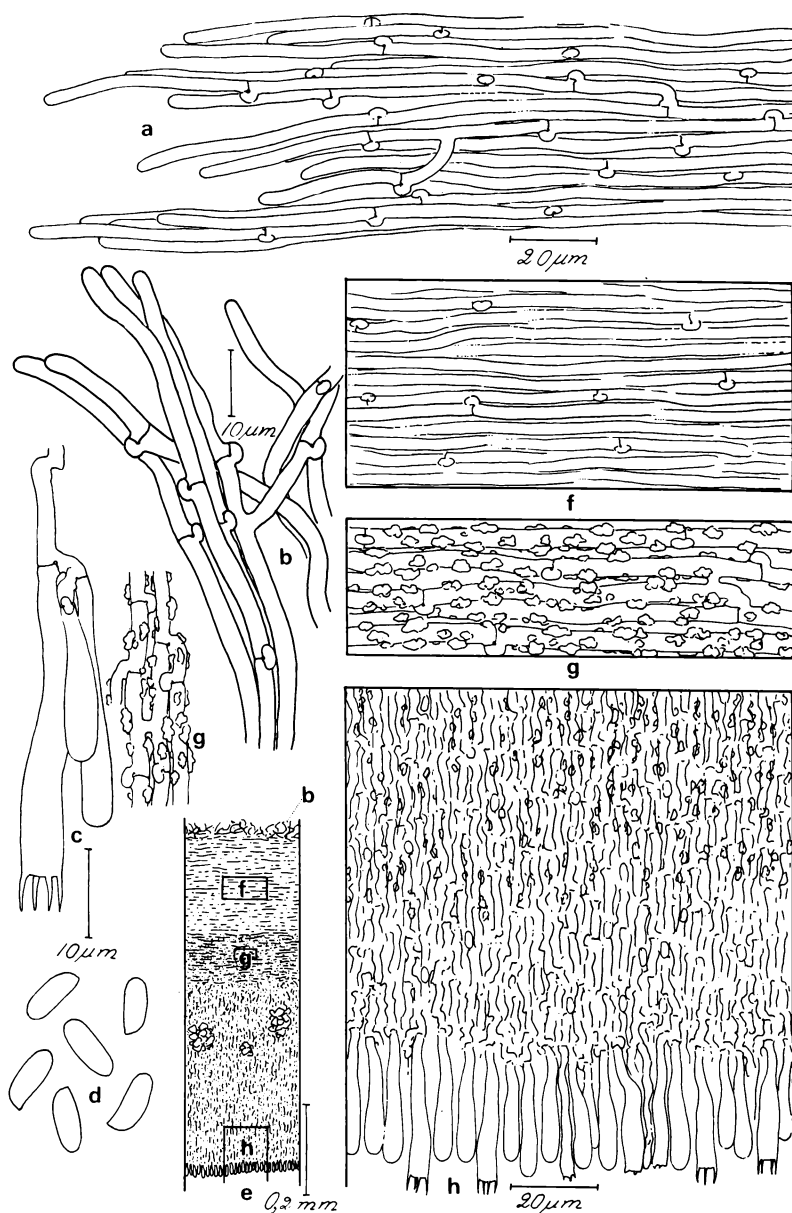


Fig. 556. *Phlebia centrifuga*. a) marginal hyphae b) hyphae from upperside of fruitbody c) basidia d) spores e) schematic sections showing situation of f, g, and h f, g) sections through the two layers of subiculum h) through hymenium and part of subhymenium. — J. Eriksson 9616.

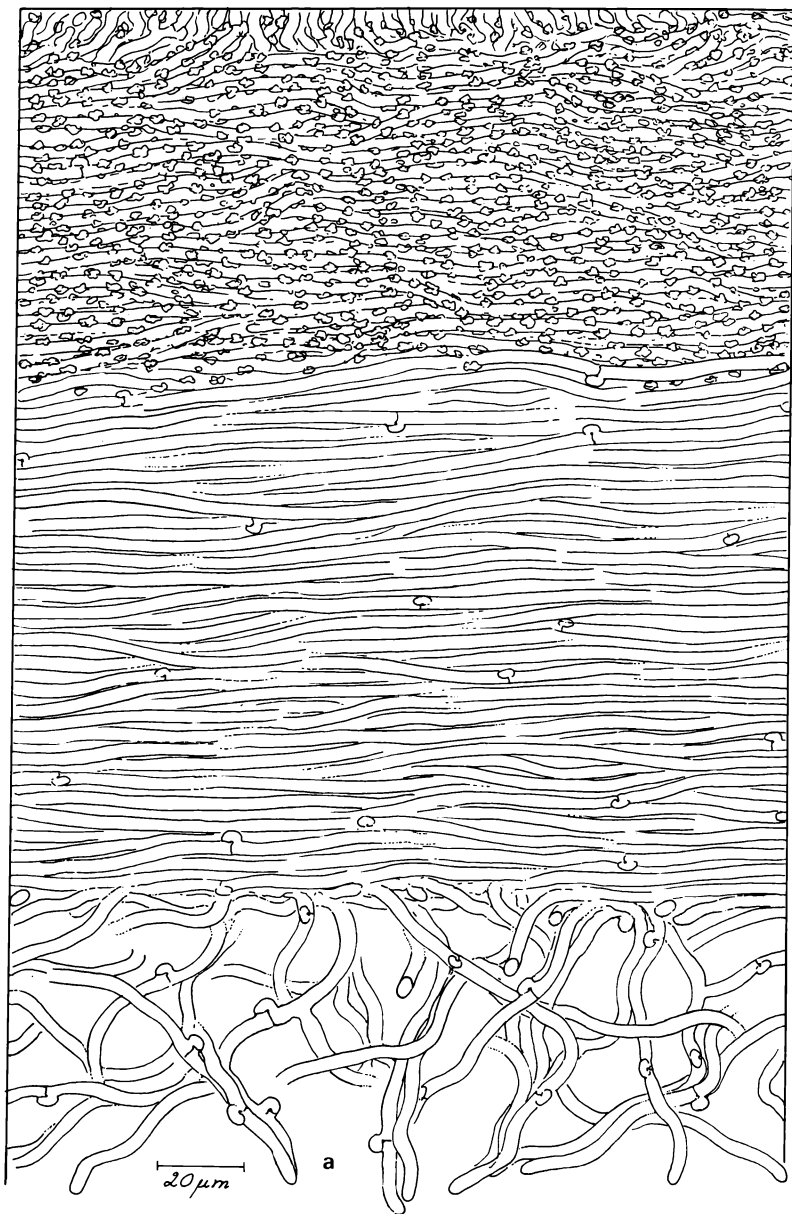


Fig. 557. *Phlebia centrifuga*. Section through subiculum and tomentum hyphae on the upperside of fruitbody. — J. Eriksson 9619.

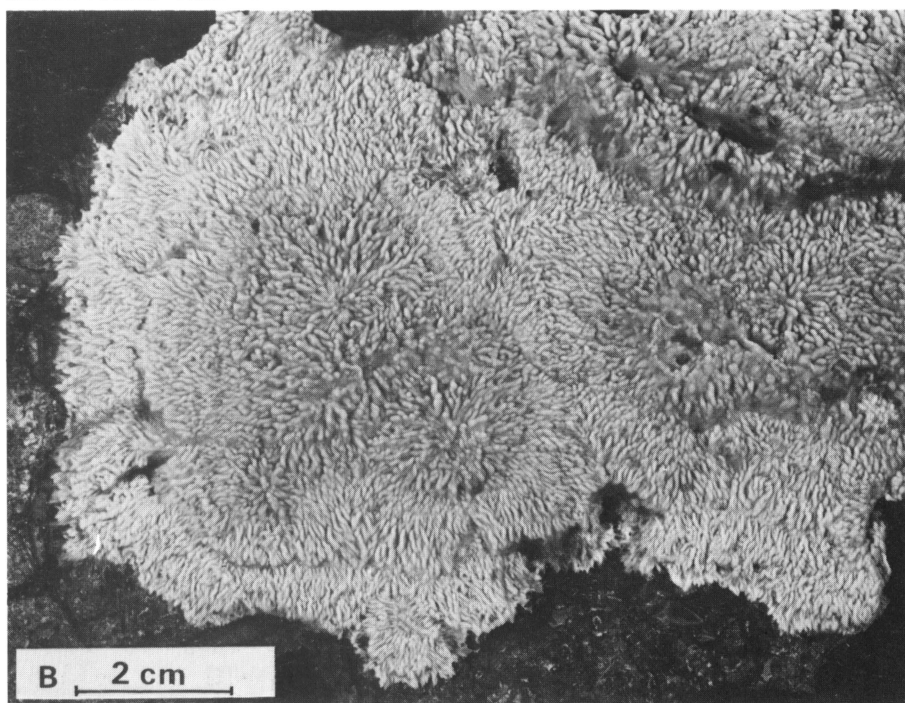
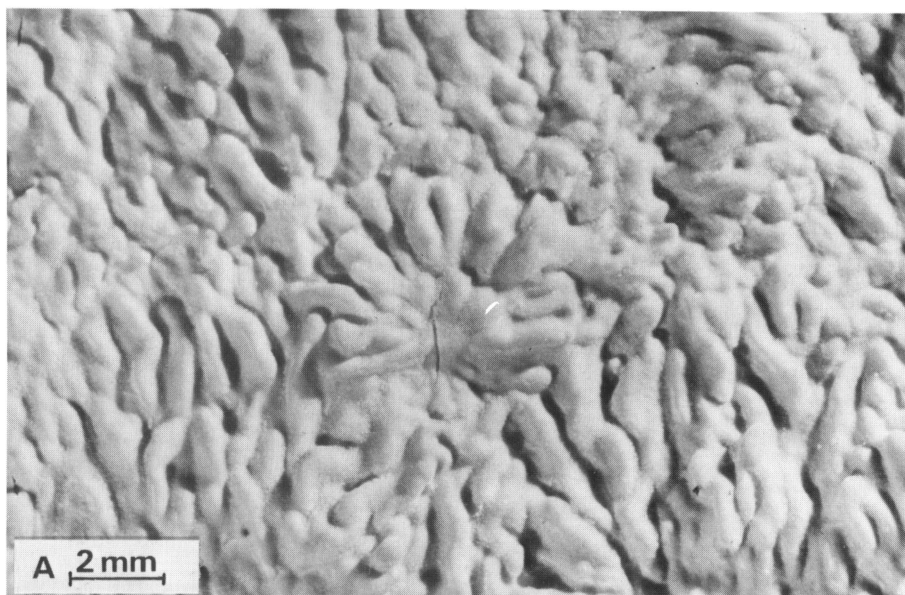


Fig. 558. *Phlebia centrifuga*. a) and b) living fruitbody. — Hjortstam 11355. Photo T. Hallingbäck.

Phlebia

Habitat. In old spruce forests, on undersides of fallen trunks and sides of stumps, mainly in normal *Vaccinium-Hylocomium* forests, but also in herb-mixed spruce forest. In virgin forests of N. Scandinavia it is one of the characteristic species, and also the few finds from S part of Scandinavia show its preference for untouched nature.

Distribution. Common in old spruce forests in N. Scandinavia but in the S. parts, where the area of preserved forests is very restricted. It shows a preference for the local continental areas and it is not found in the Trøndelag-Jämtland region, known for its suboceanic climate. In S. Sweden it is found only in Småland (N.Kvill nat. park), Östergötland (Omberg forest reserve) and Uppland (Fiby forest reserv). Besides there are two old collections from the Mälaren region (Ridö archipelago 1845, and Flottsund, S. of Uppsala, 1873). The situation is the same in Finland. There are several collections from N. Finland, while from S. Finland we know of only one, P. A. Karsten's collection in Mustiala in 1880 (Karsten: parcissime!).

In Norway it is known only from the local continental SE part (Oppland, Hedmark, Akershus). Outside N. Europe known from Austria, Sovjet and, if *Ph. mellea* is included, in N. America.

Remarks. Easily recognized species, esp. thanks to its vigorous growth. It changes drastically on drying, from being a light-coloured, very juicy fruitbody with a very papillose and wrinkled surface, to dark-coloured, more or less smooth. Its closest relative in the genus is *Ph. bresadolae*, which is a much smaller fungus, with thinner subiculum and growth in N. Europe on *Populus tremula*.

Phlebia mellea Overh. agrees in most but not all respects. It is usually a smaller and thinner species and the hymenium is distinctly radially folded, while *Ph. centrifuga* is strikingly papillose in the living state with irregular and less obvious wrinkles, mostly only in the young, marginal parts. As Overholts says "the conspicuous folds.... remain fairly distinct in dried plants," which is not the case with the Nordic *Ph. centrifuga*. Whether they are two good species cannot be definitely decided until compability tests have been performed. Without such tests it seems necessary to consider *Ph. mellea* as a form of *Ph. centrifuga*.

Phlebia subalbida W.B. Cke, Mycologia 48 p. 397, 1956, agrees in the microscope with *Ph. centrifuga*. The spores are described to be amyloid, which we are not able to confirm. Nor have we found the hymenial cystidia of the protologue. The hymenium has a glossy surface, showing that the material had reached a post-mature state already when collected. We are convinced that *Ph. subalbida* is conspecific with *Ph. centrifuga*.

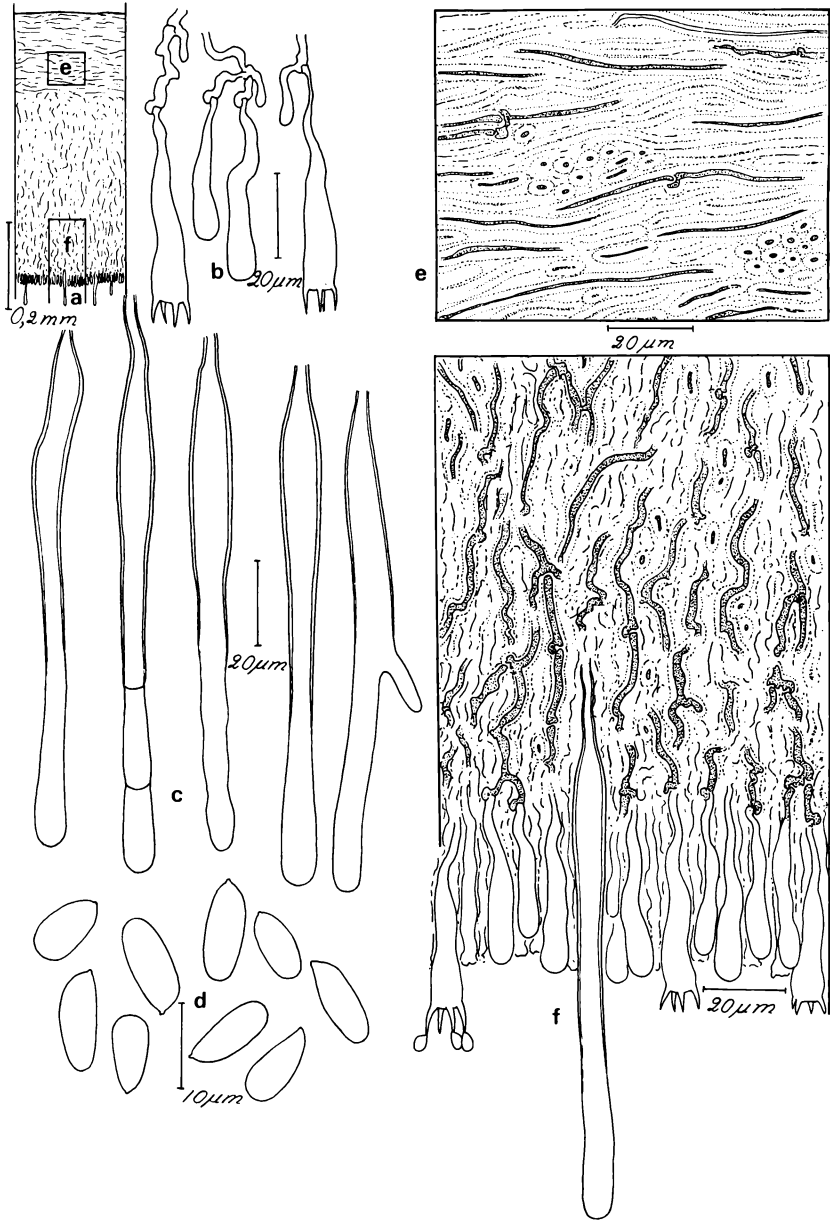


Fig. 559. *Phlebia cornea*. a) schematic section through fruitbody showing position of e and f b) basidia c) cystidia d) spores e) part of subiculum f) hymenium and part of subhymenium. — K. Hjortstam 11355.

Phlebia

There is no authentic material of *Ph. centrifuga* in P.A. Karsten's herbarium (H). His description makes it quite clear that his species is the one here described. Especially his statement "Hymenium mox carneo maculatum.... medio tuberculosum" points at characteristics of this species. If Karsten's material cannot be traced, a lectotype should be chosen from the Finnish material later collected, e.g. that by Laurila.

5. *Phlebia cornea* (Bourd. & Galz.) John Erikss.
in Lund. & Nannf., *Fungi exs. succ.* 38 p. 28
n. 1854, 1950. - *Peniophora gigantea* (Fr.)
Massee ssp. *cornea* Bourd. & Galz., *Hym. de*
Fr. p. 318, 1928.

Fig. 559

Fruitbody totally resupinate, adnate, orbicular to elongate-effused along the wood, when dried partly loosening in the margins, 0.2 – 0.8 mm thick; when wet and alive subgelatinous, watery semihyaline, greyish – brownish, tuberculate, pruinose, under the lens velutinous from the projecting cystidia, when dried horny; margin determinate, sometimes finely fimbriate.

Hyphal system monomitic; hyphae 3–5 μm wide, hyaline, with clamps at all septa; hyphal walls gelatinized in KOH; subhymenium composed of densely united vertical hyphae, subiculum of horizontal – parallel hyphae.

Cystidia subcylindrical, often widening in the apical part, seldom branched, long projecting, 80–130 x 5–9 μm , widened towards the base but often also towards the apex; walls thin in the apical part, thicker towards the base; sometimes with 1 or 2 adventitious septa.

Basidia clavate, 40–50 μm long, apically 6–8 μm wide, very narrow at the base (sometimes only 1–2 μm), with 4 sterigmata and basal clamp.

Spores narrowly ellipsoid – obovate, 8–12 x 4–5.5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed, decorticated wood of *Pinus sylvestris*, preferably in dry open localities (e.g. *Cladonia*-forest).

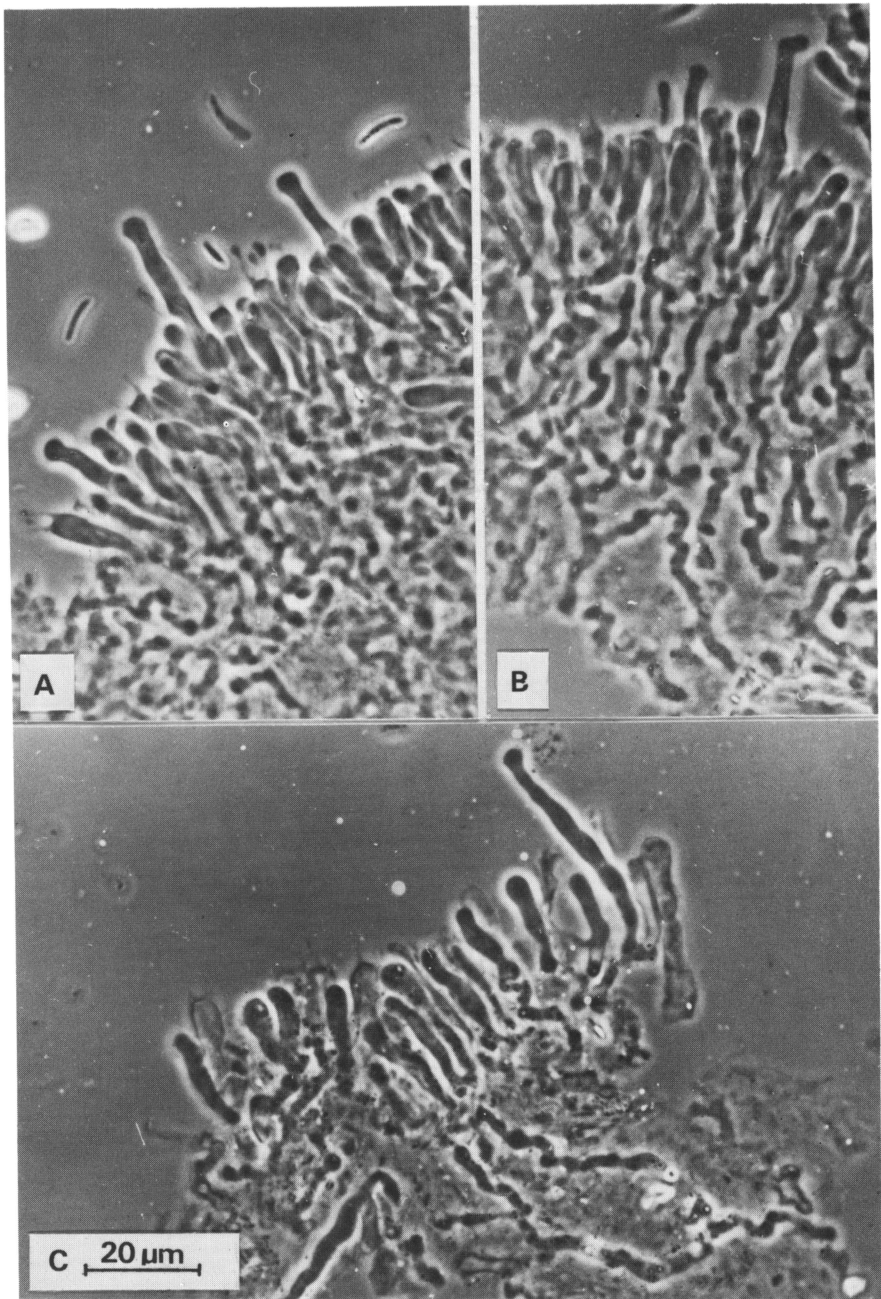


Fig. 560. *Phlebia cretacea*. Section through fruitbody, showing hymenium and the subhymenial hyphae. — Hjortstam 5023. Photo J. Eriksson.

Phlebia

Distribution. Quite common in the pine forest of N. Sweden and N. Finland, but rare in the S. parts. There are some few collections from S. Sweden in Småland (Femsjö, Hult, N. Kville nat. park, and Värnamo) and in Halland (Särö). In Norway quite common in continental areas e.g. in Hedmark. Outside Scandinavia found in Spain, Sovjet, Canada, and Africa (Tanzania, 1200 m).

Remarks. Characteristic species, but could possibly be confused with *Ph. longicystidia*. It was originally collected by C.G. Lloyd in Femsjö (coll. n. 9118), but this specimen doesn't seem to exist in Bourdot's herbarium (P).

A neotypification should therefore be made and we suggest the following specimen: Småland (Sweden), Rumsålla par., N. Kville nat. park, *Hylocomium-Myrtillus-Pinus-Picea*-forest, on decorticated trunk of *Pinus sylvestris*, 1972.10.15. N. Hallenberg (GB). The species here described agrees perfectly with the description in Bourdot & Galzin (1.c.).

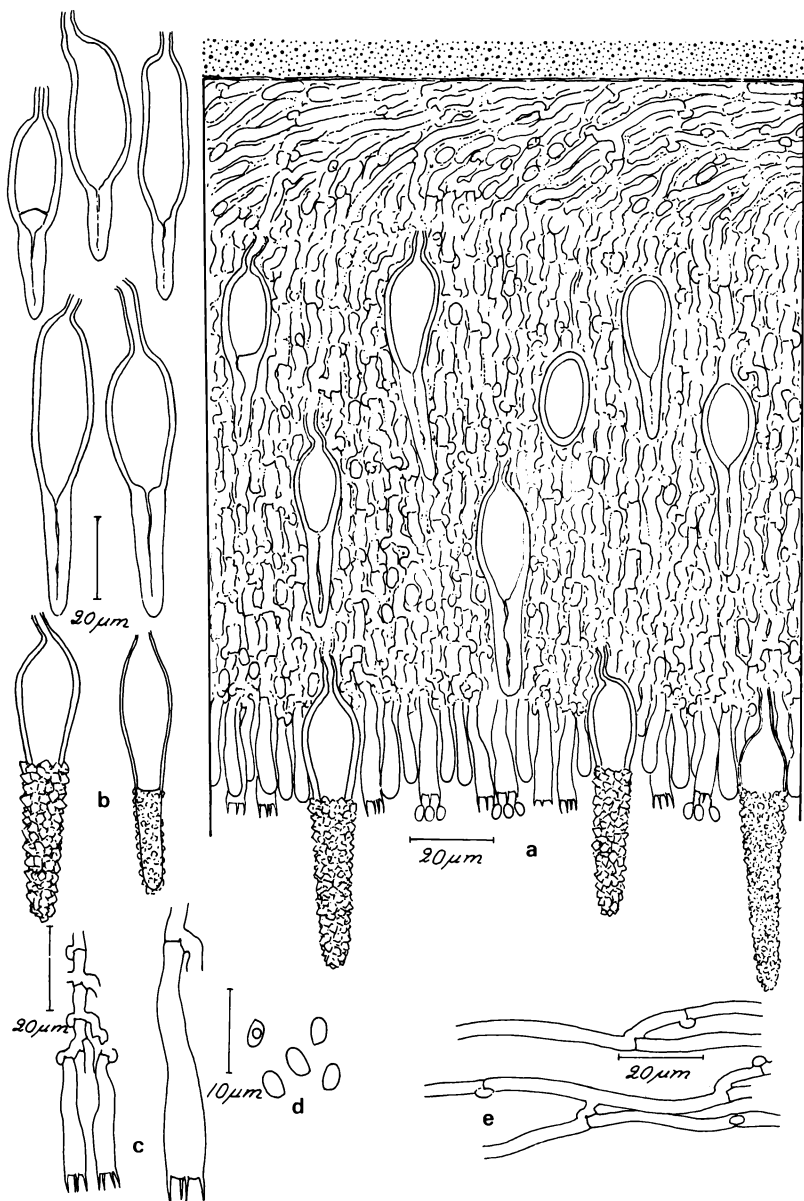


Fig. 561. *Phlebia cremeoalutacea*. a) section through fruitbody b) cystidia, hymenial ones with encrustation and enclosed ones without c) basidia d) spores e) basal hyphae. — K. Hjortstam 7796.

Phlebia

Fig. 561

6. *Phlebia cremeo-alutacea* (Parm.) Larss. & Hjortst.Mycotaxon 5 (2) p. 478, 1977. - *Metulodontia**cremeo-alutacea* Parm., Consp. syst. Cort. p.

216, 1968.

Fruitbody resupinate, closely adnate, elongate-effused, of moderate size, ab. 0.1–0.5 mm thick, when young and wet ceraceous, then becoming membranaceous, on drying often transversely cracked, hymenium smooth, under the lens finely pubescent, colour varying with age and growth circumstances from whitish, watery greyish, rose-grey, yellowish to ochraceous; margin thinning out, first white, then concolorous.

Hyphal system monomitic; hyphae 2–3 μm wide, thin-walled, with clamps at all septa; basal hyphae more or less parallel, forming a thin subicular layer, sometimes lacking; subhymenium composed of densely interwoven, vertical hyphae.

Cystidia numerous, 50–80 x 8–18 μm , enclosed in the subhymenium or projecting, at first thin-walled, then with thickened walls; basal part as a rule widened; apical part conical, encrusted when projecting, encrustation as a rule dissolved in the enclosed cystidia.

Basidia subclavate-clavate, 20–28 x 4–5 μm , with 4 sterigmata and basal clamp.

Spores ellipsoid, 3–4.5 x 2–2.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On decayed wood of coniferous and deciduous wood (i.e. *Pinus*, *Picea*, *Alnus*, and *Fagus*).

Distribution. Rather little known species. In Scandinavia found only in the southern part of Sweden, viz. in Småland (Femsjö), Västergötland (Göteborg and Östad), Dalsland (Sundals-Ryr), and Uppland (Uppsala). In N. Europe it is further found in Norway (Sør-Trøndelag), Estonia, and on Rügen (DDR) and outside the area known from different parts of the Soviet Union (Carpathian Mts., Altai, Siberia).

Remarks. The species was collected already in 1932 by S. Lundell. Later he sent material to H.S. Jackson, who referred it to *Peniophora roumeguerii*-coll., which name thereafter was used in the Swedish herbaria. It

is, however, well distinguished from this species in the clamped hyphae. Parmasto placed his new species in *Metulodontia*, which does not seem to be a proper genus for it. The type species of *Metulodontia* differs i.a. in the presence of sulfocystidia. Our reason to include it in *Phlebia* (in a wide sense) is the hyphal texture and the shape of basidia. Even if this genus is only vaguely separated, we believe that this is a better place. The encrusted cystidia make it differ from the bulk of phlebioid species, among which, however, the cystidial characteristic is very variable.

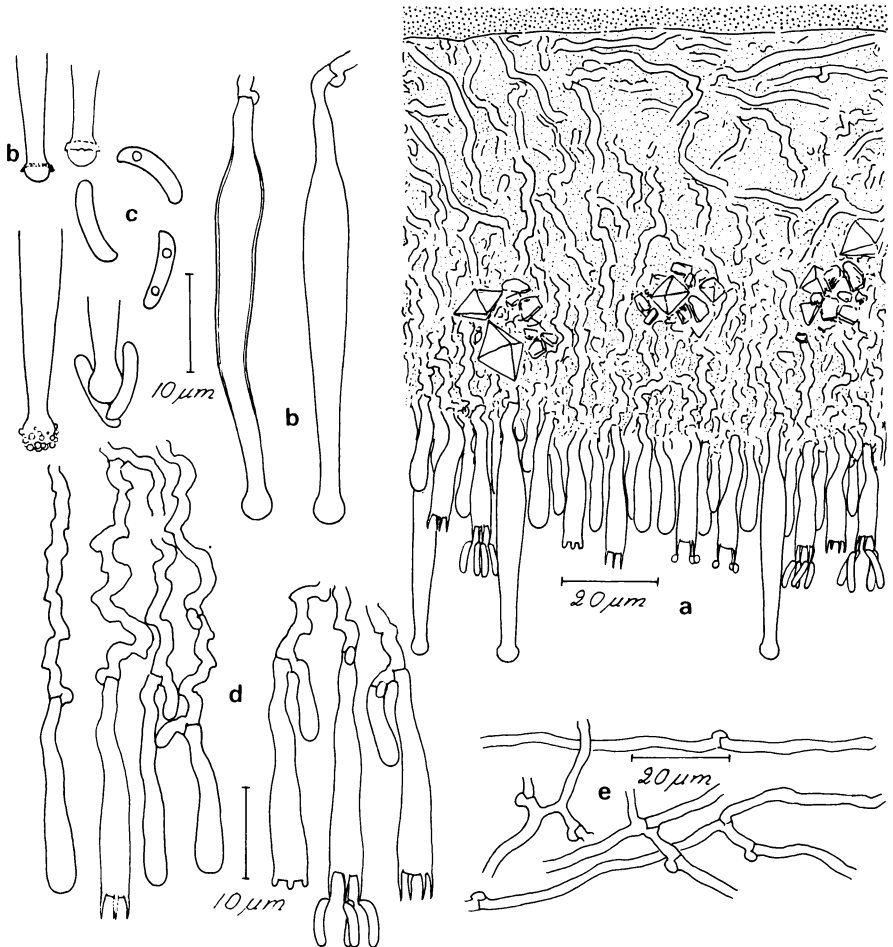


Fig. 562. *Phlebia cretacea*. a) section through fruitbody b) cystidia c) spores d) basidia and subhymental hyphae. — J. Eriksson 2897.

Phlebia

7. **Phlebia cretacea** (Bourd. & Galz.) Erikss. & Hjortst. Fig. 560, 562
 n. comb. - *Peniophora cretacea*
 Bourd. & Galz., Hym. de France p. 288,
 1928 (p.p.). - *Corticium cretaceum* (Bourd & Galz.)
 Lund. & Nannf., Fung. exs. suec. fasc.
 9–10 n. 465, 1937. - *Peniophora romellii*
 Litsch. in Bourd., Bull. Soc. Myc. France
 48 p. 212, 1932. - *Phlebia romellii* (Litsch.)
 Parm., Eesti NSV Tead, Akad. Toim. XVI.
 Biol. 1967:4 p. 393. — Not *Corticium cretaceum*
 (Fr.) Cke & Sacc., Syll. Fung. 11:128, 1895.

Fruithbody resupinate, closely adnate, orbicular — seriatly confluent, elongate-effused mainly in the fibre direction of the wood, 0.05–0.2 mm thick, ceraceous and continuous in the living state, when dried crustaceous and at least in older parts with small, mainly transversal cracks, pure white or in the herbarium partly cream-coloured; hymenium smooth in young fruitbodies, then more or less tuberculate; margin determinate or thinning out into a pruinose periphery.

Hyphal system monomitic; hyphae thin-walled, 2–3 μm wide, richly branched and embedded in a gelatinuous interhyphal matrix; basidium-bearing subhymenial hyphae more or less volute, with marks from old, dissolved basidia; no subiculum.

Cystidia numerous, subfusiform with a apical head, 30–55 μm long, 5–6 μm broad in the widest part, with thin or slightly thickened walls; apical head 3–5 μm , normally with an encrustation, which easily falls off in the slides.

Basidia narrowly clavate, 20–30 x 3–3.5 μm , with 4 sterigmata and basal clamp.

Spores allantoid, 6–9 x 1.3–2 μm , thin-walled, smooth, often with 2 oil-drops, non-amyloid, non-cyanophilous.

Habitat. On decorticate coniferous wood (*Pinus*, *Picea*) in open biotopes e.g. *Cladonia* pine forest. It was a characteristic species in the nowadays rare wooden fences, earlier commonly used in rural industry. Lundell (Lund. & Nannf. 1.c.) even states that the species grows exclusively in such habitats, which, however, is not true as it grows very well

on fallen branches and trunks as long as the biotope suits in other respects. With the disappearing of the wood fencing it has certainly become much less common.

Distribution. In Sweden known from Småland to N. Lapland (Muddus), locally frequent in S and Central Sweden, rarer in the northernmost part. Probably common also in Norway and Finland but only few specimens seen. Not known from Denmark. Its distribution outside N. Europe is not well known. Material collected in W. Canada (Vancouver Island) agrees in microstructure but deviates in not having pure white fruit-bodies (sordid in the herbarium).

Remarks. Easily recognized species. Cystidia with ringlike remnants of the apical encrustation may resemble those of *Resinicium furfuraceum*. Scanning pictures of the cystidia show that they don't have the extra wall round the top, characteristic for *Resinicium*. The basidium-bearing hyphae agree with those of *Ph. subcretacea* a.o. in the respects that they don't branch and produce only one basidium at a time, which results in a characteristic hyphal element.

The species was long known in Sweden as *Corticium cretaceum*, an unpublished name made by L. Romell. When Romell sent material of the species to Bourdot, he happened to get a specimen overgrowing old cystidia of a *Tubulicrinis* sp. Bourdot and Galzin believed the cystidia of the latter to be enclosed cystidia and described the species as *Peniophora cretacea*. As this species thus was described on two entirely discordant elements it was later considered not valid and the name *Peniophora romellii* Litsch. was introduced. This name was never published by Litschauer, but was used by Bourdot 1932 in a discussion about the names involved in the *Peniophora calcea*-complex. He clearly refers *Corticium cretaceum* Romell to this *P. cretacea*, and he says that it is a member of a series in which he also mentions *P. romellii* Litsch. as n. 2, however without explicitly telling that he considers it to be a good new species. He also tells that L. Romell opposed against the use of his name as a species epithet. However, it is "without difficulty possible to select one of these elements as satisfactory type" and thus it should not necessarily be rejected (Art. 70 of the Code, ed. 1972, deleted in the ed. 1978). Moreover, when Lundell & Nannfeldt (1937) used the name *Corticium cretaceum* there was no discordance. They referred to the protologue of Bourdot & Galzin but excluded the *Tubulicrinis* part. We therefore prefer to use the old epithet, even if Lundell & Nannfeldt in Fung. exs. succ. 1950, p. 37 changed their opinion. Bourdot & Galzin did not refer to any type collection and a neotype should

Phlebia

therefore be chosen. We have found that the following specimen should be appropriate: Stockholm, Lidingö, coniferous wood, 1913. 05.13. L. Romell 3604 (S).

8. *Phlebia deflectens* (Karst.) Ryv.

Fig. 563-64

Rep. Kevo Subarc. Res. Stat. 8 p. 150, 1971.

- *Grandinia deflectens* Karst., Bidr. Känned.

Finl. Nat. Folk 37 p. 239, 1882; Medd. Soc.

F. Fl. fenn. 9 p. 50, 1882. Not *Corticium deflectens*

s. Bres., Ann. mycol. I p. 94, 1903, = *Phlebia*

bresadolae Parm. - *Phlebia lilacea* M.P. Christ.,

Dansk bot. ark. 19:2 p. 165, 1960. - *Corticium*

umbratum Bourd. & Galz. Hym. de France p.

220, 1928.

Fruitbody resupinate, closely adnate, effuse, smooth or papillose — minutely warted, thin (mostly 0.1–0.2 mm), when wet and alive ceraceous, continuous, as a rule irregularly cracked when dried, pale ochraceous — pale brown, often with a greyish, reddish or violaceous tint; margin indeterminately thinning out.

Hyphal system monomitic; hyphae thin-walled, 2.5–3.5 μm wide, normally without clamps, but scattered clamps may occur in some specimens; those in the horizontal layer indistinct and more or less parallel; subhymenial hyphae densely united; tissue often filled with a fine-grainy resinous matter.

Cystidia varying in number, often few, cylindrical, thin-walled, 70–120 x 4–5 μm , often with oildrops in the protoplasm, and sometimes with a slight encrustation.

Basidia narrowly clavate, 25–30(–40) x 3–5 μm , with 2–4 sterigmata and without basal clamp.

Spores ellipsoid, (3.5–)4–5 x 2.5–3 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On much decayed wood, more often deciduous than coniferous, in humid, fertile localities, e.g. herb-rich forests.

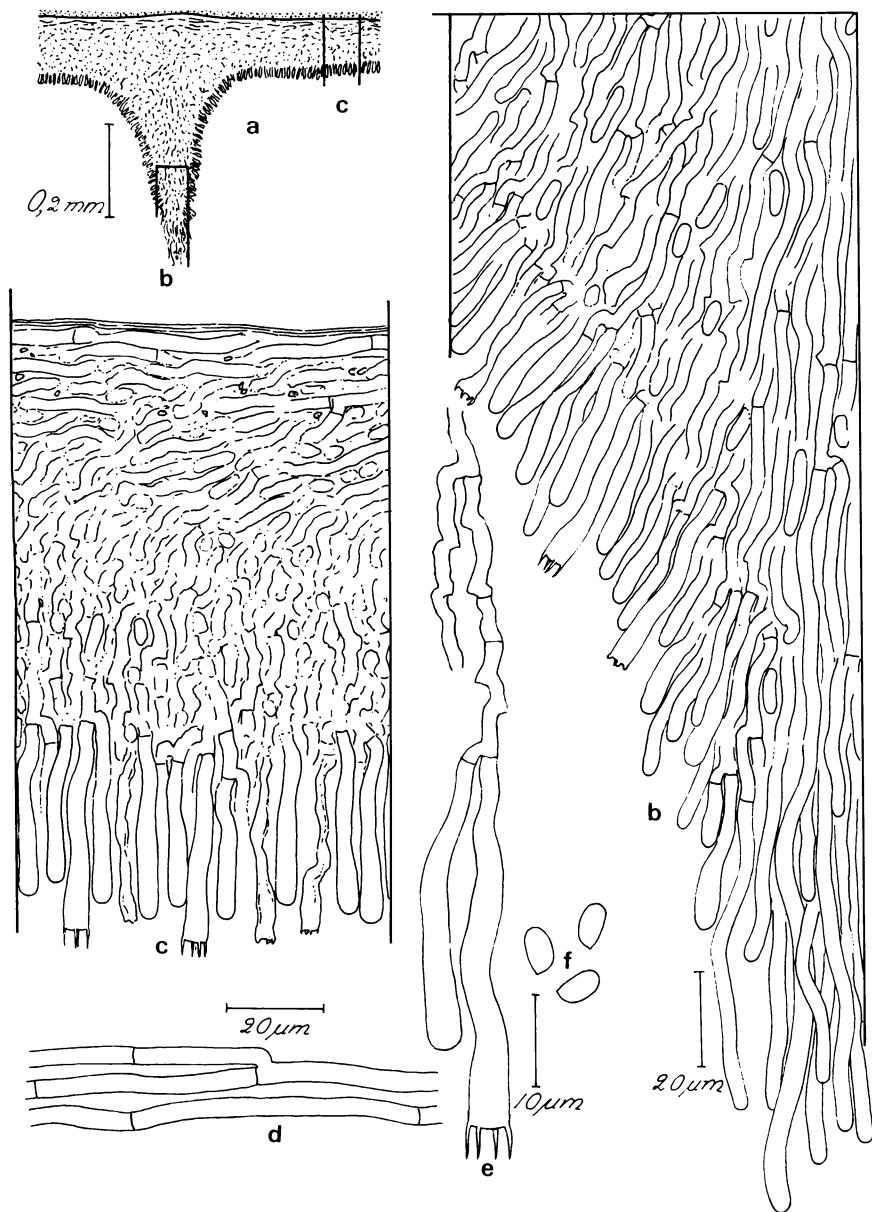


Fig. 563. *Phlebia deflectens*. a) schematical section through fruitbody, showing position of b and c b) part of section through a hymenial aculeus c) section through smooth part of fruitbody d) basal hyphae e) basidia f) spores. — P.A. Karsten 772 (*Grandinia deflectens*).

Phlebia

Distribution. Only few specimens seen, most of them from S. Scandinavia (Denmark, SE and C. Norway, S. and C. Sweden, S. Finland) but also one from N. Finland. Outside Scandinavia known from France (*Corticium umbratum*) and different parts of the Sovjet Union (Carpatorossia, Azerbaidzhan, Armenia).

Remarks. There has been a lot of confusion round this species, partly because it belongs to a critical group, partly because Karsten used the name in several different ways, as has been shown by Ryvarden (1.c.). Bourdot's *Corticium deflectens* material includes 4 different species: n.1) is *Ph. deflectens* s.str., n.2) *Ph. bresadolae*, n.3) *Ph. nitidula*, and n.4) *C. cremeoochraceum* Bourd. & Galz. The latter is a species of its own, evidently better placed in *Phanerochaete* than in *Phlebia*.

Corticium umbratum is in the same way divided in 4 taxa, the first of which includes the syntypes. The specimens of these, which we have seen (n. 30051, 30055), agree so far as we can see with *Ph. deflectens* s.str. The material is, however, very difficult to study. Bourdot & Galzin report e.g. "boucles éparses", while we have not been able to find any clamps at all in the very indistinct tissue.

Two specimens (S. Sivertsen n. 77–66 from Troms in Norway and V. Kujala & J. Eriksson n. 4235 from Pisavaara in N. Finland) deviate in having a rhizomorphic structure of the fruitbody. In other respects they agree with other specimens.

There still remain problems to solve also about *Ph. deflectens* s.str. Karsten's type material is a grandinioid species with small, conical aculei on a smooth hymenium, while most of the material here included in the species has a smooth hymenium without such aculei. The lack of clamps, which, however, often is difficult to detect because of the dense tissue, makes this species differ from most other *Phlebiae*.

Other characteristics, e.g. the dense, ceraceous texture, make it match this genus better than other genera.

9. *Phlebia diffissa* Erikss. & Hjortst. n.sp.

Fig. 565

Fructificatio resupinata, dense adnata, 0.1–0.2 mm crassa, in statu vivo ceracea, sicco crustacea, albido-argillacea – cremea – pallide ochracea; hymenium primo continuum leveque, mox tuberculatum, sicco dense rimosum; margo tenuis, saepe determinata; hyphae monomiticae, 2–4 μ m latae, tenuitunicatae, fibulatae; cystidia nulla; basidia clavata, 22–28 x 4–5 μ m, 4 sterigmatica, fibula basali provisa; sporae suballantoidae, (5–)7–8 x 2–2.5 μ m; ad lignum coniferarum.

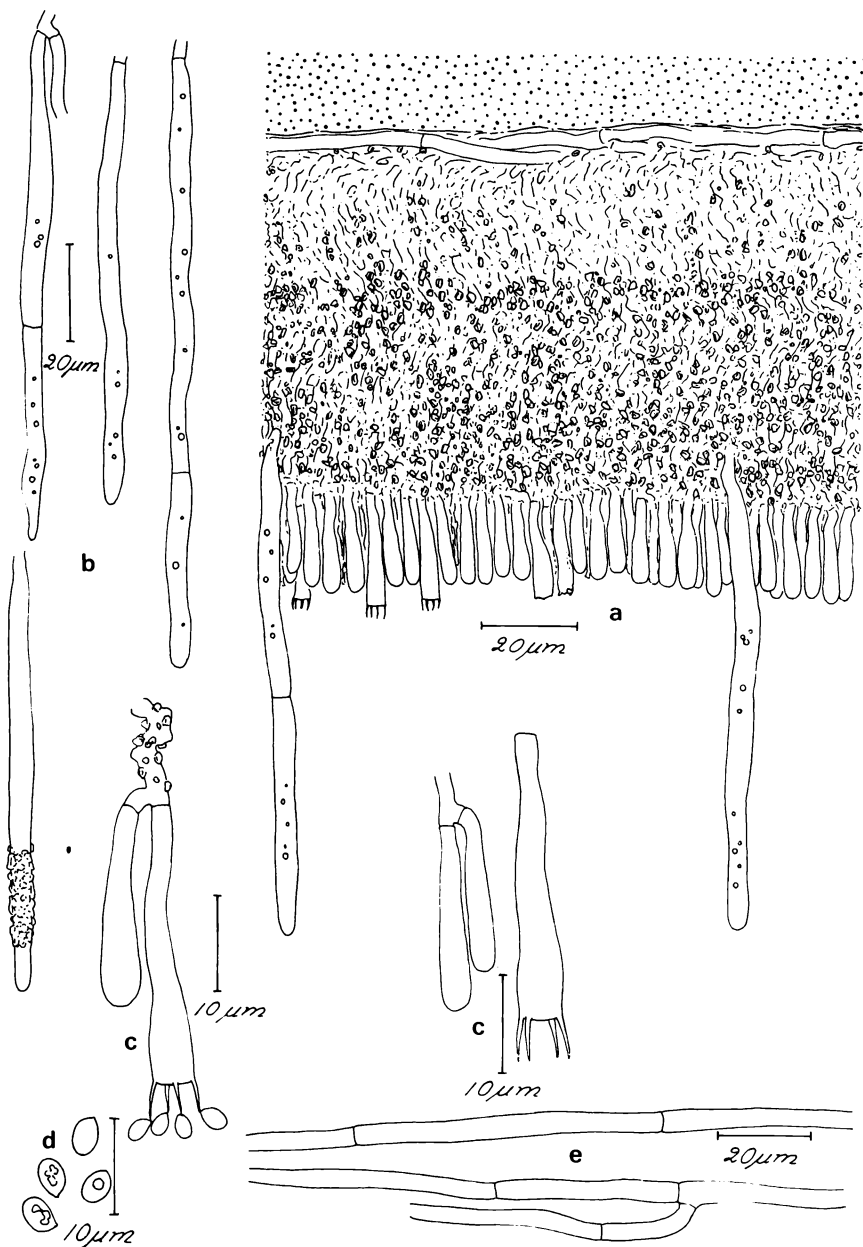


Fig. 564. *Phlebia deflectens*. a) section through fruitbody b) cystidia c) basidia d) spores e) hyphae. — J. Eriksson 4431.

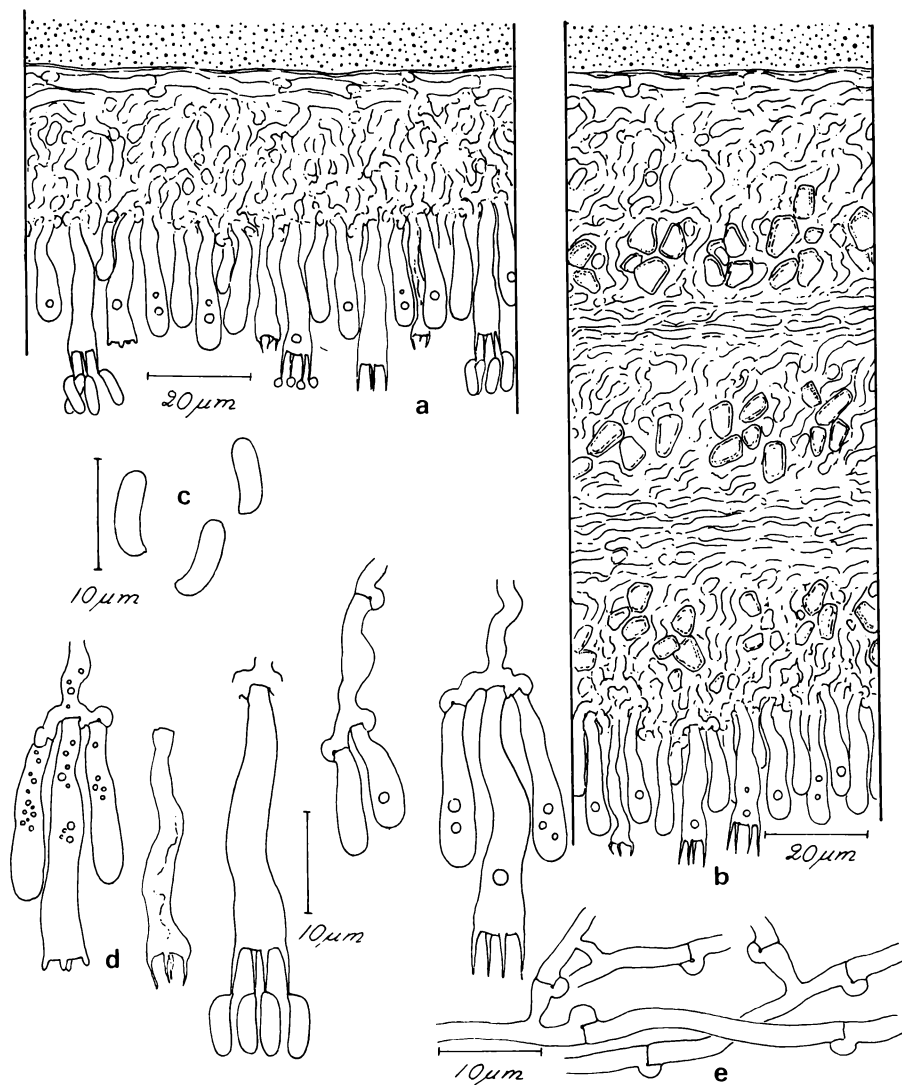


Fig. 565. *Phlebia diffissa*. a) section through young fruitbody b) through older, 2-layered fruitbody c) spores d) basidia e) basal hyphae. — a, c-e J. Eriksson 1966.09.18, b J. Eriksson 4817.

Holotypus: J. Eriksson n. 24726. Ångermanland, Junsele par. Åkerbränna for. res. 1966.09.18. on *Pinus sylvestris*. Herb. GB.

Fruitbody resupinate, closely adnate, ceraceous in the living state, when dried crustaceous, mostly 0.1–0.2 mm thick, light-coloured: whitish, argillaceous, cream-coloured, in old parts pale buff to pale ochraceous; hymenium at first smooth and continuous, then more or less tuberculate and when dried with small, dense transversal cracks; margin thinning out, in mature specimens determinate.

Hyphal system monomitic; hyphae 2–4 μm wide, thin-walled, provided with clamps, intertwined into a conglutinate texture, in old parts filled with crystals; old fruitbodies often stratified.

Cystidia none.

Basidia clavate, 22–28 x 4–5 μm , normally with 4 sterigmata and with basal clamp.

Spores suballantoid, (5–)6–7(–8) x 2–2.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat and distribution. On decayed, mostly decorticate, coniferous wood (*Pinus sylvestris*, *Picea abies*) in intact *Hylocomium Vaccinium*-conifer forests. Probably rare. Known collections, all in GB.

Sweden: Småland: Rumskulla par., N. Kivall national park, on fallen trunk of *Pinus sylvestris*, 1970.10.14. K. Hjortstam 5302.

Ångermanland: Junsele par., Åkerbränna forest reserv, on branch of *Pinus sylvestris*, 1966.09.18. J. Eriksson 24726 (holotype); do., on fallen trunk of *Pinus sylvestris*, 1970.09.20, K. Hjortstam 4170.

Finland: Ostrobothnia borealis: Pisavaara nature park, near the wood-guard's farmstead, 1960.08.28. V. Kujala & J. Eriksson 9401.

Remarks. Similar to *Ph. firma* in several respects (lack of cystidia, size and shape of basidia and spores) but there are some clear differences. The fruitbody is more light-coloured and in the dry state characteristically cracked, and no spores are sigmoid.

It is remarkable that all collections hitherto made come from virgin forests.

Phlebia

10. **Phlebia femsioeensis** (Litsch. & Lund.)
 Erikss. & Hjortst. n. comb. - *Peniophora*
femsioeensis Litsch. & Lund. in Litsch.,
 Sv. bot. tidskr. 32 p. 290, 1938.

Fig. 566

Holotype: Sweden, Femsjö par., Prästgårdsskogen, 1937.08.19.
 S. Lundell n. 1511 (UPS).

Fruitbody resupinate, adnate, effuse, when wet and alive ceraceous, when dried hard, ab. 0.3–0.7 mm thick; hymenium uneven, tuberculate-folded, orange red, darkening to reddish violaceous or brownish, with a greyish pruina; margin varying, often fibrillose-strigose, in the growing fungus orange red.

Hyphal system monomitic: hyphae thin-walled, 2–4 μm wide, with clamps at all septa, densely united into a conglutinate tissue, difficult to examine; all hyphae embedded in a gelatinous matrix, partly with a resinous, brown encrustation, forming strata or lumps, esp. in the subicular layer.

Cystidia numerous, 50–75 μm long, thin-walled, from the beginning naked but then becoming covered with a resinous encrustation and reaching a width of 15 μm ; old cystidia enclosed in lumps of resinous matter in the subhymenial layer.

Basidia clavate, 25–30 x 4–5 μm , with 4 sterigmata and basal clamp.

Spores ellipsoid-oblong, 4–5 x 2–2.7 μm , thick-walled, smooth, often with 1–2 oil-drops, non-amyloid, non-cyanophilous.

Habitat. On decayed coniferous wood (*Pinus*, *Picea*), in *Hylocomium-Vaccinium* forest.

Distribution. Rare species, in Sweden found in Småland (Femsjö and Värnamo) and in Dalsland (Dalskog), in Norway in Oppland (Jevnaker), and in Estonia in Hiiumaa (=Dagö). In E. Europe also found in Transcarpatia.

Remarks. May in the living state to the naked eye look like *Ph. radiata* do to the orange-red colour, but is easily distinguished in the microstructures.

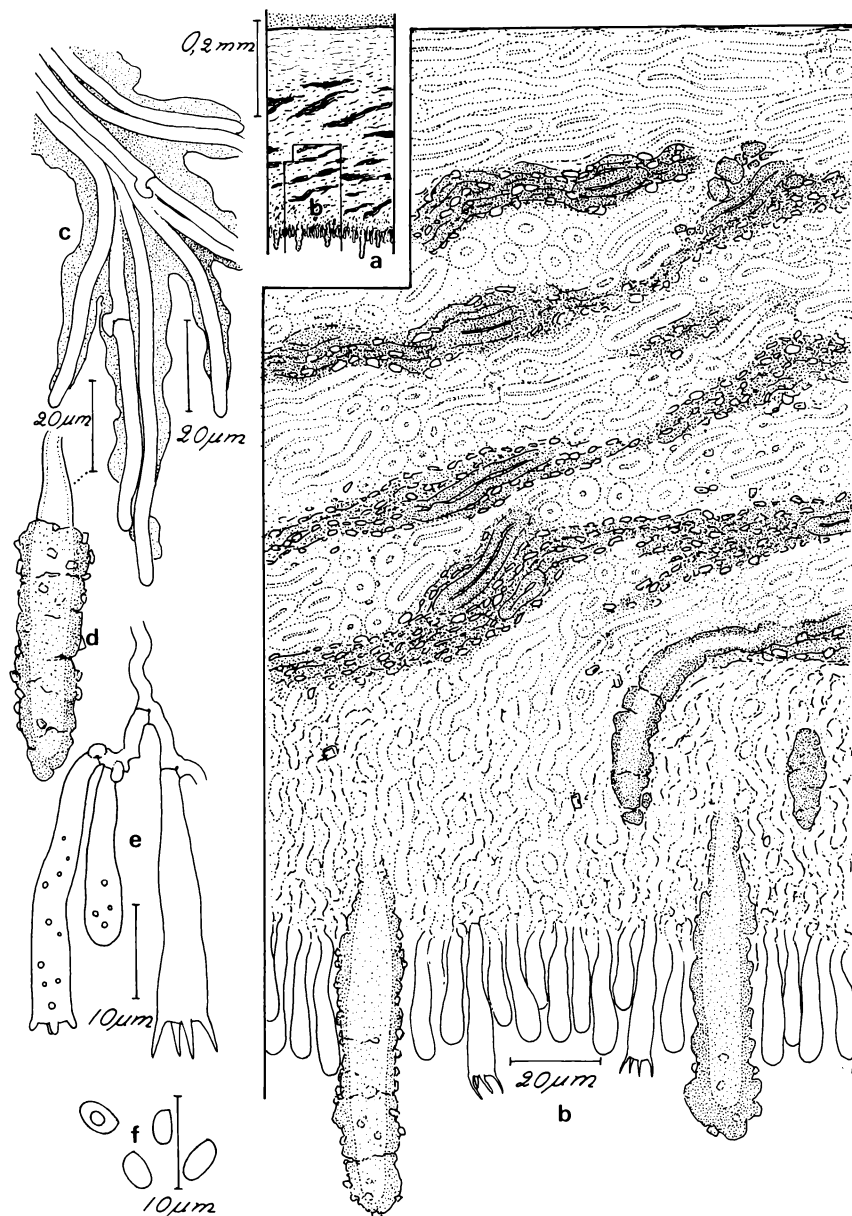


Fig. 566. *Phlebia femsioeensis*. a) schematic section through fruitbody with position of b b) section through hymenium, subhymenium and part of subiculum c) marginal hyphae with gelatinous matrix d) cystidium e) basidia f) spores. — Parmasto 3444.

Phlebia

11. **Phlebia firma** Erikss. & Hjortst. n.sp.
 - *Corticium firmum* Litsch. in herb.

Fig. 567

Fructificatio resupinata, adnata, effusa, ceraceo-membranacea, levis, pallide griseolutescens-ochraceae, 0.1–0.4 mm crassa; margo indeterminata; hyphae dense conglutinatae, 3–4 μ m latae, fibulatae, tenuitunicatae, hyphae subhymeniales saepe materia resinoso incrustatae; cystidia nulla; basidia subclavata, interdum leviter constricta, 4-sterigmatica, basaliter fibulata; sporae subballantoideae, tenuitunicatae, leves, 6–8.5 x 2–3 μ m; in ligno coniferarum.

Holotypus: L. Romell 3553 (S). Sweden, Uppland Rödmannsö par., Asken island, N. of Furusund, 1912.08.25.

Fruitbody resupinate, closely adnate, effuse, 0.4–0.4 mm thick, when wet and alive ceraceous, old specimens more membranaceous, varying in colour with age and growth circumstances – yellowish, greyish – ochraceous; hymenium smooth, continuous in the living fungus, with small irregular cracks when dried; margin indistinctly thinning out.

Hyphal system monomitic; hyphae 3–4 μ m wide, thin-walled, richly branched, with clamps at all septa; tissue dense, conglutinate esp. in the subhymenium, in old specimens with a yellowish resinous encrustation.

Cystidia none.

Basidia subclavate, sometimes sinuous or somewhat constricted, 25–35 x 4.5–5.5 μ m, with 4 sterigmata and basal clamp.

Spores cylindrical-subballantoid, a few spores slightly sigmoid, 6–8.5 x 2–3 μ m, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed, generally decorticated wood, mostly conifers, preferably *Pinus sylvestris*.

Distribution. The following collections are hitherto known.

Sweden: Västergötland, Sydbillingen, near Store mosse, coniferous wood, 1976.09. K. Hjortstam 7146 (GB). – Undesnäs par., S. of Metesjön, Trollkyrka nature reserve, on fallen trunk of *Betula*, 1969-10.03. K. Hjortstam n. 2850 (GB). – Uppland, Rådmansö par., island of Asken, N. of Furusund, 1912.08.25. L. Romell 3553 (S, holotype). – Åsele Lappmark, Dorotea par., ab. 4 km NW of Dorotea, 1949.08.14.

B. & J. Eriksson 3562 (GB). — Lule Lappmark, Jokkmokk par., S. of Muddus nat. park, between Tuoraselet and Tuoljejokk, 1958.08.06. J. Eriksson 8494 (GB). — d:o, S part of Moskokorso, 1950.06.24. B. & J. Eriksson 4585 (GB).

Finland: Lapponia Kemi., Kittilä par., Ounas-Pallastunturi nat. park, lower part of Pyhäjoki, on *Pinus sylvestris*, 1960.09.04. V. Kujala & J. Eriksson 666 (GB). — Satakunta, Sukainen par., Vuorijärvi, 1938. 08.21. M. Laurila 3068 (H).

Norway: Hedmark, Løten, Rokoberget, on *Picea*, 1975.06.01, E. Høgholen 60/75 (GB, O).

Denmark: Sjaelland, Svinkløv Plantage, 1965.09.18. K. Hauerslev (KH).

Remarks. Important characteristic is the shape of the spores. The few slightly sigmoid spores may help the determination, but they are generally too few to be of greater diagnostic value. In several respects the species agrees with *Ph. diffissa*, which has no sigmoid spores, a less conglutinate texture and a lighter hymenium, transversely cracked when dried.

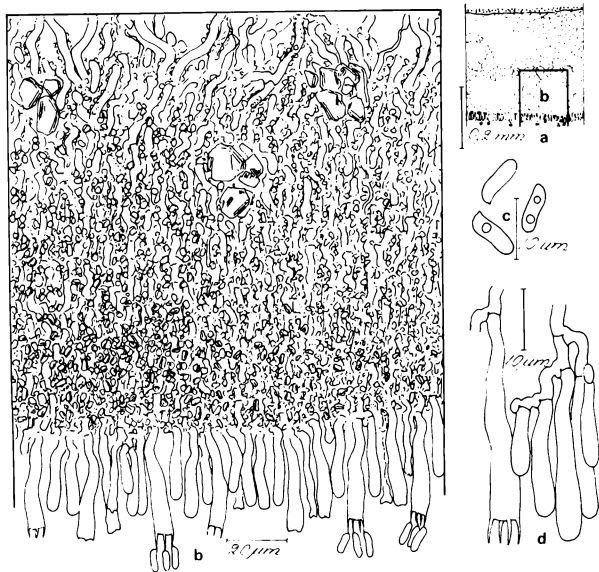


Fig. 567. *Phlebia firma*. a) schematic section through 2-layered fruitbody showing position of b b) section through hymenium, subhymenium and part of second subiculum c) spores d) basidia. — L. Romell 3553.

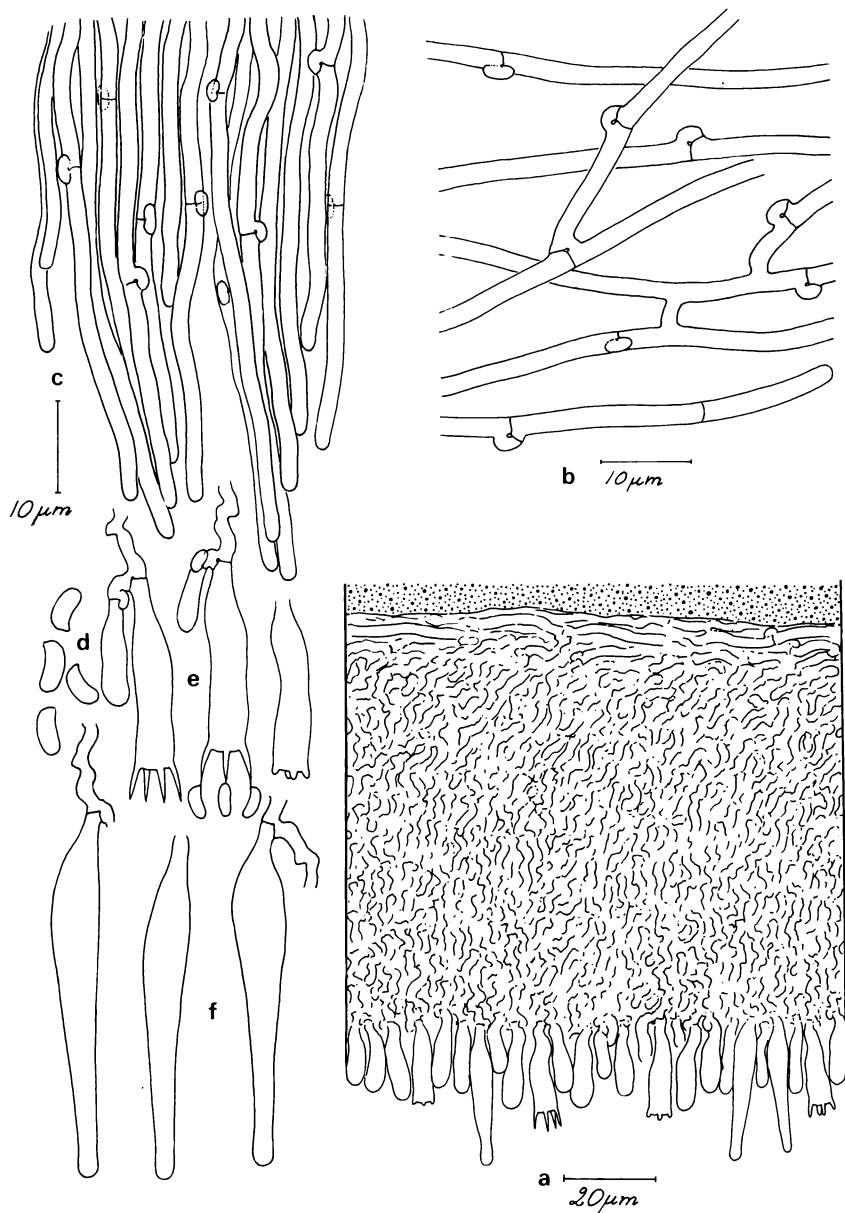


Fig. 568. *Phlebia georgica*. a) section through fruitbody b) basal hyphae c) marginal hyphae d) spores e) basidia f) cystidia. — Holotype.

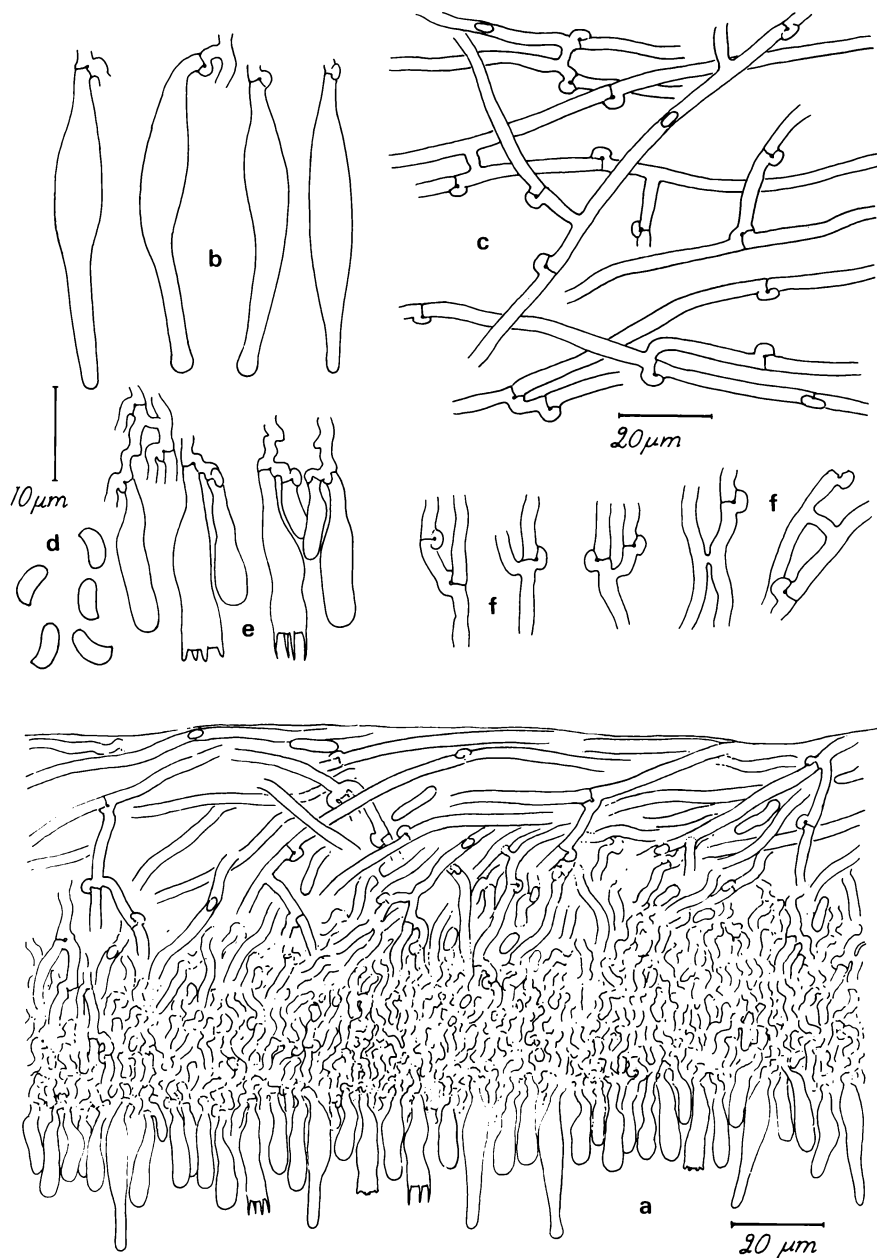


Fig. 569. *Phlebia georgica*. a) section through fruitbody b) cystidia c) hyphae d) spores e) basidia f) hyphae. — Hjortstam 12120.

Phlebia

12. **Phlebia georgica** Parm., Eesti NSV Tead. Akad. Toim. Biol. 16 p. 390, 1967. - *Rogersella eburnea* Hjortst. & Høgh., Mycotaxon 10. p. 265, 1980. Fig. 568-69

Holotypus: Sovjet Union, Adsharic SSR, distr. Tshacva, Ciscari, 800 m. alt., in fageto ad ramum dejectum *Lauroceraci officinalis*, 1963.10.14. E. Parmasto 16679 (TAA).

Fruitbody resupinate, closely adnate, 2–10 cm wide, 0.1–0.4 mm thick, mostly smooth, ceraceous in the living state, firm when dried, pure white or slightly creamish white, margin varying: determinate, finely byssoid or indeterminate and farinaceous.

Hyphal system monomitic; hyphae with clamps, in the subhymenium 1.5–2.5 μm wide, thin-walled, richly branched and densely united, next to the substrate 2–3 μm , straight and sparsely branched, with slightly thickened walls, in the margin sometimes parallelly agglutinated.

Cystidia 25–40 x 3–5(–6) μm , numerous to rather sparse, subfusiform – subconical, obtuse, often subcapitate, thin-walled, not encrusted, with basal clamp.

Basidia clavate to subcylindrical, 15–20 x 4–5 μm , with 4 conical sterigmata and basal clamp.

Spores allantoid, 4.5–5(–6) x 1.8–2.2 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed deciduous and coniferous wood.

Distribution. Incompletely known, hitherto found in Sovjet, Sweden (Västergötland), Norway (Hedmark), U.S.A. and Canada.

Remarks. In the material studied when *R. eburnea* was described, the phlebioid characteristic was not observed, partly because the fruitbodies available were mainly young ones with more open texture than is normal in *Phlebia*. The resemblance to *Hyphoderma sambuci*, recently referred to *Rogersella*, in the white colour and the shape of the cystidia was more striking. However, when more material became available it was clear that the right place for the species is in *Phlebia*, and moreover

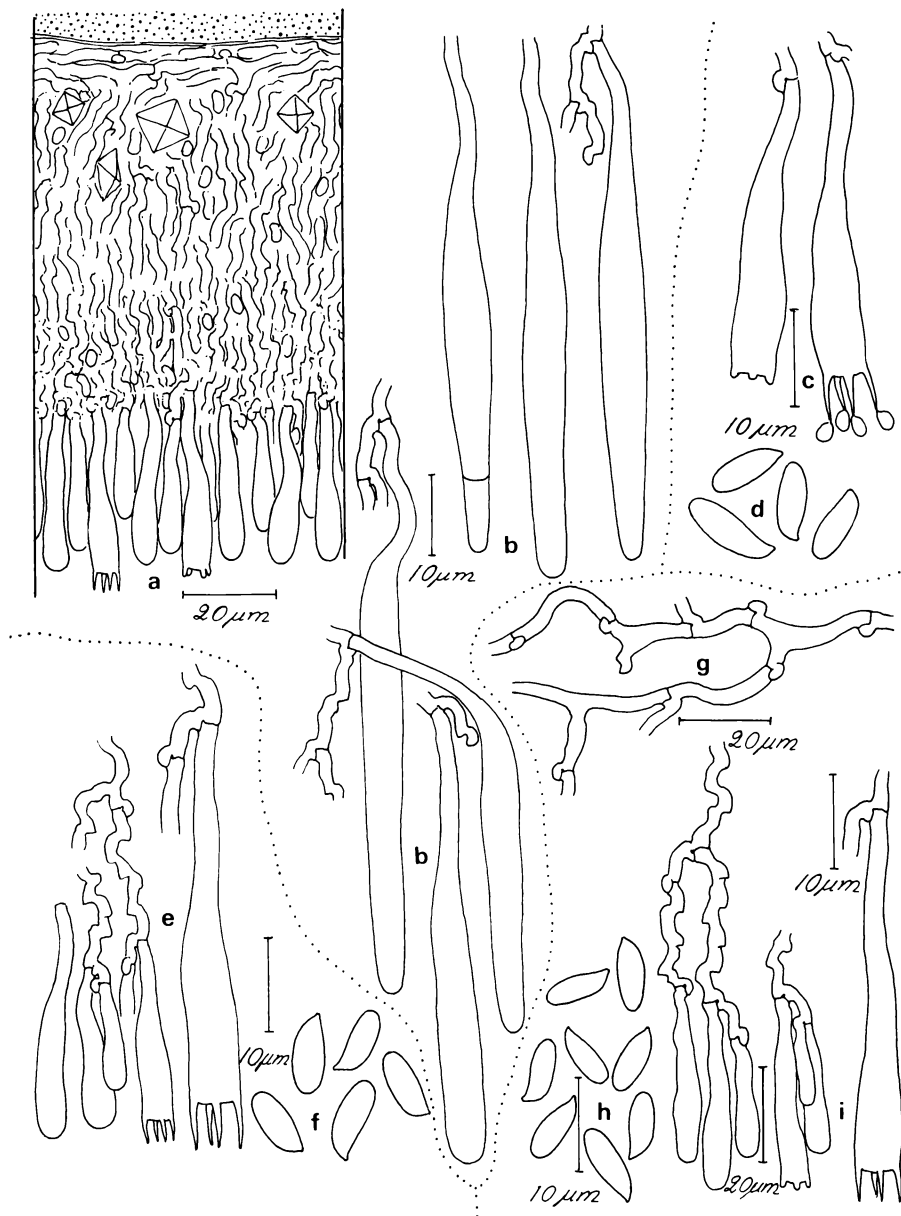


Fig. 570. *Phlebia griseoflavescens*. a) section through fruitbody b) cystidia c, e, i) basidia d, f, h) spores g) basal hyphae. — a-d Pilat & Lindtner 489256 (type of *Ph. griseoflavescens*) g-i Romell 2176 (type of *C. pallidocreum*).

Phlebia

that it is identical with *Phl. georgica* Parm. The type of this species is well developed and shows clearly the generic character of *Phlebia*. The species is close to *Phl. cretacea*, *phlebioides*, *segregata*, *subcretacea*, and *subulata*. Its white colour makes it simulate *Phl. cretacea* to the naked eye, but it is easily distinguished by the spore shape. *Phl. georgica* was in the protologue reported to grow only on deciduous wood but in N. Europe it grows also on coniferous wood.

13. ***Phlebia griseoflavescens*** (Litsch.)

Fig. 570

Erikss. & Hjortst. n. comb.

- *Corticium griseoflavescens* Litsch. in

Pilát & Lindt., Bull. Soc. Sci. Skopje

18 p. 178, 1938. - *Corticium pallidocremsum*

Litsch., Ann. mycol. 39 p. 121, 1941.

- *Phlebia pallidocrema* (Litsch.) Parm.,

Eesti NSV Tead. Akad. Toim. 16 Biol. p.

391, 1967. - *Hyphoderma griseoflavescens*

(Litsch.) Jül., Persoonia 8 (1):80, 1974.

Fruitbody resupinate, adnate, effused — elongate, ceraceous when fresh, in the dry state crustaceous, 0.1–0.3 mm thick; hymenium smooth, continuous but when dried often with small transversal cracks in the old parts, in young fruitbodies whitish — pale cream-coloured, often with a glaucous tint, in the herbarium pale greyish — pale sordid brown; margin indeterminately thinning out into a pruinose periphery.

Hyphal system monomitic; hyphae thin-walled, 2–3.5 μm , thinner and more densely intertwined in the subhymenium; basal hyphae more distinct but forming only a very thin layer next to the substrate; in old fruitbodies a resinous encrustation in the hyphal tissue, esp. in the subhymenium.

Cystidia varying in number and sometimes difficult to find, in other fruitbodies quite frequent, 50–75 x 5–8 μm , fusiform to clavate, thin-walled, not encrusted, with hyaline, not oily contents.

Basidia clavate, basally often prolonged into a stalk-like part, 30–40 x 5–6 μm , with 4 sterigmata and basal clamp.

Spores 6–9 x 2.5–3 μm , subcylindrical to elongate-subfusiform, as a rule tapering to the basal end, thin-walled, smooth, non-amyloid, non-cyanophilous, in the fresh material often with small oildrops.

Habitat. On decayed, decorticate deciduous wood, of e.g. *Fagus*, *Populus*, *Salix*.

Distribution. Rare species. In Sweden found in Småland (Femsjö, type of *C. pallidocremeum*) and Uppland (Uppsala), in Norway in Nordland (Lødingen). From outside N. Europe we have seen material from Yugoslavia (Sar Planina, type of *C. griseoflavescens*), Germany (Bayern), Sovjet (Carpatorossia).

Remarks. Litschauer's description and esp. illustrations of *C. pallidocremeum* agrees so well with the same of *C. griseoflavescens*, that it is remarkable, as he used to be very observant, that he did not realize that he described the species twice, in 1938 and 1941. He placed the species both times in *Corticium* sect. *Ceracea*, most species of which are here included in *Phlebia*. It is, however, not a very typical member of the genus and the reason why we leave it here is mainly that we have not been able to find a better place. The shape of spores and cystidia could possibly remind of *Hyphoderma*, an idea which, however, is contradicted by the shape of the basidia. These may direct a thought to *Athelopsis*, but this genus has more or less pellicular fruitbodies, very different from those of this fungus.

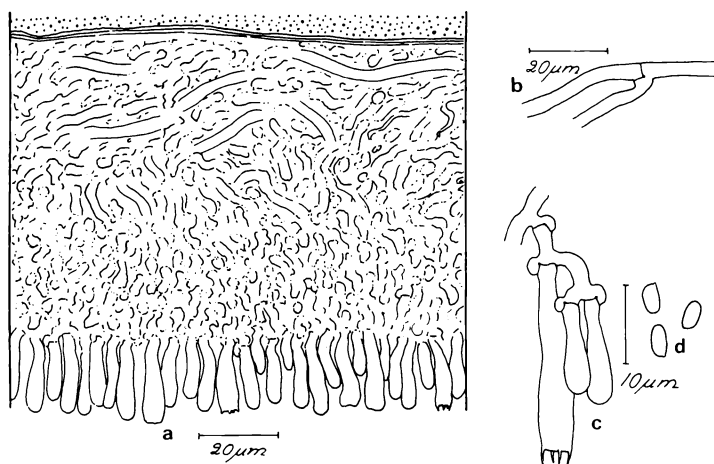


Fig. 571. *Phlebia lilascens* a) section through fruitbody b) hypha c) basidia d) spores. — Bourdot 5515.

Phlebia

Fig. 571-72

14. **Phlebia lilascens** (Bourd.) Erikss. & Hjortst.
n. comb. - *Corticium lilascens* Bourd., Rev.
Sci. Bourb. 23 p. 13, 1910. - *Corticium*
pallidoincarnatum Litsch., Ann. mycol. 39
p. 123, 1941. - *Phlebia pallidoincarnata*
(Litsch.) Parm., Eesti NSV Tead. Akad.
Toim. XVI. Biol. 1967:4 p. 391.
- *Corticium seriale* s. Bourd., Hym. de
France p. 219, 1928. Non *Corticium*
seriale Fr. s. str.

Fruitbody resupinate, closely adnate, effuse, 0.1–0.4 mm thick, ceraceous in the living state, crustaceous when dried; hymenium smooth — tuberculate, with age and growth circumstances varying in colour: sordid yellow, often a shade of rose or violaceous, pale ochraceous, pale brown; margin indeterminate.

Hyphal system monomitic; hyphae thin-walled, with clamps, 2–3 μm wide, those next to the substrate sometimes wider, to 4 or 5 μm ; all hyphae joined into a dense, conglutinate tissue in which the hyphal elements are discerned with difficulty, esp. in the herbarium material; old specimens with a yellow resinous encrustation, rarely turning reddish in KOH.

Cystidia none.

Basidia narrowly clavate, 25–28 x 4–5 μm , with 4 sterigmata and basal clamp.

Spores 4–4.5 x 2–2.5 μm , narrowly ellipsoid, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed coniferous and deciduous wood, mostly decorticate, but found also on bark. Biotope varying from *Hylocomium* — *Vaccinium* — *Pinus* — *Picea* forests to herb-rich deciduous forests.

Distribution. Collected in all the Scandinavian countries and is at least locally fairly frequent. In Sweden there are collections from Småland to Ångermanland, most of them from Västergötland. It has been found several times in Denmark (Sjælland) but there are only few collections from Norway and Finland. From outside Scandinavia we have seen material from Spain, C. France, Poland and Carpatorossia.

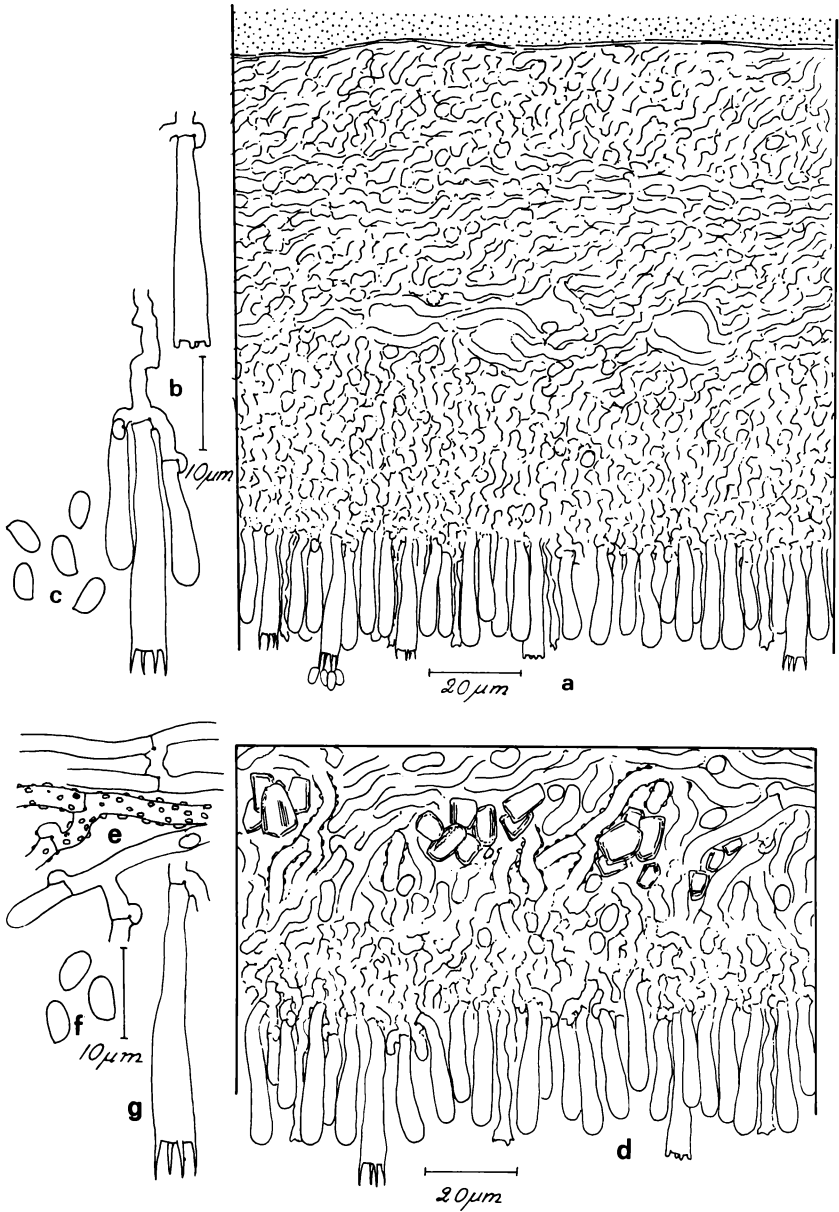


Fig. 572. *Phlebia lilascens* coll. a) section through fruitbody b) basidia c) spores. — Hjortstam 2737. *Phlebia lacteola* d) section through fruitbody e) hyphae f) spores g) basidium. — Bourdot 8219.

Phlebia

Remarks. It is not fully clear if what is here named *Ph. lilascens* is one species or a species complex. The differences in microstructures are too small to allow its separation in several taxa, but at the same time it is not convincingly uniform and there are good reasons to believe that more than one species is included. There are small differences esp. in the shape of the spores, caused by a greater variation in width than in length. Experience says that in the natural spore variation length is more variable than width. The variation in colour of the fruitbody is considerable but this characteristic is of less taxonomic importance. Bourdot found that his *C. lilascens* was restricted to deciduous wood while most of the Nordic specimens grow on conifer wood, esp. on pine. Without culture criteria we find it necessary to treat *Ph. lilascens* in our sense as one species. The material on which the conclusion is based is fairly comprehensive Nordic material, mostly from Sweden and Denmark, including the holotype collection of *C. pallidoincarnatum* Litsch., further the holotype (herb. Bourdot n. 5516) and 2 other authentic collections (herb. Bourdot n. 5515 and 18543) of *C. lilascens*. The species was also named *C. serialis* e.g. by Bourdot and *Ph. serialis* by Donk. This opinion is based on a fragment, sent by Bresadola to Bourdot, of a specimen, which should have been determined by E. Fries as *C. seriale*. However, there is no such specimen in herb. Fries (UPS) now, but three good specimens collected by Fries and determined by him as *C. seriale*, which belong to the species here described as *Ph. serialis*.

Another species name to consider is *Corticium lacteolum* Bourd., Soc. Sci. Bourb. p. 14, 1922. It has the same small spores and fibulate hyphae and could therefore be thought to belong to the *Ph. lilascens*-complex. It differs, however, in having milk-white fruitbodies in the living state, and a different (looser) hyphal texture, with wider, when dried collapsed hyphae. Bourdot & Galzin didn't, consequently, place this species in sect. 9 *Ceracea* of *Corticium* but in sect. 6 *Arescentia*. Even if there are similarities in the dry material, we take for granted that this is a species of its own, distinguished from *Ph. lilascens*. M.P. Christiansen reports *Corticium lacteolum* from Denmark and refers it to *Phlebia*. We have not seen any material collected by Christiansen, but judging from his description (Dansk bot. ark. 19:2 p. 167, 1960) his *Ph. lacteola* might rather belong to the *Ph. deflectens*-complex in having thin-walled cystidia and no clamps. Specimens later collected by K. Hauerslev in Denmark and determined *Ph. lacteola* are as a rule *Ph. lilascens* in our opinion.

Ph. pallidolivens (Bourd. & Galz.) Parm., Eesti NSV Tead. Akad. Toim. XVI. Biol. 167:4 p. 391, was originally described as *Corticium seriale* ssp. *pallidolivens* Bourd. & Galz., Bull. Soc. Myc. France 27

p. 254, 1911. We have seen two specimens of this species, n. 5545 and 14125 in herb. Bourdot (P). The former specimen, from 1908, agrees with the protologue and is evidently a syntype. The latter, from 1910, deviates and is apparently conspecific with *Ph. lilascens*. The true *C. pallidolivens* is a species of its own. It has larger spores, reaching $9 \times 4.5 \mu\text{m}$, has a gelatinous hymenium and a thin but distinct subiculum, which extends beyond the hymenium and forms a whitish marginal zone. The species, which preferably grows on branches of pine, fallen or still attached, could possibly be found in N. Europe.

Two specimens, one collected by Eriksson in 1959 (n. 2949) and the other by Hjortstam in 1977 (n. 24719), both from Småland (Värnamo, Moen, on coniferous wood) evidently represent a taxon of their own. The fruitbody has a yellow-ochraceous colour, brighter than in *Ph. lilascens* even in the wide sense here given it, and, which is more im-

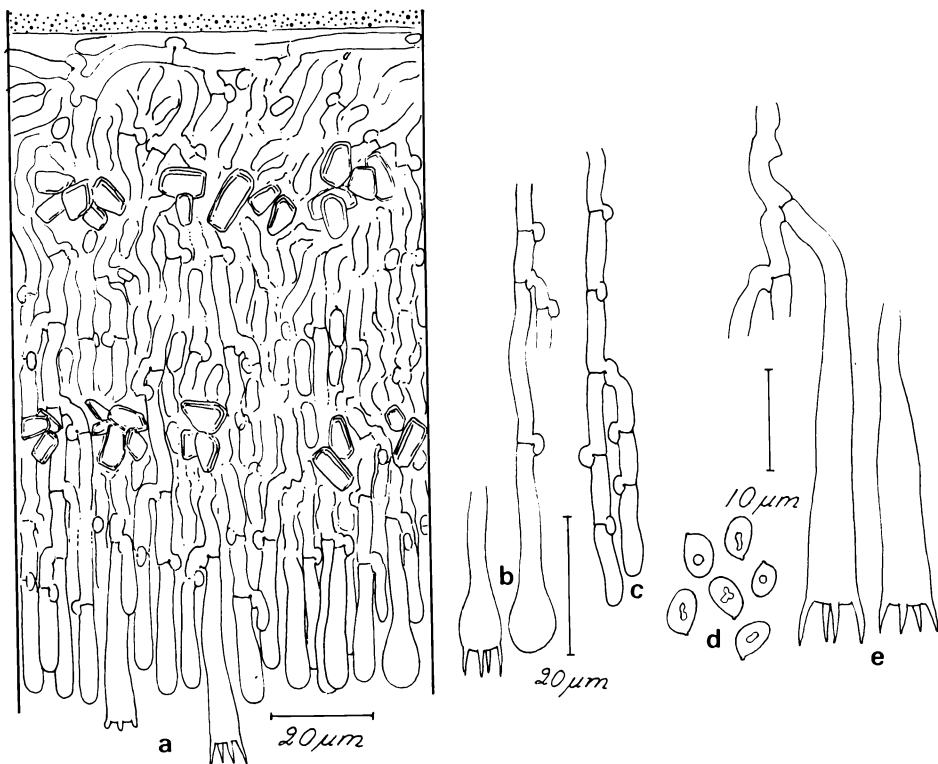


Fig. 573. *Phlebia* sp. a) section through fruitbody b) clavate basidia c) subhymenial hyphae d) spores e) normal basidia. — J. Eriksson 2949.

Phlebia

portant, the spores are rounder and remarkably thin-walled (fig. 573).

Corticium pallido-virens Bourd. & Galz., Hym. de France p. 215, 1928, is another species which reminds of *Ph. lilascens* in several respects. In the description a difference in colour of the fruitbody and in the size of spores is reported, but the colour is an unreliable characteristic and the spore sizes overlap. We have studied one specimen (herb. Bourdot 35798), which is in poor condition with most spores collapsed, and from this specimen no definite conclusions can be drawn as to the taxonomic value of *C. pallidovirens*. It seems, however, to be close to *Ph. lilascens*.

Litschauer collected in the year 1920–27 a species which he after correspondence with Bourdot published as *Corticium pallido-virens* Bourd. & Litsch. in Litsch., Österr. bot. Zeitschr. 77 p. 123, 1928. In the Vienna herbarium there are 5 specimens from two localities. One of them is a syntype (W.n. 16376), two are isosyntypes of the same. The two remaining specimens are collected in the syntype locality Ruetztal. These specimens shows that *C. pallido-virens* Bourd. & Litsch. is not conspecific with *C. pallido-virens* Bourd. & Galz. They are homonyms, but not synonyms, and as *C. pallido-virens* Bourd. & Galz. seems to be first published, the species described by Litschauer should get a new name, with the cited syntype as type.

Being a non-fibulate species its generic place is a problem, but just like the non-fibulate *Phlebia deflectens* it is in the present taxonomical situation best placed in *Phlebia* s.l.

According to Bourdot & Galzin (l.c.) Litschauer had in their correspondence suggested the species name *Corticium viride-salebrosum* for his species, and this name is herewith validated:

***Phlebia viride-salebrosum* Erikss. & Hjortst. nom. nov.** - *Corticium pallido-virens* Bourd. & Litsch. – non *C. pallido-virens* Bourd. & Galz. Protologue: Litschauer, l.c.

Lectotype: Australia, Tirol, small forest near Stams in Oberinntal, on decayed, fallen branches of *Corylus avellana* and *Alnus incana*, 1926.06.06., V. Litschauer 16376 (W). Besides in W two isotypes.

Paratypes: Austria, Tirol, Ruetztal near Ruezwerk, Stubai, on dry branches of *Alnus incana*, 1927.07.15. V. Litschauer 15285 (W); d.o, Ruezbachschlucht near Ruezwerk, on decayed twigs of *Alnus incana* and *Corylus avellana*, 1923.09.09, V. Litschauer 41507 (W).

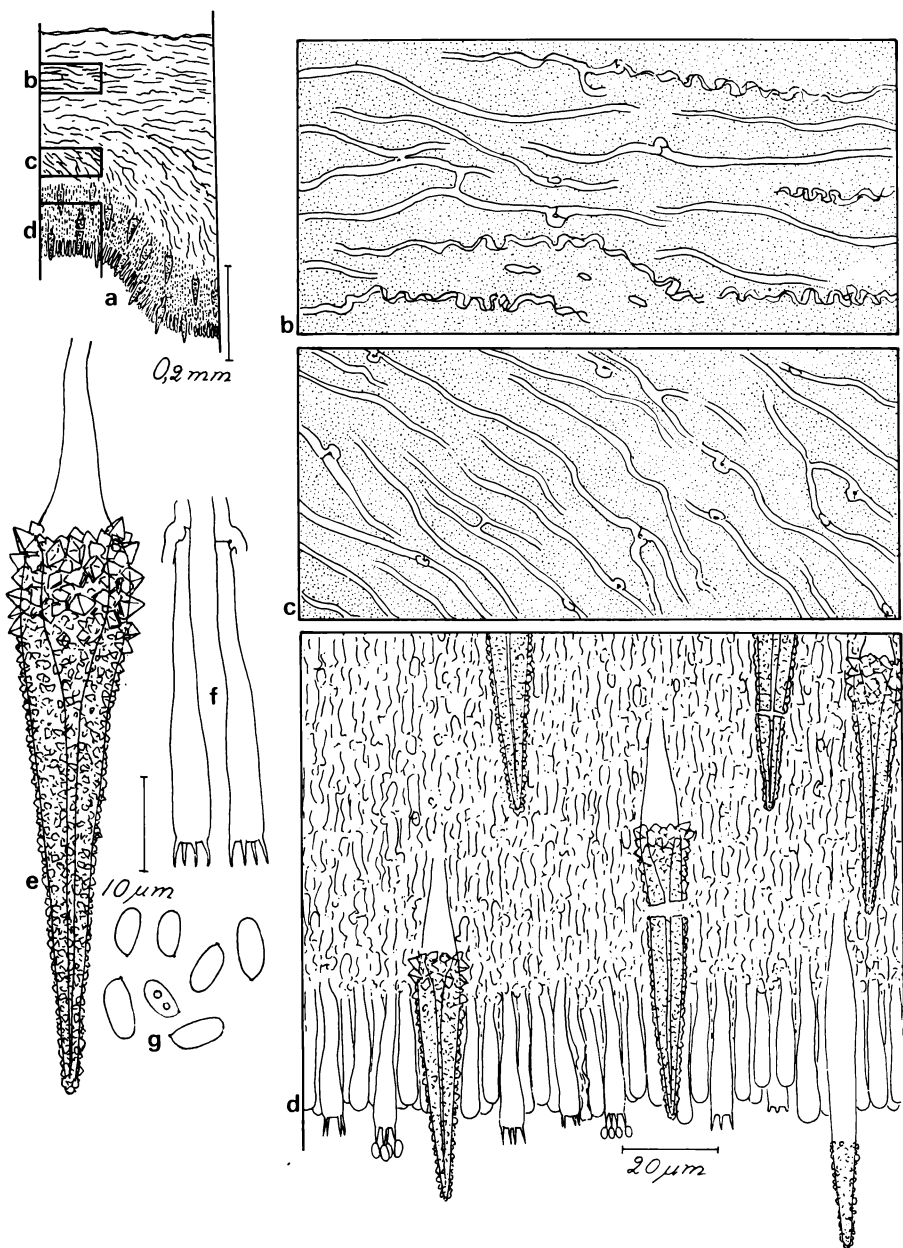


Fig. 574. *Phlebia lindtneri* a) schematical section through part of fruitbody b) section through part of subiculum c) of transitional layer d) of hymenium and part of subhymenium e) cystidium f) basidia g) spores. — A. Strid.

Phlebia

Fig. 574

15. **Phlebia lindtneri** (Pilát) Parm. in Strid, Wahlenbergia. I p. 74, 1975. - *Peniophora lindtneri* Pilát, Bull. Soc. Mycol. France 53 p. 97, 1937. - *Phlebia merulioidea* Parm., Not. Syst. Inst. bot. Komar. Sci. 15 p. 127, 1962.

Fruitbody resupinate or with somewhat reflexed margin, quite loosely adnate, 1–2 mm thick, orbicular and confluent – effused, when fresh ceraceous, watery semihyaline and totally attached, when dried horny, hard and brittle and often loosening from the margin; hymenium folded, in the marginal partly mainly radially, in the central part in all directions, forming a meruloid to reticulate pattern with meshes, sometimes 1–2 mm wide, but often more crowded together; colour (in the herbarium) of the whole fungus greyish, or in older parts turning to pale ochraceous; margin fibrillose in the growing fungus, in old specimens fertile throughout.

Hyphal system monomitic; hyphae mostly 1.5–2.5 μm wide, but locally widened to 5 or 7 μm , thin-walled, with clamps and anastomoses; hyphae of the subhymenium vertical, united into a dense, often stratified tissue, those of the subiculum embedded into a gelatinous matrix, rather sparse and with some hyphae empty, collapsed and then often spiralled.

Cystidia numerous, 60–110 μm long, 10–15 μm wide (incl. encrustation). conical, generally acute, at first thin-walled and naked, then encrusted with a crystalline cover and also with an inner thickening of the wall through addition of wall substance in the encrusted part; basal, not encrusted part remaining thin or only slightly thickened; young thin-walled cystidia earlier described as gloeocystidia.

Basidia narrowly clavate, 30–40 x 4–5 μm , with 4 sterigmata and basal clamp, forming a very dense hymenial palisade.

Spores ellipsoid – oblong, 5–6.5 x 2.5–3 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed deciduous or coniferous wood, in Sweden *Pinus sylvestris* and *Picea abies*.

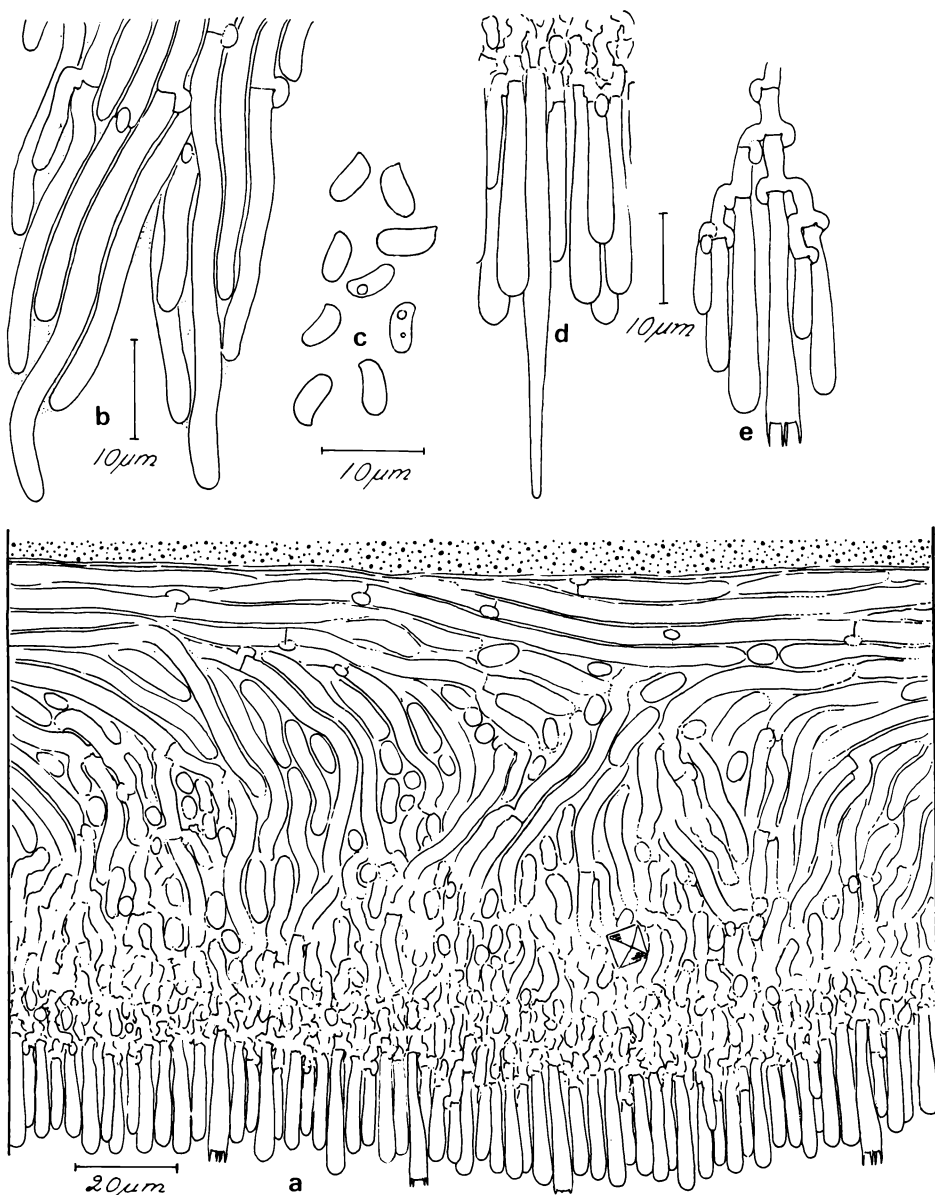


Fig. 575. *Phlebia livida* a) section through fruitbody b) marginal hyphae c) spores d) part of hymenium e) basidia. — Hjortstam 11866.

Phlebia

Distribution. Very rare species, though being very characteristic, known only from some few localities. In Sweden found twice viz. in Stockholm (H. Kugelberg 1890, det. J. Ginns) and in Västerbotten (Å. Strid 1971), in Norway in Hedmark (E. Høgholen, 1979). Outside N. Europe found in Yugoslavia (Lindtner), in Iran (N. Hallenberg), in the Sovjet Union (Siberia, E. Parmasto), and in Germany (H. Grosse-Brauckmann).

Remarks. Very characteristic species. It differs from the generic type in its meruloid hymenophore and in the presence of encrusted, metuloid cystidia. In other respects it fits the genus quite well, e.g. in the dense hymenium of narrow basidia. Its outer appearance should give it a natural place in *Merulius* s.str., but in the microstructures it comes closer to some *Phlebiae*. The definite solution of the generic arrangement will need a worldwide study of the meruloid species.

16. *Phlebia livida* (Fr.) Bres.,
Atti Accad. Sci. Lett. Arti Ag. ser. III
vol. III p. 105, 1897. - *Thelephora livida*
Fr., Syst. myc. I p. 447, 1821. - *Corticium*
lividum Pers., Obs. myc. I p. 38, 1796.

Fig. 575-79

Authentic specimen: Småland; Femsjö, Elias Fries. *Corticium lividum* Pers. (with Fries's own handwriting). Chosen as lectotype.

Fruitbody resupinate, closely adnate, confluent — effused, mostly 0.1–0.3 mm thick, sometimes more (in the warts), ceraceous when fresh, corneous in the herbarium; hymenium varying in colour, reddish, bluish or violaceous, depending on age and water content, at first smooth, then more or less tuberculate, often in the warts, a filling of crystals, finally emerging to the surface; margin sometimes fimbriate, in other cases indeterminately thinning out.

Hyphal system monomitic; hyphae with clamps, embedded into a conglutinate tissue, those of the subhymenium 2–3 µm wide, thin-walled, vertical, those of the basal layer 3–5 µm, horizontal, ± parallel, with walls somewhat thickened and swelling in KOH; in older fruitbodies often big heaps of crystals, finally emerging through the hymenium.

Cystidia varying in number and often difficult to find, in other cases quite frequent, subulate, 40–50 x 3–4 µm, thin-walled, not encrusted.

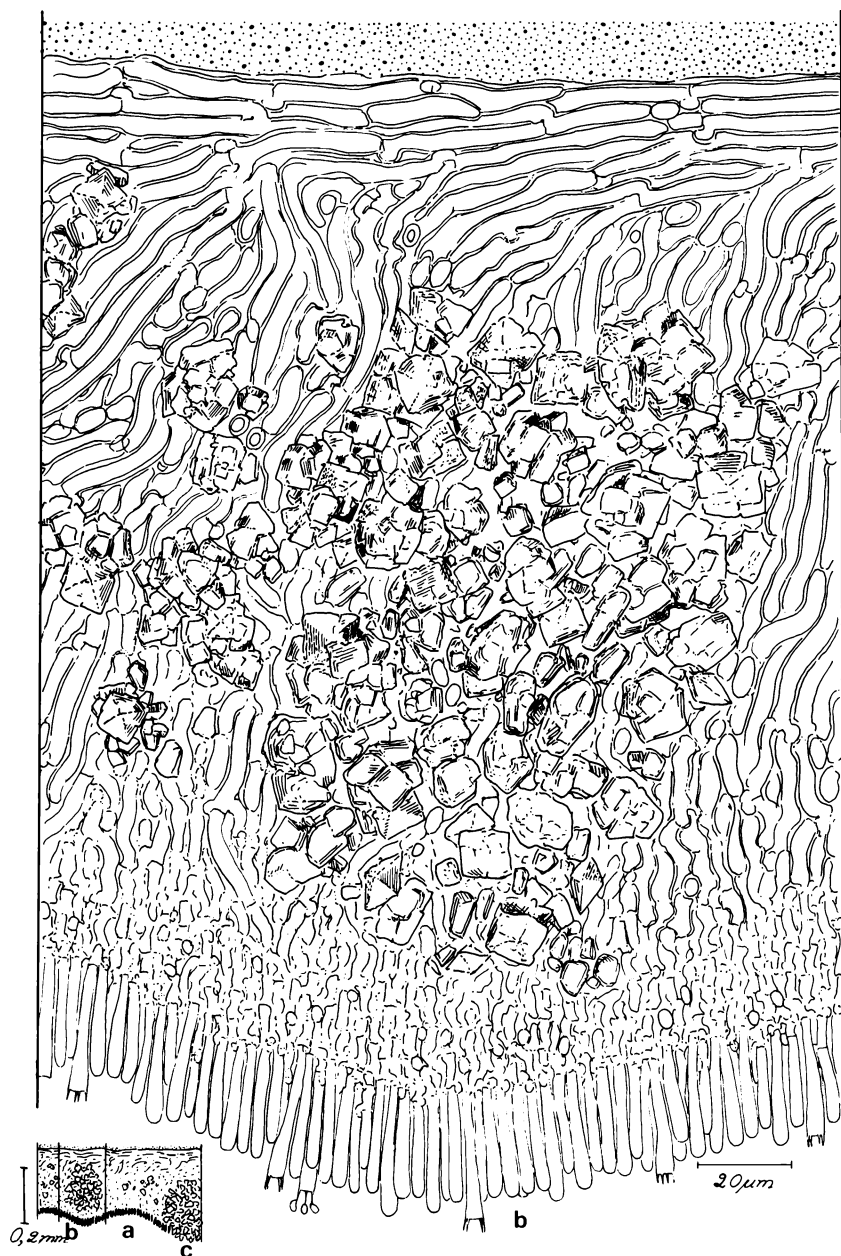


Fig. 576. *Phlebia livida* a) schematical section showing position b. At c crystal-masses erupt through the hymenium b) section through fruitbody with enclosed crystal masses. — Hjortstam 11868.

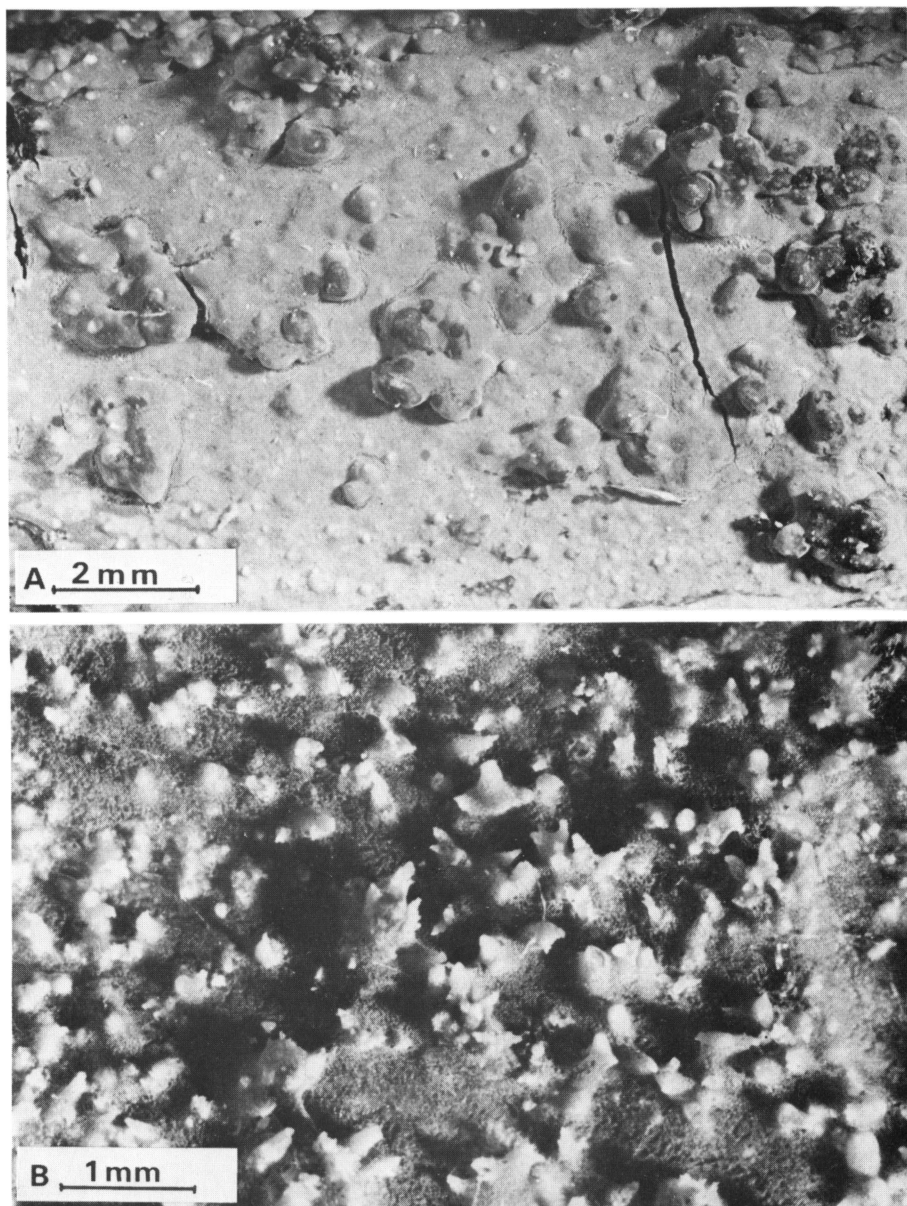
Phlebia

Fig. 577. *Phlebia livida*. a) tuberculate hymenium. — Hjortstam 11864. b) subodontioid hymenium. — O. Andersson & J. Eriksson 2838. Photo T. Hallingbäck.

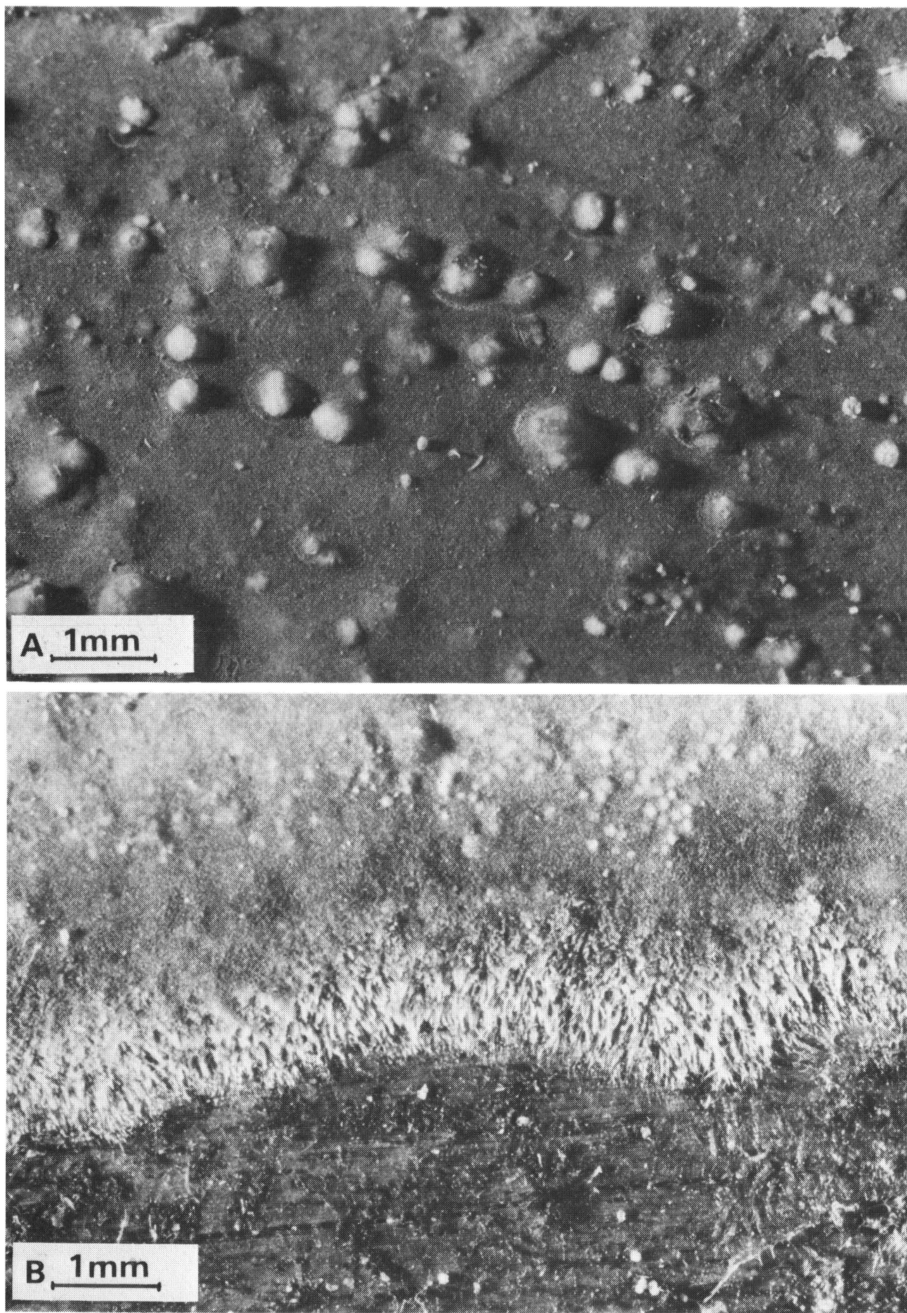


Fig. 578. *Phlebia livida*. Dried fruitbody a) showing enclosed crystal lumps b) the fimbriate margin. — Hjortstam 11863. Photo T. Hallingbäck.

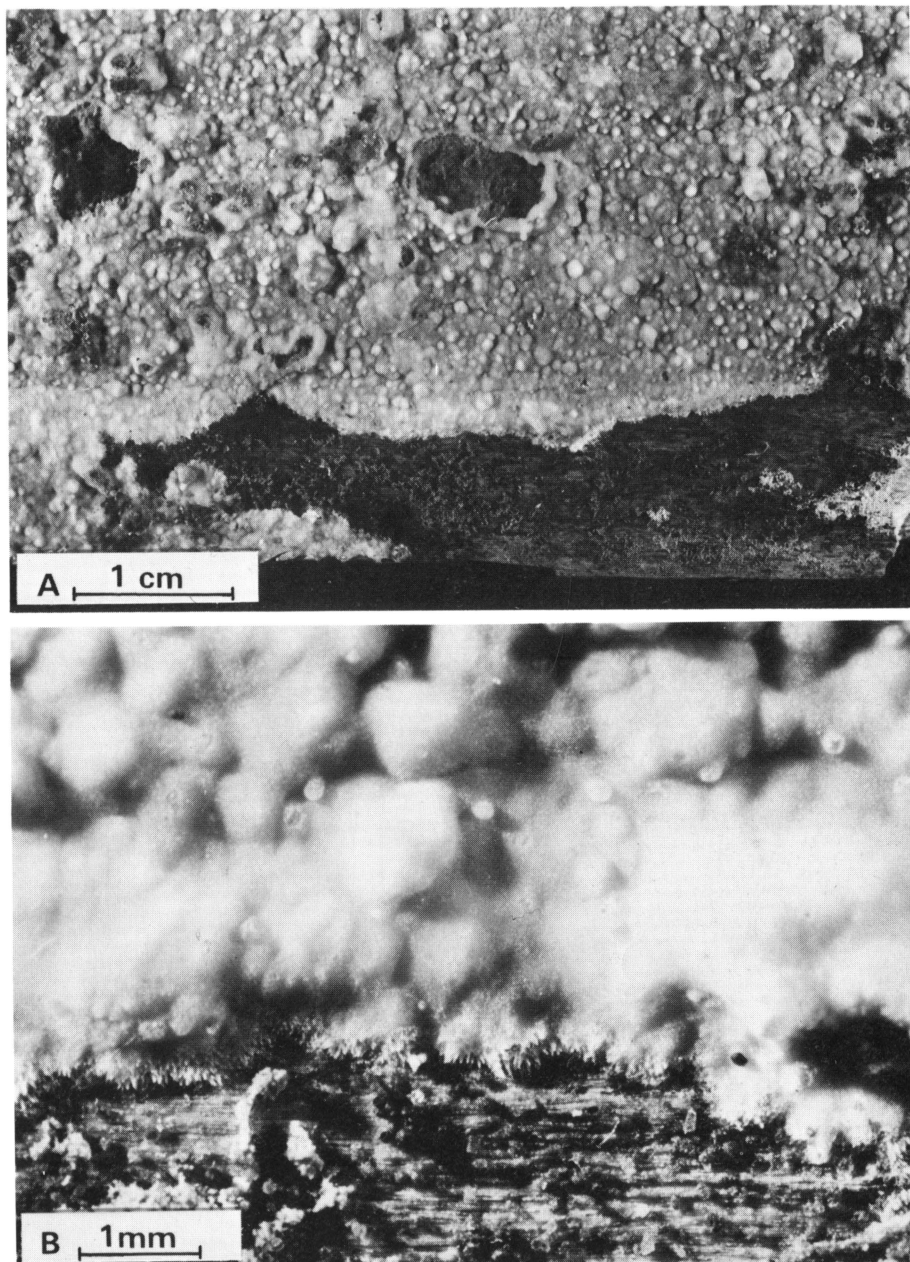


Fig. 579. *Phlebia livida*. Living fruitbody. a) showing the gradinoid hymenium
b) the fimbriate margin. — Hjortstam 11335. Photo T. Hallingbäck.

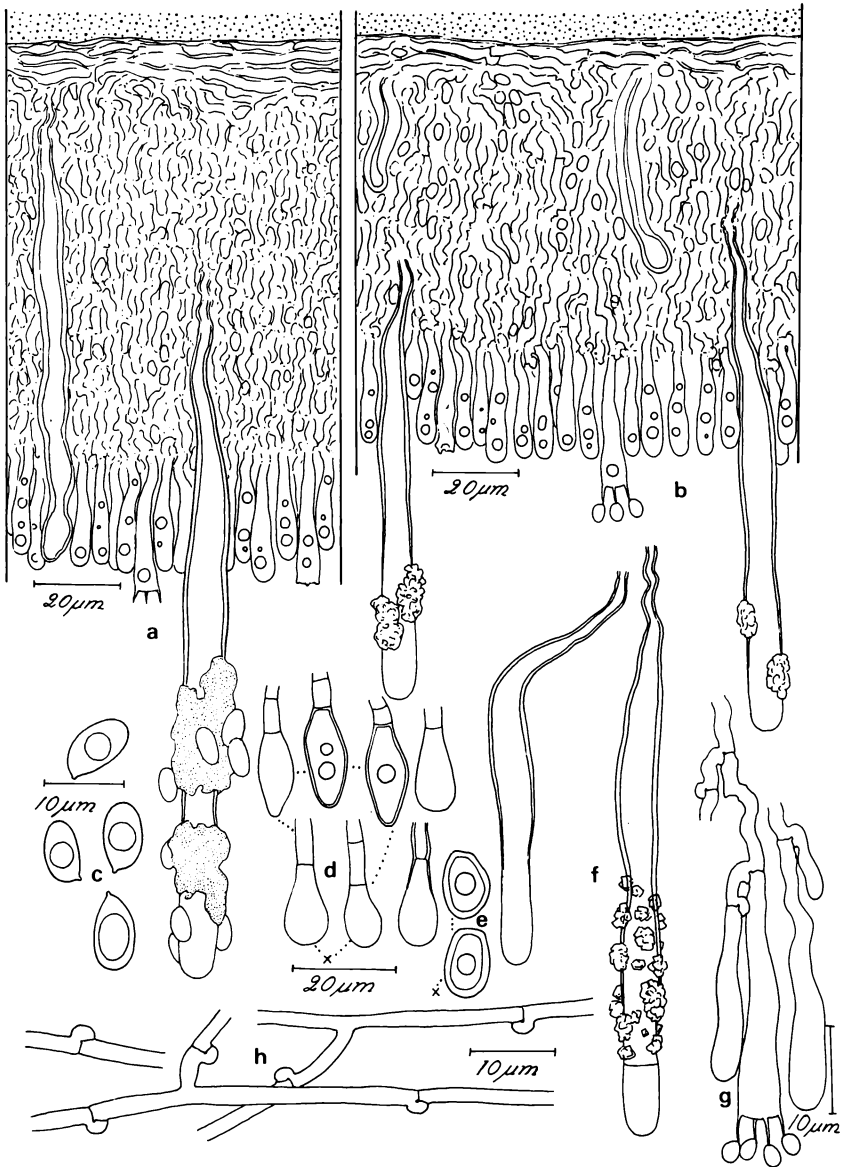


Fig. 580. *Phlebia longicystidia* a) section through fruitbody. Cystidium with resinous encrustation b) do. Encrustation crystalline c) basidiospores d) chlamydospore formation e) mature chlamydospores f) cystidia g) basidia h) hyphae from the wood. — Fagerström 1976.08.11. Chlamydospores marked with x from the holotype.

Phlebia

Basidia subclavate, 22–26 x 3.5–4 μm , with 4 sterigmata and basal clamp, standing in a dense palisade.

Spores 5–6 x 2–2.5 μm , subballantoid, thin-walled, smooth, with 1–2 oildrops, non-amyloid, non-cyanophilous.

Habitat. On decayed wood, in N. Scandinavia generally on coniferous wood, preferably *Picea*, in the S. more often on deciduous wood and is for example common on *Fagus*. The biotope is as a rule rather humid.

Distribution. *Ph. livida* is found in all forested parts of N. Europe except in subalpine birch forests and it is not rare, in some forests even quite frequent. M.P. Christiansen reports it as not rare in Denmark and in Sweden there are numerous collections from Skåne to N. Lappland. The distribution in Norway and Finland is very likely the same. Outside N. Europe it is widely distributed (C. and S. Europe, N. America, Asia).

Remarks. The species is variable, also if only the N. European material is considered. Much of the variation is a matter of age. Young fruit-bodies have as a rule a reddish colour while older ones turn to bluish or violaceous. The number of cystidia varies considerably. The characteristic crystal eruptions is totally absent in many species, while numerous in others. There seem, however, to be no good reasons to doubt its homogeneity. Whether or not *Ph. cacao* is a species of its own or only an aberrant form of *Ph. livida* is a problem not yet definitely solved.

17. **Phlebia longicystidia** (Litsch.)
Hjortst. & Ryv., Mycotaxon 9 p. 507,
1979. - *Peniophora longicystidia* Litsch.
Österr. Bot. Zeitschr. 77:2 p. 131, 1928.

Fig. 580

Fruitbody resupinate, closely adnate, elongate – effused, mostly 0.1–0.2 mm thick, when fresh softly ceraceous, when dried crustaceous; hymenium continuous, smooth, under the lens velutinous by the projecting cystidia, ash-grey to brownish-grey; margin pruinose to very finely fimbriate.

Hyphal system monomitic; hyphae fibulate, those of the subhymenium thin-walled, 2–3 μm , densely conglomerate; basal hyphae 3–4 μm , with thin to somewhat thickened walls, next to the wood a thin layer of horizontal hyphae; old tissue containing a yellowish, resinous encrustation.

Cystidia numerous, cylindrical, obtuse, 100 μm or more long, 7–12 μm wide, long projecting, thin-walled in the apical part, thick-walled towards the base, in old cystidia walls swelling in KOH, more or less encrusted with crystals or resinous matter; the cystidia may continue their apical growth and reach a considerable length (Litschauer : to 370 μm !).

Chlamydospores in multitude in the type specimen, formed in the end of vertical hyphae in the hymenium; at first rounded, claviform or fusiform and finally loosening, then rounded or angular, thick-walled, with one or more oil-drops; young chlamydospores grey in Melzer; mature ones 12–15 x 7–10 μm . Litschauer observed only the young chlamydospores, when still attached to the bearing hyphae and reported the whole structures as paraphyses. In the Nordic material only few and then thin-walled, still attached such spores are seen. In the mature state they resemble the chlamydospores of *Gloeocystidiellum porosum*, which, however, are dark brown.

Basidia narrowly clavate, 20–30 x 5–6 μm , with 4 sterigmata and basal clamp.

Spores ellipsoid-oblong, 6–9 x 4–5 μm , thin-walled, smooth, with 1 large oil-drop or 2 or more smaller ones, non-amyloid, non-cyanophilous.

Habitat and distribution. On coniferous wood. Very rare species. Except type locality (K. Keissler W, n. 10429, holotype, and n. 6549 isotype) we know it only from Finland (Karelia, Miekikkellä, Muhikko, 1976.08.11. L. Fagerström) and Norway (Hedmark, Høgholen).

Remarks. Characteristic species. Its relation to *Phlebia* may be uncertain, but its ceraceous structure gives it a better place here than anywhere.

Phlebia

Fig. 581-82

18. **Phlebia martiana** (Berk. & Curt.)
 Parm., Eesti NSV Tead. Akad. Toim.
 16. Biol. 1967:4 p. 391. - *Corticium*
martianum Berk. & Curt., Grev. I p.
 179, 1873. - *Peniophora egelandii* Bres.,
 Ann. mycol. 9 p. 428, 1911. - *Phlebia*
atkinsoniana Wm. B. Cooke, Mycologia
 48 p. 393, 1956. - *Phlebia pulcherrima*
 Parm. loc. cit. 392.

Fruitbody resupinate, closely adnate, effuse, 0.2–0.4 mm thick, in living state ceraceous, tuberculate – rugose, bright red or blood red to fuscous red, when dried corneous, somewhat tuberculate, darkening to umber – brown; margin in the young fruitbody orange, then indistinct.

Type species: Ravenel, Fungi carol. exs. fasc. V2:30.

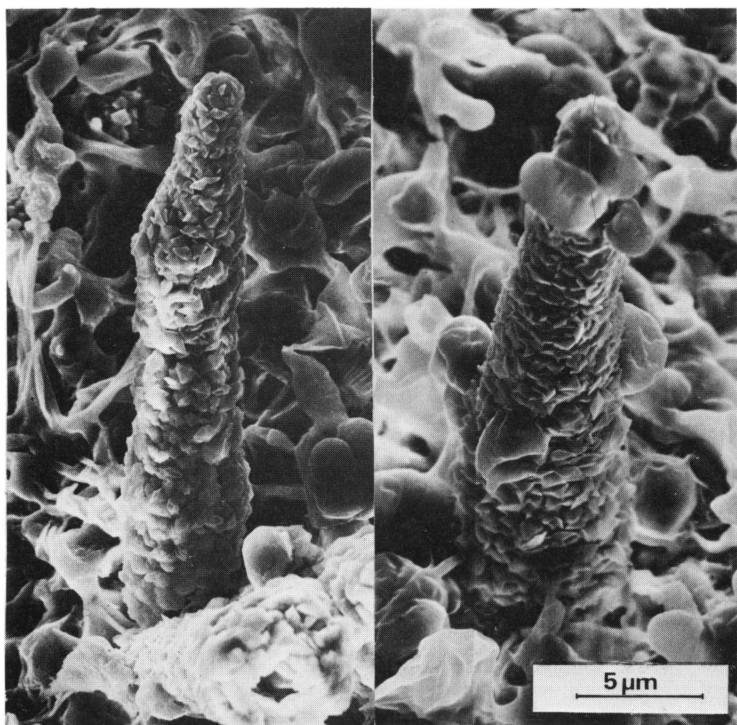


Fig. 581. *Phlebia martiana*. Encrusted cystidia. — Coll. Egeland 11534. SEM L. Ryvarden.

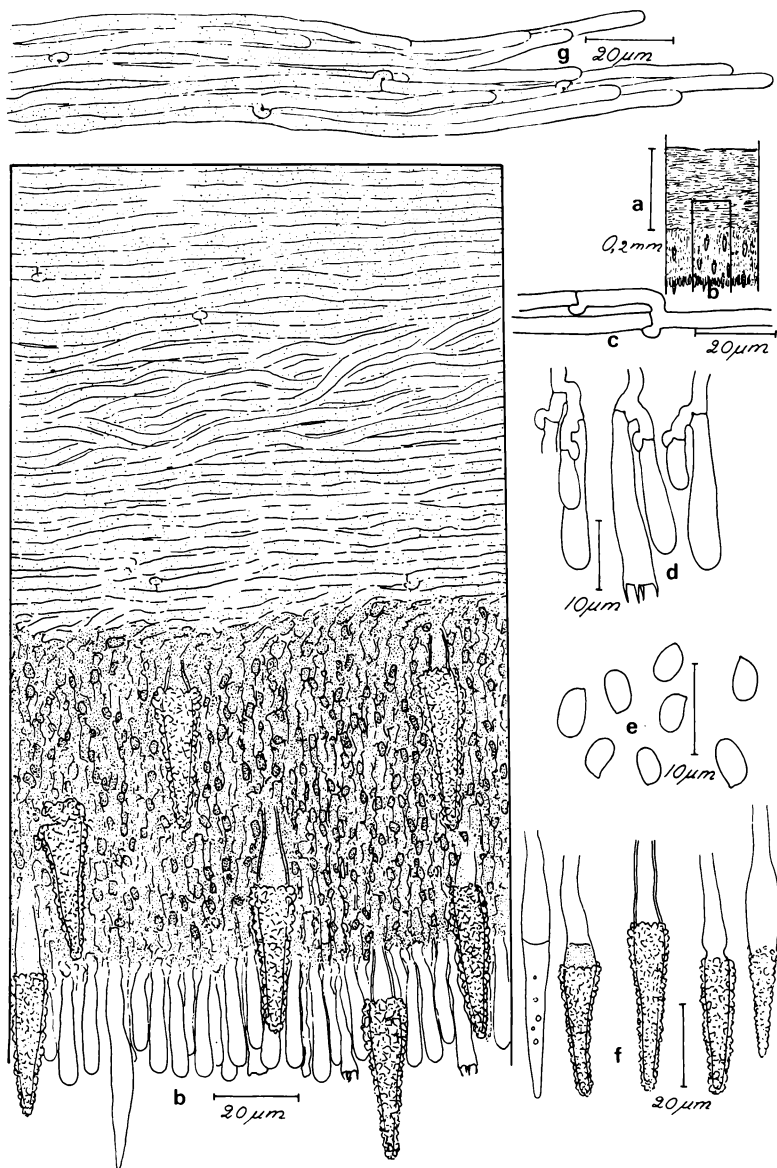


Fig. 582. *Phlebia martiana*. a) schematical section through fruitbody showing position of b) section through hymenium, subhymenium and part of subiculum c) hyphae d) basidia e) spores f) cystidia g) marginal hyphae. — a-f Egeland 1909, g Cain 11582. Dotting marks the yellow colour of subiculum and the yellow-brown parts of the subhymenium.

Phlebia

Hyphal system monomitic, hyphae 2–3 μm wide, clamped, conglomerate, vertical hyphae with a grainy – resinous encrustation, giving the layer a dark brown colour, yellow-brown under the microscope, subiculum bright orange-yellow, turning vinaceous red in KOH, composed of dense, horizontal hyphae; in crevices of the wood a yellow, cottony hymenium.

Cystidia numerous, at first thin-walled and naked, then in the distal, conical part with a yellow, crystalline encrustation, total length 50–60 μm , encrusted part 30–40 μm , greatest width 8–12 μm .

Basidia narrowly clavate, 20–30 x 4–6 μm , with 4 sterigmata and basal clamp.

Spores ellipsoid, 4–5(–6) x 2.5–3.5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed wood. In the protologue of *Peniophora egelandii* the substrate is reported as "In Abieti", which, however, is not true. Egeland wrote on the label of the first collection (1909) "spruce stump", on later collections (1914–18) *Fraxinus*, after information from L. Romell, to whom he sent material. The species seems to be restricted to biotopes on rich soils.

Distribution. Extremely rare. In N. Europe collected only in the neighbourhood of Oslo (Berg and Hoff) by J. Egeland between the years 1909 (type of *P. egelandii*) and 1918. It is reported from the Sovjet Union and from N. America, where it seems to be more frequent in the eastern part.

The duplicate of Ravenel: Fungi carol. exs. V:30 in herb. Uppsala (UPS) agrees with the Nordic material but for the size of spores which are somewhat larger, 5–7 μm long (4–5 μm in coll. Egeland). They are no doubt conspecific. The Ravenel exsiccate is labelled: *Corticium martianum* Berk. & Curt.! ad corticem mort. *Betulae*. Alabama, coll. cl. Peters. We suggest that a duplicate from an American herbarium is chosen as lectotype.

Remarks. Already Romell noted, on an Egeland specimen "an *Phlebia*". The living fungus resembles as to the shape and colour of the hymenium *Ph. radiata*, but differ, except in microstructures, in the orange subiculum. Even if it is not close to the type species of *Phlebia*, it may have a place in *Phlebia* s.l. as it is delimited here.

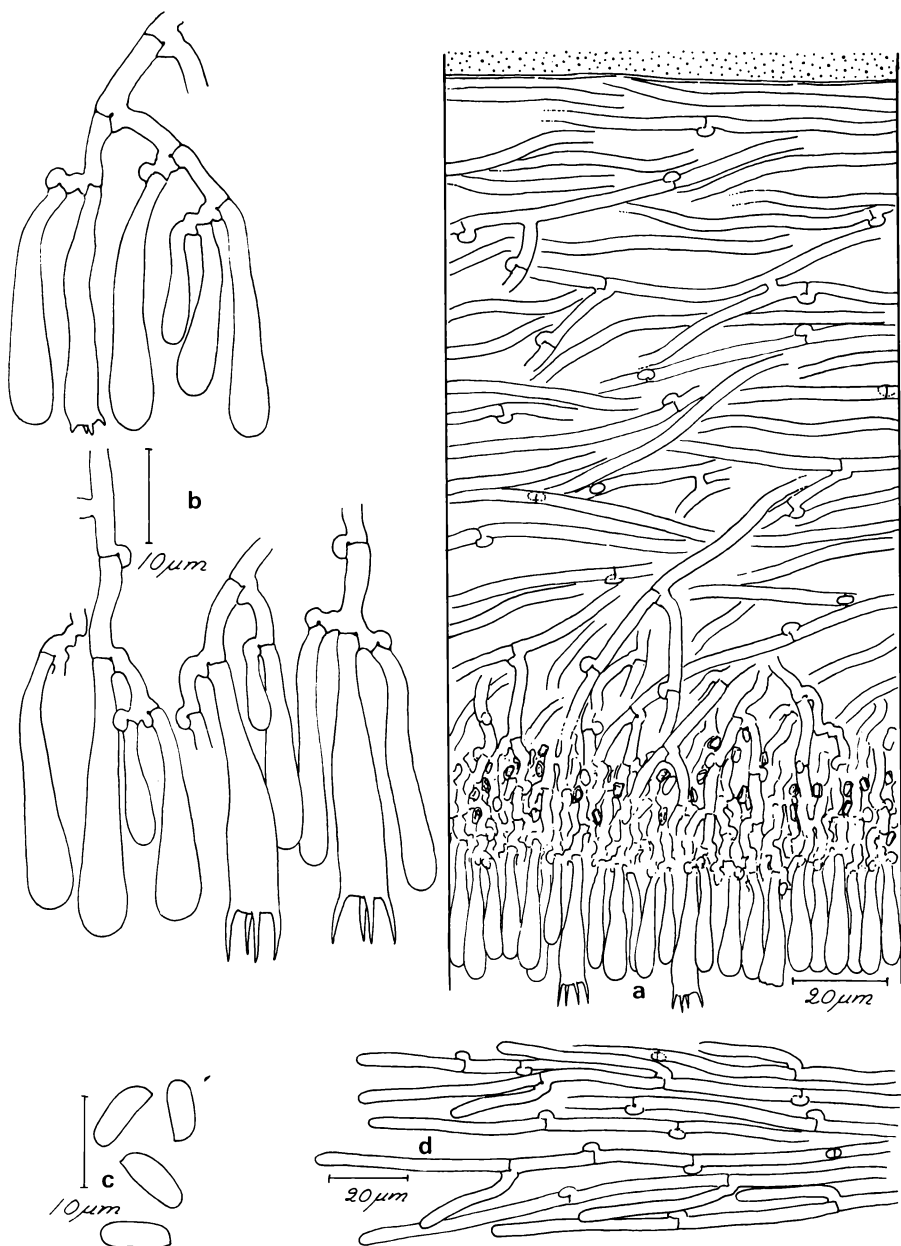


Fig. 583. *Phlebia nitidula* a) section through young fruitbody b) basidia c) spores d) marginal hyphae. — Hjortstam 1749.

Phlebia

Fig. 583

19. **Phlebia nitidula** (Karst.) Ryv.
Rep. Kevo Subarc. Res. Stat. 8 p. 151,
1971. - *Corticium nitidulum* Karst., Medd.
Soc. F. Flora Fenn. VI p. 11, 1881.
- *Corticium deflectens* n. 3 in Bourdot &
Galzin, Hym. de France p. 218, 1928.

Fruitbody resupinate, closely adnate, mostly remaining orbicular and small, sometimes confluent along the twig, 0.1–0.3 mm thick, in the living state ceraceous, when dried membranaceous; hymenium smooth or somewhat tuberculate, continuous or in older fruitbodies cracked in pieces, at first whitish, then yellowish and finally brown but then as a rule with the margin remaining light-coloured, often fimbriate under the lens.

Hyphal system monomitic; hyphae thin-walled, 2–3(–4) μm wide, richly branched and with clamps at all septa, those of the subhymenium vertical, densely conglutinate, often with a grainy resinous encrustation, in the subhymenium more distinct in a rather open tissue, mainly horizontal.

Cystidia none.

Basidia clavate, 25–30 x 5–6 μm , with (2–)4 sterigmata and basal clamp.

Spores narrowly ellipsoid – subcylindrical, 6–8 x 2.5–3.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On dead, still attached branches of *Salix* in thickets and mixed forests, often 1–3 m above the ground, sometimes on fallen twigs and branches. Of all specimens seen, only one is observed on another substrate, viz. *Populus tremula*.

Distribution. Quite common species at least in N. Scandinavia. Collected several times also in Västergötland. In Norway and Finland it can probably be found everywhere. Not collected in Denmark. Reported from Estonia by E. Parmasto. We have seen no collections from S. and C. Europe, but several from N. America.

Remarks. *Ph. nitidula* is one of the characteristic species of hanging brittle *Salix*-twigs and grows often together with *Peniophora violaceo-livida*, *Cytidia salicina*, *Exidia recisa*, *Laeticorticium roseum* a.o. Presence of clamps distinguishes it from the very similar *Phanerochaete jose-ferreirae*. Nomenclatorically it has often been confused, e.g. by Bresadola and Bourdot, with *Ph. deflectens*, from which it is very well distinguished.

20. ***Phlebia ochraceofulva*** (Bourd. & Galz.)
 Donk, Fungus 27 p. 12, 1957. - *Corticium ochraceofulvum* Bourd. & Galz.,
 Bull. Soc. Myc. France 27 p. 257, 1911.
 - *Corticium subseriale* Bourd. & Galz. ssp.
ochraceo-fulvum (Bourd. & Galz.) Bourd.
 & Galz., Hym. de France p. 220, 1928.

Fig. 584

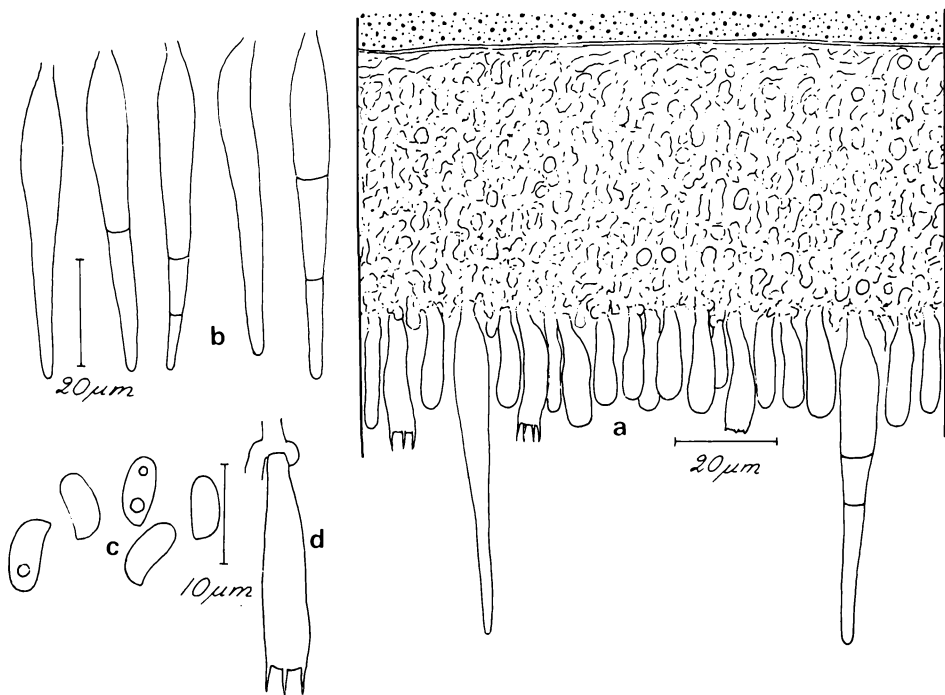


Fig. 584. *Phlebia ochraceofulva* a) section through fruitbody b) cystidia c) spores d) basidium. — Hjortstam 1515.

Phlebia

Fruitbody resupinate, closely adnate, orbicular — confluent, ab. 0.1–0.2 mm thick, ceraceous or subgelatinaceous in the living state, crustaceous in the herbarium; hymenium usually smooth, varying in colour, pale brownish or violaceous grey to rust coloured; margin mostly indeterminate.

Hyphal system monomitic; hyphae with clamps, thin-walled, 2–3 μm wide, forming a densely conglutinate tissue; no subicular layer or a very thin layer of horizontal hyphae.

Cystidia numerous, 40–65 x 4–7 μm , tapering to a narrow but obtuse apex, often with a 1 — more adventitious septa.

Basidia clavate, 20–25 x 4–5 μm , with 4 sterigmata and basal clamp.

Spores 6–7 x 3 μm , ellipsoid — subballantoid, adaxial side slightly concave — straight — slightly convex.

Habitat and distribution. On decayed deciduous wood in humid localities. Its distribution in N. Europe little known, but it seems to occur sparsely in the southern part (Sverige: Västergötland, Norway: Hordaland, Rogaland, Sogn og Fjordane, and Denmark. Not known from Finland).

Remarks. It is doubtful if *Ph. ochraceofulva* can be maintained as a species of its own. It is very close to *Ph. subochracea*, from which it differs in colour and consistency of the fruitbody. The latter species has a lighter colour and usually retains a light orange to brick-red colour also in the herbarium. *Ph. ochraceofulva* has a denser tissue with indistinct hyphae while in *Ph. subochracea* the tissue is more open with easily visible hyphae. There are, however, at least in the dry material intermediate forms and the matter cannot be fully solved without culture tests.

Bourdot & Galzin evidently knew the species well from several collections and had studied it in the field at all times of the year. We have seen too few of these collections to be able to make a well notified type selection.

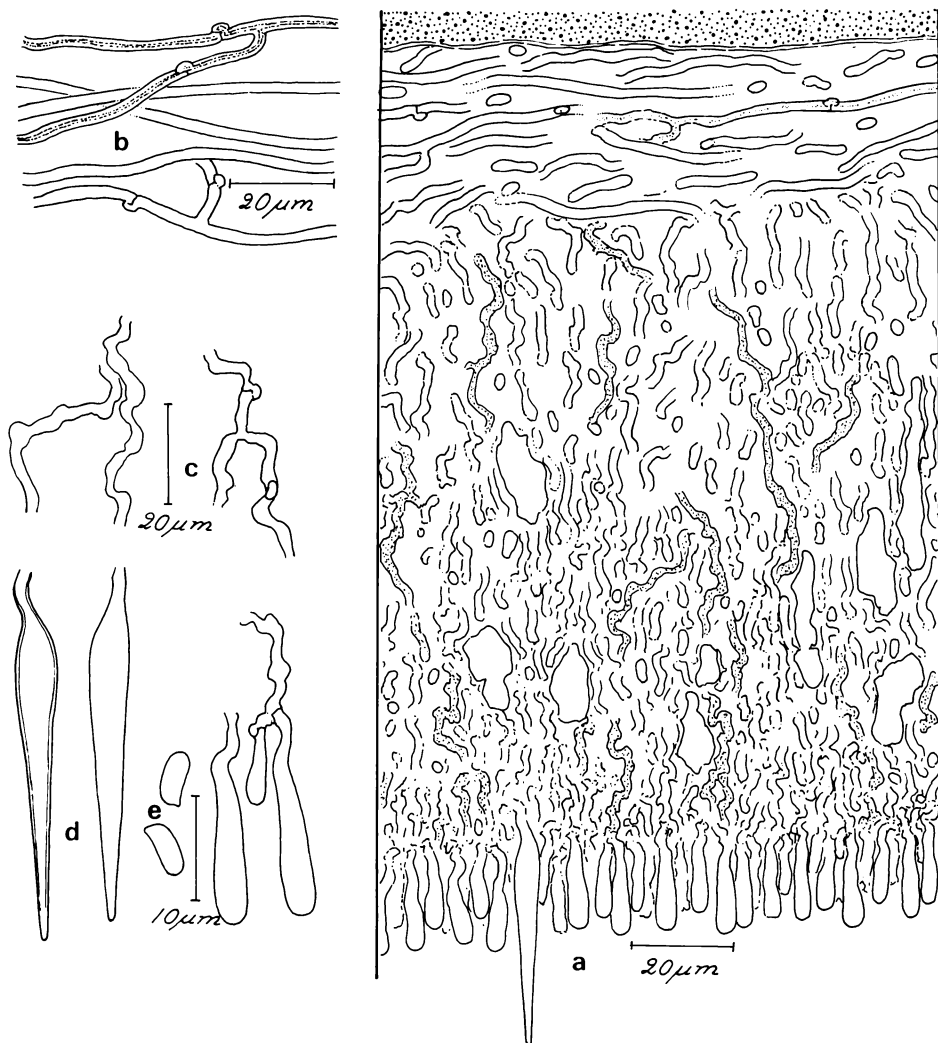


Fig. 585. *Phlebia phlebioides* a) section through fruitbody b) subicular hyphae c) subhymenial hyphae c) cystidia d) spores e) basidia. — Jackson 11546 (isotype). Plasma-filled hyphae dotted in section a. Cotton-blue.

Phlebia

Fig. 585

21. **Phlebia phlebioides** (Jacks. & Deard.)
 Donk, Fungus 27 p. 12, 1957.
 - *Peniophora phlebioides* Jacks. &
 Deard., Can. Journ. Res. C. 27 p. 150,
 1949. - *Jacksonomyces phlebioides*
 (Jacks. & Deard.) Jül. Persoonia 10 p.
 329, 1979.

Fruitbody resupinate, closely adnate, effuse, 0.1–0.2 mm thick, ceraceous in the living state, crustaceous when dried; hymenium white to cream-coloured, smooth, somewhat folded or irregularly tuberculate; margin indeterminate, thinning out.

Hyphal system monomitic; hyphae 1.5–3 μm wide, with clamps, embedded in a gelatinous matrix, vertical in the thickening subhymenium, horizontal in the thin subiculum.

Cystidia numerous, subulate, 25–45 x 3.5–4.5 μm , with thin or slightly thickened walls, smooth, not encrusted.

Basidia clavate, 18–20 x 3.5–4.5 μm , with 4 sterigmata and basal clamp.

Spores subballantoid, 4.5–5.5 x 2–2.5 μm , adaxial side somewhat convex, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat and distribution. On coniferous wood (*Pseudotsuga*).
 Hitherto not known outside N. America.

Remarks. Closely related to *Phlebia segregata*, but well distinguished in the size and shape of cystidia. Superficially resembling *Ph. subserialis* in the shape of cystidia and spores, but with a more gelatinous fruitbody. Studied material: isotype (I. Mounce 11546). Not found in Europe. Jülich described *Jacksonomyces* without any discussion as to the limitation of the new genus, evidently hoping that it some time may be needed if *Phlebia* s.l. becomes split into small genera. Though not being a North-European species it is for comparison treated here.

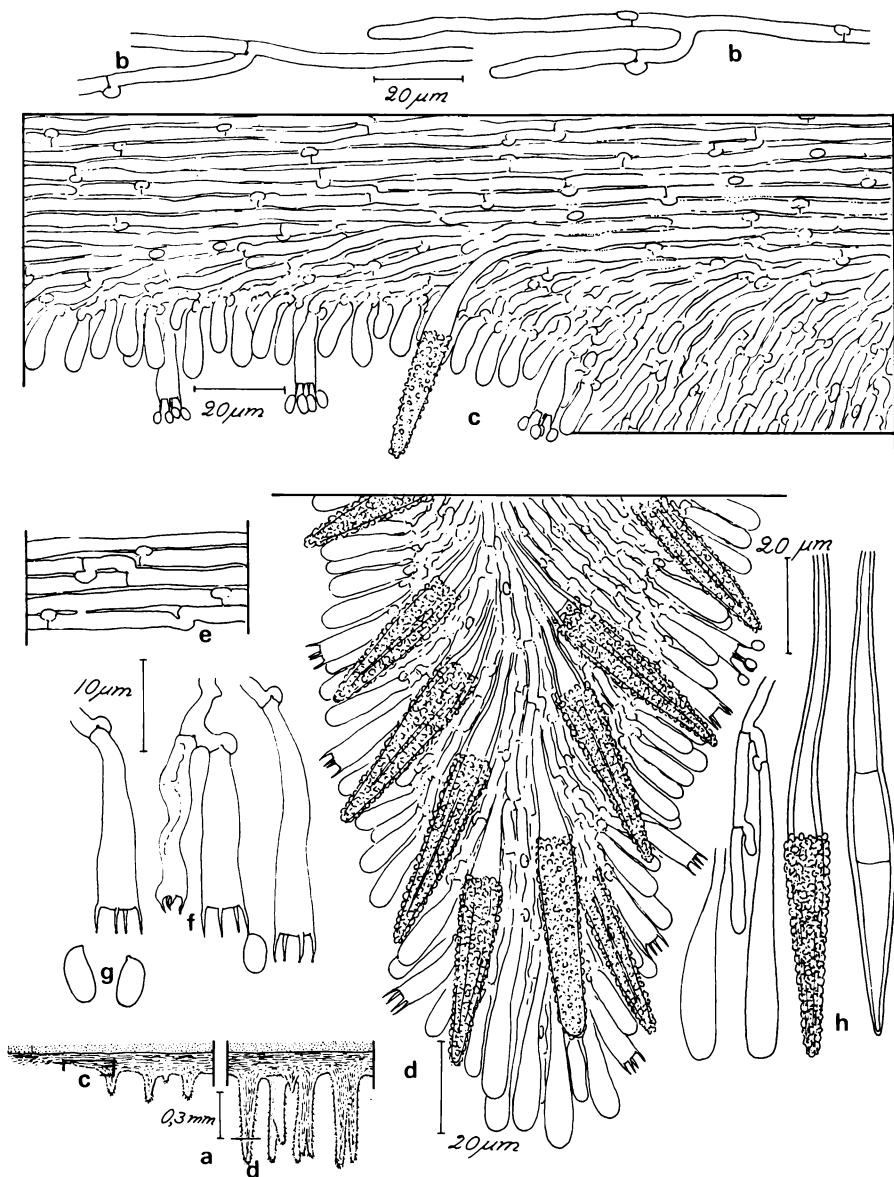


Fig. 586. *Phlebia queletii* a) schematical section through marginal and central part of fruitbody with positions of c and d b) marginal hyphae c) section through marginal part with young hymenium d) section through top of a hymenial tooth e) subicular hyphae f) basidia g) spores h) cystidia. — M.P. Christiansen.

Phlebia**22. *Phlebia queletii* (Bourd. & Galz.)**

Fig. 586-87

M.P. Christ., Dansk bot. ark. 19:2 p. 176,

1960. - *Odontia queletii* Bourd. & Galz.,

Bull. Soc. Myc. France 30 p. 270, 1914.

- *Odontia pinastris* s. Quel. in Bourd. & Galz. l.c. p. 435.

Fruitbody resupinate, adnate, orbicular — confluent, white or yellowish in the living state, yellow-ochraceous when dried; hymenophore odontoid with dense short aculei, 0.5–1 mm long, on a thin subiculum; margin thinning out indeterminately or sometimes finely pubescent.

Hyphal system monomitic; hyphae thin-walled, with clamps at all septa, 2–3 μm wide, densely united into a conglutinate tissue both in the centre of the aculei and in the subiculum.

Cystidia numerous, 50–100 x 6–12 μm , fusiform, with an apical, conical, encrusted part, 35–50 μm long; walls thin in the young cystidia, e.g. in the aculeal apices, then thickened; adventitious septa often seen.

Basidia clavate, 15–25 x 4–5 μm , with 2–4 sterigmata and with basal clamp.

Spores narrowly ellipsoid, 5–6 x 3–3.5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On branches of *Abies alba*, both on still attached and fallen ones.

Distribution. In Scandinavia found only in Denmark (M.P. Christiansen). In Sweden looked for in *Abies* plantations, e.g. on Omberg, but without result.

Remarks. Well distinguished from other phlebioid fungi in the area. It could perhaps just as well be placed in *Mycoacia*.

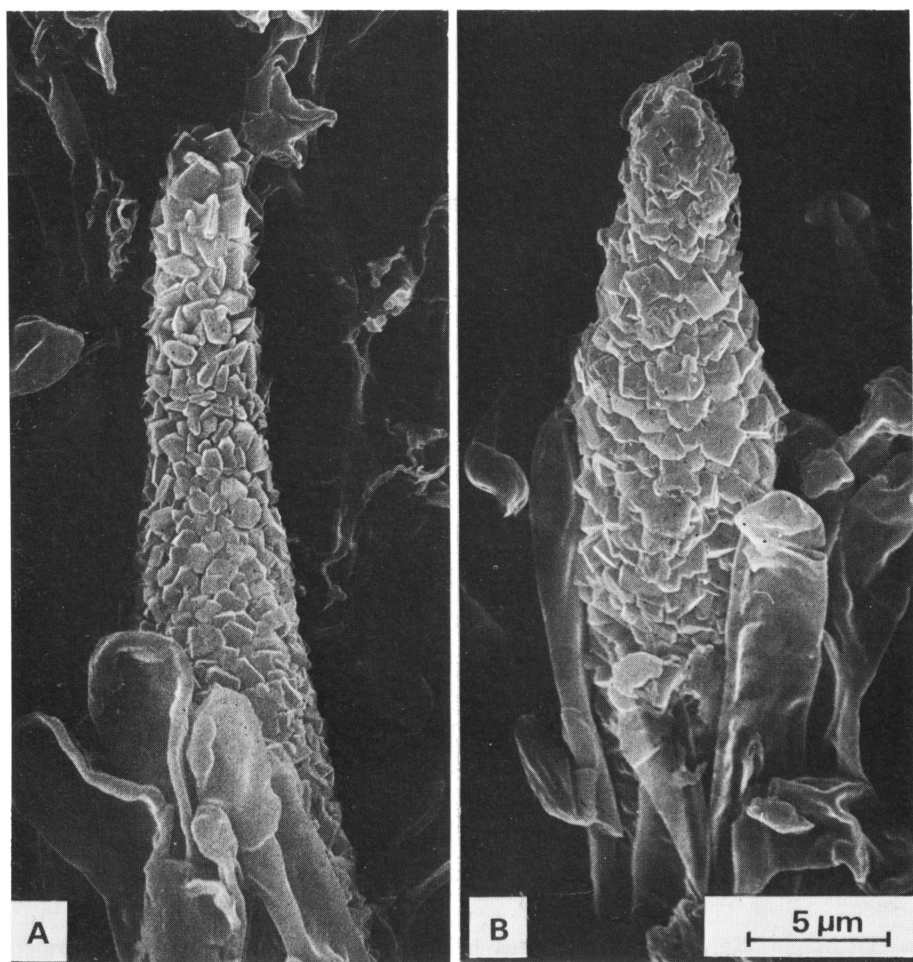


Fig. 587. *Phlebia queletii*. Encrusted cystidia. — Coll. M.P. Christiansen. SEM T. Hallingbäck.

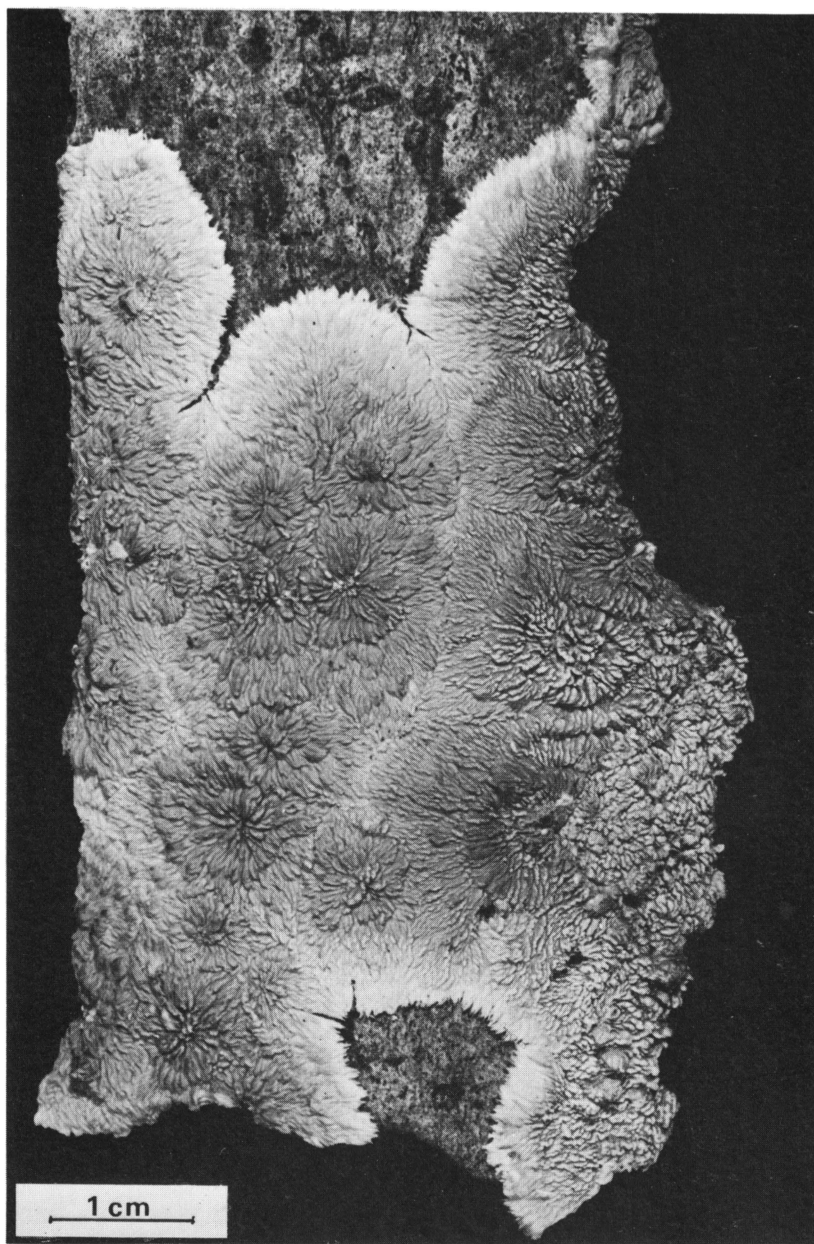


Fig. 588. *Phlebia radiata*. Freeze-dried fruitbody. — Ryvarden 14464. Photo T. Hallingbäck.

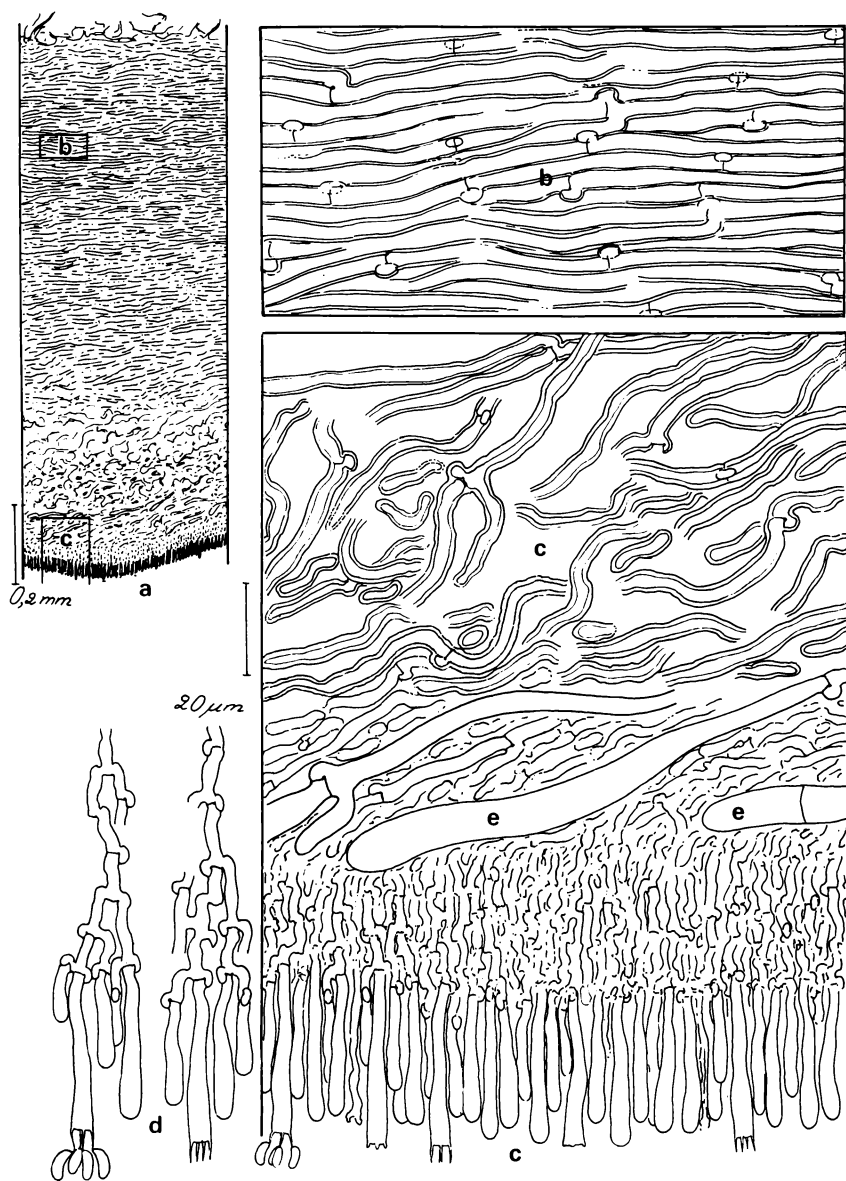


Fig. 589. *Phlebia radiata*. a) schematical section through fruitbody with position of b and c b) section through part of subiculum c) section through hymenium, subhymenium and part of the transitional layer d) basidia and subhymenial hyphae e) enclosed cystidia. — Hjortstam 11905.

Phlebia

23. **Phlebia radiata** Fr., Syst. myc. I p. 427, Fig. 588-90
1821; Elench. fung. I p. 154, 1828.

Fruitbody resupinate or sometimes reflexed-subpileate, orbiculate-confluent, closely adnate when growing on bark and wood, often encrusting mosses and then subramose, ceraceous-subgelatinous in the living state, when dried more or less corneous; hymenium radially-irregularly plicate, often besides more or less tuberculate, orange-red in the young state, then darkening to violaceous red, blue or violaceous-grey; margin generally fimbriate-strigose.

Hyphal system monomitic; hyphae 2-5 μm wide, with clamps, thin-walled in young parts, richly branched; those of the thickening sub-hymenium vertical, conglutinate into a dense texture, in the transition on the subiculum mostly irregularly branched into a more open tissue, in the subiculum with somewhat thickened walls, parallel, horizontal, densely united; interhyphal spaces filled with a gelatinous, at least in young fruitbodies, hyaline matrix.

Cystidia occurring in the marginal zone and in the transitional layer of the trama as thin-walled, tube-like, horizontal, widened hyphal elements, reaching a length of 120 μm and a width of 10 μm , sometimes enclosed in the subhymenium and then generally clavate, 50-70 x 8-12 μm ; in old tissue often filled with yellow-brown, resinous matter; in very young hymenia similar cystidia sometimes appearing between the basidia, enclosed or somewhat projecting.

Basidia in a dense palisade, narrowly clavate, 30-40 x 4-4.5 μm , with 4 sterigmata and basal clamp.

Spores 4-5 x 1.5-2 μm , subballantoid, thin-walled, smooth, often with 1-2 oildrops, non-amyloid, non-cyanophilous.

Habitat. On decayed wood, e.g. stumps, fallen trunks, fallen or still attached low branches, mostly of deciduous wood, rarely on spruce in humid localities.

Distribution. Common in S. Scandinavia, in N. Scandinavia still quite common in the coastal regions but in the inner parts only a few finds in the most suitable localities. No collections from the subalpine deciduous forest.

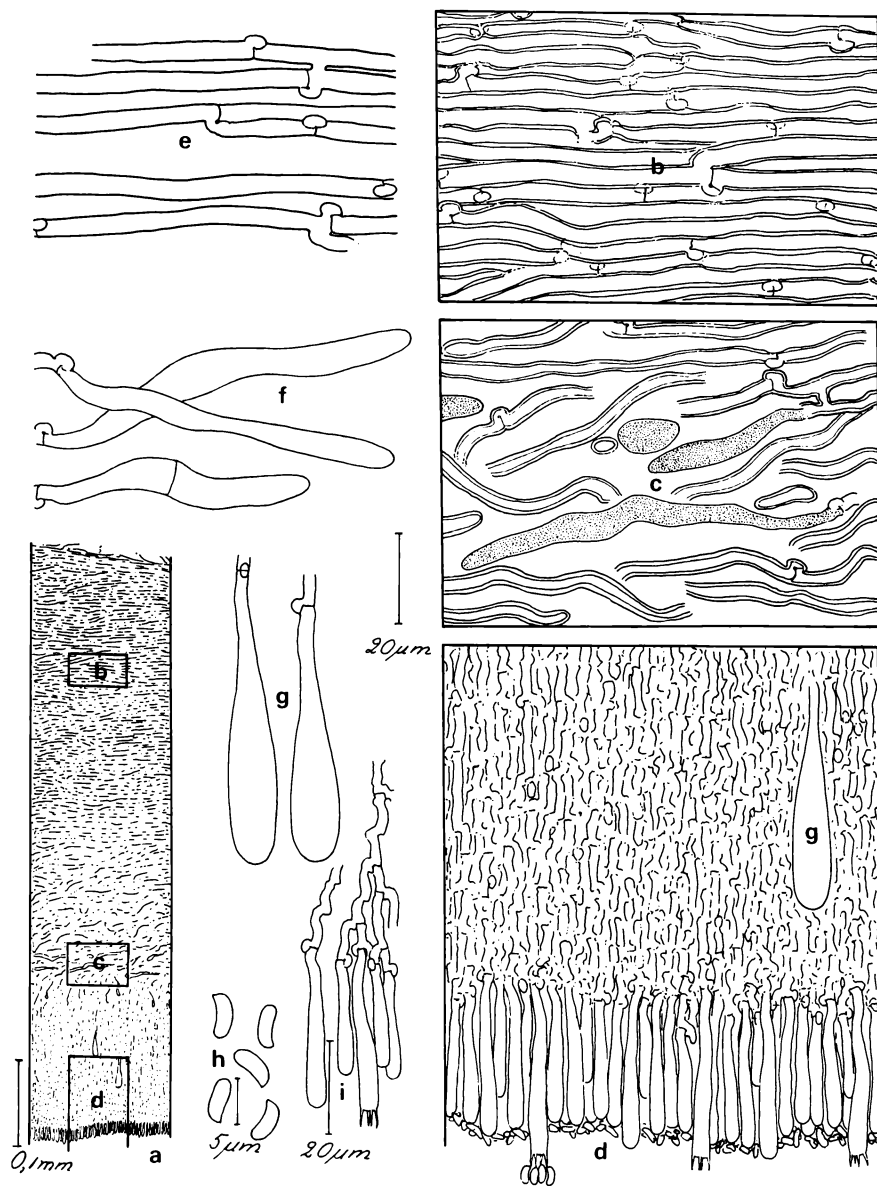


Fig. 590. *Phlebia radiata* dark form a) schematical section through fruitbody with position of b, c, d b) part of subiculum c) part of transitional layer with enclosed cystidia with reddish content (dotted) d) section through hymenium and part of subhymenium with enclosed cystidia e) marginal hyphae f, g) enclosed cystidia h) spores i) basidia. — Sunhede 9648.

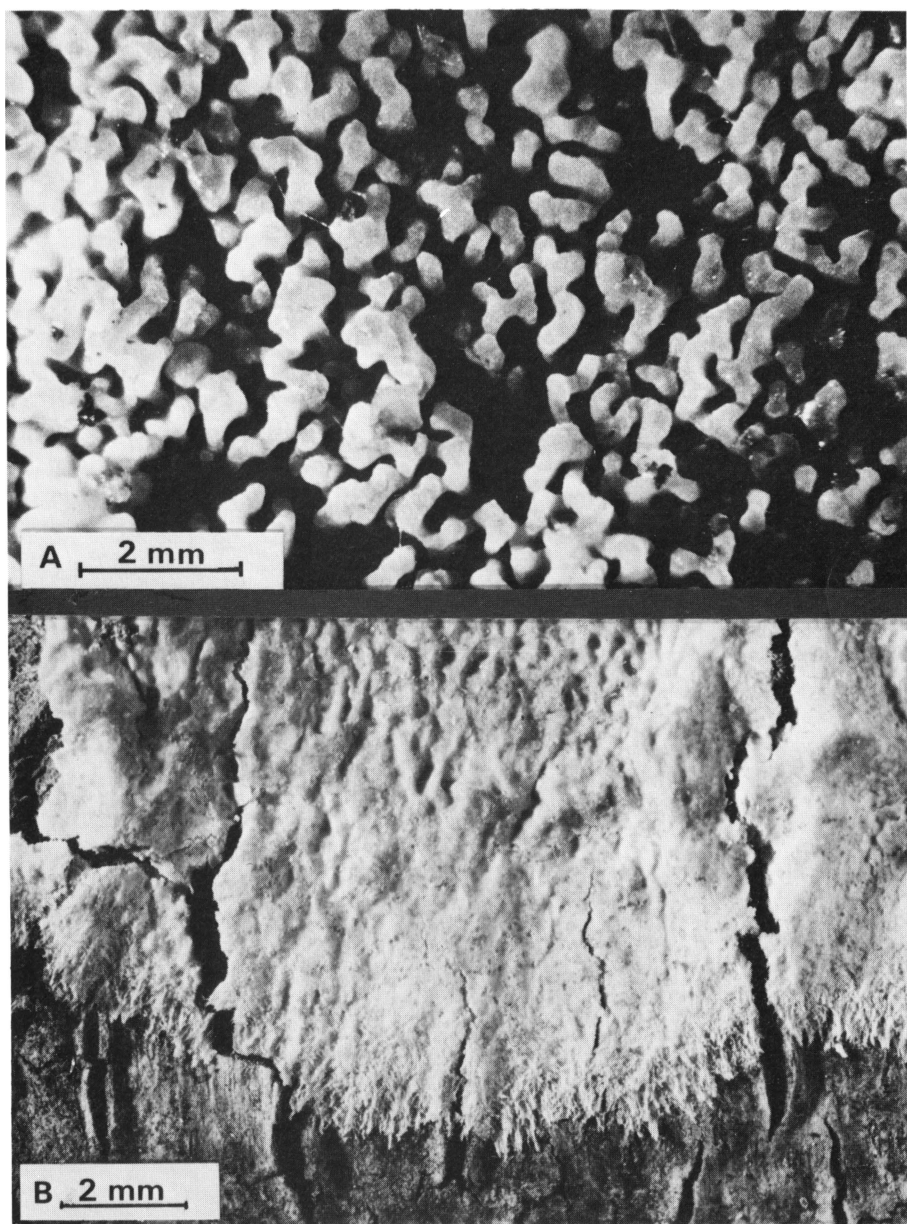


Fig. 591. *Phlebia rufa*. a) hymenial structure of living fruitbody. — S. Jacobsson 8787. b) marginal part of dried fruitbody, with subporoid hymenium and fimbriate margin. — B. & J. Eriksson 7628. Photo T. Hallingbäck.

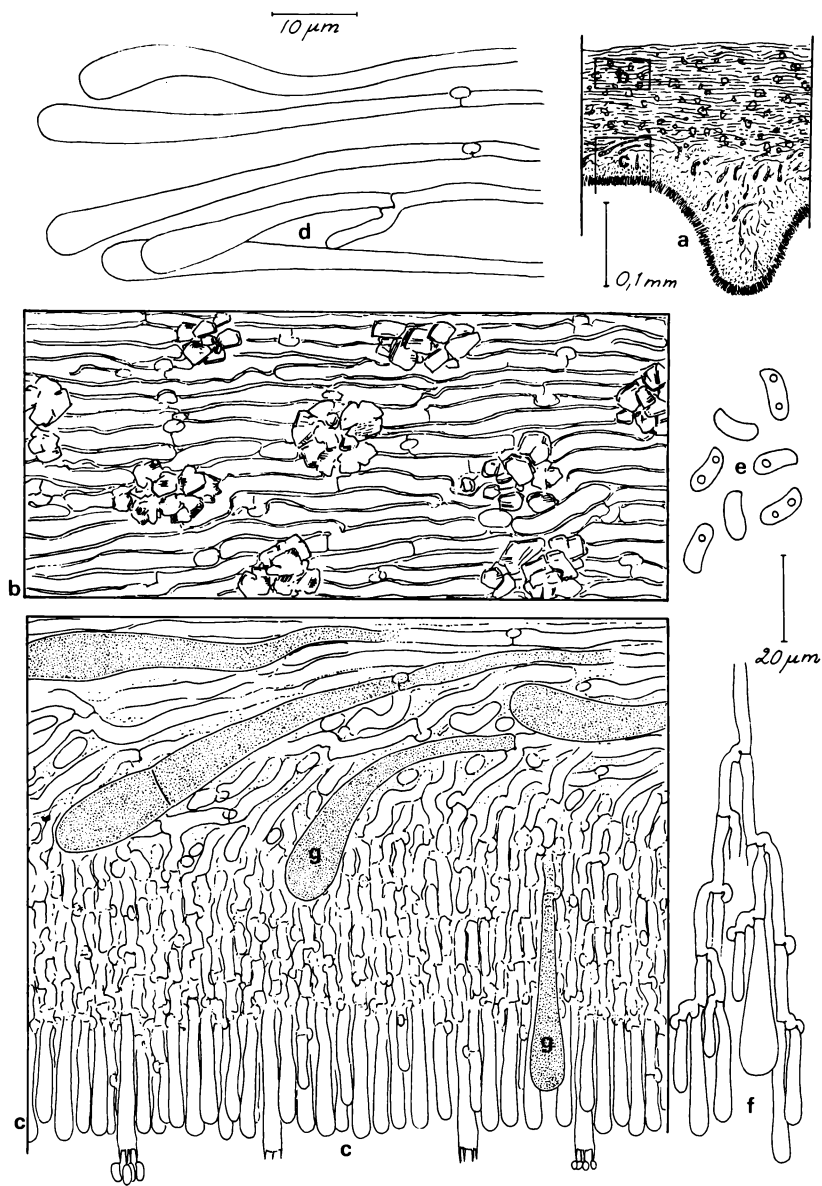


Fig. 592. *Phlebia rufa*. a) schematical section through fruitbody with position of b and c b) section through subiculum with lumps of crystals c) through hymenium, subhymenium and part of transitional layer with enclosed cystidia d) cystidia from margin of fruitbody e) spores f) basidia, cystidium and subhymenial hyphae g) enclosed cystidia, coloured contents dotted. — J. Eriksson 7628.

Phlebia

Remarks. On studies of the living fungus in the field one can easily get the impression that there are two different taxa of *Ph. radiata*, as beside the common orange-red specimens there are fruitbodies with a more dull, grey-violaceous colour. It is not only a matter of age, as even very young fruitbodies may show the dull colour. There are, however, some intermediate collections, e.g. dull specimens with an orange boarder, and without incompatibility tests we dare not separate them. There is also a variation in the micro structure, e.g. in the stratification and in the number and shape of the cystidia. E. Fries (l.c.) subdivided the form complex into three species (*Ph. merismoides*, *radiata*, and *contorta*), but he evidently did not observe the intermediate forms. In Elenchus he besides described 6 different forms of *Ph. radiata*, based exclusively on the colour of the hymenium.

The oldest name for the species is *Auricularia aurantiaca* Sowerby. Engl. Fungi III n. 296, 1803. The good illustration shows vivid orange-red, confluent fruitbodies.

Ph. cystidiata Jacks. ex W.B. Cooke, Mycologia 48 p. 395, 1956, is described to agree with *Ph. radiata* in context and outer appearance but differs by the presence of cystidia. However, the cystidia agree with the cystidial element, here described for *Ph. radiata*, and we dare therefore not accept *Ph. cystidiata* as a separate species. The type material is in very poor shape with only small patches fit for study under the microscope.

For further information of *Ph. radiata* and *Ph. rufa* see Ginns, Can. Journ. Bot. pp. 139–147, 1976.

24. **Phlebia rufa** (Fr.) M.P. Christ.,
 Dansk bot. ark. 19:2 p. 164, 1960.
 - *Merulius rufus* Pers. ex Fr., Syst.
 mycol. I p. 327, 1821.

Fig. 591-94

Fruitbody resupinate, closely adnate, effuse, in the living state ceraceous-fleshy, when dried membranaceous-coriaceous to corneous, varying in colour: pale yellowish, reddish, greenish or brownish, darker when dried; hymenium reticulately folded to almost poroid; margin ± indeterminate, sometimes finely fimbriate.

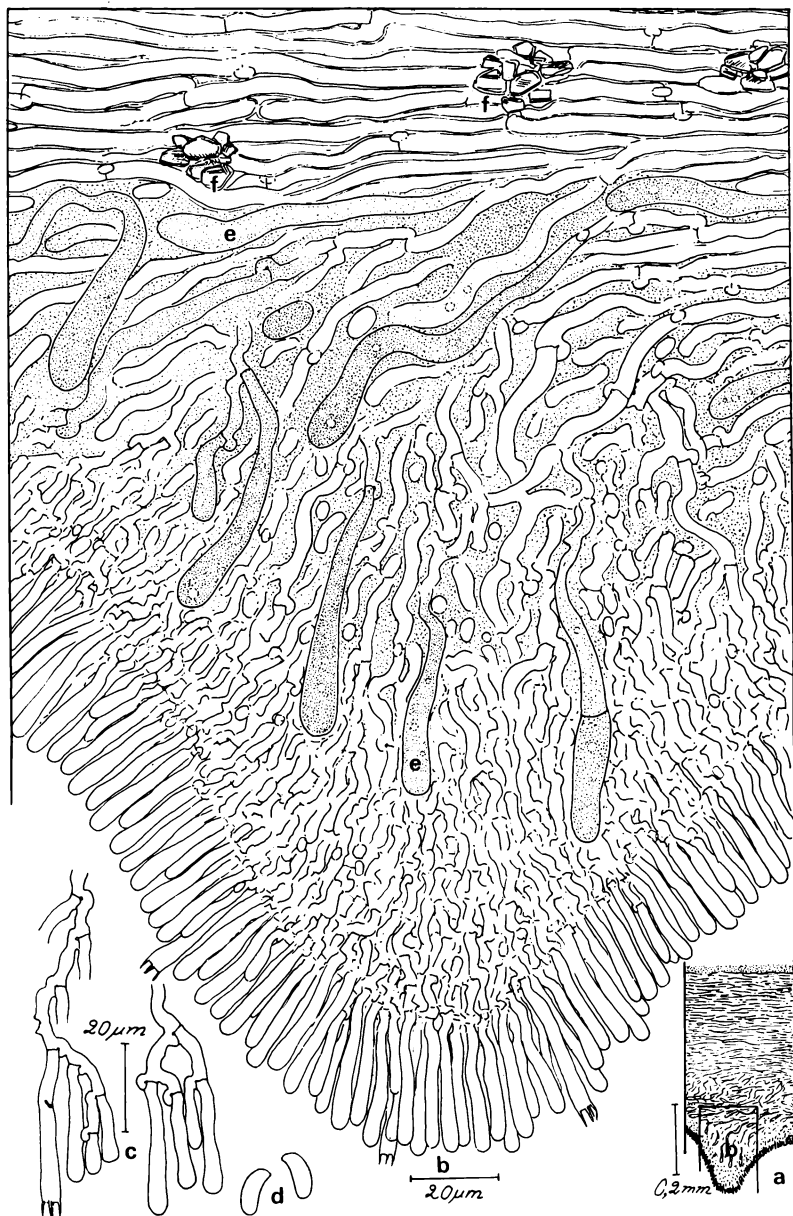


Fig. 593. *Phlebia rufa*. a) schematical section through fruitbody with position of b) section through hymenium, subhymenium, transitional layer and part of subiculum c) basidia d) spores e) enclosed cystidia f) lumps of crystals. — J. Eriksson 7628.

Phlebia

Hyphal system monomitic; hyphae with clamps, in subhymenium 2–3 μm wide, thin-walled, vertical, densely united, in subhymenium 3–5 μm , with somewhat thickened walls, horizontal; all hyphae embedded in a gelatinous matrix, often, esp. in the transition between subhymenium and subiculum coloured reddish-brown; crystals often in lumps – abundantly occurring, esp. in old fruitbodies.

Cystidia narrowly clavate or fusiform, appearing in the margin of growing fruitbodies, and in the transitional layer, then mainly horizontal, varying in length (50–100 μm or more), 10–15 μm in width; in subhymenium generally fewer and smaller, often clavate, 35–50 x 7–8 μm ; young cystidia as a rule hyaline, old ones often filled with a reddish-brown matter.

Basidia narrowly clavate, 25–35 x 3.5–4.5 μm , with 4 sterigmata and basal clamp.

Spores subballantoid, 4.5–6.5 x 2–2.5 μm , smooth, thin-walled, with 1–2 oildrops, non-amyloid, non-cyanophilous.

Habitat. On decayed deciduous wood, e.g. fallen trunks and branches, but also on dead, still attached branches, both on bark and decorticate wood. It is mainly found on *Quercus* but may grow also on other broad-leaved trees in the more fertile forests, as *Corylus*, *Ulmus*, *Fraxinus* and *Acer*.

Distribution. Fairly frequent in S. Scandinavia: Denmark (not rare), S. Sweden to Uppland (many collections), S. Norway, S. Finland. Outside N. Europe it occurs in S. and C. Europe, SW. Asia (many collections from Iran), N. America. Material collected in Br. Columbia agrees very well with the European specimens.

Remarks. Closely related to *Ph. radiata*. The microstructure is practically the same. There is a great variation in colour of the herbarium material, with bright red and dull violaceous as extremes. It is always merulioid-poroid, never radially folded as *Ph. radiata*.

25. ***Phlebia segregata*** (Bourd. & Galz.)
 Parm., Eesti NSV Tead. Akad. Toim.
 Akad. XVI. Biol. 1967:4 p. 393.
 - *Peniophora segregata* Bourd. & Galz.,
 Hym. de France p. 284, 1928. -
 - *Peniophora livida* Burt, Ann. Miss.
 Bot. Gard. 12 p. 239, 1926; non
Phlebia livida (Fr.) Bres.

Fig. 595-96

Fruitbody resupinate, closely adnate, effuse, mostly 0.1–0.2 mm thick, subgelatinous in the living state, firm, membranaceous to corneous when dried, to begin with whitish, then watery greyish or livid, when wet somewhat translucent, in the herbarium often yellowish, pale ochraceous or sordid, the projecting cystidia causing a change to whitish when looked at from the side; margin varying, as a rule thinning out but often quite distinct.

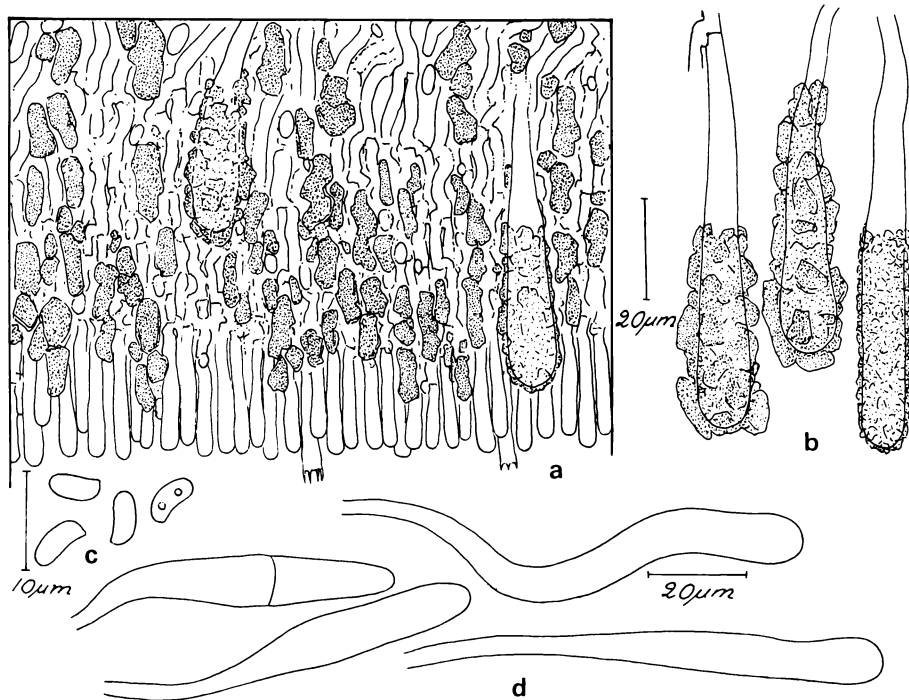


Fig. 594. *Phlebia rufa*. a) section through hymenium and part of subhymenium b) cystidia with resinous encrustation c) spores d) horizontal cystidia from margin of fruitbody. — J. Eriksson 8687.

Phlebia

Hyphal system monomitic; hyphae with clamps, thin-walled, 2–3 μm , embedded in a gelatinous, interhyphal matrix; subiculum lacking or present as only a thin layer of horizontal hyphae next to the substrate.

Cystidia numerous, 50–70 x 6–10 μm , subulate-acute, few cystidia obtuse, walls at first thin then thickened, sometimes with adventitious septa; enclosed cystidia more or less dissolved and becoming a part of the matrix.

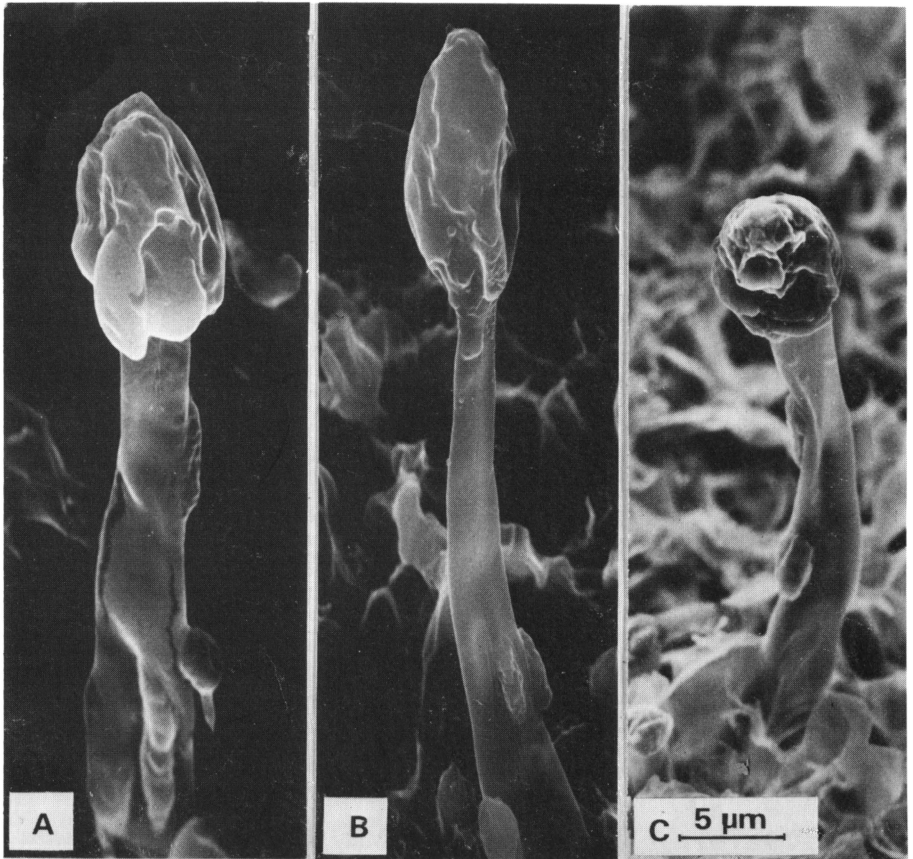


Fig. 595. *Phlebia segregata*. Cystidia with apical, resinous encrustation. — Coll. A, B, C) = Hjortstam 3830. A-B) SEM T. Hallingbäck, C = L. Ryvarden.

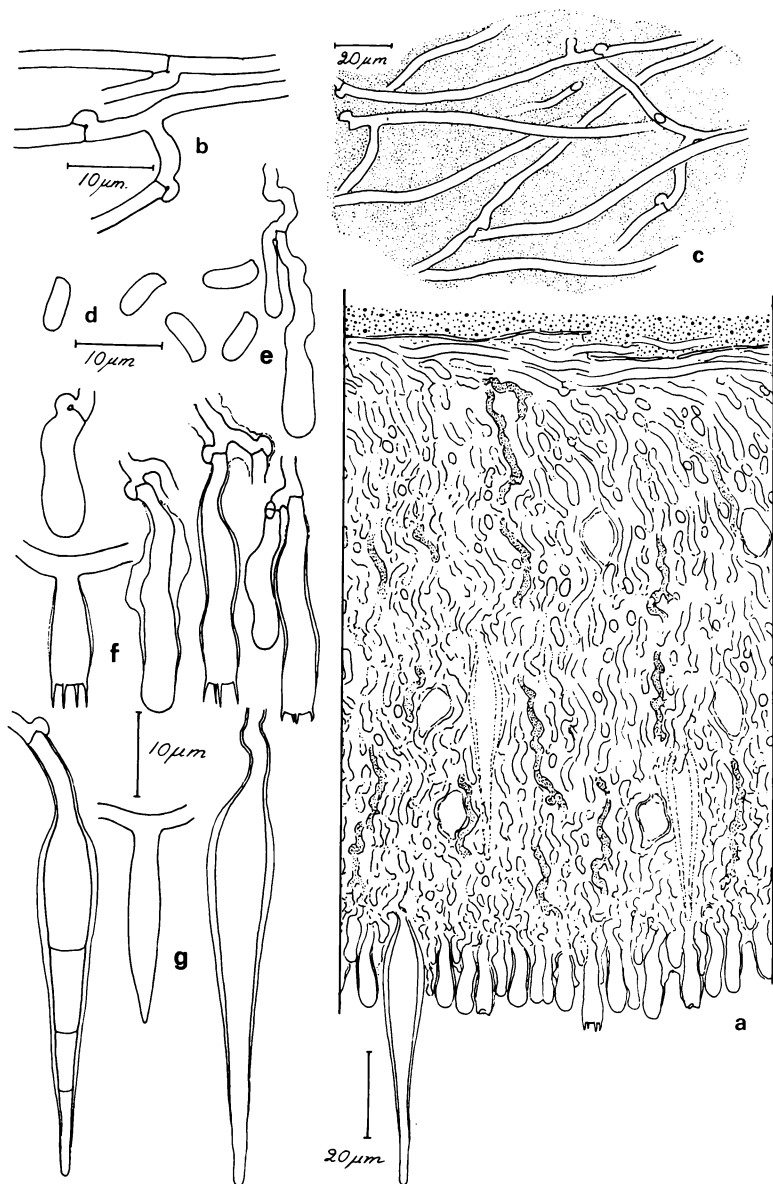


Fig. 596. *Phlebia segregata*. a) section of fruitbody, plasma-filled hyphae dotted b) subicular hyphae, horizontal section, matrix dotted c) hypha branches d) spores e) young basidia f) mature basidia, partly covered with gelatinous matter, one lateral basidium g) cystidia, one lateral. — N. Hallenberg 22656. Cotton-blue.

Phlebia

Basidia narrowly clavate, often with a gelatinous cover and also somewhat thick-walled, $15-25 \times 4-5 \mu\text{m}$, with normally 4 sterigmata and basal clamp; occasionally some pleural basidia have been observed.

Spores suballantoid, $5-7 \times 2-2.5 \mu\text{m}$, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. Mostly on conifers, generally on decorticated wood, both in drier forests with *Cladonia* and in more humid *Hylocomium-Vaccinium* forests. Also collected on outdoor wood-constructions, pieces of planks etc. Rare on deciduous wood (*Populus tremula*, *Salix?*).

Distribution. Common in natural conifer forests in all parts of Scandinavia and distributed through the circumboreal conifer region of the N. hemisphere. There are no reports from Denmark but a great number of collections from Sweden, from Småland in the south, to N. Lappland in the north. The finds in Norway and Finland are fewer, but it is very likely equally frequent there.

Remarks. Easily recognized species. It has long been known under the name *Peniophora livida* Burt, but when moved to *Phlebia* another name had to be found. E. Fries must with certainty have seen it many times, but it is not known what name he may have used for it. There is no material in herb. Fries (U).

When Bourdot & Galzin described *Peniophora segregata* they did it firmly convinced that it was distinguished from *P. livida* as they had found rounded spores. These spores, however, evidently were extraneous as the fruitbody clearly is *P. livida*. *P. segregata* is consequently described from two clearly discordant elements and should therefore be rejected (Art. 70). As there is no available synonym, we follow the possibility given in the article, which allows one of the elements to be chosen when it is possible to do so, and this has been done in this case.

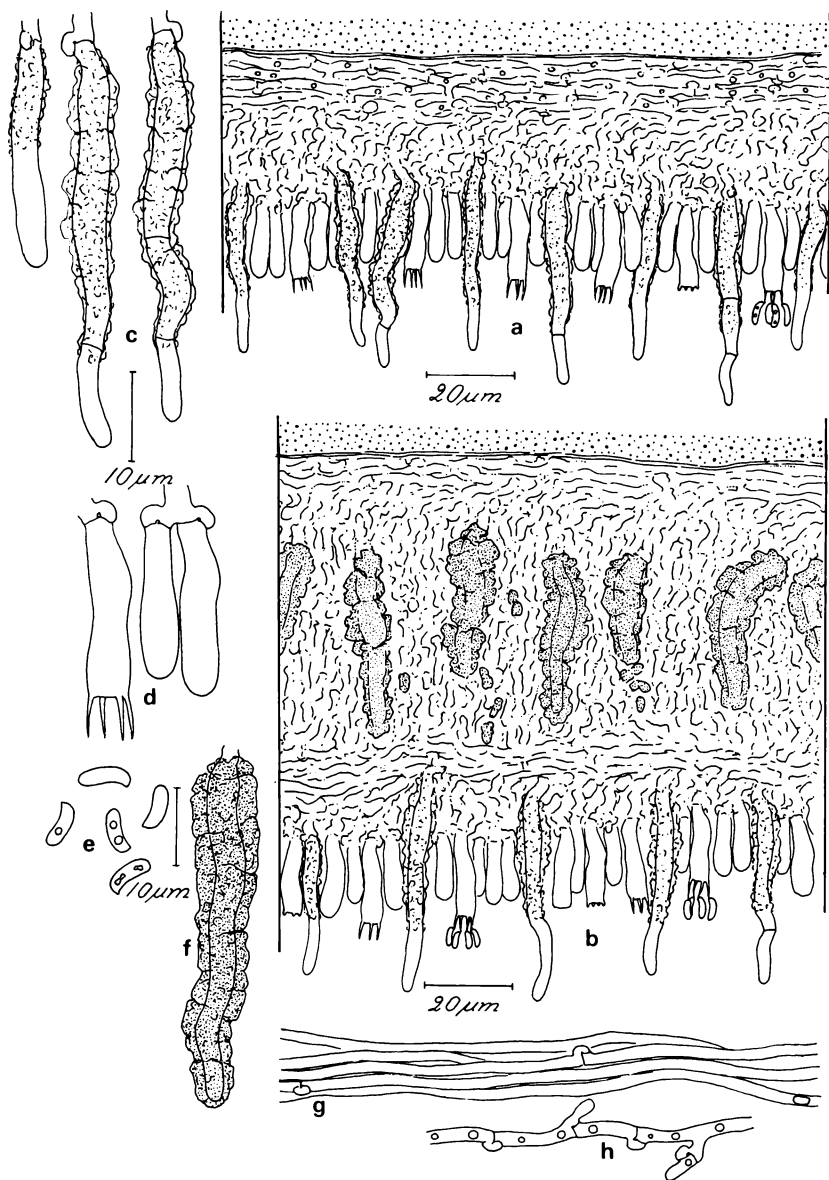


Fig. 597. *Phlebia serialis*. a) section through young, marginal part of fruitbody b) through central 2-layered part of fruitbody c) cystidia d) basidia e) spores f) enclosed cystidium with resinous encrustation g) marginal hyphae h) hypha from the wood. — Hjortstam 6771.

Phlebia

26. **Phlebia serialis** (Fr.) Donk, Fungus 27 p. 12, 1957 (the name, not the fungus). - *Thelephora serialis* Fr., Syst. myc. I p. 445, 1821; Elenchus I p. 217, 1828; non *Corticium seriale* s. Bourd. & Galz. et al. - *Xerocarpus ? flavoferrugineus* Karst., Hedw. 34 p. 8, 1895. - *Peniophora flavoferruginea* (Karst.) Litsch. in Lund. & Nannf., Fungi exs. suec. fasc. 11–12, n. 574 p. 28, 1938; Sv. bot. tidskr. 32 p. 286, 1938.

Fig. 597

Neotype: *Corticium seriale* Fr., E. Fries (UPS).

Fruitbody resupinate, closely adnate, elongate-effuse, often covering large areas of undersides of lying trunks, mostly 0.05–0.2 mm thick, ceraceous-subgelatinous in the living and wet state, crustaceous when dried, smooth or somewhat tubercular, continuous or in older parts transversely cracked, yellow-ochraceous when alive, in the herbarium varying: sordid yellow, pale ochraceous, reddish, brownish, often with a greyish pruina; in KOH violaceous; margin thinning out, sometimes more determinate.

Hyphal system monomitic; hyphae thin-walled, 2–3 μm wide, with clamps, embedded in a gelatinous matrix and united into a dense texture with indistinct hyphal elements; next to the wood as a rule a very thin layer of horizontal hyphae.

Cystidia numerous, 50–50(–70) \times 3.5–5 μm , hyphoid, cylindrical to subfusiform, thin-walled, with basal clamp, often with adventitious septa; to begin with naked, then more and more covered with a yellow-brown resinous encrustation; old cystidia, enclosed in the subhymenium, disappearing in a lump of resin.

Basidia narrowly clavate, sometimes constricted, 18–20 \times 4–5 μm , with 4 sterigmata and basal clamp.

Spores allantoid, 5–6 \times 1.5–1.8 μm , thin-walled, smooth, usually with 2 oil-drops, non-amyloid, non-cyanophilous.

Habitat. On decayed coniferous wood, mainly fallen decorticate trunks, in normal *Vaccinium*-conifer forest.

Distribution. In Sweden collected several times from Småland in the S. to N. Lapland; locally it seems to be quite frequent. It seems to occur in all parts of Finland, to Kuusamo in the North, from where excellent material has been sent by Å. Strid. The collections from Norway are fewer and it is not found in Denmark. Parmasto reports several localities in Estonia. Outside N. Europe known from several parts of Canada (from Ontario to Br. Columbia).

Remarks. In herb. Fries (UPS) there are 4 collections labelled "*Corticium seriale* Fr., Femsjö" with E. Fries's own hand. In one of them *Phanerochaete velutina* is mixed in. The other are purely the species here described. As the generic name used by Fries is *Corticium*, showing that they are late collections, none of the specimens can be treated as syntypes, but they no doubt give a clear idea of Fries's intention with *Th. serialis*. They also match the description very well and Fries's description is in this case usually good even if as usual, nothing is said about microstructures. Fries used the epithet *serialis* for fungi with longitudinally extended fruitbodies, forming series, which this species often does when

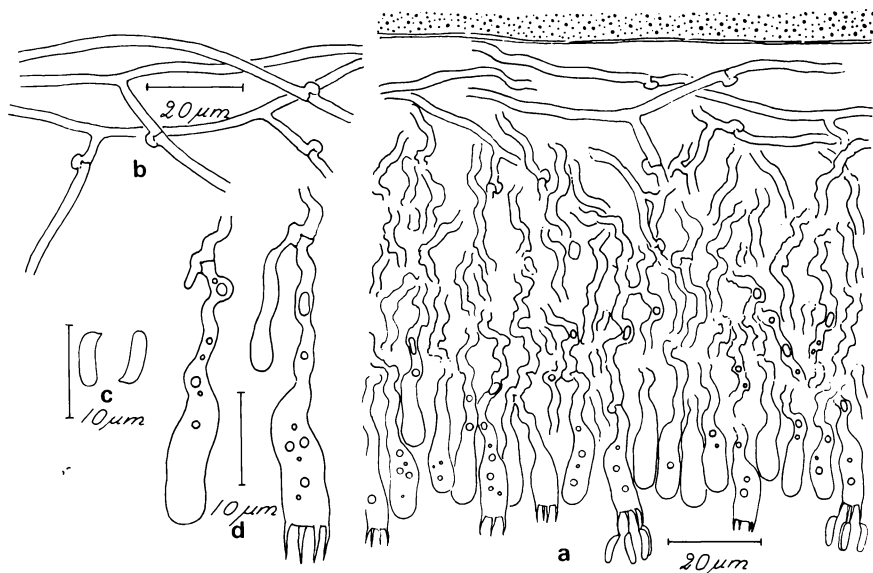


Fig. 598. *Phlebia subcretacea*. a) section through fruitbody b) basal hyphae c) spores d) basidia and subhymenial hyphae. — S. Jacobsson 9652.

Phlebia

growing on decorticate logs. One of these specimens is herewith chosen as neotype. It is identified with the loan number 3202:2 stamped on the envelope. In Karsten's herbarium (H) there are two specimens that can be looked upon as syntypes (n. 1322 and 1380) of *P. flavoferruginea*. We suggest n. 1322 as lectotype, as it is in a better shape. N. 1380 bears a note by v. Höhnelt: "Anstrichfarbe. Sicher kein Pilz!" v. Höhnelt & Litschauer (1906 p. 1567) were of opinion that *X. flavoferrugineus* was not a fungus, only a paint, a statement about which Litschauer (1938 p. 287) changed his mind when he had examined material collected by Romell in Sweden.

27. **Phlebia subcretacea** (Litsch.) M.P. Christ., Fig. 598-99
 Dansk bot. ark. 19 p. 165, 1960.
 - *Corticium subcretaceum* Litsch., Öst. bot.
 Zeitschrift 88 p. 110, 1939. - *Corticium*
aerugineolividum Romell ex. Lund. in
 Lund. & Nannf., Fungi exs. suec. fasc.
 37-38 n. 1840, 1950. - *Phlebia aerugineo-*
livida (Lund.) Donk, Fungus 27 p. 12,
 1957. - *Phlebia lichenoides* Parm., Eesti
 NSV Tead. Akad. Toim. XVI. Biol. 1967:4
 p. 391.

Fruitbody resupinate, closely adnate, effuse, 0.05–0.15 mm thick, sometimes thicker (to 0.5 mm in the dry state), ceraceous – subgelatinous in the living state, crustaceous – corneous when dried, when young whitish or yellowish, often with a greenish tint, when wet semitranslucent, in the herbarium varying in colour: whitish, yellowish, livid, greyish to pale ochraceous; hymenium smooth, glabrous, continuous but in old parts often cracked when dry; margin mostly indistinct but sometimes there is a white, narrow or wider marginal zone, at times finely fimbriate under the lens (50 x).

Hyphal system monomitic; hyphae 1–2 μ m wide, with clamps, thin-walled, richly branched and intertwined, in mature fruitbodies embedded in a gelatinous matrix; subhymenial hyphae winding, with irregular constrictions and dilatations, and with numerous oil-drops in the plasm; basal layer in some specimens composed of straighter hyphae with sparse branches.

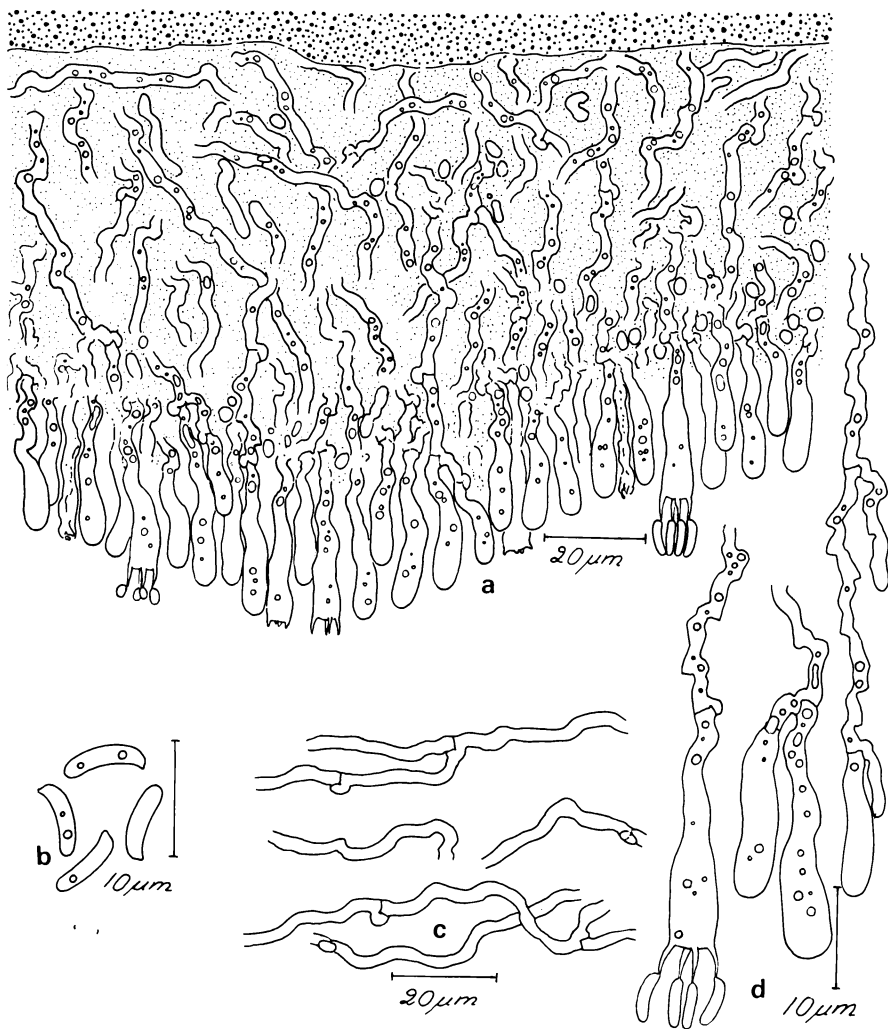


Fig. 599. *Phlebia subcretacea*. a) section through fruitbody b) spores c) basal hyphae d) basidia and subhymenial hyphae. — Hjortstam 7419.

Phlebia

Cystidia none.

Basidia clavate, basally narrowing to a hypha-like part, total length 25–35 μm , greatest width 4–5 μm ; normally with 4 sterigmata and with basal clamp.

Spores allantoid, (5.5)6–7 x 1.3–1.8 μm , thin-walled, smooth, usually with 2 oil-drops, non-amyloid, non-cyanophilous.

Habitat. On decayed, mostly decorticate wood, on conifers as well as on broadleaved trees; sometimes seen on waste, sawn timber.

Distribution. Less frequent or rare, scattered in the whole of N. Europe, from Denmark to N. Finland.

Remarks. Even if the species is mostly uniform and easily determined, there are some deviations. One collection (Västergötland: Mölndal, S. Jacobsson 9652) has spores shorter than normal (5–6 x 1.5–2 μm) and a subpellicular fruitbody, detachable in small pieces. As there so far is only one collection we cannot decide as to its taxonomical status.

The type collection of *Ph. lichenoides* is a young and thin fruitbody but in microstructure agreeing well with *Ph. subcretacea*.

28. **Phlebia subochracea** (Bres.) Erikss. & Ryv.,
Cort. N. Eur. vol. 4 p. 873, 1976.
- *Grandinia subochracea* Bres., Hedw. 33
p. 206, 1894. Non *Acia subochracea* Bres.
s. Bourd. & Galz. - *Peniophora danica*
M.P. Christ., Friesia 5 p. 207, 1956. - *Phlebia*
danica (M.P. Christ.) M.P. Christ., Dansk bot.
ark. 19:2 p. 167, 1960. - *Peniophora ludo-*
viciana Burt., Ann. Miss. Bot. Gard. 12 p.
244, 1925.

Fig. 600

Fruitbody resupinate, closely adnate, effuse, mostly 0.1–0.2 mm thick, ceraceous in the living state, when dried crustaceous, rather brittle and easily crushed in the slide; hymenium more or less tuberculate, often bright red or brick-red as young, sordid buff or ochraceous in older parts, in the herbarium sometimes even darker, greyish brown; margin narrow, often white, sometimes finely fimbriate, in other cases indeterminate.

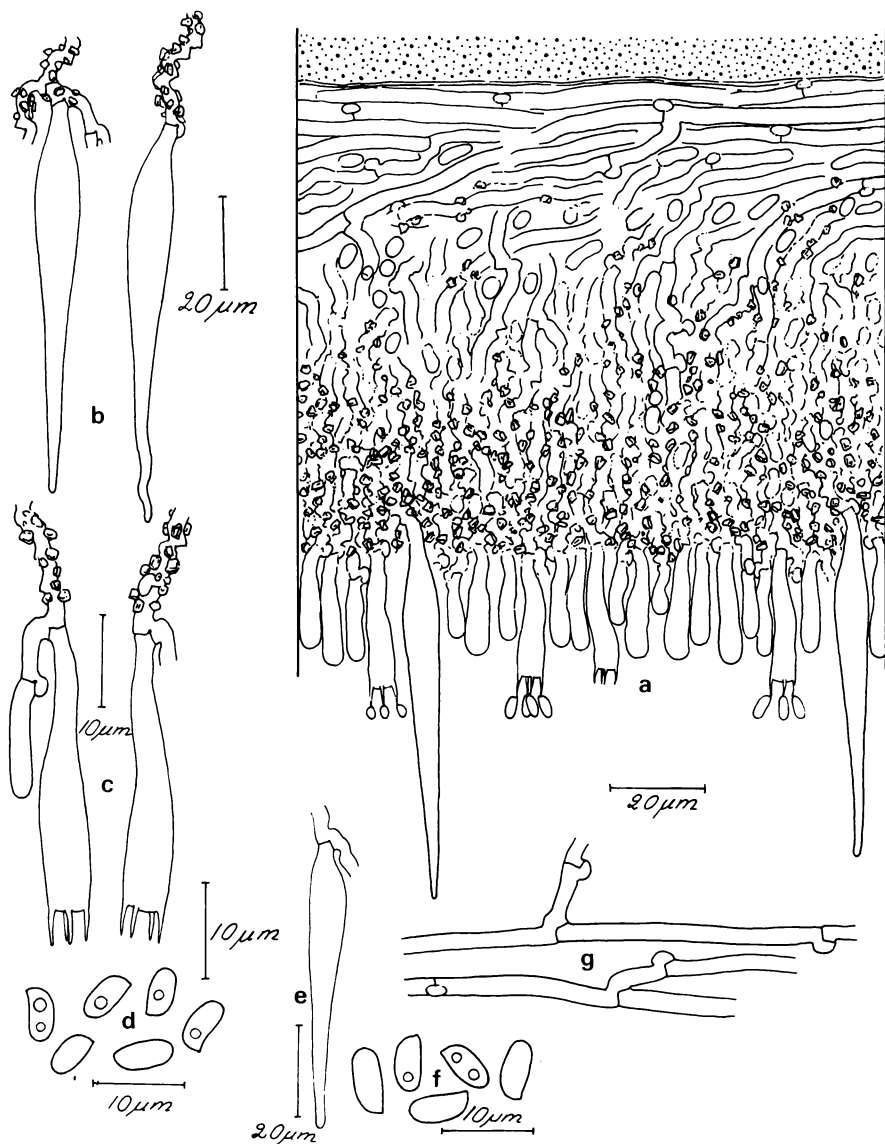


Fig. 600. *Phlebia subochracea*. a) section through fruitbody b, e) cystidia c) basidia d, f) spores g) basal hyphae. — a-d, g) N. Hallenberg 1021, e, f) Krieger (holotype).

Phlebia

Hyphal system monomitic; hyphae 2–3 μm wide, with clamps, thin-walled, richly branched, subhymenial hyphae vertical, ab. 3 μm wide, basal hyphae 4–5 μm wide, forming a mostly thin subiculum; tissue in mature specimens filled with a yellow-brown, granular encrustation.

Cystidia varying in number but generally numerous, subulate, thin-walled, 50–60(–90) \times 5–7 μm , naked or with sparse encrustation.

Basidia clavate, 25–35 \times 5–6 μm , with normally 4 sterigmata and basal clamp.

Spores ellipsoid, 6–8 \times 2.5–3.5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous, usually with 1–2 oil-drops.

Habitat. On much decayed, frondose wood in humid localities.

Distribution. Collected several times in Denmark and S. Sweden (to Uppland), SW. Norway, and Estonia. No material from Finland seen. Known from France, Germany, Poland, N. America.

Remarks. The holotype (S) of *Grandinia subochracea* Bres. is a well preserved, lightcoloured (Bresadola: "e flavo-vitellina.") material, which agrees very well with the Nordic collections, even if the cystidia are fewer than in most other collections. The main taxonomic problem is to delimit *Ph. subochracea* from *Ph. ochraceo-fulva*. The latter has in typical cases a much denser hyphal texture and a darker colour, and therefore seemingly very different from *Ph. subochracea*, but there are intermediates, and without culture tests it is impossible to decide definitely if there are two overlapping species or only one, very variable taxon. The type of *Peniophora danica* agrees well with that of *Grandinia subochracea*.

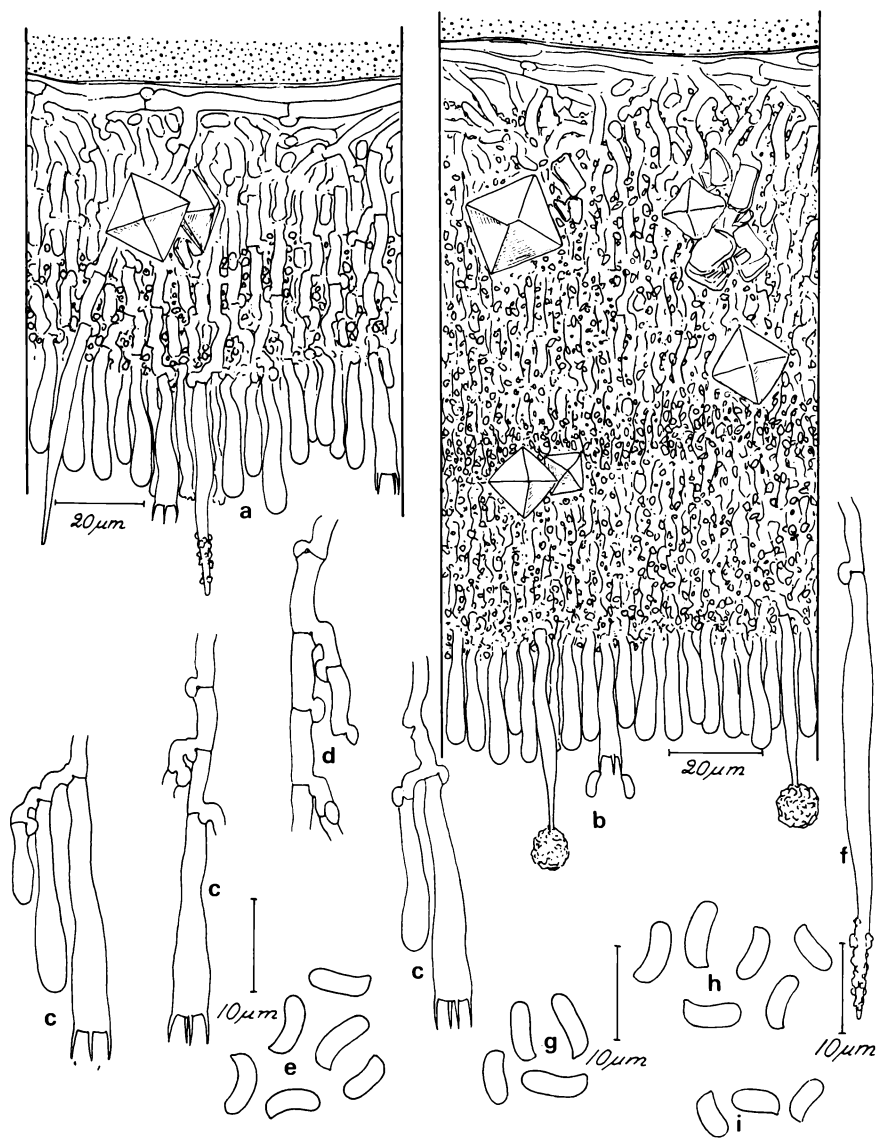


Fig. 601. *Phlebia subserialis*. a) section through young fruitbody b) through older, 2-layered part c) basidia d) subhymenial hyphae e, g-i) spores f) cystidium. — K. Hjortstam 17697, g) Bourdot 29877, h) Romell 1959, i) Lindblad, May 1845.

Phlebia

Fig. 601

29. **Phlebia subserialis** (Bourd. & Galz.) Donk,
Fungus 27 p. 12, 1957. - *Corticium sub-*
seriale Bourd. & Galz., Hym. de France
p. 219, 1928.

Fruitbody resupinate, closely adnate, mostly 0.1–0.2 mm thick, elongate-effused, ceraceous in the living state, crustaceous when dried, smooth, continuous, whitish or cream-coloured when young, then pale buff – ochraceous, often darkening in the herbarium to isabellinous – pale brown; margin as a rule thinning out and indeterminate, sometimes more distinct and lighter than the hymenium.

Hyphal system monomitic; hyphae 2–4 μm wide, with clamps and with thin or in the basal part somewhat thickened walls; subhymenial hyphae vertical, densely united, in old fruitbodies stratified; basal hyphae mainly horizontal, as a rule forming a thin subiculum; tissue more or less filled with a grainy encrustation and often large KOH-crystals.

Cystidia as a rule numerous, subulate, 40–50(–70) \times 3–4 μm , often with attached crystals or an apical globe of resinous matter, which easily falls off in microscopical preparations and are therefore best studied in living material under the lens (50 \times or more).

Basidia clavate, sometimes slightly constricted, 25–30(–40) \times 4–5 μm , usually with 4 sterigmata and with basal clamp.

Spores suballantoid, 6–7(–8) \times 2–2.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On decayed, mostly decorticate wood of conifers, rarely on wood of broadleaved trees.

Distribution. Rather rare species, in Sweden found from Småland to S. Lapland, single specimens from Norway and Finland. Reported from Denmark by M.P. Christiansen (1960 p. 170). Common in C. France (Bourdot & Galzin). A few finds in other parts of Continental Europe, Siberia and N. America.

Remarks. Easily recognized species, evidently without delimitation problems.

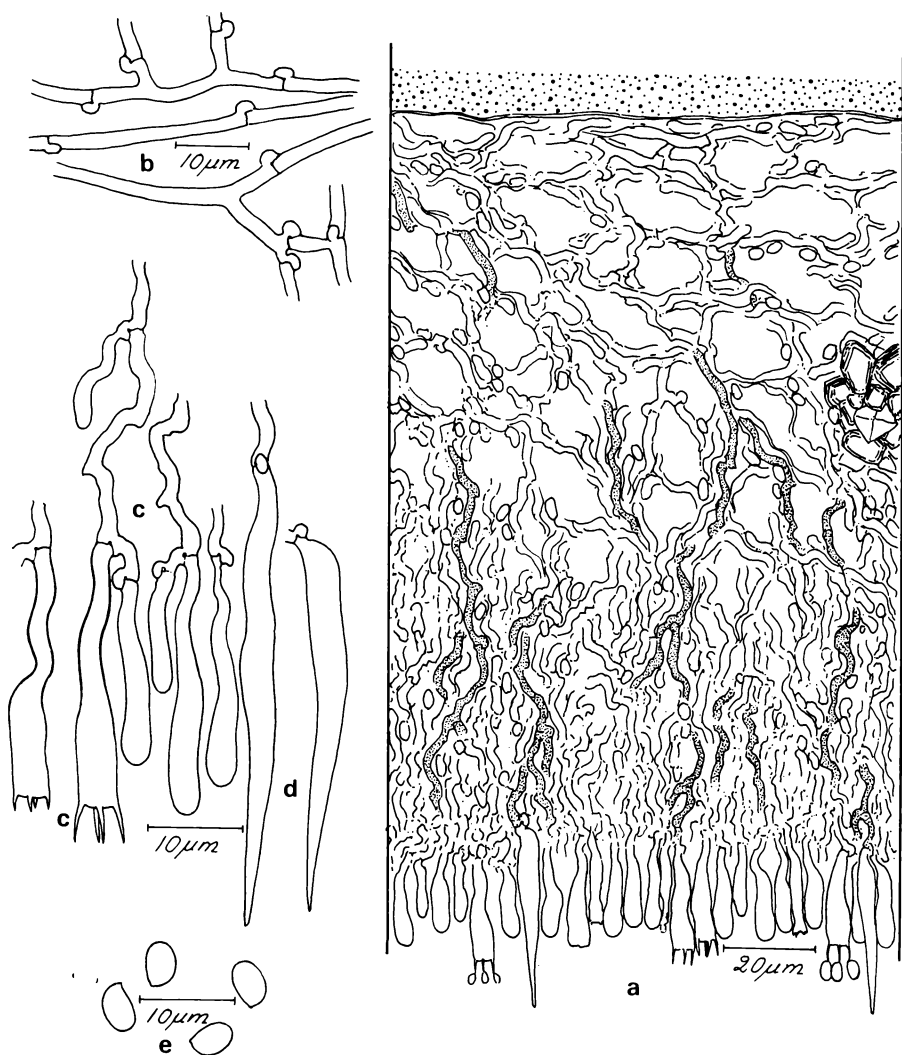


Fig. 602. *Phlebia subulata*. a) section through young fruitbody b) basal hyphae c) basidia and subhymenial hyphae d) cystidia e) spores. — B. & J. Eriksson 3460. Cotton-blue.

Phlebia**30. *Phlebia subulata* Erikss. & Hjortst. n. sp.**

Fig. 602

Fructificatio resupinata, adnata, orbicularis-confluens-effusa, 0.1–0.2 mm crassa, ceracea in statu vivo, sicco crustaceo-membranacea, levis, glabra, continua, albida-cremeoalbida; margo concolor, tenuis, subdistincta; hyphae monomiticae, 1.5–2 μm latae, tenuitunicatae, fibulatae, valde ramosae; cystidia numerosa, subulata, 40–50 x 3–4 μm , projecta, tenuitunicata; basidia sinuoso-clavata, basin versus angustiora, 20–28 x 3.5–4 μm , 4-sterigmatica, basi fibulata; sporae ellipsoideae, 4–5.5 x 2.5–3 μm , leves, tenuitunicatae, non-amyloideae, non-cyanophilae; ad lignum coniferarum.

Holotypus: B. & J. Eriksson 3460 (GB). Åsele Lappmark, Dorotea par. Vallsjöskogen. 1949.08.12.

Fruitbody resupinate, closely adnate, orbicular-confluent to elongate-effuse, 0.1–0.2 mm thick, ceraceous in the living state, when dried crustaceous – membranaceous, smooth, continuous, glabrous, white to yellowish white; margin concolorous, thinning out, often rather determinate.

Hyphal system monomitic; hyphae narrow, 1.5–2 μm , thin-walled, with clamps, richly branched and anastomosing, joined by a interhyphal matrix into a dense texture, esp. in the subhymenial part; in older fruitbodies, esp. in the basal part, the tissue netlike in sections with meshes filled with a gelatinous matrix; in the subhymenium such meshes seem to be caused – at least in some cases – by the swelling and dissolving of old enclosed cystidia.

Cystidia numerous, subulate, 40–50 x 3–4 μm , thin-walled, not encrusted, sometimes with an adventitious septum, projecting 10–25 μm .

Basidia clavate, 20–28 x 3.5–4 μm , often sinuous, basally narrowing to a hypha-like part; 4 sterigmata and basal clamp.

Spores ellipsoid, 4–5.5 x 2.5–3 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On decayed coniferous wood (*Pinus sylvestris*, *Picea abies*) in *Vaccinium*-conifer forest. Hitherto found only in virgin forests.

Distribution. Specimens hitherto known, all in herbarium GB.

Sweden: Småland: Rumsquilla par., N. Kvill nat. park, fallen trunk of *Picea abies* in *Hylocomium-Vaccinium-Picea* forest, 1966.10.08. B. & J. Eriksson 9649.

Västergötland: V. Tunheim par. Halleberg, Hallesnupen, on *Picea abies* 1978.08.24. K.-H. Larsson 1894. Revsund par., between Stavre and Lake Bodsjön, decayed log of coniferous wood, 1958.07.30. B. & J. Eriksson 8297.

Åsele Lappmark: Dorotea par., Vallsjöskogen, decayed fallen trunk of *Picea abies*, 1949.08.12. B. & J. Eriksson 3460 (holotypus).

Norway: Akershus: Hurdal kommune, S. side of Fjellsjøkampen, 1978.09.28. K.-H. Larsson 2321.

Finland: Lapponia inarensis: Inari par., Kuusipää, decayed wood of *Picea abies*, virgin *Picea* forest with *Hylocomium*, *Vaccinium myrtillus* and *uliginosum*, *Empetrum*, 1962.09.09. Å. Strid & J. Eriksson 10209.

Ostrobothnia borealis: Rovaniemi, Pisavaara nature park, Sorvannulikka, fallen trunk of *Picea abies* in virgin forest, 1962.09.18.

Å. Strid & J. Eriksson 10491; do., 1960.08.29. V. Kujala & J. Eriksson 9570; do., between Isopäri and Teeripäri, trunk of *Picea* in herb-mixed forest, 1960.09.01. V. Kujala & J. Eriksson 9887 (2 coll.).

Remarks. *Ph. subulata* agrees in many respects with *Ph. phlebioides* and *Ph. segregata* but deviates distinctly in the spore shape. Judging from a piece of *Ph. adsharica* Parm. nom. prov. in GB, this species is very close. It agrees in the shape of spores and cystidia, and the "meshes" seen in *Ph. subulata* can be seen also in *Ph. adsharica*. The latter species differs, however, in its outer shape and colour. While *Ph. subulata* is smooth, thin, white, not transparent and not corneous when dry, *Ph. adsharica* looks like melted wax, is thicker, tuberculate, semitranslucent, corneous, dull-coloured, and clearly looks like a distinct species. We have not been able to find the description of the species, only its enumeration in Conspectus syst. cort. p. 97, 1968. In a letter from Dr. Parmasto we are told that by an oversight *Ph. adsharica* has not yet been but will be described as a new species.

Phlebia

Fig. 603

31. **Phlebia tristis** (Litsch. & Lund.) Parm.,
 Eesti NSV Tead. Akad. Toim. XVI. Biol.
 1967:4 p. 393. - *Gloeocystidium triste*
 Litsch. & Lund. in Litsch., Svensk Bot.
 Tidskr. 32 p. 292, 1938.

Fruitbody resupinate, adnate, effuse, thin, mostly not more than 0.1–0.2 mm thick, smooth, continuous, ceraceous in the living state, when dry membranaceous-crustaceous, whitish to pale cream-coloured when young, in mature parts and in the herbarium pale greyish – sordid yellowish – ochraceous; margin indeterminately thinning out.

Hyphal system monomitic; hyphae mostly 2–3 μm wide, with clamps, thin-walled, richly branched and densely intertwined; no subiculum – or a thin layer of horizontal hyphae; old specimens with an interhyphal matrix filled with yellowish, resinous grains.

Cystidia usually numerous, 50–120 μm long, sometimes more, 7–10(–12) μm wide, subcylindrical, basally widest, narrower in the middle part, apically often slightly widened, obtuse, thin-walled, not encrusted, with basal clamp, sometimes with a few adventitious septa.

Basidia clavate, 20–25(–30) \times 4–5 μm , normally with 4 sterigmata and basal clamp.

Spores allantoid, 6–7(–8.5) \times 1.7–2 μm , thin-walled, smooth, with 1 or more oil-drops.

Habitat and distribution. On decorticated coniferous wood (*Pinus* and *Picea*). Rare species, in N. Europe only collected a few times in Norway and in Sweden occasionally from Småland in the S. to N. Lappland, besides found in Spain.

Remarks. Characteristic species, carefully described by Litschauer (1. c). Type material distributed in Lundell & Nannfeldt: Fungi exs. succ. n. 744. It is evidently not very close to the type species of *Phlebia*, but we cannot find any better alternative for its generic arrangement.

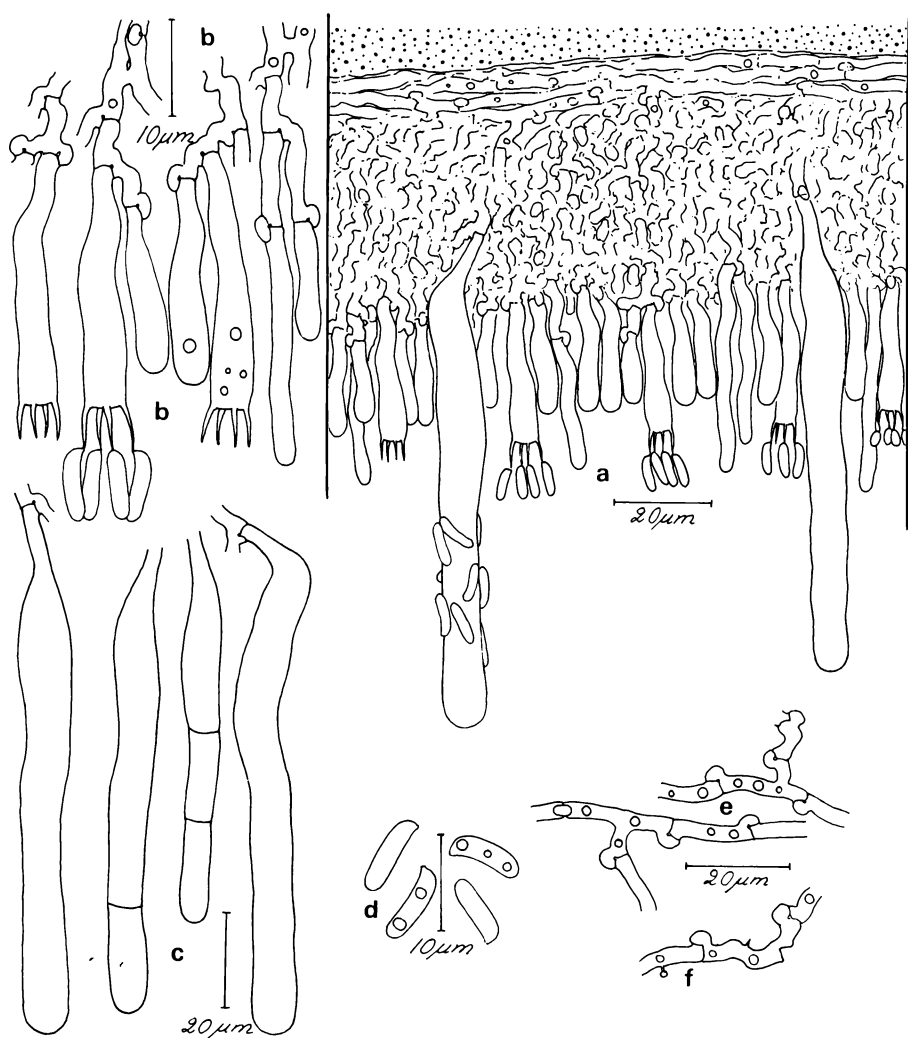


Fig. 603. *Phlebia tristis*. a) section through fruitbody b) basidia and hymenial hyphae c) cystidia d) spores e) hyphae from wood f) hyphae with conidioid processes. — N. Hallenberg 1972.10.12.

Phlebiopsis

Phlebiopsis Jül., Persoonia 10 p. 137, 1978.

Fruitbodies resupinate, adnate or loosening and rolling off in the margins; hymenium smooth, tuberculate or with peg-like projections; subiculum variable, well-developed or very scarce; hyphal system monomitic, hyphae thin-walled in the hymenial part, otherwise with thickened walls, without clamps in the hymenial layer but clamps occurring in the subiculum; hyphae densely united into a firm context esp. in the subhymenium which is ceraceous in the living state, when dried crustaceous — corneous; cystidia numerous, conical, richly encrusted, in the basal part naked, with thickened walls; basidia ab. 20 μm long, apically dilatated, normally with 4 sterigmata, without basal clamp; spores narrowly ellipsoid — oblong, thin-walled, smooth, not amyloid, not cyanophilous.

Type species: *Thelephora gigantea* Fr., Syst. mycol. I p. 448, 1821.

Remarks. The genus was described without remarks as to its taxonomical consequences. The only species mentioned was earlier referred to *Peniophora* s.l. and later to *Phlebia*. It is with certainly not close to the generic types of these two genera. Its relations seems to be closer to *Phanerochaete*, with which it agrees i.e. in the lack of clamps but for some subicular ones, occurring singly or in whirls. It differs from *Phanerochaete* in the consistency of the subhymenium, which is very firm or hard in the dry fruitbody, a result of the thickness of the hyphal walls and of the close junctions of the hyphae.

In this respects *Phlebiopsis* reminds of many species of *Phlebia*. The shape of the basidia is fairly characteristic being rather short and apically abruptly dilatated. In *Phanerochaete* the basidium bundles are easily separated in squash preparations, but in *Phlebiopsis* the basidia stick together as if glued laterally to each other and are therefore not easily studied. In this respect it agrees with *Scopuloides* (Cooke & Massee) Hjortst. & Ryv. The generic type of *Phlebiopsis* agrees with *Phanerochaete* in the presence of a well developed subiculum, but there are still differences. In *Phanerochaete* the subicular hyphae are more or less parallel to each other as well as to the substrate, while in *Phlebiopsis* the subiculum is composed — at least partly — of hyphal strands, woven together and sometimes continuing through the hymenium, resulting in peg-like pro-

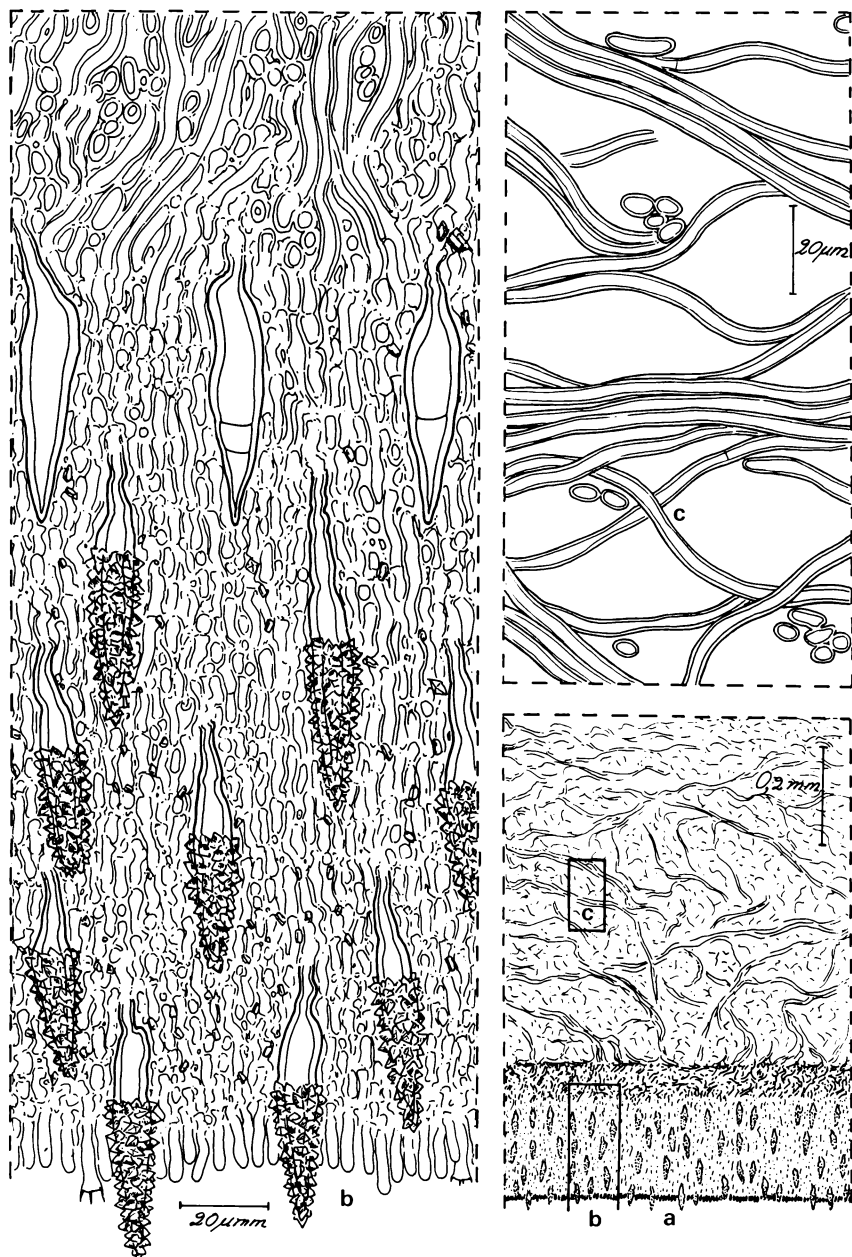


Fig. 604. *Phlebiopsis gigantea*. a) schematical section through mature fruitbody with positions of b and c b) section through hymenium and subhymenium c) section through subiculum. — Hjortstam 13222.

Phlebiopsis

jections. Whether or not these characteristics are sufficient grounds for a separate genus cannot with the present state of affairs be definitely decided. The problem will perhaps be solved when its tropical relatives become better known.

No other species than the generic type matches the genus fully, but at least one species seems to be close enough to be included, viz. *Corticium roumeguerii* Bres. It fits the genus in several important characteristics. It agrees perfectly in the size and shape of cystidia, basidia and spores, lack clamps at least in the hymenial hyphae, its hymenium elements are difficult to separate, and the texture is firm. The main difference is the lack of a subicular layer. The subhymenium of dry fruitbodies is not corneous, rather crustaceous. Notwithstanding these differences, we are of the opinion that the species should be placed together with *Phl. gigantea*. There are besides similarities in the culture characteristics, e.g. the presence of arthroconidia, number of nuclei in spores, basidia, subicular hyphae (Boidin 1954 p. 142–43).

Another species that should be discussed in this case is *Peniophora hydroides* Cke & Masee. It agrees in some respects with *Phl. gigantea* (shape of basidia and cystidia, density of hymenium, and is, besides the encrusted cystidia, provided with encrusted and therefore cystidium-like terminal hyphae.

Even if the generic arrangement is yet far from clear and definite, we choose not to include it in *Phlebiopsis*, at least till further knowledge is obtained, but follow the arrangement suggested by Hjortstam and Ryvarden (Mycotaxon 9 p. 509, 1979) and place it in a genus of its own, *Scopuloides*.

Two species, but only one in N. Europe:

- | | |
|--------------------------------|----------------------------|
| 1. Subiculum well-developed | 1. <i>Phl. gigantea</i> |
| 1. Subiculum scanty or lacking | 2. <i>Phl. roumeguerii</i> |

1. *Phlebiopsis gigantea* (Fr.) Jül., Persoonia 10 Fig. 604-05, 607 A
p. 137, 1978. - *Thelephora gigantea* Fr.,
Syst. mycol. I p. 448, 1821. - *Corticium*
giganteum (Fr.) Fr., Epicrisis p. 559, 1838.
- *Peniophora gigantea* (Fr.) Masee, Journ.
Linn. Soc. Bot. 25 p. 142, 1889. - *Phlebia*
gigantea (Fr.) Donk, Fungus 27 p. 12, 1957.

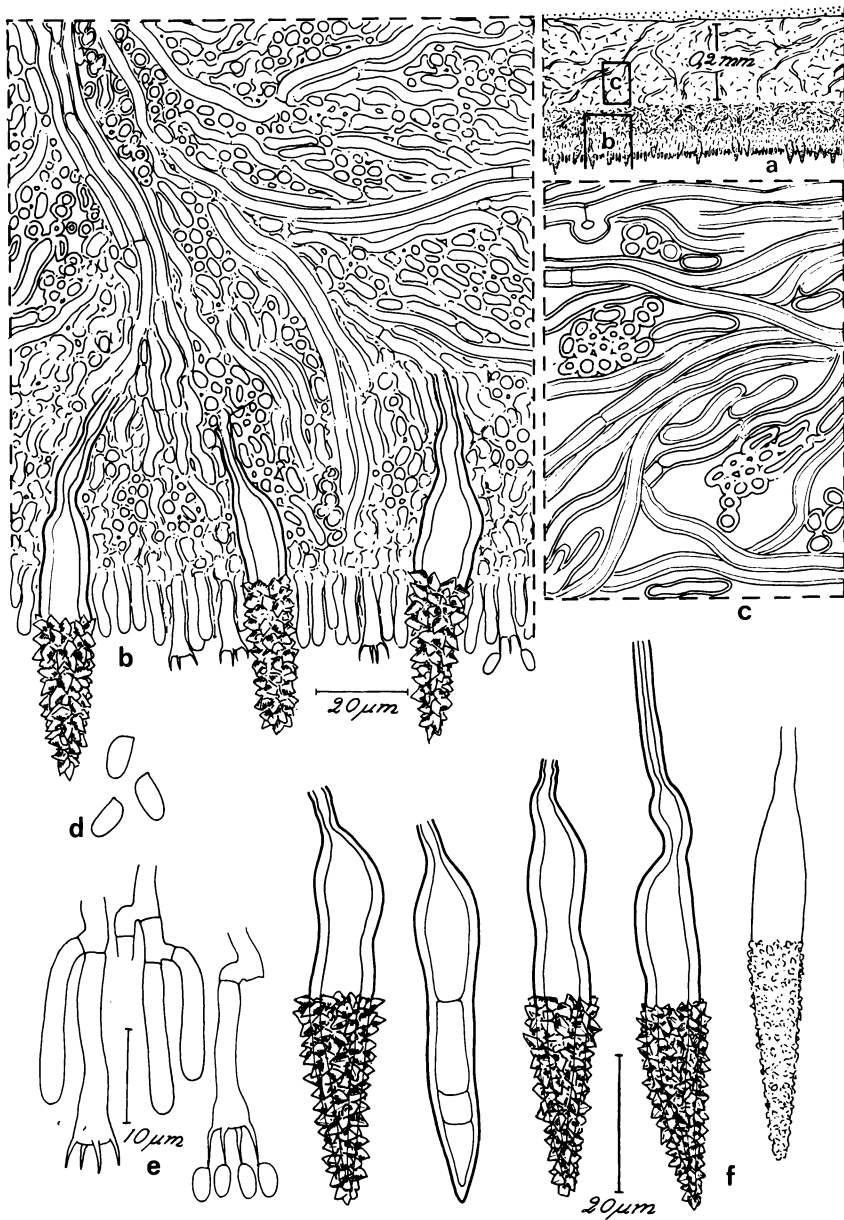


Fig. 605. *Phlebiopsis gigantea*. a) schematic section through young fruitbody with positions of b and c b) section through hymenium c) part of subiculum d) spores e) basidia f) cystidia. — Hjortstam 13222.

Phlebiopsis

Fruitbody resupinate, effused and often large, in section reaching 0.5 mm in thickness, white-greyish – pale buff, closely adnate but with age, on drying, loosening from the substrate in the margins and more or less rolled off and in that state parchment-like; hymenium in the living, wet state swollen, watery ceraceous-subhyaline, more or less tuberculate, when dry usually smooth, under the lens velutinous because of projecting cystidia; margin white, fimbriate – fibrillose determinate, sometimes fertile throughout.

Hyphal system monomitic; hyphae 2–5 μm wide, thin-walled and narrow in the hymenium, other hyphae with more or less thickened walls, clamps lacking except at some septa in the subiculum; subhymenium thickening, with densely united hyphae, therefore ceraceous when wet, corneous when dried; subiculum mostly very thick, interwoven with strands of parallel hyphae, in younger fruitbodies such strands may penetrate the hymenium and cause peg-like projections; a layer of the subiculum situated next to the subhymenium often ceraceous – corneous, dark coloured in dry section, while the main part of the subiculum is white.

Cystidia numerous, 60–90 x 10–20 μm , projecting 30–50 μm conical and richly encrusted in the apical part, basally with thickened walls, often with adventitious septa, in young state thin-walled, in the beginning naked but soon covered with crystals; in old enclosed cystidia encrustation often dissolved.

Basidia 16–22 x 4–5 μm in mature fruitbodies, in young hymenia longer (to 42 μm), apically dilatated, with 4 sterigmata and without basal clamp.

Spores 4.5–6(–8) x 2.5–3 μm , oblong – narrowly ellipsoid – subcylindrical, with adaxial side mostly straight in mature spores, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On stumps, fallen trunks and other remains of coniferous wood, rarely on frondose wood. Often seen on piled wood, left too long in the forest. One of the characteristic fungi in the lumbered forests.

Distribution. In all parts of N. Europe forests with conifers and usually common. In the northern part less frequent in the virgin forests where it is replaced by *Phlebia centrifuga*.

Remarks. Easily recognized species. It could orbicularly be confused with *Phlebia centrifuga*, but is well distinguished under the lens.

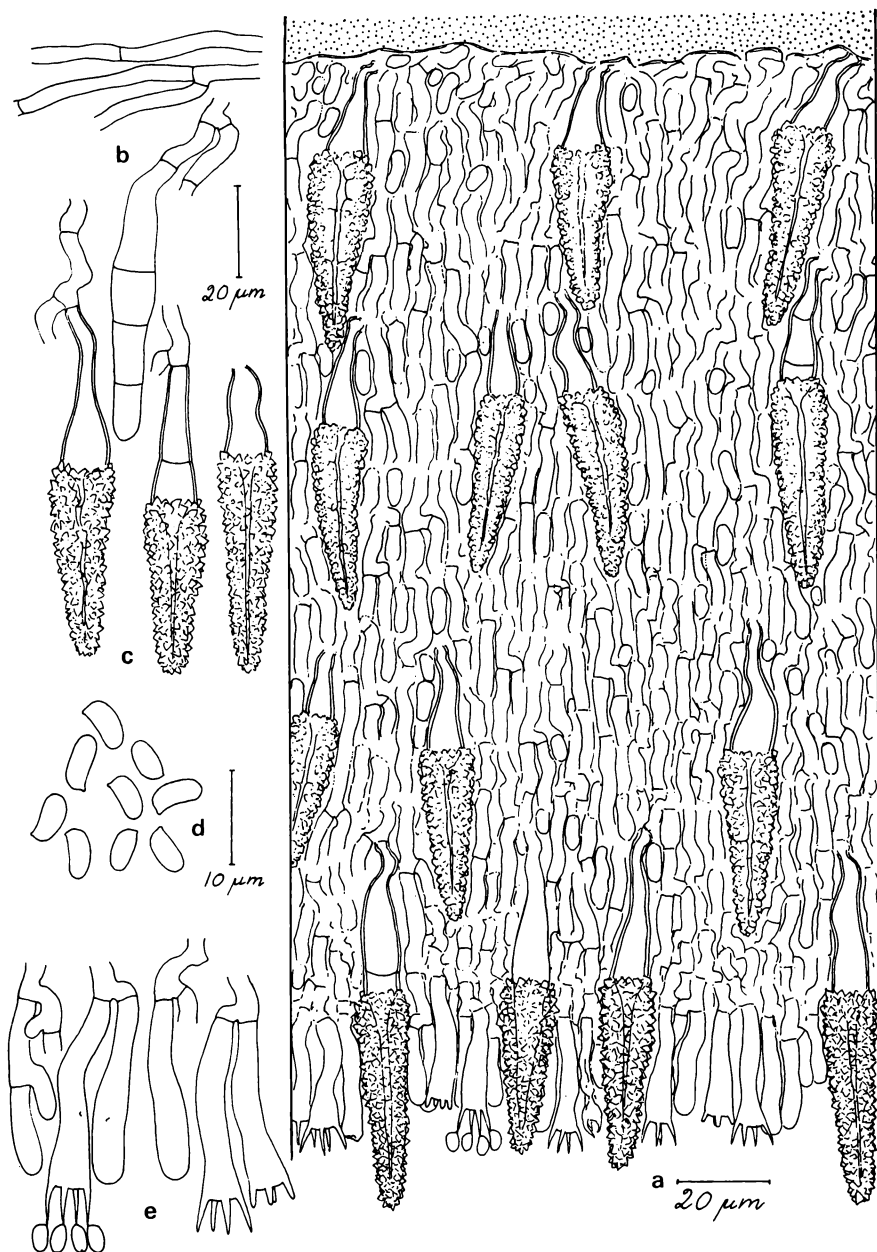


Fig. 606. *Phlebiopsis roumeguerii*. a) section through fruitbody b) basal hyphae c) cystidia d) spores e) basidia. — Ryvarden 12377.

Phlebiopsis

- 2. *Phlebiopsis roumeguerii* (Bres.) Jül. & Stalpers.** Fig. 606
 Verh. Kon. Ned. Akad. Wet. Nat. Ser. 2. Vol. 74:190, 1980.
 - *Corticium roumeguerii* Bres., Fungi trid. 2 p. 36, 1892. -
Peniophora roumeguerii (Bres.) v. Höhn. & Litsch.
 Sitzb. Akad. Wiss. Wien, Mathem. - Naturw.
 Kl. 115:I p. 33, 1906. - *Phlebia roumeguerii*
 (Bres.) Donk, Fungus 27 p. 12, 1957.
 - *Peniophora molleriana* Bres. in Sacc.,
 Soc. Brot. Bol. 11 p. 13, 1893.

Fruitbody resupinate, closely adnate, effused and sometimes large, varying in thickness to 1 mm or even more; hymenium pale whitish or greyish, in the old fruitbody densely cracked; margin determinate, not fimbriate.

Hyphal system monomitic; hyphae 2–4 μm , with thin walls in the hymenial part, otherwise, thicker, densely interwoven but the hyphal direction mainly vertical; subhymenium stratified, subiculum hardly discernable.

Cystidia numerous, conical, 50–70(–90) \times 10–15 μm , encrusted in the apical part which is also filled with a crystalline matter, leaving a central capillary lumen, basal part naked with somewhat thickened walls.

Basidia 18–22(–30) \times 4–5 μm , apically dilatated, with 4 sterigmata and without basal clamp.

Spores oblong – narrowly ellipsoid, 4–5(–6) \times 2.5–3(–3.5) μm , adaxial side straight or slightly concave in the mature spores, smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat and distribution. On decayed deciduous wood. Reported from Denmark but this material (comm. by Hauerslev) is clearly not this species but rather a deviating form of *Ph. gigantea*. The species is quite common in the Mediterranean area but hitherto not found in N. Europe.

Remarks. Easily recognized species. Distinguished from *Ph. gigantea* in lacking subiculum, and having thinner walls in the base of the cystidia. It fits the genus *Phlebiopsis* in several characteristics, e.g. size and shape of spores, basidia, as well as the basidia being difficult to separate thanks to the dense subhymenial context.

Physodontia Ryv. & Solheim, Mycotaxon 6,
p. 375, 1977.

Holotypus: *Physodontia lundellii* Ryv. & Solheim.

Fruitbodies resupinate, closely adnate, odontoid, whitish or pale cream-coloured, very thin and porose-reticulate between the aculei, soft-ceraceous, when dry fragile; hymenial aculei very small and dense; margin indistinct; hyphal system monomitic, hyphae very thin-walled, with clamps at all septa; in the hymenium numerous narrow cystidia, tapering to the obtuse apex, thin-walled, not encrusted; gloecystidia very numerous, rounded or oblong, thin-walled, plasmatic contents granular, oily, light-refracting (in phase); basidia small, with 4 sterigmata and basal clamp; spores ellipsoid, small, smooth, thin-walled, non-amyloid, non-cyanophilous.

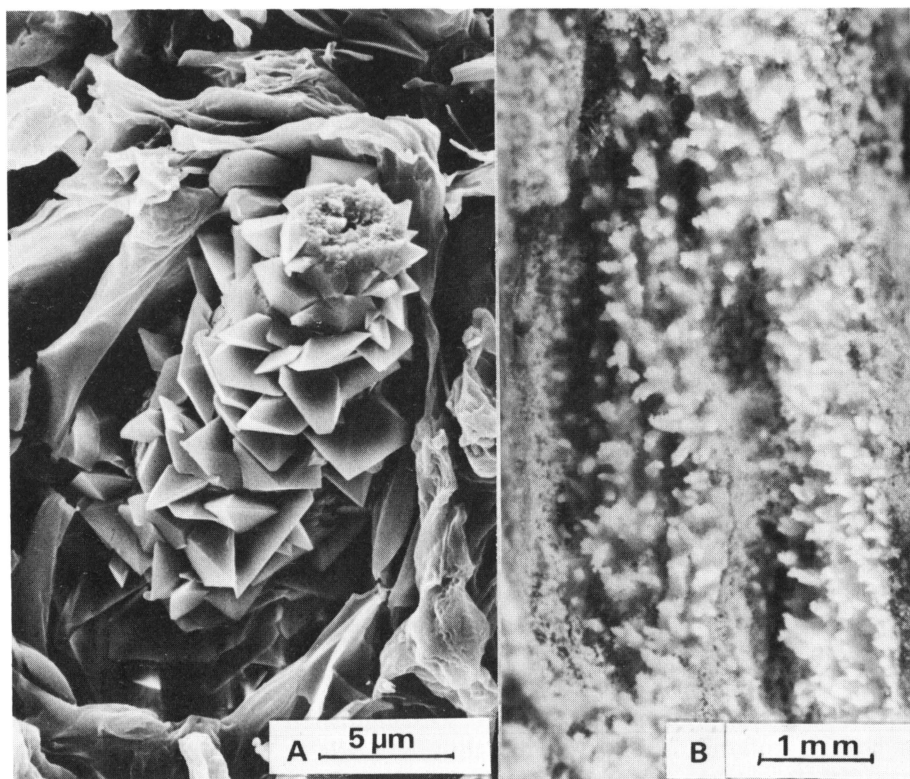


Fig. 607. A) *Phlebiopsis gigantea*. Cystidia encrusted with Ca-oxalate crystals. — Coll. Hjortstam 13216. SEM L. Ryvarden. B) *Physodontia lundellii*. Part of fruitbody. — Kujala & J. Eriksson 9821. Photo T. Hallingbäck.

Physodontia

Remarks. This little fungus is in several respects remarkable and has therefore been placed in a genus of its own. Without any explanations at all Jülich refers it to *Parvobasidium* Jülich, but the differences are too many to make such an arrangement possible. *Physodontia* is clearly odontoid, *Parvobasidium* clearly corticioid; *Physodontia* has a very loose texture both in the aculei and between them, where it is porulose and almost pulverulent, while *Parvobasidium* is described as membranaceous. The abundant gloeocystidia of *Physodontia* are filled with a granular-oily protoplasm, strongly light-refracting in phase, while in *Parvobasidium* they are seemingly empty, maybe with a thin, much vacuolate protoplasm more like that of *Vesiculomyces*. In *Physodontia* the gloeocystidial protoplasm is firm (in dry material) and coherent also when the cystidia are crushed in the slides, and the plasm is often squeezed out through a small hole in the wall in a very characteristic way while the contents of *Parvobasidium* cystidia seem to be watery. The similarities between *Parvobasidium* and *Physodontia* seem to be coincidental and are no proof of a close relationship between them. *Parvobasidium*, with the single species *P. cretatum* (Bourd. & Galz.) has been collected only a couple of times and the herbarium material is scarce. When collected it is possible that some better information about its taxonomical position may be achieved.

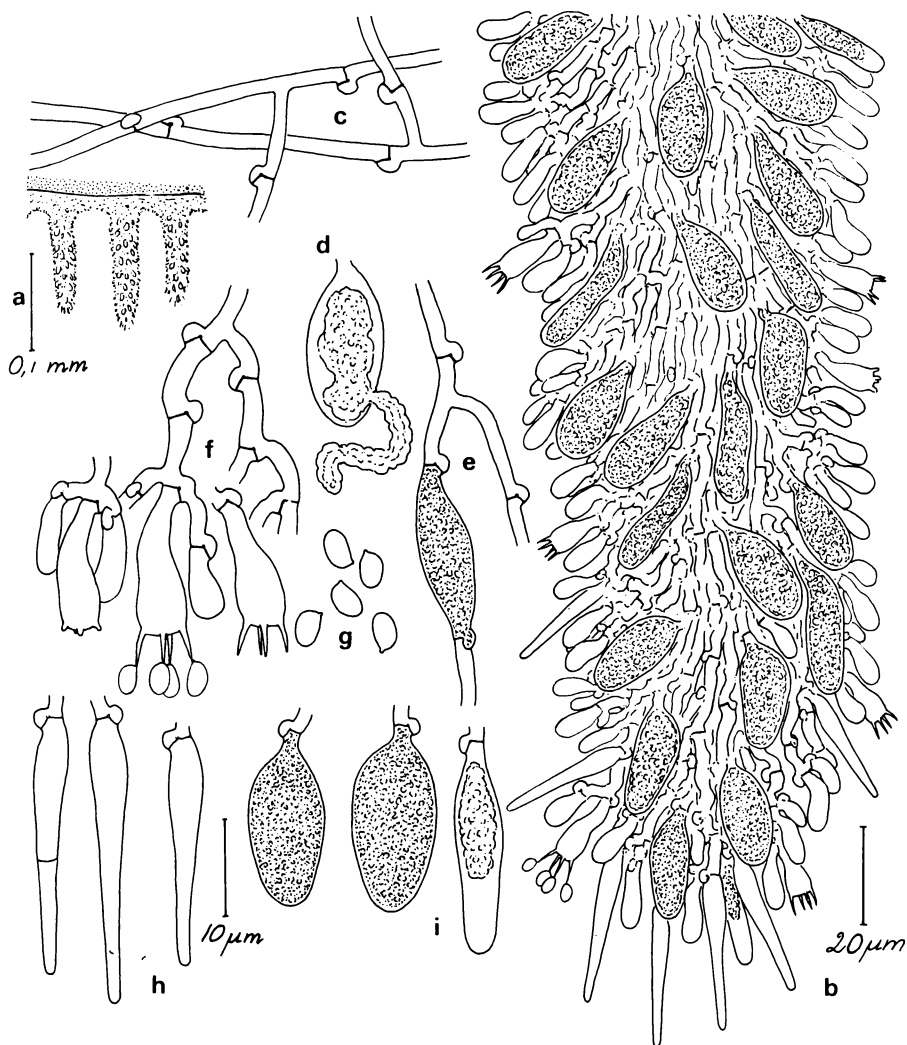
One species described.

Physodontia lundellii Ryv. & Solheim, Myco-
taxon 6 p. 376, 1977.

Fig. 607 B, 608

Holotypus: Sweden, Småland, Femsjö par., N. slope of Dullaberget, 1939.10.04. S. Lundell 1667 (GB).

Fruitbody resupinate, closely adnate, odontoid, soft and ceraceous in the living state, when dried loose and fragile, whitish to pale cream-coloured; very thin and porulose between the aculei, which are very small, ab. 0.1–0.3 mm long in the dry state, cylindrical, tapering apically and provided with projecting hair-like cystidia (lens); margin mostly indistinct, partly finely fimbriate.



2 Fig. 608. *Physodontia lundellii*. a) schematic section through fruitbody b) section through hymenial teeth c) basal hyphae d) burst gloeocystidium e) ampullate hyphae f) basidia g) spores h) cystidia i) gloeocystidia. — Holotype.

Physodontia

Hyphal system monomitic; hyphae very thin-walled, fibulate, 1.5–2.5(–4) μm wide.

Cystidia of two kinds 1) hymenial cystidia in the apical part of the aculei, tapering towards the blunt apex, thin-walled, non-encrusted and without inclusions in the protoplasm, with basal clamp.

2) numerous gloeocystidia, terminal, rarely intercalary, rounded or oblong, 15–20(–30) \times 6–12 μm , thin-walled, with basal clamp, filled with oily, granular plasmatic contents, light-refracting in phase, yellow in white light, when pressed squeezed out through a narrow hole in the wall, stained by eosin, dissolved in sulfoaldehyde reagents.

Basidia 12–15 \times 4–5 μm , clavate, with 4 sterigmata and basal clamp.

Spores ellipsoid, 3–4 \times 2–2.5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat and distribution. Growing on very decayed coniferous wood in normal *Picea-Pinus* forest. Apparently very rare as it is hitherto collected only a few times, three times in Sweden (Femsjö in Småland, Mölndal in Västergötland, and Töfsengdalen i Dalarna), once in Finland (Pisavaara nat. park) and three times in Norway (Engerdal and Rendalen in Hedmark and Oppland, Ormtjern-kampen).

Remarks. To the naked eye as well as under the lens it looks like a *Trechispora* and the consistency of the fruitbody agrees also with that of this genus. The few finds hitherto made give the impression of a very uniform species, and thanks to the small and cylindrical aculei it is determinable already under a lens. The striking characteristic in the microscope is the number of gloeocystidia, making the texture seemingly filled with oil-rich bladders, reminding to some degree of the subhymenial texture of *Cystostereum murrayi*. The species deviates from all hitherto known members of *Corticaceae* and it seems therefore inevitable to place it in a genus of its own. The similarities with *Trechispora* are evidently coincidental and its place within the family is not clarified.

Piloderma Jül., Ber. Deutsch. Bot. Ges. 81
p. 415, 1969.

Fruitbodies resupinate, effuse, when dried generally fragile, soft and porulose but sometimes firmer and more continuous, as a rule easily detached from the substrate at least in pieces but may be quite adnate; subicular mycelium often well developed, like a cobweb, in other cases scanty; rhizomorphs often present; hyphae without clamps, with thin or somewhat thickened walls, richly branched in the hymenial layer, in the subiculum straight and sparsely branched; anastomoses frequent; basidia clavate, as a rule basally narrowed into a stalk-like part, without basal clamp; spores globose-ellipsoid, smooth, with somewhat thickened walls and central oil drop, non-amyloid, often somewhat dextrinoid, non-cyanophilous.

Type species: *Corticium bicolor* Peck.

Remarks. The shape of the basidia points at *Athelopsis*, but *Piloderma* differs in other respects. Essential characteristics are the porulose (under the lens) hymenium, at least in the young state, the loose texture, and the lack of clamps, which evidently is total. The taxa described are close to each other and too little is still known about the variability of some of the characteristics used to distinguish them, e.g. the development of the subicular hyphae. Their taxonomy is therefore in several respects not fully clear.

The species of *Piloderma* belong to those fungi which grow in the litter of more or less acid coniferous forests. They are not able to decay wood. Being nourished by a mycelium growing in the litter layer, their fruitbodies can develop on all sorts of substrates, even on living mosses or other plants. Ecologically the species of *Piloderma* thus agree with *Amphinema*, *Tylospora*, *Tomentella*, and other small fungi, the hyphae of which often are found mixed among those of *Piloderma*. This genus is also known as an important mycorrhiza producer.

The genus includes two well known, frequent species, for which the names *P. bicolor* and *P. byssinum* are commonly accepted. They have briefly been described as one species with yellow rhizomorphs — *P. bicolor*, and one with no or white rhizomorphs — *P. byssinum*. Besides there are three more dubious species described, based on characteristics which are more difficult to estimate. Our investigation of a large material, including type specimens, has shown that there are several problems involved concerning both taxonomy and nomenclature. The investiga-

Piloderma

tion shows that *P. bicolor* cannot be used as a name for the species with the yellow rhizomorphs, and it has therefore been necessary to introduce a new name — *Piloderma croceum*. The type of *P. bicolor* agrees on the other hand perfectly with the type of *P. byssinum*, why these taxa are clearly synonymous, and as *P. bicolor* has priority this name should unfortunately be introduced as a name for what hitherto is called *P. byssinum*.

As *Piloderma bicolor* since 1950 (Lundell & Nannfeldt, Fungi exs. suec. No. 1842) has been widely and persistently used as a name not including the type, we suggest it being listed as a nomen rejiciendum (Art. 69:1), thus avoiding the troubles a change of names inevitably would cause. Three other taxa — *P. lapillicolum*, *P. reticulatum* and *P. sphaerosporum* — appear to be of doubtful value. The characteristics used — the shape and size of the spores and the degree of development of a subicular tissue — show a uniform series of intermediates, and therefore we don't find it possible to delimit them by morphological criteria alone.

Jülich described two varieties of *P. byssinum*, var. *bisporum* and var. *lanatum*. They differ considerably and are here joined as a species of its own, *P. lanatum*.

Key to the species

1. Rhizomorphs yellow. Mature hyphae in the subiculum and rhizomorphs with a yellow, fine-grained encrustation easily visible in Melzer. Fruitbody from the beginning yellow but fading during development as the yellow subicular hyphae become covered by the hymenium 2. ***P. croceum***
1. Rhizomorphs white or lacking. Hyphae without yellow grainy encrustation but often covered with rodlike crystals or with amorphous grains, soluble in Melzer's reagents. Fruitbody from the beginning white but often turning more or less yellow 2
2. Spores 3 — 4 (— 4.5) μm long, norm. 4 sterigmata ... 1. ***P. byssinum***
2. Spores (4.5 —) 5 — 7 μm long, 2 or 4 sterigmata 3. ***P. lanatum***

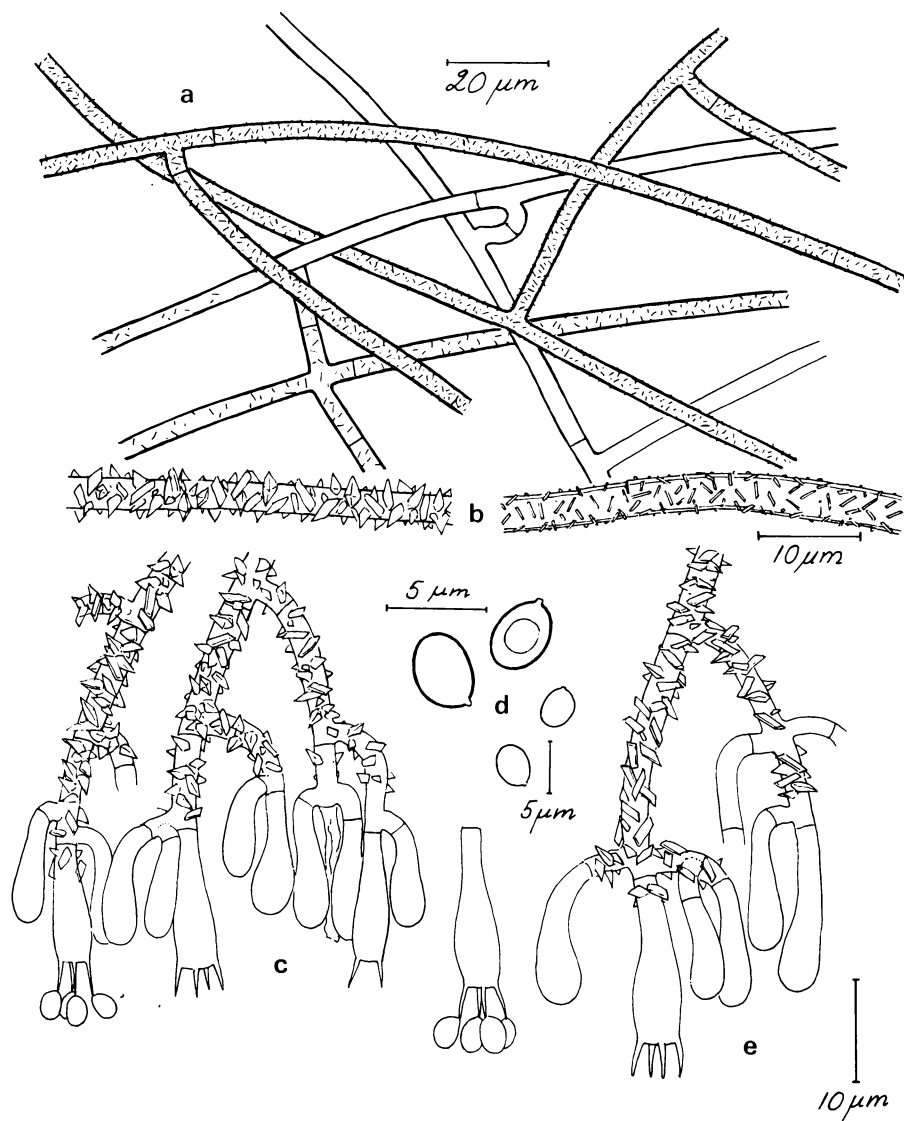


Fig. 609. *Piloderma byssinum*. a, b) basal hyphae c, e) basidia d) spores. — J. Eriksson 9667.

Piloderma

1. **Piloderma byssinum** (Karst.) Jülich, loc.cit. Fig. 609-13, 616A
 p. 418, 1969.
 — *Lyomyces byssinus* Karst., Medd. Soc. F.
 Fl. fenn. 11, p. 137, 1884. — *Corticium byssinum*
 (Karst.) Massee, Journ. Linn. Soc. Bot. 27,
 p. 133, 1890; Karst., Hedw. 35, p. 174, 1896.
 — *Athelia byssina* (Karst.) Parm., Eesti NSV
 Tead. Akad. Toim. 16. Biol. p. 380, 1967.
 — *Coniophora byssiseda* Karst. in herb.
 — *Corticium bicolor* Peck, Bull. Buffalo Soc.
 Nat. Hist. 1, p. 62, 1873 (nom. rejic.).
 — non *Piloderma bicolor* (Peck) Jülich loc.
 cit. (= *Piloderma croceum* Erikss. & Hjortst.).

Holotype of *Lyomyces byssinus*: Finland, Nyland, Helsinki, Mjölö (= Iso-saari). 1883.10.—. E. Wainio. Herb. Karst. n 681 (H).

Holotype of *Corticium bicolor*: USA, Korner Center (NY), on rotten wood, C.H. Peck n. 135 (NY).

Fruitbody resupinate, as a rule loosely attached to the substrate by a more or less cobweb-like subiculum, but sometimes more adnate with a reduced subiculum, from the beginning white.

Hyphal system monomitic; hyphae 2.5 — 3.5 μm wide, without clamps; thin-walled and richly branched and as a rule covered with crystals in the subhymenial layer; basal hyphae with thin to thickened walls, normally with small, attached, baculiform crystals but lacking yellow encrustation in Melzer.

Cystidia none.

Basidia (10) — 12 — 15 (— 25) x 3.5 — 5 μm , clavate, basal part often prolonged, with (2 —) 4 sterigmata, without basal clamp. In coloured fruitbodies basidia and subbasidial cells sometimes filled with yellow plasmatic contents.

Spores 3 — 4 (— 4.5) x 2.5 — 3.5 μm , subglobose-ellipsoid, white to yellowish, smooth, with thickened walls non-amyloid but in Melzer yellow or in mass in some fruitbodies even yellow-brown.

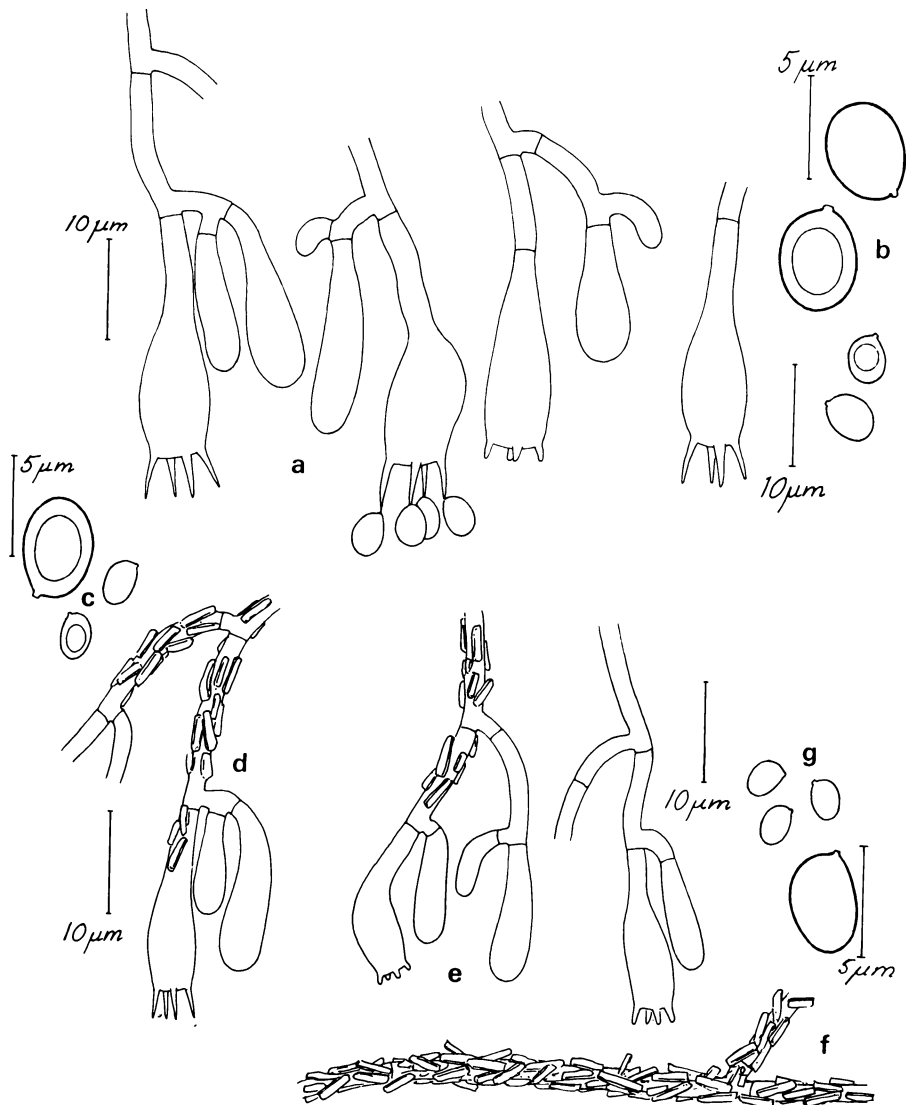


Fig. 610. *Piloderma byssinum*, forms a, d, e) basidia b, c, g) spores f) encrusted hyphae. — a-b Eriksson & Kujala 10071, c-d S. Lundell 1327 e-f) Hauerslev 3148 "lapillicolum".

Piloderma

Habitat. On decayed wood and litter of all kinds, preferably in less acid coniferous forest but also in mixed forests and less fertile deciduous ones thus differing from *P. croceum*, even if the two species overlap ecologically. As the latter, it is likely that *P. byssinum* is an important mycorrhiza symbiont in the coniferous forests.

Distribution. Collected many times in all parts of N. Europe, to N. Lapland and evidently it is a common species in the whole of the N. temperate region.

Remarks. Close to *P. croceum* but always distinguished by the whitish, not bright yellow rhizomorphs, and in the nature of the basal hyphae, which do not have the grainy, in Melzer yellow encrustation (corticocin). They are instead provided with attached rhomboid KOH-crystals, well visible both in Melzer and in SEM. In many specimens the basal hyphae may have, instead of KOH-crystals, an amorphous grainy encrustation, in SEM similar to that of *P. croceum*, but dissolved in Melzer. The hymenium may be just as much coloured as that of *P. croceum*. The presence of drop-craters is more frequent than in this species. The types of *C. bicolor* and *L. byssinus* agree very well with each other so there can be no doubt that they belong to the same species. Both deviate from the appearance normal and characteristic for the species here described in having an adnate fruitbody with less developed subiculum. It is, however, a very variable species and we don't think that it is possible to divide it into two or more taxa as they are connected with intermediate forms. There are specimens that agree well with the types, but normally *P. byssinum* in N. Europe has a more conspicuous, cobweb-like subiculum and slightly larger spores. *Coniophora byssiseda* Karst., a name given to a specimen collected by Karsten (Tammela, Syrjä, on *Picea abies*, Nov. 1883, H), showing *P. byssinum* as it normally appears in N. Europe, was never published by Karsten.

Jülich separated two taxa with very little developed subiculum as two separate species, *P. reticulatum* Jülich and *P. sphaerosporum* Jülich. The former is represented by only one specimen (the type of *Corticium reticulatum* Litsch.) and of the latter 5 specimens are cited. There are, however, many intermediate specimens in our material and we have not been able to delimitate them from *P. byssinum*. As a matter of fact they agree in several respects with the types of both *C. bicolor* Peck and *L. byssinus* Karst.

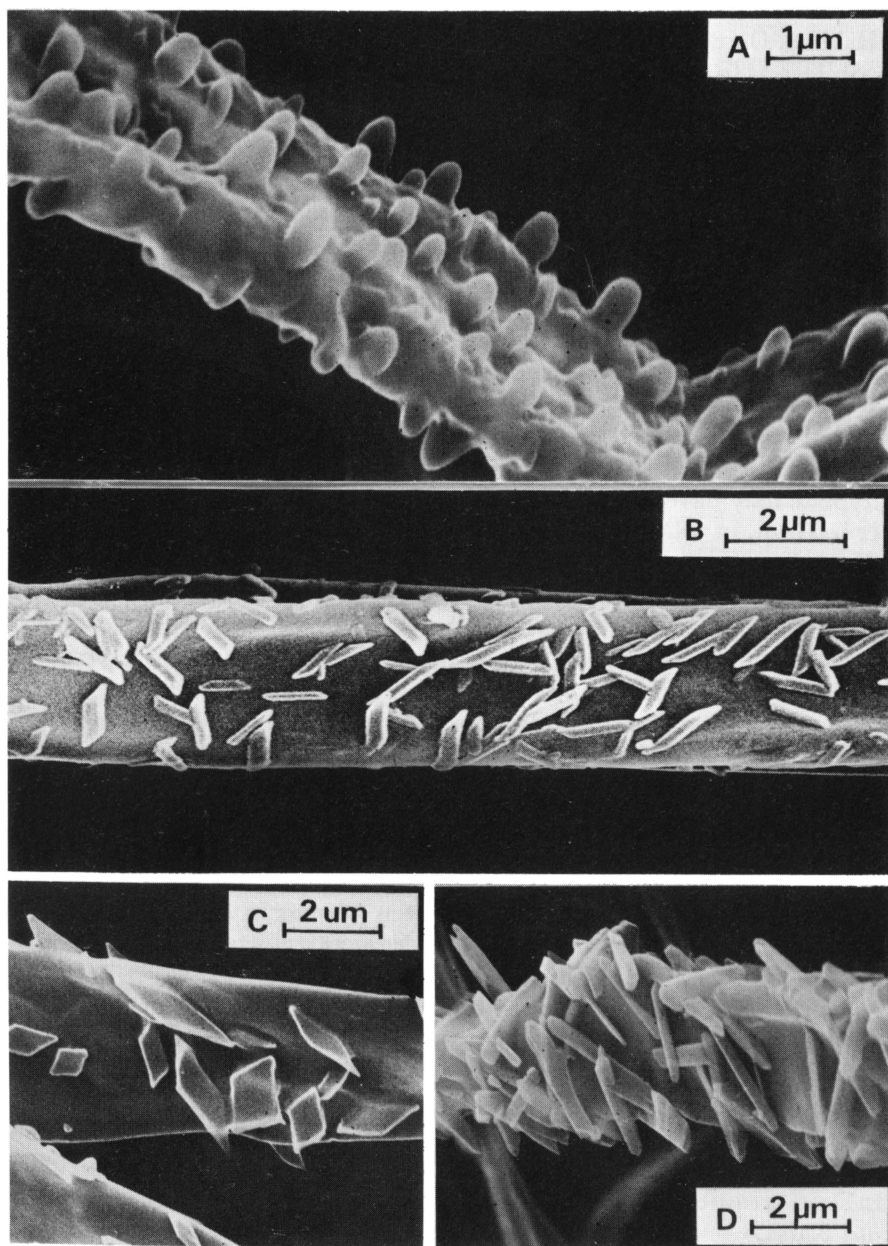


Fig. 611. *Piloderma byssinum*. Basal hyphae with Ca-oxalate crystal, and one with crystallized matter from dried-up drops (A). — Coll. A) Nathorst 1007, B) Hjortstam 13113, C) J. Eriksson 9665, D) Hjortstam 13114. SEM T. Hallingbäck.

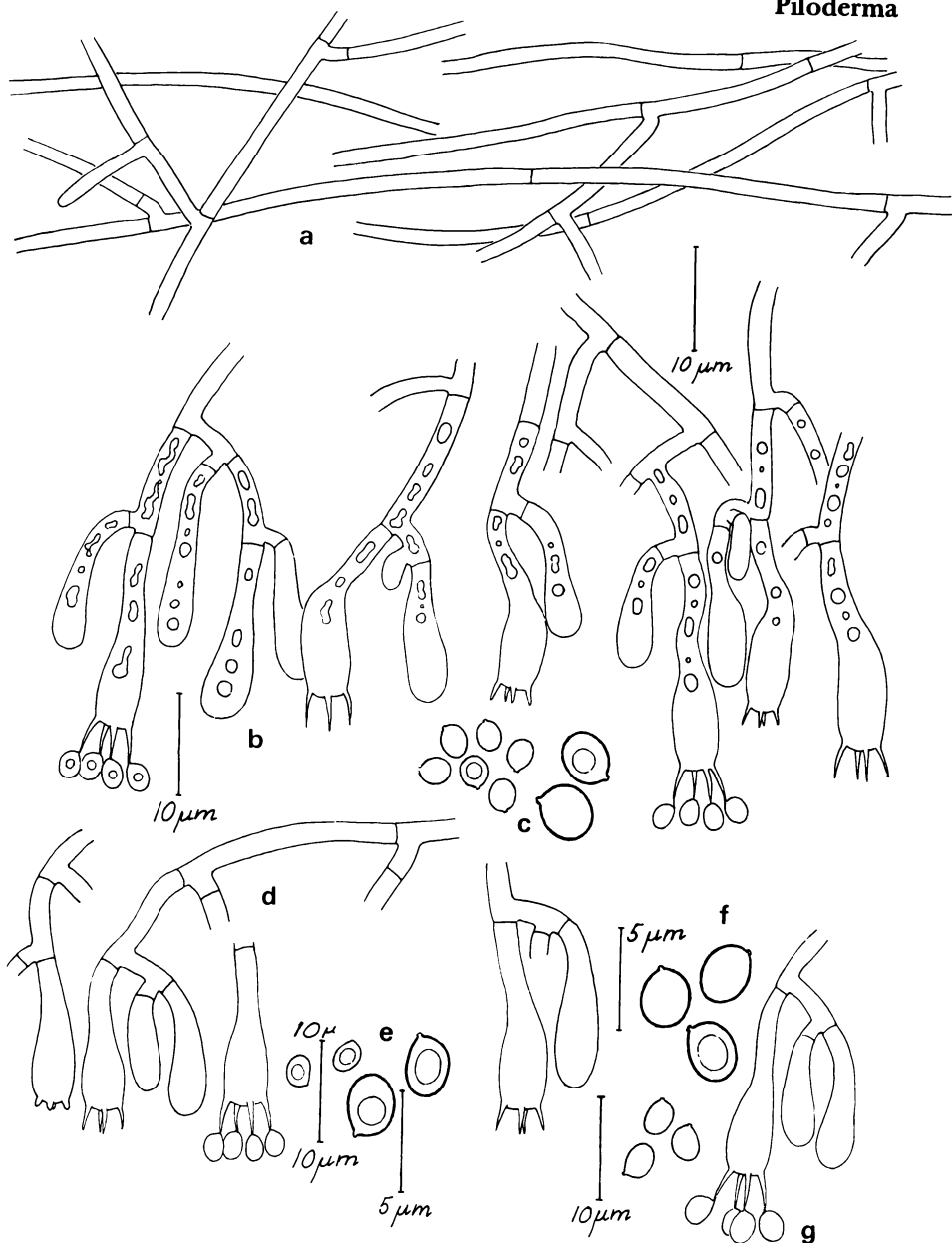
Piloderma

Fig. 612. *Piloderma byssinum* coll. — a) subhymenial hyphae b), d), g) hymenial hyphae and basidia c, e, f) spores. — a-c) *sphaerosporum* Typus, d, e) *P. reticulatum* Typus, f, g) Hjortstam 7568.

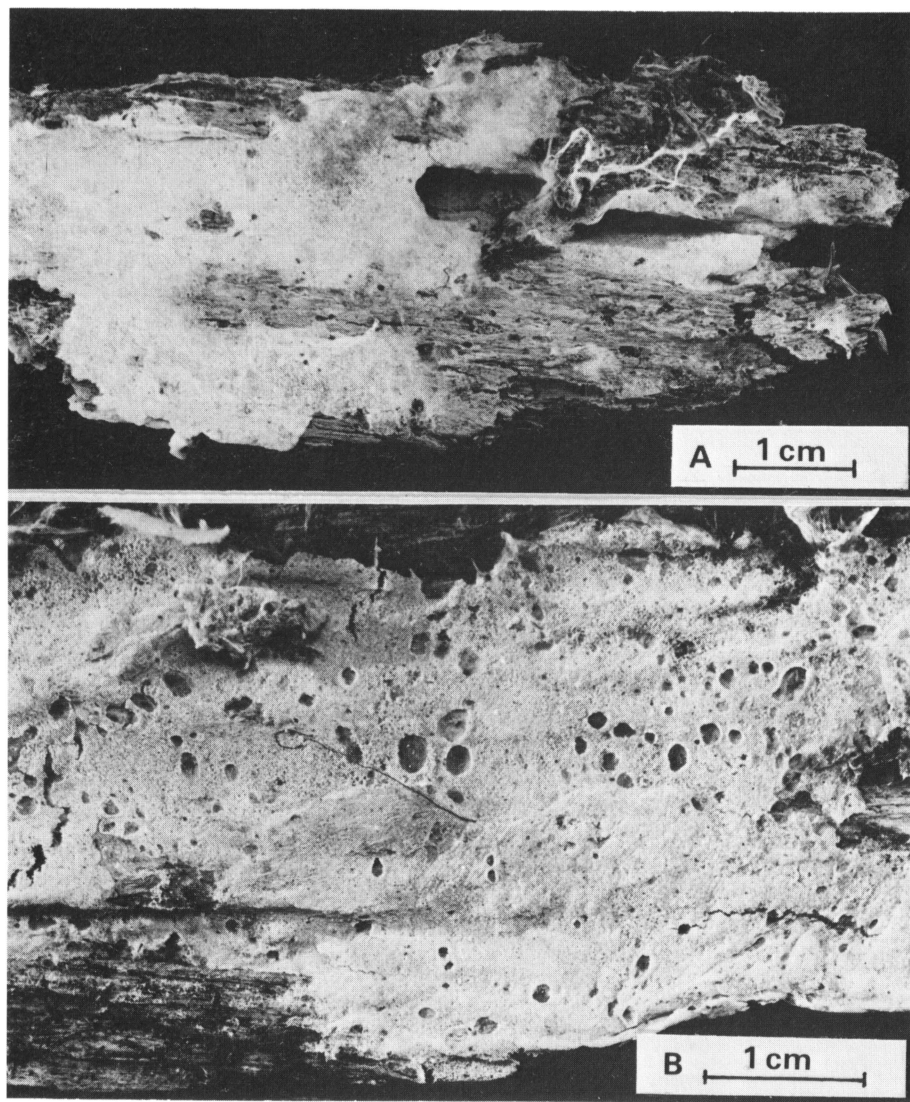


Fig. 613. *Piloderma byssinum*. a) Young fruitbody with white rhizomorphs. — Hjortstam 13109. b) Fruitbody with drop-craters. — Hjortstam 13112. Photo T. Hallingbäck.

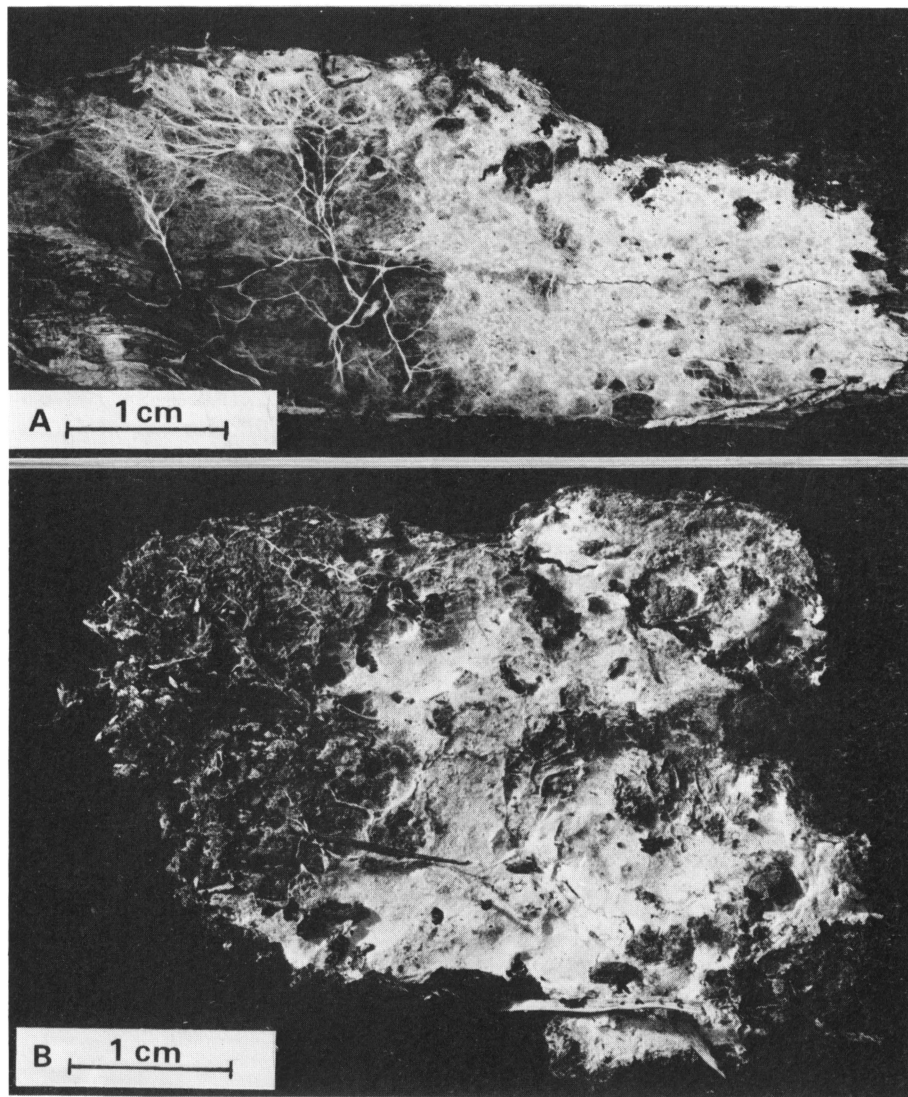
Piloderma

Fig. 614. *Piloderma croceum*. a) young fruitbody with thin rhizomorphs. — Hjortstam 13127. b) Older fruitbody with continuous hymenium. — Kujala 186. Photo T. Hallingbäck.

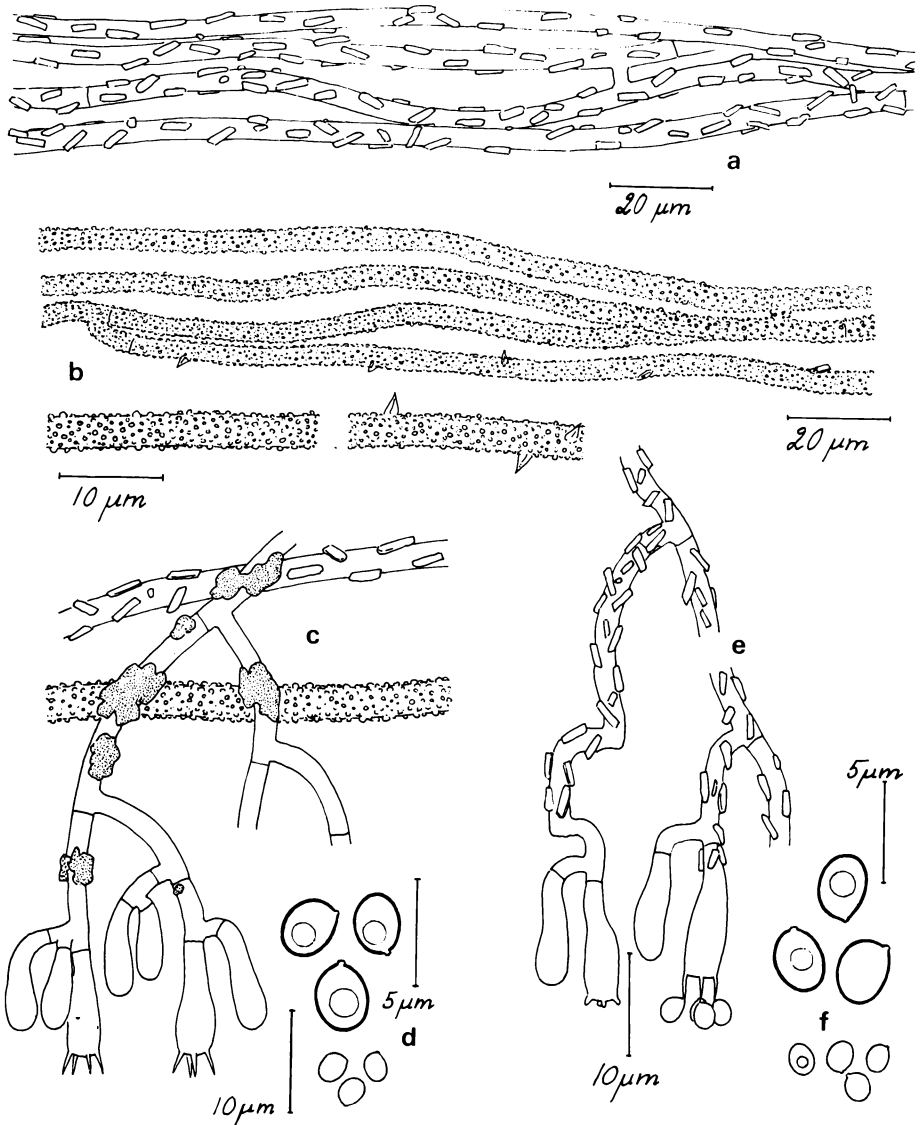


Fig. 615. *Piloderma croceum*. a) rhizomorphal hyphae with crystals (KOH) b) basal hyphae with yellow encrustation of corticocin (Melzer) c,e) basidia and hymenial hyphae d,f) spores. — a) J. Eriksson 12180 b-d) forma *olivacea* K.-H. Larsson 979, e-f) J. Eriksson 180.

Piloderma

Fig. 614-17

2. **Piloderma croceum** Erikss. & Hjortst. n.sp.
 – *Corticium croceum* Bres., I.R. Acad. Agiati
 Atti: III: 3 p. 112, 1897, non *Corticium cro-*
ceum (Pat.) Sacc., Syll. fung. 11 p. 124, 1895
 (= *Aleurodiscus croceus* Pat., 1893).
 – *Piloderma bicolor* (Peck) sensu Jül., Ber.
 Deutsch. Bot. Ges. 81 p. 417; non *Corticium*
bicolor Peck, Bull. Buffalo Soc. Nat. Hist. 1
 p. 62, 1873.

Fructificatio resupinata, irregulariter effusa, laxe adhaerens, mollis vel in vetustiore submembranacea, primo flavido-crocea, deinde pallidior; margo irregularis, indistinctus; rhizomorphae tenues croceaeque, plerumque adsunt; systema hyphale monomiticum, hyphae tenuitunicatae, effibulatae, 2 – 3 μm latae, hyphae basales granulis aureis ornatae; basidia clavata, 12 – 20 x 2.5 – 4.5 μm , 4 – sterigmatica, effibulata; sporae subglobosae -subellipsoides, 3 – 3.5 (– 4.5) x 2 – 3 (– 3.5) μm , leves, tunicis crassiusculis, non-amyloidibus, parum dextrinoidibus, non cyanophilis.

Holotype: Sweden, Småland, Almesåkra par., ab. 400 m NW of Uddeberg. 1947-10-19. S. Lundell (n. 3026) & G. Haglund. Fungi exs. suec. n. 1842 (UPS).

Fruitbody resupinate, at first thin and soft, then submembranaceous, loosely attached, in the beginning as a rule bright yellow, with the thickening of the hymenium fading to pale yellow or even almost white; hymenium soft, finely porulose (lens 50 x), smooth to irregularly folded or somewhat tuberculate; margin not differentiated: rhizomorphs regularly present, conspicuous, yellow-orange, 0.1 – 1 mm thick, more or less branched.

Hyphal system monomitic, hyphae 2.5 – 3.5 μm wide, without clamps, with numerous anastomoses, often with attached baculiform crystals; subbasidial hyphae thin-walled, richly branched; subicular ones with thin or slightly thickened walls, straight, sparsely branched, covered with small, yellow grains (visible in Melzer) of corticrocin (Erdtman), single hyphae yellow in Melzer but in mass, e.g. in the rhizomorphs, reddish-brown; hyphae of the rhizomorphs parallel, densely packed, kept together by anastomoses.

Cystidia none.

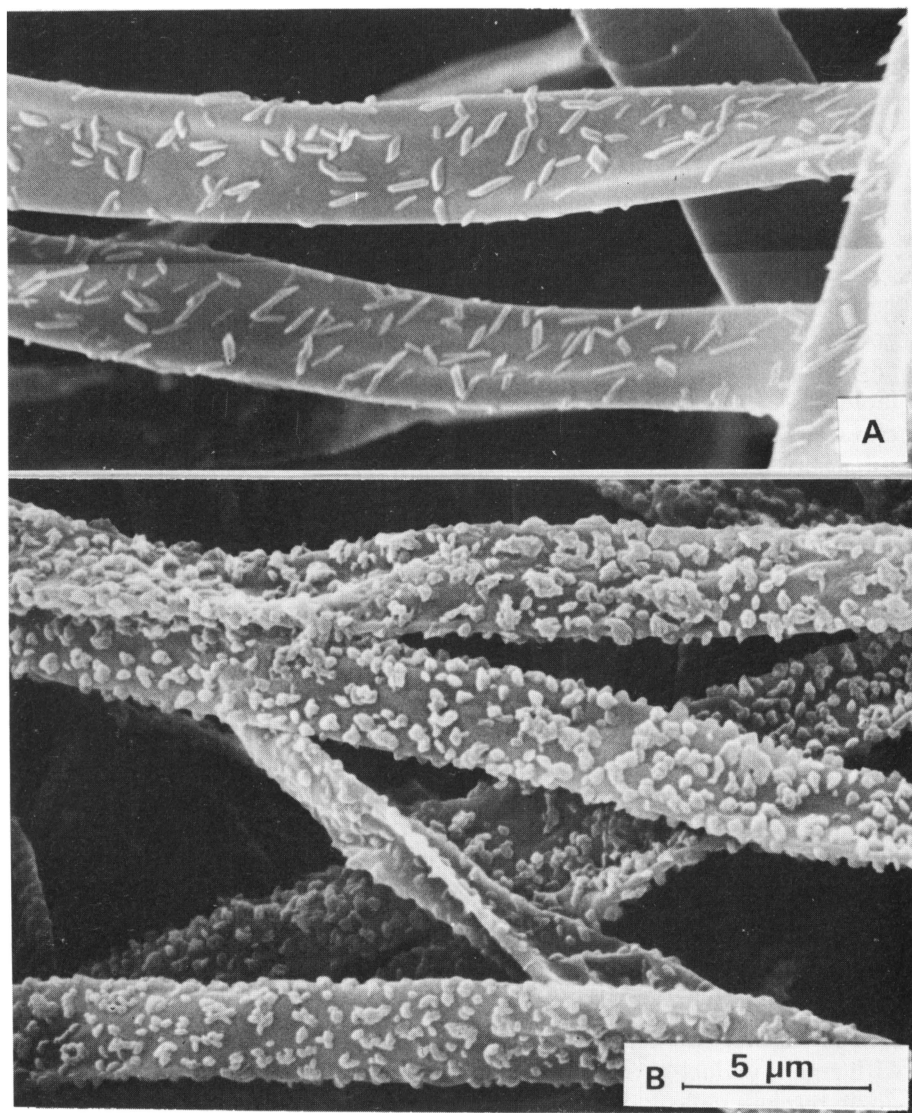


Fig. 616. Basal hyphae, showing the difference between typical *P. byssinum* (A) and typical *P. croceum* (B), the former with Ca-oxalate crystals, the latter with grains of corticocin. — Coll. A) Hjortstam 13113, B) Hallenberg 22643. SEM L. Ryvar-den.

Piloderma

Basidia 12 – 20 x 3.5 – 4.5 μm wide, clavate, basal part often narrowed to a hypha-wide part which may be prolonged; normally 4 sterigmata; no basal clamp.

Spores mostly subglobose, sometimes subellipsoid, 3 – 3.5 (– 4.5) x 2 – 3 (– 3.5) μm , smooth, with thickened walls, usually with one large oil-drop, not amyloid but yellowish in Melzer when single, in masses often more or less reddish-brown.

Habitat. Normally on much decayed wood or litter but fruitbodies may develop on any substrate as a support, e.g. on soil, rock, litter, mosses a.s.o. *Piloderma croceum* is restricted to the acid forest soils where it is frequently present as rhizomorphs in the litter or humus layers. Fruitbodies not equally frequent. On calcareous soil it can sometimes be seen

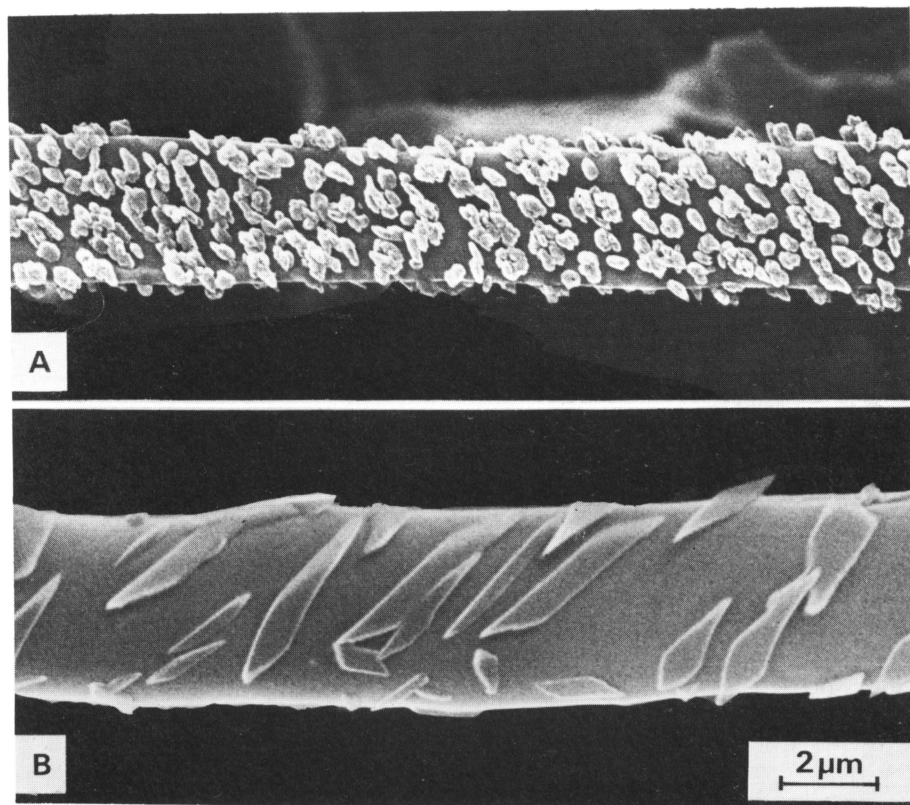


Fig. 617. Basal hyphae of A) *Piloderma croceum* – Coll. Kujala 186, B) *Piloderma byssinum* – Coll. Type material. SEM T. Hallingbäck.

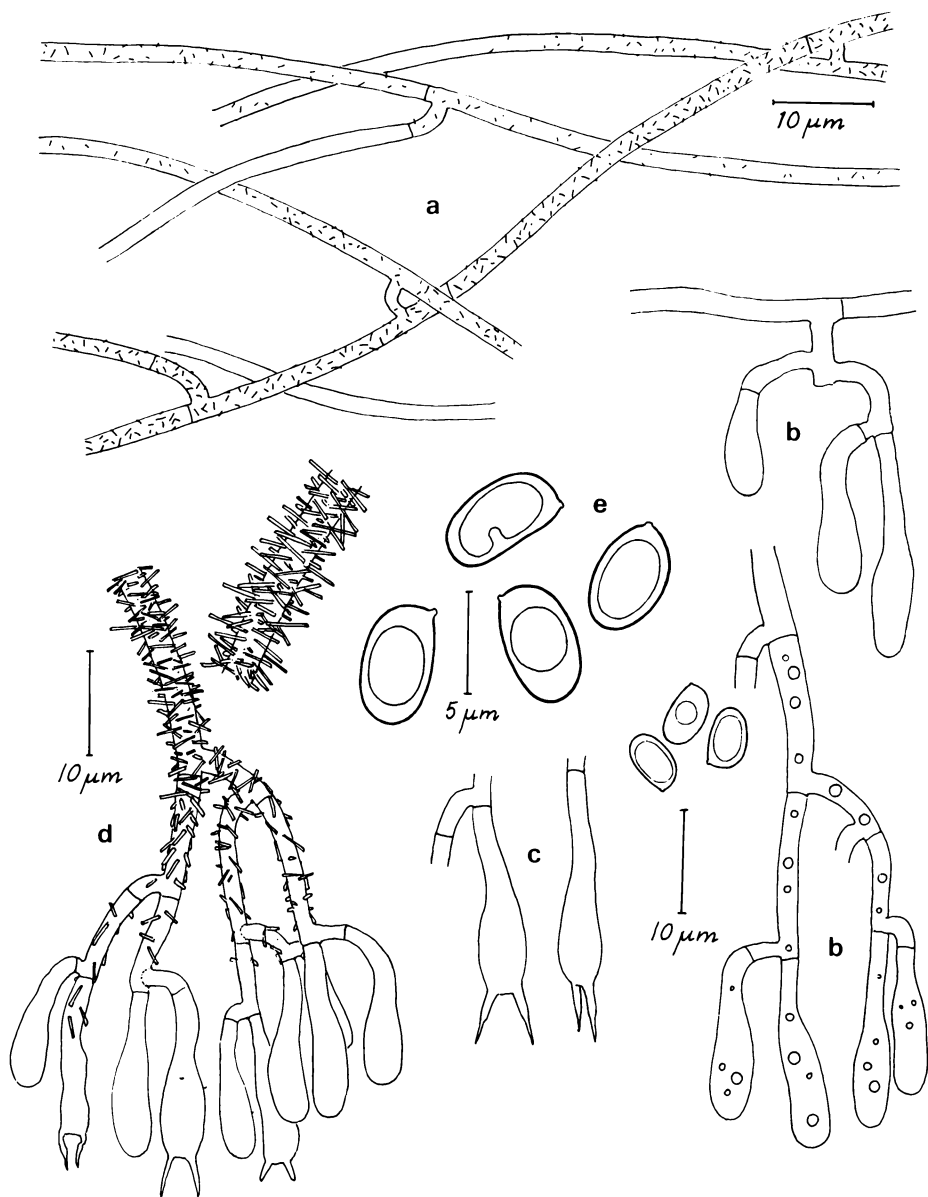


Fig. 618. *Piloderma lanatum* var. *bisporum*. a) basal hyphae b) young basidia c-d) basidia and encrusted hymenial hyphae e) spores. — J. Eriksson 9105.

Piloderma

(e.g. in Gotland) in small rises of thick humus, where the leaching of the basic compounds has lowered the pH. It is one of the more important mycorrhiza-producers in acid coniferous forests in N. Europe and N. America and has been intensely studied both in the field and in culture (verbal information by I.E. Nylund, Uppsala).

Distribution. Collected in all parts of N. Europe where soil conditions allow its growth, from Denmark to N. Lapland. Evidently a common species in the whole of the temperate region of the N. hemisphere.

Remarks. *P. croceum* is best recognized by its yellow rhizomorphs. The species varies with age and growth conditions but it is on the whole not very variable and is well characterized besides by the rhizomorphs, by the yellow, grainy encrustation of the subicular and rhizomorphic hyphae. The presence of this encrustation makes it possible to determine accurately also isolated rhizomorphs. Investigations have shown that not all of the yellow rhizomorphs in the acid forest soils belong to this species but that is by far the most frequent species with bright yellow rhizomorphs.

There is a complicated nomenclatural problem involved in the name of this, at least in Europe, long and well known species. The main problem is connected with the fact that the earliest names were given to the sterile, rhizomorphic state, under generic names such as *Ozonium*, *Alytosporium*, and *Sporotrichum* (Rogers & Jackson l.c.). In Europe it was long known as *Corticium croceum* (Pers.) Bres., which, however, is not valid, as *C. croceum* (Pat.) Sacc. is older. Fries (Elench. fung. 1 p. 159) included the species in what he called *Thelephora sulphurea*, together with other species with yellow fruitbodies and rhizomorphs. S. Lundell (Fungi exs. suec. n. 1842) rejected this name totally after having found that the single authentic Swedish specimen in Herb. Fries was the rare *Peniophora sulphurina* (Karst.) v. Höhn. & Litsch. (= *Ceraceomyces sulphurinus*). This very rare species is certainly not representative of E. Fries' idea of *Thelephora sulphurea* even if the preserved specimen happened to be this fungus. From his discussion in Elenchus it is clear that *Th. sulphurea* covers several species. Through Rogers & Jackson the name *C. bicolor* Peck was introduced in a wide sense. Lundell was, however, convinced that *C. croceum* Bres. was a species of its own and therefore used *C. bicolor* in a more restricted sense for this species (Lund. & Nannf., Fungi exs. suec. n. 1842, 1950) as the name *C. croceum* apparently was not valid. In the same sense it became referred to *Athelia* by Parmasto and to *Piloderma* by Jülich. This has also been the commonly used name. However, investigation of the holotype of *C. bicolor*

Peck clearly shows that it is a different taxon. It lacks the yellow rhizomorphs, and the hyphae have nothing of the grainy yellow encrustation, characteristic of *C. croceum* s. Bres. As in *P. byssinum* the basal hyphae in SEM appear to be covered with KOH-crystals and with amorphous grains, which dissolve in Melzer's reagent. *C. bicolor* belongs definitely to what could be called the *Piloderma byssinum*-complex. It has therefore become necessary to describe a new species.

Literature concerning the *P. croceum*-mycorrhiza:

L. Froidevaux & M. Jaquenoud-Steinlin, Schweiz. Zeitschr. f. Pilzkunde 56 p. 9 – 14, 1978.

Concerning corticocin:

H. Erdtman, Acta Chem. Scand. 2 p. 209 – 219, 1948.

P. croceum* f. *olivaceum (Parm.) Erikss. & Hjortst., n. comb.

— *Athelia bicolor* f. *olivacea* Parm. 1. c. p. 380.

Fruitbody olivaceous — olive-brown, thinner and more adnate than the type form, often with small drop-craters in the hymenium. In other characteristics as the type form.

P. croceum f. *olivaceum* seems to be very constant and clearly gives the impression of a separate taxon on species level. The olivaceous col-

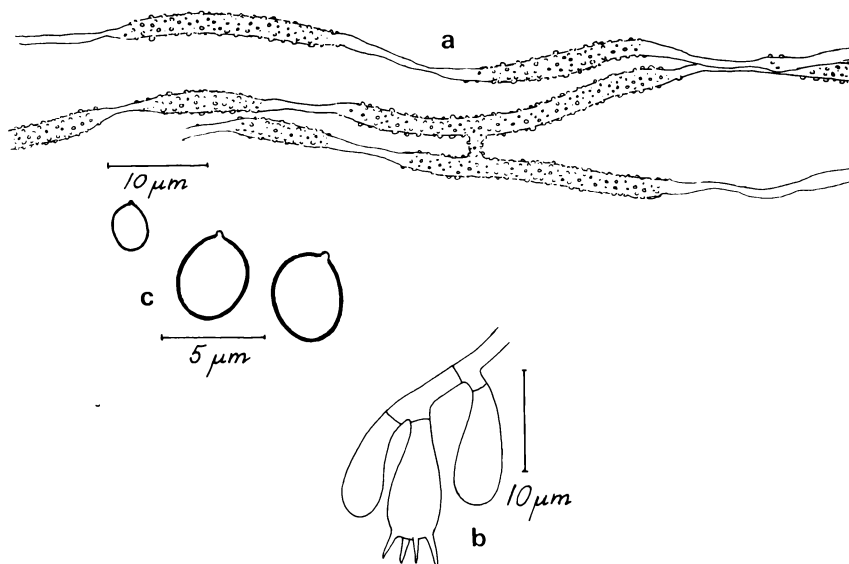


Fig. 619. *Piloderma lapillicolum*. a) shrunk hyphae b) basidia c) spores. — Typus.

Piloderma

our is evidently caused by excreted resinous material in the hymenium. The form is in herb. GB represented by 20 specimens, from Småland in the south to north Finland. One specimen is from Br. Columbia. F.exs. suec. n. 1034 a and b belong to this form. The majority of the specimens is collected in more or less virgin coniferous forest. The material is very uniform, but without culture tests, we dare not give it the rank of species.

Piloderma lapillicolum Jülich, Willd. Beih. 7, 1972, is described from a type specimen and three paratypes. Two of the paratypes (one from Sweden and one from Finland) are identical with *P. byssinum*. The third paratype is not seen by us. The holotype, however, has in Melzer the same characteristics, grainy, yellow hyphal encrustation, as *P. croceum* and must therefore be identical with or at least very close to this species. It differs from typical *P. croceum* in somewhat larger spores and broader basidia. The material is extremely scanty — a little piece of young, thin fruitbody on a small piece of rock, and it is therefore not possible to make a definite decision about its taxonomical status.

The occurrence on rock is certainly not its normal way of living, and the difference in size of spores and basidia may be explained by the fact that the fruitbody is very young, in the first state of development.

3. *Piloderma lanatum* (Jülich) Erikss. & Hjortst. n. comb. Fig. 618

Basionym: *Piloderma byssinum* var. *lanatum* Jülich, Willd. Beih. 7 p. 230, 1972.

Holotype: J. Eriksson 1949.10.16 (UPS).

Fruitbody adnate, effuse, of small to moderate size, white-cream coloured, without differentiated margin.

Hyphal system monomitic, basal hyphae straight, 2 – 3 μm wide, with somewhat thickened walls, subhymenial hyphae thin-walled, richly branched.

Cystidia none.

Basidia narrowly clavate, 20 – 30 x 5 – 6 μm , normally with 4 sterigmata.

Spores ellipsoid, 4.5 – 6 x 2.5 – 4 μm , with smooth, thickened walls, non-amyloid, in Melzer yellow-brown, non-cyanophilous.

Habitat and distribution. Found only once in N. Europe (Uppland, Billudden) on decayed wood of *Alnus*.

Remarks. Close to *P. byssinum* but well distinguished by the size and shape of the spores. Together with its 2-spored variety it forms a well-defined taxon.

P. lanatum var. *bisporum* (Parm.) Erikss. & Hjortst. n. comb.

Basionym: — *P. byssinum* var. *bisporum* (Parm.) Jülich l.c. p. 230. — *Athelia byssina* var. *bispora* Parm., Eesti NSV Tead. Akad. Toim. Biol. 16 p. 380, 1967.

Agrees with *P. lanatum* in all respects except for the bispored basidia and the spores which are somewhat larger, $5.5 - 6.5 \times (3.5 -) 4 - 4.8 \mu\text{m}$.

We have not seen the type specimen but Parmasto's and Jülich's descriptions fit our material. Found three times in the Nordic countries, once in Sweden (Lapland; Tornehamn, on *Betula*, J. Eriksson 9105) and twice in Norway (Oppland: Kongsvold, on *Betula*, Hjortstam 10457, and Sør-Trøndelag: Ulsberg, on *Picea abies*, Hjortstam a.o. 10648).

Plicatura Peck, Ann. Rep. New York St. Mus.
24 p. 75, 1872.

Type species: *Plicatura alni* loc. cit.

Fruitbodies resupinate — dimidiate, loosely adnate, white, soft, when dried fragile; upperside not especially differentiated, composed of intertwined hyphae similar to those of the trama (= subiculum), in older fruitbodies forming a thin pileipellis of collapsed hyphae; hymenial side at first smooth, then more or less wrinkled or irregularly plicate, not forming regular gills or pores; hyphae with clamps, conspicuous esp. in the trama, hyphae of the subhymenium thin-walled and richly branched, those of the trama and the upperside with more or less thickened walls, more straight and sparsely branched; no cystidia; basidia subclavate, forming a dense palisade; spores allantoid, smooth, thin-walled, amyloid, not cyanophilous.

Plicatura

Remarks. The nature of the fruitbody gives this genus a natural place in *Corticaceae*, where it reminds of *Amylocorticium* and is hence placed in *Amylocorticieae* by Parmasto, but also of *Ceraceomyces*. In many respects it shows affinities to *Plicaturopsis* Reid, and these two genera must necessarily be placed in the same family.

Merulius petropolitanus Fr. has according to E. Fries, Hym. eur. p. 591, been found in Sweden. Bourdot & Galzin (1928 p. 344) report it as a synonym of *Plicatura nivea*, but the original description does not fit this species at all. We don't have any idea what fungus Fries may have seen.

Plicatura nivea (Fr.) Karst., Bidr. Känned. Finl.
Nat. Folk 48 p. 342, 1889. - *Merulius niveus*
Fr., Elench. fung. I p. 59, 1828. - *Merulius*
serpens Fr. s. Sommerf., Fl. lapp. 1826, p. 268.
Non *M. serpens* Fr. — *Plicatura alni* Peck. loc. cit.

Fig. 620-21 A

Lectotypus: Norway, Salten, leg. Chr. Sommerfeldt, in herb. Fries (UPS).

Fruitbody resupinate to dimidiate, orbicular and some cm wide, or confluent, loosely attached to the substrate, in the living state soft and lax, when dried fragile and very light; upperside smooth, in very young specimens and in the growing margin of older ones finely velvety (lens), in the beginning white but turning greyish or pale beige brown; hymenial side white, turning yellowish with age and on drying, even orange or pale brown, smooth in the young fruitbody but becoming distinctly and irregularly plicate but not forming net-like pores.

Hyphal system monomitic; hyphae with large clamps with a conspicuous "eye" at least in the wider hyphae; in the subhymenium 2–3 μm wide, thin-walled, richly branched; hyphae of the trama (subiculum) 3–6 μm wide, over the clamp to 8 or 10 μm wide; most hyphae with somewhat thickened walls, straight, sparsely branched; anastomoses few.

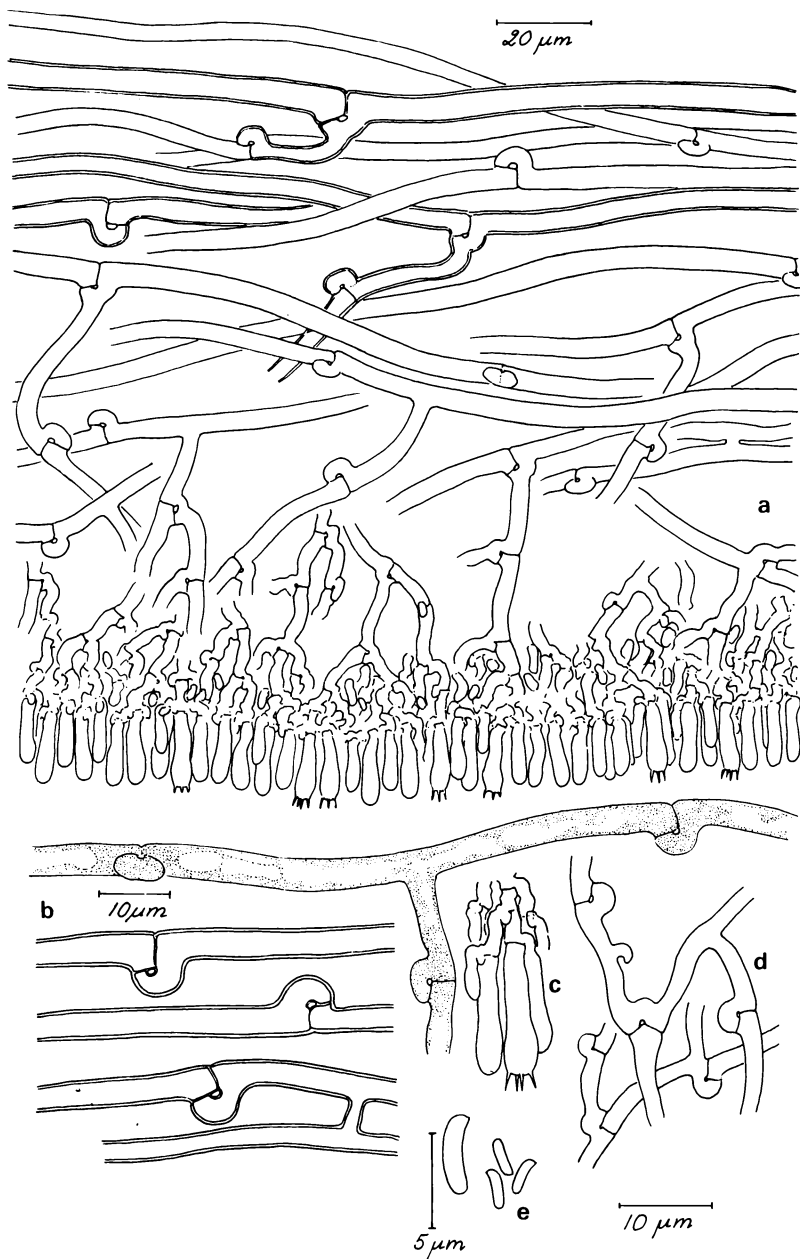


Fig. 620. *Plicatura nivea*. a) hymenium and subhymenial layer b) hyphae c) basidia d) hyphae e) spores. — J. Eriksson 9689.

Plicaturopsis

hyphae with somewhat thickened walls, straight, sparsely branched; anastomoses few.

Cystidia none.

Basidia subcylindrical — narrowly clavate, 12–18 x 3–4 μm , with 4 sterigmata and basal clamp.

Spores 4–4.5 x 1 μm , allantoid, smooth, thin-walled, amyloid, non-cyanophilous.

Habitat. On dead, hanging or fallen branches, standing or fallen dead trunks etc. of *Alnus* ssp., rarely on other deciduous trees, e.g. *Prunus*, *Salix*, *Betula*, once found on *Picea* (Å. Strid, 1975 p. 75). A common species and "one of the important initial species in alder wood" (Å. Strid) in the *Alnus*-zone along the shores of the Northern Baltic.

Distribution. A common species in continental parts of Norway, throughout Finland, in Sweden found only north of a line from Stockholm to C. Västergötland. It has not yet been found in S. Sweden or Denmark. Bourdot & Galzin (1928, p. 344) report it from Les Voges. Its total distribution is boreo-circumpolar — montane, following *Alnus* in climate of a moderate continental type. Its Nordic distribution is mapped by Å. Strid (1975, p. 176) and H. Solheim: Vedboende sopp (thesis), Oslo, 1979.

Remarks. Easily recognized by its white colour, its irregularly wrinkled hymenium and hyaline, clearly amyloid spores.

Plicaturopsis Reid, Persoonia 3 p. 150, 1964.

Type species: *Cantharellus crispus* Fr.

Fruitbodies pileate-cupulate-subresupinate, single, aggregated or imbricately expanded, soft and pliable in the living and wet state, contracted and brittle when dried, upperside subzonate and velutinous; hymenophore plicate with low radial, bifurcate gill-like ridges; margin more or less involute; hyphae mostly thin-walled but in the upper part of trama with thickening walls; clamps conspicuous;

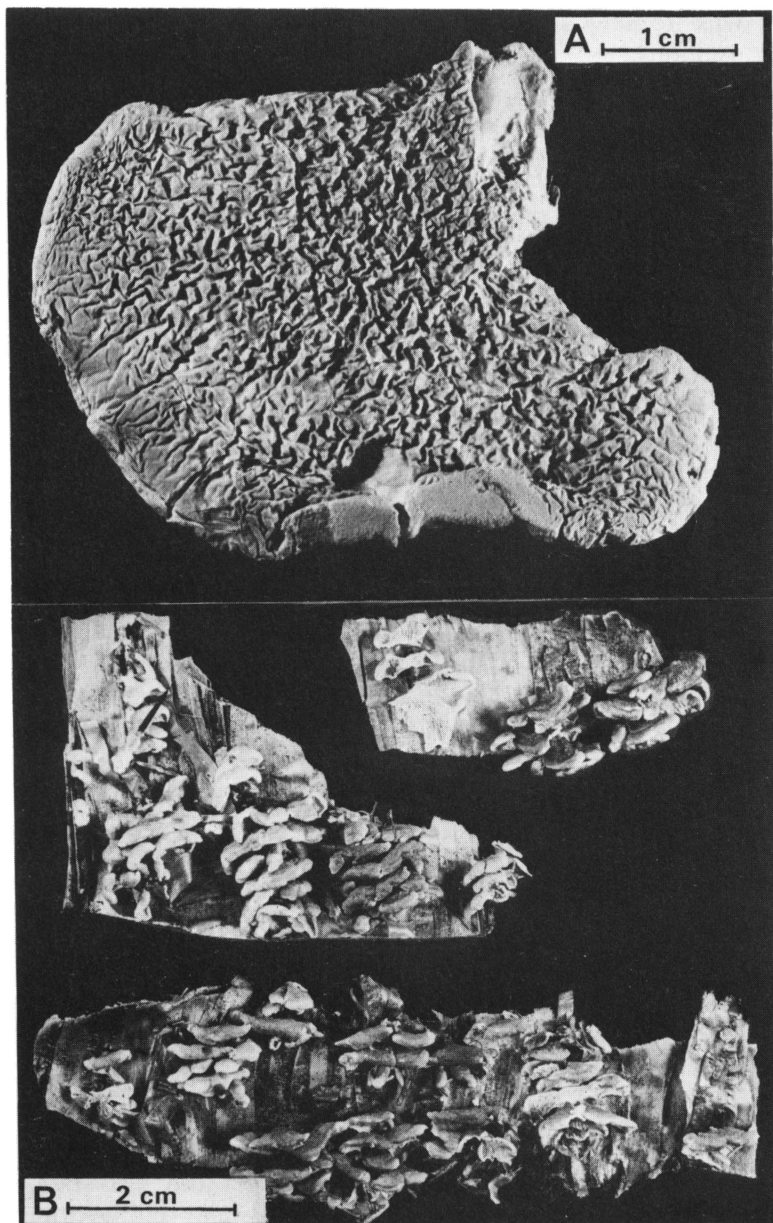


Fig. 621. A) *Plicatura nivea*. Underside of fruitbody showing the hymenial structure. — Nannfeldt 20711. B) *Plicaturopsis crispa*. Seriate, dimidiate fruitbodies. — B. & J. Eriksson 7240. Photo T. Hallingbäck.

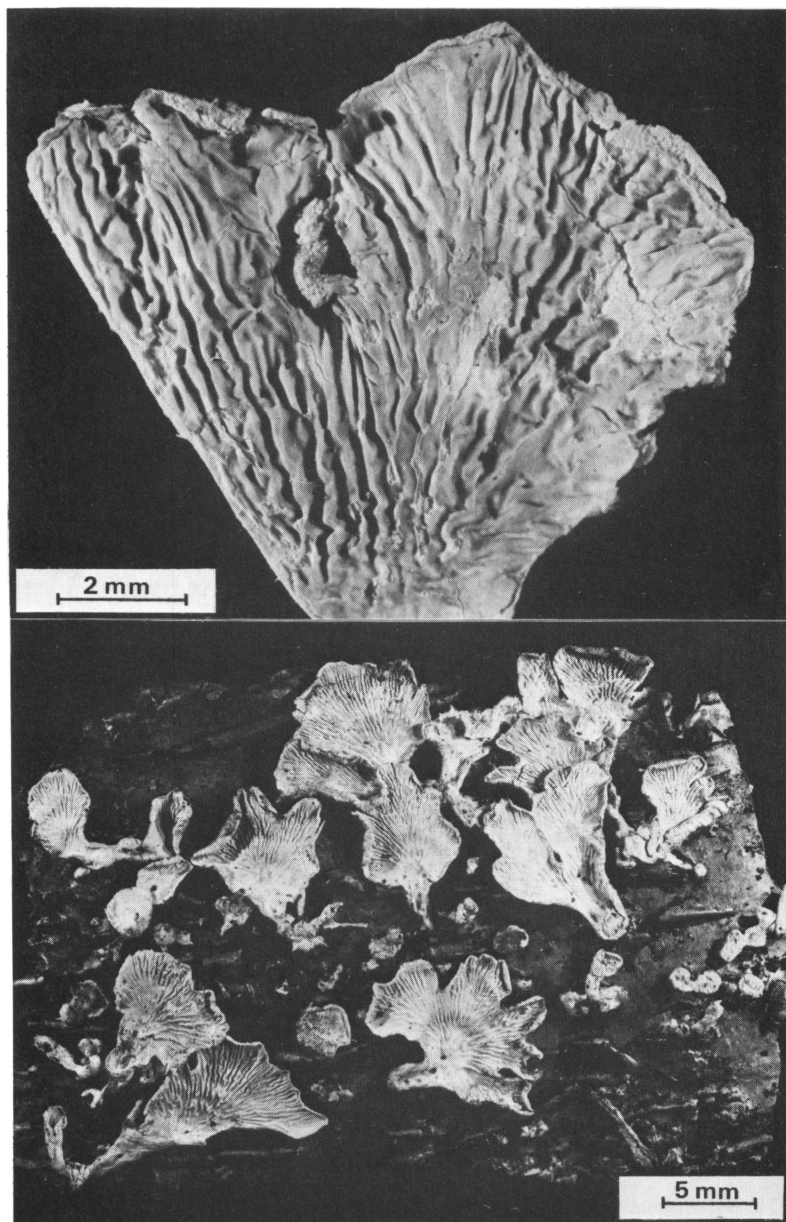
Plicaturopsis

Fig. 622. *Plicaturopsis crispa*. a) hymenial side of fruitbody b) resupinate fruitbodies. — A. Strid 866. Photo T. Hallingbäck.

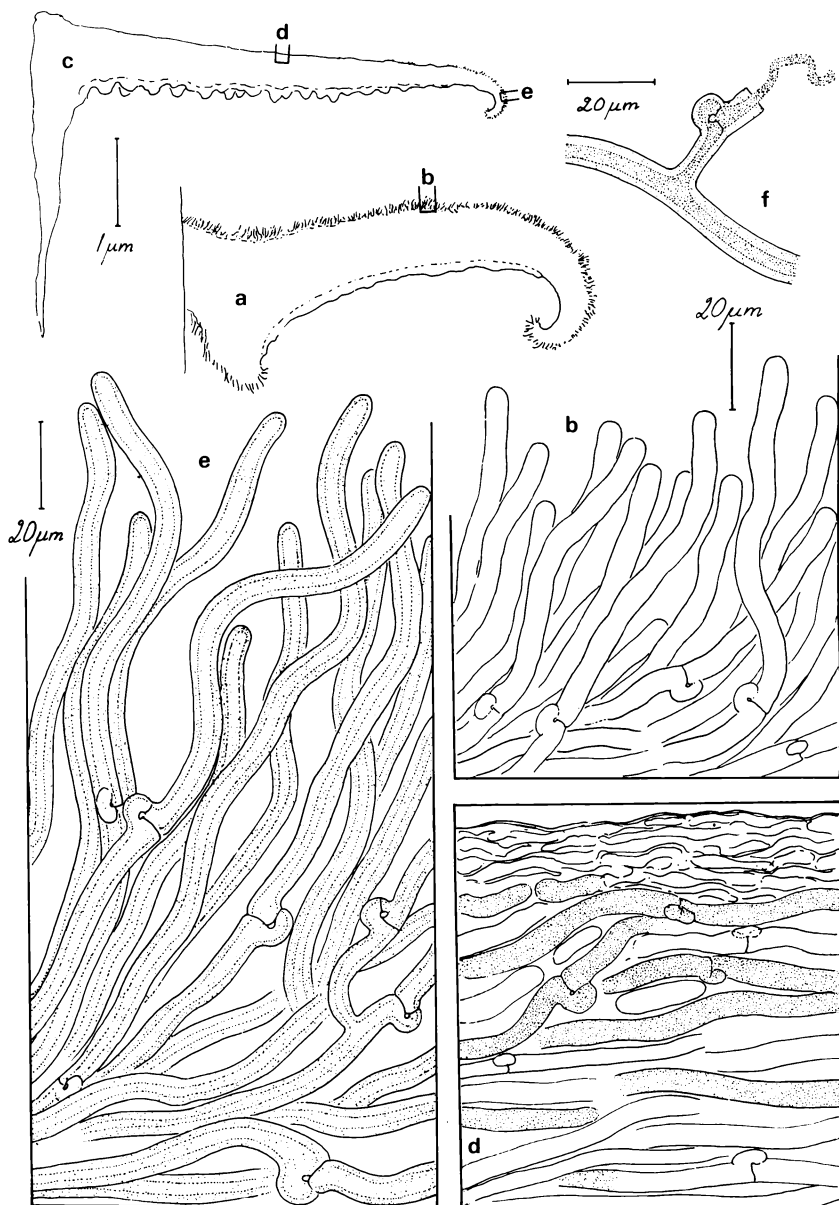


Fig. 623. *Plicaturopsis crispa*. a) section through young fruitbody b) sterile hyphae from the upper side of the fruitbody c) section through older fruitbody d) sterile hyphae from the pileus cuticle e) sterile hyphae f) broken hyphae with emerging protoplasm. — a-b) Morander 1946, c-f) Strid 866.

Plicaturopsis

hyphae of the trama mainly horizontal, those of the subhymenium much intertwined; no cystidia; basidia subclavate, forming a dense palisade, with 4 sterigmata; spores allantoid, thin-walled, amyloidity weak in some specimens, more obvious in others.

Only one species.

Remarks. The genus agrees in so many respects with *Plicatura* that they must be regarded as closely related. The microscopical characteristics are the same, except for the denser texture of *Plicaturopsis* with thick-walled hyphae on the upperside of the fruitbody. To the naked eye they are very different, this genus having a much more differentiated shape of the fruitbody with an hymenial layer folded in cantharelloid, dichotomously branched ridges. The spores show a very weak amyloid reaction, often not easily observed. The generic evaluation, whether *Plicatura* and *Plicaturopsis* should be joined in one genus or not, seems to be a matter of personal opinion. J. Ginns is of the opinion that they are congeneric. Without opposing this opinion we find it for practical reasons useful to keep them separate. For further information see Reid l.c. and J. Ginns, Can. Journ. Bot. 48 p. 1039–43, 1970.

Plicaturopsis crispa (Fr.) Reid l.c.

Fig. 621 B-24

- *Cantharellus crispus* Pers. ex Fr., Syst. mycol. I p. 323, 1821. - *Merulius crispus* (Fr.) Fr. loc. cit. (synonym); Syst. mycol. 3, index p. 116, 1832, - *Troglia crispa* (Fr.) Fr., Monogr. Hym. Suec. p. 244, 1863. - *Plicatura crispa* (Fr.) Rea, Brit. Basid. p. 626, 1922. - *Plicatura faginea* Karst., Bidr. Känned. Finl. Nat. Folk 48 p. 342, 1889.

Fruitbody usually dimidiate, flabelliform or cupulate, mostly crowded — imbricate, without stipe or with the fruitbody narrowed into a short, stipe-like part (pseudostipitate), depending on the situation of the substrate, on undersides of horizontal substrate subresupinate, more or less lobed, on vertical sides laterally fixed; diameter 1–2 cm, seldom more; young fruitbody white but upperside soon becoming pale brown to tobacco-brown, finely velutinous, often sub-

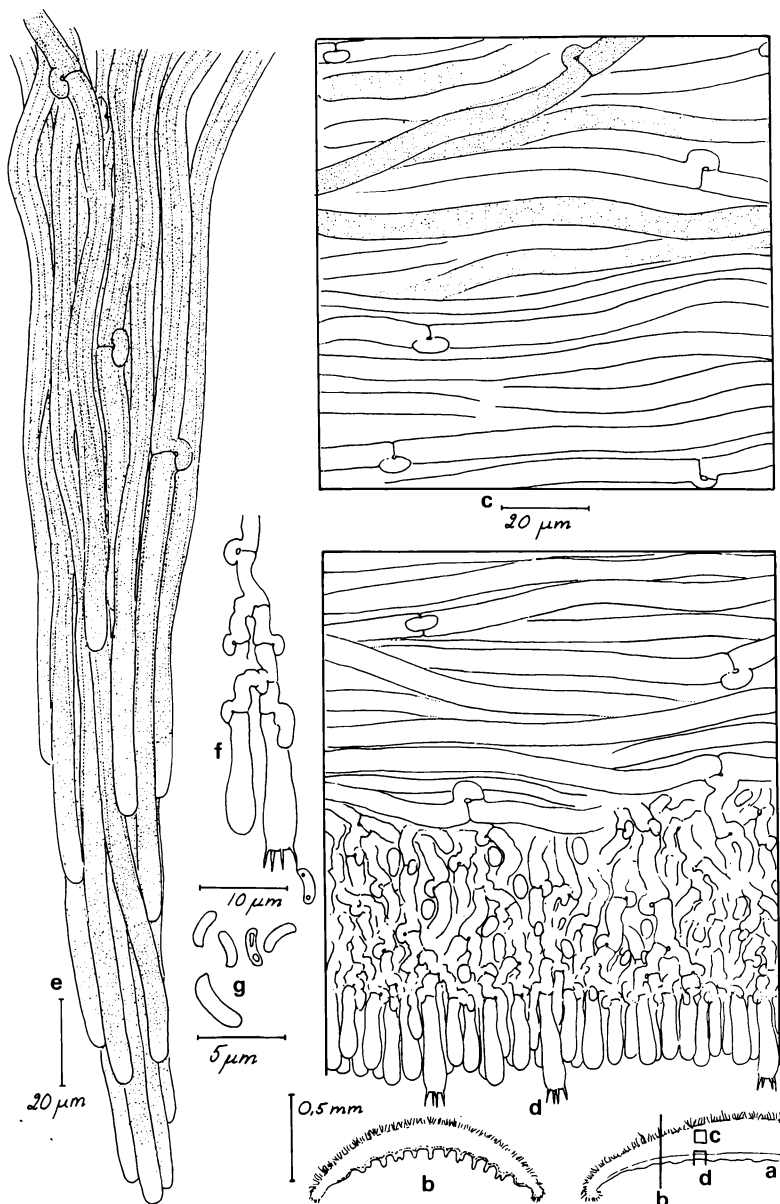


Fig. 624. *Plicaturopsis crispa*. a) schematic section through fruitbody showing tangential section b and position of c and d b) vertical section through fruitbody c) hyphae of trama d) hymenium and subhymenium e) hyphal hair from the pileus f) basidia g) spores. — S. Jacobsson 79224.

Plicaturopsis

zonate; hymenial side white — glaucous white, darkening in old specimens and in the herbarium, folded in dichotomously branched gill-like ridges with uneven — crispate edge; consistency of the young fruitbody soft, pliable, when mature fruitbody firmer, when dried brittle.

Hyphal system monomitic, hyphae 3–5(–7) μm wide with large clamps, often with a conspicuous "eye"; subhymenial hyphae 3–5 μm , richly branched; tramal hyphae 3–5 μm , mainly parallel, hyphae of the upperside ab. 5–7 μm wide, coarse, thick-walled (somewhat swelling in KOH and Melzer, best studied in cotton-blue); ends of such hyphae form the tomentum of the upperside, in old fruitbodies more or less glued together, forming composed bristles.

Cystidia none.

Basidia subclavate — subcylindrical, 15–22 x 3.5–4.5 μm , with 4 sterigmata and basal clamp, forming a dense hymenial palisade.

Spores allantoid, 3–4.5 x 0.75–1.25 μm , exceptional spores somewhat larger, thin-walled, smooth, with oily contents, amyloid reaction in some specimens clear, in others weak or even difficult to observe, especially as the number of spores is often small and the spores very narrow. The oily contents give them a tint of green that can hide the reaction.

Habitat. On dead, corticate trunks and branches in N. Europe preferably of *Corylus* and *Fagus* but is found also on other substrates, e.g. *Betula*, *Alnus*, *Tilia*, *Prunus* and *Aesculus*. There are also reports about it growing on living wood.

Distribution. Southern species, in N. Europe not rare in Denmark and S. Sweden but rarer in S. Norway and still rarer in S. Finland, but it has in Norway an isolated locality as far north as Alta in Finnmark. O. Andersson has mapped the Scandinavian distribution (Friesia 3. p. 139, 1945). It has not been possible to verify the most northern Swedish collection. The specimen does not seem to exist in the Swedish herbaria, and it cannot therefore be excluded that it is *Plicatura nivea*.

Remarks. Close to *Plicatura nivea* but easily distinguished by the radially folded hymenium. The species was from this characteristics referred to *Cantharellus* by Fries, later by him to *Trogia* Fr. The species was, however, not included in the original description of *Trogia* and this genus is nowadays typified in such a way that it does not include *P. crispa*. Reid treated it among Cyphellaceae, used in a wide sense. He also supposed a relationship to *Merulius tremellosus*. We think that it rather is a link in an evolution from the Corticiaceae (*Amylocorticium*, *Ceraceomyces*) over *Plicatura* to *Plicaturopsis*. These two genera represent different adaptations, the former to more humid conditions, the latter which has firmer and drought-enduring fruitbodies to drier biotopes.

Podoscypha Pat., Ess. taxon. p. 70–71, 1900.

Fruitbody coriaceous varying in shape from spatulate or flabellate to infundibuliform, normally stipitate; hyphal system dimitic, generative hyphae with clamps; gloecystidia in the hymenium; few species with metuloid cystidia, besides in some species caulo- and pilocystidia; basidia normally clavate, with 2–4 spores; sp. sub-cylindric – ellipsoid, smooth, thin-walled, hyaline, non-amyloid. Type species: *Stereum surinamense* Lév.

Remarks. No species of the genus found in N. Europe. One species, *P. multizonata* (Berk. & Br.) Pat. is collected several times in the British Isles and a few times on the European continent (Reid, A Monograph of the Stipitate Stereoid Fungi, 1956). This species might possibly be found in S. Scandinavia.

Pseudomerulius Jül., Persoonia 10:3 p. 330, 1979.

Type species: *Merulius aureus* Fr.

Fruitbodies resupinate or partly reflexed, loosely attached; hymenophore ceraceous when wet and alive, brittle when dried, with meruloid or sublamelloid surface; all hyphae with clamps, subhymenial ones richly branched and densely united into a ceraceous layer, more or less swelling in KOH, easily separated from the subiculum, some hyphae banded with ringformed wall-thickenings; subicular hyphae with thin or somewhat thickened walls, forming a loose, white texture; no cystidia; basidia clavate, normally with 4 sterigmata; spores cylindrical, smooth, somewhat thick-walled, cyanophilous, not amyloid.

Pseudomerulius

Remarks. In several respects *Pseudomerulius* agrees with *Leucogyrophana*, esp. in the more or less coloured and thick-walled, cyanophilous spores. In the original description it is said to differ by having much smaller and narrower basidia and by the swelling in KOH of the basal hyphae. The fact is, however, that the most small-spored species of *Leucogyrophana* have spores of the same size as *Pseudomerulius*, the basidia of which are not narrower, rather more clavate and broader than in most species of *Leucogyrophana*. In any case the differences are too small for generic separation. The basal hyphae do not swell in KOH, only the subhymenial hyphae.

No reason should therefore remain to accept a separate genus for *Merulius aureus*, but we still have to do so, partly due to the fact that there exist some morphological peculiarities in the hyphal structure (banded hyphae, ampullate clamps and wide open clamps) in the trama and partly that J. Ginns, when revising *Leucogyrophana* did not want to include *M. aureus*. Parmasto (1968) referred the species to *Plicatura*, but in this case the differences are more striking, esp. in the nature of the spores (hyaline, amyloid, thin-walled in this genus).

Only one species.

***Pseudomerulius aureus* (Fr.) Jül. loc. cit.**

Fig. 625-626

- *Merulius aureus* Fr., Elench. 1 p. 62, 1828.

- *M. vastator* Tode ex Fr., Syst. mycol. 1 p.

329, 1821. - *M. vastator* Tode fide Fries,

Elench. 1.c. Treated in detail by J. Ginns

(Can. Journ. Bot. 54 p. 120-22, 1976).

Fruitbody resupinate or partly reflexed, adnate but when dried easily detached, mostly orbicular with rounded circumscription, 1-2 cm wide, but often confluent and larger; ab. 1 mm thick; hymenium ceraceous in the living state, brittle when dried, at first yellow or almost orange, then yellow brown, darkening when touched, in the herbarium more lurid brown, sometimes with a tint of olivaceous, folded into an irregular net of angular, composed pores, 1-3 mm wide, in young fruitbodies sometimes radiate in a cantharelloid way; margin distinct white or yellow, narrow, soft, finely velutinous (lens).

Hyphal system monomitic, hyphae thin-walled or in the subculum slightly thick-walled, with clamps and anastomoses; subhymenial

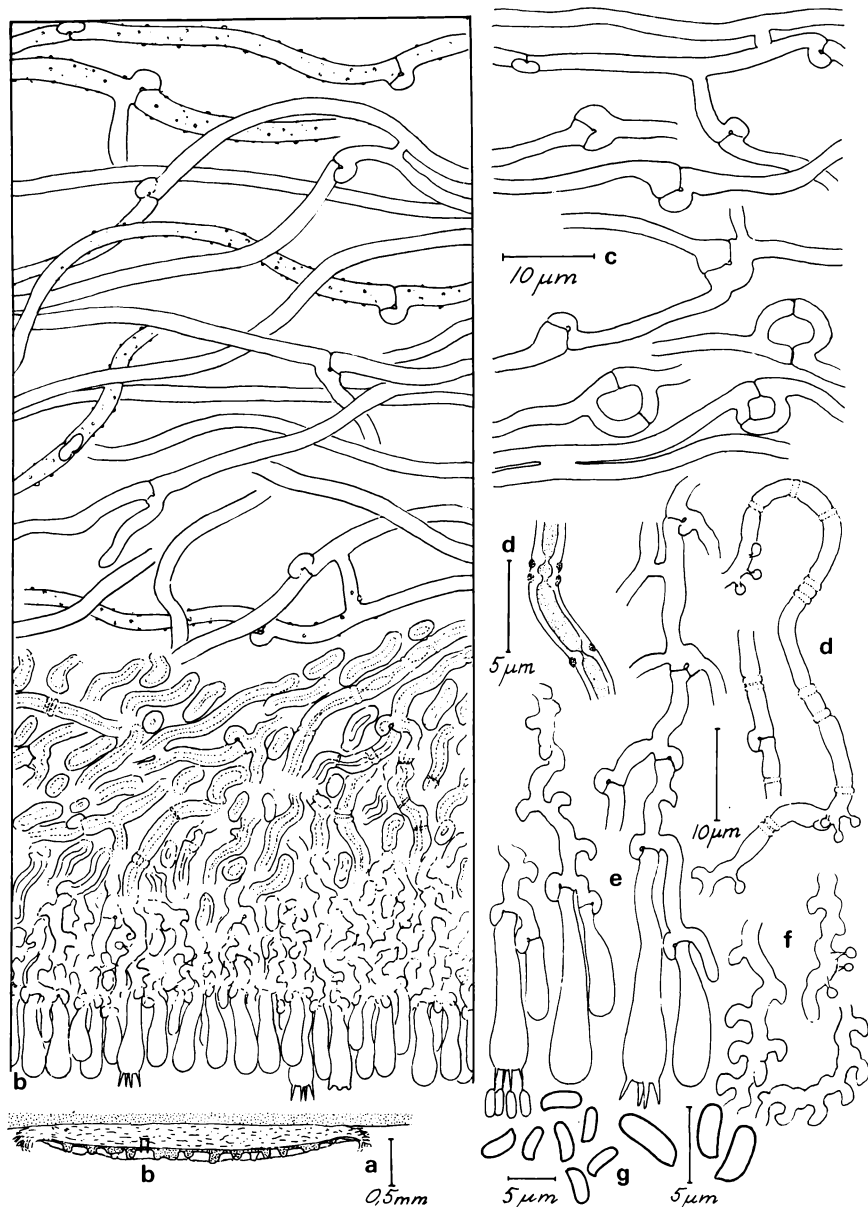


Fig. 625. *Pseudomerulius aureus*. a) section through fruitbody showing position of b) hymenial and subhymenial layers c) subicular hyphae d, f) hyphae with ring-structures and conidioid processes e) basidia g) spores. — a-e, g) Hjortstam 14966, f) J. Eriksson 7947.

Pseudomerulius

hyphae 2–3 μm wide, swelling in KOH, richly branched, some hyphae with peculiar bands or rings at irregular intervals, sometimes also with capitate projections looking like conidium formation but evidently something else; deviating clamps often seen – ampullate or with wide ansiform clamps; subicular hyphae normally 3–5 μm wide, not swelling, provided with a sparse fine-grainy encrustation, with scattered clamps and branches, forming a loose context without interhyphal substance.

Cystidia none.

Basidia clavate, 15–20 x 4–5 μm , sometimes longer – to 40 μm with a prolonged base, with 4 sterigmata and basal clamp. New basidia as a rule formed not from the basal clamp but opposite to it, forming a characteristic subbasidial hyphae with lateral hooks marking the sites of earlier basidia.

Spores 4–4.5(–5) x 1.3–1.8 μm , cylindrical, straight or with slightly concave adaxial side, or subballantoid, smooth, with thickened walls, yellow in the microscope, cyanophilous, non-amyloid, in Melzer with a slight, reddish-brown tint, spore-print brown.

Habitat. On decayed, decorticate wood, in N. Europe found exclusively on conifers, but reported by Bourdot & Galzin to grow also on deciduous wood. The habitat is as a rule mainly open pine-forests. It was earlier one of the fungi growing on old wooden fences, which were very common in the countryside. The species seems to prefer wood that sometimes becomes warmed up by the sun and is therefore found in sunny places.

Distribution. Rare species but probably spread in conifer forests in the whole of North Europe. In Sweden found from Småland in the S. to Hälsingland. Å. Strid did not find it in N. Sweden, nor did Eriksson in Lapland. The *Merulius vastator* Fr. reported by Chr. Sommerfeldt, Fl. lapp. p. 269, 1826, is said to grow on decayed branches and leaves, which makes it probable that it was not *P. aureus*. It is widely spread in the N. hemisphere (specimens seen from i.a. Brit. Columbia) in N. Europe found besides in Sweden also in Finland, Denmark, Norway, and Estonia.

Remarks. Easily recognized already with the naked eye by its radial to net-like hymenophore, bright colours and narrow white or yellow margin, under the microscope by the nature of the spores.

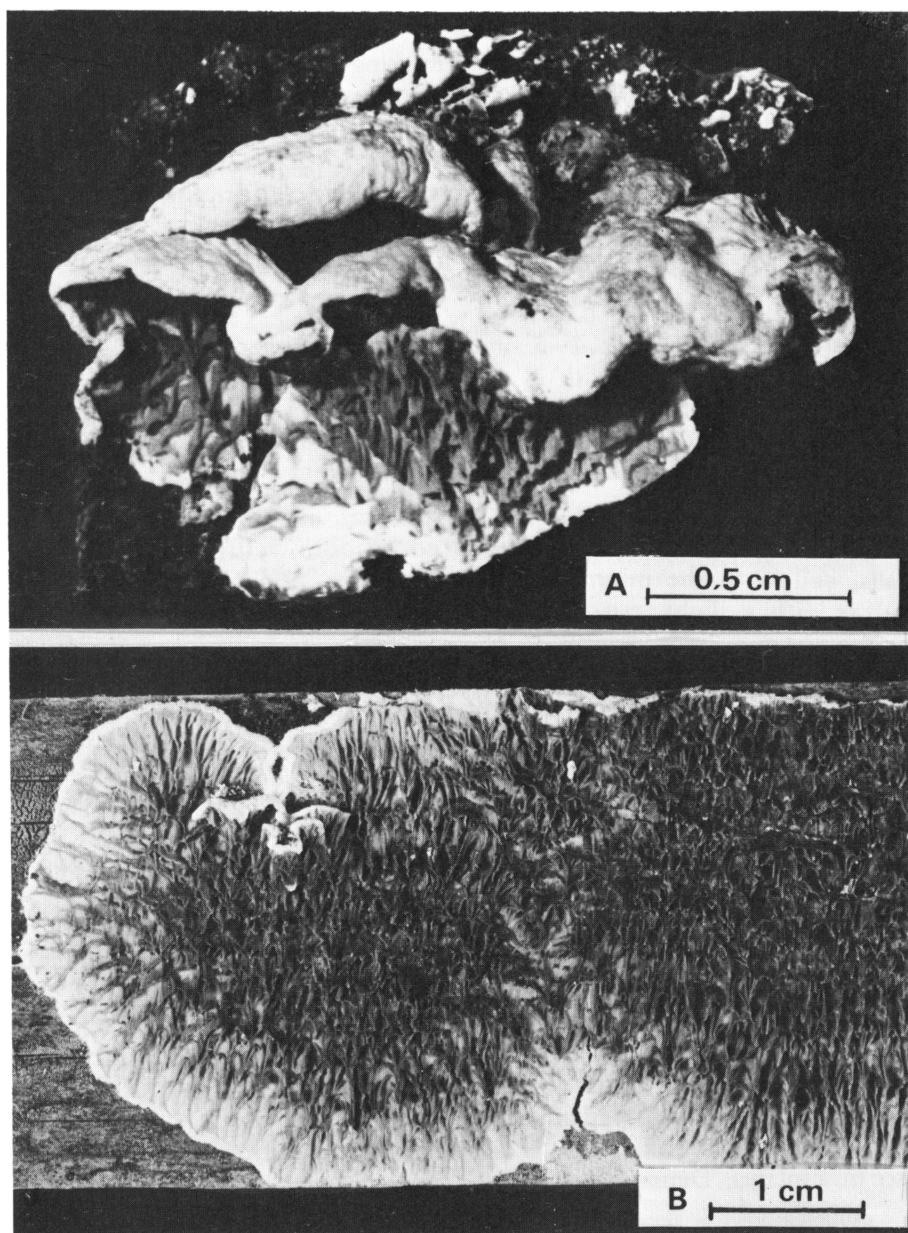


Fig. 626. *Pseudomerulius aureus*. a) reflexed part of fruitbody b) resupinate fruitbody. — K. G. Nilsson. Photo T. Hallingbäck.

Pseudoxenasma

Pseudoxenasma Larss. & Hjortst., *Mycotaxon*
4(1) p. 307, 1976.

Fig. 627

Fruitbody resupinate, effused, very thin, ceraceous, hymenium normally smooth; hyphal system monomitic; hyphae with clamps, thin-walled, densely interwoven; sulfocystidia always present, often with apical, globular schizopapilles, and filled with grainy protoplasmatic contents, light-refracting in KOH (phase); basidia broadly clavate – subcylindrical, in most cases pleurobasidial, with 4 large sterigmata; spores broadly ellipsoid – subglobose, thick-walled, verrucose, strongly amyloid.

Type species: *Pseudoxenasma verrucisporum* Larss. & Hjortst.

Remarks. The genus reminds of *Aleurodiscus* in the size and structure of the spores, of *Xenasma* in the presence of numerous pleurobasidia and in having a thin fruitbody with dense and indistinct hyphal texture, and of *Gloeocystidiellum* in the combination of the characteristics of amyloid, verrucose spores and presence of sulfocystidia. It differs from all species of *Aleurodiscus* by the lack of acanthohyphidia and dendrohyphidia, from *Xenasma* by the presence of sulfocystidia, and from *Gloeocystidiellum* by the presence of pleurobasidia.

Only one species hitherto known.

Pseudoxenasma verrucisporum Larss. & Hjortst., l.c.

Fruitbody resupinate, effused, closely adnate and not detachable, mostly of small dimensions, ab. 50 μm thick, ceraceous in the wet, living state, when dried crustaceous, greyish white to ash-grey; hymenium smooth or uneven after the structure of the substrate, under the lens pruinose or slightly furfuraceous; margin indistinctly thinning out.

Hyphal system monomitic, hyphae with clamps, narrow, 1.5–2.5 μm , thin-walled, richly branched and interwoven into a close texture, often with old spores enclosed; hyphal details difficult to study.

Cystidia present as sulphocystidia, frequent, 25–40 x 5–9 μm , subcylindrical, thin-walled with one, sometimes 2–4 schizopapilles; protoplasm grainy, light refracting in KOH (phase), darkening in sulfoaldehyde reagents, with terminal, pleural, or intermediate bases.

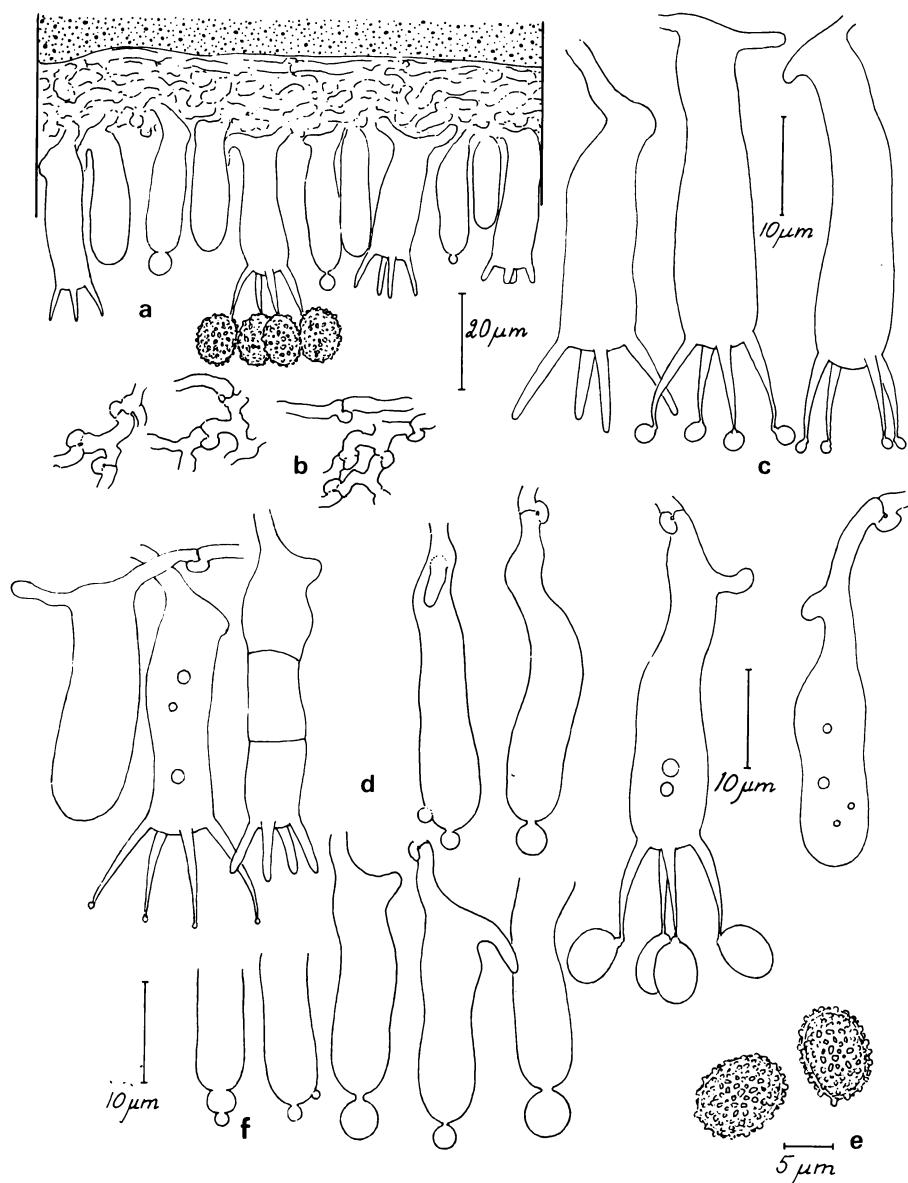


Fig. 627. *Pseudoxenasma verrucisporum*. a) section through fruitbody b) hyphae c-d) basidia e) spores f) gloecystidia with schizopapillae. — Hjortstam 7126.

Pulcherricium

Basidia subclavate — subcylindrical, with as a rule pleural bases, 25–40 x 5–9 μm (measured to the basal clamp), with 4 sterigmata, 9–11 μm long.

Spores 8–10 x 7–8 μm , broadly ellipsoid — subglobose, thick-walled, verrucose, with strong amyloid reaction.

Habitat. On fallen branches and trunks as well as on dead, still attached branches of *Picea abies* and *Juniperus* (Norway) in humid forests, e.g. shadowed valleys. On *Picea* it is often seen together with *Aleurodiscus amorphus*, *Globulicium hiemale* and *Gloeocystidium furfuraceum*.

Distribution. According to the collected material the species seems to have a more or less oceanic distribution and is hitherto found in the SW Sweden (Halland, Västergötland, and Dalsland) where the fungus is quite frequent in suitable environment. In Norway known from but one locality (Hordaland: Bergen, Kvituren. Hjortstam 10201). Additional finds ought to be expected when the SW part of Norway is better investigated.

Remarks. One of the most characteristic Corticiaceae. For further information see Larsson & Hjortstam loc.cit.

Pulcherricium Parm., Consp. syst. Cort.
p. 132, 1968; Jülich Persoonia 8 p. 88,
1974.

Fruitbody resupinate, totally attached or partly loosening at the margins, orbicular and confluent, the whole fungus deep blue, hymenium soft-ceraceous, smooth or tuberculate, composed of basidia and dendrohyphidia as well as intermediates between them; hyphal system monomitic, hyphae with clamps, with thin or thickened walls, between the hyphae amorphous blue matter; basidia clavate, with normally 4 sterigmata and basal clamp; spores ellipsoid, smooth, thin-walled, hyaline, sporeprint white.

Remarks. This monomitic genus occupies an isolated position among the Corticiaceae. Especial characteristic are the intermediates between dendrohyphidia and basidia and also the striking colour of the fruit-body.

***Pulcherricium caeruleum* (Fr.) Parm. loc.cit.**
 - *Thelephora caerulea* Fr., Elench. I p. 202,
 1828.

Fig. 628

Fruitbody resupinate, adnate but in older specimens loosening in the margins, orbicular and confluent and thus sometimes becoming quite large, ab. 0.2–0.5 mm thick, deep blue when alive and in good state, older specimens fading to greyish or brownish blue; hymenium soft-ceraceous, smooth or irregularly tuberculate, old specimens cracking in pieces; margin more or less fimbriate, concolorous or in the youngest state whitish.

Hyphal system monomitic; all hyphae with clamps, often also with adventitious septa, which may be frequent in some hyphae; branches as a rule from clamps; subbasidial hyphae thin-walled, 2–3 μm wide, subicular ones 4–5 μm , with thickened walls, the basal ones straight and with sparse ramifications, other hyphae much branched and interwoven; cell contents blueish, besides blue excreted matter between the hyphae, esp. in the subhymenial part of the tussue; walls hyaline or in the basal hyphae yellowish or brownish, which together with the blue contents makes them often look greenish.

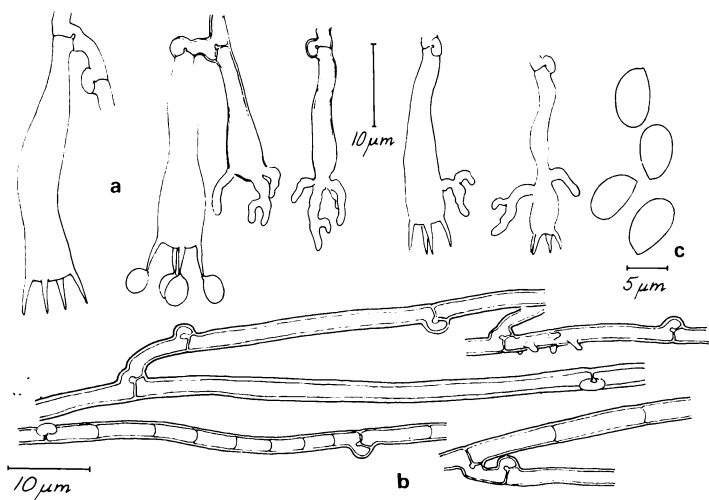


Fig. 628. *Pulcherricium caeruleum*. a) basidia and dendrohyphidia b) hyphae c) spores. — Ryvarden 9724.

Cystidia none.

Dendrohyphidia formed from basidial primordia from which irregularly branched dendrohyphidial hyphae appear; total length 25–40 μm . Intermediates between basidia and dendrohyphidia common, sometimes with both sterigmata and dendrohyphidial branches.

Basidia narrowly clavate, hyaline or light to dark blue, at maturity 35–45(–60) \times 5–6(–8) μm , with 4 conical sterigmata and basal clamp; sometimes with lateral dendrohyphidial branches.

Spores ellipsoid, thin-walled, hyaline, 7–9(–11) \times 4–6(–7) μm , non-amyloid, non-cyanophilous.

Habitat. On dead branches of deciduous trees, in Scandinavia found on *Fraxinus*, but in the southern part of its wide area of distribution on all sorts of deciduous wood and on dead stems of big herbs. The localities in W. Norway are very special, at the inner end of fiords, sheltered both from the coolness of the sea and from cold winds from inland, and thanks to the topographical situation with a larger number of sunshine hours and in this way getting higher temperatures both summer and winter.

Distribution. In Scandinavia very rare, known from only two areas, the Norwegian SW. coast in Hardanger and Ryfylke, where it has been collected several times now, and the island of Fyn in Denmark (latest collection 1882!). It is rare in C. and W. Europe but more commonly distributed in S. Europe and evidently in all sub-tropical and tropical regions.

Remarks. The easiest recognized of all Corticiaceae. Fries when he first described the species in *Elenchus* reported it as common (*vulgaris*) and also that he had seen living material. There is nothing left to prove that this is correct. In *Monogr. Hym. Suec.* 1863 he has changed the statement to "*rarius*" but without any locality mentioned. There is reason to believe that the species is never found in Sweden.

The Norwegian material appears to have smaller basidia and spores and shorter and fewer dendrohyphidial branches, but this is evidently a case of intraspecific variation.

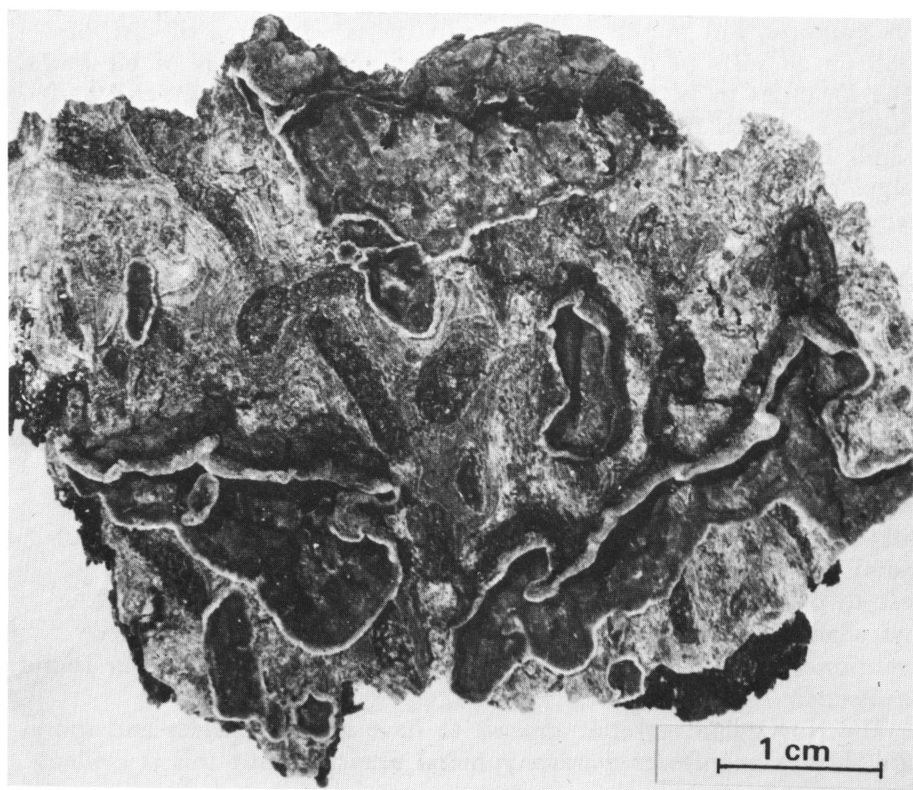


Fig. 629. *Punctularia strigosozonata*. Orbicular, more or less reflexed fruitbodies.
— B. & J. Eriksson 9030. Photo T. Hallingbäck.

Punctularia

Punctularia Pat. & Lagerh., Bull. Herb. Boiss. 3 p. 57, 1895; Talbot, Bothalia 7:1 p. 140 and 164, 1958. - *Phaeophlebia* W. Br. Cooke, Mycologia 48:3 p. 401, 1956.

Fruitbody resupinate, reflexed or dimidiate; hymenium subgelatinous, composed of hemisphaerical nodules or elongate, radial ridges; upper-side of reflexed parts zonate; margin determined, narrow, finely fimbriate or velutinous; hyphal system monomitic, hymenial hyphae thin-walled, richly branched, trama hyphae mainly parallel and horizontal, with more or less thickened walls, swelling in KOH, all hyphae with clamps; dendrohyphidia present, hyaline at first, then yellow or dark-coloured; conidia often present; basidia elongate, flexuose, with 4 sterigmata and basal clamp; spores ellipsoid, hyaline — yellow.

Type species: *Corticium tuberculosum* Pat.

Remarks. *Punctularia* was by Talbot provisionally placed in Thelephoraceae, subfam. Merulioideae. He was well aware of the uncertainty and artificiality of the arrangement. The genus shows great resemblances to *Laeticorticium*, esp. in the presence of dendrohyphidia, nature of basidia and shape of spores. Also the nature of the hyphae is essentially the same. The difference remaining is the pigmentation of the dendrohyphidia, the subgelatinous consistency of the hymenial layer and the ability to form reflexed pilei of *Punctularia*. We leave the genera separate but consider it possible to include *Laeticorticium* as a subgenus in *Punctularia*.

One species in N. Europe. The genus is mainly distributed in tropical and subtropical regions.

Punctularia strigosozonata (Schw.) Talbot, Bothalia 7:1 p. 143, 1958. - *Merulius strigosozonatus* Schw., Trans. Am. Phil. Soc. n.s. 4 p. 160, 1834. - *Phlebia strigosozonata* (Schw.) Lloyd, Myc. Writ. 4 p. 15, 1914. - *Phaeophlebia strigosozonata* (Schw.) W. Br. Cooke, Mycologia 48 p. 401, 1956.

Fig. 629-30

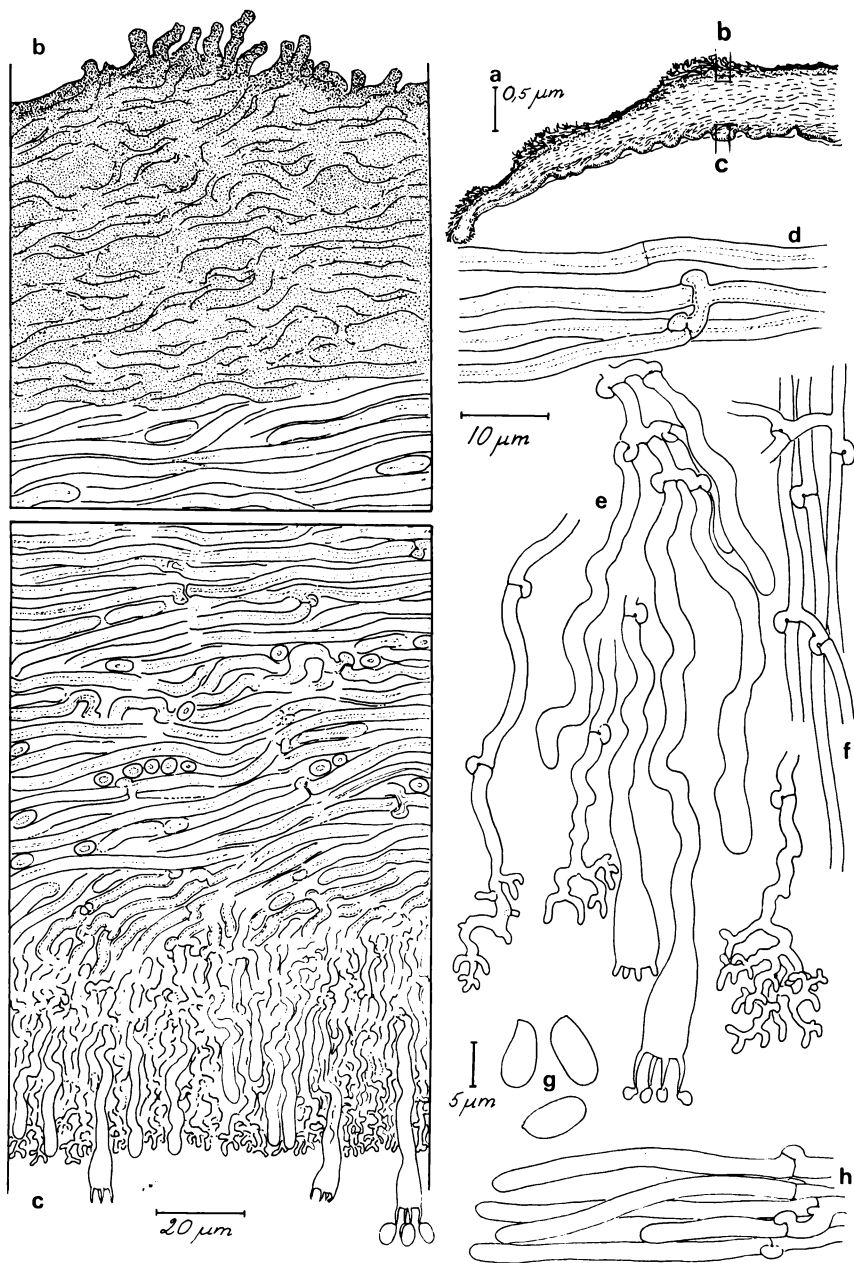


Fig. 630. *Punctularia strigosozonata*. a) schematic section through fruitbody showing position of b and c b) upper surface c) hymenial and subhymenial layer d) basal hyphae e) basidia and dendrohyphidia f) hyphae g) spores h) sterile hyphae. — E. Parmasto 1423.

Punctularia

Fruitbody resupinate or often reflexed, orbicular and confluent to rather large size, upperside of reflexed parts zonate with black brown concentric furrows of totally conglutinate hyphae, and lighter brown ridges, velutinous by projecting hyphal-ends; oldest part often ash-grey; margin bright yellow brown to reddish-brown; hymenium dark brown – violaceous, gelatinous in the wet living state, drying hard, in the youngest state smooth, then with elongate, radial ridges or irregular tubercles, when fertile with a whitish pruina of spore deposits.

Hyphal system monomitic; all hyphae with clamps, those of the upperside and next to the substrate pigmented brown, ab. $5\ \mu\text{m}$ wide, often encrusted with lumps of excreted resinous matter, and forming a layer, $30\text{--}50\ \mu\text{m}$ thick or sometimes more; major part of the trama composed of mainly hyaline, more or less horizontal hyphae with thick walls, swelling in KOH and with sparse clamps and branches, this layer reaching a thickness of $500\text{--}1000\ \mu\text{m}$; from this trama layer the subhymenium is formed, thickens with age to about $100\ \mu\text{m}$, composed of vertical, densely interwoven hyphae with thinner walls producing the basidia; in older fruit-bodies the hyphae producing the dendrohyphidia may become pigmented brown, other hyphae hyaline or slightly yellowish.

Cystidia none.

Dendrohyphidia numerous, richly branched, at first hyaline then yellowish and in older hymenia grey-brown, in the furrows between the hymenial ridges the hymenial layer may be formed by dendrohyphidia alone, in such spots sometimes covered with a layer of crystals, visible to the eye as white patches.

Basidia in the immature state tube-like, flexuose, when mature apically widened and projecting, $40\text{--}50\text{--}(80) \times 4\text{--}5\ \mu\text{m}$, with 4 sterigmata; in hymenia with rich development of dendrohyphidia a catahymenium-like structure is formed.

Spores $6.5\text{--}8.5^{(13.5)} \times 3.5\text{--}4.5\ \mu\text{m}$, ellipsoid to ovate, adaxial side straight or somewhat convex, rarely slightly concave, smooth, thin-walled, new spores hyaline or yellowish, old enclosed spores brown, non-amyloid, non-cyanophilous.

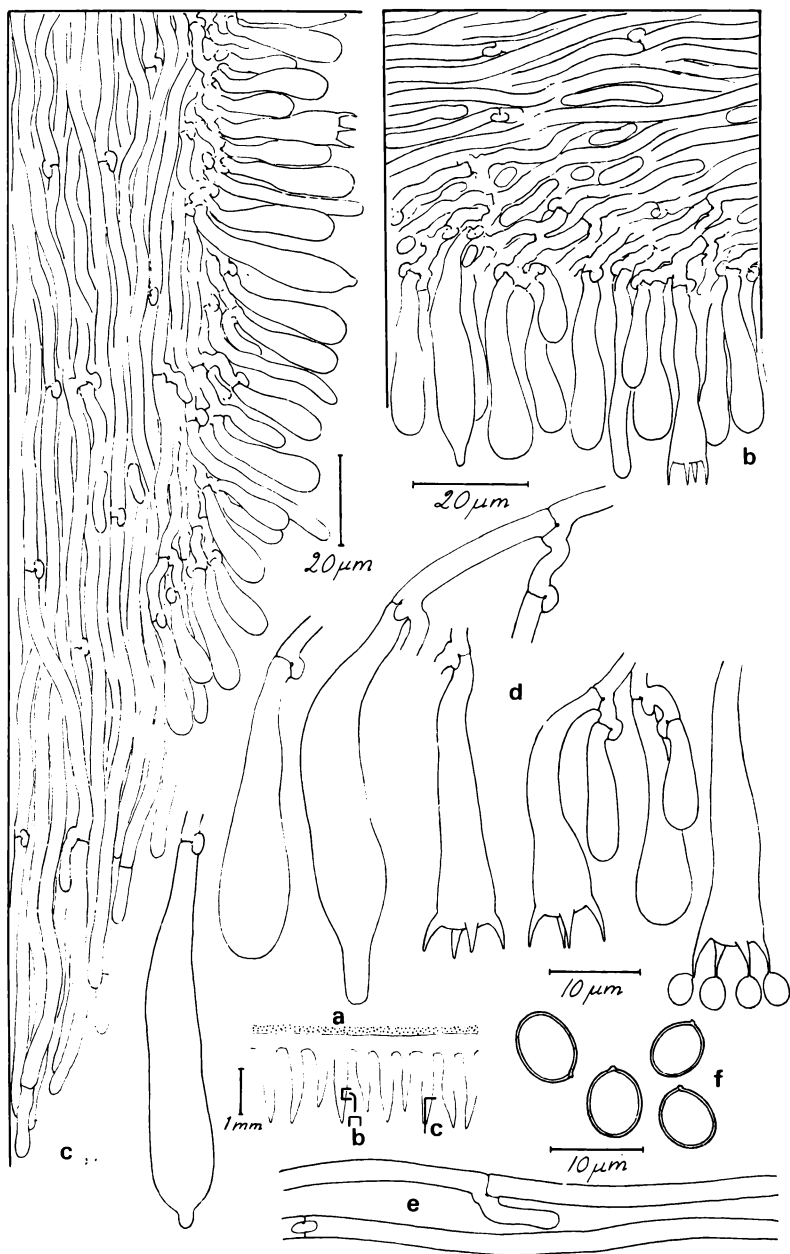


Fig. 631. *Radulodon erikssonii*. a) schematic section through fruitbody showing position of b and c b) hymenium and part of subiculum c) section through hymenial tooth d) basidia and cystidia e) basal hyphae f) spores. — Lundell 225.

Radulodon

Habitat. In N. Europe found only on *Populus tremula* and *Alnus incana*, in N. part of its area in N. America on *Populus tremeloides*, but in southern part of its distribution found on a number of different hosts (see W.B. Cooke loc. cit.).

Distribution. In N. Europe found only in Estonia (Parmasto, Mycoth. Est. fasc. 1 n. 8, 1957, map of distribution). Might occur in SE Scandinavia, e.g. in Gotland. Widely distributed in warm-temperate and tropical areas all over the world.

Remarks. Easily recognized thanks to its dark colour, red-brown margin and numerous dendrohyphidia.

Radulodon Ryv., Can. Journ. Bot. 50 p.
2073, 1972.

Fruitbodies resupinate, light coloured, effuse, adnate, odontoid with dense teeth, 1–3 mm long, cylindrical or flattened, smooth or apically fimbriate; subiculum white in section, varying in thickness but mostly thin; hyphal system monomitic; hyphae with thin or somewhat thickened walls, 2–3 μm wide, with clamps; cystidia lacking or present as thin-walled gloeocystidia; young basidia clavate, older ones often sinuous or constricted; spores 4–8 μm in diam., globose, smooth, with somewhat thickened walls, non-amyloid, non-cyanophilous.

Type of the genus: *R. americanus* Ryv.

Radulodon reminds in its outer appearance and in the nature of hyphae and basidia of *Hyphoderma*, but differs by having the round spores with thickened walls. Besides the species of this genus generally have a smooth hymenium. The spores are similar to those of *Hypochnicium*, but they are not cyanophilous as in this genus. It reminds also of *Sarcodontia* but in this genus the subicular hyphae are very thick-walled.

Only one Nordic species, besides one species *R. americanus* in N. America. A third species, *R. casearius* (Morg.) Ryv. is referred to the genus but differs in having non-clamped, partly thick-walled hyphae, why its place in the genus seems uncertain.

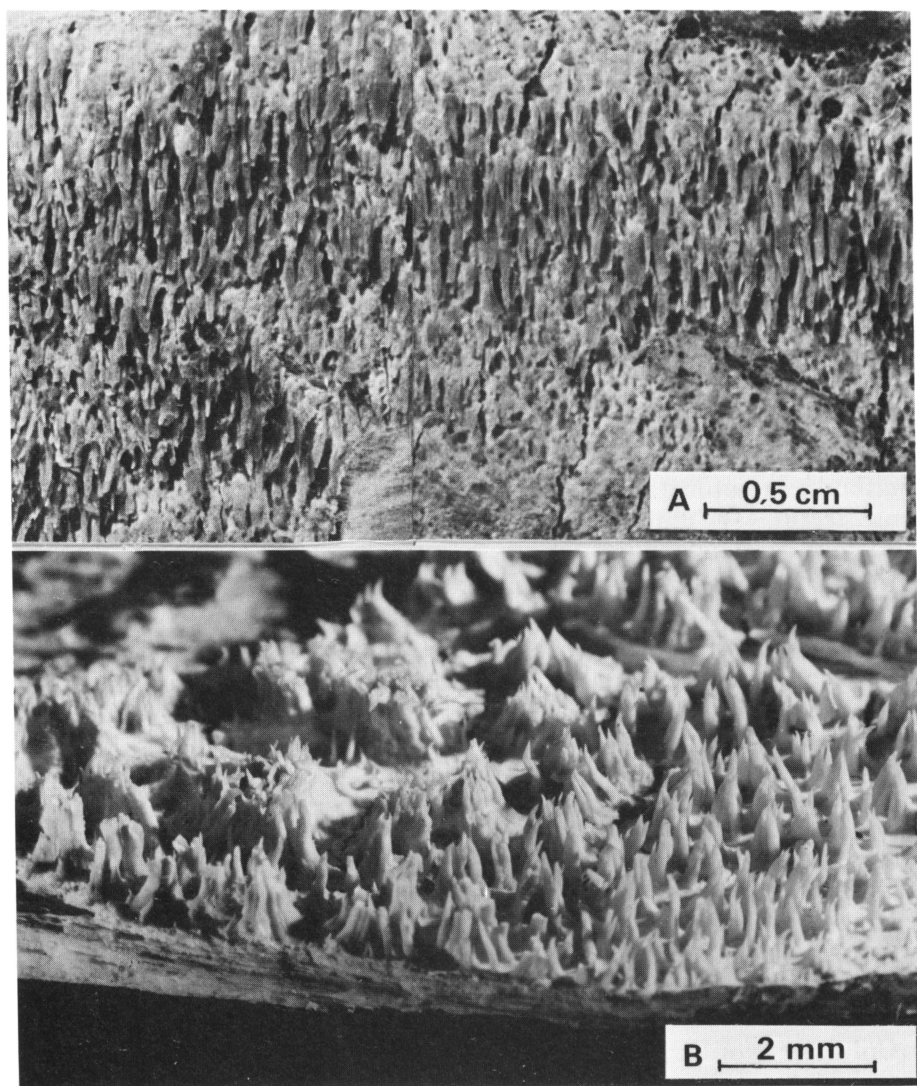


Fig. 632. *Radulodon erikssonii*. Parts of fruitbodies. a) — S. Lundell 9784. b) — Kujala 9786. Photo T. Hallingbäck.

Radulodon**Radulodon erikssonii** Ryv. loc. cit. p. 2075.

Fig. 631-32

Fruitbody resupinate, closely adnate, effuse, of moderate size, in the living state ceraceous, when dried firm membranaceous; hymenium hydroid with dense teeth, 1–3 mm long, conical with acute apex, when young white, then yellow and finally pale buff, esp. when dried; margin white, usually indeterminate; subiculum white in section, mostly thin, 0.1–0.3 mm.

Hyphal system monomitic; hyphae 2–3 μm wide, with clamps; sub-hymenial hyphae thin-walled, those of the subiculum with thickened walls, in the tooth-trama more or less parallel, in the subiculum more irregularly intertwined.

Cystidia present as thin-walled, clavate or fusiform gloecystidia, often narrowed to an obtuse apex, 35–50(–70) \times 6–8(–12) μm , with homogeneous contents.

Basidia clavate, when mature often somewhat sinuous, 25–30(–40) \times 6–8 μm , normally with 4 sterigmata and basal clamp.

Spores sub-globose – globose, 6–8 \times 5–6 μm , with smooth, somewhat thickened walls, non-amyloid, non-cyanophilous.

Habitat. On decayed wood of *Populus tremula*.

Distribution. Rare species, found once in Norway (Oslo), once in Sweden (Uppsala), and three times in Finland (Mustiala, Koli, and Jämsä). It may be restricted to areas (mainly eastern) with an inclination towards a drier and warmer, more continental type of climate. It should therefore be expected to be more frequent in Continental Europe, but is evidently hitherto not found there.

Remarks. Distinguished from *R. americanus* by the presence of gloecystidia. This species is much more vigorous with large fruitbodies covering undersides of *Populus* trunks while *R. erikssonii* is of moderate dimension. The Mustiala specimen (Rabenhorst – Pazschke, Fung. eur. n. 4343), collected by Karsten was by him determined *Hydnum fallax* Fr. What Fries intended with this name is not known, but the description (Syst. myc. I p. 422) anyhow does not fit *R. erikssonii*.

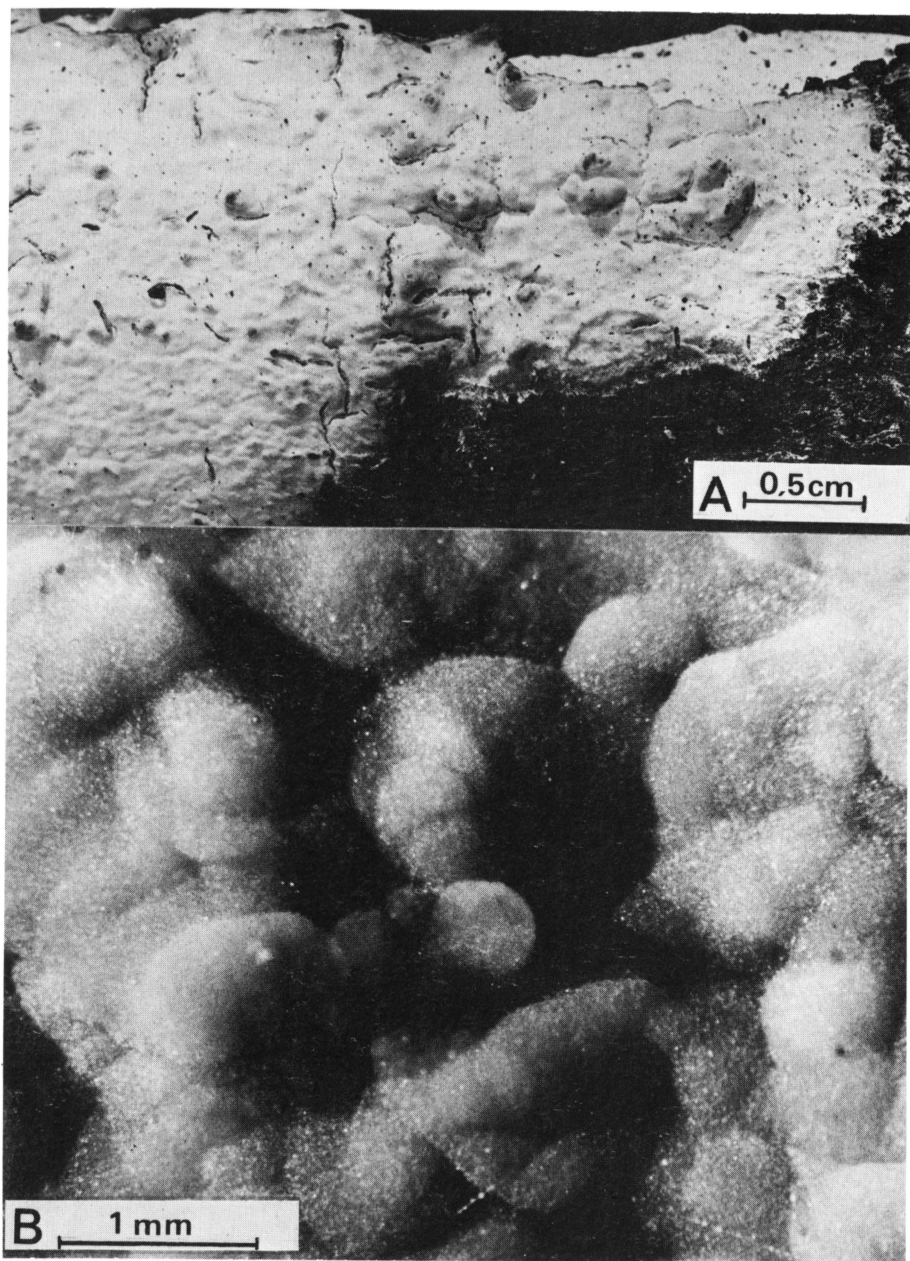


Fig. 633. *Radulomyces confluens*. A) Dry fruitbody with fimbriate margin. — Nathorst-Windahl 16943. B) Hymenial structure of living fruitbody. — N. Hallenberg 22652. Photo T. Hallingbäck.

Radulomyces

Radulomyces M.P. Christ., Dansk bot.
arkiv 19:2 p. 230, 1960.

Fruitbodies resupinate, closely adnate, effused, ceraceous, when wet hygrophanous; hymenium smooth, tuberculate or raduloid; hyphae with clamps, mostly thin-walled or in the subiculum slightly thick-walled; no cystidia; hyphal elements often present in the hymenium but never true dendrohyphidia; basidia clavate, more or less sinuose, filled with conspicuous oildrops normally with 4 sterigmata; spores ellipsoid — subglobose — globose, with oil-rich protoplasm, and smooth, somewhat thickened walls, non-amyloid, non-cyanophilous. Type species: *Thelephora confluens* Fr.

Remarks. The genus is distinguished by its watery ceraceous, hygrophanous fruitbodies and the nature of subhymenium, basidia, and spores. The basidia are in the mature hymenium very close together and get their shape mainly from the available space. Hence they are often irregularly sinuously constricted or may even look pleurobasidial, however, without being in fact so. The subbasidial hyphae are irregularly branched and very densely joined into a close tissue, very difficult to analyse. The width of these hyphae varies from narrow parts, not more than 1 μ m wide to dilated parts. The structure of the subhymenium is evidently a characteristic of importance for the genus, which in this respect is well distinguished from e.g. *Hyphoderma*, which may be superficially similar. The hygrophanous characteristic is caused by the density of the subhymenial tissue, in which the interhyphal spaces become filled with water in wet weather. On drying these spaces become filled with air with a much lighter colour of the hymenium as a result.

Parmasto (1968 p. 109–111) used the genus in a wider sense and referred several species to it. From these species *R. hiemalis* (Laur.) Parm. has been referred to a genus of its own (*Globulicium*) and *R. sibiricus* Parm. to *Hyphoderma*. *R. probatus* (Jacks.) Parm. is very close to and more likely only a form of *R. confluens*.

R. submolaris should in our opinion be referred to *Hyphoderma* as it differs clearly in the nature of the subbasidial hyphae from the type of *Radulomyces* and in this respect fits *Hyphoderma* very well. It seems to be close to *R. sibiricus*. Of *R. roseolus* Parm. and *R. licentii* (Pil.) Parm. we have not seen any material.

Two species in N. Europe:

- | | |
|--|------------------------|
| 1. Hymenium smooth or tuberculate | 1. R. confluens |
| 1. Hymenium raduloid with well developed teeth | 2. R. molaris |

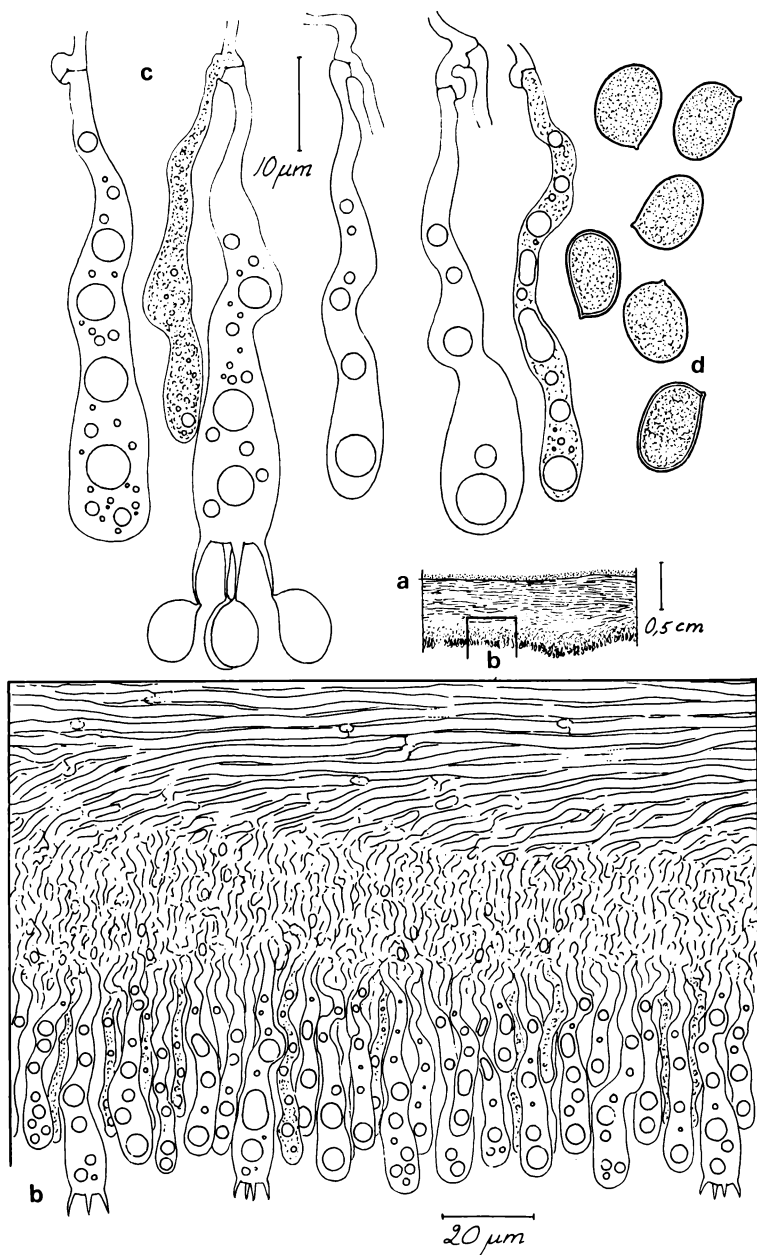


Fig. 634. *Radulomyces confluens*. a) schematical section through fruitbody showing position of b) b) section through hymenium, subhymenium and part of subiculum c) basidia d) spores. — Hallenberg & Sunhede 1212.

Radulomyces

1. **Radulomyces confluens** (Fr.) M.P. Christ.,
loc. cit. - *Thelephora confluens* Fr., Syst.
mycol. I p. 447, 1821.

Fig. 633-34

Fruitbody resupinate, closely adnate, effused or orbicular — confluent, varying in size from small to quite large, ab. 0.1–0.5 mm thick, when wet watery ceraceous and hygrophanous, greyish, often with a rosaceous or violaceous tint, on drying changing to whitish, greyish or pale buff, more or less tuberculate in the wet state, smoothing on drying; margin in the growing fruitbody fimbriate, then fertile throughout. Normally turning yellow in KOH.

Hyphal system monomitic, all hyphae with clamps, those of the subhymenium 1–3 μ m wide, thin-walled and richly branched, those of the subiculum mainly parallel with the substrate, sparsely branched, with thin or thickened walls, ab. 3 μ m wide.

Cystidia none. Simple or somewhat branched hyphae often seen, but they are in no way differentiated as dendrohyphidia.

Basidia clavate, sinuose, 35–55 x 6–9 μ m, with numerous oil-drops, 4 sterigmata and basal clamp.

Spores ellipsoid — subglobose, 8–12 x 6.5–9 μ m, oily and granular, walls smooth, slightly thickened in the mature spores, non-amyloid, non-cyanophilous.

Habitat. On bark and decayed wood of fallen or hanging branches, on logs and stumps, esp. of deciduous tree but in suitable localities also on conifers. It seems to favour humid conditions and is especially common near water e.g. in the *Alnus* zone along the N. coast of Sweden. It is also a characteristic species in parks and gardens, where it grows on dead branches of cultivated bushes and hedges. It is remarkably common also in the subalpine deciduous forest, e.g. in Abisko nat. park in N. Lapland.

Distribution. Very common in the southern parts of the area, less common northwards but evidently occurring in suitable localities in the whole of N. Europe and is one of the most common species of Corticiaceae.

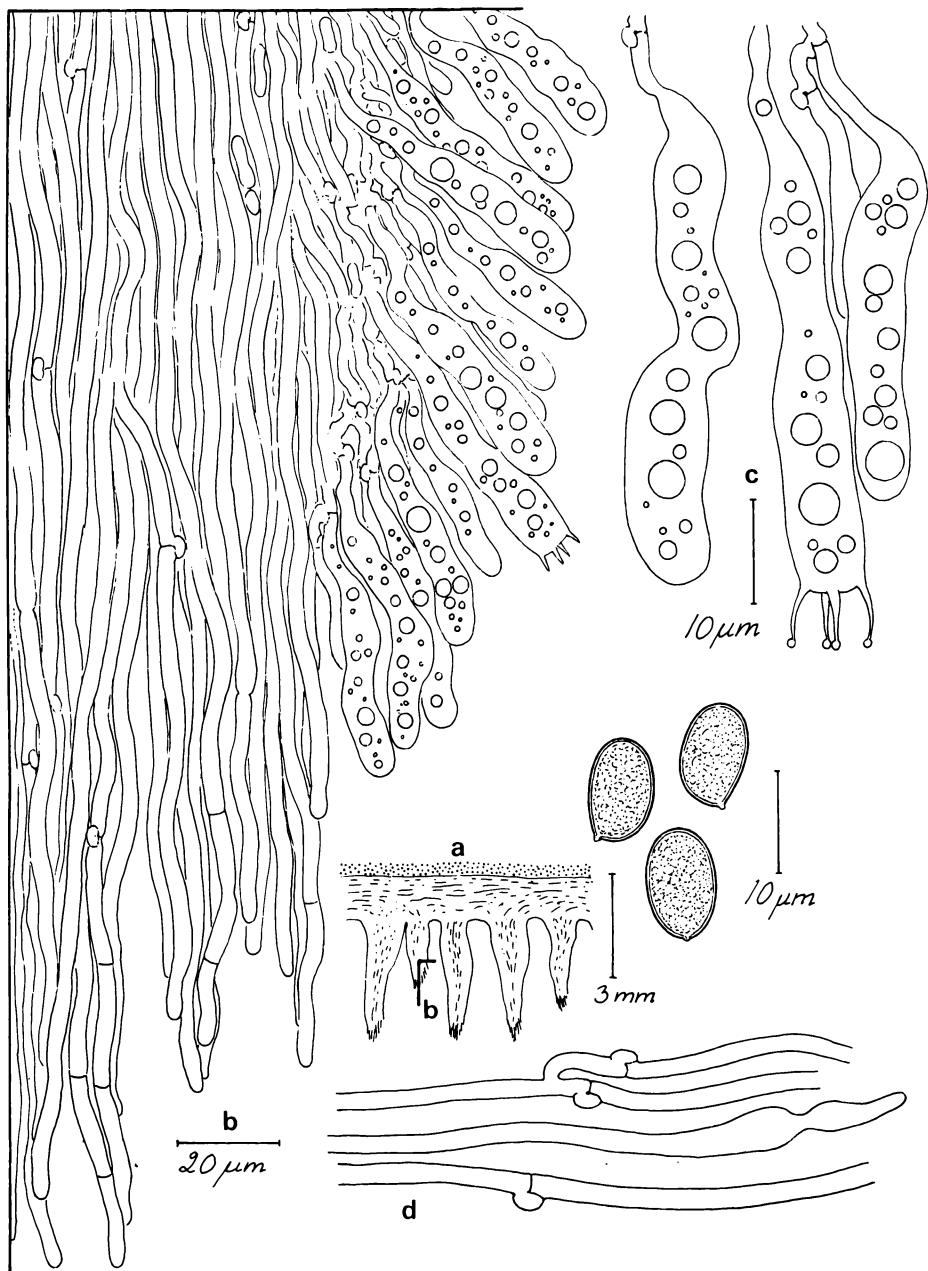


Fig. 635. *Radulomyces molaris*. a) schematical section through fruitbody showing position of b) section through hymenium c) basidia d) basal hyphae e) spores.
— Hallenberg & Sunhede 1223.

Radulomyces

Remarks. The fruitbodies of *R. confluens* are conspicuously hygrophanous which gives the hymenium during wet conditions a dark, often blueish or violaceous colour. This is one of the reasons that make the species seem very variable. The micromorphological variation concerns mainly the spore shape, from ellipsoid to subglobose. This makes the limit towards *R. rickii* (Bres.) M.P. Christ. (*Corticium rickii* Bres. ex Rick, Oesterr. bot. Zeitschr. 48 p. 136, 1898) uncertain, but so far as we can see all the Nordic material belongs to *R. confluens*. *R. rickii* may be a species of its own with a more southern distribution but it is also possible that it only represents one extreme in the spore variation of *R. confluens*. *Corticium cremoricolor* Berk. & Curt., Grev. 1 p. 180, 1873, with more oblong spores, may be the other extreme in an unbroken series. Only fertility tests between these three taxa can solve this problem.

2. *Radulomyces molaris* (Fr.) M.P. Christ., Dansk bot. ark. 19 p. 232, 1960. - *Radulum molare* Chaill. ex Fr., Elench. I p. 151, 1828; *Hydnum molare* Chaill. in lit. - *Radulum rude* (Pers.) Lund. in Lund. & Nannf., Fungi exs. succ. n. 1412, fasc. 29—30 p. 9, 1947.

Fig. 635

Fruitbody resupinate, closely adnate, orbicular — confluent or effused, closely adnate or in old specimens partly detachable when dry, ceraceous when wet, membranaceous when dried, greyish or lurid yellowish, sometimes violaceous in the living state, old specimens darkening; hymenium raduloid with irregular teeth, varying in size and shape, 2—5 mm long, in the young state apically finely fimbriate.

Hyphal system monomitic; hyphae with clamps, subhymenial ones ab. 2 μ m wide; subicular hyphae ab. 3 μ m, forming a basal layer of more or less parallel hyphae and similar hyphae in the center of the teeth. The whole fungus and esp. the hymenium is hygrophanous, therefore varying in appearance with humidity.

Cystidia none.

Basidia clavate, sinuose esp. in the basal part, 30—50(—70) \times 7—9 μ m, with numerous and conspicuous oil-drops, with 4 sterigmata and basal clamp.

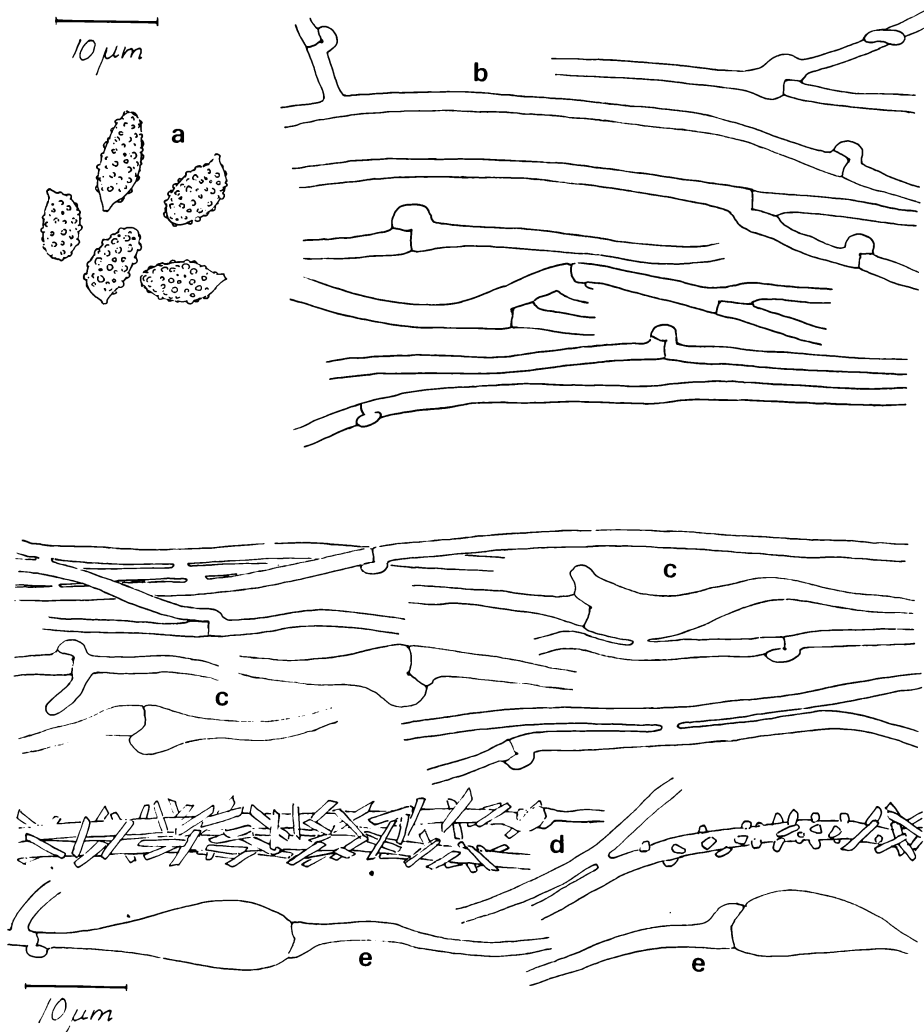


Fig. 636. *Ramaricium albochraceum*. a) spores b) hyphae c, e) hyphae with ampullaceous swellings d) hyphae with crystals. — a-b) Type. — c-e) Litschauer.

Ramaricium

Spores ellipsoid, 8–11(–13) x 6.5–8 μm , with smooth, somewhat thickened walls and oily, granular contents, non-amyloid, non-cyanophilous.

Habitat. On bark and wood of deciduous trees, esp. of *Quercus*, but also of *Corylus*, *Betula*, *Fagus*, *Prunus* a.o. It is often found on dead, still attached branches of oak, often high above the ground. It seems to be favoured by high humidity and is therefore often frequent near big waters.

Distribution. Quite common in the southern part of the area (Denmark, S. Sweden), rare along the southern coast of Norway. In Sweden it is still quite frequent near the large lakes Mälaren and Hjälmaren.

Remarks. Easily recognized species. Under the microscope it agrees almost perfectly with *R. confluens* and their close relationship is beyond doubt. Lundell's statement (loc. cit) that they are widely different is hard to understand.

Ramaricium John Erikss., Svensk bot. tidskr. 48 p. 189, 1954; Ginns, Bot. notiser 132 p. 93–102, 1979. - *Phlyctibasidium* Jülich, Proc. K. Nederl. Akad. Wet., Amsterdam (C) 77 p. 154, 1974.

Type species of *Ramaricium*: *R. occultum* John Erikss.

Type species of *Phlyctibasidium*: *Corticium polyporoideum* Berk. & Curt.

Fruitbodies resupinate, adnate, effuse; hymenium smooth, pale ochraceous, ceraceous or carnose in the living state, when dried fragile; subiculum white, contrasting against the hymenium, varying in the degree of development; white rhizomorphs and usually also a white, effuse mycelium; no differentiated margin; hyphae monomitic, with thin or more or less thickened walls, with clamps, often with ampullaceous swelling, smooth or covered with usually cyanophilous warts; no cystidia; basidia clavate, sinuous, basally narrowed to a stalk-like part; pleurobasidia present; spores globose-ellipsoid-ovoid-fusiform-cylindrical, smooth or ornamented, with thin or thickened walls, cyanophilous.

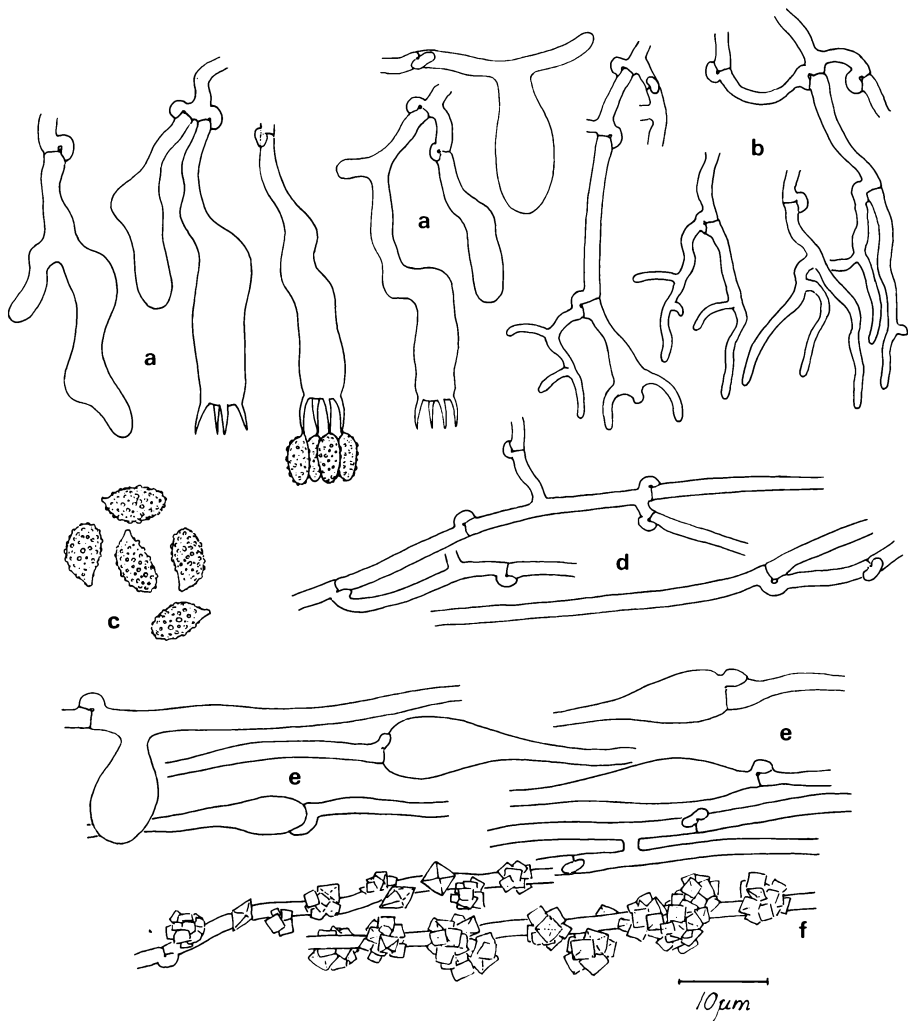


Fig. 637. *Ramaricium alboochraceum*. a) basidia b) dendrohyphidia c) spores d) hyphae e) hyphae with ampullaceous swellings f) hyphae with crystals. — a-d) Type of *R. occultum* e-f) Paratype of *R. occultum*.

Ramaricium

Remarks. The genus was described for one species and later 4 species — *R. alboflavescens* (Ell. & Ev.) Ginns, *R. alboochraceum* (Bres.) Jülich, *R. flavomarginatum* (Burt.) Ginns and *R. polyporoideum* (Berk. & Curt.) Ginns — have been added. Several characteristics, e.g. the cyanophilous, usually warty spores with thickened, yellow walls, the shape of the basidia, and the swelling of the hyphae, give it a place in the vicinity of the clavarioid genus *Ramaria* and the hydroid *Kavinia*, and it is therefore now commonly accepted as a member of fam. Gomphaceae together with these genera. In N. Europe only one species is found.

Ramaricium alboochraceum (Bres.) Jülich,
Persoonia 9 p. 417, 1977. - *Corticium albo-*
ochraceum Bres., Ann. mycol. 1 p. 96, 1903.
- *Trechispora alboochracea* (Bres.) Liberta,
Can. J. Bot. 51 p. 1888, 1973. - *Ramaricium*
occultum John Erikss., Sv. Bot. Tidskrift 48
p. 189, 1954.

Fig. 636-37

Fruitbody resupinate, adnate, irregularly effused, of small to moderate size; hymenium pale ochraceous, smooth, under the lens in the young state hypochnoid, then continuous, together with the subhymenium forming a layer, which is in the dry state fragile and easily separable from the white subiculum, this continuing into a diffuse or rhizomorphic mycelium; no differentiated margin.

Hyphal system monomitic; hyphae with clamps, 1.5–3 μm wide, thin-walled, straight and sparsely branched in the subiculum, densely branched and interwoven in the subhymenium, with branches from or opposite clamps as well as between septa; ampullaceous swellings frequent (e.g. in the paratype of *R. occultum*, less frequent or even rare (e.g. in the type of *R. occultum*); anastomoses usual, esp. in the rhizomorphs.

Cystidia none.

Basidia 35–45 x 5–7 μm , clavate, flexuose-sinuose, basally narrowed to a stalk-like part, 4 sterigmata and basal clamp, pleurobasidia frequent esp. in the young hymenia.

Spores 5.5–8(–9) x 3.3–3.9 μm , narrowly ovoid-ellipsoid-subfusiform, with elongate apiculus; walls somewhat thickened, ornamented with hemispherical or rarely conical warts; both walls and warts cyanophilous, non-amyloid.

Habitat and distribution. In N. Europe hitherto found only in the basal part of moss carpets (*Hylocomium*, *Pleurozium*) in humid *Vaccinium-Picea* forest and under *Juniperus* bushes; collected only twice in Sweden (Runmarö and Billudden in Upland) and once in N. Finland (Kuusamo). In continental Europe found on decayed wood once in Poland (Eichler, holotype S), and once in Austria (Litschauer). More frequent in N. America, and found in Africa (Tanzania) by Ryvardeen.

Remarks. Careful investigation has confirmed the identity between *R. alboochraceum* and *R. occultum* supposed by Jülich. The differences in growth habit (on mosses in N. Europe, on decayed wood in C. Europe and W. America) are evidently accidental. The SEM pictures published by Ginns seem to show differences in the spore ornament (bigger and closer warts in *R. occultum*) but also this is probably a matter of intraspecific variation.

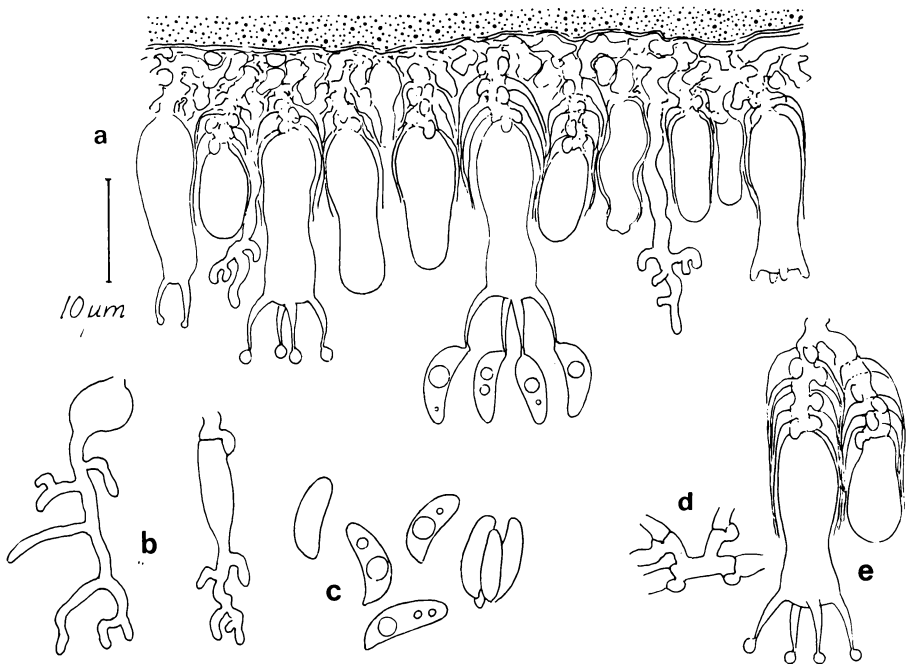


Fig. 638. *Repetobasidiellum fusisporum*. a) section through fruitbody b) dendrohyphidia c) spores d) branching hyphae e) basidia. — Hallingbäck 24884 (holotype).

Repetobasidiellum

Repetobasidiellum Erikss. & Hjortst. n. gen.

Repetobasidio simile sed differe basidiis
urniformibus.

Generic type: *Repetobasidiellum fusisporum* Erikss. & Hjortst.

Remarks. Though found only once, the description of a new genus for this species is inevitable. It reminds of *Repetobasidium*, esp. in the repetition of the basidia, but differs above all in the urniform shape of the basidia, which are obovate in the latter genus. Besides there are sterile, branched hyphae in the hymenium (dendrohyphidia) and the spore-shape is different from what hitherto is found in *Repetobasidium*. The genus is so far monotypic.

Repetobasidiellum fusisporum Erikss. &
Hjortst. n. spec.

Fig. 638

Fructificatio resupinata, arcte adnata, tenuis, exigua, continua, pallide griseofulva, levis; margo determinatus; hyphae 2–3 μm latae, fibulatae, dense intertextae, dendrohyphidia sparsa, 1–3 μm lata, sparsum ramigera; basidia urniformia, 15–18 x 5–6 μm , 4 sterigmatica, per repetitionem linearem formata; sporae 6.5–8 x 2.5–3 μm , sublunatal – subfusiformes, leves, tenuitunicatae, guttulate, non-amyloideae, non-cyanophilae. Ad rhachides filicum (prob. *Matteuccia*).

Holotypus: Sweden, Värmland, Nedre Ullerud par., the Island of Pannkakan in the River Klarälven, on dead rhachis of fern (probably *Matteuccia*). T. Hallingbäck 24884 (GB).

Fruitbody resupinate, small, thin, orbicular, closely adnate, smooth, continuous, ceraceous when alive, crustaceous when dried, pale greyish-brown, fertile to the determinate, not especially differentiated, margin.

Hyphal system monomitic; hyphae 2–3 μm wide, richly branched and intertwined into a dense texture.

Cystidia none.

Dendrohyphidia few, 1–3 μm wide, thin-walled, sparsely branched, widened in the basal part.

Basidia at first subglobose eventually urniform, repeating with short intervals, old basidia thus forming a dense sheath surrounding the basal part of the basidia, these sheaths glued side to side to each other, making it difficult to separate the basidia from each other in the slides by tapping, therefore best studied in vertical sections through the fruitbody; the subbasidial cell formed by the repetition with several clamps from old basidia.

Spores sublunate – subfusiform, 6.5–8 x 2.5–3 μm , smooth, thin-walled, with one or several oil-drops in the protoplasm, non-amyloid, non-cyanophilous.

Habitat and distribution. See holotype.

Remarks. Remarkable species, well-distinguished from other Corticiaceae.

Repetobasidium John Erikss., Symb. Bot. Ups.

16:1 p. 67, 1958. - Oberwinkler, Sydowia

19:1–3 p. 59–62, tab XVII–XIX, 1965.

Fruitbodies very thin, in the young state consisting of a net of hyphae creeping on the substrate, producing basidia and cystidia on lateral, perpendicular branches, later confluent into a thin, ceraceous or gelatinous layer, visible to the naked eye as an inconspicuous bloom on the wood, when dried hardly visible at all; all hyphae with clamps; basidia subglobose – pyriform, new ones produced by inner repetition, leaving old basidia as a clothing of the subbasidial cell, which becomes prolonged to a stalk-like part; cystidia thin-walled, tube-like or conical, in some species capitate, in such cases often also with an attached globe of excreted, hyaline or yellow-red matter; spores globose – allantoid, thin-walled, smooth, non-amyloid, non-cyanophilous.

Generic type: *Peniophora vilis* Bourd. & Galz.

Repetobasidiellum

The formation of new basidia through inner repetition occurs occasionally in some other genera, e.g. in *Galzinia*, but in *Repetobasidium* this is the normal and generally the only way. Now and then side-branches occur from the subbasidial cell, bearing a basidium, which means the beginning of a new series of repetition. The new basidium produced through repetition, starts its development through the bulging of the basal septum of the previous basidium. The resulting outgrowth gets a new septum with a clamp and the thus formed apical cell becomes the new basidium. If the procedure goes on without interruption, the subbasidial cell becomes all the time prolonged into a stalk-like part with the single basidium in the top. The stalk remains unseptated but bears clamp, each one marking the site of an earlier basidium. Now and then the apical cell may develop into a short hypha instead of a basidium and in such a case there is a remaining septum. Such apical hypha ends soon revert again to basidial formation. The growth of a basidial branch often becomes limited by the development of a top-cell into a cystidium. For continued basidium production a side branch must in such case be formed. See fig. 639.

Repetobasidium is no doubt well distinguished and has also been placed in a family of its own, Repetobasidiaceae Loquin. There is at least one genus, that shows affinities, viz. *Sphaerobasidium* Oberw. This genus agrees in the shapes of basidia and cystidia, as well as in the nature of the fruitbody. Any regular repetition, resulting in a sub-basidial stalk-cell cannot, however, be seen. *Sphaerobasidium* is a link between *Repetobasidium* and other Cortiaceae and therefore it will be difficult to separate a family Repetobasidiaceae. The taxa of higher order, established by Loquin, are evidently based on the misunderstanding that the basidial repetition of *Repetobasidium* can be compared with spore repetition, yeast-cell budding a.s.o.

There are 6 known species in N. Europe. During the investigation of available material, two American species are found to be new. They are here described. One tropical species is recently published, viz. *R. hastatum* Hjortst. & Ryv., which is not, however, a typical representative of the genus.

Key to the *N. temperate species*:

- 1. Cystidia distinctly capitate, often with a globe of oil (living state) or encrustation (dry state) 2
- 1. Cystidia tubiform or conical, not distinctly capitate, without encrustation or with very small amorphous encrustation 4
- 2. Spores globose 3
- 2. Spores ellipsoid 2. *R. canadense*
- 3. Basal hyphae with gelatinous walls, basidial stalks clothed with numerous, easily seen walls from old basidia ... 7. *R. vestitum*
- 3. Basal hyphae not gelatinous, basidial stalks covered with indistinct remnants of basidial walls 6. *R. mirificum*
- 4. Cystidia conical 6
- 4. Cystidia tubiform-cylindrical, obtuse 5
- 5. Spores ellipsoid-ovoid, 4 – 6 μm long 4. *R. erikssonii*
- 5. Spores allantoid, 8 – 10 μm long 5. *R. macrosporum*
- 6. Spores globose 3. *R. conicum*
- 6. Spores ellipsoid-allantoid 7
- 7. Spores ellipsoid, length less than twice the width. . 1. *R. americanum*
- 7. Spores allantoid, length more than twice the width 8. *R. vile*

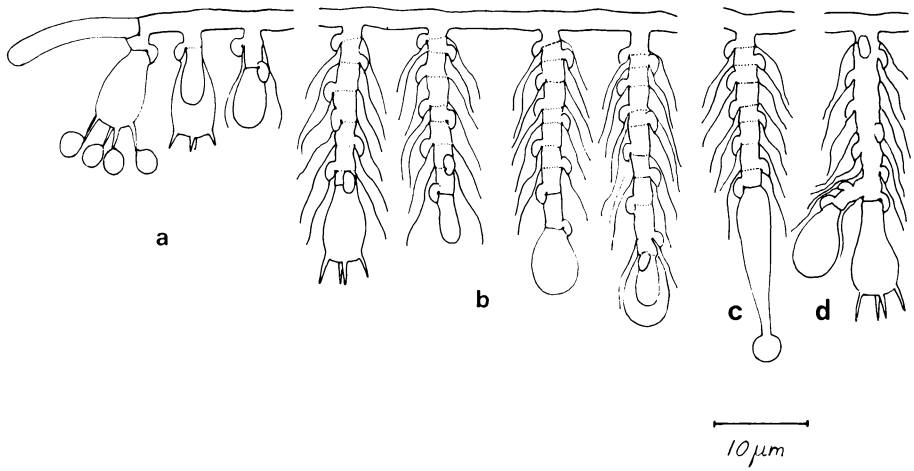


Fig. 639. *Repetobasidium*. Diagram showing the basidial repetition: a) first basidium b) advanced repetition interrupted by hyphal growth c) repetition terminated with a cystidium d) advanced repetition with sidebranch.

Repetobasidium**1. *Repetobasidium americanum* John Erikss. &
Hjortst. n. sp.**

Fig. 640

Repetobasidio conico affine, sed sporis ovoideis — ellipsoideis, 5–7 x 3.5–4 µm.

Holotype: Ryvarden 14266 (O).

Fruitbody at first very thin, ceraceous, whitish — greyish, then thickening and when dried becoming pale buff, under the lens (50 x) furfuraceous — porulose, not continuous; no differentiated margin.

Hyphal system monomitic, hyphae thin-walled, with clamp, basal hyphae attached to the wood, with perpendicular hymenial branches.

Cystidia conical, 35–45 x 5–5 µm, thin-walled, not encrusted but sometimes with a small oil-drop at the top.

Basidia subglobose — pyriform, 9–12 x 5–6.5 µm, with 4 sterigmata and basal clamp; basidial stalk reaching 100 µm in length.

Spores ellipsoid, 6–7.5 x 3.5–4.5 µm, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat and distribution. On coniferous wood. Hitherto found only once: USA, Minnesota, Clearwater Co., Itasca St. Park, Itasca Lake, on conifer wood, 1977.09.16. Ryvarden 14266 (O, GB).

Remarks. Differs from *R. conicum* in the shape of the spores and is thus a parallel to *R. canadense* which differs from *R. mirificum* in the same way. In both cases the new species deviates conspicuously from the earlier taxon which besides appears to vary very little in the size and shape of the spores.

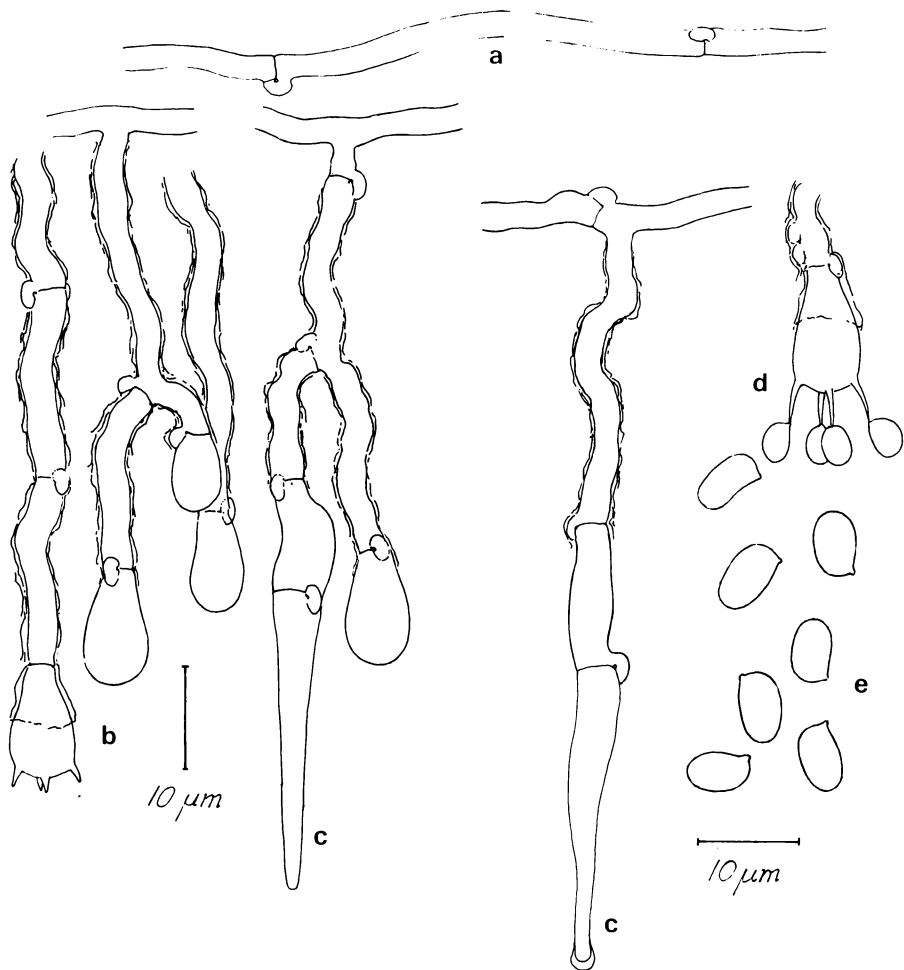


Fig. 640. *Repetobasidium americanum*. a) hyphae b) basidia c) cystidium d) basidia e) spores. — Ryvarden 14266.

Repetobasidium**2. *Repetobasidium canadense* John Erikss. & Hjortst. n. sp.**

Fig. 641

Repetobasidio mirifico affine, sed sporis ellipsoideis, 6–8 x 4–5 μ m.

Holotype: B. & J. Eriksson 9872 (GB).

Fruithbody very thin, effuse, in the living state ceraceous, like a greyish or whitish pruinose bloom on the wood, under the lens porulose; no differentiated margin.

Hyphal system monomitic; hyphae 3–4 μ m wide, with clamps, basal hyphae forming a sparse net on the wood, with short perpendicular hymenial branches.

Cystidia 35–45 x 4–6 μ m, cylindrical or somewhat tapering, capitate with an excreted globule, in the dry state composed of a grainy, yellow – red substance; globules easily seen under the lens (50 x) as golden or amber-coloured pearls; in the basal part of the cystidium normally one clamp.

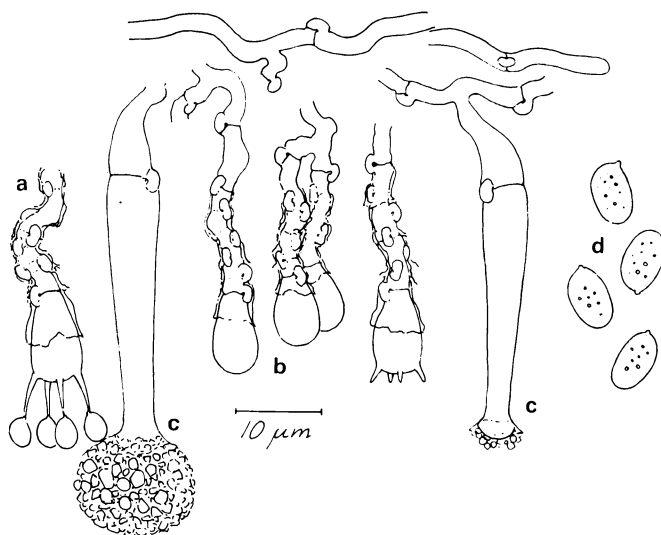


Fig. 641. *Repetobasidium canadense*. a) basidium b) young basidia c) cystidia d) spores. — B. & J. Eriksson 9872.

Basidia subglobose — pyriforme, 9–12 x 5–6 μm , with 4 sterigmata and basal clamp. Subbasidial stalk reaching 50 μm .

Spores ellipsoid, 6–8 x 4–5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat and distribution. Found only once: Canada, Br. Columbia, Vancouver Island, near Cedar Resort N. of Youlou, 1967.09.14. B. & J. Eriksson 8133, GB 9872.

Remarks. Very close to *R. mirificum* but distinguished by somewhat larger cystidia and above all the ellipsoid spores.

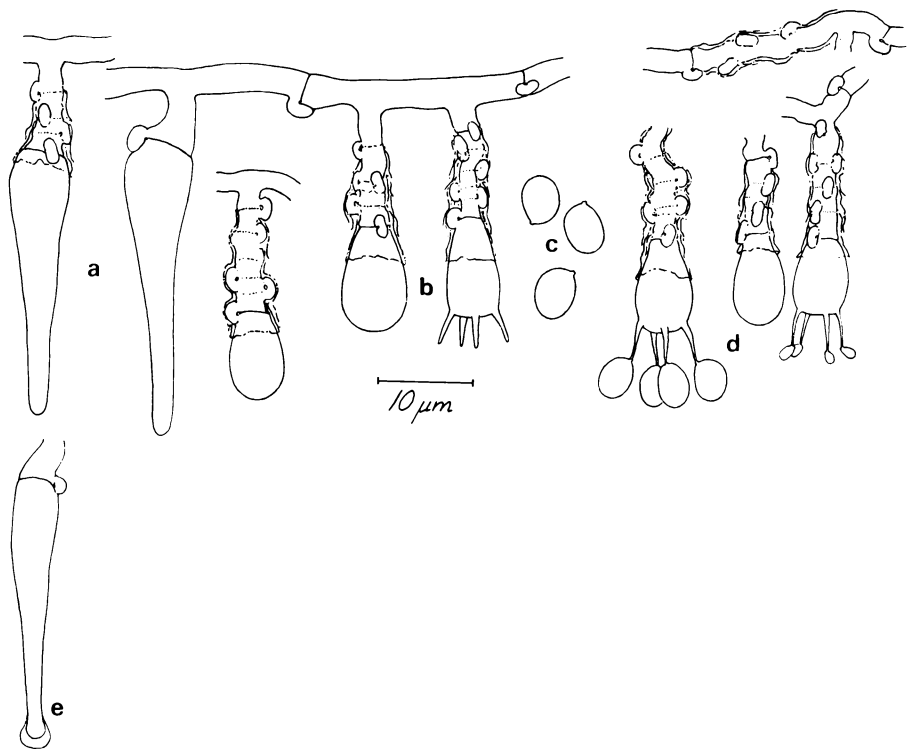


Fig. 642. *Repetobasidium conicum*. a, e) cystidia b, d) basidia c) spores. — a-d) J. Eriksson & T. Hallingbäck 9858. e) Eriksson 9860.

Repetobasidium

3. **Repetobasidium conicum** (Oberw.) John Erikss. & Hjortst. n. comb. - *Repetobasidium mirificum* John Erikss. var. *conicum* Oberw., Sydowia 19:1–3 p. 61, 1965.

Fig. 642

Holotype F. Oberwinkler 3525 (FO).

Fruitbody very thin, ceraceous in the living state, effuse; margin not differentiated.

Hyphal system monomitic, basal hyphae 2–4 μm wide, closely adnate to the substrate, with clamps; short, perpendicular hymenial branches.

Cystidia 30–40 x 5–7 μm , conical, not capitate or with a very slight apical enlargement, without coloured resinous encrustation but sometimes with a small oil-drop; one clamp in the basal part.

Basidia subglobose – pyriform, 8–12 x 5–7 μm , with 4 sterigmata and basal clamp; subbasidial stalk generally less than 25 μm .

Spores globose – subglobose, 5.5–7 x 4–5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat and distribution. Described from Germany (Bayern). Found once in Sweden (Bohuslän, Västeralanda par., on decayed wood of *Picea abies* in moist, coniferous forest) and several times in Canada (Br. Columbia).

Remarks. *R. conicum* combines characteristics from *R. vile* (the cystidia) and *R. mirificum* (the spores). From the material studied it seems to be just as consistent as the other taxa of the genus. We therefore choose to give it specific rank. Our material agrees well with F. Oberwinkler's collections (Type and 8 paratypes).

4. *Repetobasidium erikssonii* Oberw. l.c. p. 62.

Fig. 643

Holotype: F. Oberwinkler 4070 (FO).

Fruitbody very thin, effuse, closely adnate, in the living state ceraceous, to the naked eye only a whitish-pale ochraceous bloom on the wood, under the lens finely porulose, not continuous, margin not differentiated.

Hyphal system monomitic, hyphae mostly 2–3 μm wide, with clamps; basal hyphae spreading over the wood, with short perpendicular hymenial branches.

Cystidia tubelike, thin-walled, obtuse, 30–50 x 4–5 μm , with 1–2 clamps; protoplasm homogeneous, in phase somewhat light-refracting; no encrustation.

Basidia subglobose – pyriform, 6–10 x 5–7 μm , with 4 sterigmata and basal clamp.

Spores ellipsoid – subballantoid, 5–6(–7) x 2.5–3 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

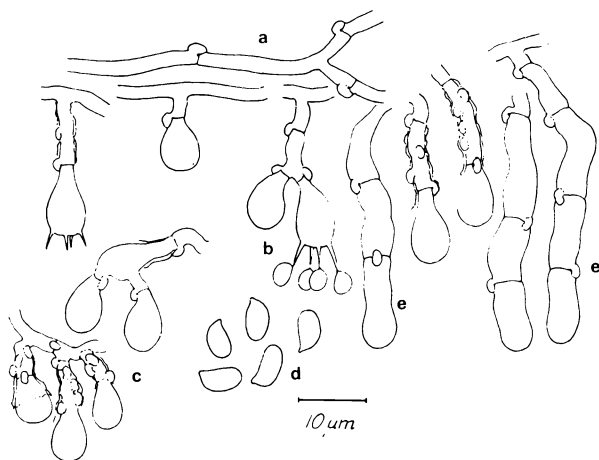


Fig. 643. *Repetobasidium erikssonii*. a) hyphae b, c) basidia d) spores e) cystidia. — Hjortstam 12168.

Repetobasidium

Habitat and distribution. Hitherto found in Germany (Bavaria) on much decayed coniferous wood (the type and two paratypes), and in Norway (Akershus, Nannestad) on fence, Hjortstam 12168.

Remarks. Agrees with *R. macrosporum* in the shape of the cystidia but differs by the shorter spores. Too little material has, however, been studied for a definite delimitation of the taxon. In the holotype very few spores are found by us and these spores might not have reached their full size.

The Norwegian material is in very good condition, but rather young, and the basidial repetition is not easily seen. The cystidia are numerous and bigger than in the type material. The spores vary in shape from ovoid-ellipsoid to suballantoid, somewhat longer than in the type.

5. *Repetobasidium macrosporum* (Oberw.)
 John Erikss. & Hjortst. n. comb. - *R. vile*
 var. *macrosporum* Oberw. loc. cit. p. 60.

Fig. 644

Holotype: F. Oberwinkler 5570 (FO).

Fruitbody very thin, effuse, ceraceous in the living state, forming a whitish-greyish bloom on the wood, under the lens finely porulose, not continuous; no differentiated margin.

Hyphal system monomitic; hyphae thin-walled, with clamp, basal hyphae 2–3 μm wide, spreading over the substrate; short perpendicular hymenial branches, to 50 μm long.

Cystidia more or less tube-like, obtuse, often somewhat sinuose or constricted, 30–50 x 3.5–6(–10) μm , thick-walled, contents homogeneous, more or less light-refracting in phase; one or two clamps.

Basidia pyriform, 8–15 x 5–7 μm , with 4 sterigmata and basal clamp.

Spores allantoid, 8–10 x 3.5–5 μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat and distribution. Described from Germany (Bavaria). Found also in Sweden (Västergötland: Hol parish, and V. Tunhem par. by K. Hjortstam) in Norway (Hedmark: Løten by E. Høgholen) and in Canada (Br. Columbia: Mt Seymour Prov. Park by B. & J. Eriksson & R. Bandoni).

Remarks. Easily recognized by the allantoid spores and the tublike cystidia. It agrees with *R. erikssonii* in the nature of the cystidia but differs in the longer spores. The Nordic and Canadian material agrees well with that collected by Oberwinkler. We consider it well distinguished from *R. vile* and it is therefore given specific rank. It is closer to *R. erikssonii* and they may represent variations within one species. To solve this taxonomic problem more material is needed.

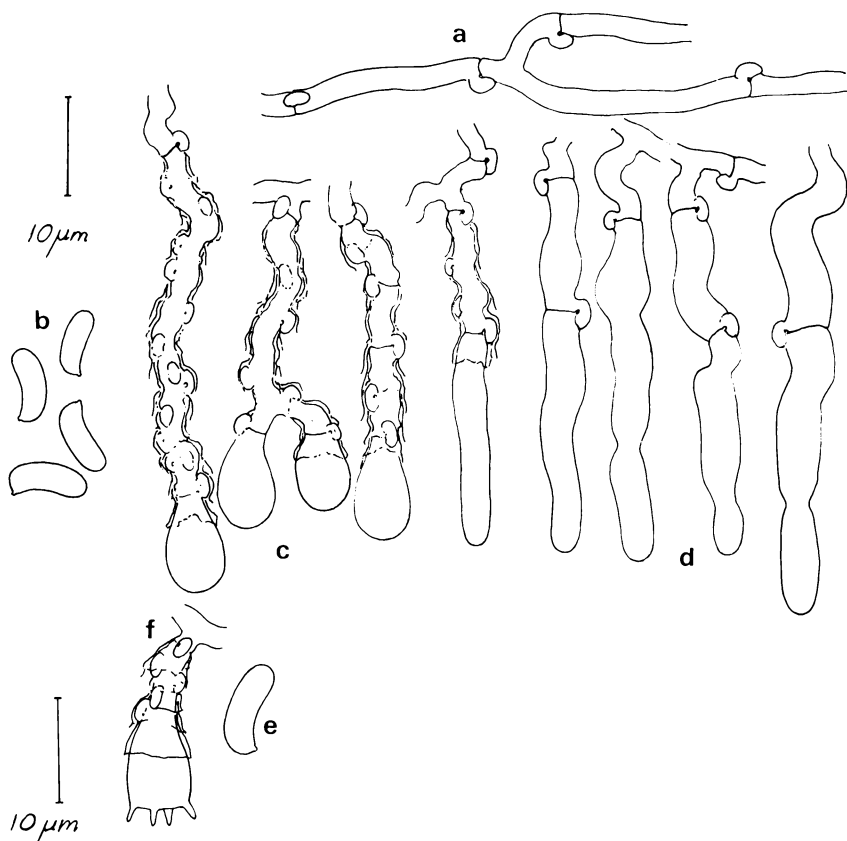


Fig. 644. *Repetobasidium macrosporum*. a) hyphae b) spores c) young basidia d) cystidia e) spore f) basidium. — a-d) Hjortstam 12052 e-f) Hjortstam 12050.

Repetobasidium

6. *Repetobasidium mirificum* John Erikss.,
Symb. bot. ups. 16 p. 70, 1958.

Fig. 645

Holotype: B. & J. Eriksson 5697 (U).

Fruitbody very thin, ceraceous in the living state, when dried greyish to pale yellowish, porulose, not continuous under the lens, margin not differentiated.

Hyphal system monomitic, hyphae 2–3(–4) μm wide, basal ones close to the wood with perpendicular, basidial branches.

Cystidia 30–45 \times 5–7 μm , capitate, apically excreting an oily substance forming a round, attached drop, ab. 10 μm wide, at first hyaline, drying to a firm, amber-coloured to yellow-red globe, well visible under the lens also in the herbarium material. In the microscope the globe appears to be composed of small grains. Sometimes it seems as the globe should be surrounded by a thin membrane, thus reminding of the cystidia of *Resinicium*. The presence of such a membrane and its nature – whether a part of the cell-wall or only the dried surface of the excreted matter – can probably best be studied on living material. SEM:s don't give definite information.

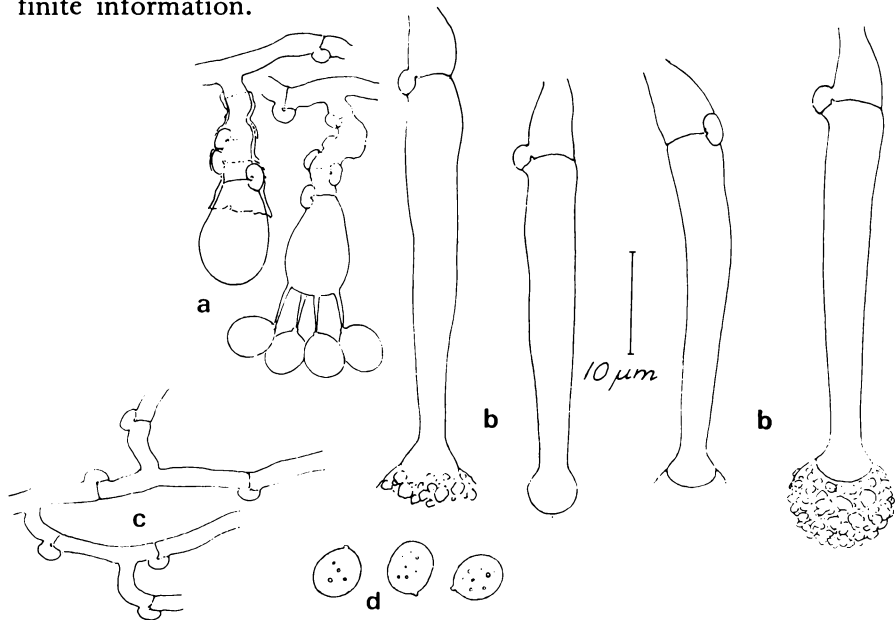


Fig. 645. *Repetobasidium mirificum*. a) basidia b) cystidia c) hyphae d) spores.
– J. Eriksson 9865.

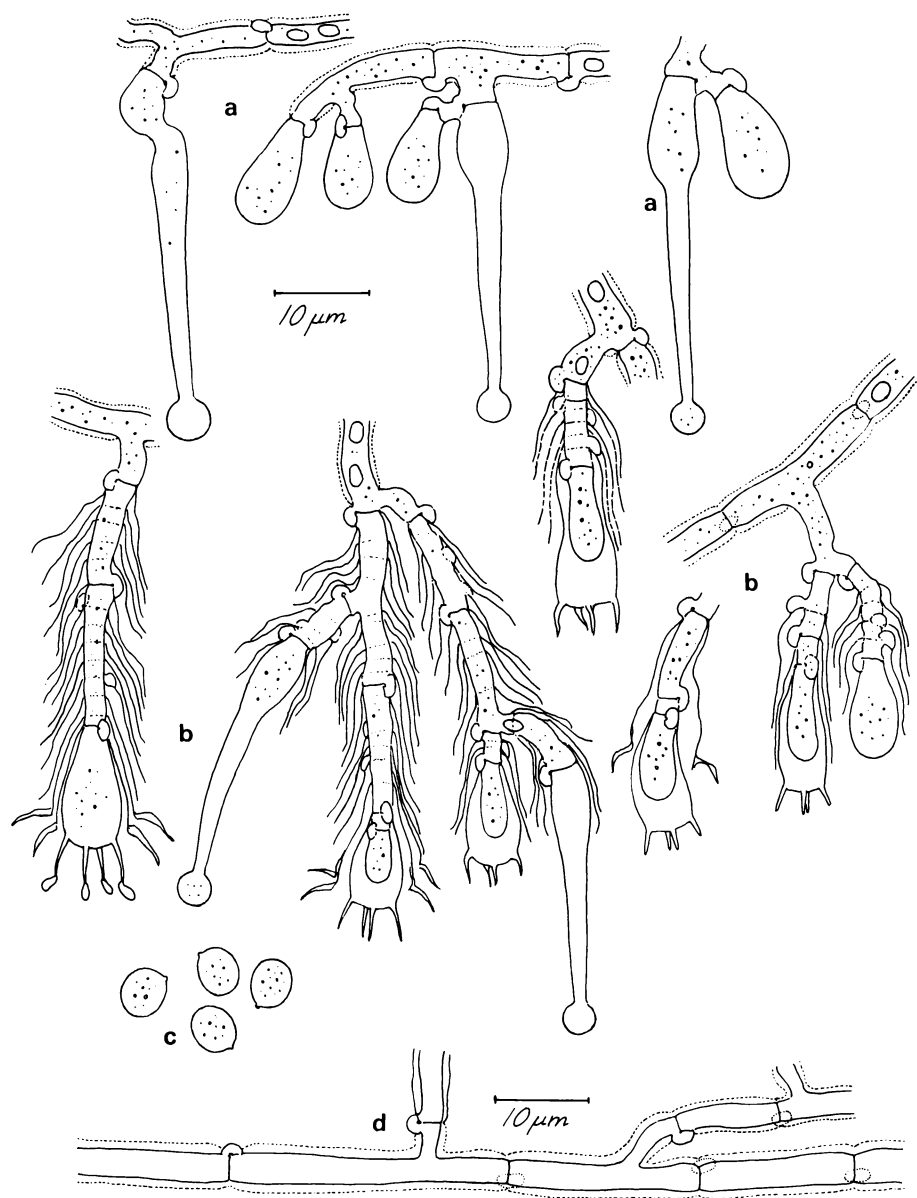


Fig. 646. *Repetobasidium vestitum*. a) cystidia b) basidium c) spores d) basal hyphae. — K.-H. Larsson 24871.

Repetobasidium

Basidia subglobose — pyriform, (8—)10–13 x (5—)7–8 μm , with 4 sterigmata and basal clamp.

Spores subglobose, 5–7 x 4.5–5.5 μm , smooth, thin-walled, non-amyloid, non-cyanophilous.

Habitat. On much decayed coniferous wood. Like other very thin corticioid fungi mostly found during wet conditions e.g. after rainy periods during summer or autumn.

Distribution. In N. Europe collected several times in Sweden (Västergötland, Dalsland, Värmland, Lule Lappmark) and a few times in Norway (Akershus, Hordaland, Nordland) and N. Finland. Outside the area collected in Germany, USSR, N. America. It is evidently the most frequent species of the genus.

Remarks. Easily recognized thanks to the nature of cystidia and to the shape of the spores. Close to *R. canadense*, which, however, has different spores.

7. *Repetobasidium vestitum* John Erikss. & Hjortst. n. sp.

Fig. 646

Repetobasidio mirifico affine, sed hyphis basalibus gelatinosis, 3–5 μm latis; cellulis subbasidialibus, membranis basidorum vestustorum perspicue vestitis; cystidia angustiora 30–45 x 4.5–5.5 μm , distincte capitata, capitibus distincte globosis, 4–5 μm latis; basidia 8–10(–13) x 5–6.5 μm ; sporae globosae — subglobosae, 4–5.5 μm in diam.

Holotype: I. Johansen & L. Ryvar den 17216 (O).

Fruitbody closely adnate, very thin, often hardly visible, watery gelatinous in the wet state, whitish or greyish when alive, when dried turning lurid yellowish; without differentiated margin.

Hyphal system monomitic; hyphae 3–5 μm wide, basal ones closely attached to the substrate, with more or less gelatinized hyphal walls (in KOH); hymenial branches reaching a length of 20–50 μm .

Cystidia capitate, 30–45 x 4.5–5.5 μm , with a round, clearly delimited head; no encrustation observed.

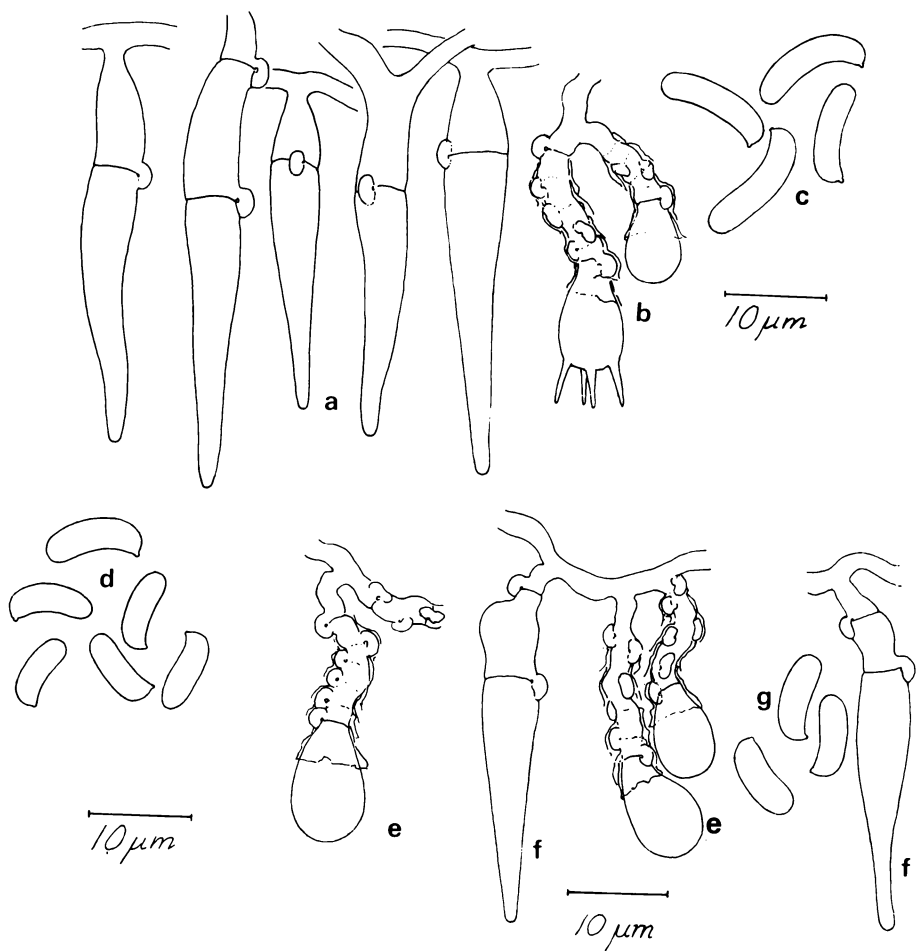


Fig. 647. *Repetobasidium vile*. a, f) cystidia b, e) basidia c, d, g) spores. — a-c) K.-H. Larsson 19371 d) J. Eriksson 3369 f, g, i) J. Eriksson 9082.

Repetobasidium

Basidia subglobose — pyriform, 8–10(–13) x 5–6.5 μm , with 4 sterigmata and basal clamp.

Spores subglobose — globose, 4–5.5 μm in diam., thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On much decayed, wet wood.

Specimens: Sweden: V. Tunhem par., Halleberg, Ovandalen, on hewn timber layer over a ditch in coniferous forest, 1978.08.26. K.H. Larsson 1947 (GB). — Finland: Kuusamo, Oulankajoki, on wood of *Pinus*, 1978.09.22. I. Johansen & L. Ryvarden 17216 (O). Holotype.

8. *Repetobasidium vile* (Bourd. & Galz.)

Fig. 647

John Erikss. Symb. bot. ups. 16 p. 67,
1958. - *Peniophora vilis* Bourd. & Galz.,
Hym. de France p. 282, 1928.

Lectotype: Galzin 13550 (PC).

Fruitbody very thin, effused, whitish — greyish and ceraceous in the living state, when dried hardly visible, under the lens porulose, not continuous; without differentiated margin.

Hyphal system monomitic; hyphae thin-walled, 2–3(–4) μm wide, spreading over the substrate, with short perpendicular basidial branches.

Cystidia 25–40 x 5–7(–10) μm , conical, thin-walled, not encrusted, with basal clamp.

Spores allantoid, 6–8(–12) x 2–3(–3.5) μm , thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decorticated, decayed wood of conifers. In Europe found a few times in France, Germany (Bayern), Sweden (Västergötland, Uppland, Jämtland), Denmark (Sjaelland), Norway (Akershus, Nordland); in addition in N. America.

Remarks. Easily recognized by the shape of cystidia and spores.

Resinicium Parm., *Consp. syst. cort.* p. 97, 1968.

Fruitbodies totally resupinate, closely adnate, effuse, whitish – greyish – yellowish; hymenium smooth, granular or odontoid – hydroid; margin pruinose, thinning out, not differentiated; hyal system monomitic, hyphae thin-walled, 2–3 μm wide, with clamps at all septa; cystidia (halocystidia) with an apical bladder, filled

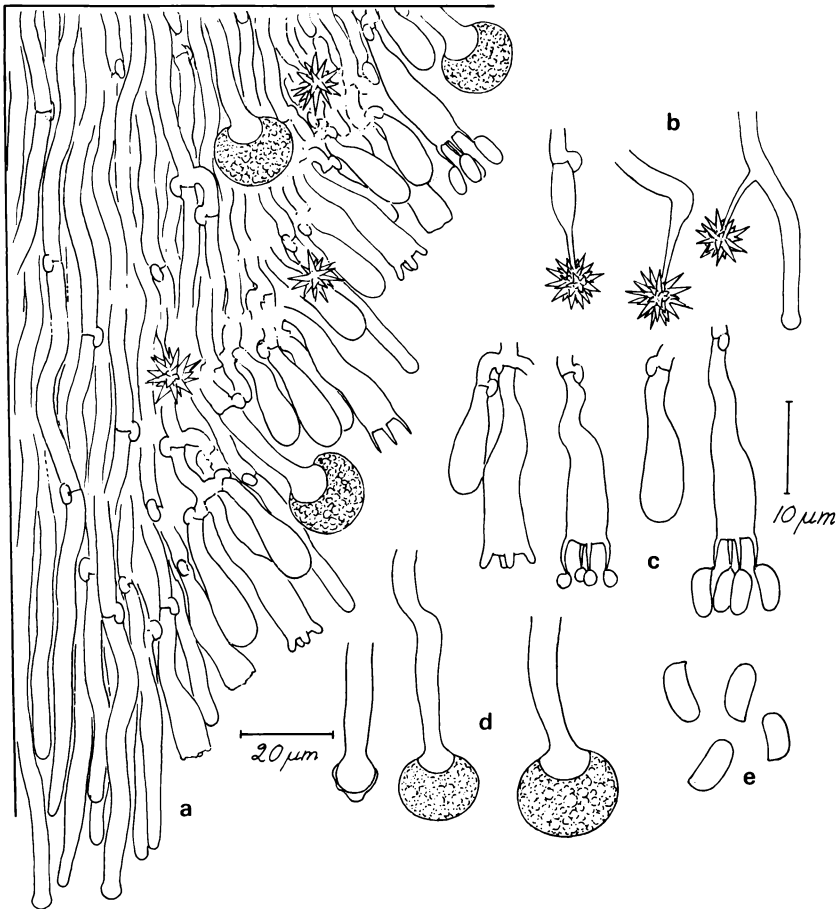


Fig. 648. *Resinicium bicolor*. a) section through part of hymenial tooth b) astero-cystidia c) basidia d) halocystidia e) spores. — Hjortstam 1530.

Resinicium

with a resinous or oily, granular or dropy substance; basidia clavate, with 4 sterigmata and basal clamp; spores narrowly ellipsoid, cylindrical or allantoid, thin-walled, smooth, not amyloid, not cyanophilous.

Type species: *Resinicium bicolor* (Fr.) Parm.

Remarks. The distinguishing characteristic is the presence of halocystidia, which normally are easily seen. In other respects the genus shows affinities to *Phlebia*, but the basidia are broader than they usually are in this genus. The 5 known species agree in all essential characteristics and the genus seems no doubt to be a natural one.

Three Nordic species:

- | | |
|--|--------------------------|
| 1. Numerous crystal stars (astrocystidia) in the fruitbody | 1. <i>R. bicolor</i> |
| 1. No crystal stars | 2 |
| 2. Hymenium smooth or finely granular | 2. <i>R. furfuraceum</i> |
| 2. Hymenium hydroid with cylindrical teeth | 3. <i>R. pinicola</i> |

Two further species, *R. chiricahuaensis* Gilb. & Bud. and *R. luteum* Jülich are also described.

1. **Resinicium bicolor** (Fr.) Parm. loc. cit.
 p. 98. - *Hydnum bicolor* Fr.
 Syst. myc. 1 p. 417, 1821. - *Odontia*
bicolor (Fr.) Quél., Ench. fung. p. 195,
 1886; Lund. & Nannf., F. exs. succ. n.
 162 a, b, 456, 1408; - *Hydnum subtile*
 Fr., Syst. mycol. 1 p. 425, 1821.

Fig. 648-49

Fruitbody resupinate, closely adnate, widely effused, thin, ceraceous in the living state, whitish or cream-coloured, sometimes with a red tint and rather often greenish from overgrown green algae, darkening with age and may turn brownish in patches; hymenium odontoid, usually with small, conical teeth, scattered or more crowded, in more vigorous fruitbodies the teeth may be bigger, giving the hymenium a more hydroid appearance; under the lens (50 x) the teeth often showing an apical tuft of sterile hyphae, in older specimens turning brown, esp. when touched; margin usually indeterminate and concolorous.

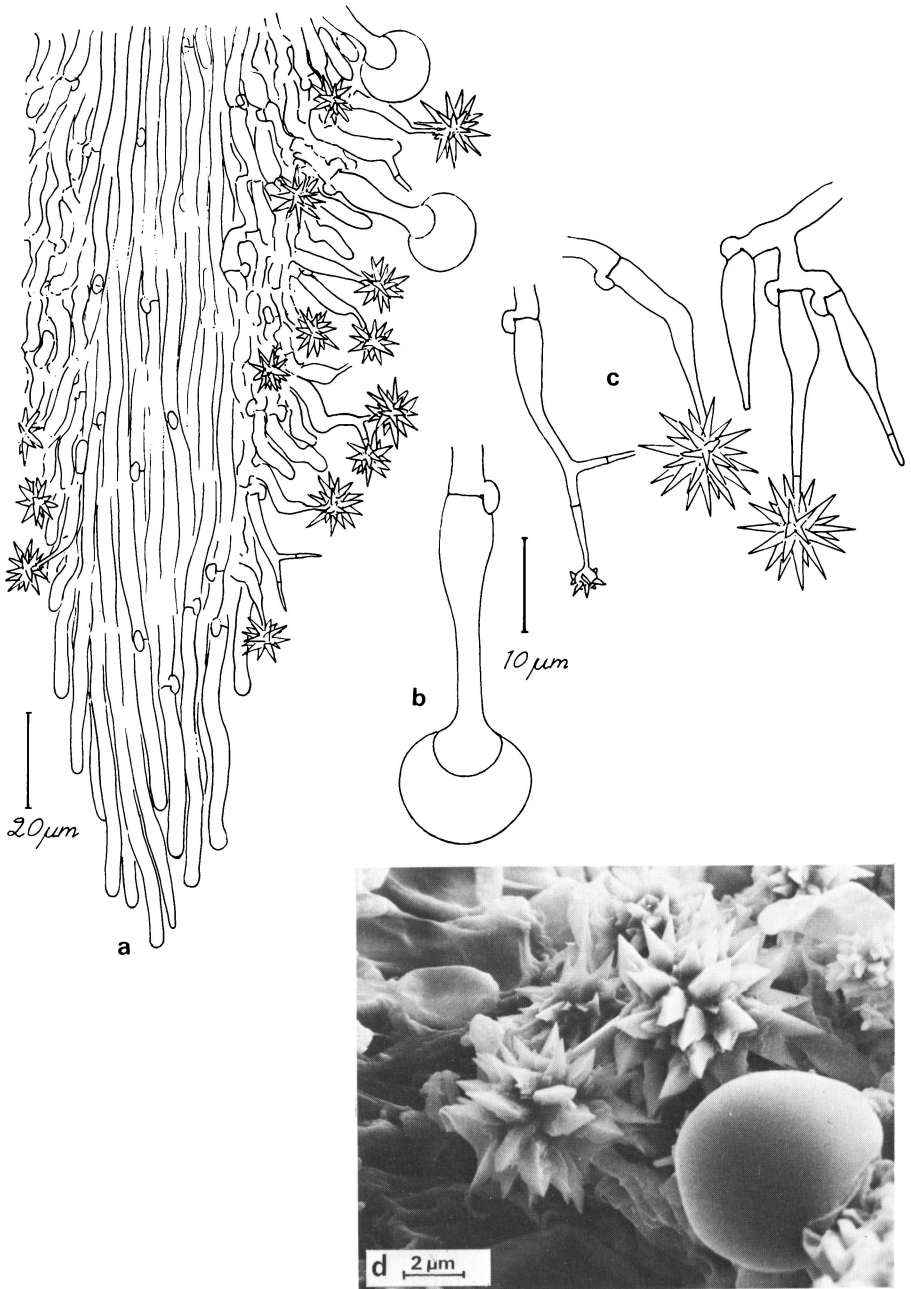


Fig. 649. *Resinicium bicolor*. a) section through part of hymenial tooth b) halocystidium c) astrocystidia in different stages. — Hjortstam 12347. d) part of hymenium with astrocystidia and one halocystidium. — Ryvarden 12151. SEM Ryvarden.

Resinicium

Hyphal system monomitic; hyphae 2–3 μm wide, thin-walled, fairly densely septate and with clamps at all septa in the centre of the teeth parallelly packed, joined by anastomoses, and continuing into the apical tuft of sterile hyphae; hyphae of the thin subiculum densely branched and intertwined.

Cystidia of two kinds, both as a rule numerous a) capitate cystidia with a distal, thin-walled bladder, 10–20 μm wide, containing resinous or oily grains or drops (halocystidia), and b) star-like cystidia, from hypha-ends narrowing into a peg, bearing a star-like cluster of crystals (astrocystidia). The halocystidia are formed by apically widened hypha-ends, which distally get a double wall, the outer layer of which inflates to a bladder, which thus apparently is not a real cell (with nuclei) but yet surrounded by a cell-wall. The astrocystidia start as a peg, which produces a small apical bladder. On this bladder the crystals are formed, radially arranged as a star, about 10 μm in diam..

Basidia when young clavate, 15–25 x 4–6 μm , with 4 sterigmata and basal clamp.

Spores oblong, 5.5–8 x 2.5–3.5 μm , adaxial side straight or slightly convex, thin-walled, smooth, non-amyloid, non-cyanophilous, usually without oil-drops.

Habitat. On corticate or more commonly decorticate wood, causing an intense white decay. It is frequent on coniferous wood but is not rare on deciduous wood either, and plays an important role as a wood-destroyer in humid forests.

Distribution. Occuring in all forested parts of N. Europe and is in most areas very frequent, though evidently less common in the northern-most part. Common on slash in lumbered forests.

Remarks. Easily recognized, generally already macroscopically. In N. Europe it has as a rule small hymenial teeth (aculei) but may under good conditions develop larger teeth, and may then be mistaken for other hydroid resupinates. This happens more often in the southern areas. Living cells of green algae are often seen in the basal layer of the fruitbodies, which thus get a greenish tint. The algae are evidently not damaged by the fungus. Whether there is a lichen-connection between the fungus and the algae, is unclear. See Oberwinkler in Deutsche Bot. Gesell. N. Folge 4:162, 1970 with further references.

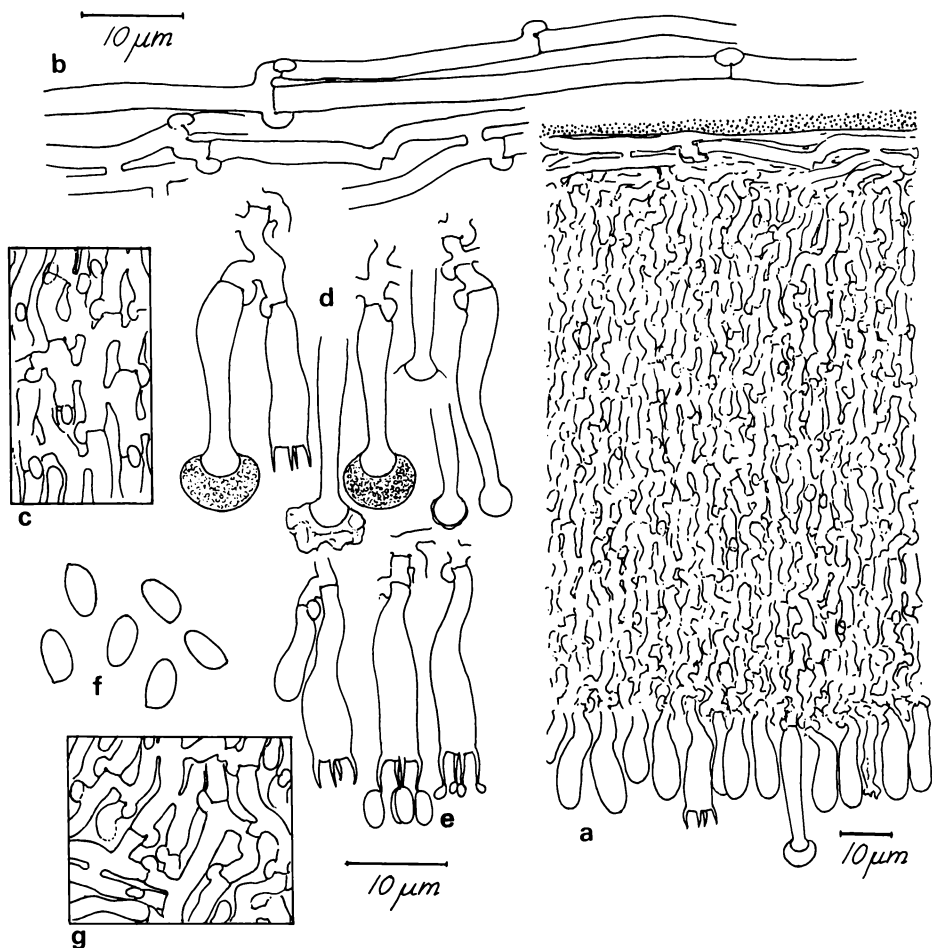


Fig. 650. *Resinicium furfuraceum*. a) section through fruitbody b) basal hyphae c) hymenial tissue, vertical section d) halocystidia in different stages e) basidia f) spores g) basal hyphae in horizontal section h) fruitbody, characteristically cracked through shrinking. — Hjortstam 12348.

Resinicium

2. **Resinicium furfuraceum** (Bres.) Parm., loc. cit. p. 98. - *Corticium furfuraceum* Bres., Mycologia 17 p. 69, 1925. - *Corticium subpallidulum* Litsch., Svensk bot. tidskr. 32 p. 284, 1938. - *Corticium grandinioides* Romell in herb.

Fig. 650

Fruitbody resupinate, closely adnate, thin, effuse, whitish, watery greyish or yellowish, ceraceous and continuous in the living state, when dried crustaceous and then becoming porulose and cracked into small pieces; hymenium smooth in young fruitbodies, more or less granular (grandinoid) in older ones; margin pruinose, not especially differentiated.

Hyphal system monomitic; hyphae thin-walled, 2–3 μ m wide, with clamps; subiculum consisting of a thin layer of richly branched hyphae; subhymenial hyphae mainly vertical, rather densely septate, with numerous anastomoses.

Cystidia (halocystidia) varying in number, sometimes difficult to find, in other cases numerous, nearly cylindrical or with widened base, thin-walled, capitate with the distal part (the "halo") filled with some oily or grainy matter. The "halo" seems to be formed so that the apical wall of the cystidium becomes double, the outer layer expanding to a rounded bladder.

Habitat. On decayed; mainly decorticate coniferous wood. It is one of the characteristic species in the dry lichen-pine heaths on sandy soil but occurs also in *Vaccinium* conifer forests of normal humidity.

Distribution. One of the most frequent Corticiaceae in Scandinavian conifer forests, even in the northernmost parts. It is, however, not reported from Denmark.

Remarks. Even if the halocystidia sometimes are few there should be no difficulty in recognizing this species. Specimens with a grandinoid hymenium were named by L. Romell *Corticium grandinioides* as a nomen nudum.

Maxwell (Can. J. Bot. 32:269, 1964) reports that *R. furfuraceum* produces tear-shaped conidia in culture. Such conidia have not been observed in the fruitbodies.

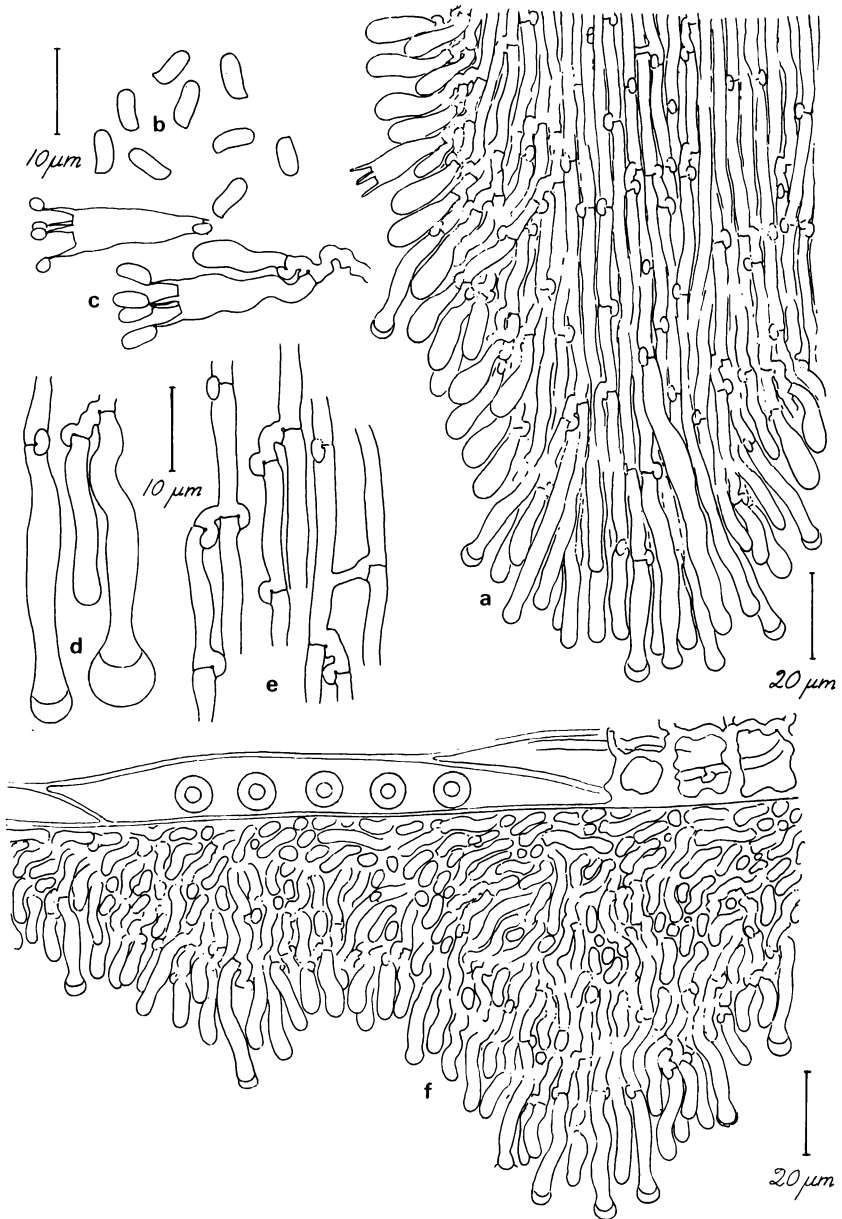


Fig. 651. *Resinicium pinicola*. a) section through hymenial tooth b) spores c) basidia d) halocystidia e) hyphae f) section through marginal part of fruitbody. — Hjortstam 15000.

Resinicium

3. *Resinicium pinicola* (John Erikss.) Erikss. & Hjortst. n. comb. - *Mycoacia pinicola* John Erikss., Sv. Bot. Tidskr. 43 p. 59, 1949.

Fig. 651

Holotype: Sweden, Halland, Ö. Karup par. Hemneslöv, on *Pinus mugo* 1946.09.18. John Eriksson 659 (UPS).

Fruitbody resupinate, closely adnate, consisting of a very thin subiculum with a pruinose, non-differentiated margin, and bearing dense teeth, 1–2 mm long, cylindrical with an apical tuft of projecting hyphae (lens); whole fungus ceraceous, when young subhyaline, watery greyish, with age darkening, eventually to brownish grey; dried young material mostly sordid yellow, old material brownish.

Hyphal system monomitic; hyphae 2–3 μm wide, with dense septa and clamps; in the teeth parallel, closely united by anastomoses into a dense tissue.

Cystidia (halocystidia) preferably in the apex of the teeth, 30–35 x 4–5 μm , "halo" 5–8 μm wide, thin-walled, filled with oily or grainy matter.

Basidia 15–18 x 4.5–5.5 μm , clavate, often somewhat sinuous or slightly constricted.

Spores 4–5(–6) x 2(–2.5) μm , cylindrical, almost straight, adaxial side straight or slightly concave, some spores with a somewhat concave adaxial side, thin-walled, smooth, non-amyloid, non-cyanophilous.

Habitat. On decayed, preferably decorticate wood of conifers, mainly on *Pinus sylvestris* and *P. mugo* but found also on *Picea*. All localities in Sweden hitherto known are situated very near the coast, with a humid climate but periodically dry and sunheated during the summer.

Distribution. Described from Sweden and there found from NW. Skåne (Hallands Väderö) in the S. to Bohuslän (Hakenäset) in the N. There are several collections from S. Halland, in pine forest planted on old sanddunes, one collection from N. Halland (Tjölöholm). From the E. coast of Sweden it is so far collected only once, viz. in Öland (Dörby forest, K. Hauerslev).

Outside Sweden it is found in the Soviet and in NE Poland (Mazury, S. Domanski) and Germany. *R. pinicola* will probably be found in many pine-forests in C and W Europe. Its southern distribution in Sweden, very near the coast, indicates that it is adapted to a warmer climate than that of the Nordic area.

Remarks. The species was described as a member of *Mycoacia*. The detection of the halocystidia in this species and the establishment of *Resinicium* has made it necessary to transfer it to this genus. It is well separated from the two other Nordic species, but is close to *R. chiri-cahuensis* Gilb. & Bud., Mycologia 62 p. 675, 1970. The latter is found on conifers in N. America and differs from *R. pinicola* in having whiter fruitbodies with a thicker subiculum and allantoid spores. A specimen collected near Gr. Slave Lake in Canada (Eriksson & Baranyay 7313) has such spores and is evidently this species even if it is thinner and therefore to the eye looks more like *R. pinicola*.

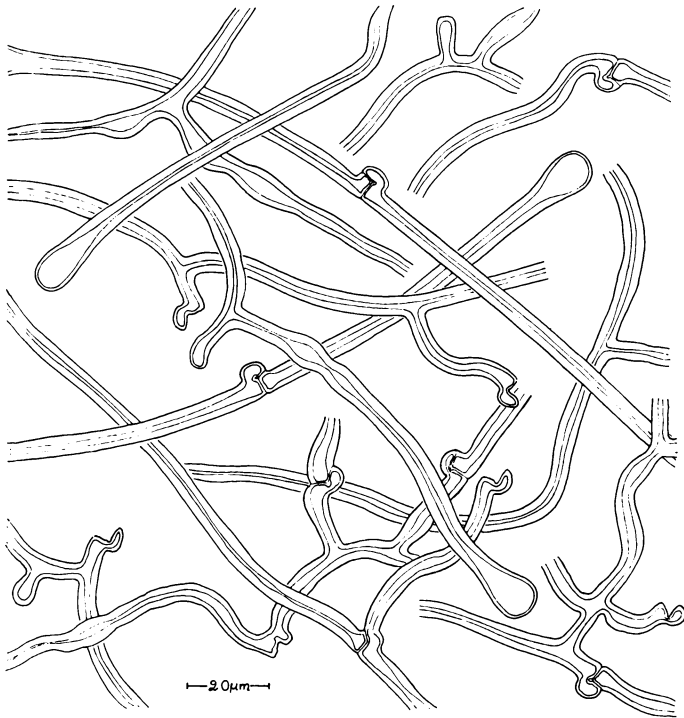


Fig. 652. *Sarcodontia crocea*. — Context hyphae. — B. & J. Eriksson 7110.

Sarcodontia

Sarcodontia Schulzer in Schulzer, Kanitz et Knapp, Verh. Zool.-bot. Ges. Wien 16 p. 41, 1866; Donk, Mycologia 44 p. 262-263, 1952. — *Oxyodontia* I.W. Miller, Mycologia 25 p. 294, 1933.

Type species of *Sarcodontia*: *S. mali* Schulzer of *Oxyodontia*: *Hydnum setosum* Pers.

Fruitbody resupinate or on vertical substrate forming nodes with fertile undersides; hymenophore of long, conical aculei; the whole fungus (incl. sterile mycelium) from the beginning yellow; hymenophore in the living state ceraceous, when dried rather hard; hyphal system monomitic, all hyphae with clamps, generative hyphae thin-walled, subicular hyphae very thick-walled; no cystidia; basidia clavate, often sinuous or constricted, with 4 ster.; spores ellipsoid — subglobose, ab. 5 μm long, with thickened walls, not amyloid, not cyanophilous.

Remarks. *Sarcodontia* agrees in some respects with *Radulodon* (shape of basidia and spores, presence of clamps, thickness of spore wall) but differs in the nature of the subicular hyphae and in the presence of yellow pigment. This does not turn red in KOH as it does in e.g. *Mycoacia uda*. The genus was by Nikolajeva (1961 p. 174-) joined with *Mycoacia*, but from this genus it is well distinguished, e.g. by the nature of the basal hyphae and by the thickened spore wall. Thus, *Sarcodontia* seems to be monotypic.

The term monomitic does literally mean one kind of hyphae, which is not in the case of *Sarcodontia* as there are really two kinds, the thin-walled and the thick-walled ones. It is, however, not dimitic in the original sense. The terminology does not always cover the reality as to the nature of the hyphae.

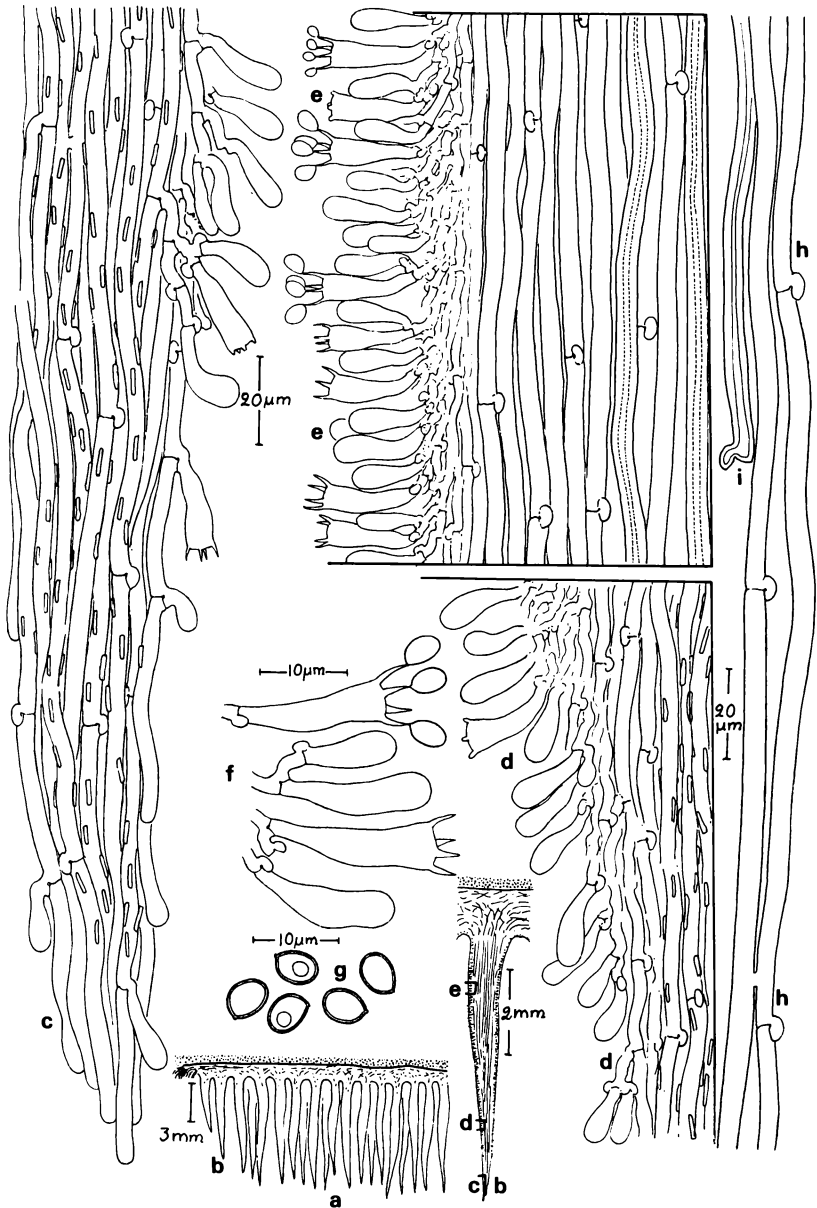


Fig. 653. *Sarcodontia crocea*. a) schematic section through fruitbody with position of b b) hymenial tooth with position of c, d, e c) apical part of hymenial tooth d, e) parts of hymenium, subhymenium and context f) basidia g) spores h) thin-walled hyphae i) part of thick-walled hyphae. — B. & J. Eriksson 7110.

Sarcodontia

Fig. 652-53

Sarcodontia crocea (Fr.) Kotlaba,

Česká mykol. 7 p. 117, 1953. Preslia 26 p. 183, 1954.

— *Hydnum croceum* Fr., Elench. fung. p. 137, 1828.— *Hydnum setosum* Pers., Myc. eur. 2 p. 213, 1825.— *Sarcodontia mali* Schulzer loc. cit.

For other synonyms, see Nikolajeva 1961 p. 176.

Type material not seen. Schweinitz evidently sent material to E. Fries, but there is nothing left in herb. Uppsala. A neotypification seems necessary.

Fruitbody adnate, totally resupinate or on vertical substrate nodulose, effuse or pulvinate, ceraceous — carneous in the living state, when dried firm, hymenophore hydroid with 5 — 15(— 20) mm long, dense, conical aculei, tapering to an acute apex; margin varying, partly thickened and velutinous, but mostly continuing into a sterile mycelium which may be abundantly developed; the sterile part and the young hymenophore yellow, but the aculei turning into a reddish colour, on drying darkening to chamois or dirty brown; subiculum white in sections, varying in thickness, often 0.2 — 0.5 mm but sometimes more.

Hyphal system monomitic, all hyphae provided with clamps, hyaline in the microscope, not amyloid, not cyanophilous; generative hyphae thin-walled, 2 — 3.5 μm wide, richly branched in the subhymenium; hyphae of the subiculum thick-walled, 3 — 5 μm wide, richly branched, in the apical end often clavately widened; hyphae in the central part of the aculei parallel, sparsely septated and branched, some of them thick-walled.

Cystidia none.

Basidia 18 — 25(— 40) \times 4 — 5 μm , clavate, often slightly sinuous or constricted, with 4 sterigmata and basal clamp.

Spores 5 — 6 \times 3.5 — 4(— 4.5) μm , broadly ellipsoid — subglobose, smooth, hyaline, with somewhat thickened walls, usually with 1 oil-drop.

Habitat. In N. Europe found only on cultivated *Malus*, but in continental Europe also on other deciduous trees, e.g. *Pyrus*, *Prunus*, *Sorbus*, *Fraxinus*. Known as serious parasite on old apple-trees. Kotlaba (loc.cit.)

gave a detailed description of its occurrence in Czechoslovakia, where it is quite common, with special attention paid to its parasitic behaviour.

Distribution. In N. Europe found only in Gotland (Sweden) from where there are a few old collections (e.g. one from 1902 by Maria Romell). Christiansen does not report it from Denmark. More frequent in N. America, i.a. on *Acer* (Ontario, J. Eriksson).

Its habitat in Europe is as a rule pruned apple-trees in orchards and gardens and it is therefore not easily observed by mycologists in the field. It is also possible that it no longer belongs to the Nordic flora. According to Kotlaba it is transmitted not so much by spores as by fragments of mycelium, infected wood, tools a.s.o.

Remarks. Conspicuous, easily distinguished species. It is usually not placed in Corticiaceae as the long aculei indicate a place among strictly hydroid fungi. Microscopically it shows, however, clear affinities to members of Corticiaceae.

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