The Corticiaceae of North Europe

By

Kurt Hjortstam, Karl-Henrik Larsson and Leif Ryvarden

with drawings by

John Eriksson

Volume 8

Phlebiella

Thanatephorus – Ypsilonidium

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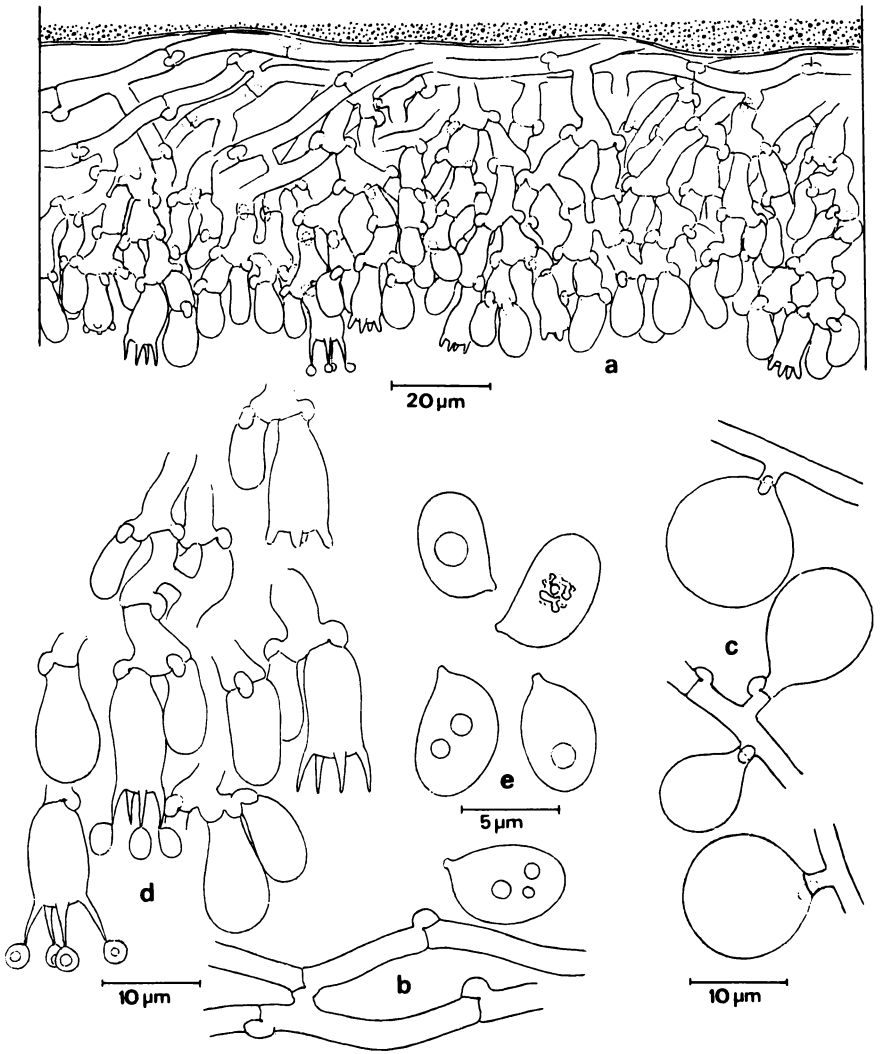


Fig. 767. *Brevicellicium exile* a) section through fruitbody, b) basal hyphae c) sphaerocysts, d) basidia, e) spores.–Coll. Larsson 5912

Brevicellicium Larss. & Hjortst.
Mycotaxon 7:117, 1978.

Fruitbodies resupinate, adnate, thin to moderately thick (0.1–0.2 mm), membranous, ceraceous, when dried somewhat brittle, smooth to granulose; hyphal system monomitic, basal hyphae straight and of more or less uniform width, without ampullate swellings at the septa, other hyphae somewhat dilated at the septa, especially in the subhymenium where the hyphae are distinctly isodiametric, all hyphae hyaline and with clamps; cystidia absent, but sometimes with smooth, subglobose cells (sphaerocysts), arising from the basal hyphae; basidia at first rounded, then short-cylindrical, slightly constricted, normally with four sterigmata, with a basal clamp; spores subglobose to ellipsoid, often lacrimiform, with a distinct apiculus, indextrinoid, inamyloid, acyanophilous.

Type species: *Corticium exile* Jacks.

Remarks. Although *Brevicellicium* shares many characteristics with *Trechispora* there are several features which should be stressed e.g. the less pronounced fragility of the fruitbody, the morphology of spores and lack of ampullate hyphae.
Two species in Northern Europe.

Key to species

1. Hymenium grandinioid, spores subglobose and somewhat asymmetric ..... **2. B. olivascens**
1. Hymenium more or less smooth, spores short-ellipsoid, without asymmetric appearance ..... **1. B. exile**

1. Brevicellicium exile (Jacks.) Larss. & Hjortst. Fig. 767
Mycotaxon 7:118, 1978 — *Corticium exile* Jacks., Can J. Res., C, 28:721, 1950.

Fruitbody resupinate, effused, thin, smooth or slightly colliculose in some specimens, whitish to creamy or in the herbarium pale ochraceous, margin indeterminable.
Hyphal system monomitic, basal hyphae straight and tolerably uniform, thin-walled or with slight wall thickening, 2.5–3.5 μm wide, subhymenial hyphae broader, always distinctly isodiametric and often 8–10 μm in diam., all hyphae with clamps.

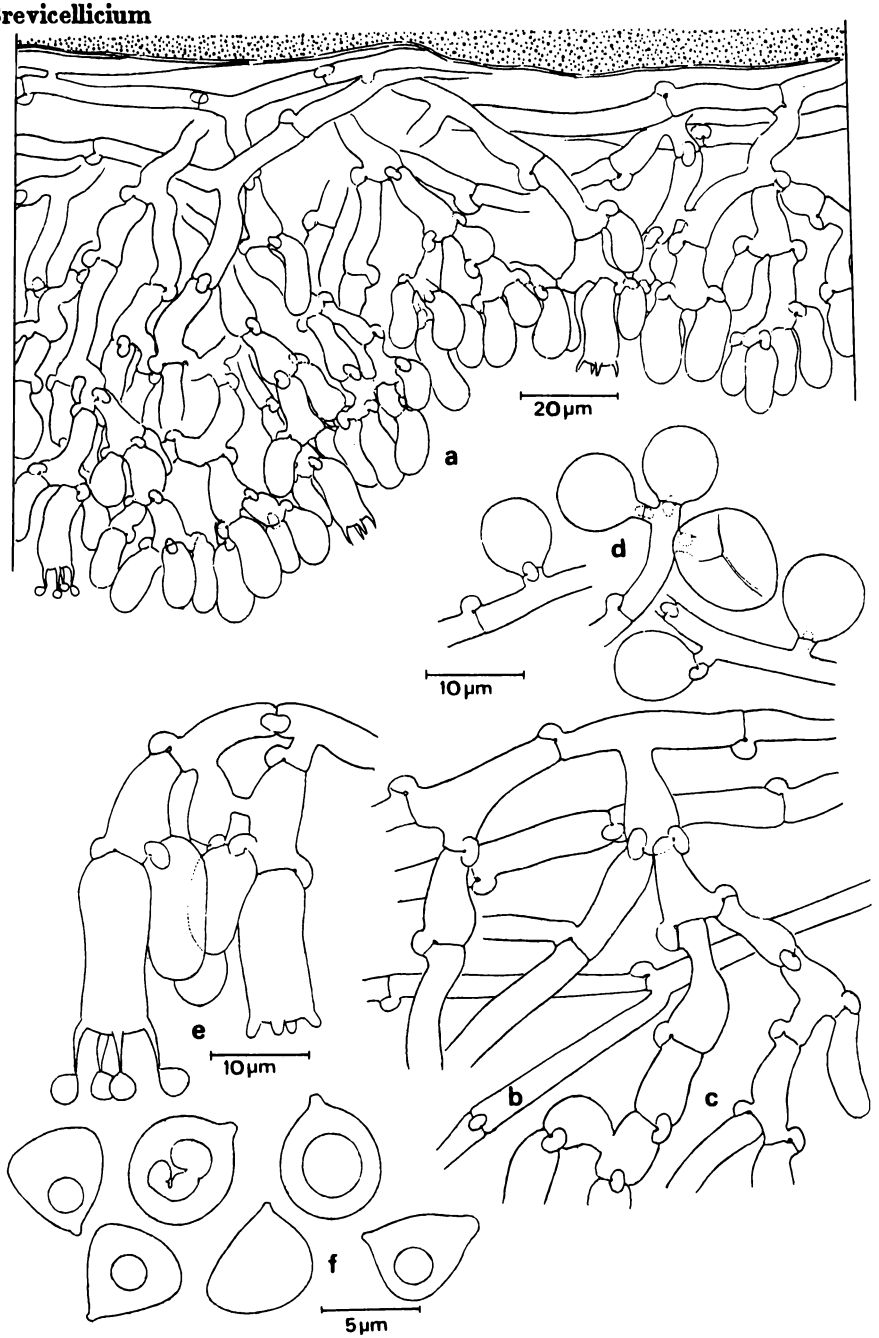


Fig. 768. *Brevicellicium olivascens* a) section through fruitbody, b) basal hyphae, c) subhymenial hyphae, d) sphaerocysts, e) basidia, f) spores.–Coll. T. Hallingbäck 30389

Cystidia absent, but now and then with subglobose cells on the basal hyphae, 5–15 μm in diam.
Basidia short-cylindrical, 12–15×5–7 μm, with four sterigmata and a basal clamp.
Spores often few in the collections, short-ellipsoid, smooth, thin-walled, hyaline, with small oil-drops in the protoplasm, 5–5.5(–6)× (2.5–)3–3.5(–4) μm.
Habitat and distribution. Not a well known species and the material is often scarce or somewhat undeveloped with few spores. Apparently rare and mostly found on well decorticated, deciduous wood, once on *Juniperus* and once on *Picea*. In Sweden known from Bohuslän, Västergötland, and Uppland. In Norway from Hedmark, Sør-Trøndelag and Finnmark, in Finland from Ostrobottnia, and in Denmark from Sjaelland.
Remarks. *B. exile* resembles the better known *B. olivascens* as to its hyphae and basidia, but seems to be rather well separated by its smoother hymenium and short-ellipsoid spores without asymmetric appearance.

2. Brevicellicium olivascens (Bres.) Larss. & Hjortst. Fig. 768
Mycotaxon 7:119, 1978 — *Odontia olivascens* Bres., Fung. trid. 2:36, 1892.

Fruitbody resupinate, effused, rather closely adnate, thin to moderately thick, ceraceous and when dried almost membranous, under a lens grandinioid with warts often up to 5–7 per mm, creamy to yellowish-cream, often sulphur-yellow or at least with a more bright yellow tint, aculei subglobose, smooth or at the apex finely penicillate.
Hyphal system monomitic, basal hyphae straight and rather uniform in width, thin-walled or with slight wall thickening, 3–3.5(–4) μm wide, subhymenial hyphae broader and short-celled, isodiametric, 5–10 μm wide, all hyphae with clamps.
Cystidia absent, but as in the preceding species sometimes with subglobose cells, mainly occurring on the basal hyphae, 5–15 μm in diam.
Basidia at first rounded, then short-cylindrical, 12–20 μm long and as much as 7 μm wide near the apex, slightly constricted, with four sterigmata and a basal clamp.
Spores subglobose, asymmetrical and with a rhomboid appearance, smooth, thin-walled, hyaline, with one or several oildrops in the protoplasm, about 5 μm across.

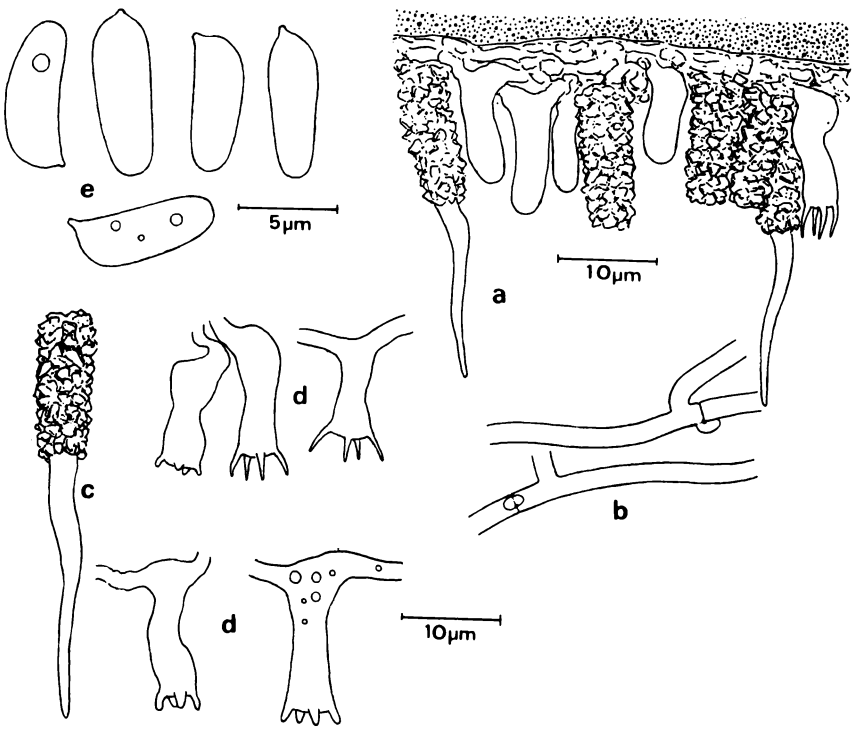


Fig. 769. *Lepidomyces subcalceus* a) section through fruitbody, b) hyphae c) cystidia, d) basidia, e) spores.–Coll. Woldmar

Habitat and distribution. On deciduous wood and preferably from the southern part of Scandinavia where it is a rather common species, more rarely in the alpine forest with *Betula* and *Salix*.
Remarks. The granular fruitbody, short-cylindrical basidia, and spores with an asymmetrical appearance will be sufficient for a reliable determination, *B. viridulum* (Parm.) Larss. & Hjortst. l.c. p. 120, is here treated merely as a colour form of *B. olivascens*. It can not be separated by micromorphological criteria and does not merit a treatment as a separate taxon.

Lepidomyces Jülich
Persoonia 10:329, 1979.

Fruitbodies resupinate, effuse, closely adnate, thin; hymenium smooth or under a lens with a slight pilose appearance due to the projecting cystidia; hyphal system monomitic, subiculum very thin to almost lacking with a few thin-walled, hyaline, mostly straight and parallel hyphae of uniform width next to the substratum, clamps present although difficult to discern, subhymenial hyphae closely packed into a dense tissue; cystidia arising from the subicular hyphae, as a rule numerous, subulate, thin-walled, basally strongly encrusted with crystalline matter; basidia mostly pleural, with a median constriction and four sterigmata, a basal clamp probably occurs but not with certainity observed; spores ellipsoid to subcylindrical, adaxial side concave, thin-walled, smooth, inamyloid, acyanophilous and indextrinoid.

Type species: *Peniophora subcalcea* Litsch.

Remarks. The genus is so far monotypic and characterized by its strongly encrusted cystidia and fairly small basidia, which often have a lateral origin. It should be noted that clamps were not mentioned in the protologue by Litschauer and not figured. Oberwinkler (1965) treated the species in *Xenasma* but owing to the above separating characteristics gave it a subgenus of its own *(Xenophlebia)*.
The holotype of *Peniophora subcalcea* (14.IX.1930, No.100, Herb. Mus. Hist. Natur. Vindob. 11110) is a relatively large and good developed specimen.

Lepidomyces subcalceus (Litsch.) Jülich Fig. 769
Persoonia 10:330, 1979. — *Peniophora subcalcea* Litsch., Österr. Bot. Zeitschr. 88:119, 1939.

Fruitbody closely attached to the substratum and as a rule very small and somewhat inconspicuous, in living stage almost ceraceous, when dried somewhat gelatinized and fairly hard, in colour white or with greyish tint.
Hyphal system monomitic; basal hyphae thin-walled, smooth or with very slight encrustations, 1.5–2.5 μm wide, hyaline and with more or less gelatinized walls swelling slightly in KOH, subhymenial hyphae as a rule horizontal with shorter cells, apparently with clamps.
Cystidia numerous and very conspicuous, basally commonly lateral and heavily encrusted, towards the acute apex smooth, thin-walled, about 30–50 μmlong and projecting above the basidia as much as 10–30 μm.
Basidia mostly pleural, constricted in the middle part, 10–15(–20)× 3.5–4 μm, with 4 sterigmata.
Spores subcylindrical and often with an allantoid appearance, about 6–7.5(–9)×2(–2.5) μm.
Habitat and distribution. On both coniferous and deciduous wood of various kinds and a very rare species though apparently over-looked due to its inconspicuosity. Found in Denmark, eastern Norway, and in the central part of Sweden.
Remarks. The species is easily recognized by its encrusted cystidia, small pleural basidia, and spores with an allantoid appearance.

Phlebiella Karst.
Hedwigia 29:271, 1890 — *Aphanobasidium* Jülich, Persoonia 10:326, 1979 — *Xenasmatella* Oberw., Ann. mycol. II 19:28, 1965.

Fruitbodies generally resupinate, effuse, closely adnate, smooth, ceraceous to phlebioid or subgelatinous, sometimes composed of more or less confluent hyphal threads or cordons which are anastomosing and branching in a free manner, in colour variable from whitish, greyish blue to ochraceous or even umber-brown, margin abrupt to strongly fibrillose with often radially growing filaments; hyphal system monomitic, hyphae generally with clamps, more rarely clampless and then with basidia not typically pleural, thin to moderately thick-walled, usually embedded in an interhyphal, gelatinous substance, intermingled, straight or irregularly inflated; cystidia lacking in most species, if present then relatively small, more or less basidia-like and thin-walled; basidia usually short-cylindric, pleural, with four sterigmata, with, or in species with clampless hyphae, without a basal clamp; spores relatively small to medium-sized, thin or with slightly thickened walls, smooth or rough, sometimes lacking warts on the adaxial side, subglobose, ellipsoid,

cylindrical or subfusiform, inamyloid or amyloid but without dextrinoid or cyanophilous reactions.

Type species: *Phlebia vaga* Fr.

Remarks. Oberwinkler (1977) restricted *Phlebiella* to some species with warted spores and left the question where to place the rest of the genus *Xenasmatella* unsolved. Our concept of the genus equals that of *Xenasmatella* by Oberwinkler (1965) with the addition of the *Phlebia vaga* group. For further information see Hjortstam & Larsson (1987). We find it convenient to divide *Phlebiella* in three subgenera.
Subgenus **Phlebiella:** *ardosiaca, borealis, californica, christiansenii, fibrillosa, inopinata, insperata, romellii, subflavidogrisea, tulasnelloidea, vaga.* — Subg. **Aphanobasidium:** *aurora, filicina, gaspesica, pseudotsugae, subnitens.* — Subg. **Amyloxenasma:** *allantospora, grisella, lloydii, ralla.*

Key to species

1. Spores smooth **2**
1. Spores rough **7**
2. Spores amyloid **3**
2. Spores inamyloid **5**
3. Basidia with walls strongly encrusted by brownish to olive granules. Only observable in Melzer and in Cotton blue ..... **9. P. lloydii**
3. Basidia with walls smooth **4**
4. Spores allantoid, 4.5–6×1.8–2 μm ..... **1. P. allantospora**
4. Spores short-allantoid to subreniform, 5–6×2.5–3 μm. (Compare *P. ralla* which has spores 5.5–6.5×(2.5-)3–3.5 μm) . **7. P. grisella**
5. Hyphae without clamps, on ferns. (Compare *P. aurora* with larger spores) ..... **5. P. filicina**
5. Hyphae with clamps **6**
6. Spores thin-walled, narrowly ellipsoid to subfusiform, 7–9×2–2.2 μm, basidia small, 7–11 μm long. In Northern Europe on ferns and herbs ..... **6. P. gaspesica**
6. Spores with somewhat thickened walls, fusiform to subamygdaliform, 6–8×3.5–4.5 μm, basidia larger, 20–25 μm long. Usually on wood. (Compare *P. subnitens* with spores thin-walled and broadest towards the apex) ..... **10. P. pseudotsugae**
7. Fruitbodies more or less brittle and fragile, usually with branches and anastomosing threads **8**
7. Fruitbodies as a rule ceraceous, rather hard, with or without branched threads **10**

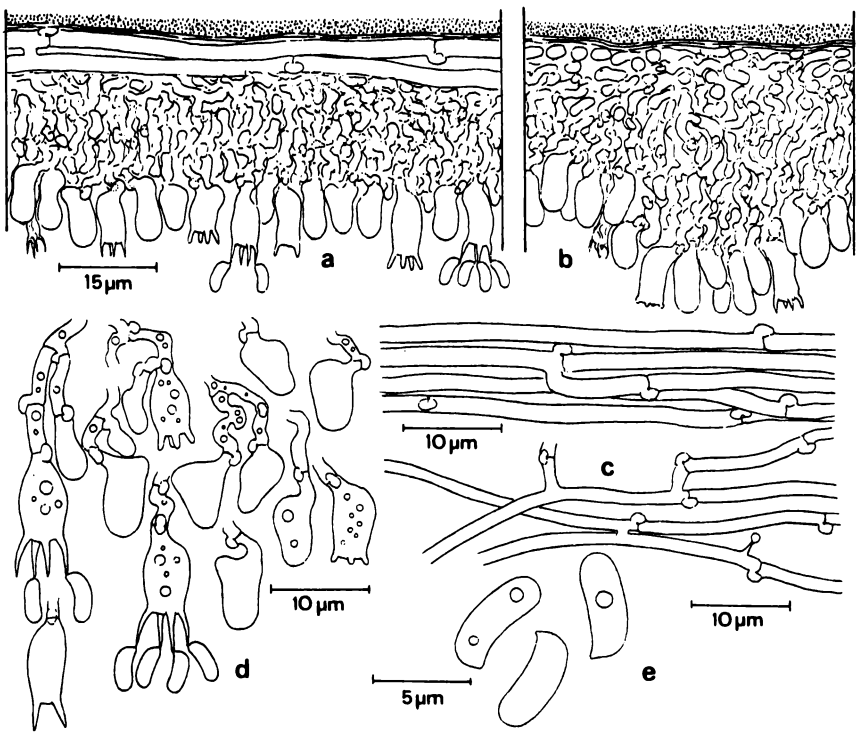


Fig. 770. *Phlebiella allantospora* a) radial section through fruitbody, b) tangential section through fruitbody, c)basal hyphae, d) basidia, e) spores. -Coll. Hjortstam 8953

8. Hymenium umber-brown to honey-coloured, usually overrun with branching threads, reddish when treated with KOH . **14. P. vaga**
8. Differently coloured, not reddish when treated with KOH **9**
9. Spores 6–7 μm long, warted throughout .... **3. P. christiansenii**
9. Spores 4–4.5 μm long, adaxial side with few warts or smooth .... **4. P. fibrillosa**
10. Spores with a distinct suprahilar depression, subglobose to ellipsoid. (Compare *P. ardosiaca* with nearly globose spores and without a distinct suprahilar depression) ..... **13. P. tulasnelloidea**
10. Spores subglobose to ellipsoid or narrowly ellipsoid, without a distinct suprahilar depression **11**
11. Spores small, 3.5–4.5 μm long, ventrally smooth or nearly so, hymenial surface often with branched threads, turning reddish-brown when treated with KOH ..... **12. P. subflavidogrisea**
11. Spores larger, hymenial surface differently shaped, unchanged when treated with KOH **12**
12. Spores ventrally smooth near the apiculus ..... **11. P. romellii**
12. Spores warted throughout **13**
13. Spores narrowly ellipsoid, 5–6×2.8–3.2 μm. (Compare *P. californica* with larger spores, 5.5–7×3–4 μm) ..... **8. P. insperata**
13. Spores ellipsoid, 5–6×3–3.5 μm ..... **2. P. borealis**

1. Phlebiella allantospora (Oberw.) Larss. & Hjortst. Fig. 770
Mycotaxon 29:318, 1987 — *Xenasmatella allantospora* Oberw., Ann. Mycol. Ser. II 19:37, 1965.

This species is very similar to *P. grisella* and has nearly the same micromorphology but often a more olivaceous colour of the fruitbody. The only reliable separating character is the spores being more typically allantoid measuring 4.5–6×1.8–2(–2.5) μm. See further under *P. grisella.*

Habitat and distribution. On decorticated coniferous as well as on deciduous wood. Seems to be a southern species in North Europe and considerably rarer than *P. grisella.* Found scattered in Denmark, Norway (mainly in the Oslo region up to Hedmark) and in South-west Sweden where it is locally as frequent as *P. grisella.*

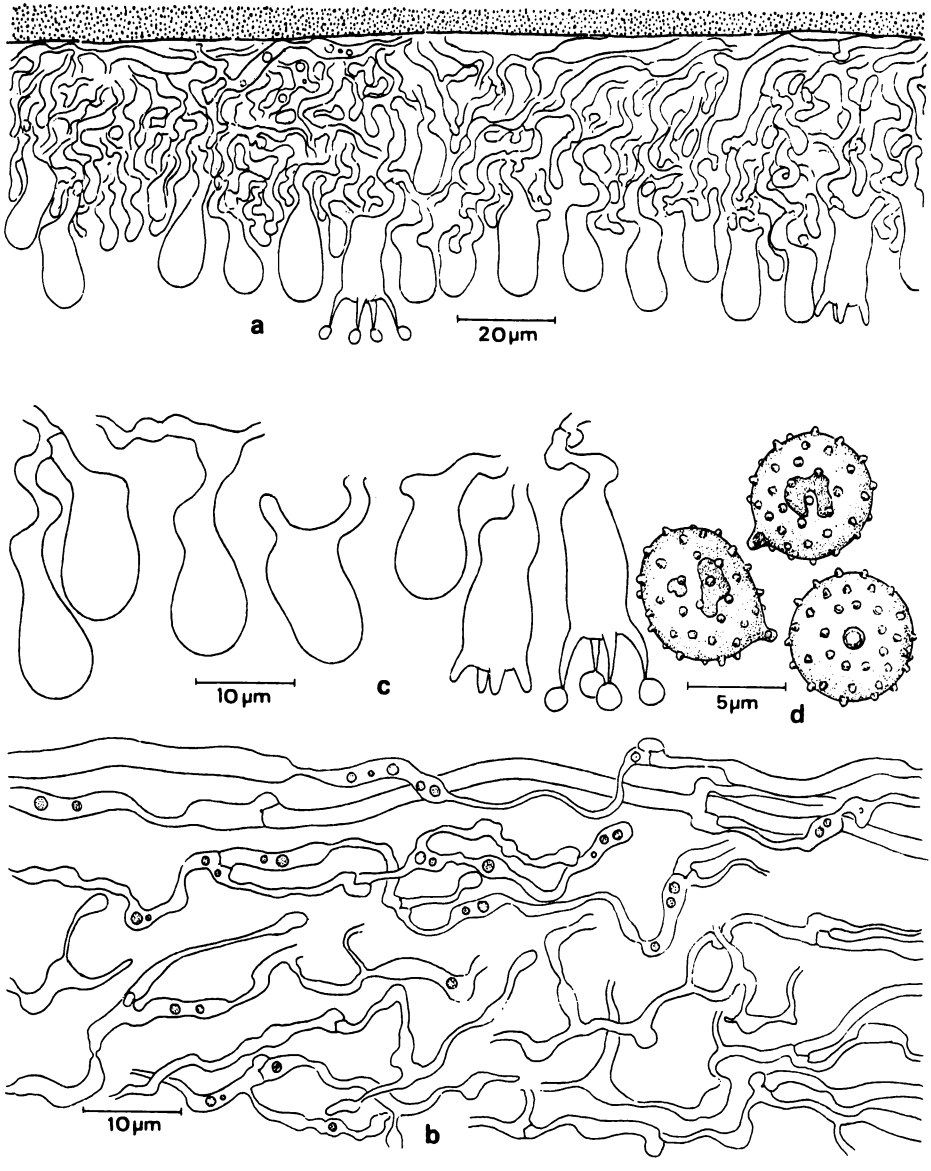


Fig. 771. *Phlebiella ardosiaca* a) section through fruitbody, b)hyphae, c) basidia, d) spores. –Coll. Hallenberg & Larsson 1899

Phlebiella ardosiaca (Bourd. & Galz.) Larss. & Hjortst. Fig. 771
Mycotaxon 29:316, 1987 — *Corticium ardosiacum* Bourd. & Galz.. Hym. de France p. 234, 1928.

Remarks. Not found in North Europe but well known from other parts of Europe, e.g. Czechoslovakia, France, and Spain. The same species was described as *Xenasmatella decipiens* Hjortst. & Ryv. (1979) and seems to be very close to the North-American species *P. inopinata* (Jacks.) Larss. & Hjortst. For further discussion see Hjortst. & Ryv. loc. cit. Also *P. tulasnelloidea* is somewhat similar but readily separated by differently shaped spores.

Phlebiella aurora (Berk. & Br.) Larss. & Hjortst.
Mycotaxon 29:317, 1987 — *Corticium aurora* Berk. & Br., Outl. Br. fungology p. 276, 1860.

Remarks. Not known from Northern Europe and probably never recollected. The original diagnosis is very short and contains only a description of the fruitbody. There is however an authentic specimen at Kew, on *Carex paniculata,* Batheaston, Dec. 2. 1851. The material is rather good but scanty. It shows a fungus without clamps, with spores that are 11 x 5 μm, thin-walled, ellipsoid and with the ventral side distinctly convex. Seemingly there are thin-walled cystidia with light-refracting contents, narrower than the fairly large basidia but only a few could be observed. The fungus is well illustrated by Oberwinkler (1965). Bourdot and Galzin (1928) reported this species from France, but both the description and figure and the specimens in the Paris herbarium show another species than the one described by Berkeley and Broome. The spores are considerably larger, up to 15 μm long or even more, they are sligthly allantoid and tapering conspicuously towards the apiculus. Also the basidia are larger but it shares with *aurora* the occurrence of cystidia. So far we have no name for this taxon.

2. Phlebiella borealis Larss. & Hjortst. Fig. 772
Mycotaxon 29:316, 1987 — *Corticium tenuiculum* Litsch., Ann. Mycol. 39:130, 1941 auct. mult. non s. str. i. e. *Trechispora* !

Fruitbody resupinate, effuse, at first somewhat arachnoid or byssoid with anastomosing hyphal strands, then continuous, more or less ceraceous, fairly thin but cracking conspicuously when dried, whitish to greyish or pale ochraceous, margin thinning out, not differentiated.

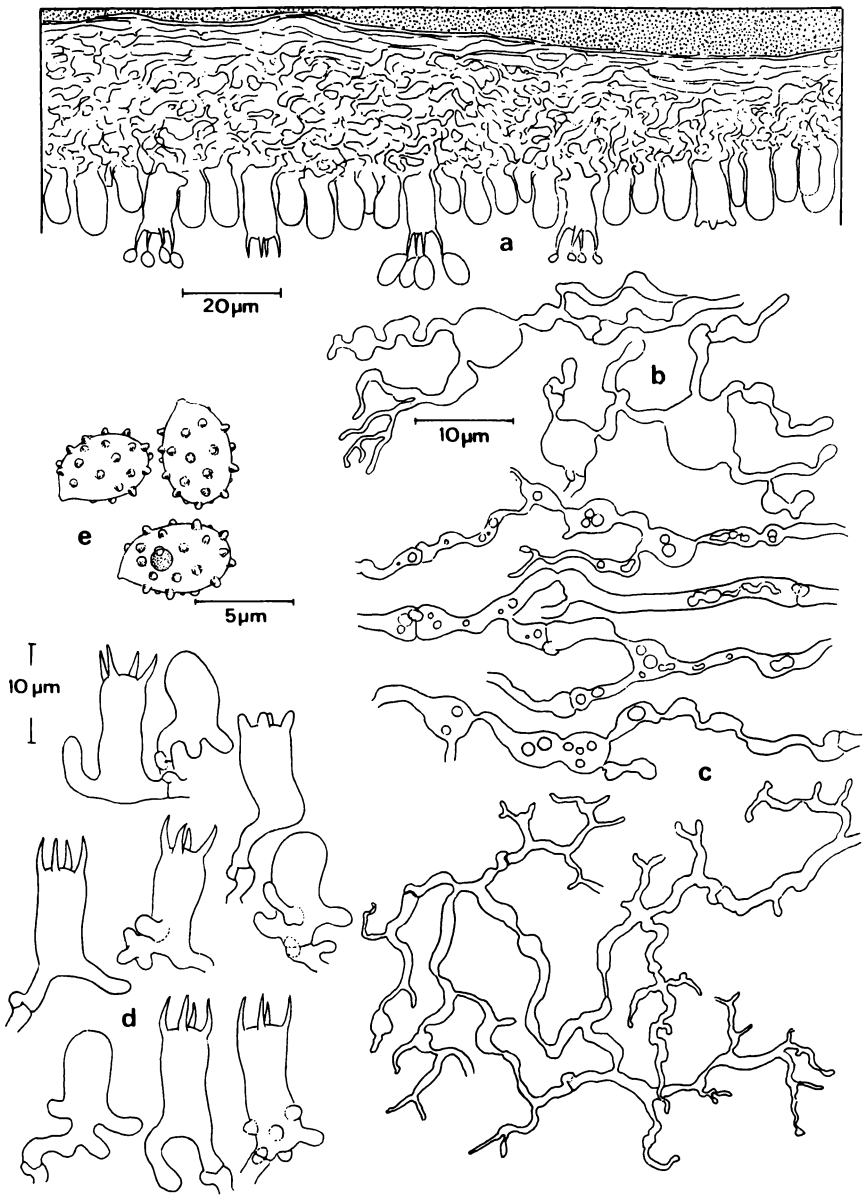


Fig. 772. *Phlebiella borealis* a) section through fruitbody, b) subicular hyphae with inflations, c) different kinds of hyphae from the subhymenial part of the fruitbody, d) basidia, e) spores –Coll. Larsson 2721

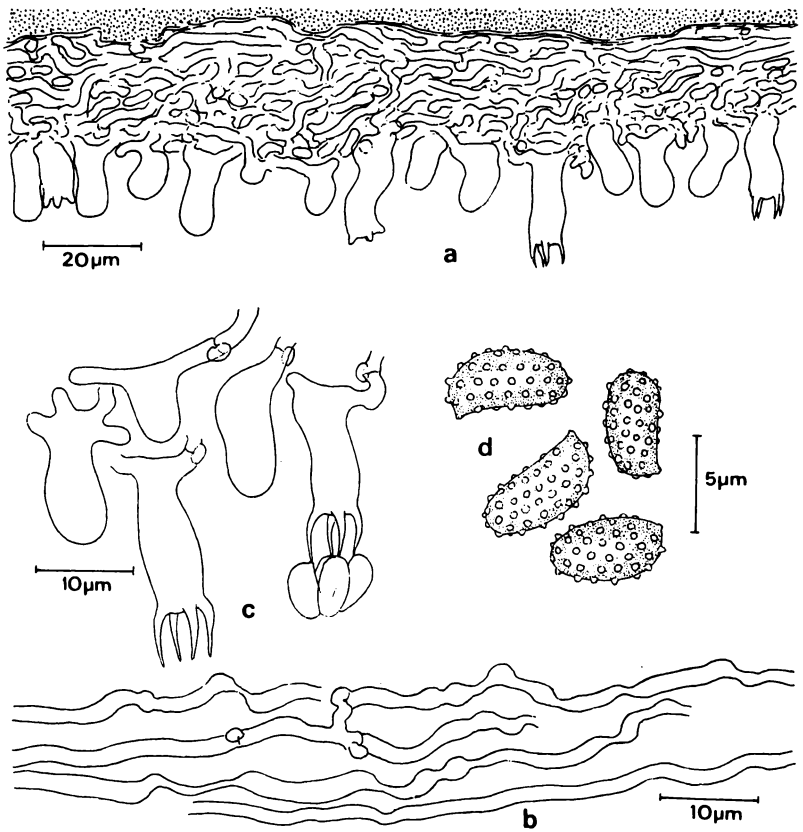


Fig. 773. *Phlebiella californica* a) section through fruitbody, b) basal hyphae, c) basidia, d) spores. –Coll. from holotype

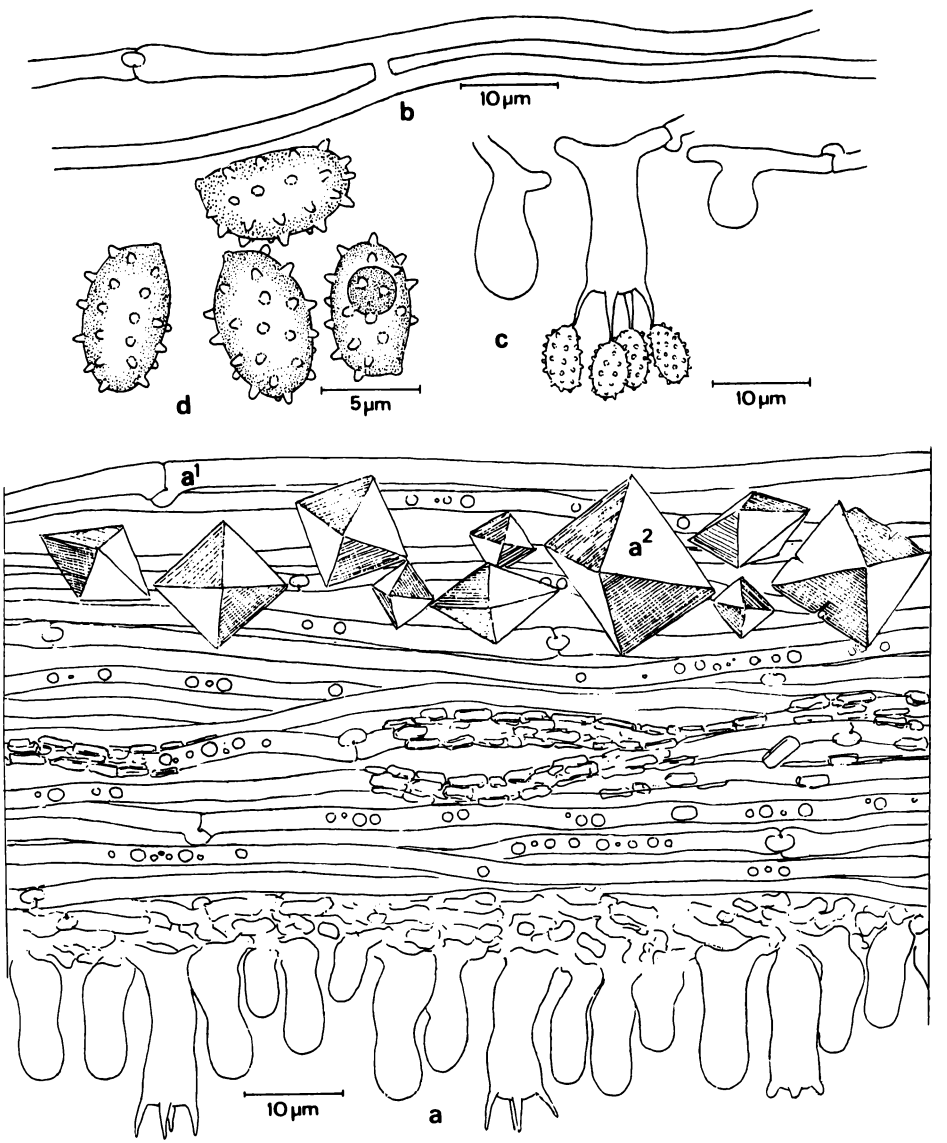


Fig. 774. *Phlebiella christiansenii* a) section through fruitbody with basal hyphae (a1) and tetragonal crystals (a2), b) basal hyphae, c) basidia, d) spores. –Coll. Hjortstam 6577

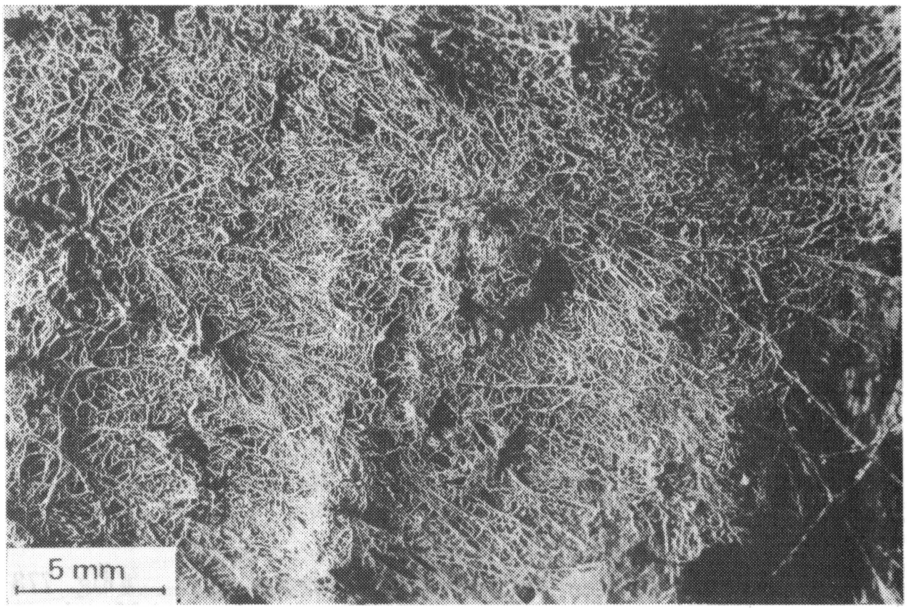
Hyphal system monomitic, hyphae thin-walled, those next to the wood sparse, straight and parallel, about 1.8–3 μm, other hyphae often inflated and varying considerably in width, all hyphae with clamps.
Basidia short-cylindrical, pleural, 12–17×5–6 μm, basally often with several hyphal outgrowths, with four sterigmata and a basal clamp.
Spores ellipsoid, distinctly warted all around and with a rather prominent apicular region, 5–6×3–3.5(–4) μm inclusive of the warts, inamyloid.
Habitat and distribution. Preferably on coniferous wood and scattered to rather common in the central and northern parts of Scandinavia and known from all countries except Denmark. Its further distribution is unknown as the species has been confused with *Corticium tenuiculum*, which belongs in *Trechispora*.
Remarks. It should be noted that Oberwinkler (1965) excluded *C. tenuiculum* from his treatment of *Xenasmatella* owing to the terminal basidia.

Phlebiella californica (Liberta) Larss. & Hjortst. Fig. 773
Mycotaxon 29:316, 1987 — *Xenasma californica* Liberta, Mycologia 57:967–968, 1965.

Remarks. Not known from Northern Europe and as far as we know only collected on the type locality. It belongs in the vicinity of *P. tulasnelloidea* and is also similar to *P. romellii*. From the former separated by more narrowly ellipsoid spores and from the latter by having warts also on the ventral side.

3. Phlebiella christiansenii (Parm.) Larss. & Hjortst. Fig. 774–775
Mycotaxon 29:316, 1987 — *Cristella christiansenii* Parm., Eesti NSV Tead. Akad. Toim. Biol. Seer. 14:222, 1965.

Fruitbody resupinate, effuse, at first filamentous with strongly branched and anastomosing threads, then often forming a more or less continuous hymenium, fragile, usually whitish or greyish, rarely with a brownish tint, not changing colour in KOH, margin strongly fibrillose, with radially arranged filaments.
Hyphal system monomitic, basal or central filamentous hyphae thin- to moderately thick-walled or with walls swelling in KOH, with clamps at every septa, relatively long-celled, hyaline to pale yellowish in KOH, varying in width but commonly 3–4 μm across, smooth or sometimes strongly encrusted, occasionally with ampulliform swellings near the



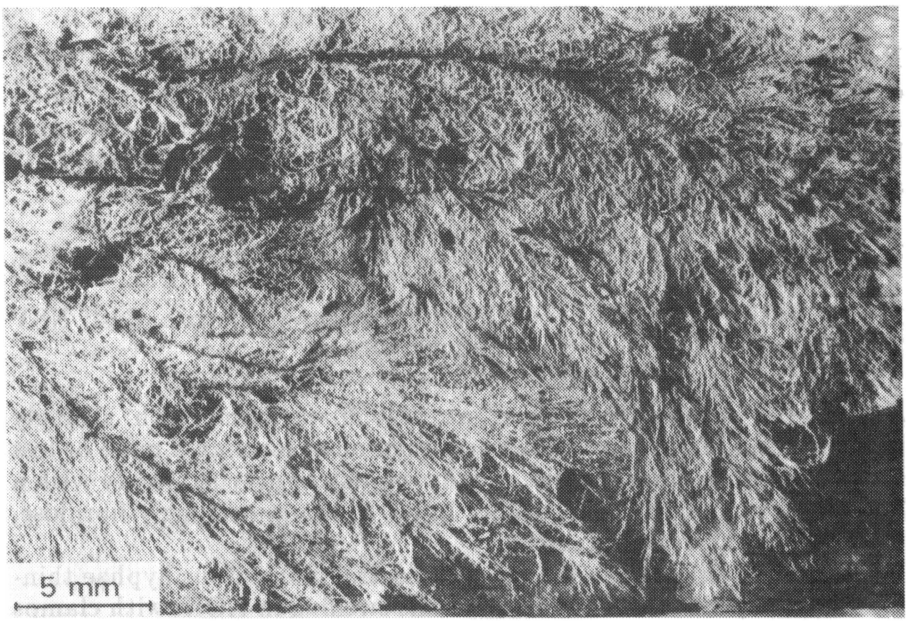


Fig. 775. *Phlebiella christiansenii* – Coll. (top) Hjortstam 14496; V. Kujala 1960-10-16. Photo E. Hansson

septa, subhymenial hyphae hyaline, forming a very thin tissue next to the basidia, thin-walled and about 2–3 μm wide.
Basidia short-cylindrical, pleural, 15–20×6–7 μm, with four sterigmata and a basal clamp.
Spores ellipsoid to more commonly narrowly ellipsoid, hyaline, warted throughout, rarely with the ventral side smooth, (5.5-)6–7×4–4.5(–5) μm, inclusive of the warts.
Habitat and distribution. A rare species and only known from a few localities in Finland (Karelia, Etelä-Häme), Norway (Hedmark, Sør-Trøndelag, Oppland), and Sweden (Västergötland). For the Danish find Parmasto (1965) referred to Christiansen (1960), but this specimen represents *P. romellii.*
Remarks. Characteristic species belonging in the vicinity of *P. vaga* which however has smaller spores and shows a reddish colour when treated with KOH.

4. Phlebiella fibrillosa (Hallenb.) Larss. & Hjortst. Fig. 776–777
Mycotaxon 29:316, 1987 — *Trechispora fibrillosa* Hallenb., Iran J. Plant Path. 14:75–76, 1978.

Fruitbody resupinate, often consisting only of radially growing, fertile hyphal strands, in well developed specimens forming a thin, farinaceous, more or less porulose to reticulate hymenium, usually pure white or with age pale ochraceous, margin fibrillose and/or strongly filamentous.
Hyphal system monomitic, filamentous hyphae thin-walled, hyaline, long-celled and loosely united, about 2.5–3(–4) μm wide, generally uniform in breadth or sometimes with walls irregular and strongly constricted, as a rule encrusted with more or less bacilliform crystals, subhymenial hyphae indistinct and forming a very thin tissue, all hyphae with clamps.
Basidia short-cylindrical, distinctly pleural, (10-)12–15(–18)×4–4.5(–5) μm, with four sterigmata and a basal clamp.
Spores short-ellipsoid, hyaline, irregularly warted, adaxial side without or with few warts, sligthly convex to more rarely straight, 4–4.5(–5.5)×3.2–3.5 μm, inclusive of the warts.
Habitat and distribution. Well known from Denmark and there collected several times by K. Hauerslev. It was already mentioned by Christiansen (1960) under the name ? *Cristella submutabilis* (at least MPC 1840 belongs to this species and is a fine developed specimen). Further known from but one locality in North Europe (Sweden, Bo-

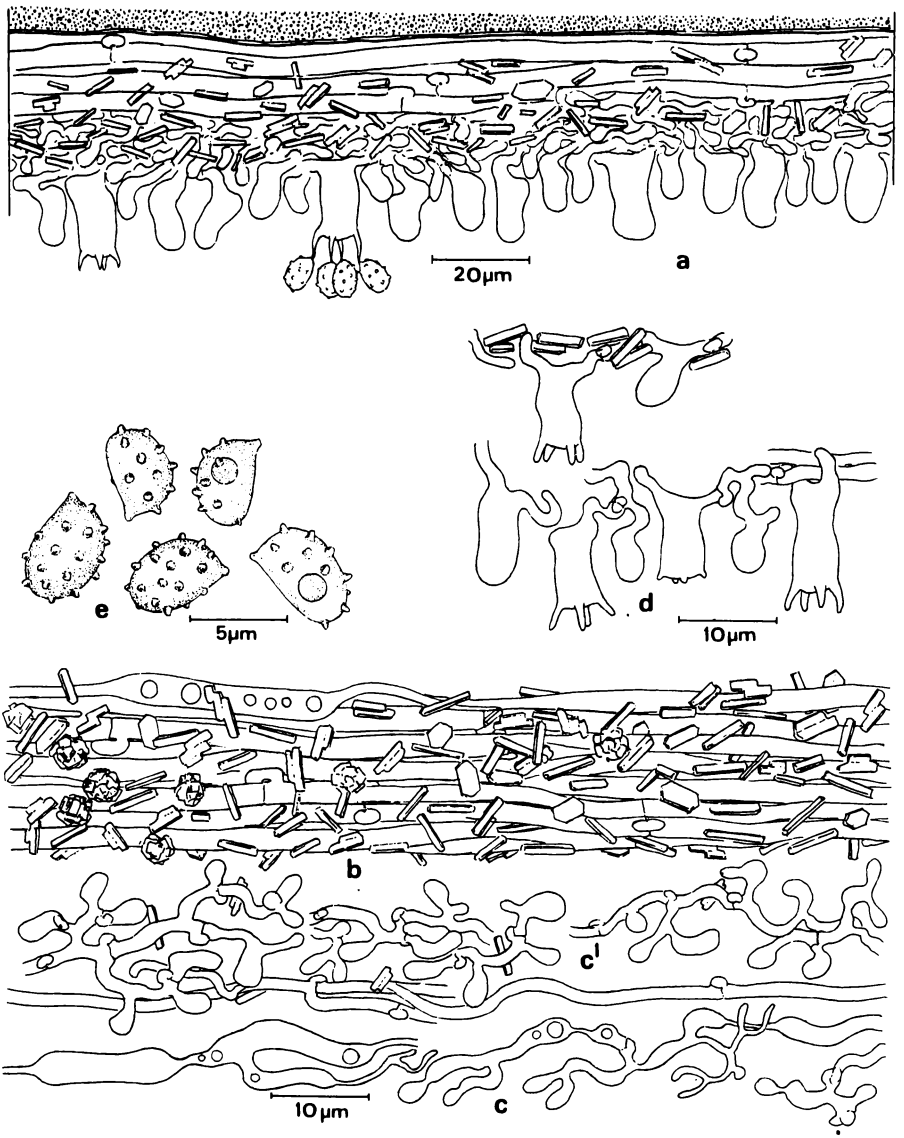


Fig. 776. *Phlebiella fibrillosa* a) section through fruitbody, b) basal hyphae, c) irregularly shaped hyphae, c1) hyphae with young and undeveloped basidia from the margin, d) basidia, e) spores. –Coll. Hauerslev 5370

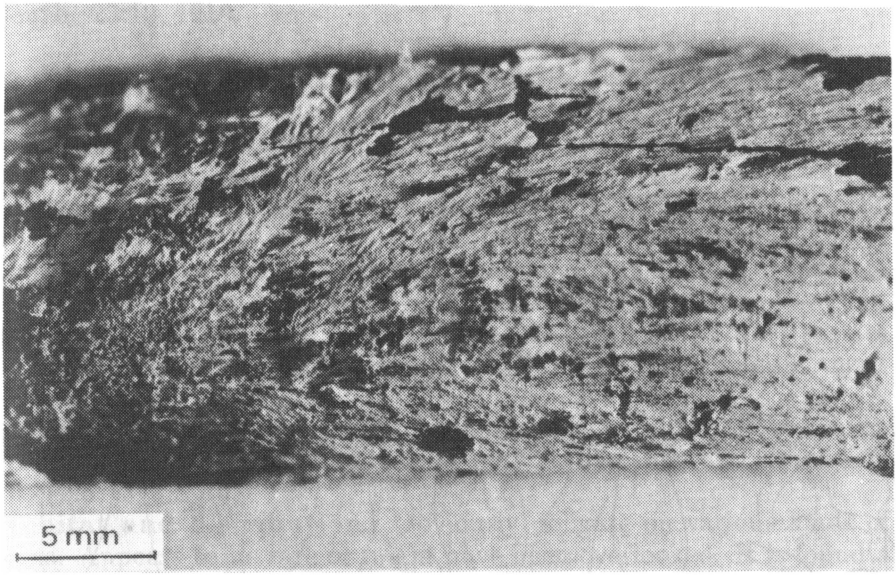


Fig. 777. *Phlebiella fibrillosa* – Coll. Hauerslev 4592. Photo E. Hansson

husläin). It grows preferably on thin branches, leaves and other debris of deciduous trees, especially *Fagus.*

Remarks. Even if most specimens look like sterile hyphal mats, *P. fibrillosa* is microscopically well recognized, preferably by its pleurobasidia and warted, small spores. It should be noted that the pleurobasidia were already described by Hallenberg in the protologue. The conidia mentioned and illustrated by Hallenberg are merely *Sterigmatomyces sp.* which can be found in several species of both *Phlebiella* and *Trechispora.*

The spores in the Nordic material tend to be longer than those reported by Hallenberg. A possible explanation could be that the infection by *Sterigmatomyces* in the holotype has affected the spore-development.

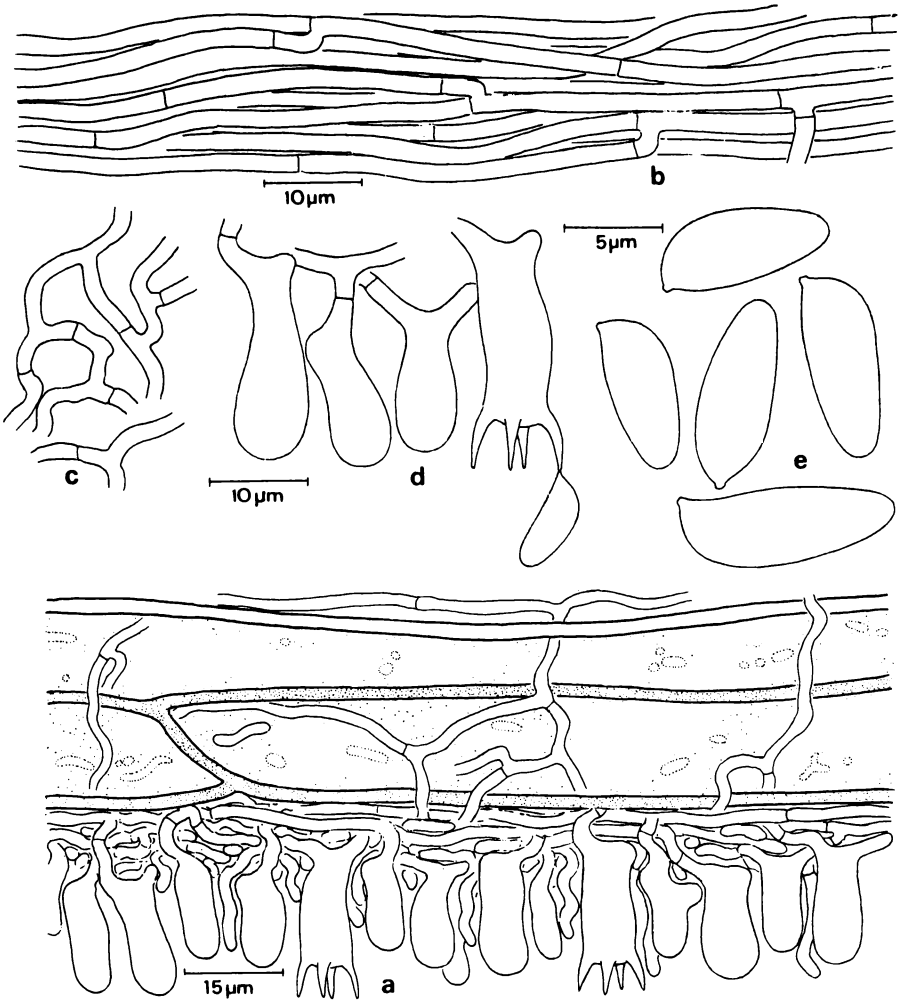


Fig. 778. *Phlebiella filicina* a) section through fruitbody, b) straight basal hyphae, c) sinous hyphae from the subhymenial tissue, d) basidia, e) spores. –Coll. Larsson 1980–07–19

5. Phlebiella filicina (Bourd.) Larss. & Hjortst. Fig. 778
Mycotaxon 29:317, 1987 — *Corticium filicinum* Bourd., Rev. Scien. Bourb. 23:12, 1910.

Fruitbody resupinate, effuse, closely adnate, thin, normally of small dimensions, smooth, subgelatinous, when dried ceraceous, greyish-white, margin indeterminable.
Hyphal system monomitic, all hyphae without clamps and rather thin-walled, basal ones forming a thin subiculum consisting of straight and parallel, (2.5–)3 μm wide, more or less agglutinated hyphae, subhymenial hyphae intermingled and sometimes sinuous. All hyphae of about the same width.
Basidia short-cylindrical, pleural, or more often than in other species of the genus terminal, 15–20×6–7 μm, with four sterigmata and without a basal clamp.
Spores ellipsoid to more commonly subfusiform with straight or convex ventral side, seldom suballantoid, smooth, thin-walled and usually 9–10×(2.5–)3–3.5 μm.
Habitat and distribution. Obviously obligate on various kinds of ferns. Appears to be rare or might have been overlooked. It is found a few times in Denmark (Sjaelland), Norway (Akershus, Hordaland) and Sweden (Skåne and Västergötland).
Remarks. This species has been misinterpreted and was placed in synonomy with *Corticium pseudotsugae* Burt by both Liberta (1960) and Oberwinkler (1965). Above all, *P. filicina* differs from that species by lacking clamps and by its occurrence on ferns. The Nordic material is rather homogenous even if the spores are somewhat variable as to their width.

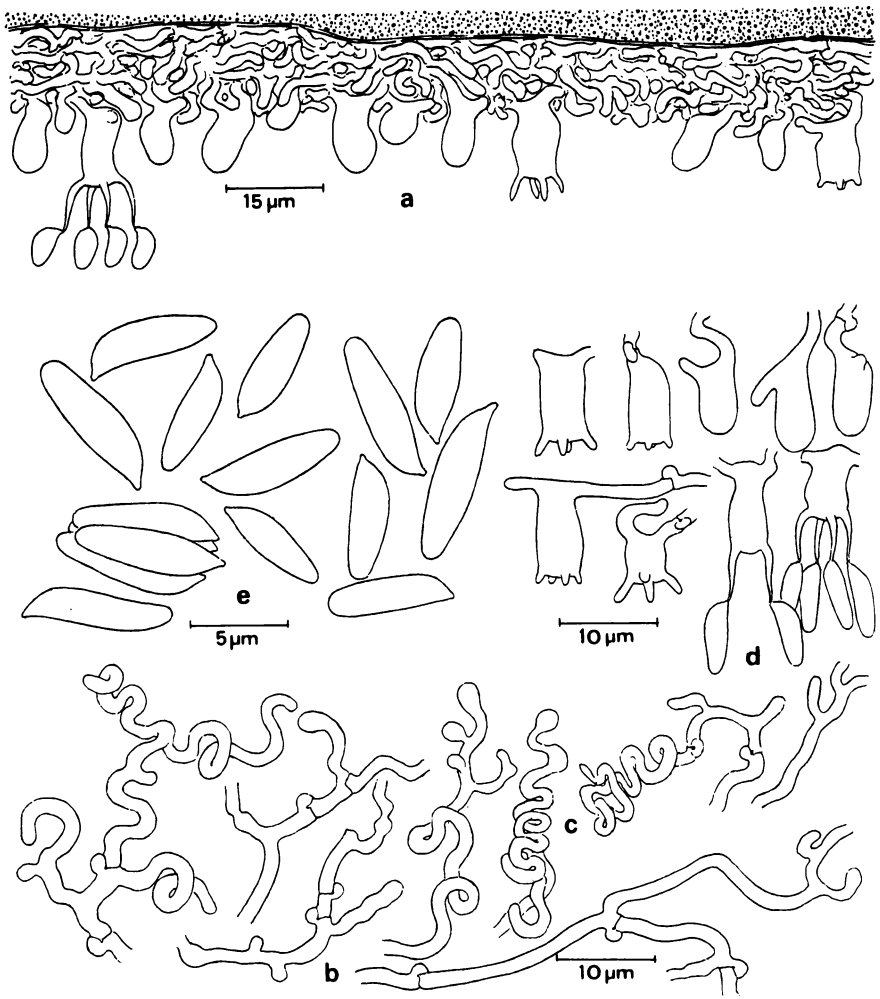


Fig. 779. *Phlebiella gaspesica* a) section through fruitbody, b) basal hyphae, c) tortuous hyphae from subhymenial tissue, d) basidia, e) spores. –Coll. Larsson 2350

6. Phlebiella gaspesica (Liberta) Larss. & Hjortst. Fig. 779
Mycotaxon 29:317, 1987 — *Xenasma gaspesicum* Liberta, Mycologia 58:932, 1966.

Fruitbody very thin or often inconspicuous, normally of small dimensions, subgelatinous, when dried ceraceous or nearly phlebioid, light grey.
Hyphal system monomitic, basal hyphae few, generally parallel to the substratum, other hyphae more or less sinuous and twisting, conglutinate, 1.5–2 μm wide, with clamps which are rather difficult to discern.
Basidia at first rounded or subclavate, then short-cylindrical or more rarely slightly stalked, pleural, when fully developed 7–11×4–4.5 μm, with 4 fairly long sterigmata, 4–6 μm, and a basal clamp.
Spores hyaline, smooth, narrowly ellipsoid to subfusiform, sometimes with a sigmoid appearance and often broadest near the base and glued together in pairs, 7–9(–11)×2–2.2 μm.
Habitat and distribution. In the Nordic countries only known from different kinds of ferns and from one collection on *Aconitum septentrionale*. It is with certainty a very rare species and found now and then in Norway (Akershus, Hedmark), Finland (Etelä-Häme), and in Sweden (Skåne, Västergötland, Östergötland). Additional finds are from Poland (leg. de Vries.) and Germany as probably Oberwinkler FO 5600 (1965) belongs here.
Remarks. The species may be readily recognized by its relatively long and subfusiform spores but with its thin fructifications it is easily overlooked. It should be noted that the spores in some of the Nordic specimens are longer than those in the type (AEL 805, Ill).

7. Phlebiella grisella (Bourd.) Larss. & Hjortst. Fig. 780
Mycotaxon 29:318, 1987 — *Corticium grisellum* Bourd., Rev. Scien. Bourb. 35:17, 1922.

Fruitbody resupinate, effuse, closely adnate, thin to moderately thick, smooth or more often slightly tuberculate under a dissecting microscope, in the living stage ceraceous or subgelatinous, when dried almost horny, usually grey to bluish grey, more rarely with an olivaceous tint.
Hyphal system monomitic, all hyphae with clamps, basal ones parallel next to the substratum, rather few, 1.5–2(–2.5) μm wide, other hyphae interwoven and conglutinate, usually more vertically arranged and with walls swelling in KOH.

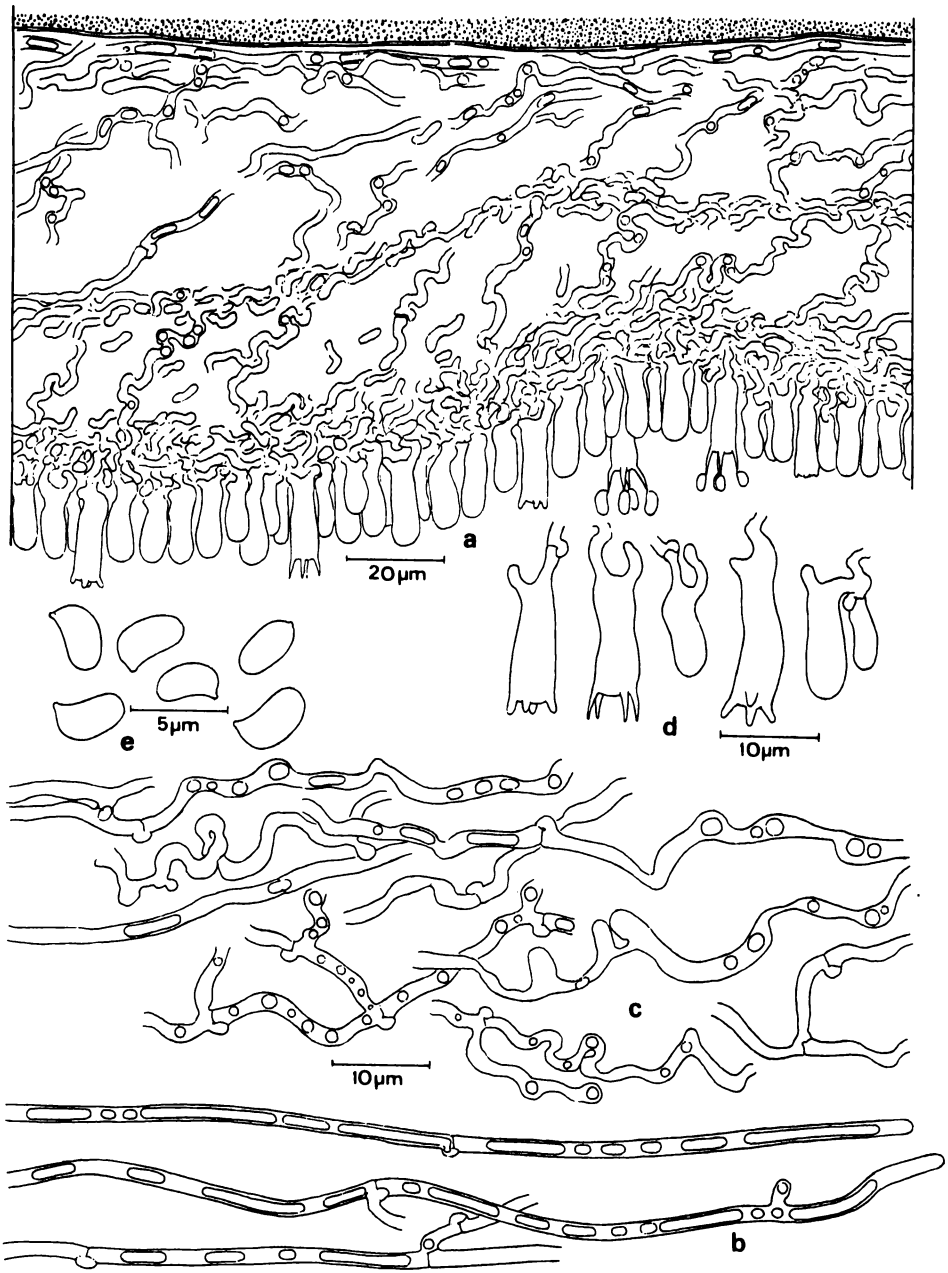


Fig. 780. *Phlebiella grisella* a) section through fruitbody, b) straight subicular hyphae, c) irregularly shaped hyphae from the subhymenial tissue, d) basidia, e) spores. -Coll. Hjortstam 14587

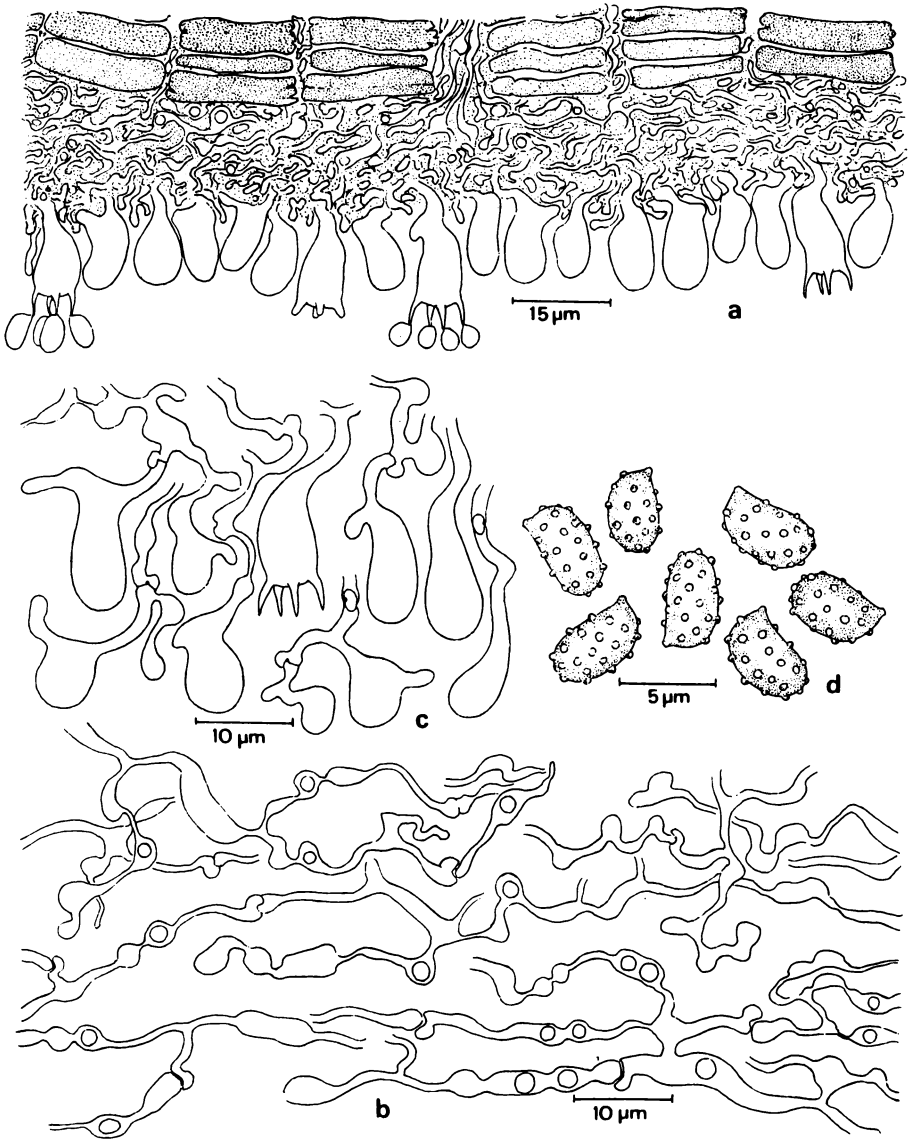


Fig. 781. *Phlebiella insperata* a) section through fruitbody, b) irregularly shaped hyphae from the subhymenial tissue, c) basidia, d) spores. –Coll. Ryvarden 14513

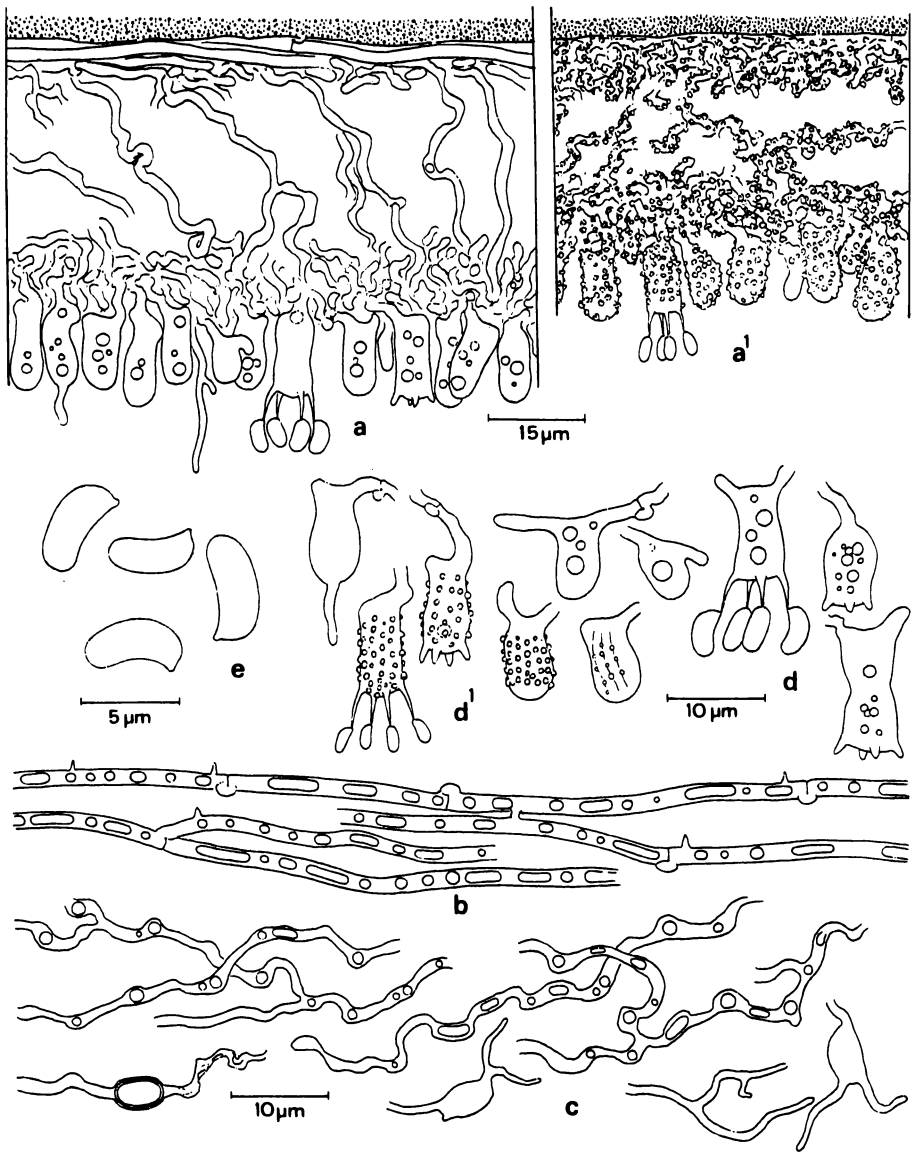


Fig. 782. *Phlebiella lloydii* a) section through fruitbody in KOH, a1) in Cotton blue, b) straight subicular hyphae, c) irregularly shaped hyphae from the subhymenial tissue, d) basidia in KOH, d1) in Cotton blue, e) spores. –Coll. Hallingbäck 19419

Basidia short-cylindrical, mostly pleural, about 7–10(–15)×3–4(–5) μm, basally sometimes with a few hyphal outgrowths, with four sterigmata and a basal clamp.
Spores short-allantoid to almost reniform, smooth, thin-walled, (4–)5–6×2.5–3 μm, amyloid.
Habitat and distribution. On decorticated wood of conifer and deciduous trees. Nowhere common but seems to be more frequent than *P. allantospora.* Collected in all Nordic countries but shows a preference for the southern area.
Remarks. In the microscope the spore-morphology will be sufficient for a separation against *P. allantospora. P. ralla* (Jacks.) Larss. & Hjortst., described from Canada, is very close to both *P. allantospora* and *P. grisella. P. ralla* is hitherto not with certainty recorded from Europe. According to the holotype the spores are larger then in the two mentioned species and measure 5.5–6.5×3–3.5 μm.

8. Phlebiella insperata (Jacks.) Oberw. Fig. 781
Bibl. Mycol. 61 p. 343, 1977 — *Corticium insperatum* Jacks., Can. J. Res. C 28:718, 1950.

Fruitbody resupinate, effuse, closely adnate, ceraceous, thin, at first consisting of gelatinized and anastomosing threads, then continuous and more or less smooth or uneven, but not distinctly tuberculate, greyish, margin not differentiated.
Hyphal system monomitic, hyphae thin-walled, about 2 μm wide but varying considerably in width, forming a thin and dense tissue, straight or more commonly irregularly inflated, gelatinized, with clamps.
Basidia short-cylindrical, mostly pleural, about 12–15×5–6 μm, with four sterigmata and a basal clamp.
Spores ellipsoid to subcylindrical, adaxial side slightly concave or straight, warted throughout, 5–6×2.8–3.2 μm warts included, inamyloid.
Habitat and distribution. On bark of decayed deciduous wood *(Corylus)* and only found once in Northern Europe viz. Norway (Oppland).
Remarks. This species is somewhat similar to *P. romellii* but differs in its slightly smaller spores and in having warts also on the ventral side. The measurement given by Jackson is probably inclusive of the warts.

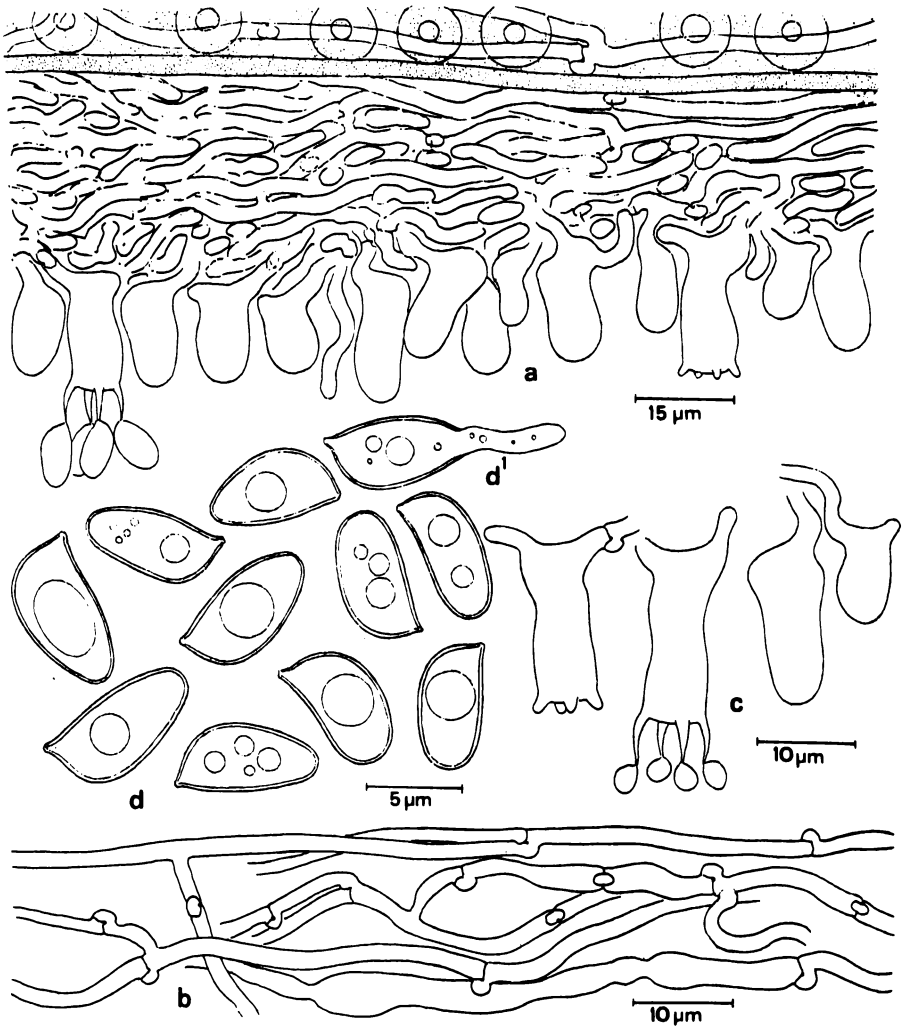


Fig. 783. *Phlebiella pseudotsugae* a) section through fruitbody, b) basal hyphae of different kind, c) basidia, d) spores, walls exaggerated in thickness, d1) growing spore. -Coll. Hallingbäck 19427

9. Phlebiella lloydii (Liberta) Larss. & Hjortst. Fig. 782
Mycotaxon 29:318, 1987 — *Xenasma lloydii* Liberta, Mycologia 59:906, 1960 — *Corticium lloydii* Bourd. & Galz., Hym. de France p. 210, 1928 non *Corticium lloydii* Bres., Selecta Mycol. II p. 61, 1926.

Fruitbody resupinate, effuse, closely adnate, moderately thin, smooth or under a strong lens uneven to granulose, ceraceous, when dried rather hard, at first greyish with an olive tint, then more or less olive-brown, margin indeterminable.
Hyphal system monomitic, all hyphae with clamps, basal ones straight, parallel to the substratum, few, 1.5–2.5 μm, other hyphae intermingled, often conglutinated with walls gelatinized, some hyphae variable in width and becoming irregularly inflated.
Basidia short-cylindrical, mostly pleural, covered with granulate encrustations which are easily observed in Melzer and Cotton blue but dissolve in KOH, 8–12(–15)×4.5–6 μm, with four sterigmata and a basal clamp.
Spores short-allantoid, smooth, thin-walled, 4.5–6×2–2.5(–3) μm, amyloid.
Habitat and distribution. Rare species and known on pine-wood from but two localities in Sweden (Småland, Bygget, type-locality; Västergötland, Billingen). Further reported from Canada by Liberta (1960).
Remarks. Easily determined by its colour and the strong basidial encrustations which are visible in Melzer's reagent and in Cotton blue. The closest relative seems to be *P. grisella.*

10. Phlebiella pseudotsugae (Burt) Larss. & Hjortst. Fig. 783
Mycotaxon 29:317, 1987 — *Corticium pseudotsugae* Burt, Ann. Mo. Bot. Gard. 13:246, 1926.

Fruitbody resupinate, often widely effused, closely adnate, smooth to uneven or rarely tuberculate, thin to moderately thick but inconspicuous in the initial stage of development, when dried rather hard, greyish white to pale ochraceous, under a strong lens the hymenial surface appears pruinose.
Hyphal system monomitic and all hyphae have clamps, 2.5–4 μm wide, thin-walled, in the subiculum rather sparse, straight and fairly uniform, more or less parallelly arranged, other hyphae somewhat narrower, intermingled and agglutinated.
Basidia cylindrical, slightly constricted, typically pleural, when fully developed usually 20–25×6–8 μm, with 4 sterigmata and a basal clamp.

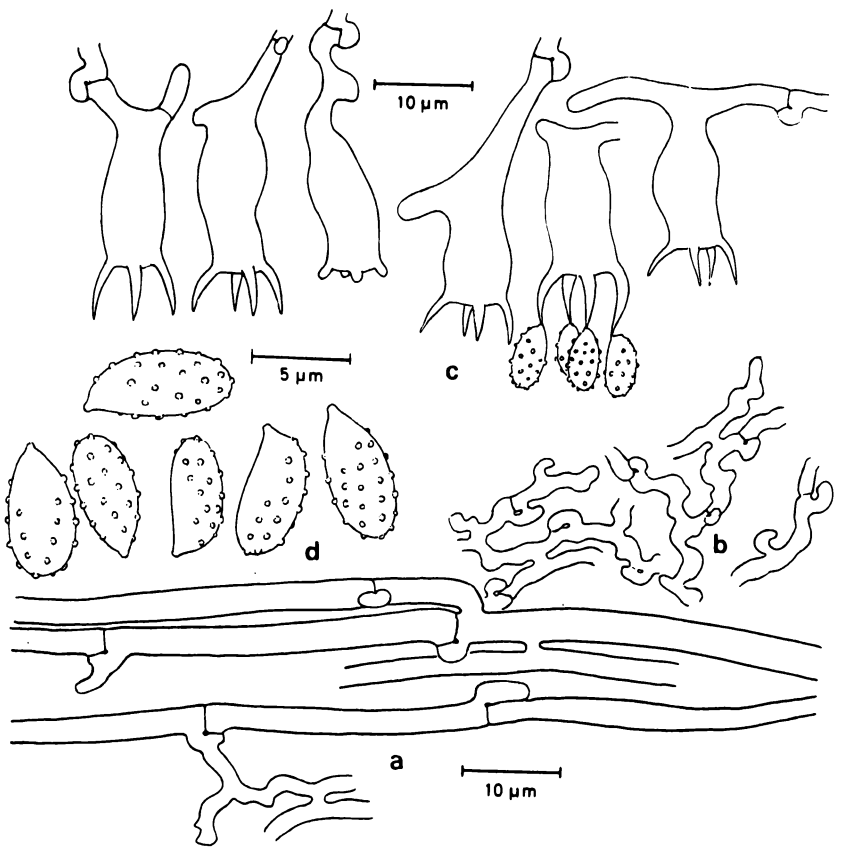


Fig. 784. *Phlebiella romellii* a) basal hyphae, b) irregularly shaped hyphae from the subhymenial tissue, c) basidia, d) spores. –Coll. from holotype

Spores somewhat variable in shape and size but as a rule ellipsoid to fusiform or subamygdaliform, thin to moderately thick-walled, smooth, normally 6–8×3.5–4.5 μm.
Habitat and distribution. Particularly on all kinds of decorticated coniferous wood, often on rotten wood waste, under foot-bridges etc., in both dry and in more humid localities. It is one of the most common members of the genus and distributed in the whole of Northern Europe but seems more frequent in the central and northern parts.
Remarks. Even if the species is determined without difficulty, there is a variation, especially as to spore-morphology (compare Oberwinkler 1965). Generally the spores are moderately thick-walled though the spore-figure 783 is a little exaggerated. In some specimens however, the wall is thin. These specimens also have a different shape and tend to be broadest towards the apex. *P. subnitens* is such a species and was described growing 'sur pin' by Bourdot and Galzin. Unfortunately the holotype (Bourd. 30464) is the only specimen left at PC and this material is in poor condition why we find it most convenient to leave the matter unsolved until the species can be recollected.

11. **Phlebiella romellii** (Hjortst.) Larss. & Hjortst. Fig. 784
Mycotaxon 29:317, 1987 — *Xenasmatella romellii* Hjortst., Mycotaxon 17:582, 1983.

Fruitbody resupinate, effuse, closely adnate, ceraceous, more rarely somewhat fragile and farinaceous, thin to moderately thick, smooth or when fully developed distinctly cracked, more rarely consisting of only radiating strands, margin indeterminable or sligthly fibrillose.
Hyphal system monomitic, basal hyphae 2.5–3.5(–4) μm wide, parallelly arranged to a very thin subiculum, subhymenial tissue consisting of irregular and interwoven hyphae, sometimes anastomosing, sligthly narrower than those in the subiculum, all hyphae with clamps.
Basidia short-cylindrical, pleural, 15–20×6–7 μm, with four sterigmata and a basal clamp.
Spores ellipsoid, hyaline, verrucose, with warts mostly arranged in oblique ridges, ventral side smooth, at least near the apiculus or with inconspicuous warts, 6.5–7.5×(3-)3.5(–4) μm inclusive of the warts.
Habitat and distribution. *P. romellii* seems to be favoured by herbaceous biotopes and is found a few times on decayed wood, herbs and ferns. The collections are from Norway (Sør-Trøndelag) Sweden (Västergötland, Västmanland, Uppland and Lappland) and Denmark (Sjaelland, cfr Christiansen 1960 p. 95).

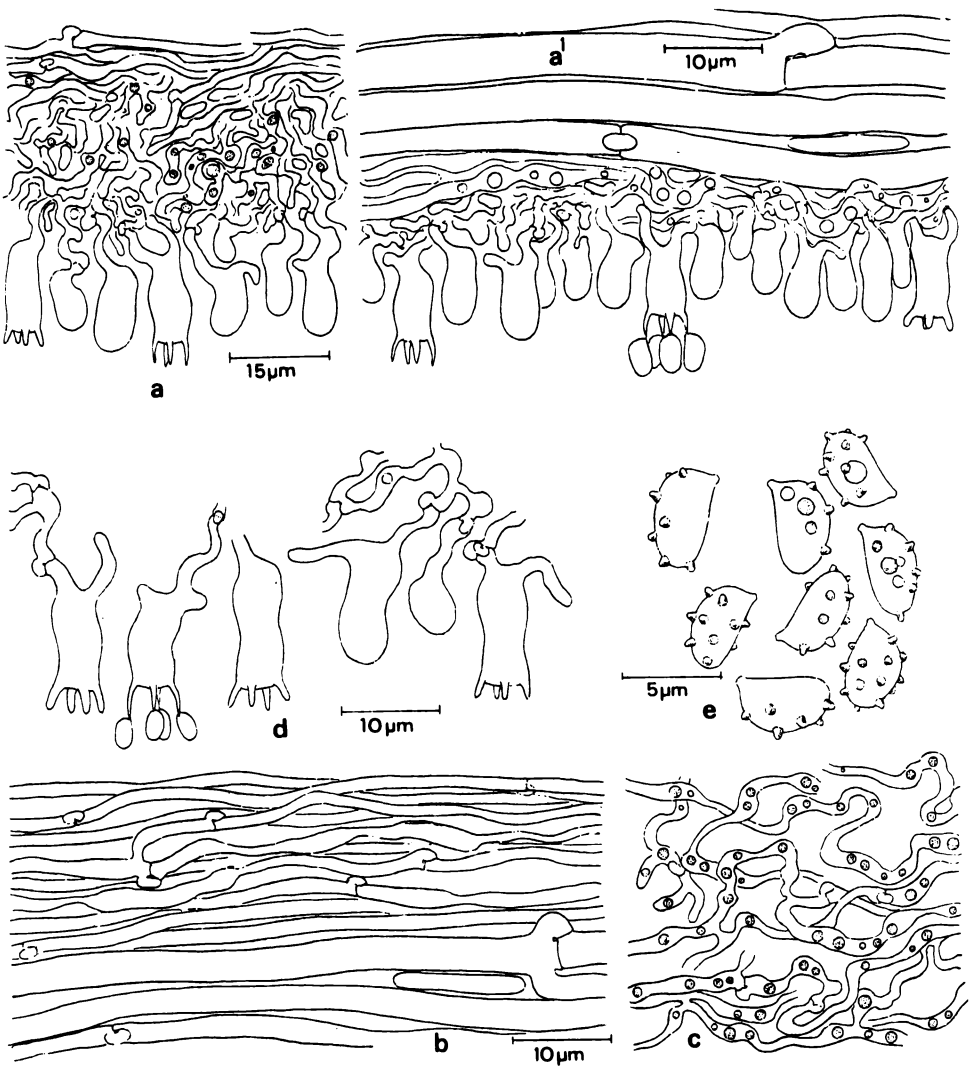


Fig. 785. *Phlebiella subflavidogrisea* a) section through fruitbody, a1) hyphal strand with hymenium, b) basal hyphae, c) irregularly shaped hyphae from the subhymenial tissue, d) basidia, e) spores. –Coll. Larsson 2092

Fig. 786. *Phlebiella subflavidogrisea* – Coll. Larsson 2092. Photo E. Hansson

Remarks. Somewhat similar to *P. fibrillosa* but differing in external appearance and in the larger spores. Also resembling *P. christiansenii* which has spores of about the same size, though warted throughout and a fruitbody composed of strongly branched and anastomosing threads.

12. Phlebiella subflavidogrisea (Litsch.) Oberw. Fig. 785, 786
Bibl. Mycol. 61:343, 1977 — *Corticium subflavidogriseum* Litsch., Ann. Mycol. 39:127, 1941.

Fruitbody resupinate, effuse, closely adnate, thin to moderately thick, smooth to porulose and commonly cracking, often with radially arranged threads, greyish white to grey, changing colour to deep reddish brown in KOH, margin indeterminable or fibrillose.
Hyphal system monomitic, hyphae in the central part of filaments thin- walled, rather wide and up to 5–7 μm, other hyphae narrower, somewhat gelatinized, 1.5–3 μm wide, in the subiculum relatively long-celled and parallel next to the substratum, some hyphae irregularly inflated, subhymenial hyphae intricately interwoven and mostly difficult to discern properly, all hyphae with clamps.
Basidia short-cylindrical, pleural, about 10–12×4–5 μm, with four sterigmata and a basal clamp.

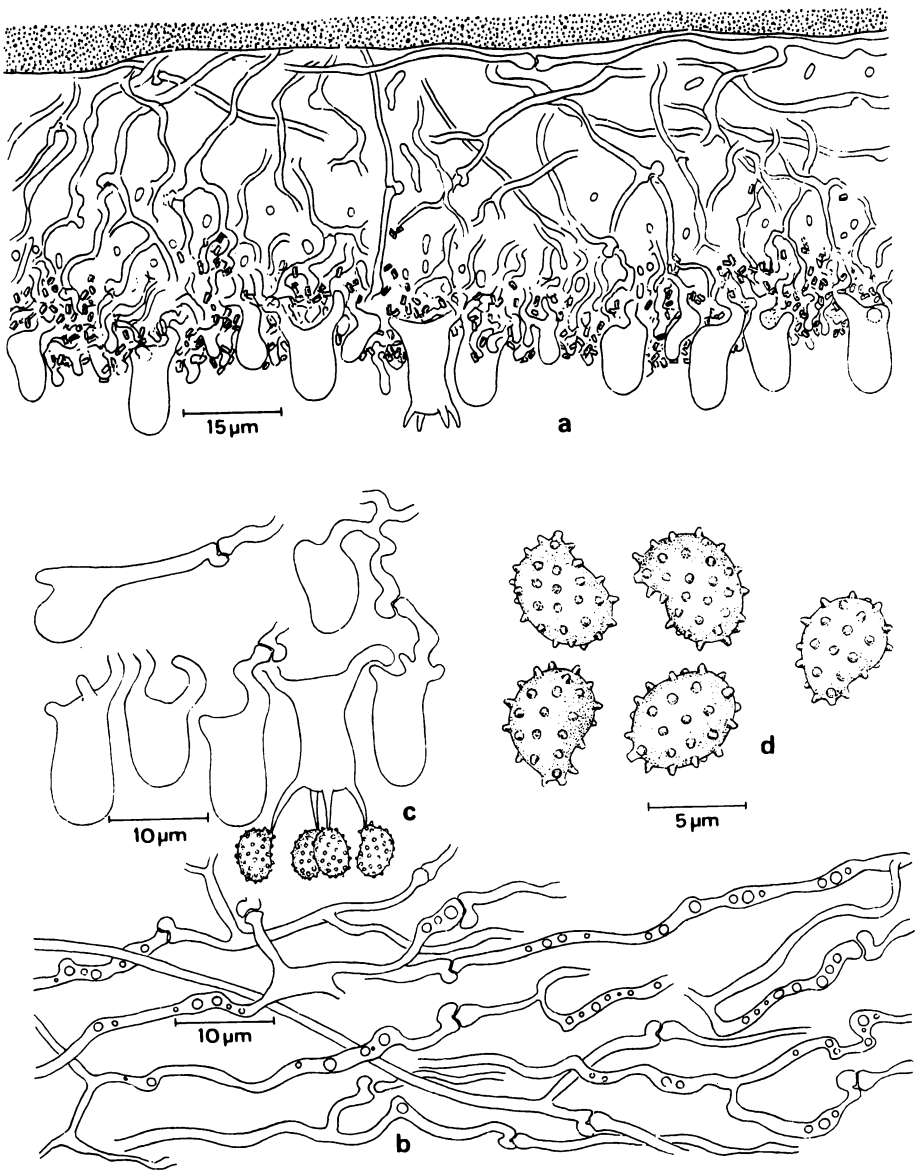


Fig. 787. *Phlebiella tulasnelloidea* a) section through fruitbody, b) hyphae, c) basidia, d) spores. –Coll. Hallenberg 3056

Spores ellipsoid, hyaline, verrucose, with rather few warts on the dorsal side and the ventral side more or less smooth, at least near the base, 3.5–4.5(–5)×2–2.5(–3) μm inclusive of the warts.
Habitat and distribution. Mostly on well rotted coniferous wood and mainly in old, natural forests. Little known species as to its distribution and except one collection from northern Finland (Pisavaara) mainly found in central Norway (Hedmark, Sør-Trøndelag) and south-west Sweden (Småland, Halland, Västergötland).
Remarks. The greyish colour, hymenial filaments and small verruculose spores are distinctive characters for an easy determination.

13. Phlebiella tulasnelloidea (Höhn. & Litsch.) Oberw. Fig. 787
Bibl. Mycol. 61:343, 1977 — *Corticium tulasnelloideum* Höhn. & Litsch., Sitzber. Akad. Wiss. Wien, Math.-nat. Kl. 117:1118, 1908.

Fruitbody resupinate, effuse, closely adnate, thin to moderately thick, approximately 40–50 μm, smooth or under a strong lens porulose, thicker specimens often cracking, usually greyish blue, but also greyish white or even pale ochraceous, margin abrupt, indeterminable.
Hyphal system monomitic, some hyphae parallel to the substratum, thin- walled, 2–2.5 μm wide, rather straight, other hyphae intermingled, conglutinate and strongly gelatinized, often irregularly inflated, all hyphae with clamps.
Basidia short-cylindrical, pleural, generally 10–18×6–8 μm, with 4 sterigmata and a basal clamp.
Spores subglobose to ellipsoid, warted throughout, adaxial side concave with a distinct suprahilar depression, when fully developed usually 6–6.5(–7) x 4.5(–5) μm, inamyloid.
Habitat and distribution. Evidently a southern species in North Europe and distributed in all Nordic countries, but preferably collected in the south-west part. It is mostly found on decorticated deciduous wood of all kinds in fertile biotopes, more rarely met with on coniferous substrata such as *Abies* and *Picea* and then usually in mixed forests.
Remarks. Easily determined species thanks to its distinctive spore-morphology with a pronounced suprahilar depression. In typical specimens the bluish colour is of diagnostic value.

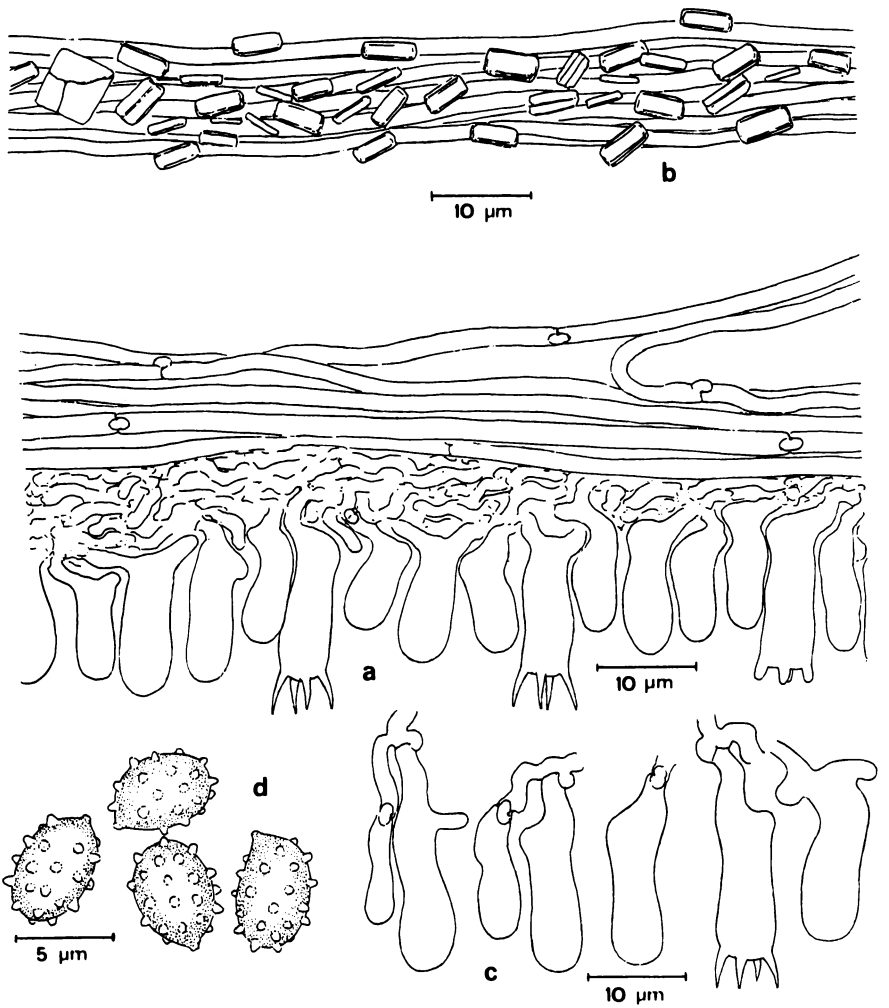


Fig. 788. *Phlebiella vaga* a) hymenium on a fertile cordon, b) encrusted hyphae in cordon, c) basidia, d) spores. –Coll. Larsson 450

14. Phlebiella vaga (Fr.) Karst. Fig. 788–790
Hedwigia 29:271, 1890 — *Phlebia vaga* Fr., Syst. Mycol. I p. 428, 1821.

Fruitbody resupinate, effused, often large, smooth, colliculose to grandinioid or comprised of richly branched and anastomosing hyphal threads, often arranged in a fan-like manner, easily detachable, fragile to membranaceous, varying in colour but always with some shade of brown from chamois to deep umber, as fresh usually with more yellowish colours, especially in sterile parts which can be sulphur-yellow, margin abrupt or thinning out and then arachnoid or fibrillose, usually of paler colour, cordons frequently occurring in the fruitbody and extending beyond the margin.
Hyphal system monomitic, all hyphae with clamps, thin-walled, subhymenial hyphae and cord-hyphae straight 2–5 μm, often provided with crystals and now and then with slightly ampulliform septa, slightly agglutinated, subhymenial hyphae sinuouse, richly branchd and 2–3 μm, hyphae turning vinaceous red in KOH.
Basidia subcylindrical to subclavate, sinuouse, pleural, mainly 15–20 x 5–6 μm, with four sterigmata and a basal clamp.
Spores subglobose to elliptical, densely verruculose (4.5)5–5.5(–7)×4–4.5 μm, nonamyloid.
Habitat and distribution. Known from all kind of forests and from both deciduous and conifer substrata. The most common species of the genus and widespread in North Europe.
Remarks. *P. vaga* seems to be a species complex which need further study. We have seen some collections with larger spores (up to 8 μm) and more irregular subicular hyphae but we can so far not judge these differences from a taxonomical view-point.

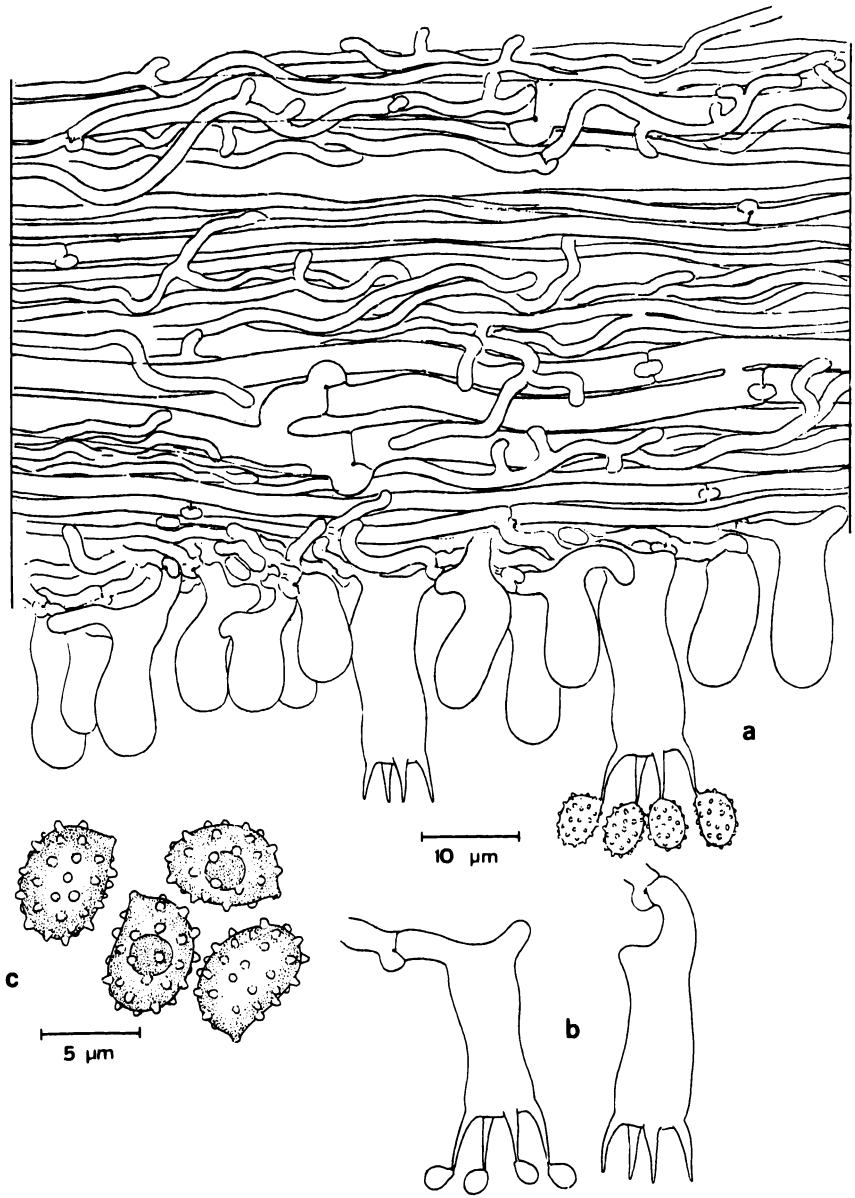


Fig. 789. *Phlebiella vaga* a) fertile cordon with a sterile cordon below, b) basidia, c) spores. –Coll. Hjortstam 10356

Fig. 790. *Phlebiella vaga* – Coll. Hjortstam 4471. Photo E. Hansson;

Thanatephorus Donk
Reinwardtia 3:376, 1956.

Fruitbodies on the whole similar to *Uthatobasidium* (see this genus) and *Ypsilonidium* and differing mainly by the connection with the form-genus *Rhizoctonia* (see Donk 1966) and in being parasitic on herbaceous plants.

Type species: *Hypochnus solani* Prill. & Delacr. (= *Hypochnus cucumeris* Frank auct. pl.).

Thanatephorus cucumeris (Frank) Donk Fig. 791
loc. cit. — *Hypochnus cucumeris* Frank, Ber. Deutsch. Bot. Ges. 1:62, 1833.

Fruitbody loosely adnate, hypochnoid to pellicular, usually whitish or cream-coloured.
Hyphal system monomitic, hyphae without clamps, basal ones hyaline or some with a light brown colour, thin or usually with walls thickened or more rarely distinctly thick-walled, 10–12 μm wide, other hyphae thin-walled and forming a very thin subhymenial tissue.

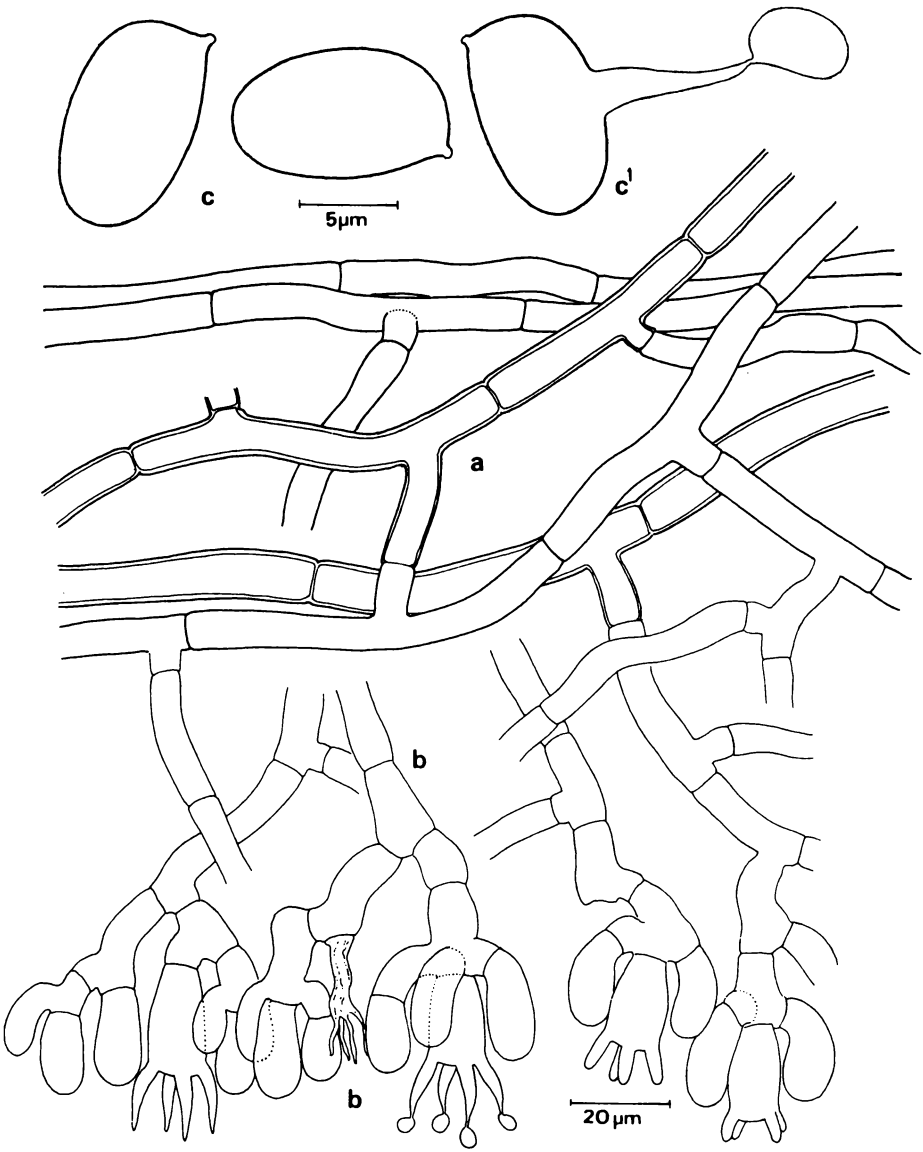


Fig. 791. *Thanotephorus cucumeris* a) basal hyphae, b) subhymenial hyphae and basidia, c) spores, c1) spore with repetition. — Coll. J. Eriksson 3384

Basidia short-cylindrical, (12–)15–20×(8–)10–12 μm, normally with four, rather stout and 8–10 μm long sterigmata.
Spores ellipsoid, thin-walled, smooth, hyaline, 8–12×5–6 μm but varying in size, adaxial side mostly convex or straight, producing secondary spores although not seen in all specimens, inamyloid, indextrinoid, acyanophilous.
Habitat and distribution. With certainty a common species though not much preserved in the herbaria. Mainly growing on stems of *Solanum tuberosum* but also collected on leaves of several other kinds of herbaceous plants such as *Aegopodium, Euphrasia, Pedicularis, Rubus,* and *Taraxacum.* It is reported from Denmark by Christiansen (1960), but we have not seen any specimens from Norway or Finland.
Remarks. One of the taxonomically most important distinctions between this species and *Ypsilonidium sterigmaticum* is the basidial morphology. In the latter species the sterigmata are two in number and reaching 15–20 μm.

Trechispora Karst.
Hedwigia 29:147, 1890.

Fruitbodies resupinate or dimidiate, thin to thick, pruinose to arachnoid to membranaceous, fragile, smooth, grandinioid, odontioid or poroid, of light colours; hyphal system monomitic or dimitic, all septa with clamps, hyphae often encrusted, ampullate septa common, subhymenial hyphae usually short-celled and more or less triangular in shape, skeletal hyphae cyanophilous; simple, hyphoid cystidia rarely present; basidia short-cylindrical, cylindrical or more rarely clavate or pedunculate, with four sterigmata and a basal clamp; spores small, usually with thickened wall, smooth or ornamented, subglobose to elliptical, rarely irregular or allantoid, neither dextrinoid, amyloid nor cyanophilous.

Type species: *Trechispora onusta* Karst (= *Trechispora mollusca* (Pers.:Fr.) Liberta).

Remarks. After the exclusion of *Phlebiella vaga* (Fr.) Karst. and allied species *Trechispora* becomes a fairly uniform genus. The treatment here must be regarded as tentative and we have largely followed Liberta (1973) and Jülich & Stalpers (1980). A more thorough revision of the genus is under preparation by one of us (Karl-Henrik Larsson).

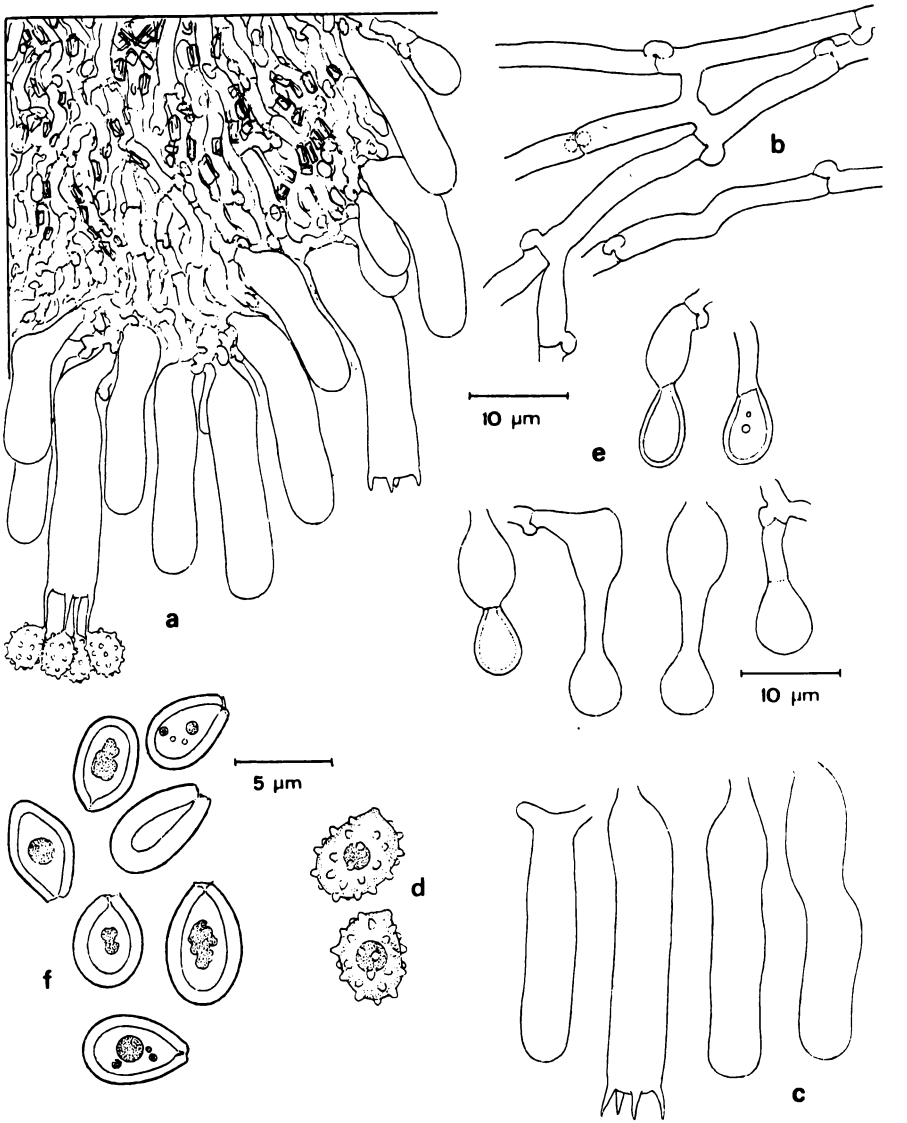


Fig. 792. *Trechispora alnicola* a) section through aculeus, b) subhymenial hyphae, c) basidia, d) spores, e) conidiophores, f) conidia – Coll. Melo et al. 1989

Key to species

1. Spores smooth, never angular **2**
1. Spores ornamented or angular **3**
2. Spores subglobose to elliptical ..... **2. T. cohaerens**
2. Spores short-allantoid ..... **6. T. lunata**
3. Fruitbody poroid ..... **8. T. mollusca**
3. Fruitbody otherwise **4**
4. Spores angular to turbinate, with warts at the corners .... **11. T. subsphaerospora**
4. Spores distinctly verruculose, verrucose or spiny **5**
5. Conidia ornamented ..... **5. T. invisitata**
5. Conidia smooth or lacking **6**
6. With acerose crystals in the subiculum **7**
6. Crystals otherwise or lacking **8**
7. Spores verrucose, 4–5 μm long ..... **7. T. microspora**
7. Spores 5.5–6.5 μm long, with long spines, ... **9. T. praefocata**
8. Spores ellipsoid, 6–7 μm long ..... **4. T. fastidiosa**
8. Spores subglobose or irregular, up to 5.5 μm **9**
9. Spores densely verrucose, fruitbody mostly grandinioid to odontioid **10**
9. Spores with few, rather long spines, appearing irregular, fruitbody usually smooth to minutely granular ..... **10. T. stellulata**
10. Basidia 20–30 μm long ..... **1. T. alnicola**
10. Basidia 11–14 μm long ..... **3. T. farinacea**

1. Trechispora alnicola (Bourd. & Galz.) Liberta Fig. 792
Taxon 15:318, 1966 — *Grandinia alnicola* Bourd. & Galz., Bull. Soc. Mycol. Fr. 30:254, 1914.

Frutibody resupinate, effuse, fragile and easily separable, grandinioid, ochracous to yellowish or nearly brick-red with a white subiculum visible in cracks in the dried fruitbody, cordons few, margin not differentiated, or distinct, whitish, arachnoid and often fibrillose.

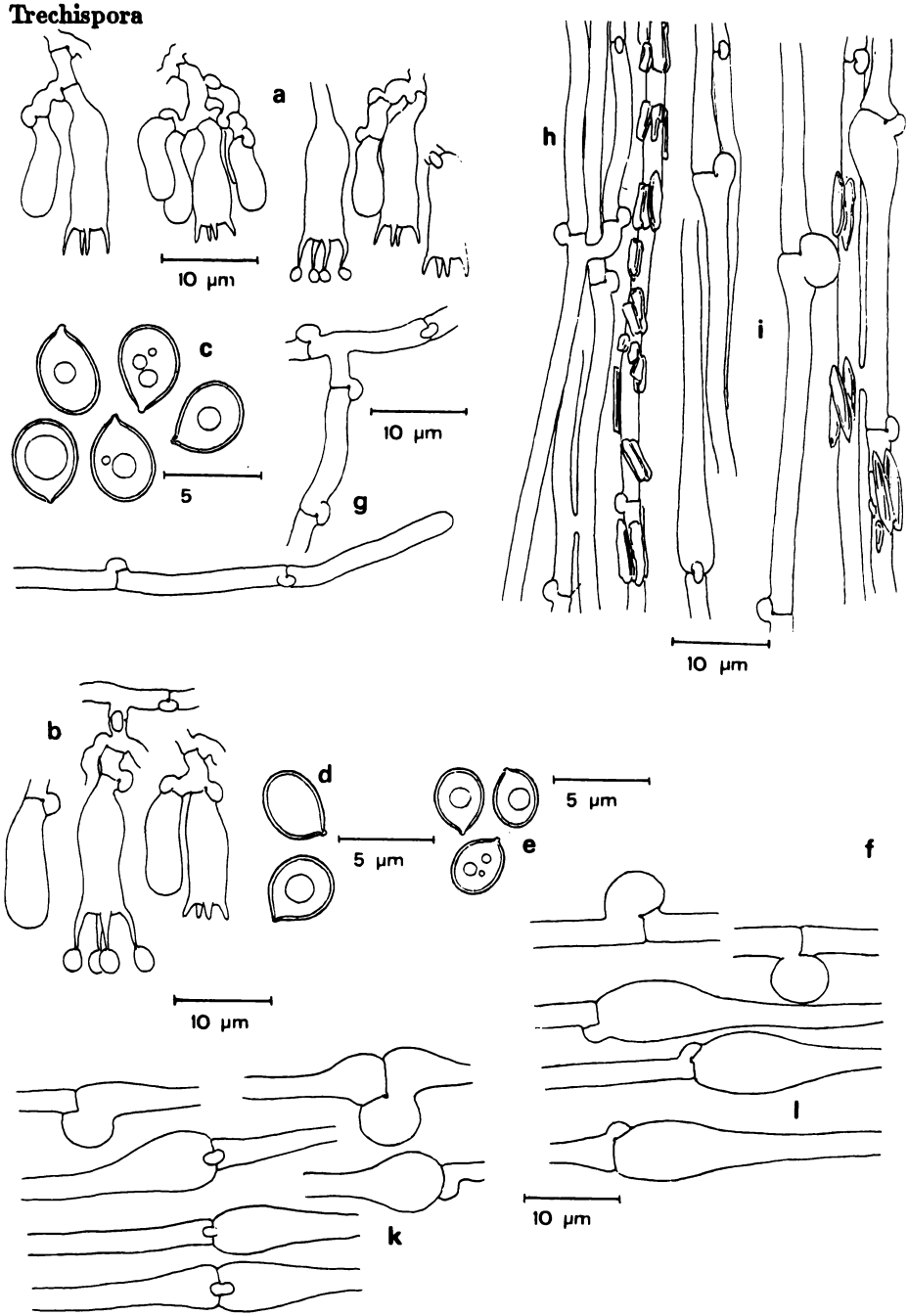


Fig. 793. *Trechispora cohaerens* a,b) basidia, c–f) spores, g–i) subicular hyphae, k,l) ampullate septa. —Coll. a,c,g,h Hallenberg & Sunhede 1153; b,d Hjortstam 12936; e Hjortstam 14141; f Eriksson 298; i,k,l Larsson 3565

Hyphal system monomitic, all hyphae thin-walled and with clamps, hyphae in the subiculum and in the cordons narrow, 1.5–3 μm wide, moderately branching and somewhat winding, encrusted, hyphe in the subhymenium short-celled, richly branched, irregular and mainly about 2 μm wide, conidiogenous hyphae narrow 0.7–2 μm wide, forming whitish to ochraceous, byssoid or pulverulent mats, especially near the margin.
Basidia cylindrical or short-pedunculate, 20–30×4.5–5.5(–7) μm, with four sterigmata and a basal clamp.
Spores verruculose, broadly elliptical with adaxial side flattened, (3–) 3.5–4(–4.5)×(2.5–)2.7–3.2(–3.5) μm inclusive of the warts, slightly thick-walled.
Conidia aleuroconidia born on 0.7–1 μm wide, short sidebranches to conidiogenous hyphae, thick-walled, (3-)5.5–6.5×(3.5-)4.5(–5) μm, elliptical to subrhomboid, basally truncate or with an appendage which presumably is the rest of the clamp.
Habitat and distribution. On both deciduous and coniferous wood. In North Europe only found twice viz. Denmark, Sjaelland. Not uncommon in South Europe and Bourdot left a rich collection in PC. Besides we have seen material from Portugal, Italy, Germany and a collection of well developed specimens from Iran.
Remarks. Only one of the Danish finds show conidia and both are in poor condition. The spores, however, as seen in SEM, has the same kind of ornamentation as material from south Europe. Besides the reddish, grandinoid hymenium with a whitish subhymenium and the long basidia should make the determination reliable.

2. Trechispora cohaerens (Schw.) Jül. & Stalpers Fig. 793
Verh. Kon. Ned. Akad. Wet. Nat. II, 74:257, 1980 — *Sporotrichum cohaerens* Schw., Trans. Amer. phil. Soc. n.s., 4:272, 1832.

Fruitbody resupinate, effuse, white to ochraceous, pellicular and pliable or loosely adnate, usually thin but sometimes with a more well developed subiculum, often cracked, smooth to minutely granular and more or less porose, younger parts often arachnoid or radially fibrillose, margin also radially fibrillose or abrupt, cordons frequent in the subiculum extending beyond the margin.

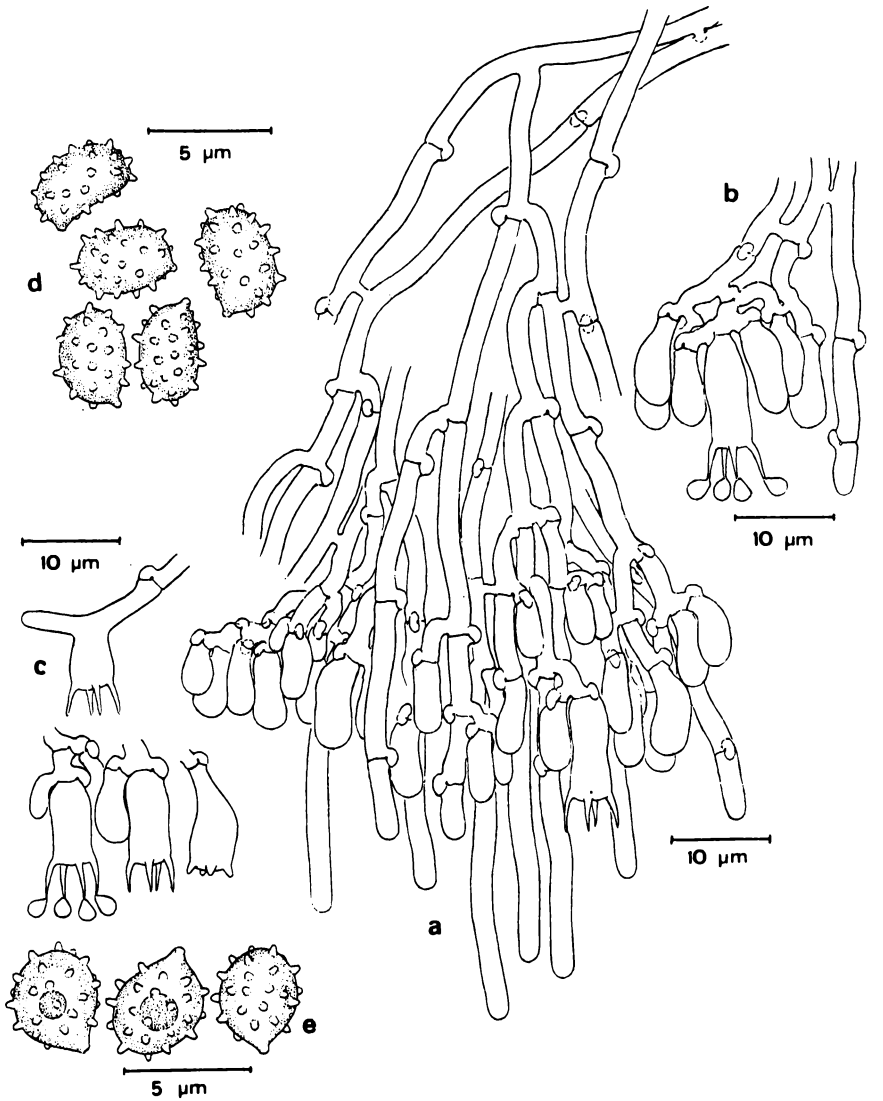


Fig. 794. *Trechispora farinacea* a) section through aculeus, b) part of hymenium, c) basidia, note false pleural basidium, d,e) spores. —Coll. a,b,d Larsson 1611; c,e Larsson 4226

Hyphal system monomitic, all septa with clamps, subicular hyphae 2–4 μm wide, thin-walled. loosely interwoven and frequently forming cordons, with ampullate septa, normally with crystals; subicular hyphae short-celled, richly branched. more or less isodiamteric and triangular in form, often looking irregular, (2–)3–5(–8) μm wide.
Basidia cylindrical, often slightly waisted 9–14×4–5 μm, with four sterigmata and a basal clamp.
Spores subglobose to broadly ellipsoid, more rarely narrowly ellipsoid, thick-walled (3–)3.5–4(–6)×(2–)2.5–3.5(–4.5) μm.
Habitat and distribution. Most common on deciduous wood but also found on coniferous wood and on a variety of other substrata like mosses, leaves and dead polypores. Known from all Nordic countries but only frequent in the southernmost parts.
Remarks. *T. cohaerens* is here treated in a broad sense including such taxa as *T. amianthina* (Bourd. & Galz.) Liberta and *T. byssinella* (Bourd.) Liberta. Further study is needed before a more narrow species concept can be applied to the smooth-spored species of *Trechispora*.

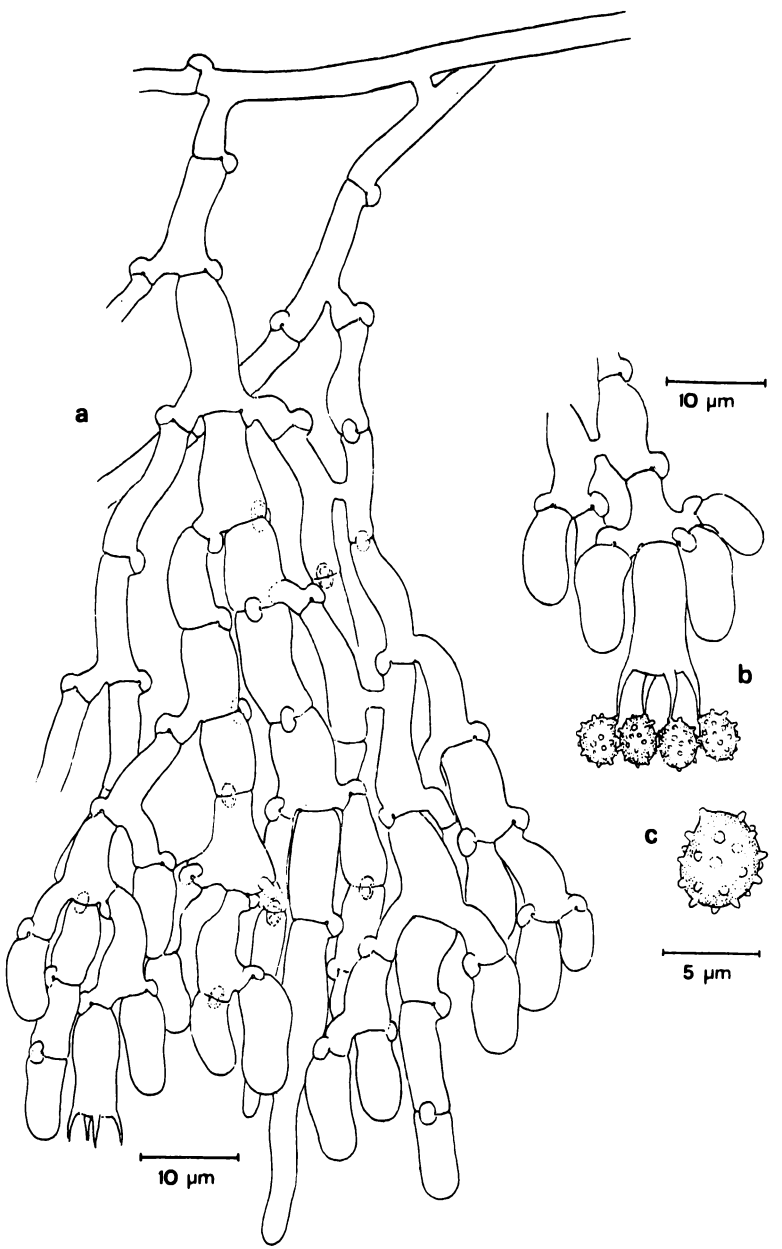


Fig. 795. *Trechispora farinacea* a) section through aculeus, b) basidia, c) spore. —Coll. Lundell 1898

3. Trechispora farinacea (Pers.:Fr.)Liberta Fig. 794–797
Taxon 15:318, 1966 — *Hydnum farinaceum* Pers.:Fr., Syst. Mycol. I p. 419, 1821.

Fruitbody resupinate, effuse, fragile, thin to moderately thick, smooth to grandinioid to odontioid, when smooth porose or cracked, whitish to ochraceous, sometimes with white, cushionlike, byssoid, conidiaforming mycelium either growing in contact with the fertile mycelium or separate, margin thinning out, sometimes fibrillose, cordons not so often seen.
Hyphal system monomitic, subicular hyphae mostly few but frequently seen at the margin, thin-walled, straight, mainly 2–3 μm wide, with ampullate septa, subhymenial hyphae broader, short-celled, richly branched, often inflated to triangular and 2.5–5(–6) μm, all septa with clamps.
Basidia cylindrical, often slightly waisted or sinuous, (9–)11–14(–18)×4.5–5 μm, with four sterigmata and a basal clamp.
Spores subglobose to broadly elliptical, densely verrucose with the warts evenly spread around the spore, 4–4.5(–5)×3.3–3.7 μm, slightly thick- walled.
Conidia as arthroconidia, cylindrical or irregular with remnants of clamps easily seen. about 5×2.5 μm, formed through fragmenting of straight, short-celled hyphae. This anamorph is called *Osteomorpha fragilis* Arnaud ex Watling & Kendrick.
Habitat and distribution. On well decayed wood both of deciduous trees and conifers. In North Europe widespread and the most common species of the genus found in all parts of the area.
Remarks. *T. farinacea* is here taken in the broad sense outlined by Liberta (1973). It then includes several taxa which definite delimitation needs futher study.

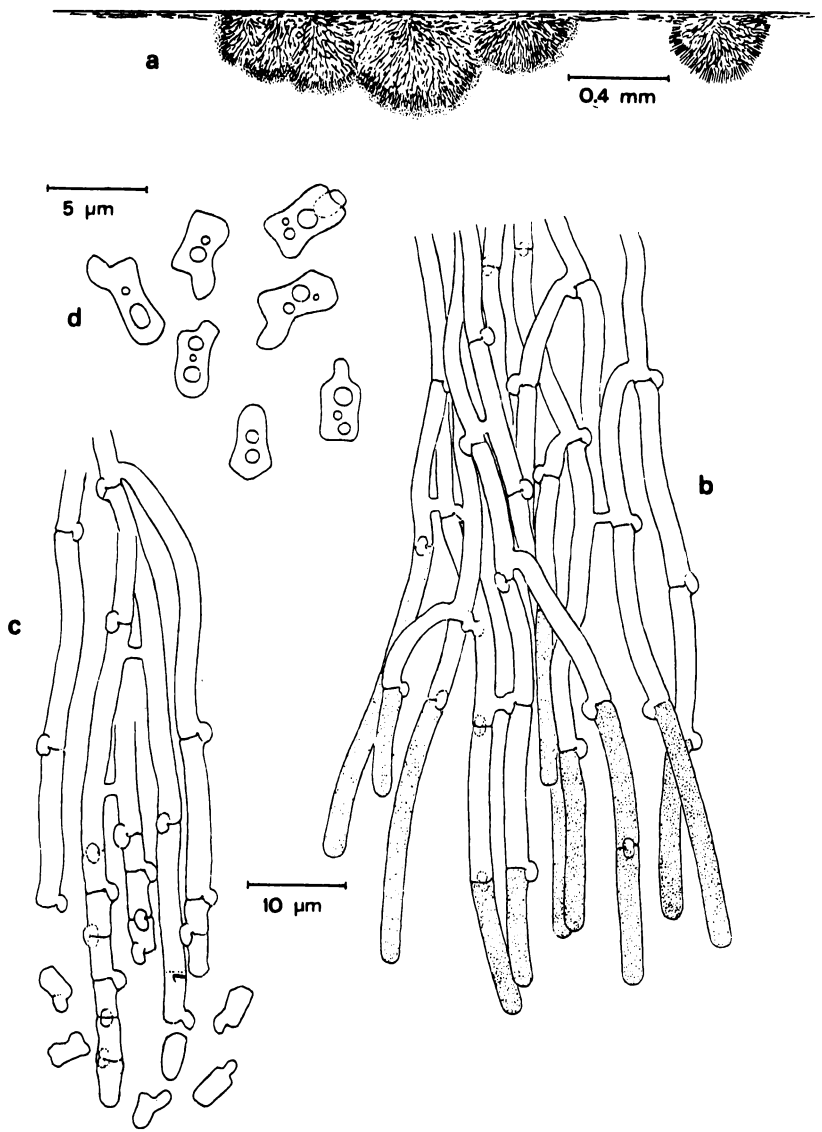


Fig. 796. *Trechispora farinacea* a) section through conidial cushions, b) unripe conidiogenous hyphae, c) ripe, fractioning conidiogenous hyphae, d) conidia. —Coll. Larsson 1611

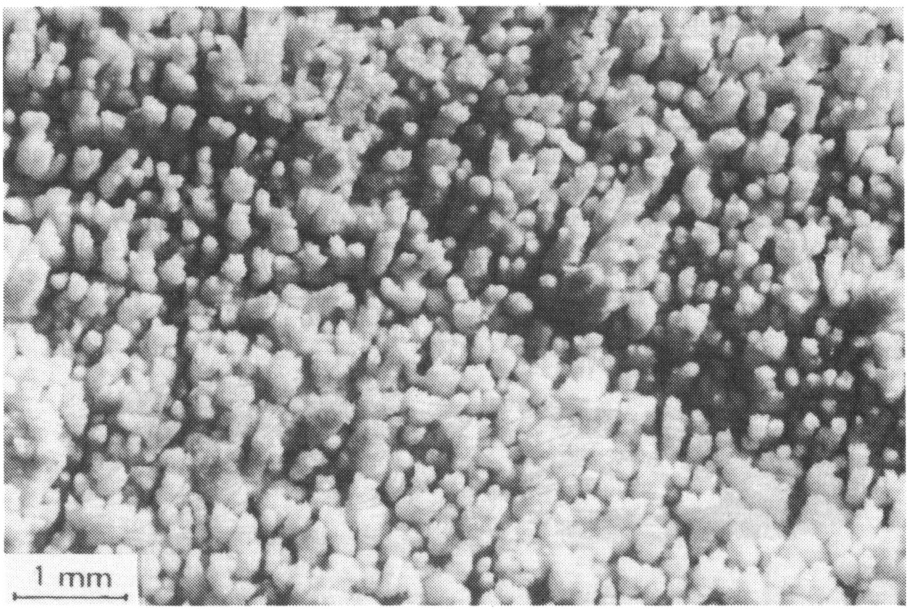


Fig. 797. *Trechispora farinacea* —Coll. Larsson 6275. Photo K.-H. Larsson

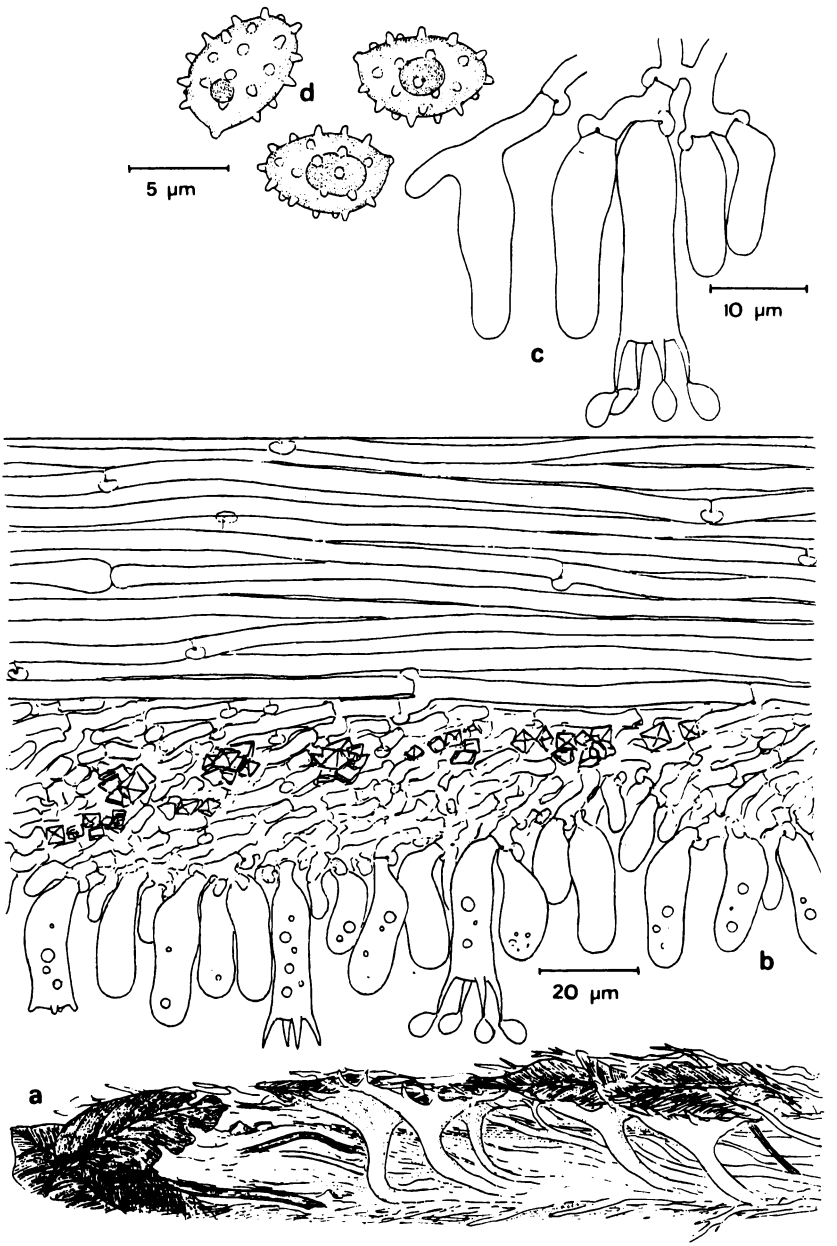


Fig. 798. *Trechispora fastidiosa* a) fruitbody growing under leaves, b) section through fruitbody, c) basidia, d) spores. —Coll. Bengt Pettersson 1946–09–27

4. **Trechispora fastidiosa** (Pers.:Fr.) Liberta Fig. 798
Taxon 15:318, 1966 — *Thelephora fastidiosa* Pers.:Fr., Syst. Mycol. I p. 435, 1821.

Fruitbody resupinate, reflexed, dimidiate or almost clavarioid, widely effused and extending over twigs, leaves and even living herbs, often forming fairy rings, moderately thick, membranaceous and the hymenium easily separated from the loosely adnate subiculum, fragile, cream-coloured with a pure white subiculum, smooth or in the dissecting microscope densely colliculose, margin thinning out, white, often radially fibrillose, with a strong unpleasant smell which disappears upon drying.
Hyphal system monomitic, subicular hyphae straight, uniform, 2–3(4) μmwide, running parallel to the substratum, subhymenial hyphae shortcelled, richly branched, varying in width from 2 to 6 μm, neither distinctly isodiametric nor triangular, all septa with clamps.
Basidia tubular, slightly constricted and often somewhat diltated basally (20–)25–30(–35)×5–6 μm, with four sterigmata and a basal clamp.
Spores elliptical, verrucose, (5–)6–7(–7.5)×(4–)4.5–5.5 μm inclusive of the warts.
Habitat and distribution. Terrestrial, growing in deciduous forests or in woodland meadows on calcareous ground. In North Europe only known from the islands of Gotland and Öland in Sweden and from Denmark (Christiansen 1960). Probably a southern species with demands for calcareous ground and a favourable climate.
Remarks. Unique species among the Corticiaceae due to its terrestrial ecology with ability to form fairy rings and the strong smell.

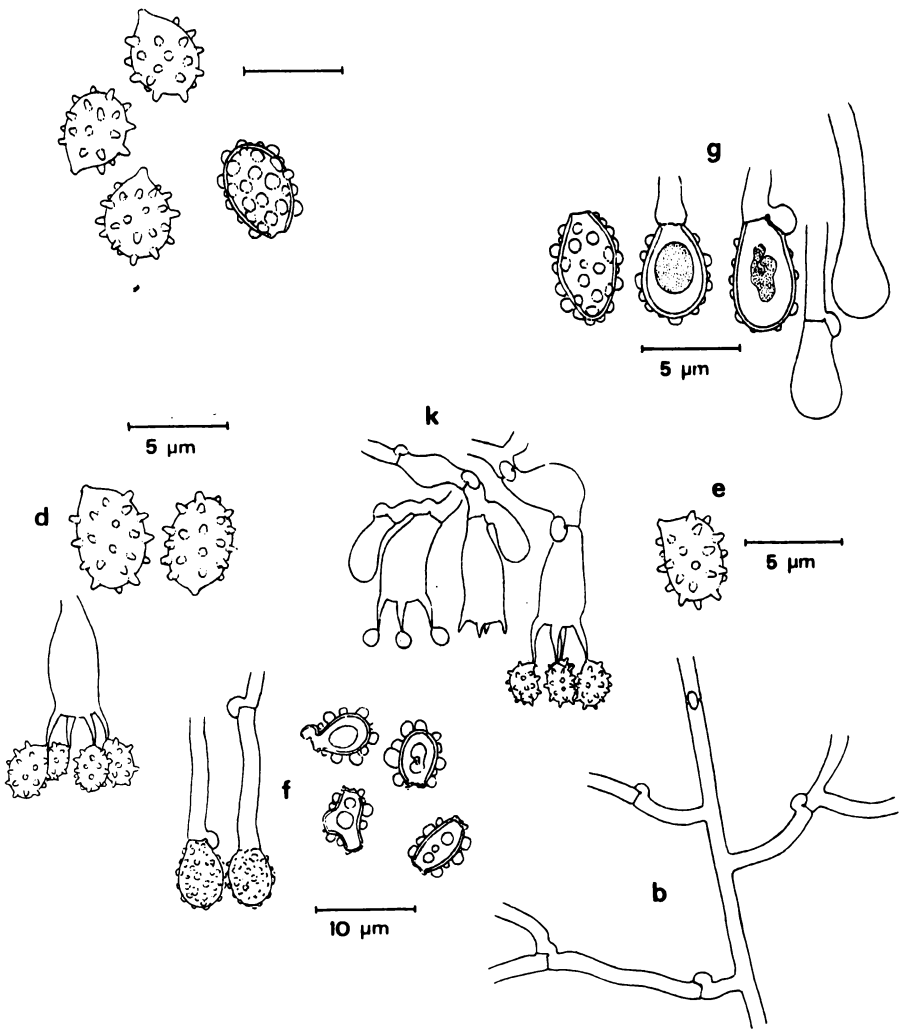


Fig. 799. *Trechispora invisitata* a) generative and skeletal hyphae in cordon, b) generative hyphae, c–e) spores, f,g) conidiophores and conidia, i,k) basidia. –Coll. a,c,h,i Typus; b,e,f,k Hauerslev 5546; d Hjortstam 9690

5. Trechispora invisitata (Jacks.) Liberta Fig. 799
Taxon 15:318, 1966 — *Corticium invisitatum* Jacks., Can. Journ. Res. C 26:155, 1948.

Fruitbody resupinate, effuse, very thin to moderately thick, at first pruinose to farinaceous, by age minutely colliculose to granulose, always strongly porose, greyish white to yellowish, conidial areas thicker, forming wooly cushions or more effused patches, white, margin white, arachnoid, often fibrillose and with cordons which extends through the subiculum and beyond the margin.
Hyphal system dimitic, skeletal hyphae occurring in the cordons, straight, rarely branched, with very few septa 1–1.5 μm wide, cyanophilous, subicular hyphae thinwalled straight, sometimes provided with needle-like crystals, 2–3 μm wide, often with ampullate septa, subhymenial hyphae thin-walled, short-celled, richly branched, often inflated or triangular in appearance 3–5(–7) μm.
Basidia cylindrical, slightly waisted, 10–13×4.5–5 μm, with four sterigmata and a basal clamp.
Spores obliquely lacrymoid or ovate with the adaxial side straight, densely verrucose with few warts in the adaxial apicular region (suprahilar plague) 4.5–5.5×3.5–4 μm.
Conidia born singly on thin-walled, 1–1.5 μm wide conidiogenous hyphae, subglobose to elliptical, thick-walled, densely covered with bladders of unequal size and provided with a clamp-like hook near the base.
Habitat and distribution. On all kind of well rotten wood lying close to the ground and on debris like fern remains, leaves and mosses. In Europe first reported from Denmark (Hauerslev, Friesia X:321) and collected by him several times. Also collected several times in southwest Sweden and occasionally as far north as Västerbotten. Neither collected in Norway nor in Finland.
Remarks. The type of this species is meager and fragmented. The description here is therefore based solely on the Nordic material. The identity of our collections with Jackson's species is not fully clear.

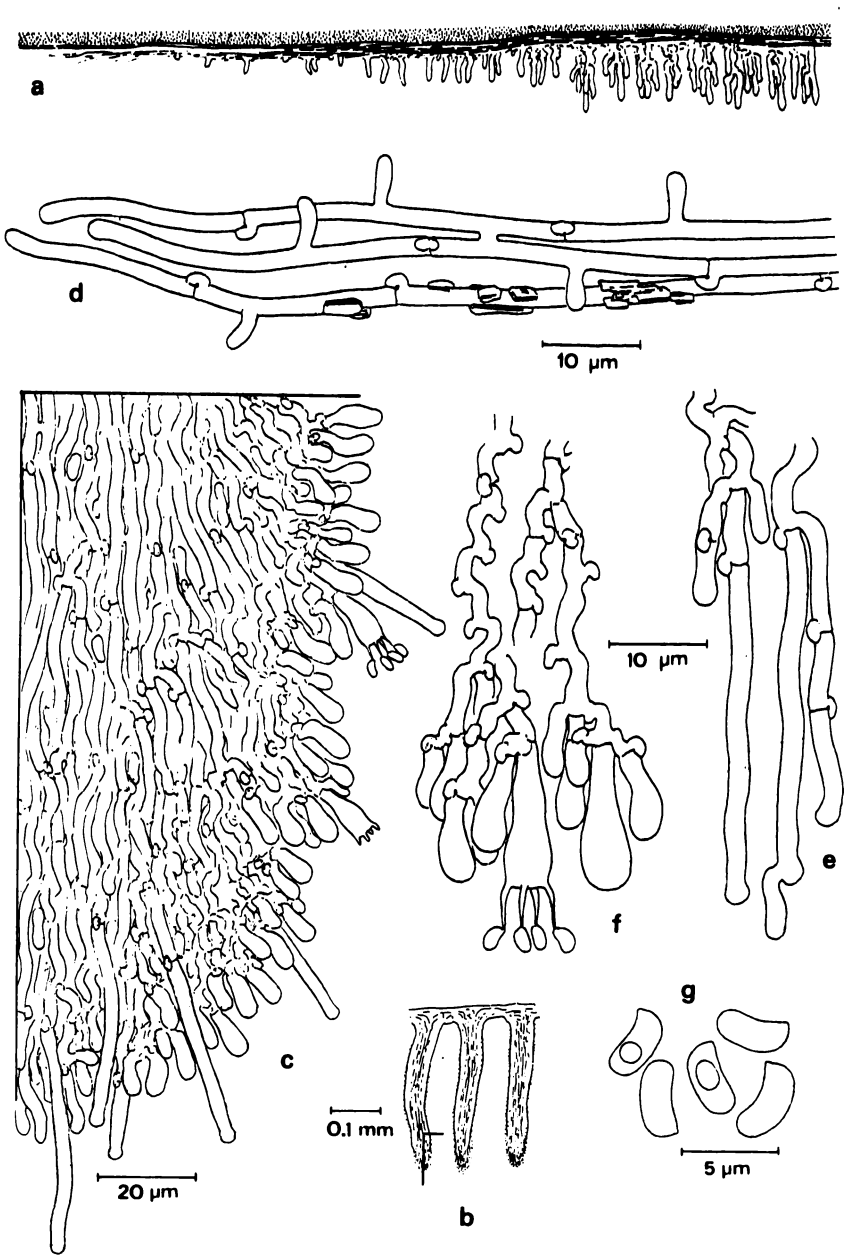


Fig. 800. *Trechispora lunata* a) section through marginal part of fruitbody, b) section through aculei showing position of section c., c) section through aculeus, d) subicular hyphae from the margin, e) part of hymenium with cystidia, f) part of hymenium, g) spores. –Coll. a–f Morander 3145; g Larsson 1744

6. Trechispora lunata (Bourd. & Galz.) Jülich Fig. 800
Persoonia 8:293, 1975 — *Grandinia lunata* Bourd. & Galz., Hym. de France p. 410, 1928.

Fruitbody resupinate, effuse, loosely adnate, at first arachnoid to reticulate, then densely grandinioid to odontioid, individual spines occasionally reaching 0.5 mm, fragile to subceraceous, greyish white, pale ochraceous to ochraceous, margin arachnoid, fibrillose, with cordons extending up to 2 cm from the fruitbody, white.
Hyphal system monomitic, subhymenial hyphae and hyphae of cordons thin-walled, straight, richly anastomosing, with short side-branches, 5–10×1–1.5 μm, not separated by a septum, hyphae in the inner of the teeth somewhat broader, 2.5–3.5 μm wide, subhymenial hyphae short-celled 2–3 μm wide, all septa with clamps. hyphae often encrusted with an amorphous matter only visible in KOH.
Cystidia hyphoid, occurring in the hymenium and more frequent near the teeth-apices, 15–40×2–3 μm, subcapitate to distinctly capitate.
Basidia subcylindrical to clavate or pedunculate (10–)12–16(–18)×4–4.5 μm, with four sterigmata and a basal clamp.
Spores smooth, thin-walled, short-allantoid, slightly broader near the apiculus, 3–3.5×1.2–1.4 μm.
Habitat and distribution. Growing on decorticated coniferous wood with a preference for *Pinus*. It is a widespread species collected in North Europe from Småland to Torne Lappmark. It is nowhere common and has probably a demand for old forests.
Remarks. This species is externally a typical *Trechispora* but in micromorphological details rather aberrant. As there is no other suitable genus available we have choosen to retain it in *Trechispora*.

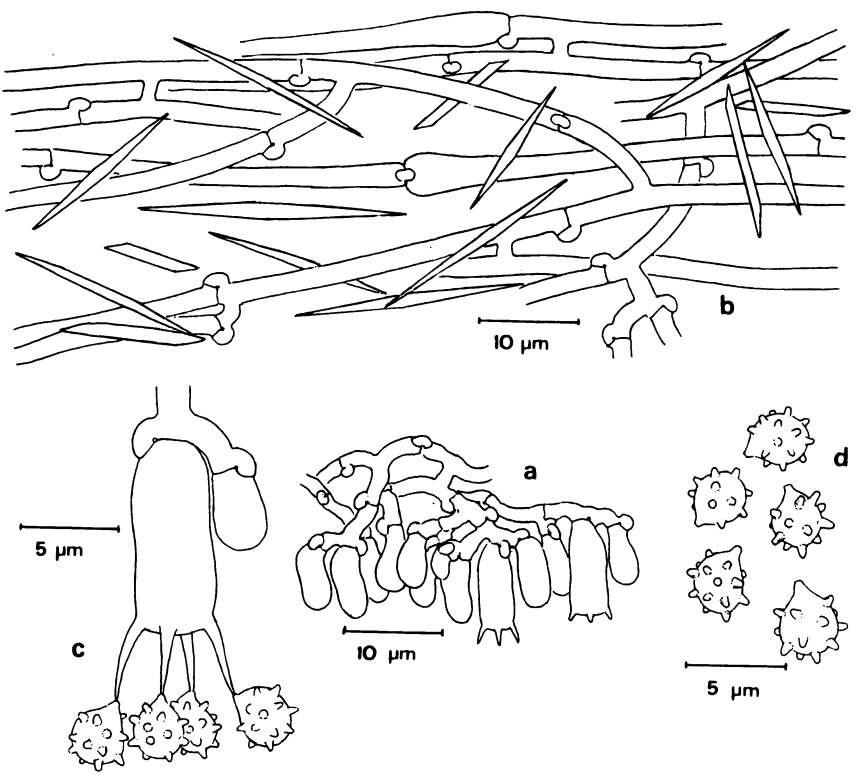


Fig. 801. *Trechispora microspora* a) section through hymenium, b) subhymenial hyphae with acerose crystals, c) basidia, d) spores. –Coll. Typus

7. Trechispora microspora (Karst.) Liberta Fig. 801
Taxon 15:319, 1966 — *Grandinia microspora* Karst., Bidr. Känn. Finl. Nat. Folk 48:365, 1889.

Fruitbody resupinate, effuse, thin and fragile, easily detachable from the substratum, arachnoid, smooth or minutely granular, always strongly porose, margin thinning out, often fibrillose, cordons regularly present in the subiculum and extending beyond the margin.
Hyphal system monomitic, subicular hyphae and hyphae of cordons thin-walled, straight, 1.5–2.5(–3.5) μm wide, frequently with ampullate septa, provided with acerose crystals, subhymenial hyphae short-celled, richly branched, of even width or sligthly inflated, 2–4(–5) μm wide.
Basidia cylindrical, 9–11×4–5 μm, with four sterigmata and a basal clamp.
Spores subglobose to lacrymoid, with a prominent apicular region, verrucose except for in the apicular region, 4–4.5(–5)×(3)–3.3–3.5(–4) μm inclusive of the warts.
Habitat and distribution. On both deciduous and coniferous wood and also collected on fern remains. Widespread but not common. Seems to be more frequent in the boreal parts of North Europe as there is only a few collections from southernmost Sweden and from Denmark. Not collected in northernmost Scandinavia.
Remarks. The acicular crystals serves to distinguish this species from *T. farinacea* and *T. stellulata.*

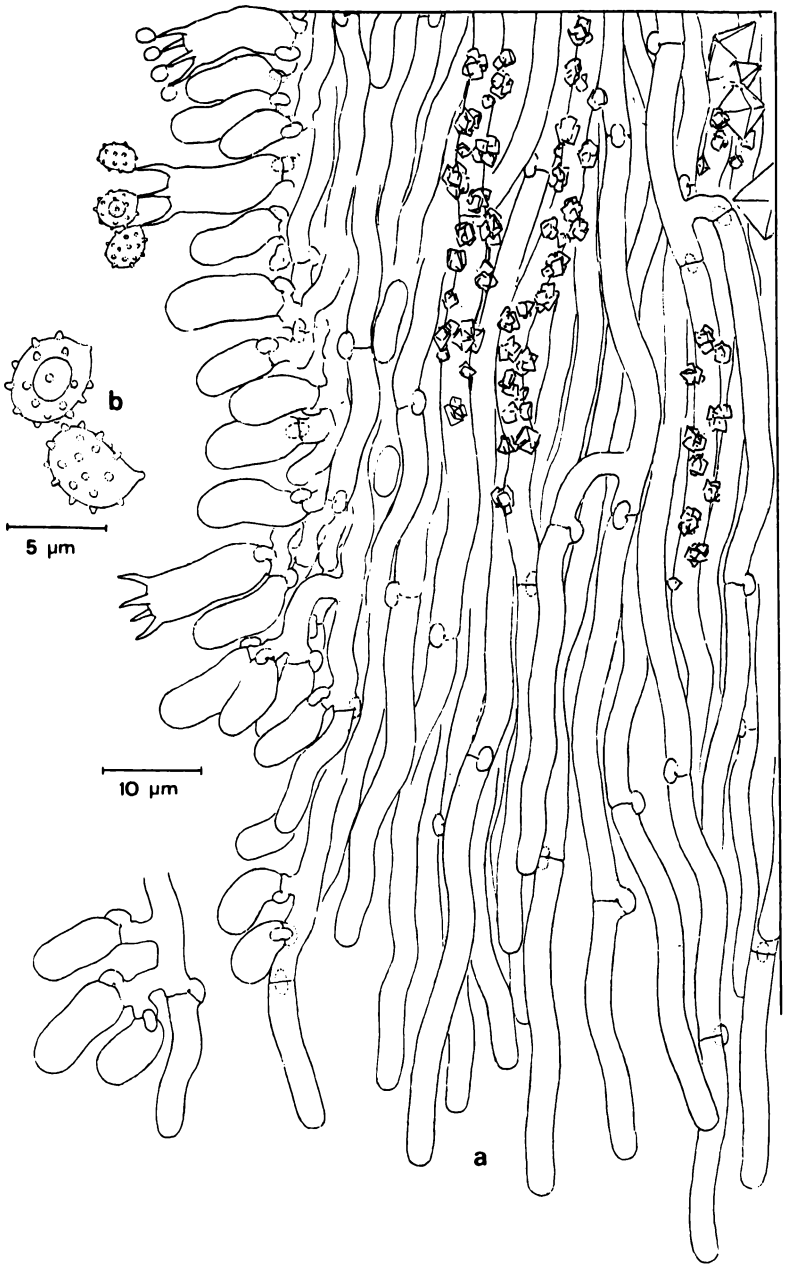


Fig. 802. *Trechispora mollusca* a) section through dissepiment, b) spores. –Coll. Ridelius 1933–11–07

8. Trechispora mollusca (Pers.:Fr.) Liberta Fig. 802–805
Can. J. Bot. 51:1878, 1973 — *Polyporus molluscus* Pers.:Fr., Syst. Mycol. I p. 384, 1821.

Fruitbody resupinate, effuse, poroid, soft and fragile, easily detachable, up to 2 mm thick, pores rounded, angular or sinuous, when dried of unequal width 2–5 per mm, as fresh white, in the herbarium changing to more or less ochraceous, cordons often seen at the margin which is thinning out, often broad, arachnoid and often finely fibrillose.
Hyphal system monomitic, in the subhymenium and in the dissepiments straight, thin-walled to slightly thick-walled 2–5 μm wide, encrusted, forming byssoid mats and cordons in the subiculum, septa in the cordons often ampulliform, hyphae in the byssoid mats often with large, globose vesicles 20–25(–40) μm, subhymenium lacking or composed of a few layers of richly branched, very short-celled, nearly isodiametric or irregular hyphae but often basidia are born directly on the dissepiment hyphae.
Basidia short-cylindrical, often slightly waisted, 10–15×5–6 μm, sometimes with a pleural appearance when terminating a vertically growing hyphae, with four sterigmata and a basal clamp.
Spores broadly ellipsoid to ellipsoid, verrucose, 4–5.5×3.5–4.5 μm inclusive of the warts.
Habitat and distribution. A very common species in both deciduous and conifer forests in the whole of North Europe. Usually growing in well sheltered places on strongly decayed trunks and branches.

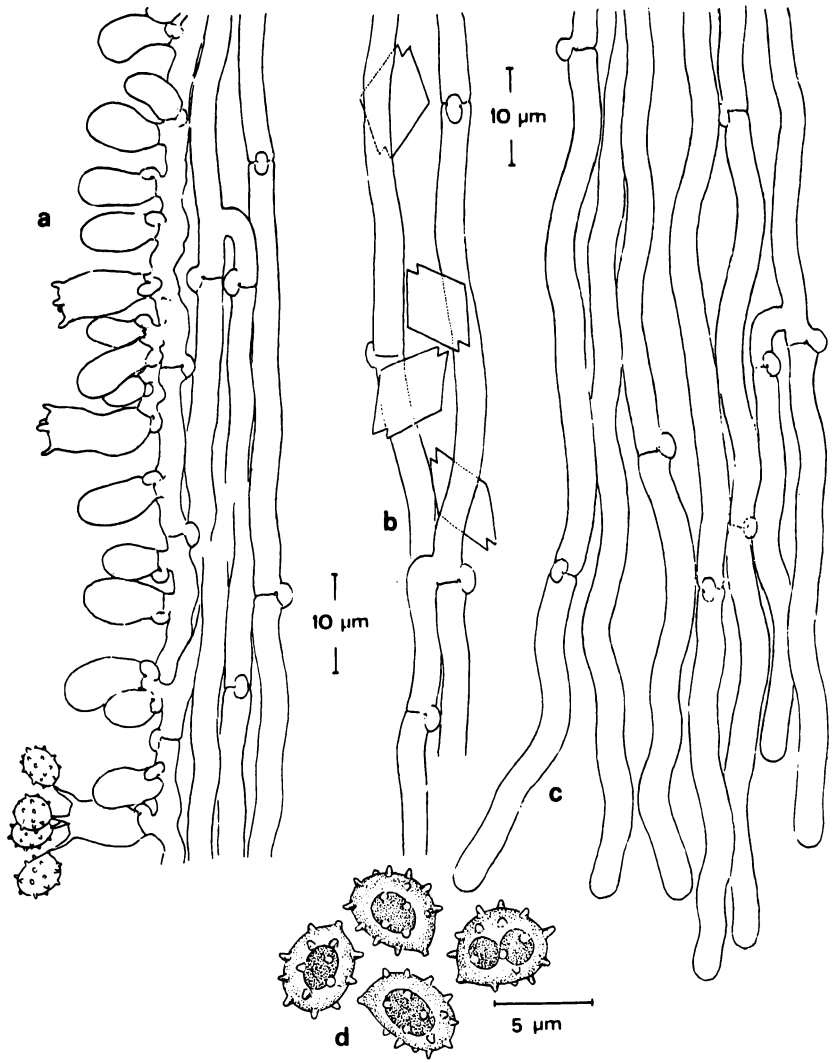


Fig. 803. *Trechispora mollusca* a) hymenium born directly on the dissepiment hyphae, b) hyphae in dissepiment, c) hyphae of pore–edge, d) spores. –Coll. Hjortstam 8628

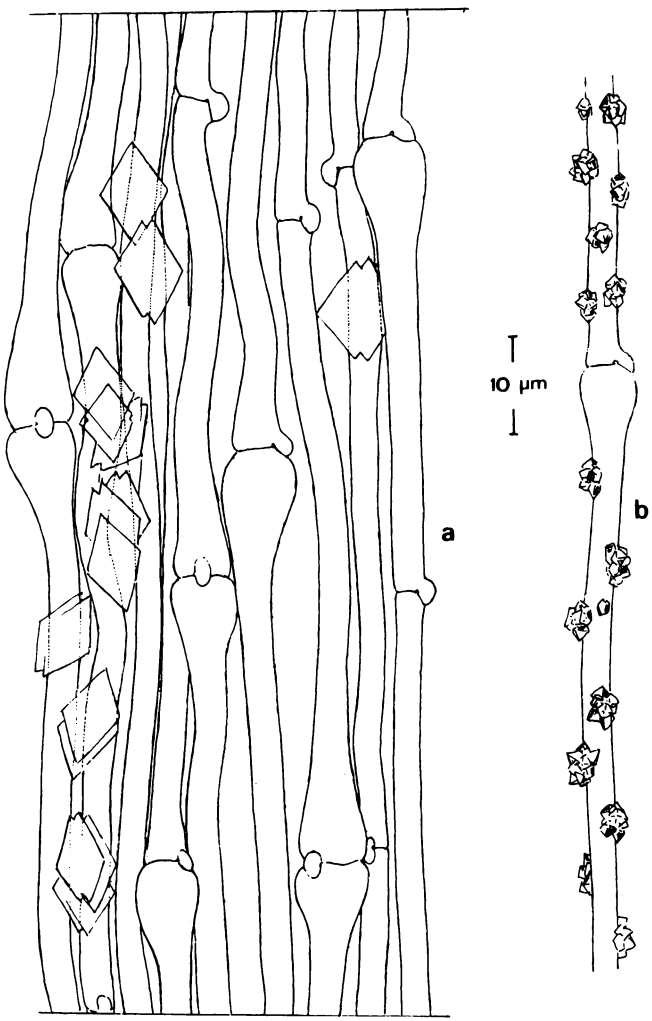


Fig. 804. *Trechispora mollusca* a,b) encrusted hyphae in cordons. –Coll. a Hjortstam 8628; b Hallenberg 1052

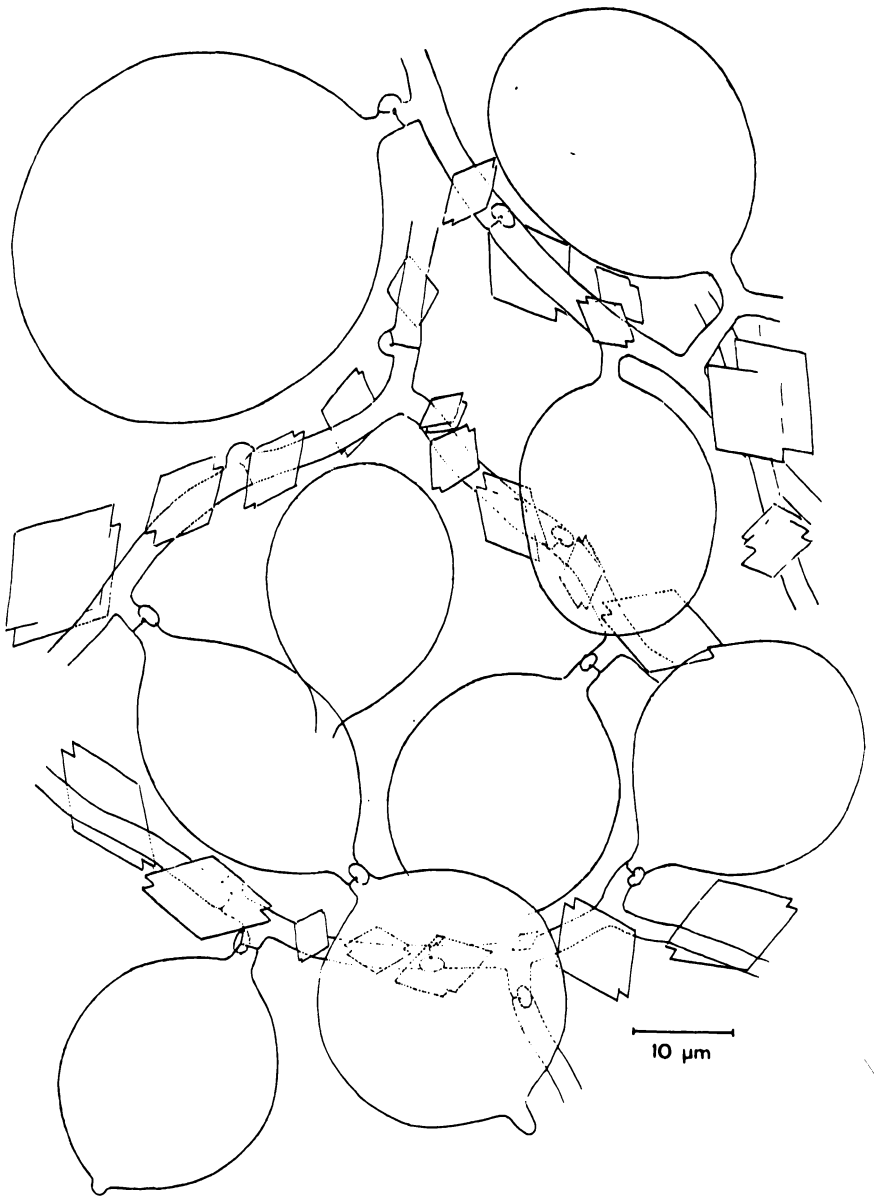


Fig. 805. *Trechispora mollusca* sphaerical bladders in byssoid mats of the subiculum. –Coll. Hjortstam 3072

9. Trechispora praefocata (Bourd. & Galz.) Liberta Fig. 806
Taxon 15:329, 1966 — *Corticium sphaerosporum* Maire ssp *praefocatum* Bourd. & Galz., Hym. de France p 233, 1928.

Fruitbody resupinate, effuse, thin, easily detachable, arachnoid to byssoid, whitish, bluish white or sligthly ochraceous, frequently with cordons in the subiculum, margin thinning out, often fibrillose.
Hyphal system monomitic, subicular hyphae horizontally arranged, thin-walled, narrow, only 1–2 μm wide, encrusted with acicular crystals, subhymenium very thin, normally only one to two cells thick composed of short-celled, richly branched, isodiametric and more or less triangular cells about 2–5 μm in width, all septa with clamps.
Basidia cylindrical to sligthly pedunculate, 12–16×5–6 μm with four sterigmata and a basal clamp.
Spores elliptical, densely covered with long spines, 5.5–6.5×4.5–5(–6) μm inclusive of the 1 μm long spines.
Habitat and distribution. Growing on all kind of debris, often fern-remains and needles but also twigs and branches in both deciduous and conifer forests. Rather rare and mostly collected in south-west Sweden and in Denmark. Also recorded a few times in Norway but not known from Finland.
Remarks. Easily determined species thanks to the narrow hyphae, acicular crystals and the long-spined spores.

10. Trechispora stellulata (Bourd. & Galz.) Liberta Fig. 807
Taxon 15:319, 1966 — *Corticium stellulatum* Bourd. & Galz., Bull. Soc. Mycol. France 27:263–64, 1911.

Fruitbody resupinate, effuse, fragile, easily separable or loosely adnate, thin to moderately thick, finely farinose to minutely granular, arachnoid to byssoid, thicker fruitbodies strongly porose, whitish to ochraceous, margin not differentiated or strongly fibrillose with cordons often seen extending beyond the margin.
Hyphal system monomitic, subicular hyphae thin-walled, straight, moderately branched, 2.5–3.5(–4) μm wide, ampullate septa few but constantly occurring, subhymenial hyphae thin-walled, short-celled, richly branched, often inflated or irregular in appearance and about 2–5 μm wide.
Basidia short-cylindrical or slightly clavate, often somewhat waisted, 9–12×4.5–5 μm, with four sterigmata and a basal clamp.

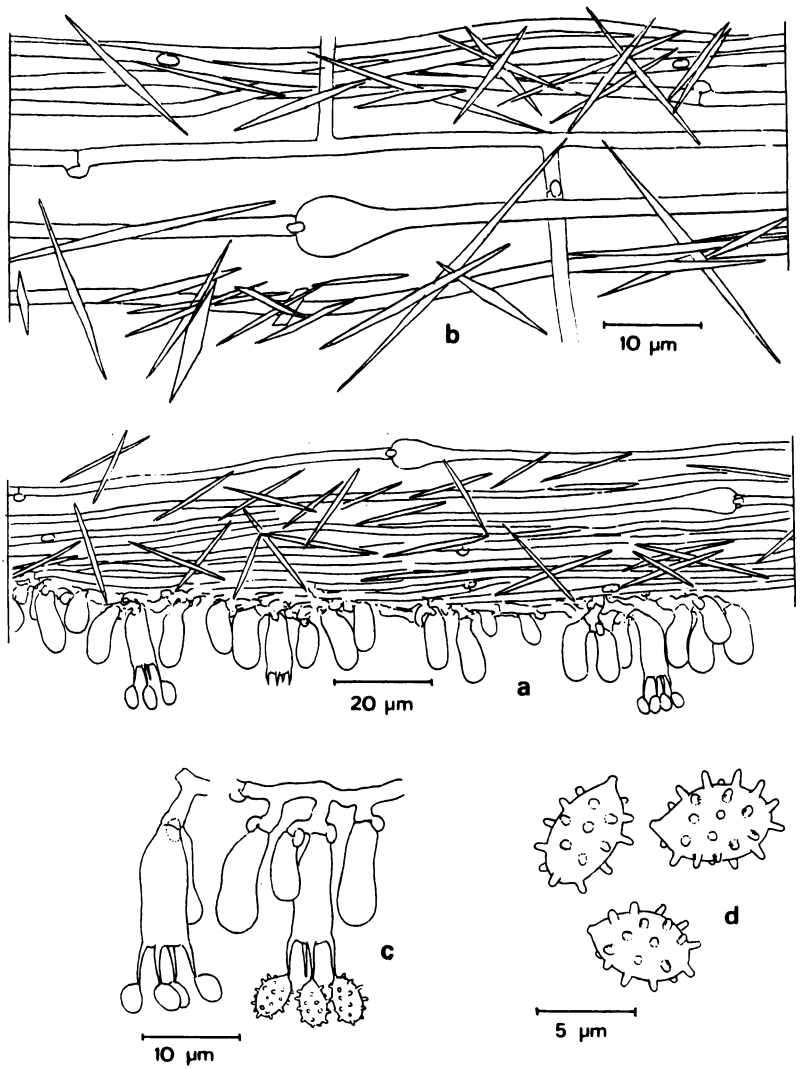


Fig. 806. *Trechispora praefocata* a) section through fruitbody, b) encrusted subhymenial hyphae, c) basidia, d) spores. –Coll. Larsson 2008

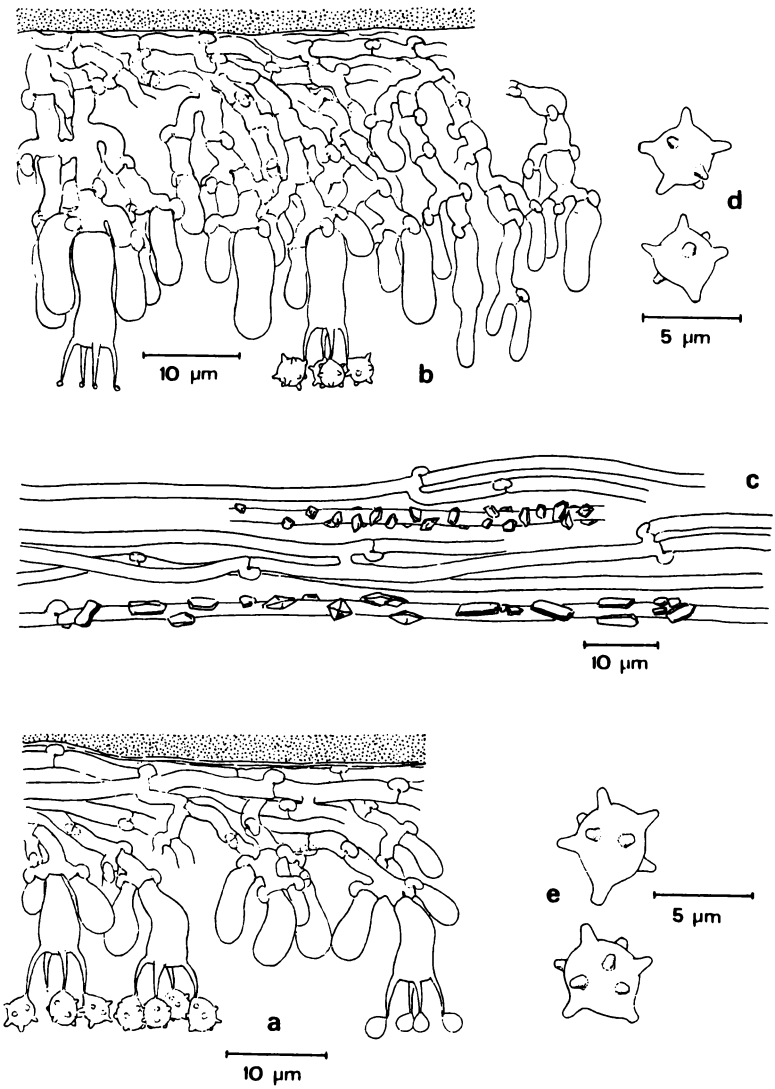


Fig. 807. *Trechispora stellulata* a,b) section through fruitbodies, c) hyphae in cordon, d,e) spores. –Coll. a,e Larsson 1601; b- -d Hjortstam 12631

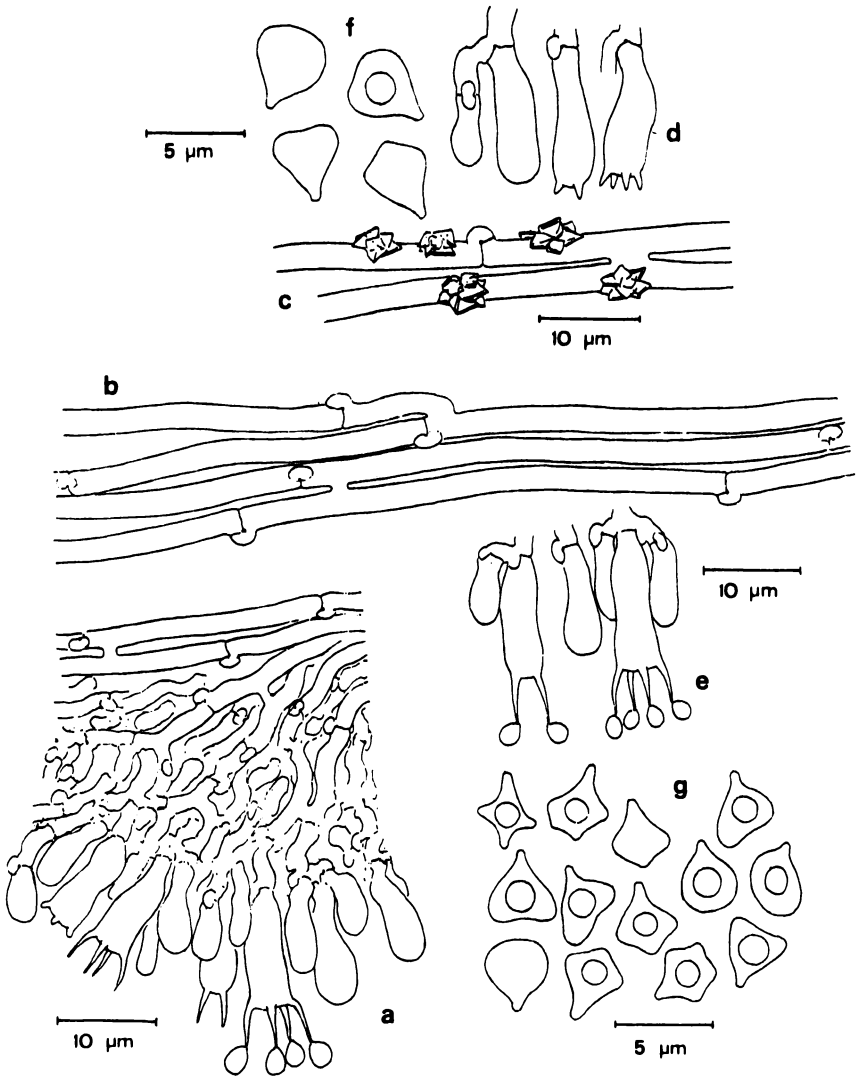


Fig. 808. *Trechispora subsphaerospora* a) section through fruitbody, b,c) subhymenial hyphae, d,e) basidia, f,g) spores. –Coll. a,b,e,g Larsson 1976–10–09; c,d,e Typus

Spores subglobose, with few but rather long spines, arranged irregularly on the spore as seen in the light-microscope, 3.5–4×3–3.5 μm inclusive of the spines.
Habitat and distribution. On all kind of wood and also frequently on fern remains or on other debris. Seems to be more frequent in the southern part of North Europe and often collected in Denmark och south-west Sweden. Collected as far north as Sør-Trøndelag in Norway and from Etälä-Häme in Finland. More frequent in herb-rich forests.
Remarks. Though much confusion has followed this species through the years we still think it is a good taxon even if the spores reported by Bourdot and Galzin proved to be an infection by *Sterigmatomyces* sp.

11. Trechispora subsphaerospora (Litsch). Liberta Fig. 808
Can. J. Bot. 51:1887, 1973 — *Corticium subsphaerosporum* Litsch. in Keissler, Nat. Hist. Juan Fernandez and Easter Island 2:549, 1928.

Fruitbody resupinate, effuse, thin to moderately thick, fragile, easily separable from the substratum to loosely adnate, even to minutely colliculose or even slightly granular, usually strongly porose or as old cracked, whitish to ochraceous, often with a more white margin with an arachnoid to byssoid appearance and with fan-shaped mycelia and/or cordons.
Hyphal system monomitic, subicular hyphae and hyphae in cordons thin-walled, straight, moderately branched, 2–3.5 μm wide, in the mycelial cords reaching 5 μm, ampullate septa not rare, subhymenial hyphae thin-walled, short-celled and much branched, often isodiametric, inflated or triangular in shape, about 3–5(–7) μm wide, all septa with clamps.
Basidia subcylindrical to clavate or sligthly pedunculate 11–14(–16)×4.5–5(–6) μm, with four sterigmata and a basal clamp.
Spores angular, turbinate, with a few low warts or tubercles, mainly in the corners and never in the apicular region, nearly isodiametric and 3.5–4(–4.5) μm.
Habitat and distribution. In deciduous and conifer forests of all kinds. Growing on wood as well as on fern remains and wood-remnants like fencing. Collected in all parts of North Europe and seems to be a wide-spread though not frequent species.
Remarks. Easily determined species thanks to the distinctive spore-morphology.

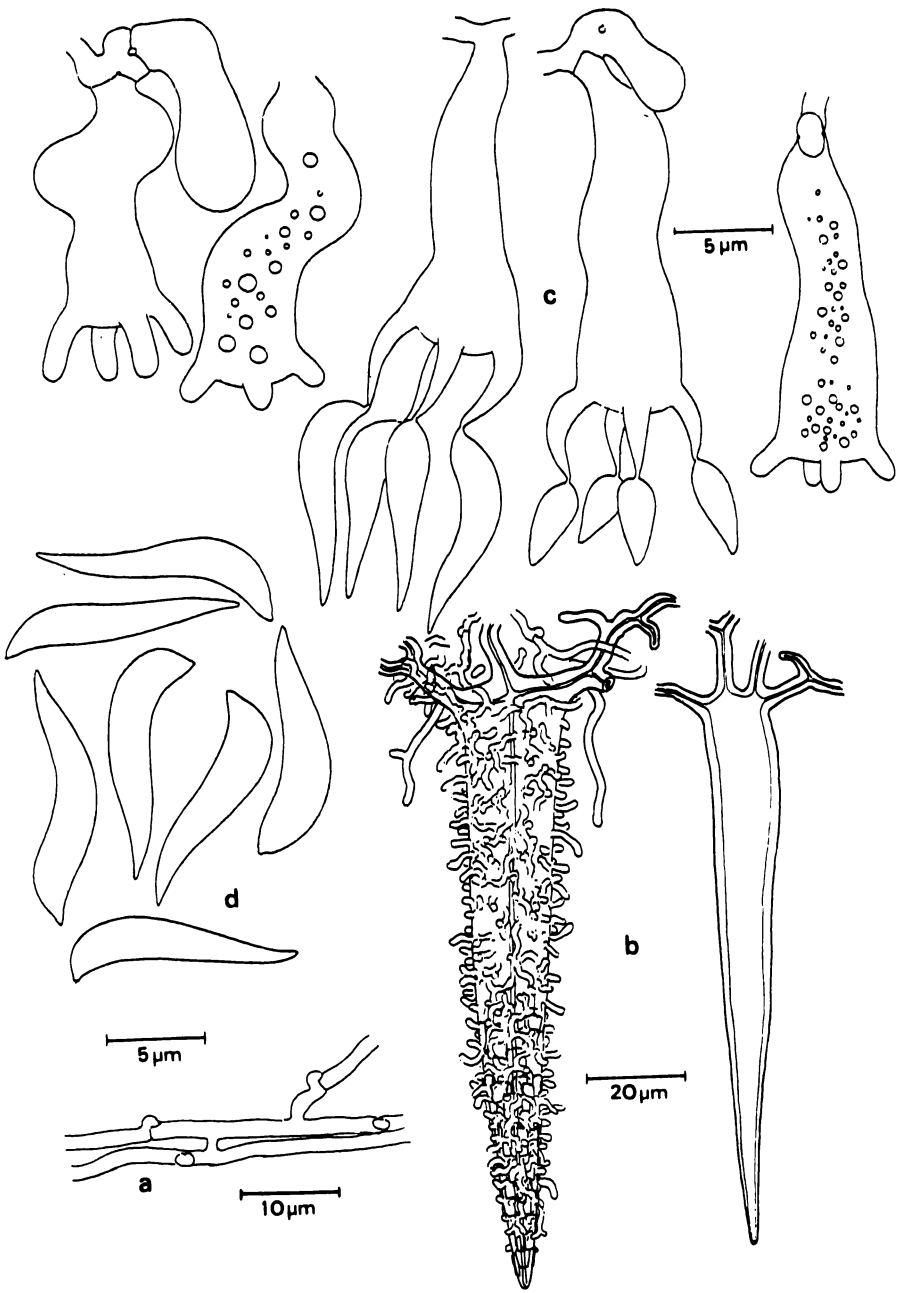


Fig. 809. *Tubulicium vermiferum* a) basal hyphae, b) cystidia, c) basidia, d) spores. -Coll. Hjortstam 12082

Tubulicium Oberw.
Sydowia, Ann. Mycol. ser. II 19:53, 1965.

Fruitbodies resupinate, effuse, closely adnate, thin to moderately thick, almost smooth but strongly hispid by protruding cystidia; hyphal system monomitic, hyphae thin-walled or with slight wall thickening, in the thin subicular tissue agglutinated, branching at more or less right angles, in the subhymenium more short-celled but still fairly straight and of uniform appearance, all hyphae with clamps, indextrinoid and inamyloid; cystidia (lyocystidia) numerous, robust and mostly multi-rooted, thick-walled throughout, strongly encrusted and covered with coralliform hyphae, distinctly narrower than other hyphae in the fruitbody; basidia clavate, more or less pedunculate, smooth, thin-walled, as a rule with four stout sterigmata; spores sigmoid to vermicular, smooth, thin-walled, inamyloid, indextrinoid and without cyanophilous reaction.

Type species: *Peniophora vermifera* Bourd.

Remarks. This genus is similar to *Litschauerella* but could possibly be kept separate by its smooth and worm-shaped spores. *Tubulixenasma* Parm. was described at the same time and with the same type and is cited in Index of Fungi to be described in May 1965. However, supplementary data have shown that *Tubulixenasma* was published in July while the description if *Tubulicium* was issued in June.

Tubulicium vermiferum (Bourd.) Oberw. ex Jülich Fig. 809–810
Persoonia 10:335, 1979. — *Peniophora vermifera* Bourd., Rev. Sci. Bourb. 23:13, 1910.

Fruitbody resupinate, spot-shaped or more normally widely effused, white to cream-yellow, smooth but often cracked, conspicuously hispid due to protruding cystidia, margin indeterminable or abrupt.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, somewhat agglutinated, 2–2.5 μm wide, with clamps.
Cystidia narrowly conical to cylindrical, usually 80–100 μm long and 8–12 μm wide near the base, thick-walled and slightly amyloid, with a narrow capillary lumen, strongly encrusted and besides also covered with narrow, dendroid hyphae, only 0.5–1 μm wide.
Basidia terminal, subclavate to more or less stalked, 25–35(–40)×10–12 μm, thin-walled, with four fairly stout sterigmata.
Spores sigmoid, flexuose-navicular or vermicular, smooth, thin-walled, generally 20–25×3.5–4 μm.

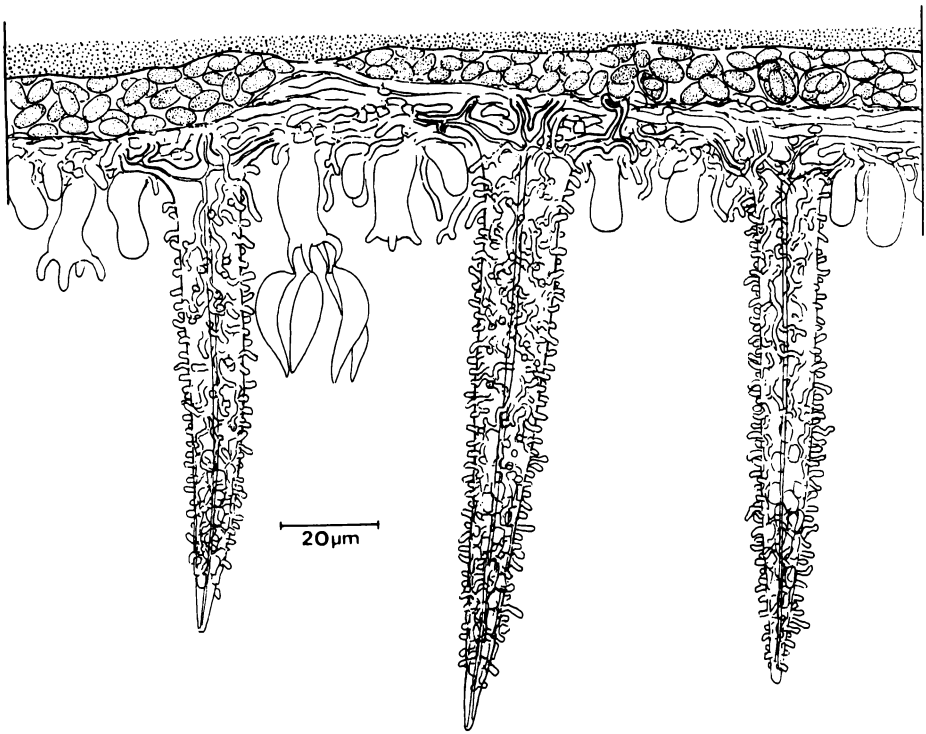


Fig. 810. *Tubulicium vermiferum* section through fruitbody. – Coll. Hjortstam 6176

Habitat and distribution. Rare species with few localities in the South-western part of Sweden and Western Norway. Usually on bark of living trees and bushes of *Salix* and *Corylus*.

Remarks. The robust lycocystidia, sheathed with dendroid hyphae and the worm-like spores are the most striking characters of this species. The spores are variable in length though in the Nordic material they are mostly 20–25 µm long. *T. dussii* (Pat.) Jülich, characterized by shorter and lunate spores, up to 11 µm long, seems to be an independent species which has a distribution in the tropics and/or the Southern hemisphere.

Tubulicrinis Donk
Fungus 26:13, 1956

Fruitbodies resupinate, effuse, firmly adnate, often inconspicuous when alive or at least rather thin, pruinose to porulose, more rarely thick and cracking in irregular pieces, in some species the fruitbody consists of small aggregated tufts giving it an odontioid appearance; hymenium as a rule smooth but commonly with a more or less pilose appearance due to the protruding cystidia, seldom granular or odontioid; in colour white, cream or with greyish tint, sometimes pale or sordidly ochraceous; hyphal system monomitic but in some species skeletal or cystidial hyphae with thick walls and narrow lumen occurs, as a rule with a slight amyloid reaction, other hyphae thin-walled or more commonly with slight wall thickening, often arranged in a dense tissue, inamyloid or with a faint amyloid reaction, indextrinoid, with clamps at all septa; cystidia (lyocystidia) conspicuous, protruding above the basidia, cylindrical or conical, with blunt, capitate or a more or less subulate tip that is thin-walled, usually bi-rooted and dissolving in strong (5–10%) KOH, mostly encrusted with crystalline or in some species amorphous matter, with a weak or strong amyloid reaction, capillary lumen ending gradually or more abruptly, sometimes distinctly asymmetric, cystidioles or hyphoids occur in a few species, usually capitate or resembling the lyocystidia; basidia relatively small, thin-walled or basally with thickened walls, sometimes arranged in a dense tissue, often clustered, and then mostly with a strong amyloid reaction, normally with 4 sterigmata and a basal clamp; spores smooth, thin-walled, often cylindrical with allantoid appearance or globose, subglobose or ellipsoid, inamyloid, indextrinoid, acyanophilous.

Type species: *Peniophora gracillima* Ell. & Everh. ex Rog. & Jacks. (=*Corticium glebulosum* Bres., nom. conf.)

Remarks. *Corticium (Peniophora) glebulosum* Bres. and its nomenclatural status has been discussed in detail by Rogers and Jackson (1943), Donk (1956), and by Weresub (1961). After having acquainted ourselves with all facts we follow Weresub and use *P. gracillima* as the legitimate name for the generic type. It should be added that the collection of *Corticium calceum * glebulosum* Fr. (UPS) which was discussed by Weresub, consists of a rather poor developed *Phlebia cretacea* mixed with cystidia of a *Tubulicrinis* species. Moreover, on the edge of one of the pieces of the specimen was found typical lyocystidia differently shaped from the above mentioned species. As no spores

and basidia occur it is impossible to draw any conclusions about Fries meaning about * *glebulosum* from this collection.

Tubulicrinis is easily recognized due to its typical lyocystidia with bifurcate base and is a well delimited taxon. It has, however, similarities with *Litschauerella* and *Tubulicium,* and to some degree also with *Hyphodontia.* In the latter genus the cystidia are single-rooted and inamyloid and lacks the narrow lumen, and the wall does not dissolve in strong KOH. *Litschauerella* has lateral basidia and the cystidia are acute and thick-walled throughout. *Tubulicium* has similar cystidia but can be defined by the worm-shaped spores.

Key to species

1. Cystidia distinctly capitate or provided with an umbrella-like encrustation **2**
1. Cystidia differently shaped **7**
2. Cystidia-apex with umbrella-like encrustation .. **12. T. hamatus**
2. Cystidia differently encrusted, distinctly capitate **3**
3. Spores allantoid to more or less reniform up to 2.5 μm wide **4**
3. Spores subglobose, ellipsoid or narrowly ellipsoid **5**
4. Cystidia with reddish excretion, easily observed under a strong lens, spores 2–2.5 μm wide ..... **9. T. evenii**
4. Cystidial encrustation crystalline, spores 1.8–2 μm wide .... **19. T. sororius**
5. Spores 6–8×3.5–5 μm, cystidia robust with a neck-width of 4–6 μm ..... **17. T. regificus**
5. Spores smaller, cystidia delicate with the neck-width usually less than 3.5 μm **6**
6. Cystidia-neck very narrow, 0.8–1.5(–2.5) μm **18. T. sceptriferus**
6. Cystidia-neck generally 2.5–3.5 μm ..... **1. T. accedens**
7. Spores globose or subglobose **8**
7. Spores ellipsoid, cylindrical or distinctly allantoid **10**
8. Cystidia subulate, with cowl-like encrustation, spores subglobose, 4.5–5×3–3.5 μm ..... **14. T. inornatus**
8. Cystidia obtuse, differently encrusted, spores subglobose, 4.5–4.8×4–4.5 μm or globose and then 4–5 μm in diam. **9**
9. Cystidia up to 120 μm long, strongly amyloid, capillary lumen ending gradually ..... **10. T. globisporus**
9. Cystidia shorter, weakly amyloid, capillary lumen ending abruptly ..... **6. T. cinctus**
10. Cystidia-apex asymmetrically thick-walled ..... **4. T. calothrix**
10. Cystidia-apex not asymmetric **11**

11. Cystidia subulate and often mucronate **12**
11. Cystidia obtuse **15**
12. Cystidia strongly pointed, the thin-walled apex very short, hymenium densely pilose from protruding cystidia (see also *T. effugiens*) ..... **5. T. chaetophorus**
12. Cystidia-apex distinctly thin-walled, mostly longer than 15 μm, cystidia protruding but the hymenium not densely pilose **13**
13. Cystidia robust, 8–10 μm wide in the middle part, spores 1.5–1.8 μm wide, fruitbody as a rule thick ..... **21. T. subulatus**
13. Cystidia slender, usually less than 7 μm wide in the middle part, spores 2–3.5 μm wide, fruitbody as a rule thin **14**
14. Cystidia with capillary lumen ending abruptly, spores 7–8.5×2–2.5 μm, subcylindrical to somewhat fusiform .... **13. T. hirtellus**
14. Cystidia with capillary lumen ending gradually, spores 6–7.5×2.5–3 μm, ellipsoid, never fusiform ..... **8. T. effugiens**
15. Thin-walled cystidial apex either short and rounded or long and sligthly widening **16**
15. Thin-walled cystidial apex long tapering gradually, never widened **19**
16. Basidia-base not or sligthly amyloid, spores 2.5–2.8 μm wide .... **20. T. strangulatus**
16. Basidia-base strongly amyloid, if indistinctly amyloid then spores 1.5–1.8 μm wide **17**
17. Cystidia widened towards the apex but not capitate **15. T. medius**
17. Cystidia with subcapitate appearance **18**
18. Basidia in a dense cluster which make the clamps difficult to discern, spores mostly 5–6×2 μm ..... **3. T. borealis**
18. Basidia in a loose cluster, clamps easily observed, spores 6–8×1.5–1.8 μm ..... **16. T. propinquus**
19. Cystidia robust, (6–)8–10 μm wide in the middle part, upper thin-walled part conspicuously contracted, usually on deciduous wood but in the south also on coniferous wood, fruitbody usually thick and cracking ..... **11. T. gracillimus**
19. Cystidia slender, usually 4–7 μm wide in the middle part, generally on coniferous wood and with the fruitbody thinner **20**
20. Spores 9–10×1.8–2 μm ..... **2. T. angustus**
20. Spores 5–7.5×2.8–3.5 μm ..... **7. T. confusus**

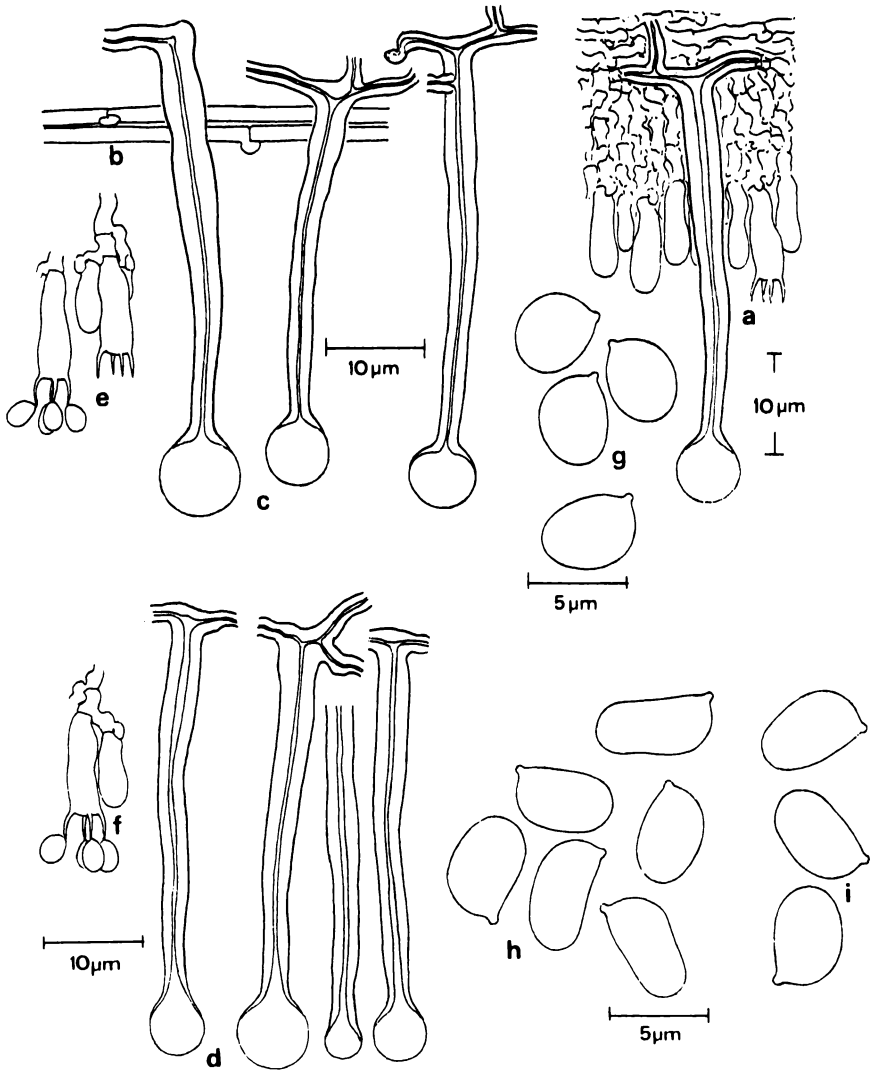


Fig. 811. *Tubulicrinis accedens* a) section through fruitbody, b) hyphae next to the substratum, c,d) cystidia, e,f) basidia, g–i) spores. –Coll. a,b,c,e,g Larsson 1231; d,f,h, Hjortstam 6258; i Hjortstam 3049

1. Tubulicrinis accedens (Bourd. & Galz.) Donk Fig. 811
Fungus 26:14, 1956. — *Peniophora glebulosa* ssp. *accedens* Bourd. & Galz., Bull. Soc. mycol. France 28:386, 1913. — *Peniophora accedens* (Bourd. & Galz.) Wakef. & Pears., Trans.Br.mycol.Soc.6:140,1919.
Fruitbody in living state inconspicuous to very thin, when dried more whitish, cystidia protruding end easily observed under a lens (50×), glittering due to the amorphous secrete at the apex.
Hyphal system monomitic; basal hyphae as a rule distinct, thin-walled, branching at right angles, 1.5–2.5 μm wide, forming together with the subhymenial hyphae a very thin, inamyloid tissue, all hyphae with clamps.
Cystidia capitate, often numerous, 50–90 μm long and about 4–6 μm wide in the middle part, narrowing sligthly from the base towards the 2.5–4 um wide neck, apically widened to a distinct thin-walled head, usually 8–9 um in diam., capillary lumen gradually expanded to the thin-walled apex. All cystidia with a weak amyloid reaction, almost greyish, encrusted with amorphous matter, quickly dissolving in KOH but discernable in water.
Basidia somewhat variable in shape from almost conical to stalked or even lateral but as a rule subclavate with a median constriction, about 10–15×4 μm, thin-walled, inamyloid, with four sterigmata and a basal clamp.
Spores narrowly ellipsoid, ellipsoid to more rarely subglobose, smooth, thin-walled, 4–5×3–3.5(–4) μm.
Habitat and distribution. Preferably on *Pinus* but often on *Picea, Juniperus* and fencing, very occasionally on deciduous wood. Found in all Nordic countries but only common in the southern part of the conifer belt (hemiboreal) in North Europe. Very rare in the south of Sweden and in Denmark where it has been found only a few times.
Remarks. The application of the name *T. thermometrus* (G.H. Cunn.) M.P. Christ. in North Europe was introduced by Christiansen (1960) and he was followed by most corticiologists. However, the characteristic used to divide *T. accedens* in two taxa here in North Europe is exclusively based upon the shape of the spores. In the very rich material we have investigated there are spore-intermediates, not only between specimens but also within collections and for that reason it seems doubtful to accept only spore-form as a delimitation. It should be noted, that in the original description both the spore-morphology (globose) and the size of the basidia (6–)8 μm long were said to be distinguishing features in comparison with *T. accedens.* Further collections from the southern hemisphere are required for a full knowledge of *T. thermometrus.*

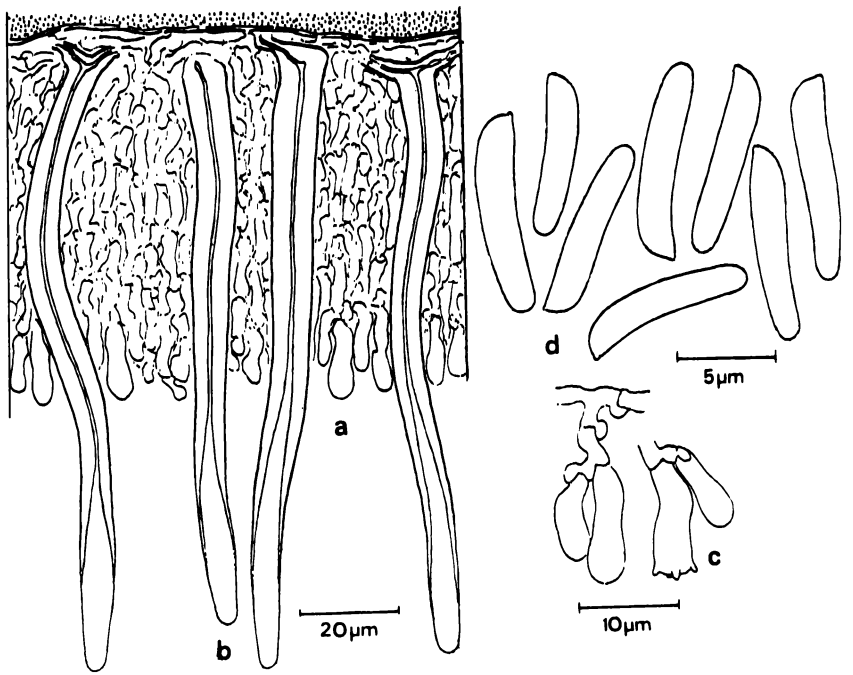


Fig. 812. *Tubulicrinis angustus* a) section through fruitbody, b) cystidia, c) basidia, d) spores. –Coll. Typus

2. Tubulicrinis angustus (Rog. & Weres.) Donk Fig. 812–813
Fungus 26:14, 1956. — *Peniophora angusta* Rog. & Weres., Can. J. Bot. 31:764, 1953.

Fruitbody resupinate, effuse, thin to moderately thick, porulose to more or less continuouse, minutely pilose by protruding cystidia, greyish white, margin indeterminable.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, 2–2.5 μm wide, composed of a fairly dense, inamyloid tissue, all hyphae with clamps.
Cystidia cylindrical, usually with a slight flexuose appearance, generally up to 100 μm long and with a width of 5 μm in the middle part, narrowing slightly towards the obtuse apex with the capillary lumen gradually expanded. Amyloidity varying from greyish to a distinct bluish reaction.
Basidia in fairly loose clusters, subclavate, 10–15(–18)×4–4.5 μm, narrowing towards the base but not distinctly stalked, often with suburniform appearance, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores suballantoid smooth, thin-walled, in some specimens slightly flexuose, (8–)9–10(–11)×1.8–2 μm.
Habitat. On decayed coniferous wood, mostly on *Pinus,* now and then on fencing and occasionally noted on deciduous trees.
Distribution. Preferably from the southern part of the area but some specimens seen from Jämtland in Sweden and from Sør-Trøndelag in Norway. Reported from Denmark by Christiansen (1960) and by Hauerslev (personal communication) and hitherto known from one locality in Finland (Etelä-Häme).
Remarks. *T. angustus* is above all similar to *T. gracillimus* but has more slender cystidia and as a rule a thinner fruitbody. The species is fairly homogenous but there is a variation as to the length, sinuosity and amyloidity of the cystidia.

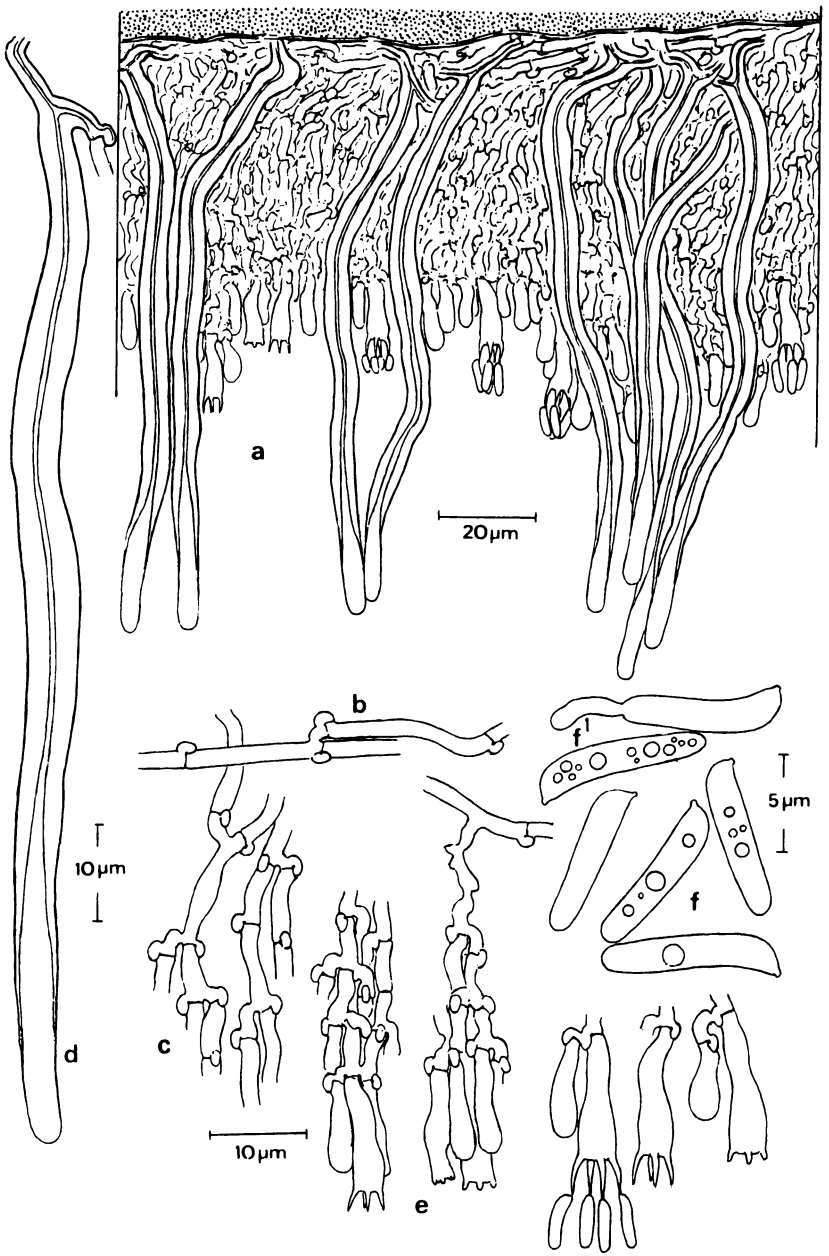


Fig. 813. *Tubulicrinis angustus* a) section through fruitbody, b) parallel subicular hyphae, c) vertical subhymenial hyphae, d) cystidium, e) basidia, f) spores, f1) germinating spore. –Coll. Hjortstam & Larsson 8609

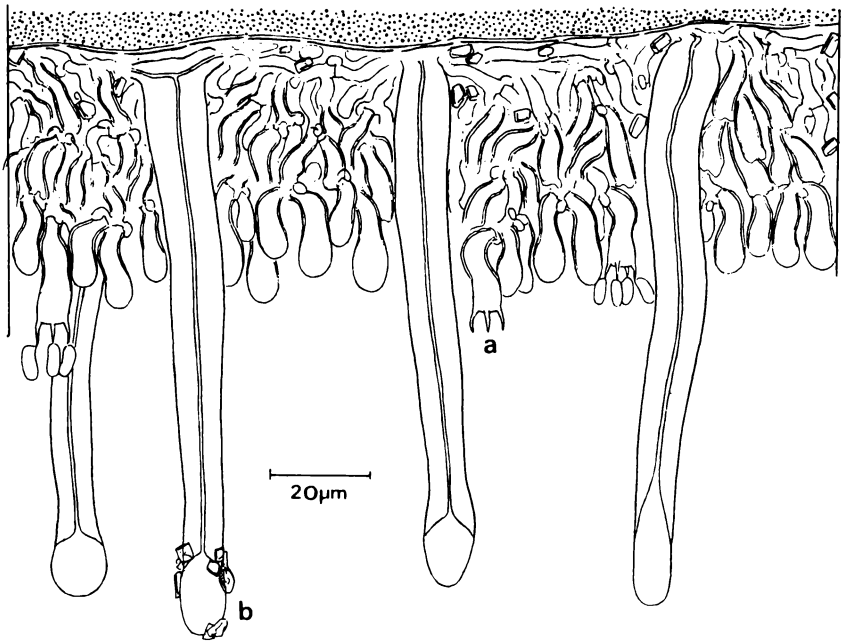


Fig. 814. *Tubulicrinis borealis* section through fruitbody a) thick-walled basidia, b) cystidia. -Coll. Typus

3. Tubulicrinis borealis John Erikss. Fig. 814–817
Symb. Bot. Ups. 16:79, 1958.

Fruitbody resupinate, effuse, thin or when fully developed often up to 70–100 µm thick, porulose to continuouse, with a pilose appearance due to the protruding cystidia, whitish, greyish white or, especially when dried, pale ochraceous, margin thinning out.
Hyphal system monomitic; hyphae thin-walled or more often with slight wall thickening, in the subhymenial layer distinctly thick-walled, 2–3 µmwide and invariably amyloid, all hyphae with clamps.
Cystidia cylindrical, generally 60–80 µm long and 5–7 µm wide in the middle part, narrowing slightly towards the neck, then slightly widened to the obtuse apex, mostly encrusted with crystalline matter at the thin-walled upper part, capillary lumen narrow, gradually expanded or more commonly abruptly widened, occasionally asymmetric. All cystidia with a very strong and invariable amyloidity.
Basidia in dense clusters, subclavate, more or less stalked, after sporu-

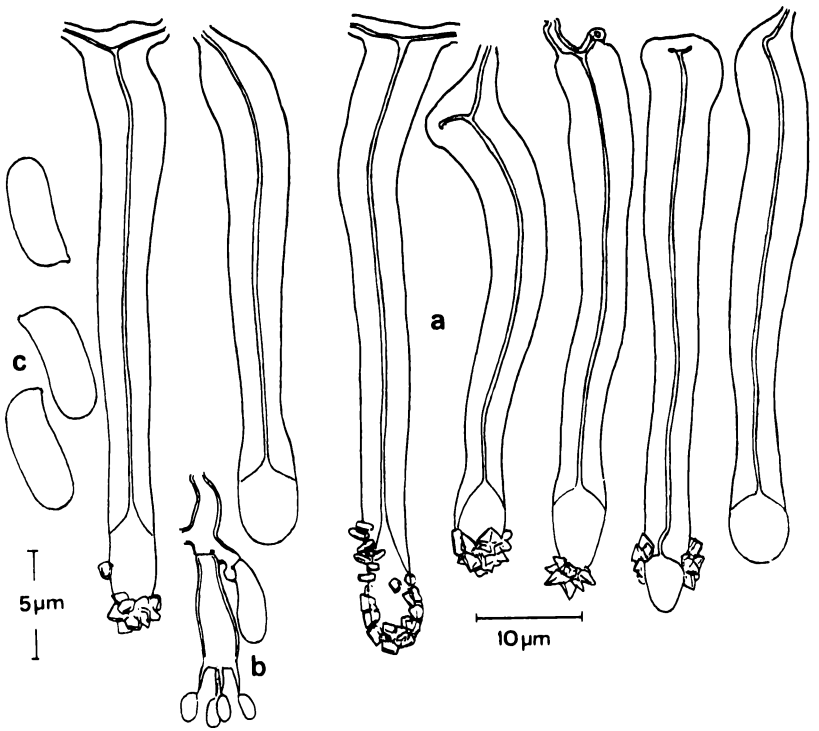


Fig. 815. *Tubulicrinis borealis* a) cystidia, b) basidia, c) spores. –Coll. Typus

lation usually shrunken and with a conical appearance, about 12–18×4
4.5 µm, thick-walled except for the upper part, strongly amyloid, wi
4 sterigmata and a basal clamp which is difficult to discern.
Spores allantoid, smooth, thin-walled, (5–)5.5–6.5(–7)×(1.8–)2(–2.2)
µm.
Habitat and distribution. On all kinds of decorticated coniferous
wood, often on fencing and other timber lying on the ground. In t
Nordic countries mainly distributed in the northern part but also co
mon southwards in the highlands, occasionally found in Halland an
Bohuslän (Sweden). Not found in the southernmost Sweden and Nor-
way, not known from Denmark.
Remarks. Though closely related to *T. propinquus* and *T. stra*
gulatus an easily recognized taxon. This applies particularly to
strongly amyloid cystidia and the thick-walled, likewise strongly amy-
loid basidia-bases. *T. propinquus* differs in having longer and narrower
spores with the thin-walled cystidia-tip nearly circular. *T. strangula*

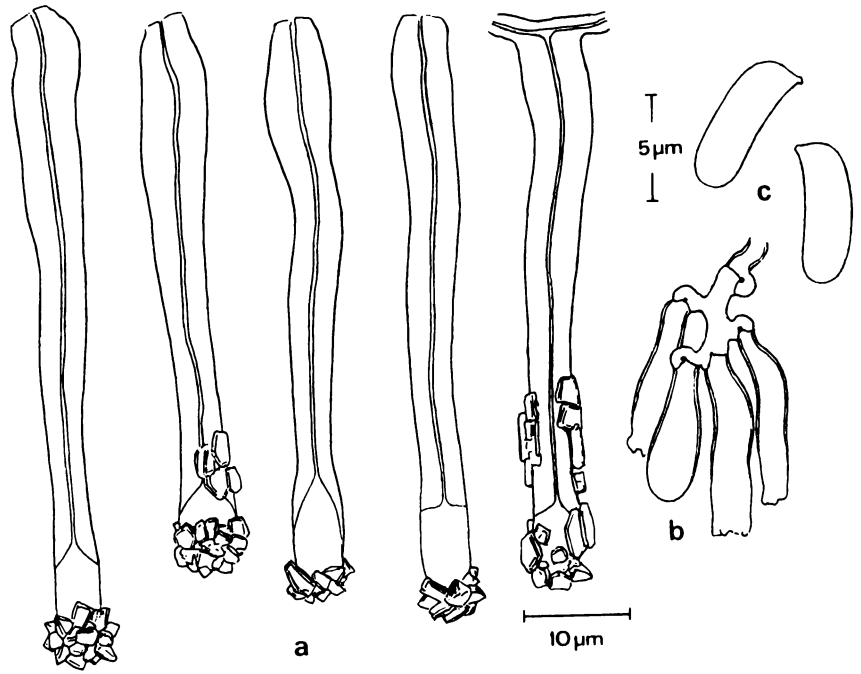


Fig. 816. *Tubulicrinis borealis* a) cystidia, b) basidia, c) spores. –Coll. Hjortstam 7256

has spores with different proportions, being shorter and wider and has basidia-bases which are thin-walled or with only slight wall thickening and with weak amyloid reaction.

The description of *Peniophora pirina* Bourd. & Galz. given by Weresub (1961) may suggest a close relationship to the species mentioned above. Unfortunately the type is missing at PC (Bourd. No. 6404) and there is no additional material left to affirm a possible similarity.

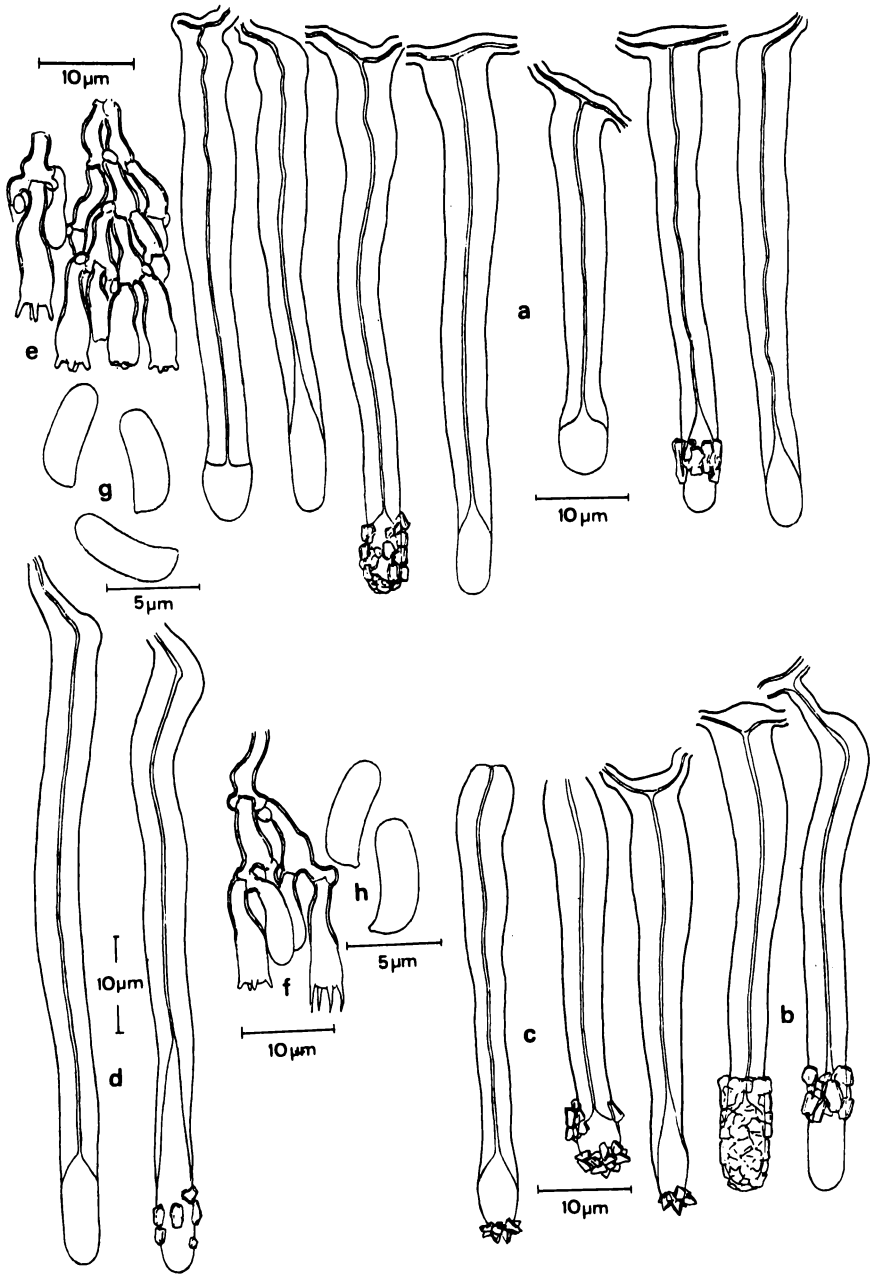


Fig. 817. *Tubulicrinis borealis* a–d) cystidia, e,f) basidia, g,h) spores. –Coll. a,e,g Hjortstam 4469; b,c Hjortstam 7084; d Hjortstam 1967–04–16; f,h Larsson 570

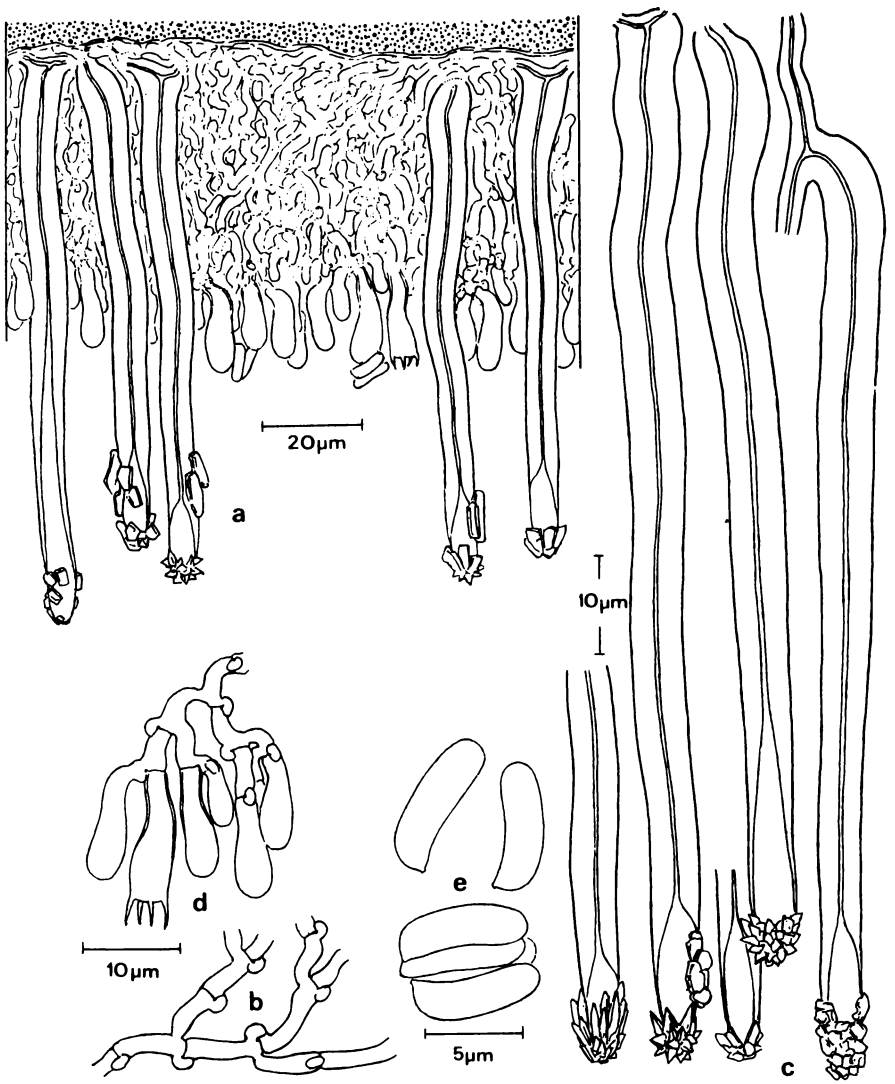


Fig. 818. *Tubulicrinis calothrix* a) section through fruitbody, b) hyphae, c) cystidia, d) basidia, e) spores. –Coll. Eriksson 8506

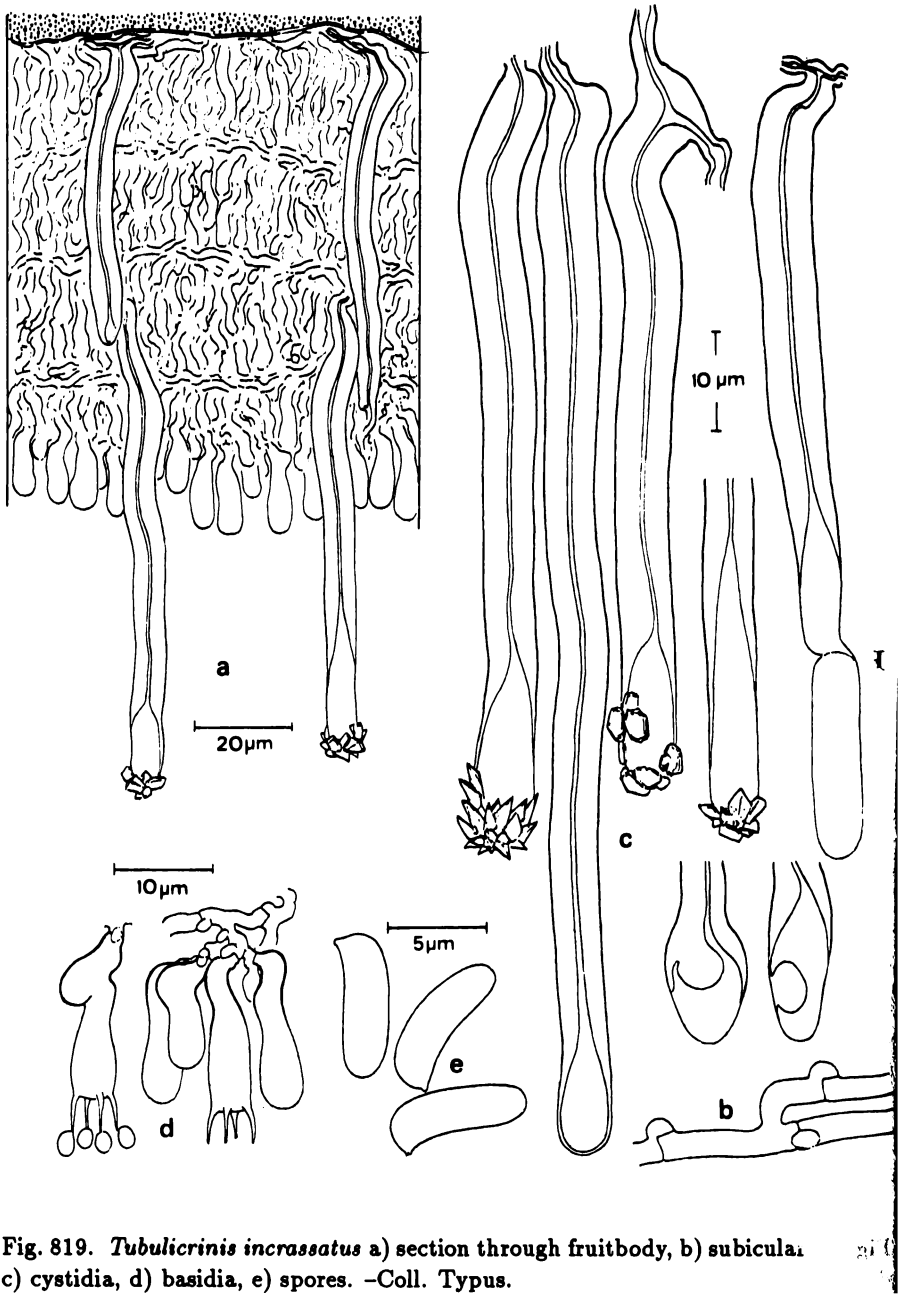


Fig. 819. *Tubulicrinis incrassatus* a) section through fruitbody, b) subiculum, c) cystidia, d) basidia, e) spores. –Coll. Typus.

4. Tubulicrinis calothrix (Pat.) Donk Fig. 818, 819
Fungus 26:26, 1956. — *Corticium calothrix* Pat., Cat. Rais. Pl. Cel. Tunisie p. 59, 1897.

Fruitbody resupinate, at first thin and discontinuous, mostly porulose but as a rule well distinguishable, then thicker and up to 100–250 um thick, continuous but with more or less pronounced tufts, not or very rarely rimulose, under a strong lens pilose by protruding cystidia, whitish to pale yellow or ochraceous, margin thinning out.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, 2–2.5 μm wide, in the subhymenial tissue fairly dense, inamyloid but remnants of old basidia often intermingled in the tissue giving it a more or less strong amyloid reaction, all hyphae with clamps.
Cystidia cylindrical, often numerous, 80–120 μm long and 6–8 μm wide in the middle part, narrowing to the obtuse and encrusted apex, with the capillary lumen gradually or more often abruptly expanded, with an asymmetric wall thickening. Amyloidity variable, but usually very strong.
Basidia subclavate, in relatively dense clusters, after sporulation often stalked and basally thick-walled, 12–15×4–5 μm, mostly with a strong amyloid reaction, with 4 sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, 6–7(–8)×1.5–1.8(–2) μm.
Habitat and distribution. On all kinds of coniferous wood, seemingly with a preference to *Picea* in the northern area, while in the south *Pinus* seems to be the most common substratum, scattered on fencing and other decorticated timber. A fairly common species in the northern part of Scandinavia and frequently collected at least north of limes norlandicus and in the highland of Småland, it is occasionally found in Västergötland and with certainty very rare in the south of Sweden. In Norway not uncommon from Akershus to Sør-Trøndelag and in Finland mainly known from the northern part. Reported also once from Denmark in a spruce-plantation.
Remarks. Easily recognized species due to its strongly amyloid cystidia which apically are asymmetrically thick-walled. *Peniophora delectans* Overh. is presumably a young stage of *T. calothrix* with the same kind of cystidia and spores approximately 6×1.8 μm. Another species which seems to be closely related is *T. incrassatus* Hallenb. It is described from Iran and distinguished by having cystidia without typical asymmetric apex and spores often more than 2 μm wide (2–2.2 μm). Also recently recollected in the southern part of Italy.

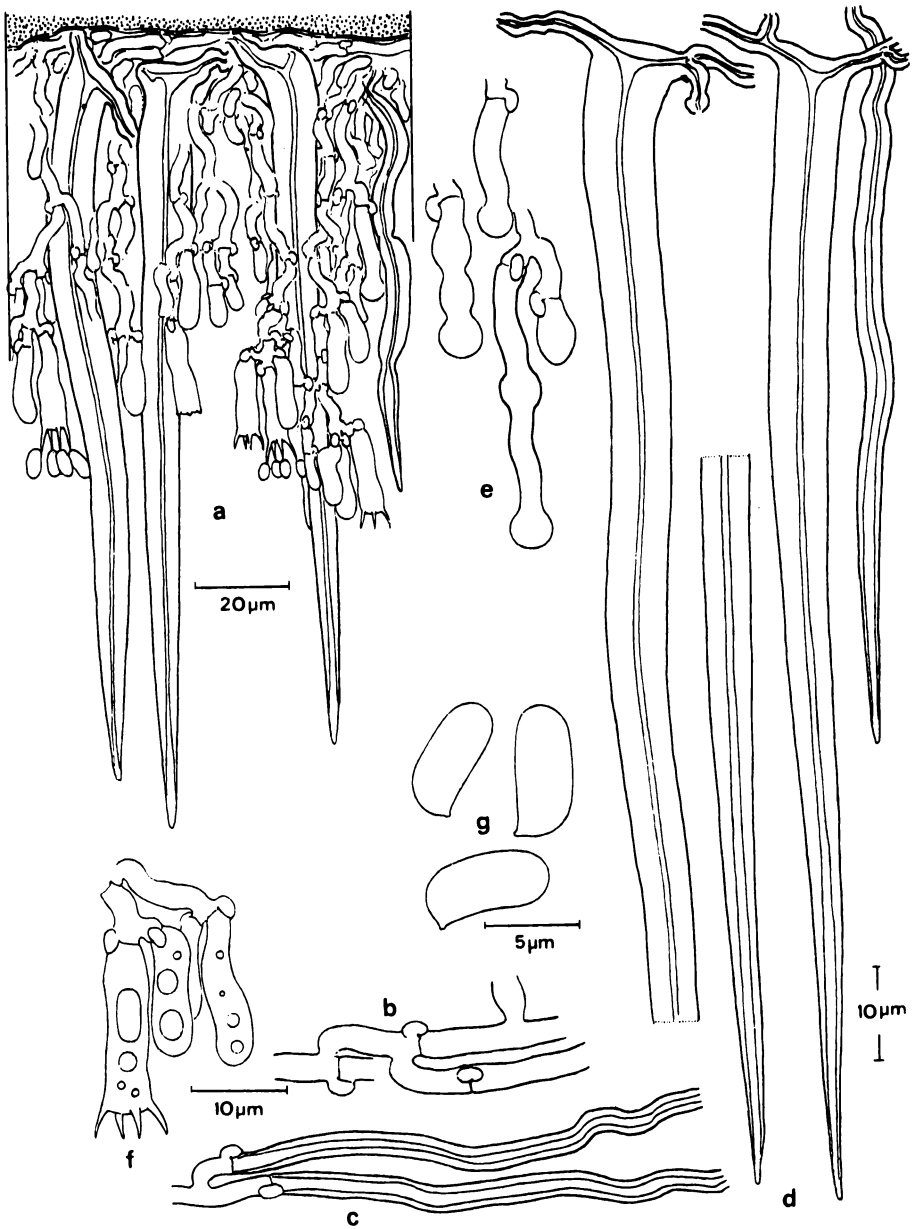


Fig. 820. *Tubulicrinis chaetophorus* a) section through fruitbody, b) basal hyphae, c) prolonged thick-walled cystidial hyphae, d) cystidia, e) subhymenial cystidia, f) basidia, g) spores. –Coll. Larsson 3356

5. Tubulicrinis chaetophorus (Höhn.) Donk Fig. 820
Fungus 26:14, 1956. — *Hypochnus chaetophorus* Höhn., Sitzber. Akad. Wiss. Wien, Math.nat. Kl. 111:1007, 1902.
Fruitbody resupinate, fairly conspicuous when well developed and consisting of aggregated tufts which only rarely forms a more continuous hymenium, strongly hispid by the long and subulate cystidia, which protrude 100–150 μm above the basidia, at first greyish then pale ochraceous, margin thinning out to an almost inconspicuous crust.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, 2.5–3 μm wide, forming a thin and in most cases inamyloid, fairly dense tissue, subhymenial layer loose with hyphae and basidia often clinging tightly to the cystidia-bases, all hyphae with clamps.
Cystidia of two kinds: 1) lyocystidia, conspicuously conical, awl-shaped, often with more than two roots, 100–200 μm long and in the middle part 10 μm wide, capillary lumen normally with a very slight expansion towards the thin-walled apex. Amyloidity variable but as a rule strong and easily observed. 2) capitate subhymenial cystidia, sparse, often with several constrictions, 20–30 μm long and sometimes with amorphous encrustation.
Basidia subclavate, often with a median constriction and oily protoplasm, 15–20×4.5–5 μm, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores ellipsoid with the adaxial side concave or straight, smooth, thin-walled 5.5–6.5×3–3.5(–3.8) μm.
Habitat and distribution. On coniferous wood but also noted on *Alnus* (Strid, 1975). Seems to be rather rare and restricted to the central and northern part of Norway (Akershus, Buskerud, Hedmark, Sør-Trøndelag, Nordland) and Sweden (Uppland, Dalarna, Jämtland, Lappland). Not known from Denmark and Finland.
Remarks. In North Europe the species is uniform as to morphology of spores and cystidia and conform to the original material of *Hypochnus chaetophorus* (Austria, "Krummbachleithen", Schneeberg. 1902–07–24, isotype in FH !). We have also seen the holotype of *Peniophora dissoluta* Overh. (Holotype in PENN) which is very similar and by several authors placed in synonomy with *T. chaetophorus*. The spores, however, deviate sligthly and tend to be more subglobose with the adaxial side more or less convex. The same deviation has been noted in a Canadian collection (TRTC 15237). Other specimens seen from North America have spores as in the European material.

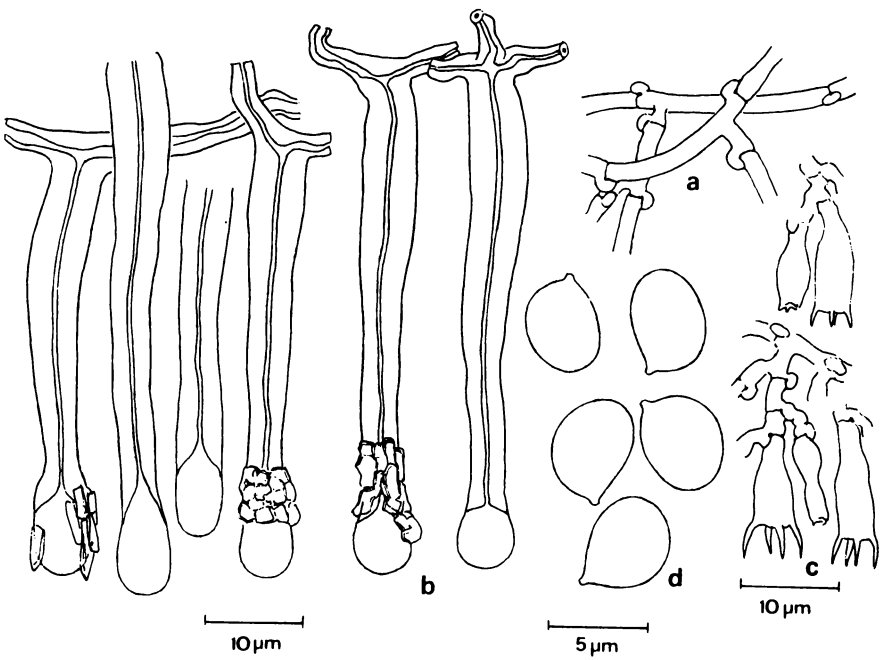


Fig. 821. *Tubulicrinis cinctus* a) basal hyphae, b) cystidia, c) basidia, d) spores. –Coll. Type specimen of *T. cinctoides*.

6. Tubulicrinis cinctus G.H. Cunn. Fig. 821
Bull. N. Z. Dep. sci. ind. Res. 145:142, 1963. — *Tubulicrinis cinctoides* Hjortst., Mycotaxon 13:120, 1981.

Fruitbody very thin to almost inconspicuous, under a lens (50×) pulveraceous to porulose, greyish white, cystidia protruding conspicuously and glittering due to the encrusted tip.
Hyphal system monomitic; hyphae thin-walled or more rarely with thickened wall, 1.8–2.5 μm wide, subhymenial hyphae in a very thin tissue, strikingly short-celled, inamyloid, with clamps at all septa.
Cystidia cylindrical, generally bi-furcate but some observed with three or more roots, dissolving slightly in strong KOH and with a faint amyloid reaction, usually 60–70(–80) μm long and 5–7 μm wide in the middle part, capillary lumen narrow and ending more or less abruptly in the widened, thin-walled, about 6–8 μm wide, apex, usually encrusted around the neck or on the whole upper part.
Basidia rather small, somewhat stalked, 12(–15)×4.5–5 μm, slightly constricted, thin-walled, without any amyloid reaction, with a basal clamp.
Spores obliquely subglobose, thin-walled, smooth, 4.2–4.8(–5)× (3.8–)4–4.5 μm.
Habitat and distribution. Little known species and originally described from but one collection. In North Europe found three times on *Picea* (Norway, Oppland; Sweden, Dalsland, and Östergötland). Further it is known from one Turkish collection (Hallenberg, 1972–04–12, GB).
Remarks. *T. cinctoides* Hjortst. was based on two specimens and was said to be separated by more globose and slightly larger spores. Also the morphology of the cystidia was stressed to be different. After a re-examination of all obtainable material, inclusive the type of *T. cinctus*, we are of the opinion that *T. cinctoides* fits within the concept of *T. cinctus*.

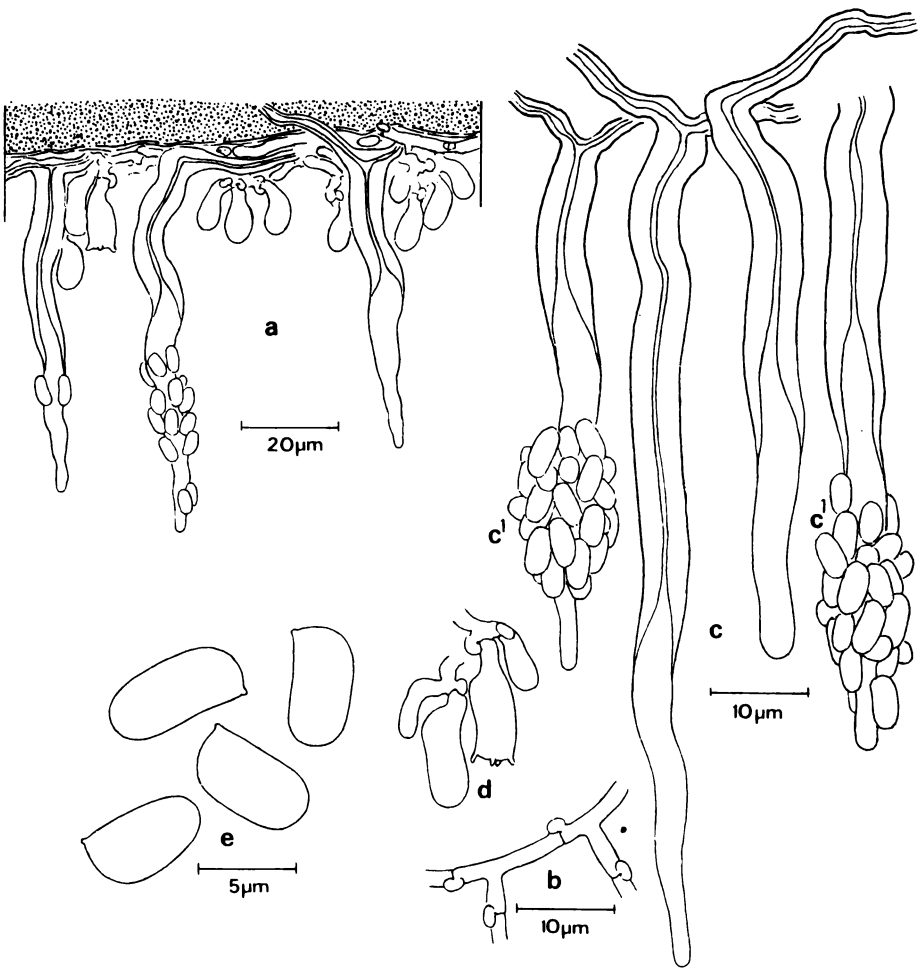


Fig. 822. *Tubulicrinis confusus* a) section through fruitbody, b) basal hyphae, c) cystidia, c1) spores stuck to the cystidia–apex, d) basidia, e) spores. –Coll. Laurila 1937–09–25

7. Tubulicrinis confusus Larss. & Hjortst. Fig. 822–824
Mycotaxon 26:437, 1986.

Fruitbody at first discontinuous and under a lens porulose to reticulately spread over the substratum, then more or less continuous and finally tufted with odontioid apperance with the cystidia protruding, in colour whitish to greyish, margin not determinable.
Hyphal system monomitic; hyphae thin-walled, next to the substratum relatively long-celled, 1.5–2 μm wide, in the very thin subhymenium short- celled and somewhat isodiametric, inamyloid, all hyphae with clamps.
Cystidia cylindrical, often and especially in the upper part slightly constricted, mostly distinctly flexuose, 80–100 μm and 5–7 μm wide in the middle part, slightly narrowing to the obtuse tip, capillary lumen narrow in the basal part, then widening gradually to a 30–40 μm long and thin-walled apex. Amyloidity weak to distinctly bluish or violet.
Basidia subclavate, slightly stalked, 15–20 μm long and 4.5–5 μm wide when fully developed, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores ellipsoid, adaxial side commonly concave, smooth, thin-walled, as a rule 5–6.5×2.8–3.5 μm.
Habitat and distribution. Evidently very rare and found scattered on coniferous wood, once in Sweden (Dalsland) and from a few localities in Norway (Hordaland, Hedmark, Oppland, and Sør-Trøndelag). In Finland collected and determined as a new species already 1960 by John Eriksson (Pisavaara) and by Laurila 1937 (Satakunta) as *Peniophora vilis* Bourd. & Galz.
Remarks. *T. confusus* is closely related to *T. effugiens* but the latter has distinctly subulate and as a rule more numerous cystidia and has spores that are somewhat narrower.

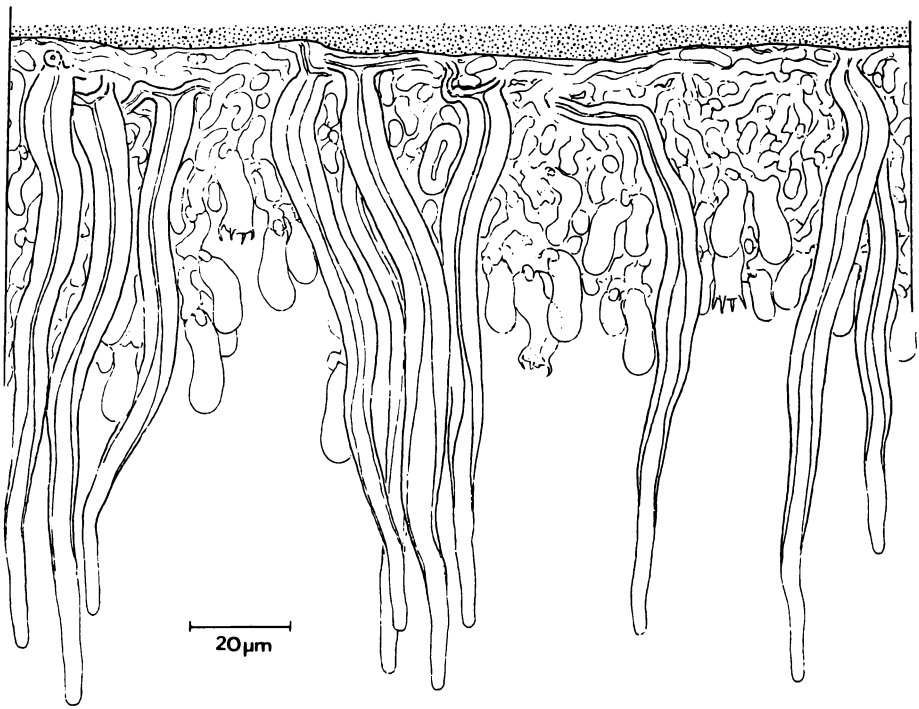


Fig. 823. *Tubulicrinis confusus* section through fruitbody. – Coll. Typus

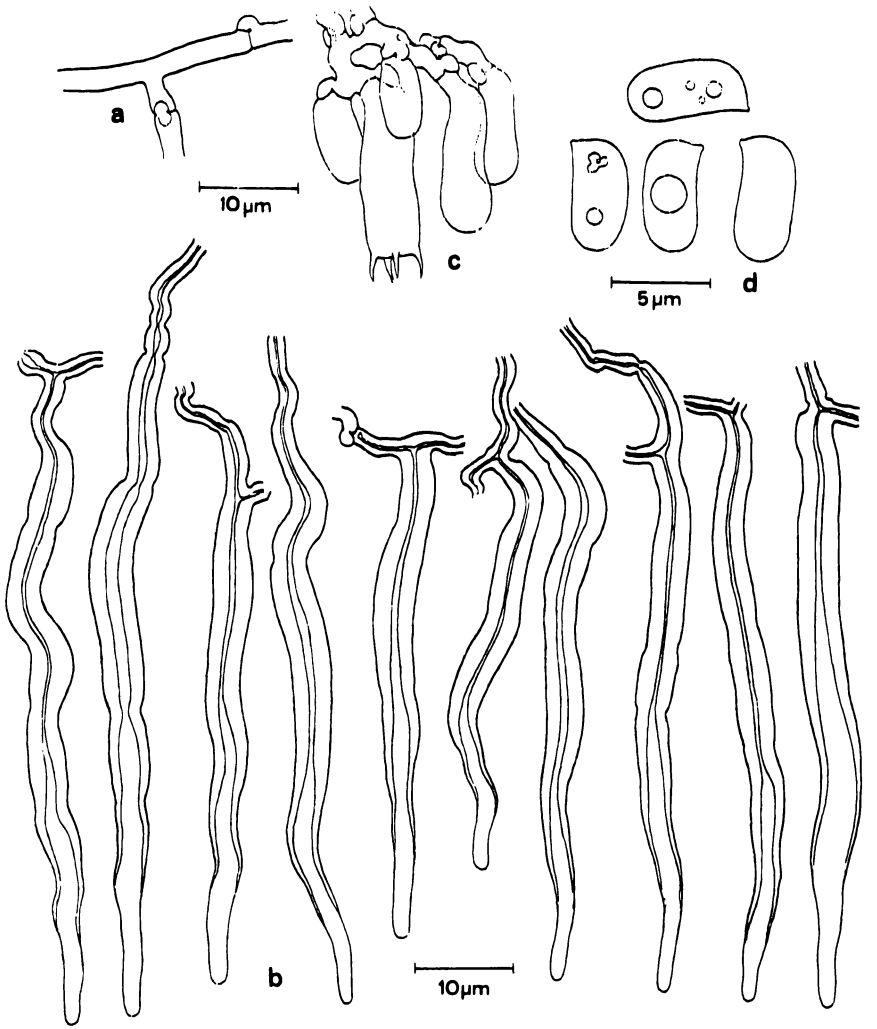


Fig. 824. *Tubulicrinis confusus* a) hyphae, b) cystidia, c) basidia, d) spores. –Coll. Typus

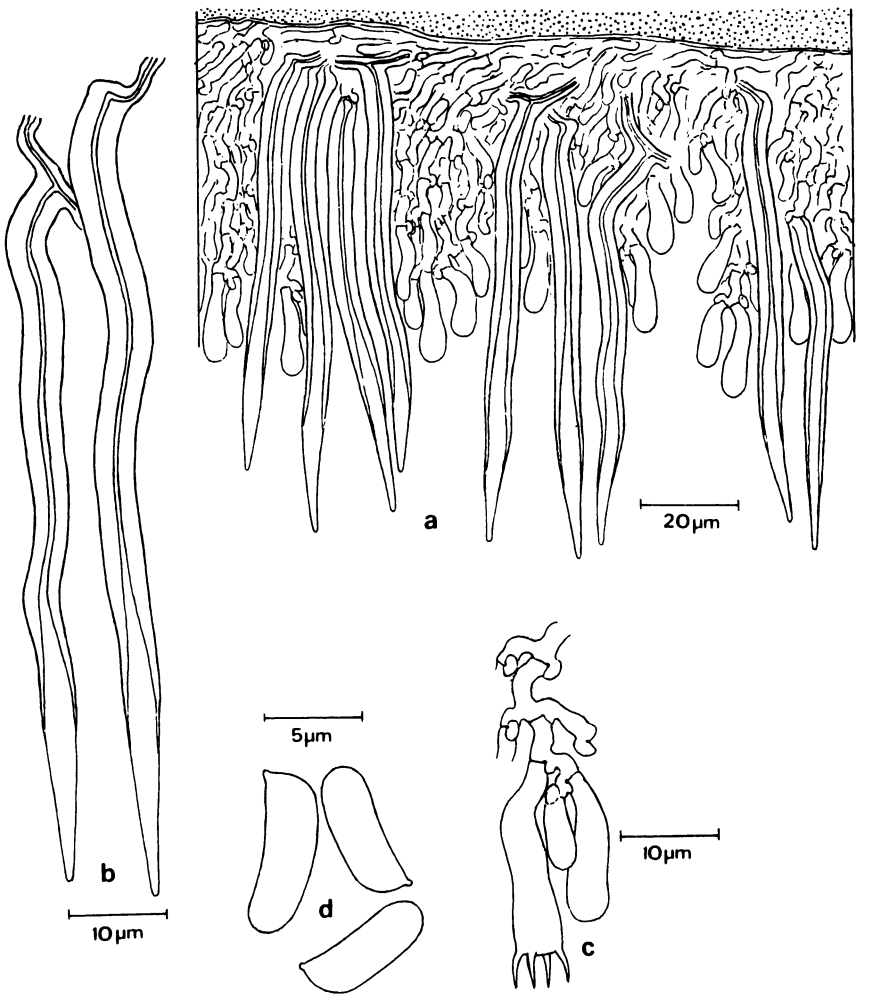


Fig. 825. *Tubulicrinis effugiens* a) section through fruitbody, b) cystidia, c) basidia, d) spores. –Coll. Hjortstam 6456

8. Tubulicrinis effugiens (Bourd. & Galz.) Oberw. Fig. 825–828
Zeitschr. für Pilzkunde 31:35, 1966. — *Peniophora effugiens* Bourd. & Galz., Bull. Soc. mycol. France 28:386, 1913.

Fruitbody resupinate, loosely adnate, when dried discontinuous and in well developed specimens pronouncedly tufted, strongly pilose by protruding cystidia, in colour whitish or, especially in the herbaria, pale ochraceous, without a distinct margin.
Hyphal system monomitic; basal hyphae thin-walled but swelling slightly in both KOH and Melzer's reagent, straight, long-celled and of with uniform width, about 2–3 μm, forming a very thin tissue, subhymenial hyphae with considerably shorter cells, more or less isodiametric, all hyphae inamyloid and with clamps at all septa.
Cystidia cylindrical, often flexuose, generally 70–100 μm long and 5–7 μm wide in the middle part, narrowing slightly to an almost subulate and sometimes mucronate tip, capillary lumen ending gradually in the thin-walled, 15–20 μm long apex, amyloidity weak, as a rule only giving a greyish colour.
Basidia subclavate, often slightly stalked, 15–20×4.5–5 μm, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores subcylindric, often broadest towards the apiculus, adaxial side straight or, more commonly, concave, smooth, thin-walled, 6–7.5×2.5–3 μm.
Habitat and distribution. On coniferous wood. In Sweden found from Västergötland in the south to Uppland, Ångermanland and Lycksele Lappmark in the north. In Norway known from Hedmark, Sør-Trøndelag and Oppland. Outside Europe one single collection seen from Canada (BC, Vancouver Island).
Remarks. In outer appearance this species reminds somewhat of *T. chaetophorus* by its tufted fruitbody but microscopically it is easily separated by the cystidia which are considerably shorter and thin-walled in the upper part. It is also similar to *T. confusus* but this species has never pointed cystidia and the spores are broader.
We have accepted the interpretation by Weresub (1961) and later by Oberwinkler (1966) and place it in synonymy with *Peniophora attenuata* Bourd. & Galz. However, at present a more precise interpretation of *P. effugiens* is not possible because neither the lectotype nor other authentic material can be obtained. The lectotype (Bourd. 8719) is missing in PC and only two additional specimens are still left (Bourd. 31821 and 31914). Both are pre–1913 specimens but none can serve as a new lectotype. The first one consists of more or less cruished wood and is worthless. The latter is very poor and remnants of at

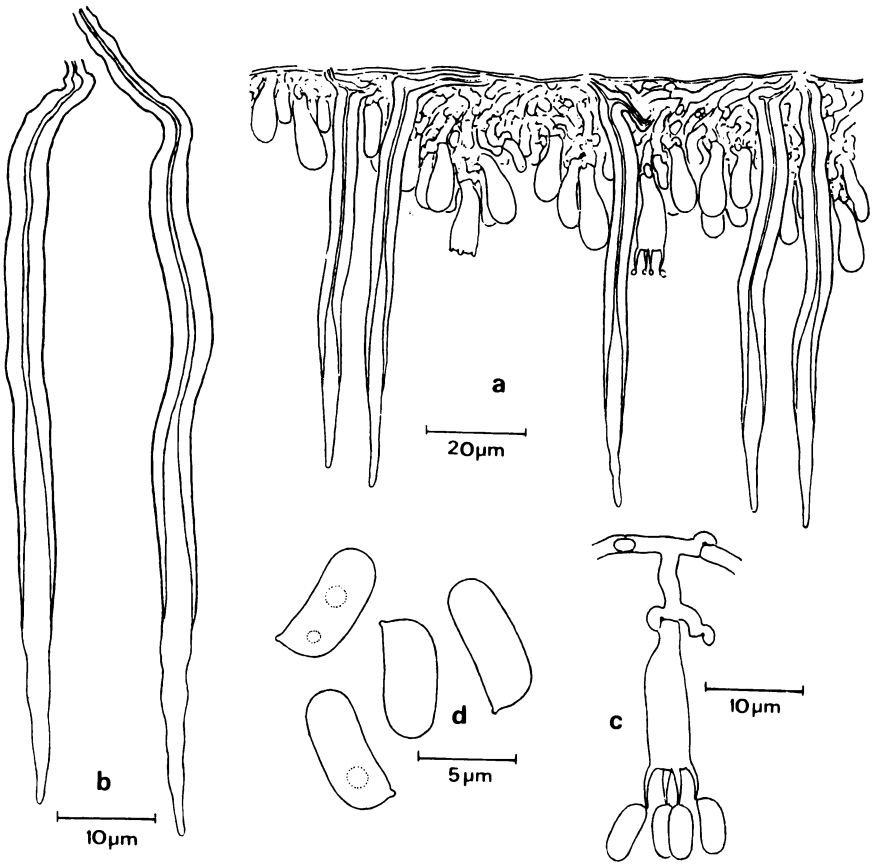


Fig. 826. *Tubulicrinis effugiens* a) section through fruitbody, b) cystidia, c) basidium, d) spores. –Coll. Hjortstam 12823

least three fungi can be found: *Tubulicrinis accedens, Botryobasidium sp.*, and here and there remains of what possibly can be interpreted as *T. effugiens* sensu Weresub. Furthermore, the envelopes are provided with figures from Bourdot's hand and do not conform with the original description.

On the other hand, *Peniophora attenuata* Bourd. & Galz. (1928) can with certainity be confirmed. The lectotype (Bourd. 12154) is, though scarce, easily studied and shows a fungus with pointed, in most cases also mucronate cystidia and with spores approximately 6–7×2.5–2.8 μm. The description of this fungus is somewhat confusing since Bourdot surprisingly described and draw the hyphae without clamps (see also note by Weresub, loc. cit.). In other respects the lectotype and the figure by Bourdot fit the fungus here named effugiens.

It should be noted that the Swedish material is not strictly homogenous. We have seen specimens which have about the same type of cystidia but have broader spores (e.g. Hallingbäck 30087). Additional material is needed to verify if there are more taxa involved in the complex *effugiens-confusus*.

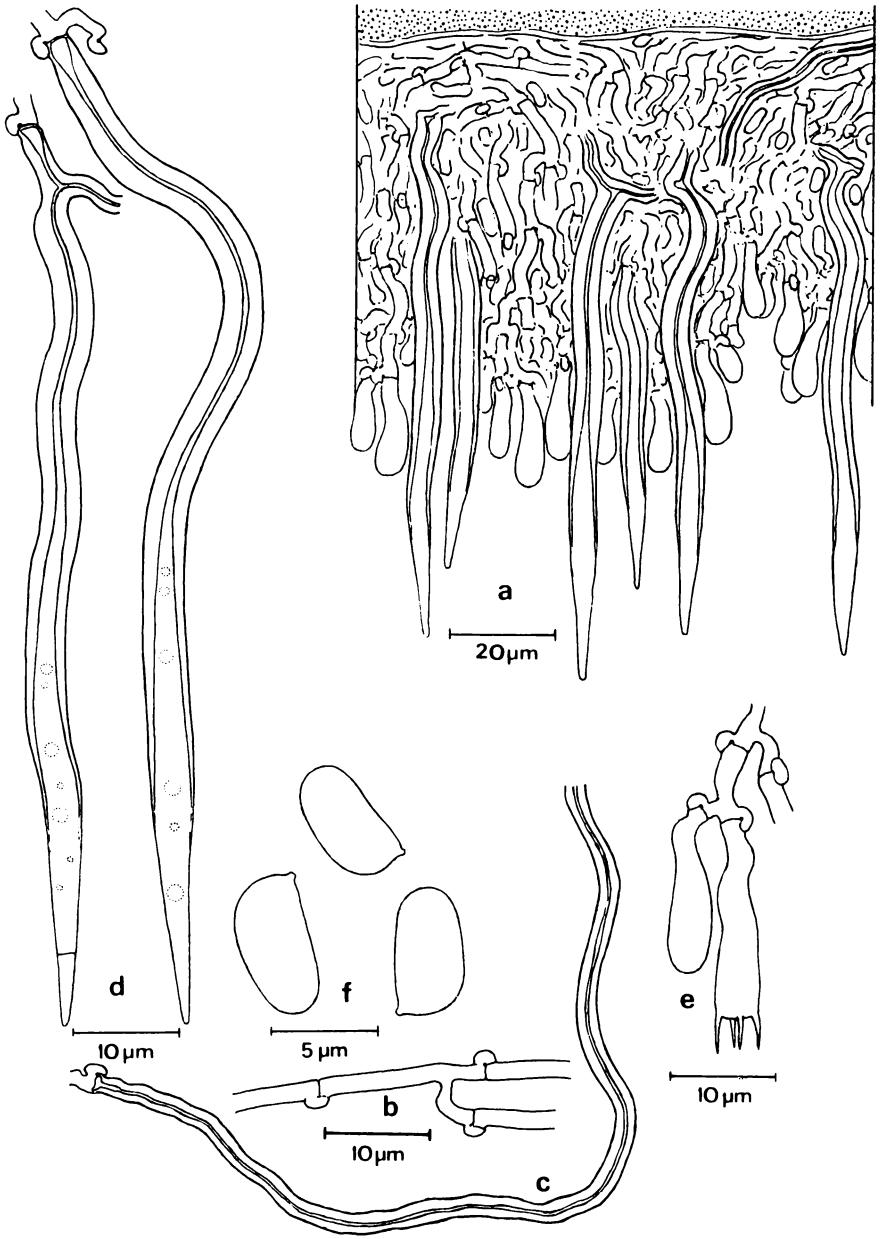


Fig. 827. *Tubulicrinis* aff. *effugiens* a) section through fruitbody, b) basal hyphae, c) prolonged cystidial hyphae, d) cystidia, e) basidia, f) spores. –Coll. Hallingbäck 1981–10–14

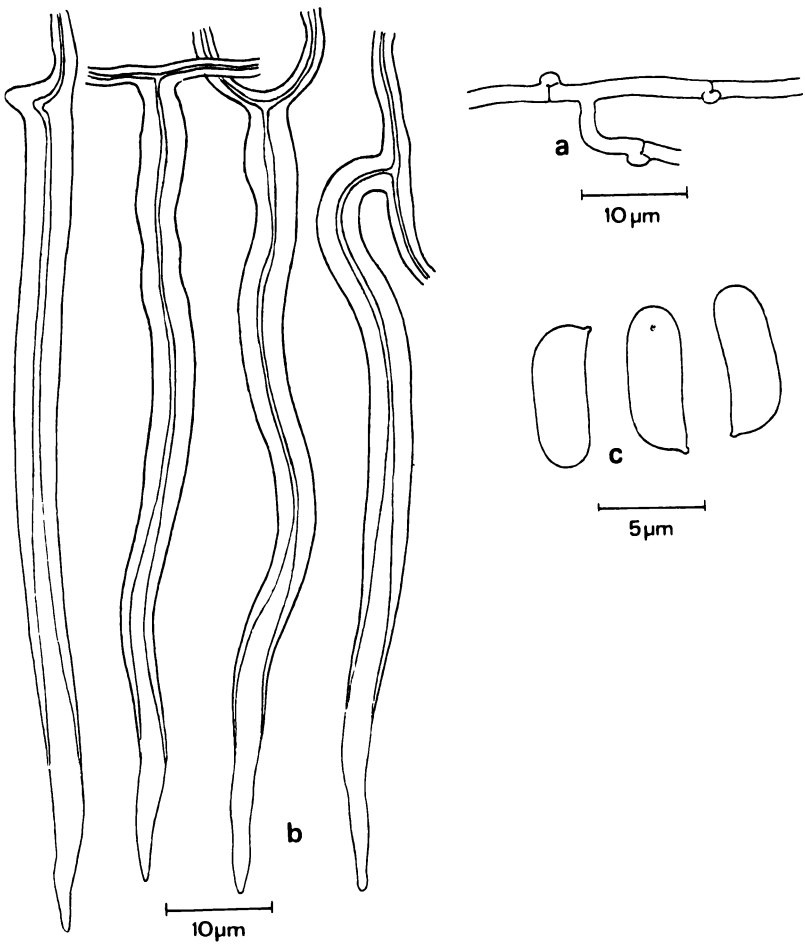


Fig. 828. *Tubulicrinis effugiens* a) basal hyphae, b) cystidia, c) spores. –Coll. Typus *Peniophora subalutacea* ssp. *attenuata* (Bourd. 13844)

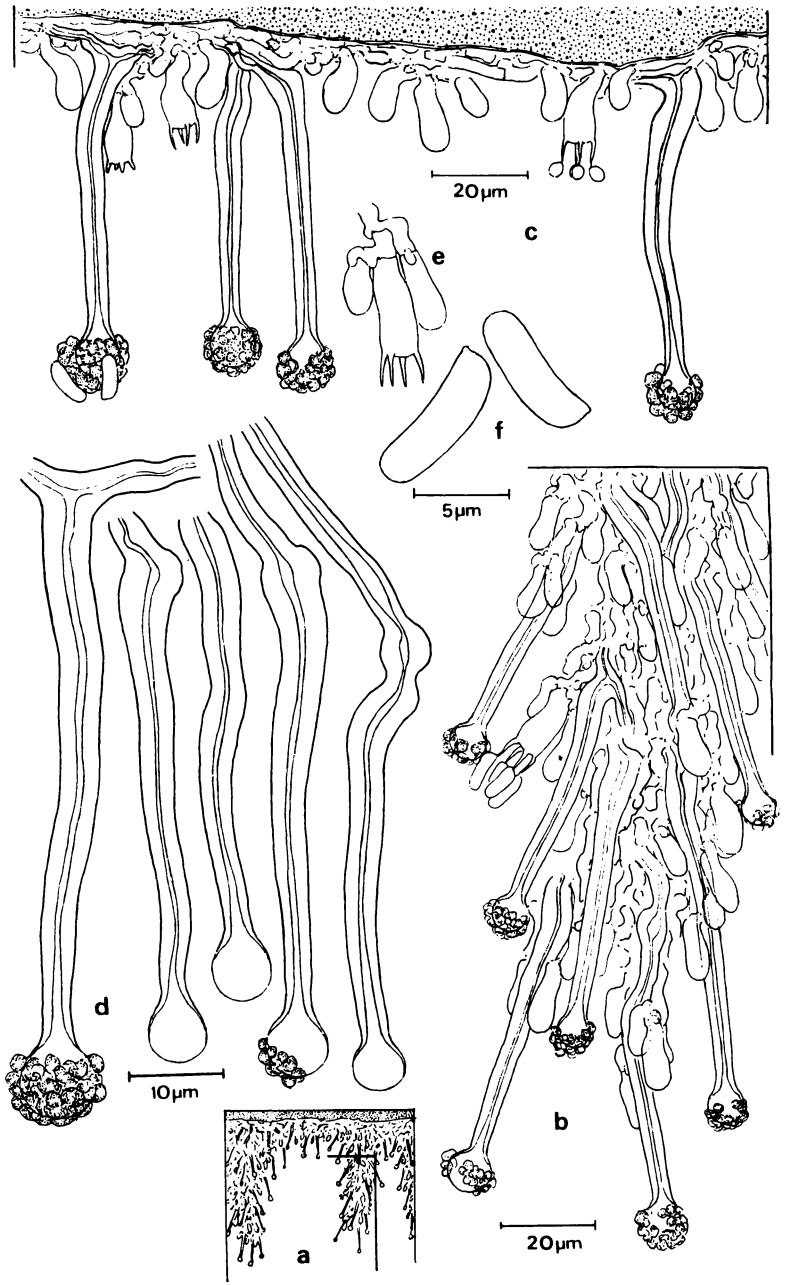


Fig. 829. *Tubulicrinis evenii* a) section through fruitbody showing the position of b. b) section through aculeus, c) section through fruitbody, d) cystidia, e) basidia, f) spores. –Coll. Typus

9. Tubulicrinis evenii Larss. & Hjortst. Fig. 829
Mycotaxon 26:438, 1986.

Fruitbody resupinate, at first thin and inconspicuous then gradually thickening and tufted, finally with a more or less odontioid or subporoid appearance, under a lens (50×) pilose by protruding cystidia, in colour whitish or pale ochraceous, margin indeterminable.
Hyphal system monomitic; hyphae thin-walled, occasionally with a slight wall thickening, 2–3 μm wide, inamyloid, all hyphae with clamps.
Cystidia capitate, generally 70–100 μm long and 5–6 μm wide in the middle part, narrowing slightly to the neck then widened to a distinct, 7–8 μm wide head, encrusted with reddish amorphous matter, capillary lumen expanding gradually or more rarely abruptly to the thin-walled and more or less circular apex. Amyloidity weak, often greyish-blue.
Basidia subclavate, 10–12(–15)×4.5–5 μm, thin-walled or basally with slight wall thickening, inamyloid, with 4 sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, 6.5–8(–9)×(2–)2.2–2.5 μm.
Remarks. On decorticated wood of *Pinus* and only known from two localities. In Norway from Hedmark (type-locality), and in Sweden from Ångermanland. It is a conspicuous species and similar to *T. sororius* but under a strong lens separated by the reddish excretion on the cystidia. In the microscope further distinguished by slightly longer and broader spores and by less amyloid cystidia with the capitate part 7–8 μm wide.

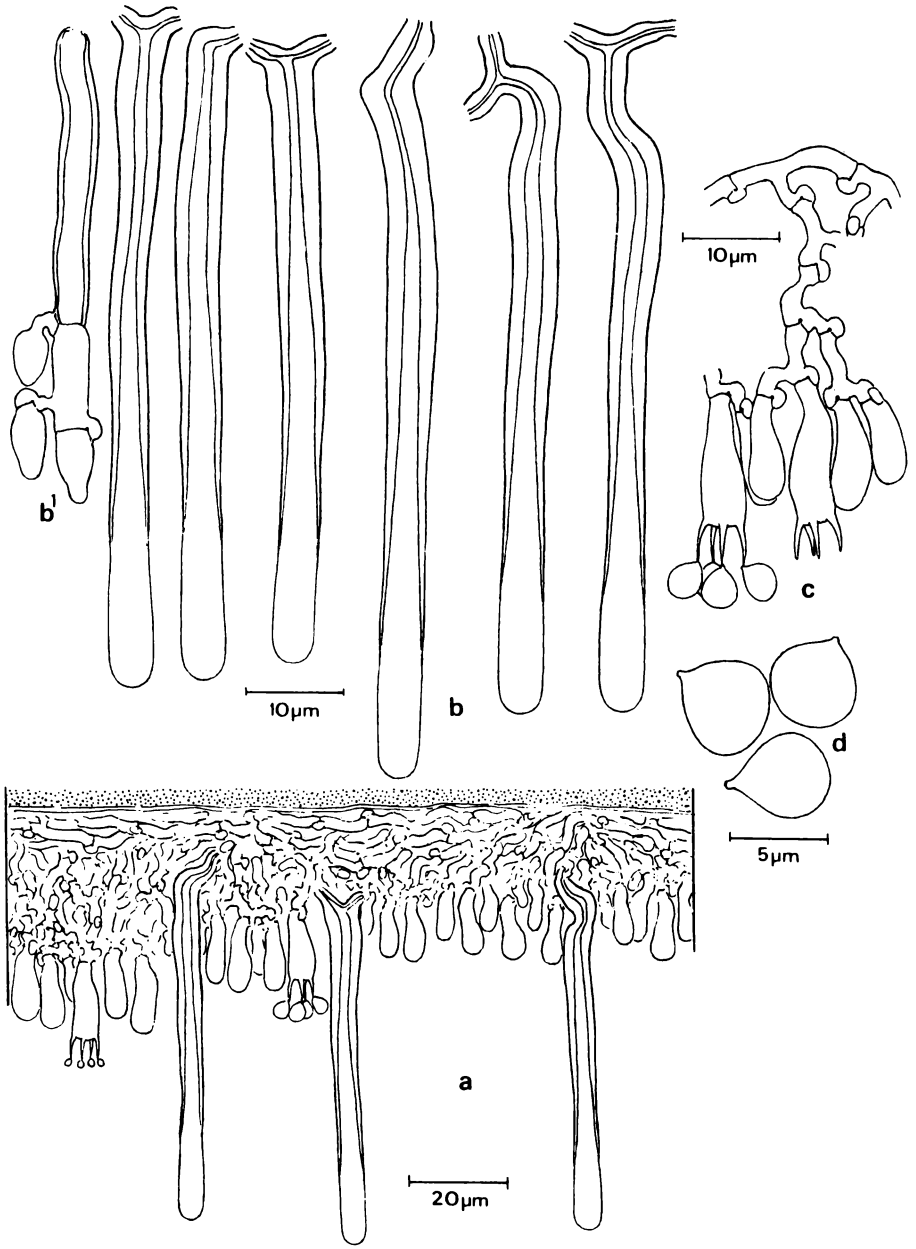


Fig. 830. *Tubulicrinis globisporus* a) section through fruitbody, b) cystidia, b1) cystidium changing its role to a generative hyphae with basidia, c) basidia, d) spores. –Coll. Hallingbäck & Larsson 1981–10–27

10. Tubulicrinis globisporus Larss. & Hjortst. Fig. 830
Mycotaxon 7:123, 1978. — *Tubulicrinis* cf *callosus* G.H. Cunn. in Oberw. Zeitschr. Pilzk. 31:30, 1966.

Fruitbody resupinate, as a rule very thin, porulose and discontinuous, pilose by protruding cystidia, whitish or in the herbaria sometimes pale ochraceous, margin thinning out, not determinable.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, 3–3.5 μm wide, arranged in a very thin and inamyloid tissue, all hyphae with clamps.
Cystidia cylindrical, usually with a very strong amyloid reaction, 70–120×5–7 μm, not or only slightly widened towards the obtuse apex, capillary lumen expanded gradually with the upper, thin-walled part more than 10 μm long.
Basidia subclavate, 10–15(–18)×5–7 μm, basally with slight wall thickening, forming rather loose clusters, inamyloid, with 4 sterigmata and a basal clamp.
Spores obliquely globose, smooth, thin-walled, 4–5(–5.5) μm in diam.
Habitat and distribution. Mostly on pine-wood. Seems to be a rare or scattered species in the area. Most of the collections are from W. Sweden (Västergötland) but found occasionally up to Jämtland. In Norway from Akershus and Hedmark. Not known from Denmark and Finland. We have seen collections from Austria and Canada and according to Oberwinkler (1966) it is also distributed in France, Germany, and northern Italy.
Remarks. The diagnostic features are the subglobose spores and the cylindrical cystida with a strong amyloid reaction.

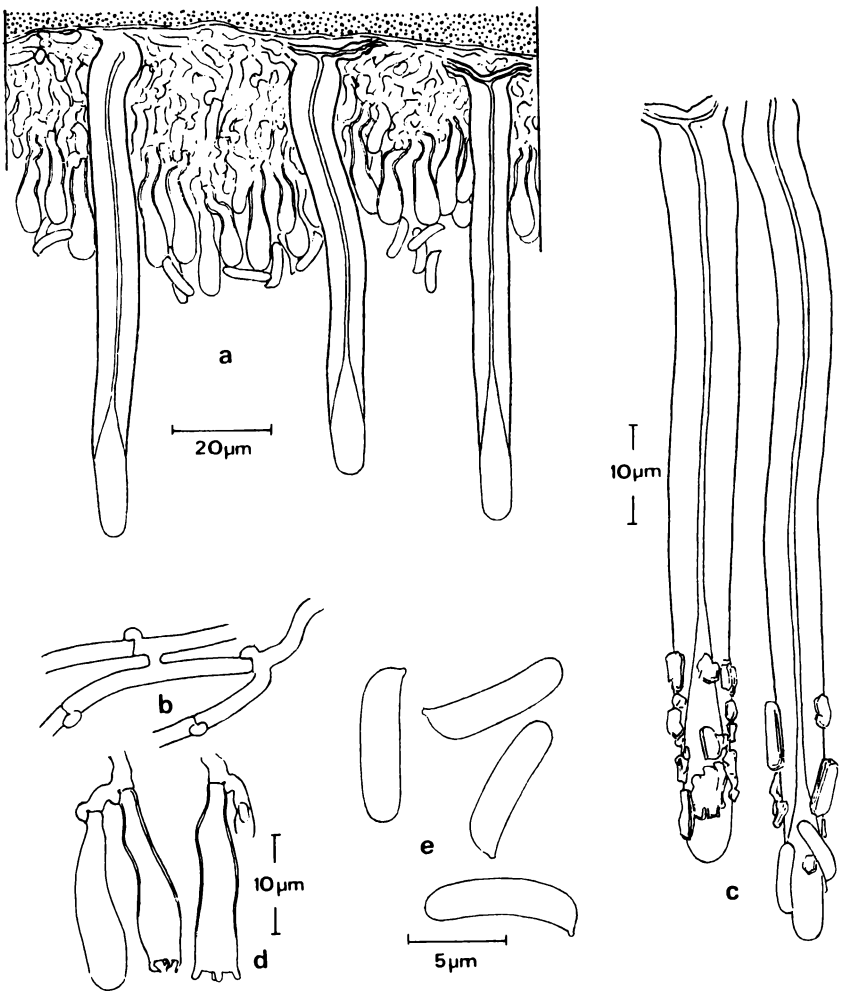


Fig. 831. *Tubulicrinis gracillimus* a) section through fruitbody, b) basal hyphae, c) cystidia, d) basidia, e) spores. –Coll. Typus

11. Tubulicrinis gracillimus (Rog. & Jacks.) G.H. Cunn. 831–833 Bull. N. Z. Dep. sci. ind. Res. 145:141, 1963. — *Peniophora gracillima* Ell. & Everh. ex Rog. & Jacks., Farlowia 1:317, 1943. — *Corticium glebulosum* (Fr.) Bres., Fung. trid. 2:61, 1898 nom. conf. — *Thelephora calcea* Fr. * *glebulosa* Fr., Elenchus fung. p. 215, 1928.

Fruitbody resupinate, effuse, in most specimens thick, up to 0.25 mm or more, at first discontinuous then continuous and widely spread over the substratum, in young parts minutely flocculose or granular (lens 50×), especially when dried cracking in small and irregular pieces, distinctly pilose by protruding cystidia, whitish or more commonly cream-coloured to sordidly ochraceous, margin mostly indeterminable.
Hyphal system normally monomitic but sometimes with thick-walled skeletal hyphae; generative hyphae thin to moderately thick-walled, 2–2.5(–3) μm wide, arranged in a dense tissue, inamyloid, all hyphae with clamps at each septa, skeletal hyphae occur in some specimens forming a thin layer next to the substratum, thick-walled and seemingly without septa, 2.5–3 μm wide and with a weak amyloid reaction.
Cystidia cylindrical, robust, generally 100–200 μm long and 6–10 μm wide in the middle part, narrowing to the obtuse and slightly contracted thin-walled apex, generally encrusted with crystalline matter, capillary lumen narrow, expanding more or less abruptly at the apex, amyloidity variable from very strong blue to a greyish reaction.
Basidia in a fairly dense palisade, clustered relatively loose, 20–25×4–4.5 μm, thin-walled or with slight wall thickening, subclavate, slightly stalked, inamyloid, with 4 sterigmata, and a basal clamp.
Spores allantoid, smooth, thin-walled, (6–7–)7.5–8.5(–9)×(1.5–)1.75–2(–2.25).

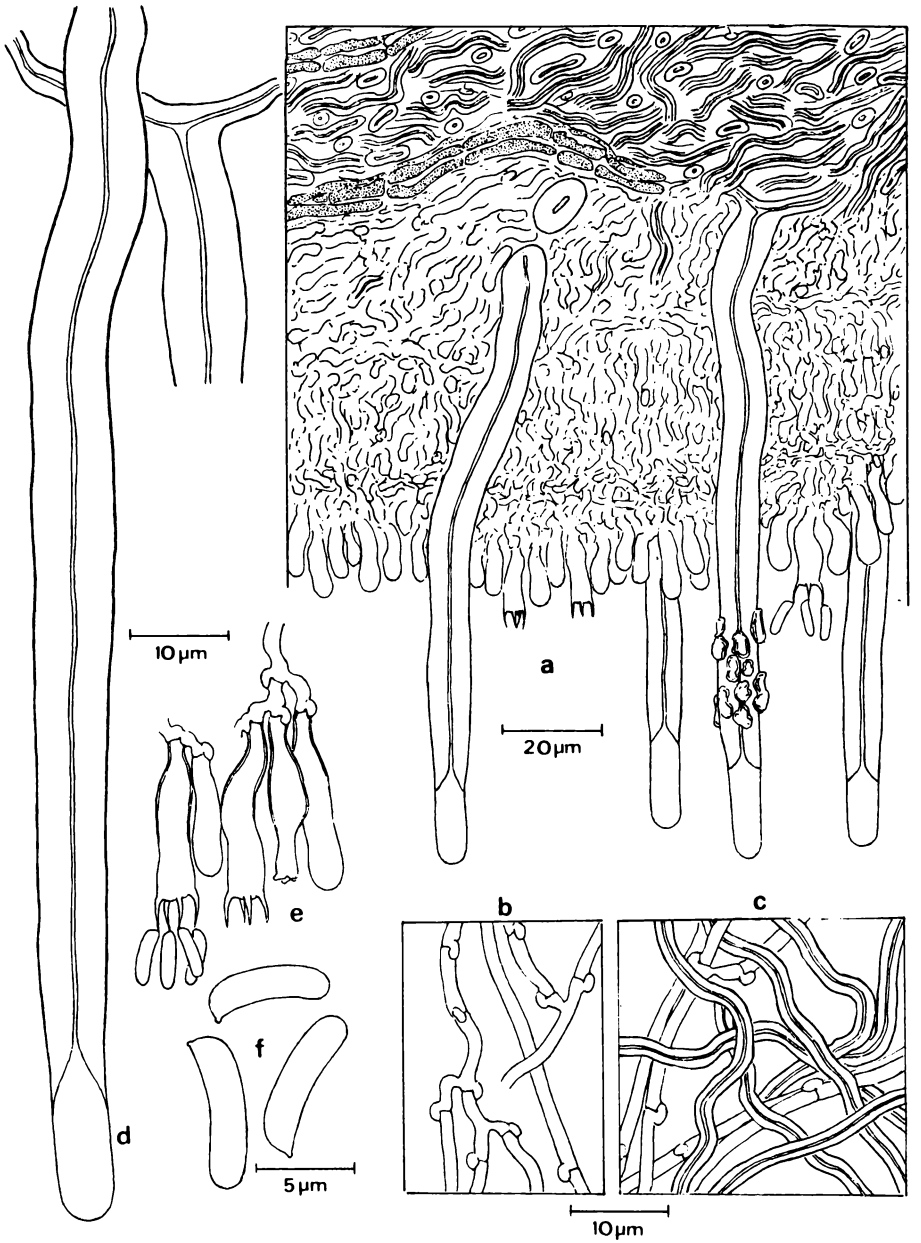


Fig. 832. *Tubulicrinis gracillimus* a) section through fruitbody, b) thin-walled basal hyphae, c) thin-walled hyphae mixed with thich-walled skeletal hyphae, d) cystidia, e) basidia, f) spores. -Coll. Hallenberg 3619

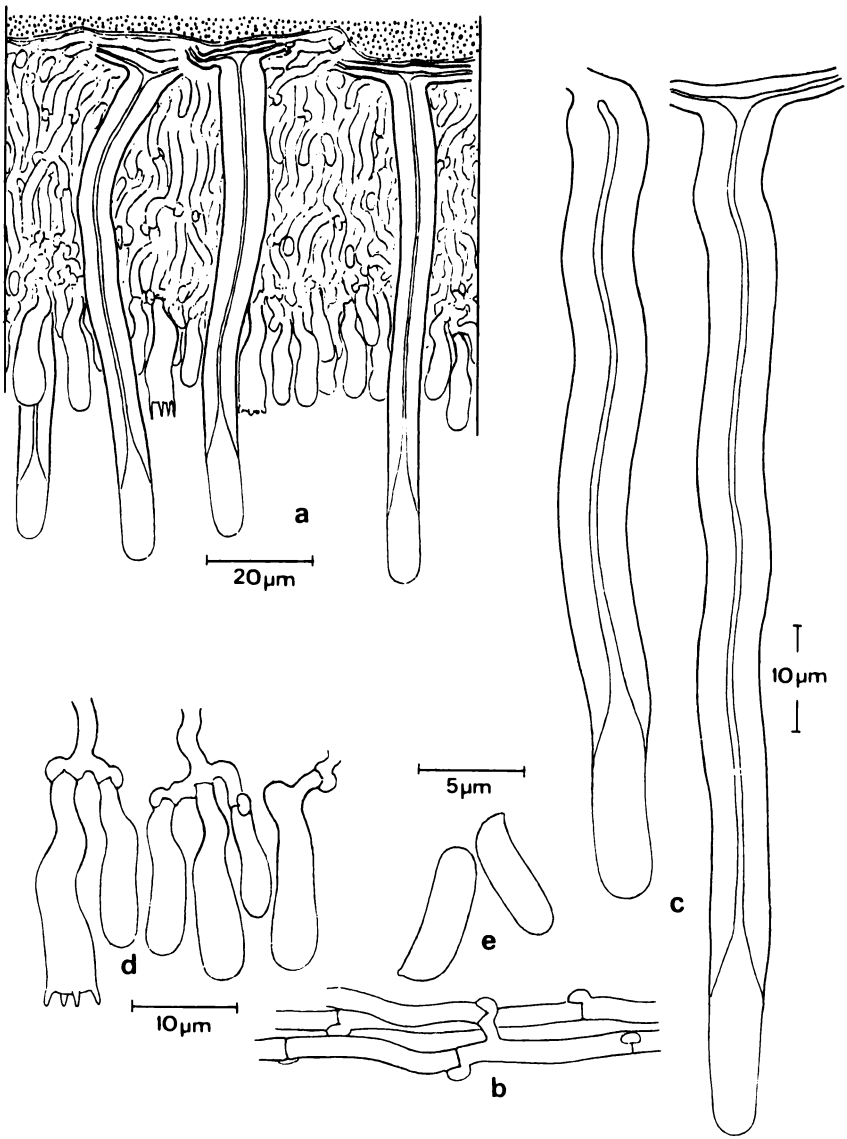


Fig. 833. *Tubulicrinis orientalis* a) section through fruitbody, b) basal hyphae, c) cystidia, d) basidia, e) spores. –Coll. Typus.

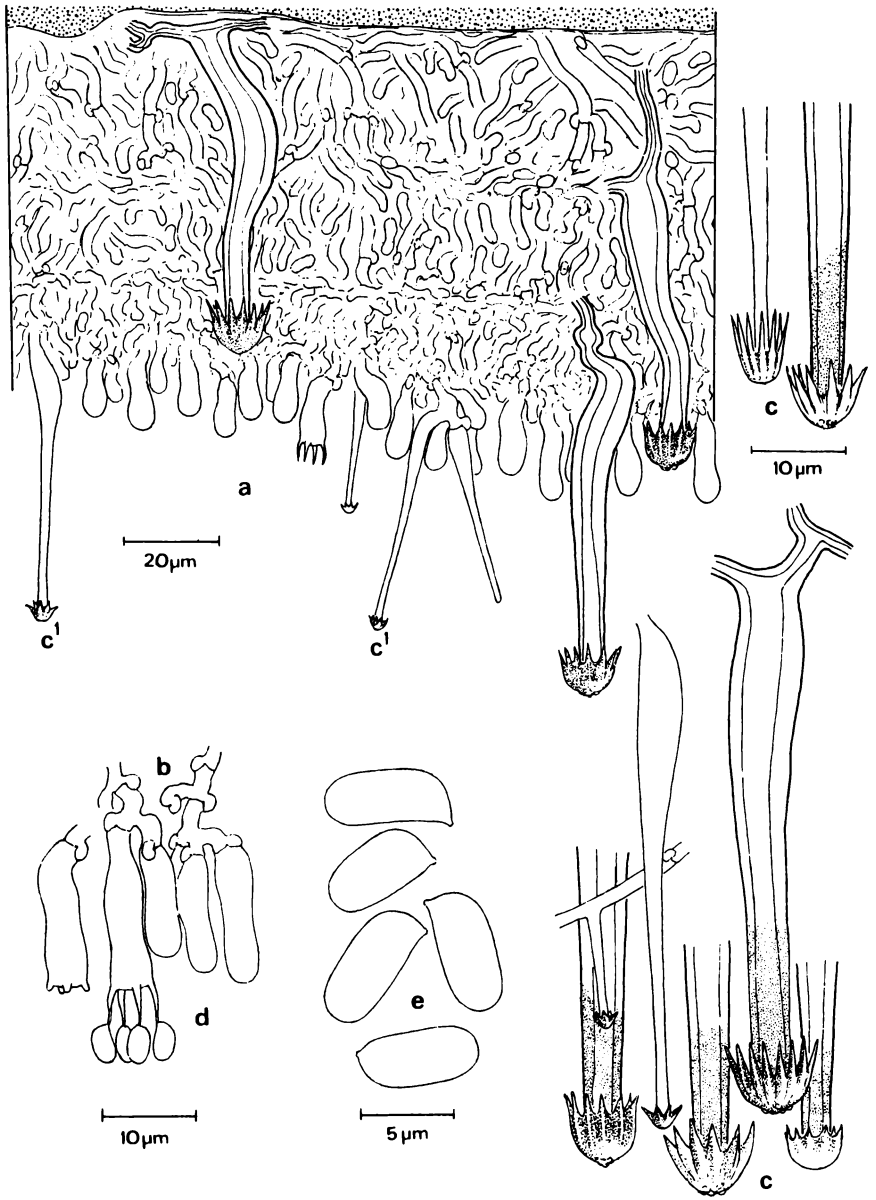


Fig. 834. *Tubulicrinis hamatus* a) section through fruitbody, b) subhymenial hyphae, c) cystidia, c1) hymenial cystidia, d) basidia, e) spores. –Coll. c Cain 14569; a–e Ryvarden 19104

Habitat and distribution. In the northern area preferably on deciduous wood such as *Betula* and *Salix* and in the subalpine birch-forests a wide-spread and characteristic fungus. Southwards less common to rare and more often found on coniferous wood. Reported from all Nordic countries but often, especially in the south, confused with *T. subulatus.*
Remarks. *T. gracillimus* is undoubtedly close to *T. subulatus* but in well developed and preserved specimens easily distinguished by its obtuse cystidia. Judging from our investigation of a large number of specimens from different geographical regions, the species varies especially as to the amyloid reaction of the cystidia. Also a rather large spore-variation has been noted, from normally 6–8 μm in length up to 8–10 um . Most of the material from North Europe, however, agrees with the description and the type specimen of *Peniophora gracillima.* Irrespective of the variation mentioned the species is on the whole easily recognized.
T. orientalis Parm. (1967) is very close and may be conspecific. The type has been examined and shows the same kind of cystidia but the spores seem to be slightly shorter, in general 5.5–6(–7) μm.

12. Tubulicrinis hamatus (Jacks.) Donk Fig. 834
Fungus 26:14, 1956. — *Peniophora hamata* Jacks., Can. J. Res. C., 26:133, 1948.

Remarks. This species is not found in North Europe but is reported from Germany (Bavaria; Oberwinkler 1966). *T. hamatus* is easily recognized and the diagnostic features are above all the conspicuous cystidia with an umbrella-like cap of encrustation and the ellipsoid spores which are 5–7×3–4 μm.

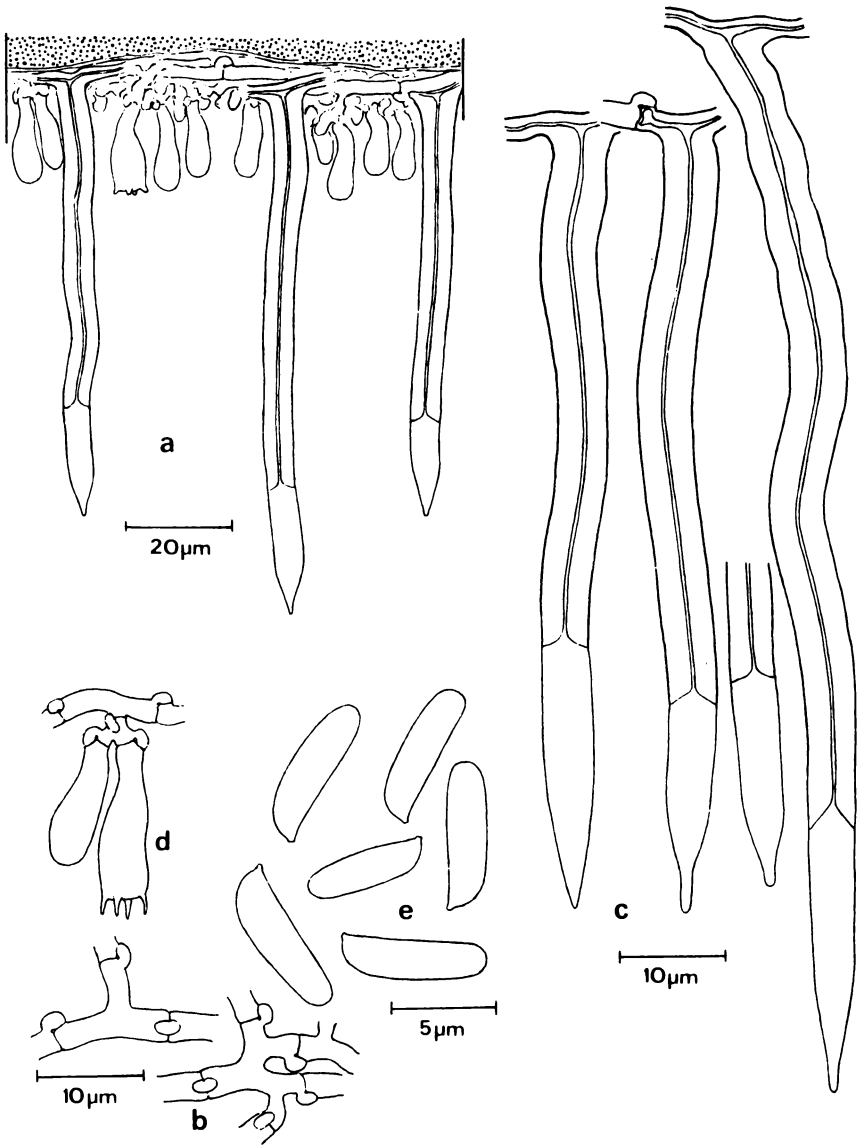


Fig. 835. *Tubulicrinis hirtellus* a) section through fruitbody, b) hyphae, c) cystidia, d) basidia, e) spores. –Coll. Larsson 2899

13. Tubulicrinis hirtellus (Bourd. & Galz.) John Erikss. Fig. 835 Symb. Bot. Ups. 16:82, 1958. — *Peniophora hirtella* Bourd. & Galz., Bull. Soc. mycol. France 28:386, 1913.

Fruitbody resupinate, usually thin but conspicuous, porulose, mostly discontinuous and often with aggregated tufts, cystidia emerging, in colour whitish or pale to sordidly ochraceous, margin thinning out.
Hyphal system monomitic; hyphae thin-walled, arranged in a very thin subicle, straight, long-celled, 2.5–3 μm wide, next to the basidia more short-celled and irregular, 3–4 μm wide, inamyloid, all hyphae with clamps.
Cystidia cylindrical, somewhat flexuose, generally 80–100 μm long and about 4–6 μm wide in the middle part, strikingly uniform in width, subulate and usually with a mucronate tip, capillary lumen widening gradually or more commonly abrupt. Amyloid reaction weak, mostly greyish.
Basidia in a loose cluster, subclavate, 13–18×4–4.5 μm, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores cylindrical or subfusiform, smooth, thin-walled, 7–8.5×2–2.5 um, adaxial side straight or slightly convex with a suprahilar concavity.
Habitat and distribution. On coniferous wood with a preference for wood decomposed by *Fomitopsis pinicola* or other cubic root fungi. With certainty a rare species in North Europe and occasionally recorded in Sweden from Västergötland and Småland in the south to Lule Lappmark in the north. In Norway hitherto only known from Sør-Trøndelag. Not reported from Finland. The collection mentioned by Christiansen (1960) is re-examined and found to be *T. angustus.*
Remarks. Conspicuous and homogenous species due to its microscopical characteristics with slender, subulate cystidia with a mucronate tip and spores somewhat subfusiform.

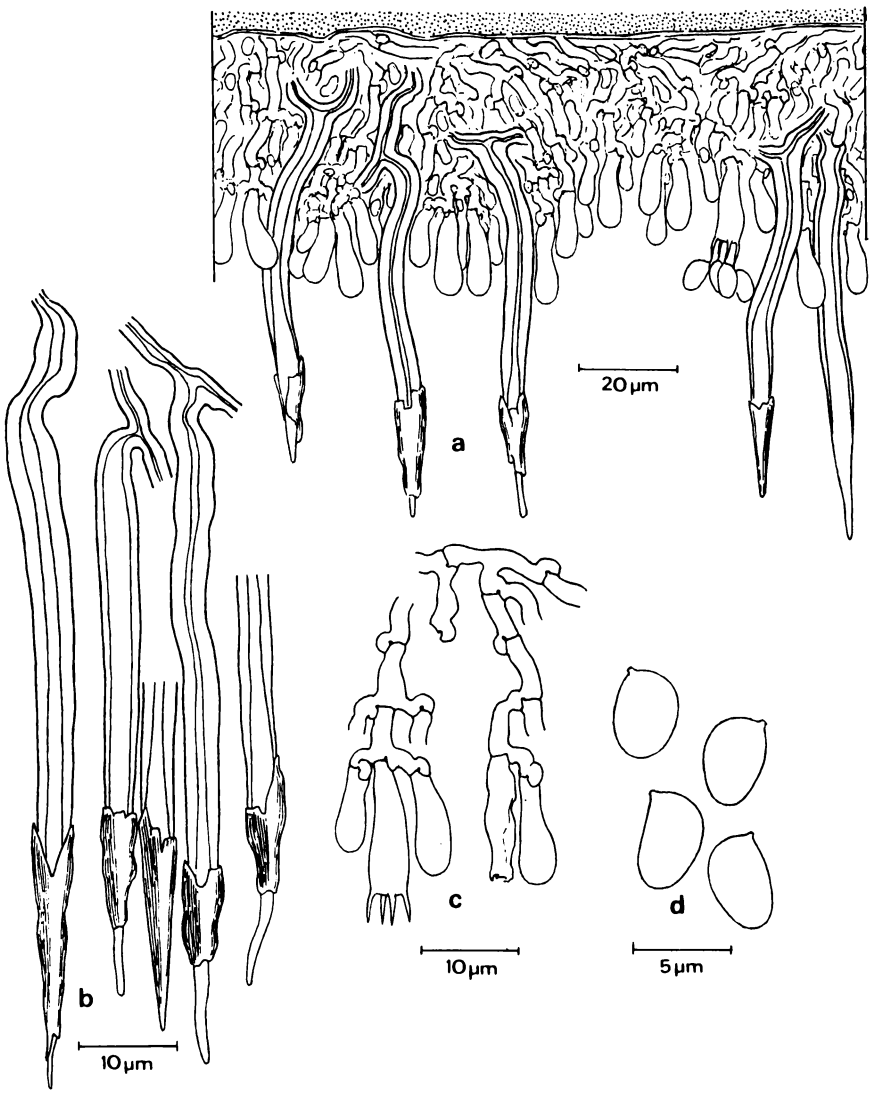


Fig. 836. *Tubulicrinis inornatus* a) section through fruitbody, b) cystidia, c) basidia, d) spores. –Coll. Larsson 4190

14. Tubulicrinis inornatus (Jacks. & Rog.) Donk Fig. 836
Fungus 26:14, 1956. — *Peniophora inornata* Jacks. & Rog., Can. J. Res. C., 26:139, 1948.

Fruitbody resupinate, consisting of small, discontinuous tufts, minutely hispid due to the protruding cystidia, whitish, margin thinning out, crust-like.
Hyphal system monomitic; basal hyphae distinct, straight, thin-walled or with slight wall thickening, 2.5–3 μm wide, tissue fairly dense and inamyloid, subhymenial layer loose, all hyphae with clamps.
Cystidia usually bifurcate, originating from basal hyphae or from the lower parts of the basidial clusters, dissolving slightly in strong KOH, inamyloid or with greyish reaction to Melzer, generally 70–90 μm long and 4–6 μm wide near the base, with a fairly wide capillary lumen which widenes gradually to the thin-walled pointed apex, apically covered with cowl-like encrustation.
Basidia subclavate, ordinarily 12–15×4–4.5 μm, constricted, thin-walled, inamyloid, with a basal clamp.
Spores ovate to short-ellipsoid, adaxial side convex, thin-walled, smooth 4.5–5(–5.5)×3–3.5 μm.
Habitat and distribution. On well decayed and decorticated wood of both *Picea* and *Pinus* and with a certain preference for old, virgin forest. *T. incornatus* is a rare species with few localities in Sweden (Västergötland, Ångermanland, Västerbotten, Lycksele and Lule Lappmark), Norway (Akershus, Hedmark, Sør-Trøndelag, Nordland, and in Finland (Kuusamo and Pisavaara Nat. Park). Not known from Denmark.
Remarks. Characteristic species owing to its distinctive cystidia and ovate spores. According to the investigated specimens from North Europe the species is homogenous and conform to material seen from other parts of the world, inclusive of the type.

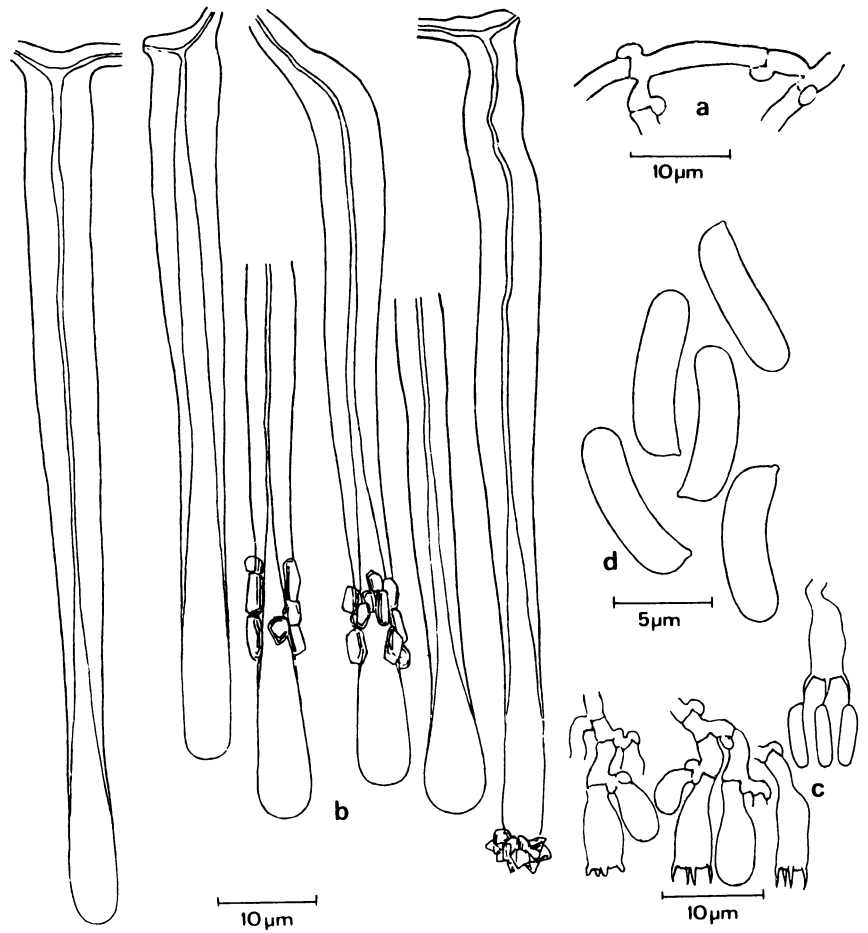


Fig. 837. *Tubulicrinis medius* a) hyphae, b) cystidia, c) basidia, d) spores. –Coll. Larsson 2609

15. Tubulicrinis medius (Bourd. & Galz.) Oberw. Zeitsch. Pilzk. 31:26, 1966. — *Peniophora media* Bourd. & Galz., Bull. Soc. mycol. France 28:385, 1913. Fig. 837–840

Fruitbody resupinate, closely adnate, porulose to continuous, as a rule conspicuous, sometimes up to 0.2 mm thick, then often pseudoaculeate due to aggregated tufts and easily peeled of from the substratum, in colour often white or snow-white when alive, in the herbarium whitish or with a greyish tint, nore rarely ochraceous, margin thinning out to an inconspicuous crust.
Hyphal system monomitic; hyphae thin or with slight wall thickening, 2–3 μm wide, forming a usually thin tissue without or with weak amyloid reaction, thicker fruitbodies often with intermingled hyphae and old shrunken, more or less amyloid basidia, subhymenial layer inamyloid, rather dense and sometimes both hyphae and basidia cling tightly to the cystidia-bases, all hyphae with clamps.
Cystidia subclavate to cylindrical, slightly widened towards the thin-walled and obtuse apex, strongly amyloid, generally 70–100 μm long and about 6–8 μm wide in the middle part, capillary lumen expanded gradually to a neck-width of 4–6 μm, thin-walled upper part varying in length but generally 10–15 μm long, encrusted with crystalline matter.
Basidia arising in a loose cluster, subclavate, 10–15×3.5–4.5 μm, thin-walled or basally with slight wall thickening and then commonly amyloid, with four sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, normally 6–8×1.5–1.8(–2) μm.
Habitat and distribution. Normally on coniferous wood. Appears to be rare outside the well investigated provinces of Västergötland, Småland, and Dalsland in Sweden where it is not uncommon. Otherwise there are scattered collections from Skåne to Ångermanland in Sweden and from Buskerud, Hedmark, Sør-Trøndelag, Troms, and Finnmark in Norway. Collected once in Finland (Etälä-Häme) and known from several spruce-plantations in Denmark.
Remarks. As a rule well distinguished by its apically widened and (most often) strongly amyloid cystidia and allantoid spores. Examination of the holotype (Bourd. 8924, in PC) has shown that the specimens from North Europe fits well booth the type and the original description. There is, however, a variation, especially in collections from outside Europe and the species may include several taxa or geographical races. Even if the cystidia are the most characteristic feature of the species a fairly large variation has been noted, partly in their amyloid reaction, partly (most often in extra-European specimens) in their length, width and appearance of the capillary lumen. Besides, the thickness of the

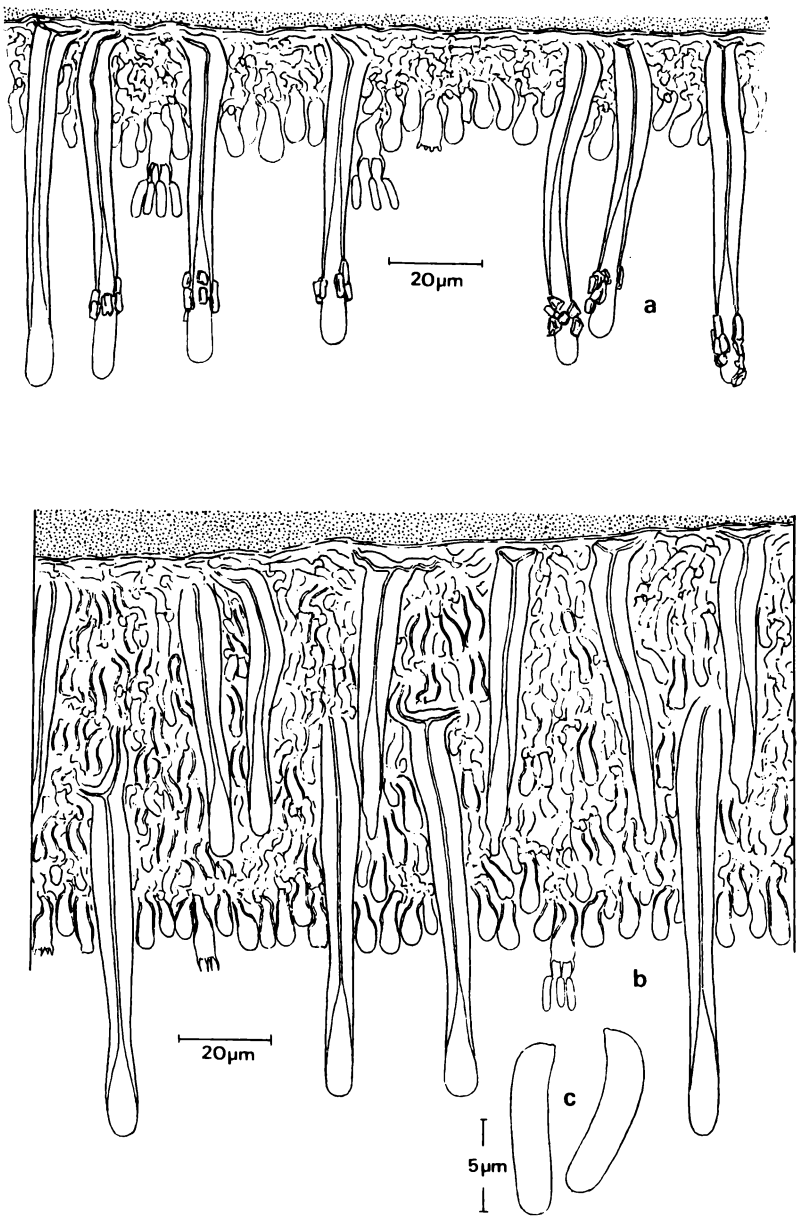


Fig. 838. *Tubulicrinis medius* a,b) section through fruitbody, c) spores. –Coll. a Larsson 2609; b,c Hallingbäck 11029

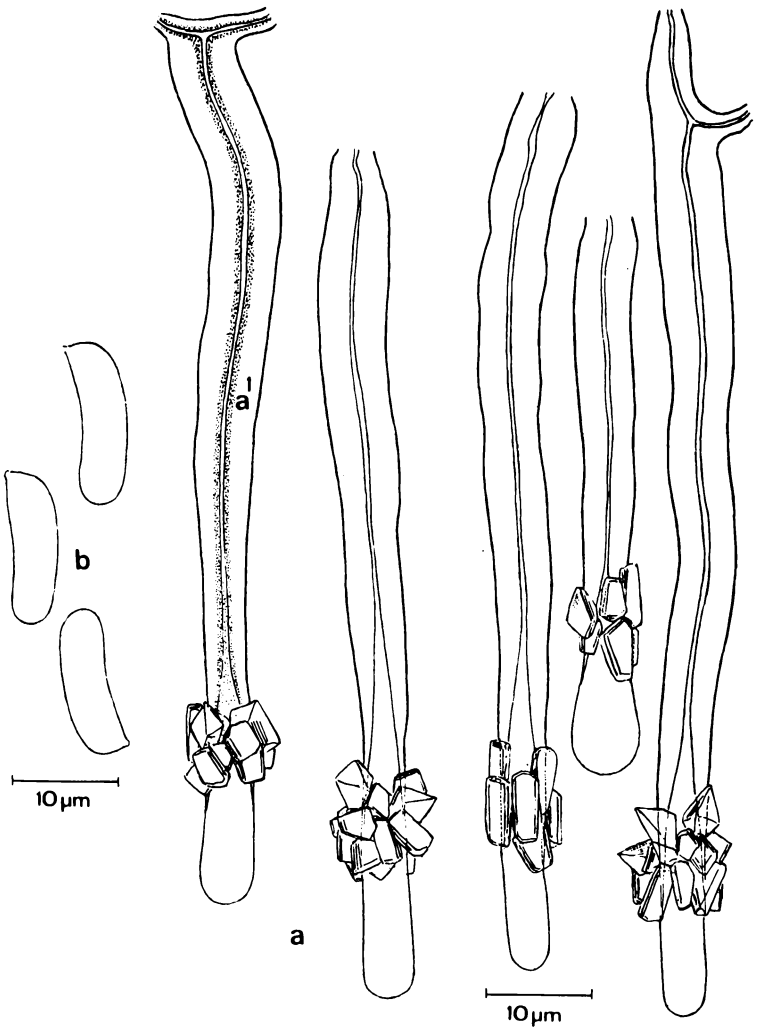


Fig. 839. *Tubulicrinis medius* a) cystidia, a1) amyloid part of the cystidia dotted, b) spores. –Coll. Hallingbäck 30065

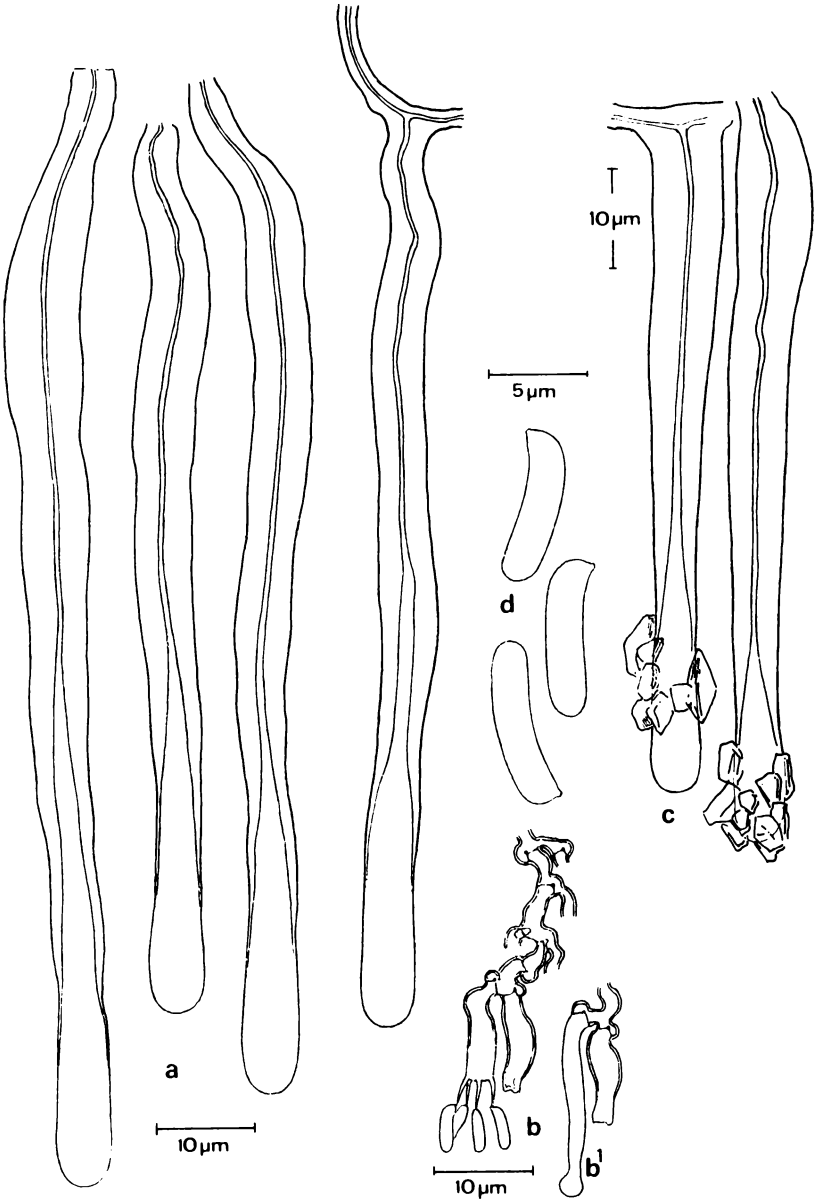


Fig. 840. *Tubulicrinis medius* a,c) cystidia, b) basidia, b1) capitate hyphoid, d) spores. –Coll. a,b Hallingbäck 11028; c,d Larsson 2409

basidia-wall fluctuate between thin and fairly thick and in the last case they are often distinctly amyloid.

16. Tubulicrinis propinquus (Bourd. & Galz.) Donk Fig. 841
Fungus 26:14, 1956. — *Peniophora cretacea* ssp. *propinqua* Bourd. and Galz., Hym. de France p. 288, 1928. — *Peniophora propinqua* (Bourd. & Galz.) Laurila, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo 10(4):8, 1939.

Fruitbody resupinate, thin but as a rule rather conspicuous, porulose to almost continuous, more rarely thick and tufted, whitish to pale ochraceous, margin indeterminable.
Hyphal system monomitic; hyphae thin-walled or with sligth wall thickening, 2.5–3 μm wide, forming a dense and sligthly amyloid tissue, all hyphae with clamps.
Cystidia cylindrical, 60–80 μm long and about 7 μm wide at the middle part, narrowing slightly to the neck, then widened to the obtuse, often bulb-like tip, strongly encrusted with crystalline matter around the neck or with crystals covering the whole head, capillary lumen widening abruptly to an almost circular and thin-walled apex. Amyloidity invariably strong and distinctly blue.
Basidia subclavate, forming loose clusters, 12–18×4–4.5 μm, thin-walled or basally with slight wall thickening, distinctly amyloid, with 4 sterigmata and a basal clamp.
Spores sligthly allantoid, smooth, thin-walled, (5.5–)6–8(–9.5)×1.5–1.8 μm.
Habitat and distribution. On coniferous wood, especially on *Pinus* and often in heath pine-woods. It is known from a lot of collections in Sweden (Småland, Västergötland, Dalsland) but otherwise very little noted which may give the impression of a southern distribution, In Norway found occasionally in Sør-Trøndelag and Troms and in Finland once (Etälä-Häme). Laurila (1939) reported it from Satakunta and Kuusamo but the determination has not been verified. He described the cystidia as "magis attenuatis" which not fits this species.
Remarks. Characteristic species and well distinguished from both *T. borealis* and *T. strangulatus* which seem to be the closest relatives. For comparison see these species.

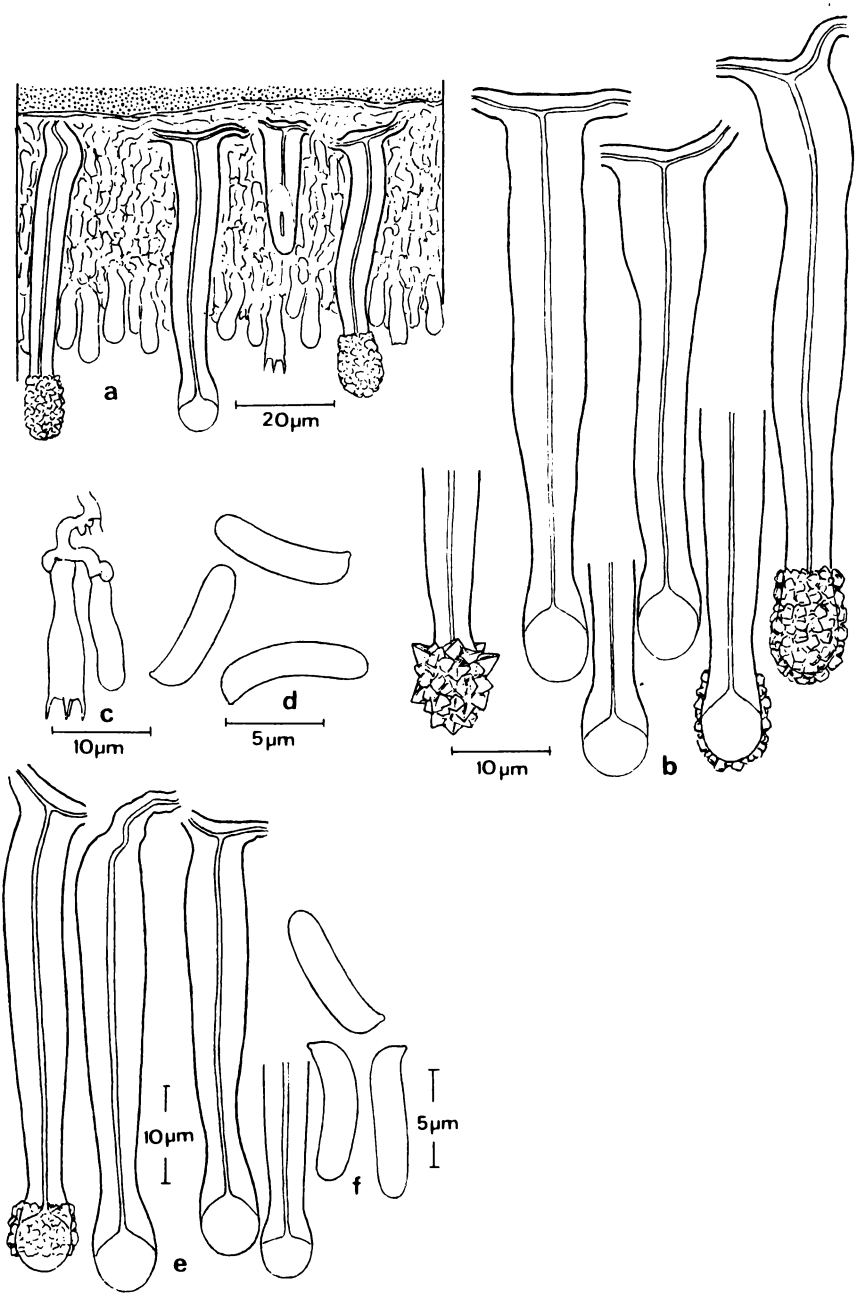


Fig. 841. *Tubulicrinis propinquus* a) section through fruitbody, b,e) cystidia, c) basidia, d,f) spores. –Coll. a–d Typus; e,f Hagstrøm 1972–08–17

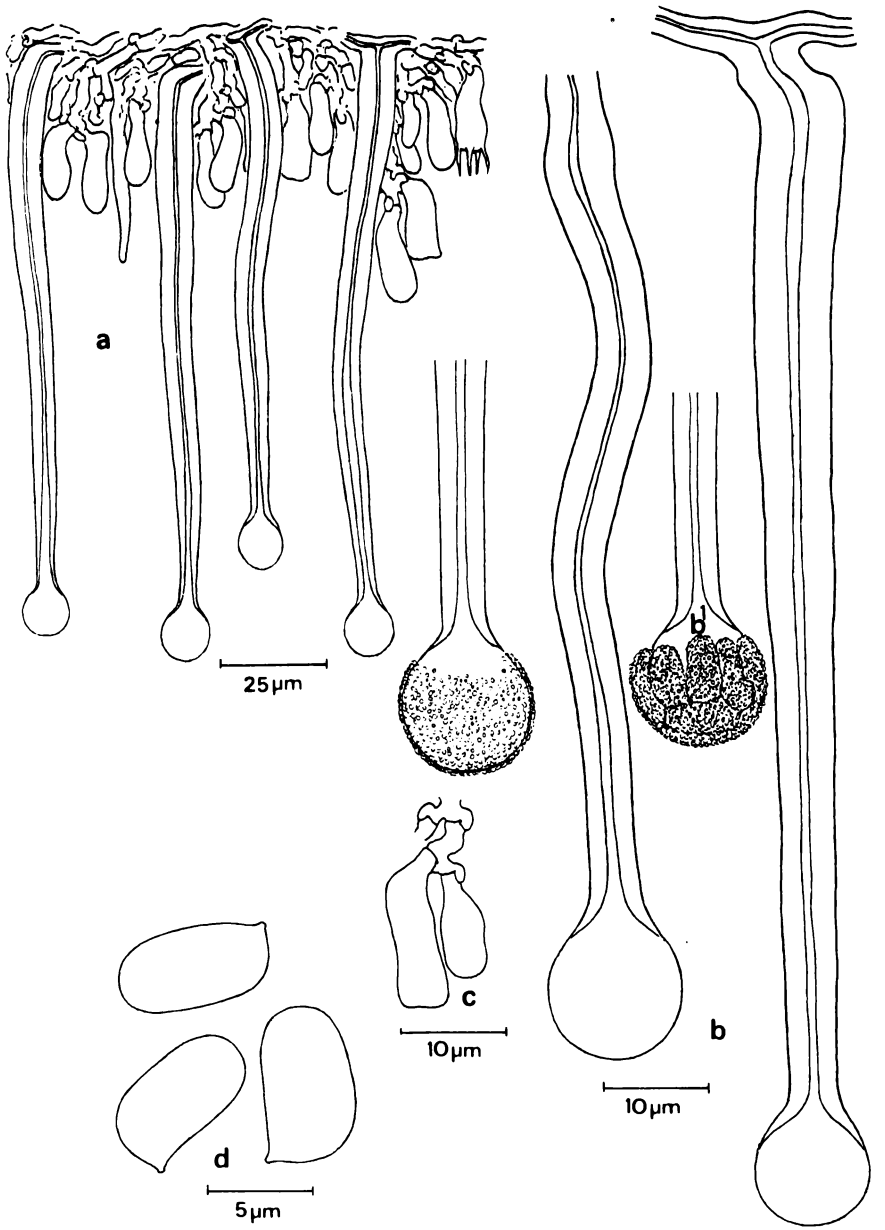


Fig. 842. *Tubulicrinis regificus* a) section through fruitbody, b) cystidia, b1) spores stuck to the cystidium–apex, c) basidia, d) spores. –Coll. Hjortstam 10184

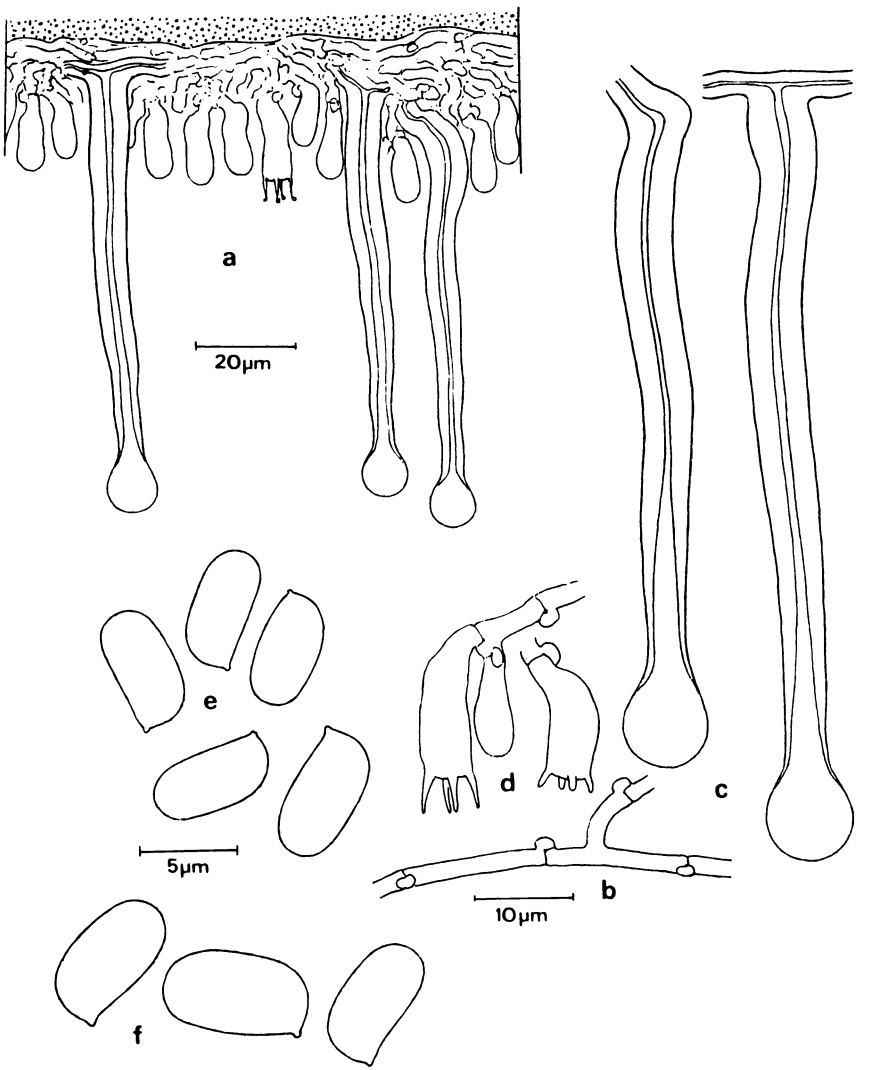


Fig. 843. *Tubulicrinis regificus* a) section through fruitbody, b) hyphae, c) cystidia, d) basidia, e,f) spores. –Coll. a–e Høgholen 254/79; f Hjortstam 7046

17. Tubulicrinis regificus (Jacks. & Deard.) Donk Fig. 842–845
Fungus 26:14, 1956. — *Peniophora regifica* Jacks. & Deard., Mycologia 43:57, 1951.

Fruitbody resupinate, at first very thin and pulverulent to porulose, then gradually thicker, tufted and in well developed specimens with sligthly odontoid appearance, cystidia protruding conspicuously, whitish to more rarely pale ochre, margin not determinable.
Hyphal system monomitic; basal hyphae thin-walled or with slight wall thickening, straight and branching at more or less right angles, 2–3 μm wide and with 30–50 μm long cells, subhymenial hyphae thin-walled, short-celled, twisted, with more oily contents than in other species, all hyphae inamyloid and with clamps.
Cystidia capitate, weakly amyloid, 80–120 μm long, in the type specimen considerably longer, reaching 170 μm in length, normally 5–8 μm wide in the middle part, narrowing sligthly towards the neck, then abruptly widened to a distinct, thin-walled head about 8–15 μm in diam., in most cases provided with brownish amorphous matter, easily observed under a lens (50×), capillary lumen widening gradually or abrupt to a thin-walled and almost circular apex.
Basidia subclavate, 15–20×6–7 μm, with oily contents, thin-walled, inamyloid, with 4 sterigmata and a basal clamp.
Spores ellipsoid, adaxially straight or sligthly convex, more rarely concave, smooth, thin-walled, 6–8(–9)×3.5–5 μm.
Habitat and distribution. On bark and decorticated wood of conifers. Evidently a very rare species but found several times on decorticated wood near riverbanks and other wet localities in Norway (Hedmark and Hordaland). Otherwise known from Denmark (Sjaelland) and from Västergötland in Sweden.
Remarks. An examination of the type-specimen of *Peniophora regifica* (Doty 5236, in TRTC) has shown that the Nordic material conforms in essential characteristics, e.g. capitate cystidia with weak amyloid reaction and spores typically ellipsoid and approximately 7–8×4–5 μm. The type consists of a rather thick, well developed, almost tufty fruitbody. The cystidia are robust, in general longer than 150 μm. Most of the Nordic collections have fruitbodies thinner but under a strong lens it can be observed that the hymenium starts as aggregated tufts. The cystidia are more slender and about 100–120 μm long.
Two collections from Canada (Figs. 844) deviate in spore morphology. They are mostly suballantoid with the adaxial side more pronounced concave. In other respects these collections fit into the concept of the species.

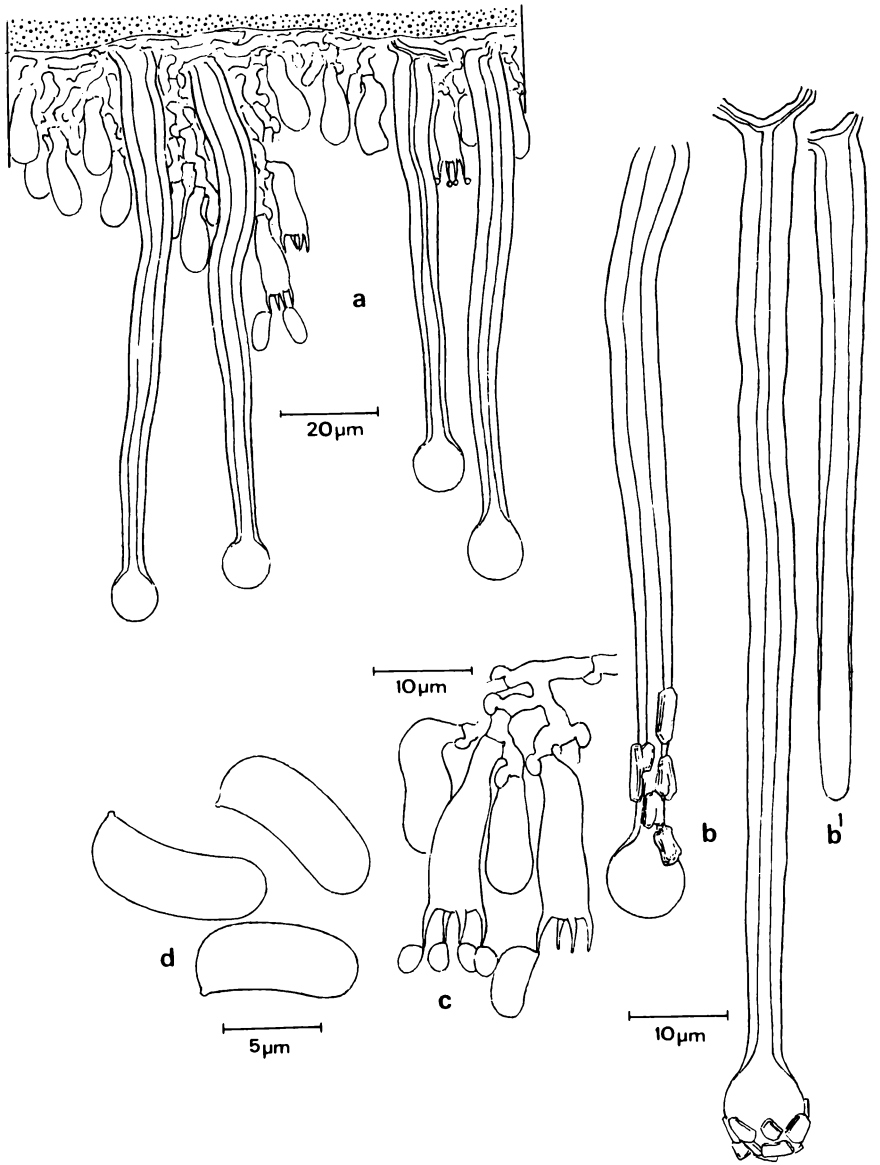


Fig. 844. *Tubulicrinis* aff. *regificus* a) section through fruitbody, b) cystidia, b1) abnormal cystidium, c) basidia, d) spores. –Coll. Eriksson & Bandoni 8567

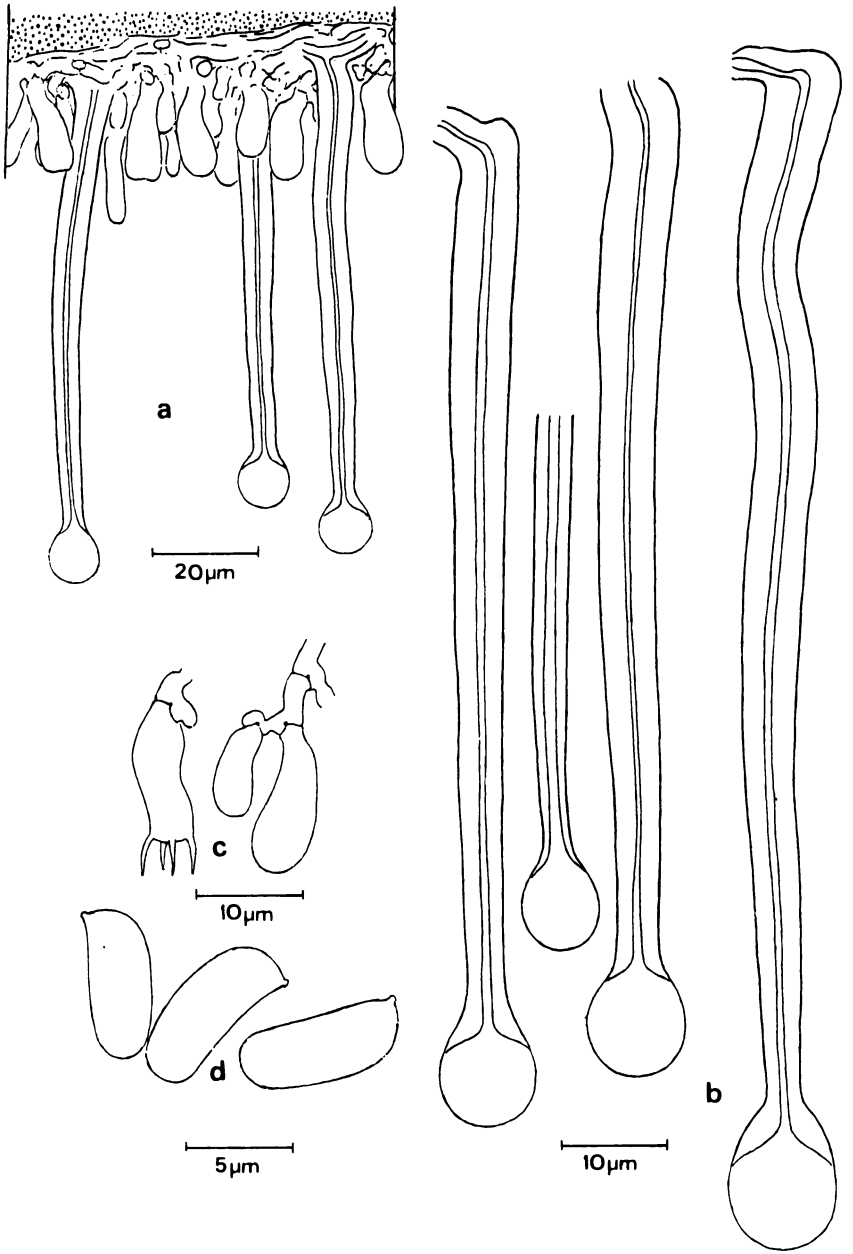


Fig. 845. *Tubulicrinis* aff. *regificus* a) section through fruitbody, b) cystidia, c) basidia, d) spores. –Coll. Eriksson & Bandoni 8446

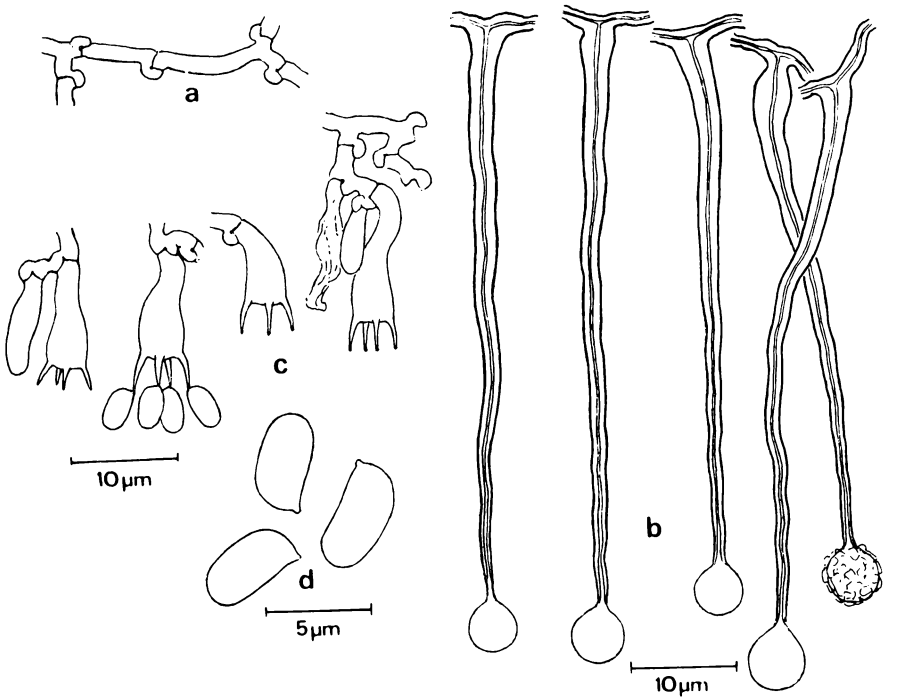


Fig. 846. *Tubulicrinis sceptriferus* a) basal hyphae, b) cystidia, c) basidia, d) spores. -Coll. Ryvarden 21638 (China)

18. Tubulicrinis sceptriferus (Jacks. & Weres.) Donk Fig. 846
Fungus 26:14, 1956. — *Peniophora sceptrifera* Jacks. & Weres., Can. J. Bot. 31:772, 1953.
Remarks. In Europe only reported from Germany (Bavaria) by Oberwinkler but as in the case with *T. hamatus* it could be expected to occur also in Northern Europe. It is a minute species and well distinguished from e.g. *T. accedens* by its very narrow cystidia-neck.

19. Tubulicrinis sororius (Bourd. & Galz.) Oberw. Fig. 847
Zeitschr. Pilzk. 31:23, 1966. — *Peniophora sororia* Bourd. & Galz., Bull. Soc. mycol. France 28:386, 1913, nec *Peniophora sororia* G.H. Cunn. = *Subulicystidium nikau* (G.H. Cunn.) Jülich. — *Peniophora glebulosa* ssp. *juniperina* Bourd. & Galz., Bull. Soc. mycol. France 28:386, 1913.
Fruitbody at first thin and inconspicuous, then thickening but as a rule discontinuous, porulose, in colour whitish to grey.

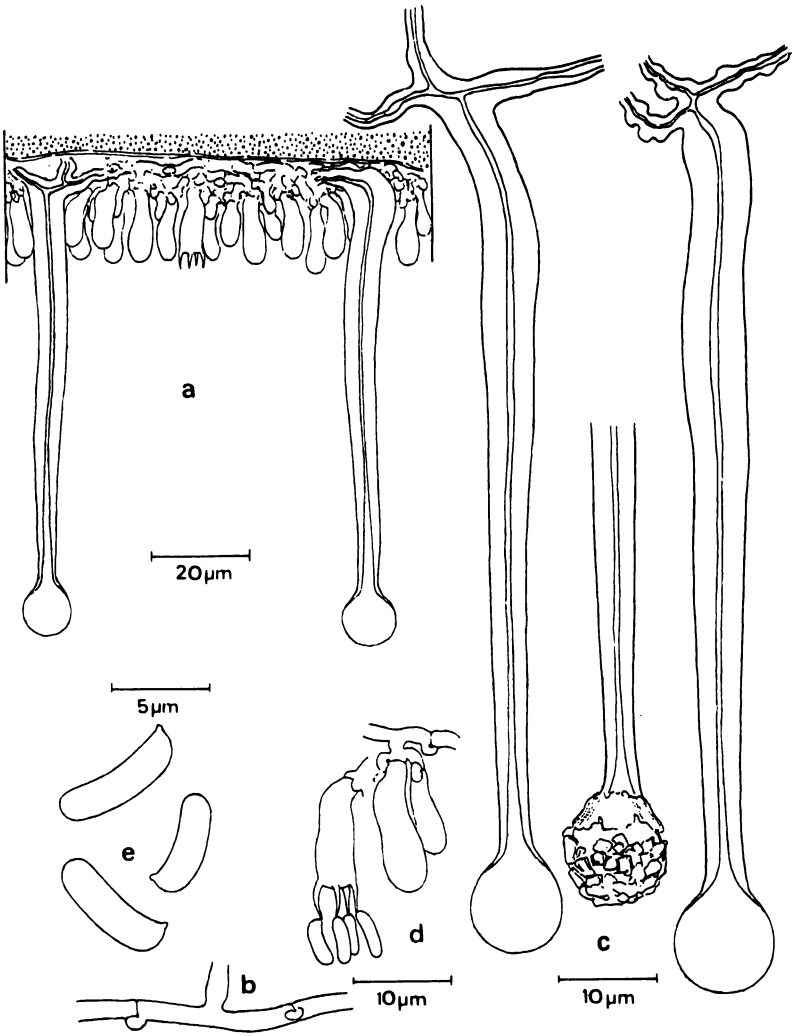


Fig. 847. *Tubulicrinis sororius* a) section through fruitbody, b) hyphae, c) cystidia, d) basidia, e) spores. –Coll. Larsson 4487

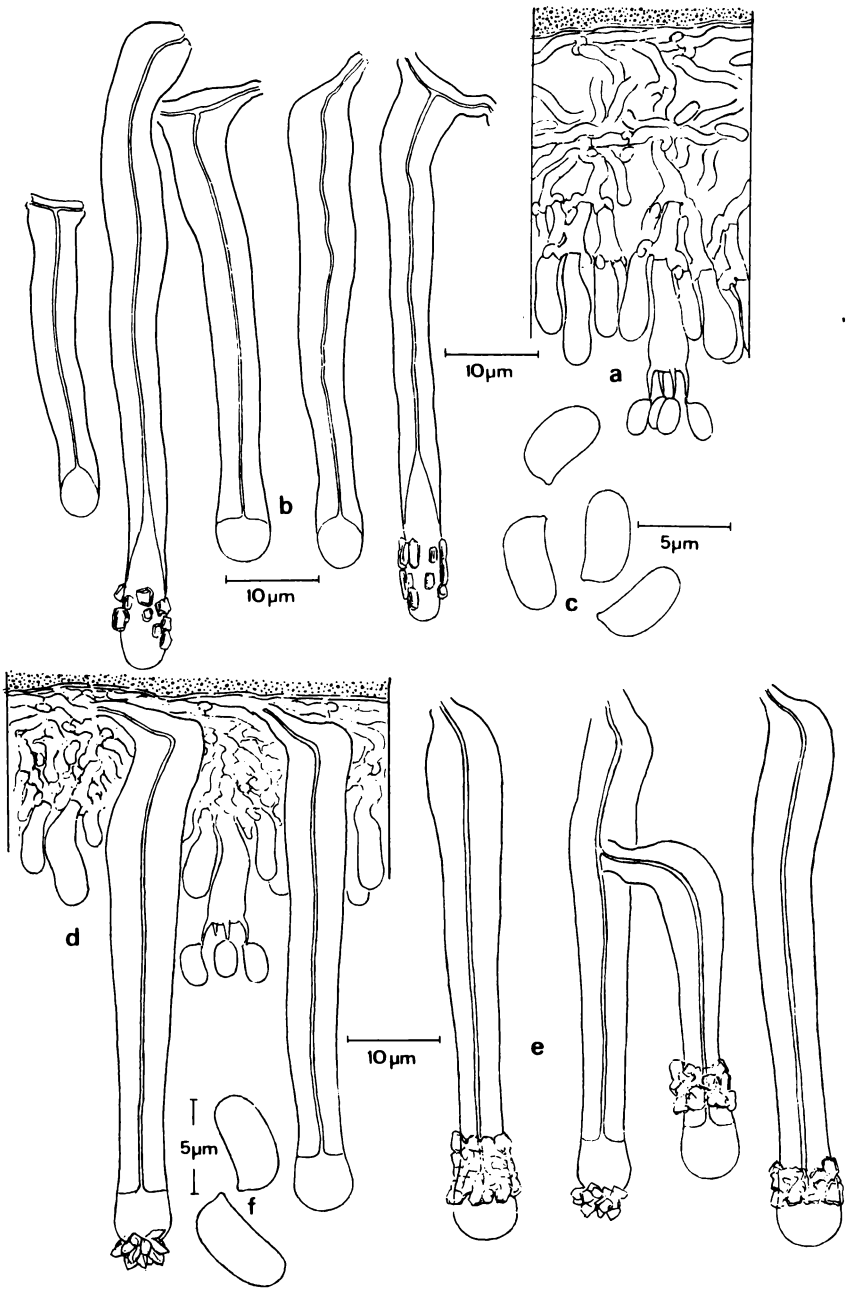


Fig. 848. *Tubulicrinis strangulatus* a,d) section through fruitbodies, b,e) cystidia, c,f) spores. –Coll. a–c Larsson 1966; d–f Strid 7384

Hyphal system monomitic; hyphae thin-walled or occasionally with slight wall thickening, 1.8–2.5 μm wide, inamyloid, all hyphae with clamps.
Cystidia capitate, normally 80–100 μm long and 5–6 μm wide at the middle part, narrowing slightly to the neck, then widening to a distinct, 7–10 μm wide head, usually encrusted in the thin-walled part, capillary lumen widening more or less abrutly in a nearly circular and thin-walled apex. Amyloidity distinct giving a weak blue colour.
Basidia subclavate, strinkingly small, 10–12×4 μm, slightly constricted, thin-walled, inamyloid, with four sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, 5.5–6.5×1.8(–2) μm.
Habitat and distribution. On various kind of coniferous wood and also once noted on a fallen *Alnus incana* (Sweden, Jämtland). A rare species though found scattered in the Nordic countries, in Sweden from Småland and Västergötland northwards to Jämtland and in Norway known from Akershus, Hordaland and Sør-Trøndelag. Further it is known from two localities in Denmark (Jylland), both in pine plantations and twice i Finland (Etälä-Häme and Kuusamo).
Remarks. The capitate cystidia of *T. sororius* reminds of *T. regificus* but the latter is easily distinguished by its ellipsoid spores. For the delimitation against *T. evenii* see this species.

20. Tubulicrinis strangulatus Larss. & Hjortst. Fig. 848
Mycotaxon 26:438, 1986.

Fruitbody resupinate, effuse, at first thin and porulose, then thicker and in most cases continuous, occasionally tufted and discontinuous, whitish to very pale ochraceous.
Hyphal system monomitic; hyphae thin-walled or with slight wall-thickening, 2.5–3(–3.5) μm wide, in the subicular layer often with a slight asymmetric appearance, amyloidity weak or indistinguishable, all hyphae with clamps.
Cystidia cylindrical, normally 60–80 μm long and 7–8 μm wide in the middle part, narrowing towards the neck, then widened slightly to an obtuse apex and generally encrusted apically with crystalline matter, often exclusively around the neck, capillary lumen ending gradually or more commonly abrupt in a thin-walled and capitulate tip. Amyloidity as a rule very strong.
Basidia subclavate forming relatively loose clusters, 12–15×4–4.5 μm, thin-walled or basally with slight wall thickening, inamyloid or with a weak amyloid reaction, with 4 sterigmata and a basal clamp.

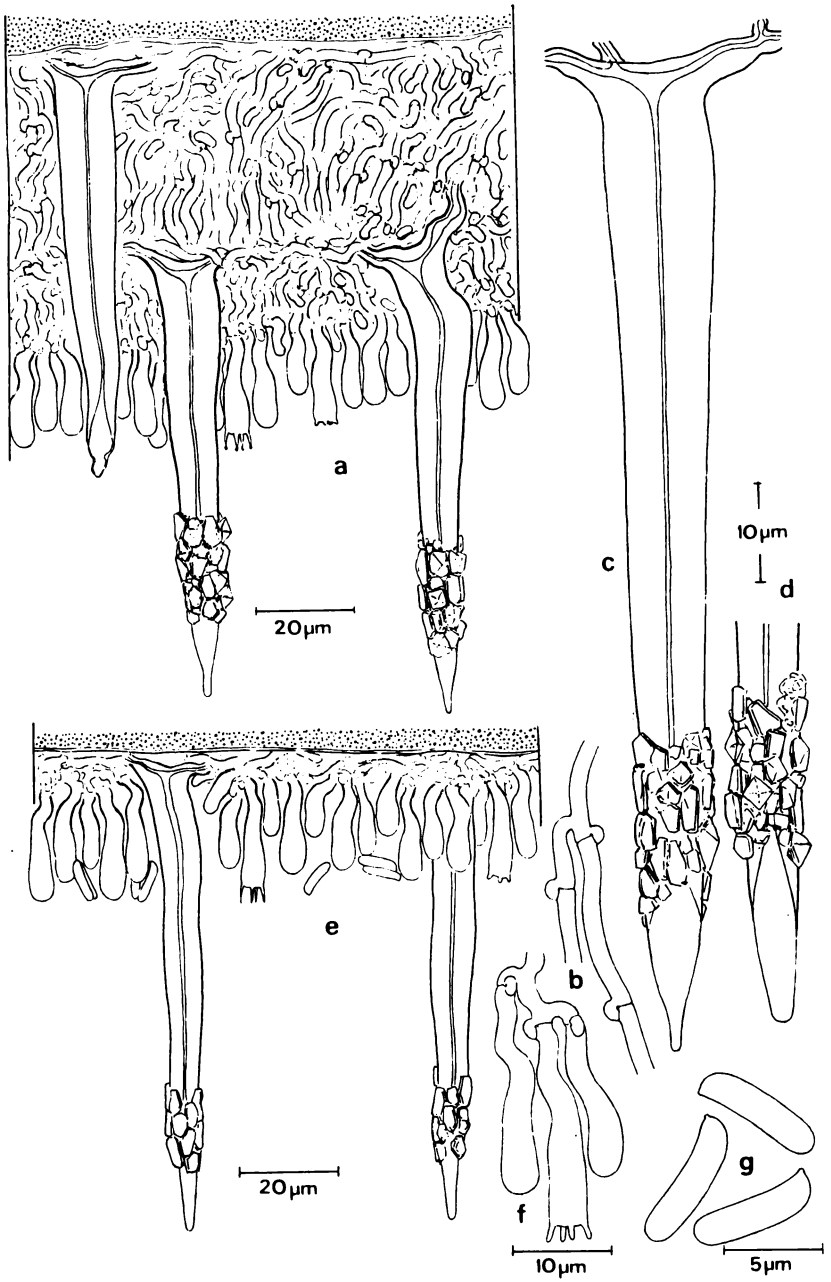


Fig. 849. *Tubulicrinis subulatus* a,e) section through fruitbodies, b) hyphae, c,d) cystidia, f) basidia, g) spores. –Coll. a,c Hjortstam 8604; d Lundell 1394; b, e–g Larsson & Hjortstam 10079

Spores short-allantoid to subreniform, adaxial side distinctly concave, smooth, thin-walled, (4–)5–5.5(–7)×2.5(–2.8) μm.
Habitat and distribution. Little known species and hitherto found on coniferous wood from a few localities in Norway (Hedmark) and Sweden (Småland, Västergötland, Ångermanland, and Lycksele Lappmark). Recently collected also in Romania.
Remarks. *T. strangulatus* is readily recognized by its strongly amyloid cystidia with a typical neck-incrustation, subreniform spores, and fairly thin-walled, inamyloid basidia. The species is closely related to *T. borealis* and *T. propinquus* but separated from both by spore-proportions.

21. Tubulicrinis subulatus (Bourd. & Galz.) Donk Fig. 849
Fungus 26:14, 1956. — *Peniophora glebulosa* ssp. *subulata* Bourd. & Galz., Bull. Soc. mycol. France 28:385, 1913. — *Peniophora subulata* (Bourd. & Galz.) Donk, Meded. Nederl. mycol. vereen. 18–20:165, 1931.
Fruitbody resupinate, effused, closely adnate, when fully developed mostly thick often up to 0.2 mm or more, continuous but when dried as a rule cracking in irregular pieces, strongly pilose by protruding cystidia, in colour whitish to cream or yellowish brown, margin thinning out.
Hyphal system monomitic; hyphae thin-walled or with slight wall thickening, 2–2.5(–3) μm wide, inamyloid, arranged in a fairly dense tissue, subicular hyphae irregularly interwoven, subhymenial ones more or less densely packed, all hyphae with clamps.
Cystidia cylindrical, robust, ordinarily 80–100 μm long and 8–10 μm wide in the middle part, narrowing slightly to the subulate and mostly mucronate tip, apically encrusted with crystalline matter except for the outermost,thin-walled part, capillary lumen widening gradually. Amyloidity variable, usually only a greyish hue but in some specimens the reaction is a fairly strong blue.
Basidia in a rather dense palisade, subclavate to more or less stalked, 15–18(–20)×3.5–4.5 μm, thin-walled or, especially after sporulation, basally with thickened walls, inamyloid, with four sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, generally 6–8×1.5–1.8 μm.
Habitat and distribution. A very common species in the whole area. It appears on all kind of coniferous wood and now and then also on deciduous wood.
Remarks. *T. subulatus* is a well known fungus and easily recognized by its thick fruitbody and subulate cystidia.

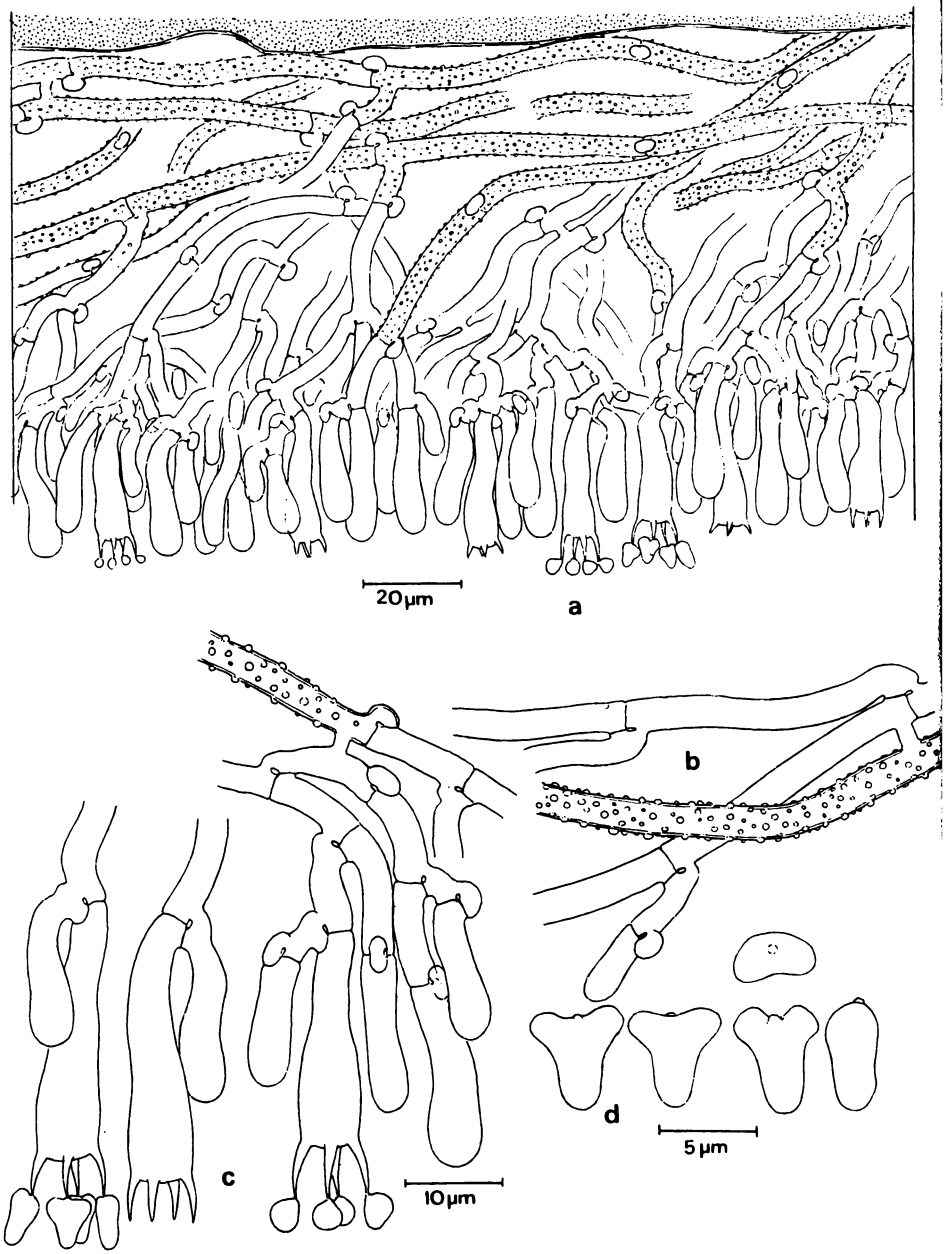


Fig. 850. *Tylospora asterophora* a) section through fruitbody, b) hyphae, c) basidia, d) spores. –Coll. Hjortstam 7251

Tylospora Donk
Taxon 9:220, 1960.

Fruitbodies resupinate, effuse, loosely adnate, rather thin, arachnoid to byssoid, usually continuous; hymenium smooth or somewhat rough, whitish to cream-coloured; hyphal system monomitic, all hyphae with clamps, subiculum thin, thready, with hyphae parallelly arranged, thin to moderately thick-walled, encrusted, other hyphae usually smooth and of about the same width; cystidial elements lacking; basidia typically clavate, not or indistinctly constricted, with 4 sterigmata and a basal clamp; spores in profile tri-angular or lobed with irregular warts, with slight wall thickening, apparently hyaline, not or faintly cyanophilous, indextrinoid, inamyloid.

Type species: *Corticium trigonospermum* Bres. (= *Hypochnus asterophorus* Bon.)

Remarks: Seems to be rather isolated in the *Corticiaceae* s.l. but especially by its spore-morphology at least superficially similar to species in *Tomentella* which, however has coloured spores. The basidia reminds somewhat of those of *Piloderma* but all species in that genus are lacking clamps and the spores are globose to subglobose, never angular. Only two species hitherto known.

Key to species

1. Spores tri-angular in profile ..... **1. T. asterophora**
1. Spores lobed with irregular warts ..... **2. T. fibrillosa**

1. Tylospora asterophora (Bon.) Donk Fig. 850
Taxon 9:220, 1960. — *Hypochnus asterophorus* Bon., Handb. allg. Mykol. p. 160, 1851. — *Corticium trigonospermum* Bres., Ann.mycol. 3:163, 1905.

Fruitbody resupinate, thin to moderately thick; hymenium smooth or slightly blistery, whitish or in the herbarium changing to yellowish-cream; margin indifferent.
Hyphal system monomitic, basal hyphae mostly with strong encrustations and with walls thickened, frequently branched, branching at right angles, 3.5–4(–5) μm wide, subhymenial hyphae thin-walled, usually smooth and of about the same width, all septa with clamps.
Basidia clavate, 20–25×4.5–5.5 μm, normally with 4 sterigmata.

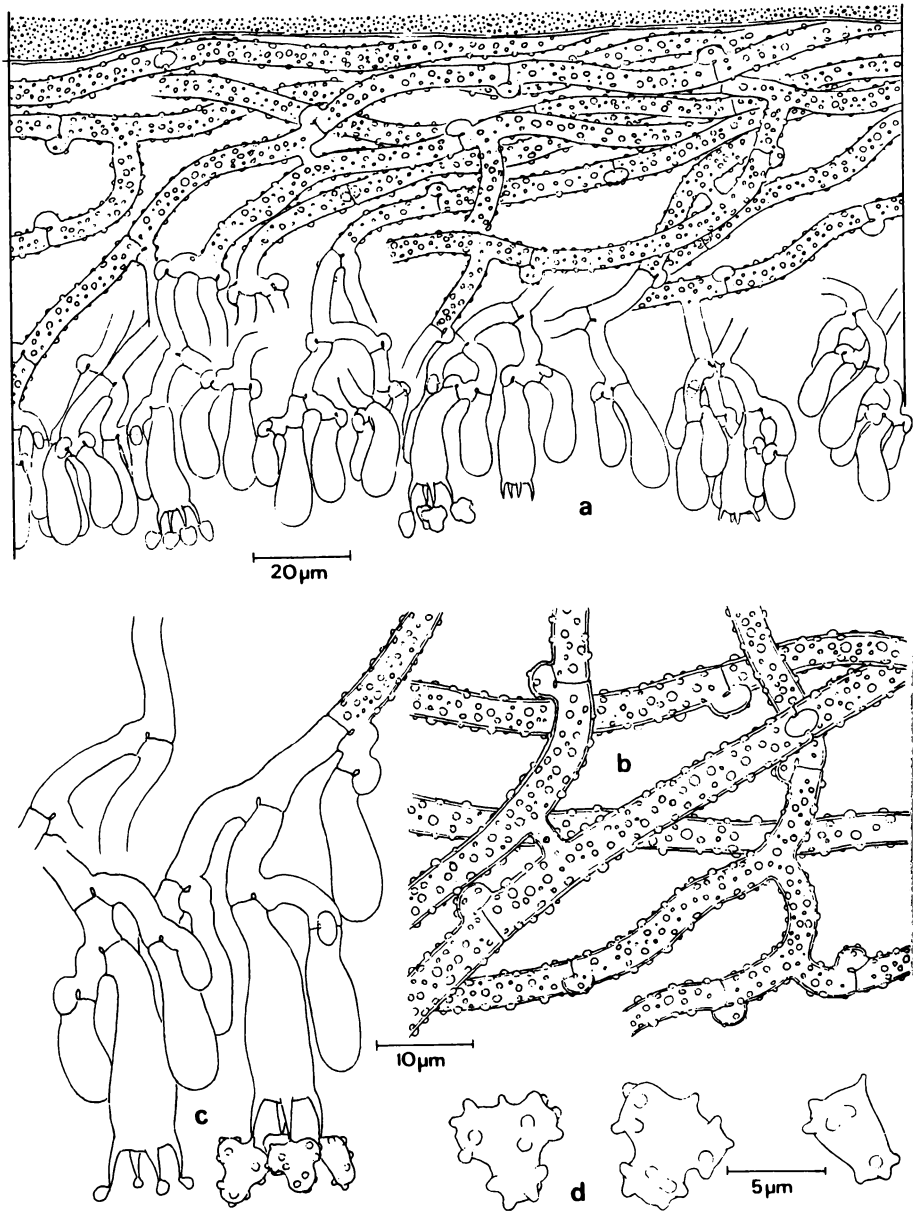


Fig. 851. *Tylospora fibrillosa* a) section through fruitbody, b) hyphae, c) basidia, d) spores. –Coll. Larsson 1287

Spores of tri-angular shape, about 4–4.5×4.5–5.5 μm, with slight wall thickening and cyanophility.
Habitat. Mostly on well decayed wood but found on all kind of debris on the ground and may occur in all humid periods from early spring to autumn.
Distribution. Found in all parts of the area but may be less frequent than *T. fibrillosa.*
Remarks. Easily recognized species due to its spore-morphology.

2. Tylospora fibrillosa (Burt) Donk Fig. 851
Taxon 9:220, 1960. — *Hypochnus fibrillosus* Burt, Ann. Mo. Bot. Gard. 3:238, 1916.

In general features very similar to the preceding species. The fruitbody is as a rule thinner and not blistery, the hyphae are sligthly broader and the basidia are somewhat more stalked and in general ligthly encrusted basally. The spores are, however, quite differently shaped being distinctly lobed, warted, with warts bifurcate, when fully developed 5–6 μm across.
Habitat and distribution. As in the case of *T. asterophora* it belongs rather to the humus fungi than to the wood fungi. It can be collected on all kinds of substrata and seems to be widely distributed in Northern Europe, though less frequent in the northern part.
Remarks. Similar to *T. asterophora* but easily separated by the spore-morphology which is unique among species in the *Corticiaceae.*

Uthatobasidium Donk
Reinwardtia 3:376, 1956.

Fruitbodies loosely adnate, lignicolous, more rarely growing on herbs, hypochnoid or mucedinoid, rarely pellicular, much reminding of some species of *Botryobasidium;* hyphal system monomitic with the hyphae similar to those of *Thanatephorus* and *Ypsilonidium* but with a slight cyanophilous reaction; cystidia absent; basidia normally with four sterigmata; spores citriform (in the type), moderately to distinctly thick-walled, repetitive, in some (older?) specimens faintly dextrinoid, with a slight or sometimes rather strong cyanophilous reaction.

Type species: *Hypochnus fusisporus* Schroet.

Remarks. One species in the genus is accepted here. Another taxon with more or less subglobose spores, but evidently without spore-repetition, has been reported from Sweden (see Eriksson 1958) and

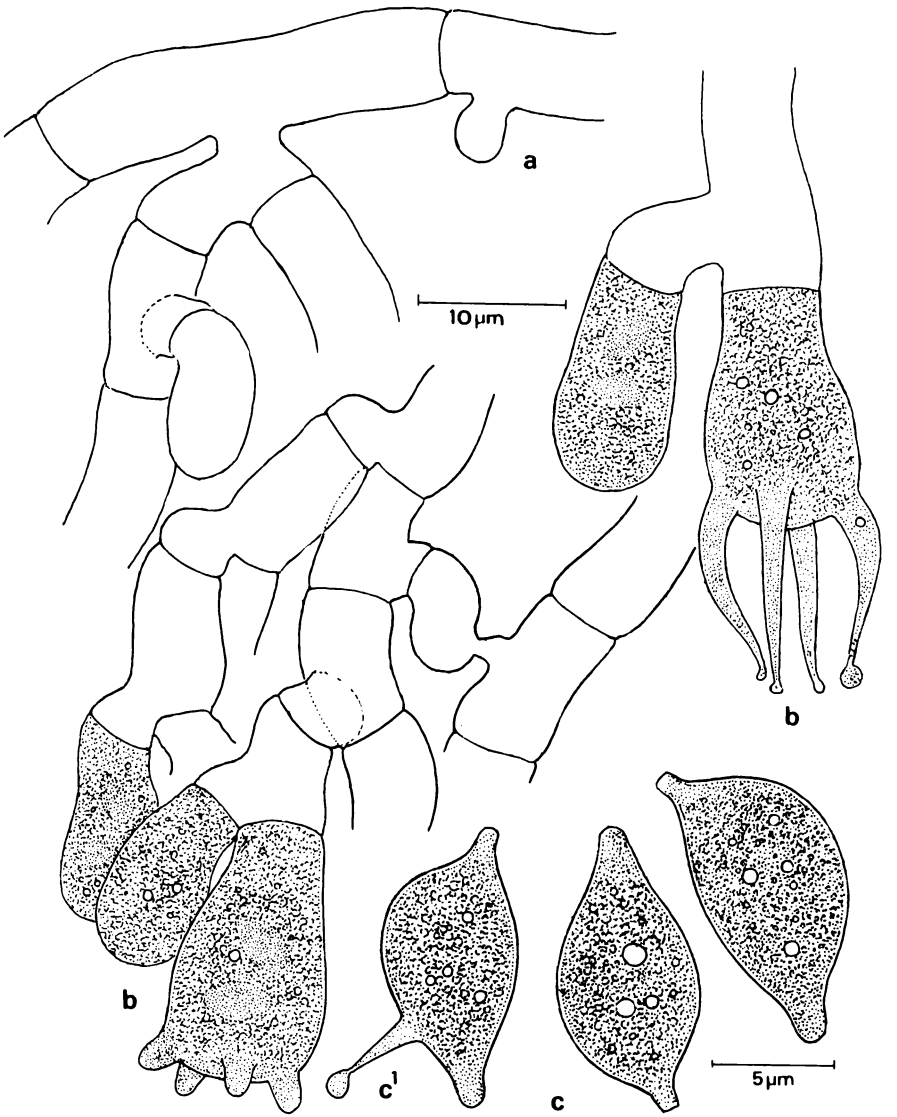


Fig. 852. *Uthatobasidium fusisporum* a) hyphae, b) basidia, c) spores, c1) spore with repetition. –Coll. Hjortstam 14610

determined as *U. ochraceum* (Massee) Donk. The type, however, of this species is missing at Kew (compare also Ginns 1982) and the name should preferably be omitted as a nom. dub. Nevertheless , the Swedish material obviously represents a taxon of its own but as the occurrence of spore-repetition is an important character in generic delimitation it should be described in another genus.

Uthatobasidium fusisporum (Schroet.) Donk Fig. 852
Fungus 28:22, 1958 — *Hypochnus fusisporus* Schroet., Krypt.-Fl. Schlesien 3:416, 1888.

Fruitbody resupinate, loose in consistency, hypochnoid to mucedinoid, rarely pellicular, rather wide-spread over the substratum, greyish to pale ochraceous or in the herbarium sometimes yellowish.
Hyphal system monomitic, basal hyphae mostly thin to moderately thick- walled, hyaline or pale yellowish, straight and parallel next to the substratum, 8–12(–15) μm wide, rarely some of the hyphae are distinctly thick-walled, up to 20 μm wide and pale brown, hyphal walls faintly cyanophilous and sometimes lightly dextrinoid, subhymenial hyphae thin- walled, slightly narrower, all hyphae without clamps.
Basidia short-cylindrical, 15–25(–30)×10–15 μm, generally with four sterigmata.
Spores smooth, moderately to distinctly thick-walled, at first obliquely subglobose, then biapiculate and distinctly citriform, 10–15(–18)×8–10 μm, producing secondary spores.
Habitat and distribution. Distributed in the whole of Scandinavia but scattered and with a preference for the southern region. Mostly found in herb-rich habitats where it normally grows on deciduous wood, but now and then also found on coniferous remnants. More rarely the fungus is found on herbaceous plants and on ferns.
Remarks. Easily determined thanks to the citriform, repetitive spores.

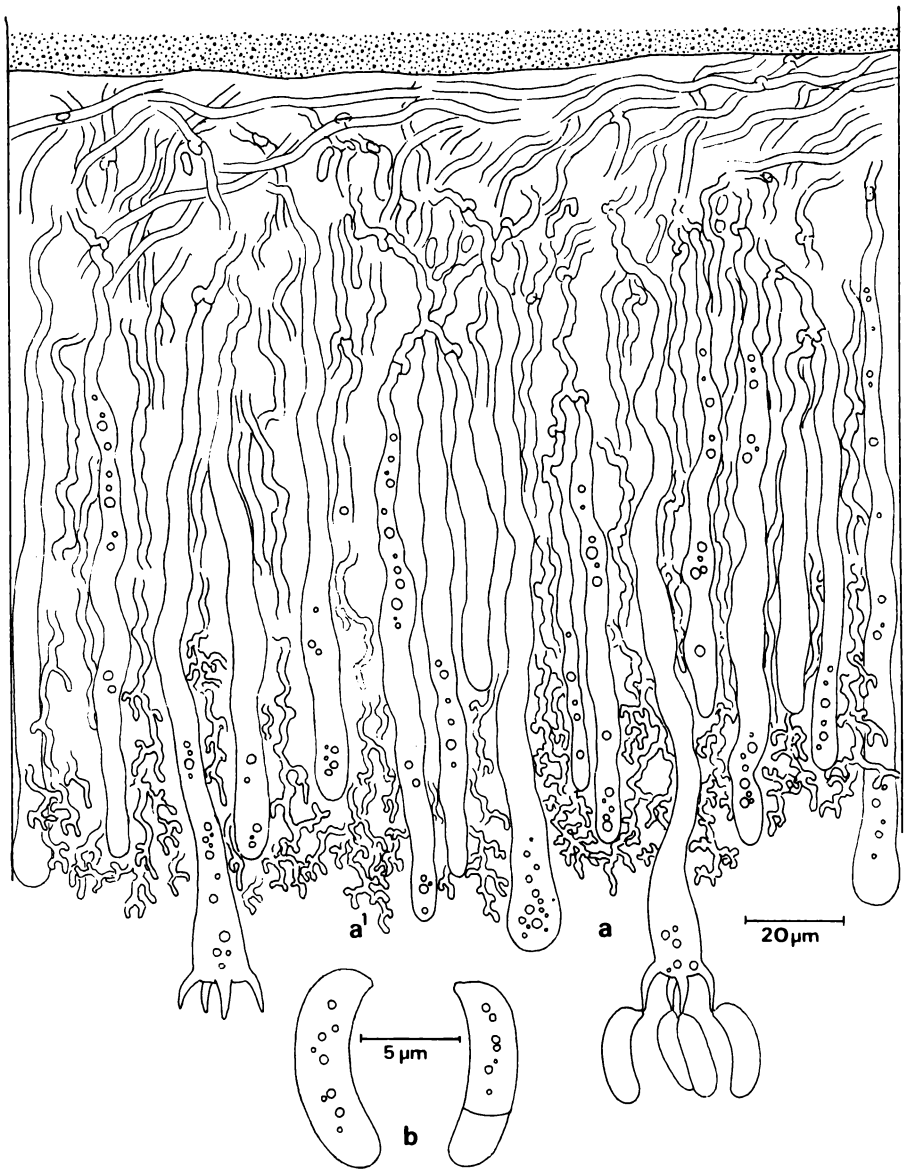


Fig. 853. *Vuilleminia comedens* a) section through fruitbody, a1) dendrohyphidia, b) spores. –Coll. Hallingbäck 1974-01-23

Vuilleminia Maire
Bull. Soc. Mycol. France, 18 (suppl.):81, 1902.

Fruitbodies resupinate, widely effused, ceraceous, gelatinous when fresh, smooth or more or less tuberculate, usually cream-coloured, greyish orange or reddish brown; hyphal system monomitic, with hyphae normally fibulate, thin- to moderately thick-walled; cystidia present or absent; dendrohyphidia usually numerous, encrusted; basidia long, up to 100 μm or more, pedunculate, sinuous, normally with four sterigmata; spores large, allantoid or ellipsoid, thin-walled, smooth, with oily inclusions in the protoplasm, indextrinoid, inamyloid, acyanophilous.

Type species: *Thelephora comedens* Nees: Fr.

Key to species

1. Subulate cystidia present, hymenial surface creamy, in Northern Europe found on species of *Rosaceae* ..... **2. V. cystidiata**
1. Cystidia lacking, hymenial surface orange or reddish brown, mostly on *Betula, Corylus, Fagus* and *Quercus* ..... **1. V. comedens**

1. Vuilleminia comedens (Nees: Fr.) Maire Fig. 853
loc. cit. — *Thelephora comedens* Nees: Fr., Syst. Mycol. I p. 447, 1821.

Fruitbody resupinate, widely effused and often several dm. long, closely adnate, developing under the bark, then erumpent with the bark coiling up, hymenium smooth or sligthly tuberculate, finely pulverulent under a dissecting microscope, ceraceous and/or somewhat gelatinous but rather loose in consistency, margin floccose.
Hyphal system monomitic, hyphae with clamps, thin-walled or with slight wall thickening, sinuous and loosely intermingled, (1.5-)2–3 μm wide, subhymenium composed of vertically arranged hyphae and numerous, encrusted dendrohyphidia and basidia in different stages of development.
Cystidia absent but often numerous protruding hyphoids, which probably are immature basidia, can be seen.
Basidia clavate, basally narrow, about 2–3 μm wide, more or less pedunculate, strongly sinuous, 80–150 μm long or sometimes even longer, in the upper part 8–10 μm wide, normally with 4 sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, often with one or two adventitious septa, 15–20(–25)×5–6 μm, inamyloid.

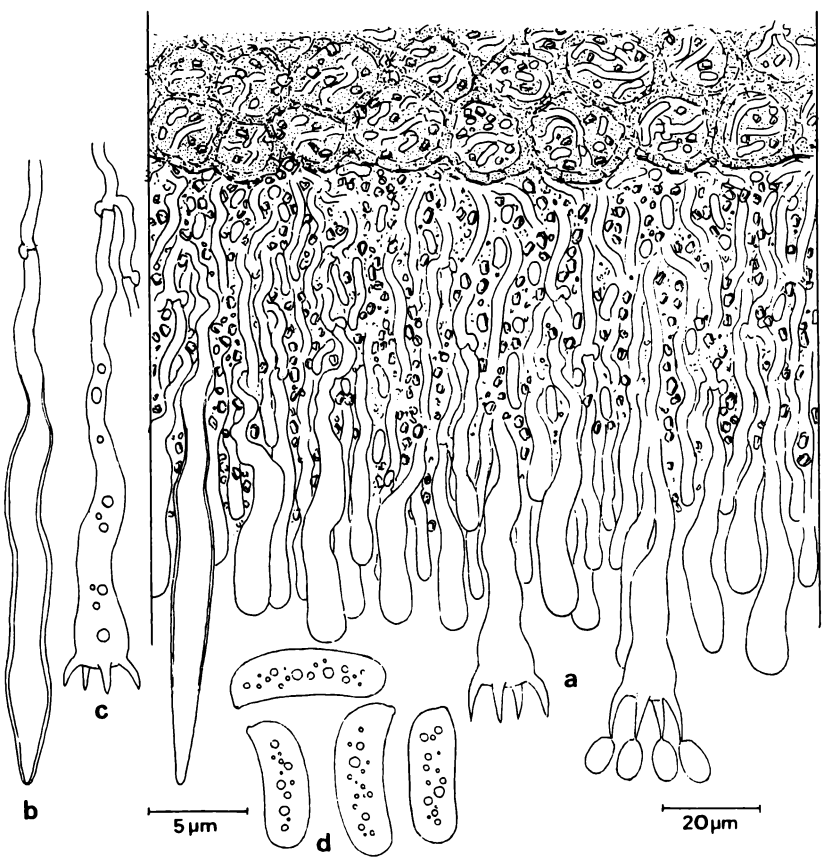


Fig. 854. *Vuilleminia cystidiata* a) section through fruitbody, b) cystidia, c) basidia, d) spores. –Coll. Hallenberg 2162

Habitat and distribution. On dead or partially dead, still attached branches of deciduous trees, preferably *Betula, Fagus,* and *Quercus* or on standing stems of e.g. *Corylus.* A very frequent species, at least in the south, but also occurring in the alpine birch forest in the north.
Remarks. As a rule recognized in the field due to the ecological adaptation and the rupturing of the bark. Microscopically easily distinguished by its very large basidia and spores. *V. cystidiata* is very closely related, but well distinguished by a more light-coloured fruitbody and presence of subulate cystidia.

2. Vuilleminia cystidiata Parm. Fig. 854
Eesti NSV Tead. Akad. Toim. Biol. seer. 14:232, 1965.

Fruitbody resupinate, closely adnate, effuse, developing under the bark in the same manner as *V. comedens*, hymenial surface distinctly pulverulent, creamy or greyish and sometimes with a yellowish tint, ceraceous and rather loose in consistency, margin abrupt, fibrillose or floccose.
Hyphal system monomitic, all hyphae with clamps, arranged vertically in a loose tissue, thin-walled, 2–3 μm wide, dendrohyphidia as a rule numerous, but less prominent in some specimens.
Cystidia few to rather frequent, subulate, slightly sinuous, moderately thick-walled, 50–70(–100) μm long and towards the base 6–7(–10) μm wide.
Basidia clavate, sinuous, with a pedunculate appearance, generally 80–100 μm long, basally 2–4 μm and apically 8–10 μm wide, with 4, rarely 2, sterigmata and a basal clamp.
Spores allantoid, smooth, thin-walled, sometimes with one adventitious septum, 15–18(–20)×4.5–5(–6) μm, inamyloid.
Habitat and distribution. A rare species in Northern Europe and only known from Sweden on *Malus* and *Rosa* spp. from the West coast and from the very rich deciduous forest at Högholmen island in lake Mälaren.
Remarks. The species has the same ecology as *V. comedens* and is determined without difficulty by its paler hymenium and the occurrence of subulate cystidia.

Xenasma Donk
Fungus 27:25, 1957, emend. Oberw., Sydowia, Ann. Mycol. Ser II, 14(1–3):38, 1965.

Fruitbodies resupinate, closely adnate, ceraceous to gelatinous in the living stage, when dried firmly membranaceous to almost horny, smooth to slightly warted or aculeate in a few cases; hyphal system monomitic with a thin or thickened subiculum, composed of more or less agglutinated hyphae, all hyphae with clamps though they sometimes are difficult to discern; cystidia of two kinds 1) cylindrical, obtuse or capitate, thin-walled or basally with sligthly thickened walls, smooth or apically somewhat encrusted, acyanophilous 2) small cystidioles, occurring regularly but few and often difficult to find, apically often subcapitate or with several protuberances; basidia lateral (pleurobasidia), cylindrical to subclavate, with a variable number of sterigmata, usually 3–5, with a basal clamp; spores hyaline, rough or striate, thin to moderately thick-walled, the ornamentation or striate markings are easily observed in Melzer and Cotton blue but may dissolve in 2–5 % KOH, inamyloid, sometimes with a weak dextrinoid reaction.
Type species: *Corticium rimicolum* Karst.
Remarks. In its strict sense, (Oberwinkler 1965) *Xenasma* is a homogenous taxon and easily distinguishable by a combination of characters. The main microscopical features are the pleurobasidia, rough or striate spores and fairly large cystidia. Most species within the genus seem to have a world-wide distribution.

Key to the species

1. Spores striate, the markings only visible in Melzer and Cotton blue ..... **2. X. pulverulentum**
1. Spores differently ornamented **2**
2. Spores with wall-markings visible in KOH, 5–8×4.5–7 μm. Not known from Northern Europe ..... **X. praeteritum**
2. Spores with wall-markings not or hardly visible in KOH, but prominent in Melzer and Cotton blue as well as in sulphovanilline **3**
3. Spores ellipsoid to subcylindrical, 6–7×3–4 μm **1. X. pruinosum**
3. Spores broadly ellipsoid, 8–12×5–7.5 μm ..... **3. X. rimicolum**

Remarks. Apart from *X. parvisporum* (see *X. pulverulentum* below) there is one other species described which should be treated in the strict sense of the genus namely *X. aculeatum* Gomez (described from Argentina). This species differs from *X. praeteritum* by its spore-warts

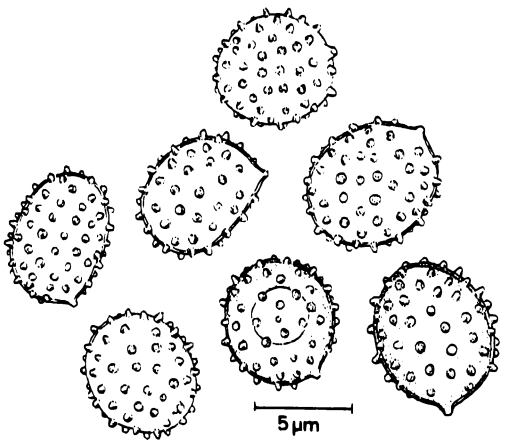


Fig. 855. *Xenasma praeteritum* spores. -Coll. N. & L. Hallenberg

which are distinstly conical, larger and fewer. The size and shape of the warts are very striking in KOH but less pronounced in Melzer. The holotype was not available for study but we have seen one authentical specimen (Gomez 2519).

1. **Xenasma pruinosum** (Pat.) Donk Fig. 855–857
Fungus 27:25, 1957. — *Corticium pruinosum* Pat., Cat. Rais. Pl. Cel. Tunisie p. 60, 1897.

Fruitbody effused, closely adnate, thin, in living stage semihyaline to bluish grey, when dried hard to almost horny, under a lens appearing pruinose with the cystidia protruding beyond the basidial layer.
Hyphal system monomitic, basal hyphae forming a thin subiculum, parallely arranged next to the substratum, thin or with a slight wall swelling in KOH, 2.5–3.5 µm wide, other hyphae densely interwoven, more vertically arranged, all hyphae with clamps.
Cystidia of two kinds 1) tubular, normally 50–80 µm but occasionally up to 100 µm or more in length, 5.6 µm wide in the middle part, thin-walled or basally with a slight wall thickening, narrowing towards the obtuse apex, smooth or apically with a globule of excreted amorphous matter 2) cystidioles few, 20–35 µm long, thin-walled, apically with several protuberances.
Basidia subcylindrical, typically pleural, 15–20(–25)×7–8 µm, thin-walled, with 4–6 sterigmata and a basal clamp. Spores ellipsoid to narrowly ellipsoid, adaxial side stright or slightly concave, seemingly

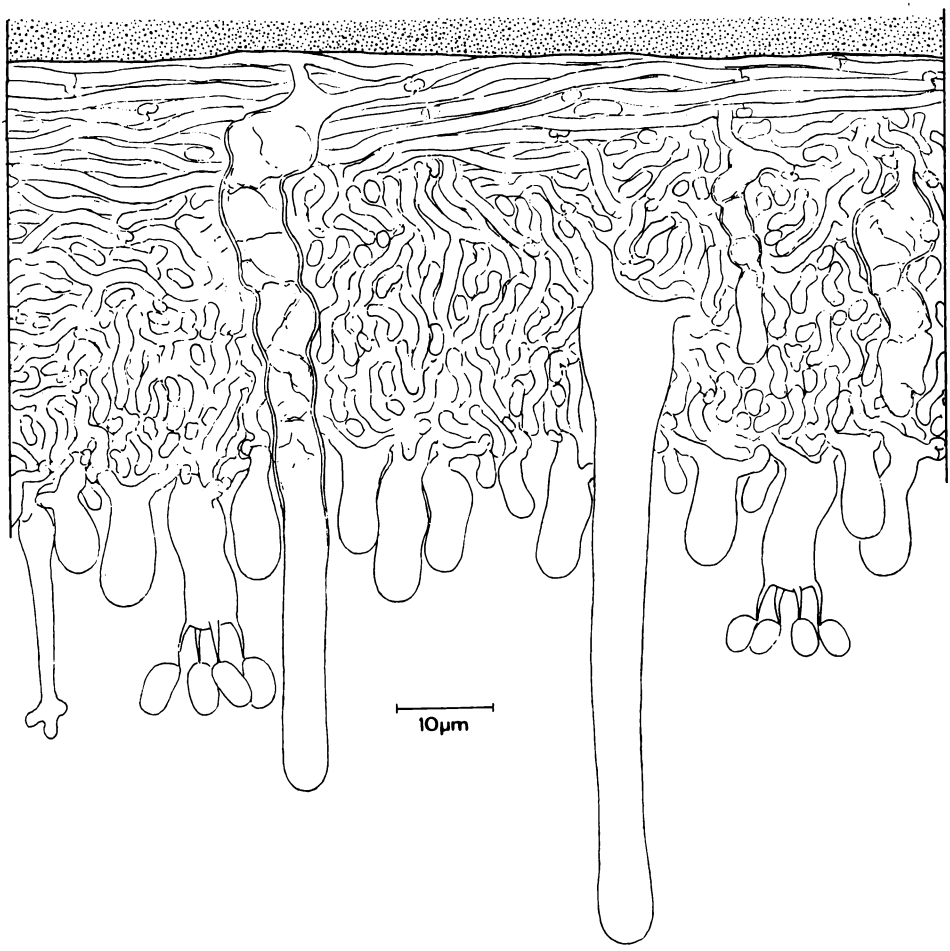


Fig. 856. *Xenasma pruinosum* section through fruitbody. – Coll. Larsson 3541, living material.

smooth in KOH but warts easily observed in Melzer and Cotton blue, generally 6–7×(3–)3.5–4 µm.

Habitat and distribution. Mostly on deciduous wood in favourable localities but also found once on drift wood *(Picea)*. Apparently a somewhat rare species in Northern Europe and found scattered in the southern part of Sweden and Norway. In Denmark reported from Sjaelland but not yet found in Finland.

Remarks. Easily separated from both *X. praeteritum* and *X. rimicolum* by its small and mostly subcylindrical spores.

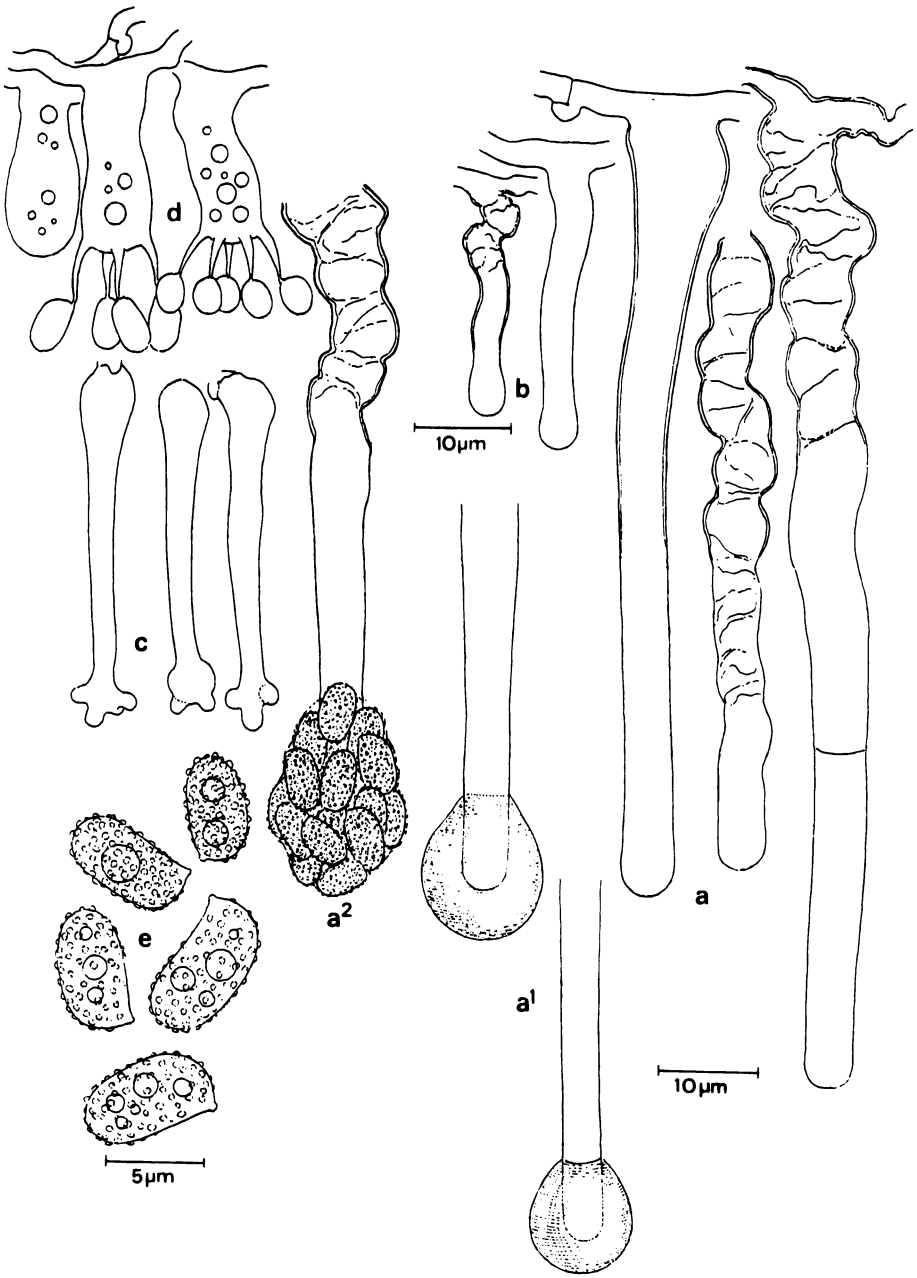


Fig. 857. *Xenasma pruinosum* a) cystidia, a1) cystidia with sphaerical globules, a2) cystidium with spores stuck to the apex, b) immature cystidium, c) "cystidoles" with apical protuberances, d) basidia, e) spores. –Coll. Larsson 3541, living material

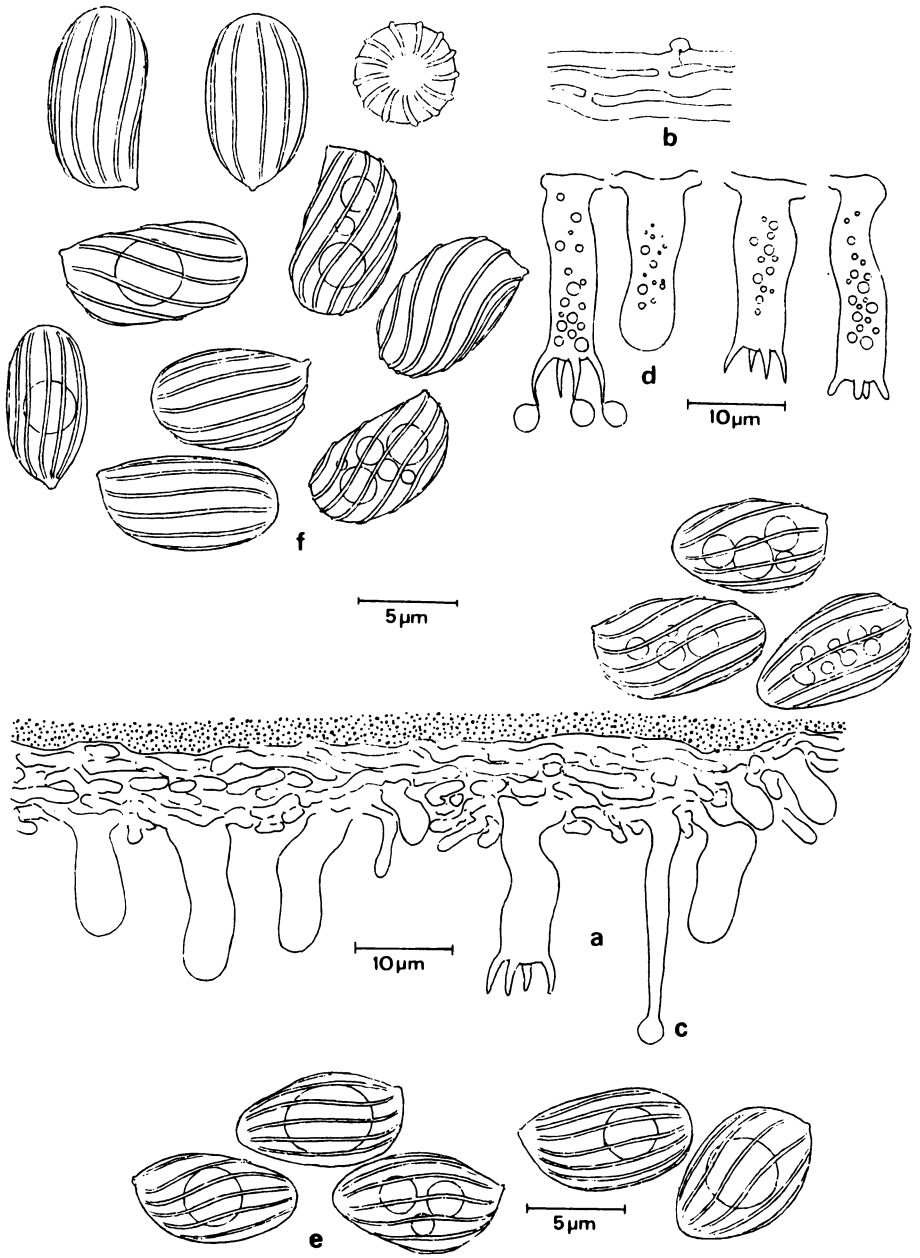


Fig. 858. *Xenasma pulverulentum* a) section through fruitbody, b) basal hyphae, c) cystidium, d) basidia, e,f) spores. –Coll. a,c,e Hjortstam 13969; b,d,f Hjortstam 5251

2. Xenasma pulverulentum (Litsch.) Donk Fig. 858
Fungus 27:25, 1957. — *Corticium pulverulentum* Litsch., Österr. Bot. Zeitschr. 88:112, 1939.

Fruitbody resupinate, closely adnate, thin to moderately thick, in living state whitish to semihyaline, continuous, pruinose, when dried somewhat hard, not horny but rather cartilaginous, greyish or bluish grey, margin indeterminable.
Hyphal system monomitic; all hyphae with clamps, hardly discernible due to the dense and gelatinized tissue, subiculum thin with hyphae arranged parallel to the substratum (1.5–)2.5–3 μm wide, other hyphae intermingled and mostly difficult to separate.
Cystidia thin-walled, usually capitate, smooth, with the basal part widened, terminal or more rarely lateral, about 15–30 μm long and 3–4 μm wide in the middle part.
Basidia short-cylindrical, pleural, thin-walled, often slightly sinuous and/or with constrictions, (15–)20–35(–40)×5–7(–8) μm, with four sterigmata and a basal clamp.
Spores ellipsoid, seemingly smooth in KOH, but in Melzer, Cotton blue, and sulphovanilline with striate markings, thin-walled or with walls slightly thickened, old spores sometimes dextrinoid, 8–11(–12)×5–6.5 μm.
Habitat and distribution. The species is very rare in North Europe and judging from the few finds it seems to be restricted to herb-rich, deciduous woods on calcareous ground. It is reported by Hauerslev from Denmark (Sjaelland) and found once in Norway (Akershus, Nannestad). In Sweden known from the provinces of Västergötland (Kinnekulle), Skåne (Örups almskog) and Gotland (Fide).
Remarks. Easily recognized by the striate spores and the capitate cystidia. The spore-ornamentation is unique among species in *Corticiaceae* s.l. Similar spore-markings can be observed in e.g. *Clitopilus prunulus (Agaricaceae)* and in *Ramaria botrytis (Clavariaceae)*. See also Donk (1957) who discussed this matter and the genus *Clitopilina* Arnaud.
A very similar species is *X. parvisporum* Pouz. which according to the original description differs primarily by smaller spores (4.5–5.5×2.8–3.2 μm). It should be mentioned that Iranian specimens seen by us show spores which are somewhat intermediate and measure 7.5–8.5×4.5–5 μm.

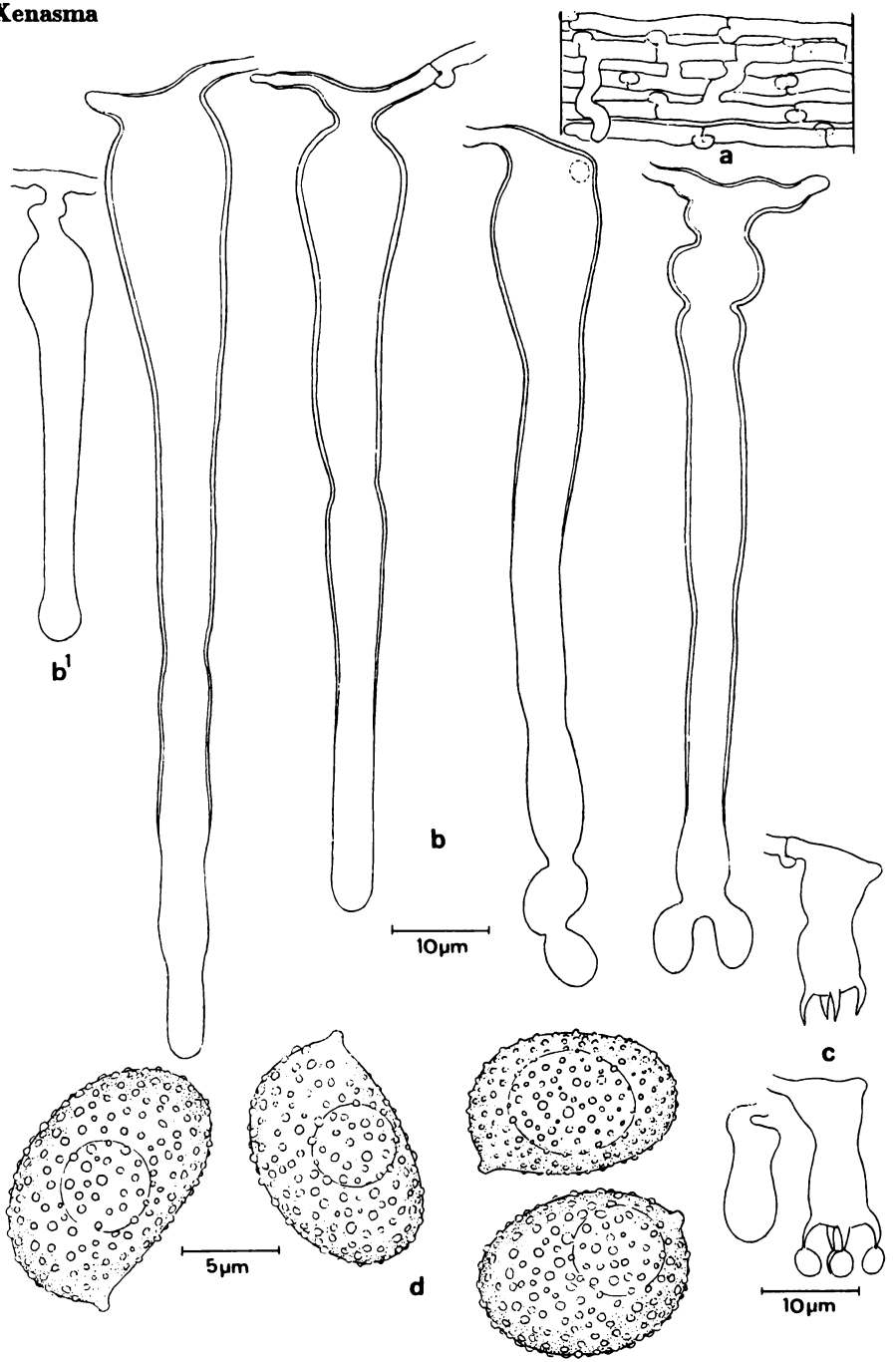


Fig. 859. *Xenasma rimicolum* a) section through part of basal tissue, b) cystidia, b1) immature cystidium, c) basidia, d) spores. –Coll. Larsson 5028

3. Xenasma rimicolum (Karst.) Donk Fig. 859–860
Fungus 27:26, 1957. — *Corticium rimicolum* Karst., Hedwigia 35:45, 1896.

Fruitbody and hyphal system. The general features of this species is very similar to those described for *X. pruinosum.* In some specimens, however, the hymenium has a tendency to form small, scattered aculei. This is not evident in the Nordic material but more pronounced in specimens seen from Nepal (see below under Remarks).
Cystidia apparently of two kinds 1) tubular, 70–130 μm long or in some cases even longer, thin-walled or basally with slight wall thickening or distinctly thick-walled 2) cystidioles few, about 20–35 μm long, subcapitate.
Basidia subcylindrical, 12–15(–20)×6–7 μm, pleural, generally with four sterigmata and a basal clamp.
Spores broadly ellipsoid, nearly smooth in KOH, in Melzer and Cotton blue with small blunt warts, (8–)10–12×5–8 μm.
Habitat and distribution. Little known species and besides the type-locality (Finland, Mustiala) it is found in Northern Europe from but two places in Norway (Akershus; Baerum and Nannestad). All specimen are from deciduous wood.
Remarks. *X. rimicolum* is closely related to *X. praeteritum* (Jacks.) Donk and differs mainly in the spores which in the latter species are smaller and have warts which are easily observed also in KOH. *X. rimicolum* from Nepal reported by Hjortstam and Ryvarden (1984) proved to be *X. praeteritum.* The spores in the Nepal specimen are somewhat smaller than normal and intermediate beween *X. praeteritum* and *X. rimicolum.*

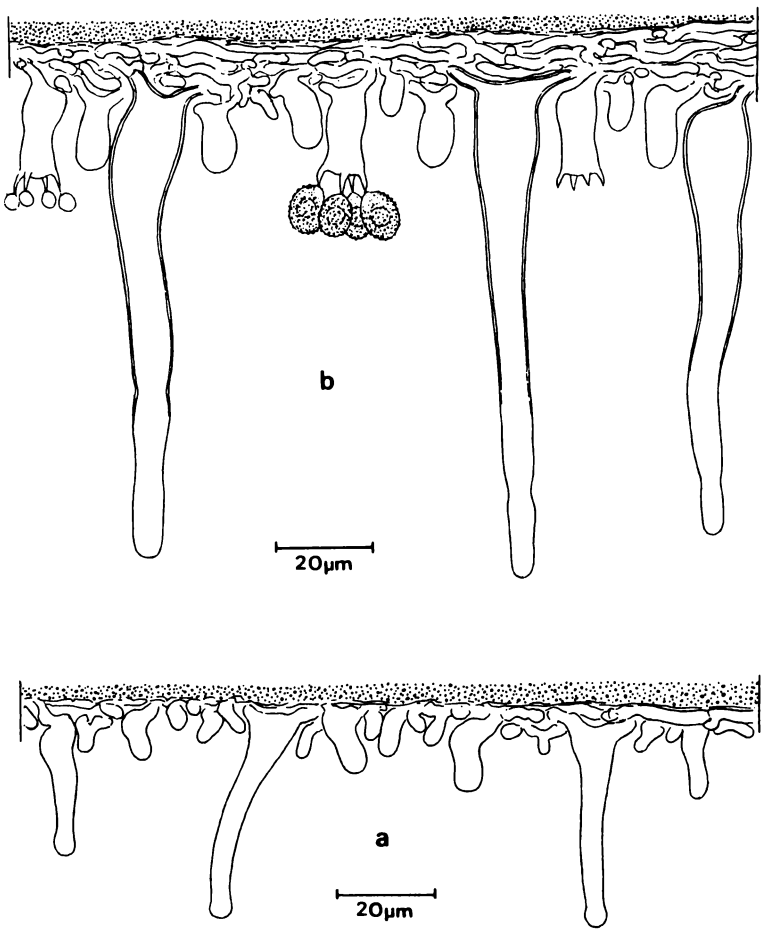


Fig. 860. *Xenasma rimicolum* a) section through young part of fruitbody, b) section through fruitbody with developed cystidia, basidia, and spores. –Coll. Larsson 5028

Xenosperma Oberw.
Sydowia (Ann. Mycol. Seer. II) 19:45, 1965.

Fruitbodies forming an inconspicuous, often not more than 10–30 μm thick, closely adnate layer on the substrata, when dried more or less pruinose, continuous; hyphal system monomitic, hyphae thin-walled, rather narrow and becoming gelatinized, with clamps; cystidia absent; basidia pleural, small-sized, with two or four sterigmata and with a basal clamp; spores angular, or in optical section mostly tetrahedral, hyaline, with a prominent apiculus, indextrinoid, inamyloid, and without cyanophilous reaction.

Type species: *Xenasma ludibundum* Rogers & Liberta.

Remarks. The genus contains two species and is well characterized by its pleurobasidia and more or less pyramid-shaped spores. The second species, *X. murillii* Gilberts. & Blackwell (Mycotaxon 38:400), which was recently described from Florida, differs by considerably longer basidia, larger spores and four sterigmata. We have not yet studied any material of this species.

Xenosperma ludibundum (Rog. & Lib.) Oberw. ex Jülich Fig. 861 Persoonia 10:335, 1979 — *Xenasma ludibundum* Rog. & Lib., Mycologia 52:902, 1960.

Fruitbody thin and inconspicuous, hardly visible when dried, in the dissecting microscope looking finely pruinose, gelatinous, not separable from the substratum, reminding somewhat of a thin heterobasidiomycete.
Hyphal system monomitic, hyphae with clamps, thin-walled, 2.5–3 μm wide, basal hyphae few, mostly arranged parallelly next to the substratum, slightly conglutinated.
Basidia pleural, 8–10×6–7 μm, with two, rarely four, rather stout, about 6–7 μm long sterigmata, with a basal clamp.
Spores tetrahedral, thin-walled, about 8 μm across.
Habitat and distribution. Found on decorticated deciduous wood and noted from Denmark only (Sjaelland, see Hauerslev, Friesia 11:277, 1979). With certainty a very rare species but easily overlooked due to its thin fruitbodies. Besides the original description from U.S.A. also reported from Germany by Oberwinkler (1965).

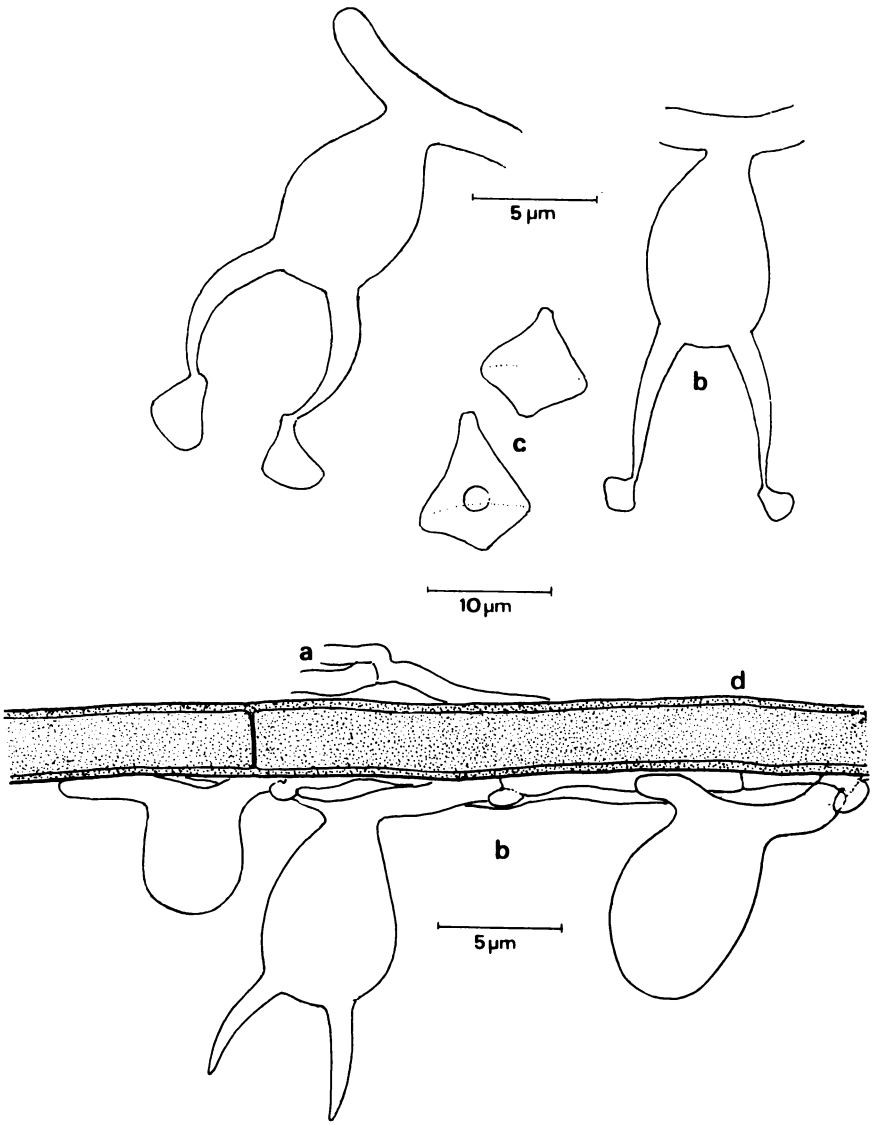


Fig. 861. *Xenosperma ludibundum* a) hyphae, b) basidia, c) spores, d) hyphae from a hyphomyceteous fungus. –Coll. Hauerslev 5574

Fig. 862. *Xylobus frustulatus* a) cross-section showing dimidiate part of fruitbody, b) from above. -Coll. Sunhede 7507

Xylobolus Karst.
Medd. Soc. Fauna Fl. Fenn. 6:11, 1881.

This is a satellite genus to *Stereum* and above all resembling the subgenus *Acanthostereum* introduced by Boidin et. al. 1979 (Persoonia 10:320). The type of *Xylobolus* is, however, separated from *Stereum* by its vertically arranged hyphae and by the pseudocystidia (or oleiferous hyphae) turning greyish black in sulphovanillin. It has also an intense white pocket rot of a type unknown in *Stereum*. Other characters matches the concept of *Stereum* e.g. simple septate hyphae, occurence of acanthocystidia, and smooth, amyloid spores.
Another species which long has been a member of the genus is *X. subpileatus* (Berk. & Curt.) Boid. This species has horizontally arranged hyphae, like in *Stereum*, that bend vertically into the subhymenium and appear as pseudocystidia. These cystidia seem to lack the positive reaction in sulphovanillin. In our opinion this species fits better in *Stereum*. One species in North Europe.

Type species: *Thelephora frustulata* Pers.:Fr., selected (compare Donk in Taxon 6:123, 1957).

Xylobolus frustulatus (Pers.:Fr.) Boid. Fig. 862–864
Rev. Mycol. 23:341, 1958 — *Thelephora frustulata* Pers.:Fr., Syst. Mycol. I p. 445, 1821.

Fruitbody perennial, more or less woody, mostly 1–2 mm thick, but sometimes considerably thicker, distinctly stratified in several layers, apileate and rather soon cracked into small, angular polygons (frustose), rarely reflexed to dimidiate at the margin and then with the upper part zonate and more or less glabrous and dark brown; hymenial

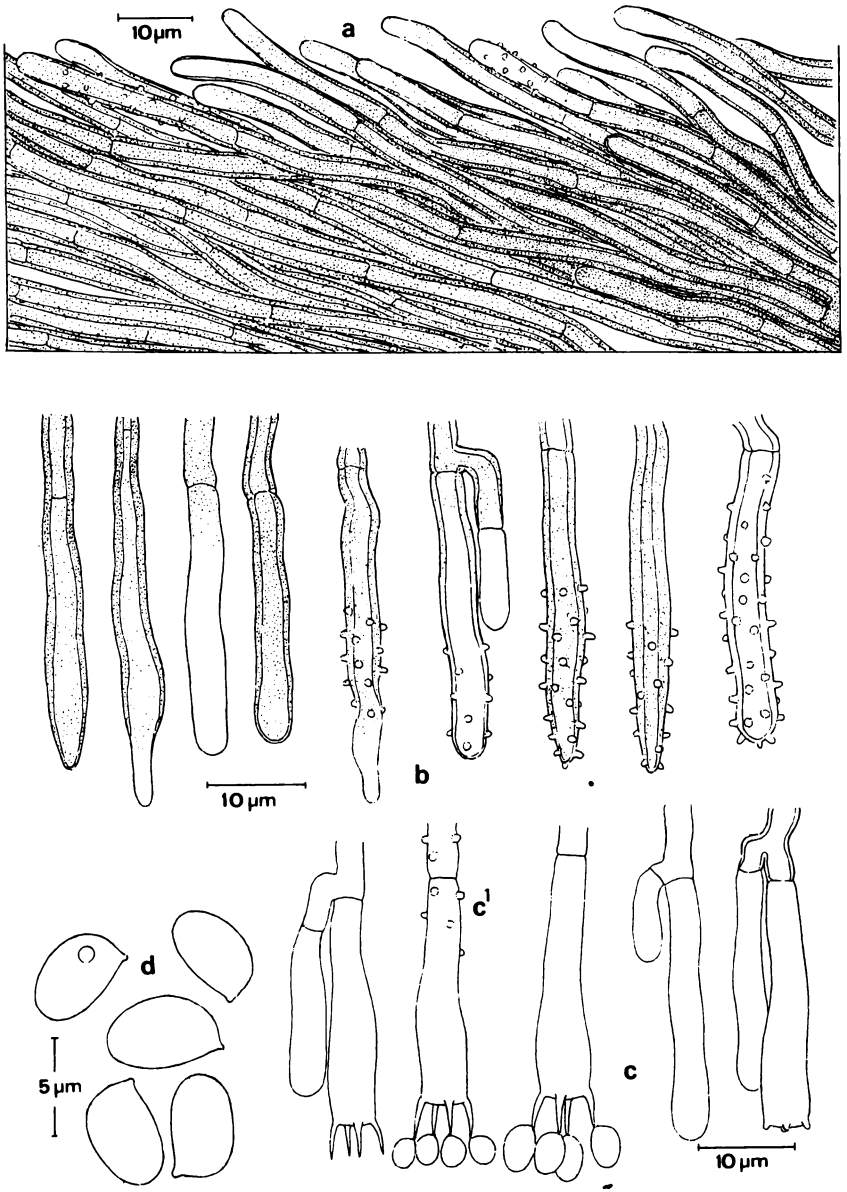


Fig. 863. *Xylobus frustulatus* a) vertical section through tomentum, b) acanthocystidia, c) basidia, c1) basidium with outgrowths, d) spores. –Coll. Sunhede 7507

surface smooth or in the dissecting microscope pilose by protruding acanthocystidia and hyphae; young layers pale ochraceous, older ones dull to deep brown.

Hyphal system monomitic, hyphae vertically arranged, short-celled and with transitions to acanthocystidia, about 3.5–5 μm wide, sparsely branched, hyaline to yellowish brown or in older layers more strongly pigmented, other hyphae (tramal hyphae) few or not always found, easiest observed in very thin sections, vertically arranged, thin to moderately thick-walled, with transitions to pseudocystidia, greyish black in sulphovanillin, 3–5 μm wide, all hyphae without clamps.

Cystidia of two kinds;**1) Pseudocystidia** rare (not drawn on figure 863, thin to moderately thick-walled, barely or not projecting above the basidia and acanthocystidia;**2) Acanthocystidia,** or acanthophysoid hyphae, numerous, especially during the non fruiting time, approximately 25–30 μm long and 4–5 μm wide.

Basidia elongated clavate, smooth or with a few basal protuberances (acanthobasidia), 25–30×4–5 μm, with four sterigmata.

Spores short-ellipsoid, thin-walled or with slight wall thickening, smooth, 4.5–5(–5.5)×3–3.2(–3.5) μm, with a distinct amyloid reaction.

Habitat and distribution. Solely on well decorticated wood of *Quercus* and occurring on branches and trunks lying on the ground, more rarely seen on still attached branches. On the whole it follows the distribution of *Quercus* in Northern Europe but with a variation as to its local frequency. In Sweden found up to Gästrikland, in Finland and Norway only from the southernmost parts and in Denmark recently collected by Stellan Sunhede. We have not been able to verify older reports from Denmark, e.g. Skovsted in Compt.-rend. Lab. Carlsberg, Ser. Physiol. 25:412, 1956.

Remarks. Easily recognized species already in the field because of its strongly cracked fruitbodies. The sporulation is supposed to take place mainly during the summer as most specimens from autumn and early spring are sterile with the hymenium consisting only of acanthocystidia.

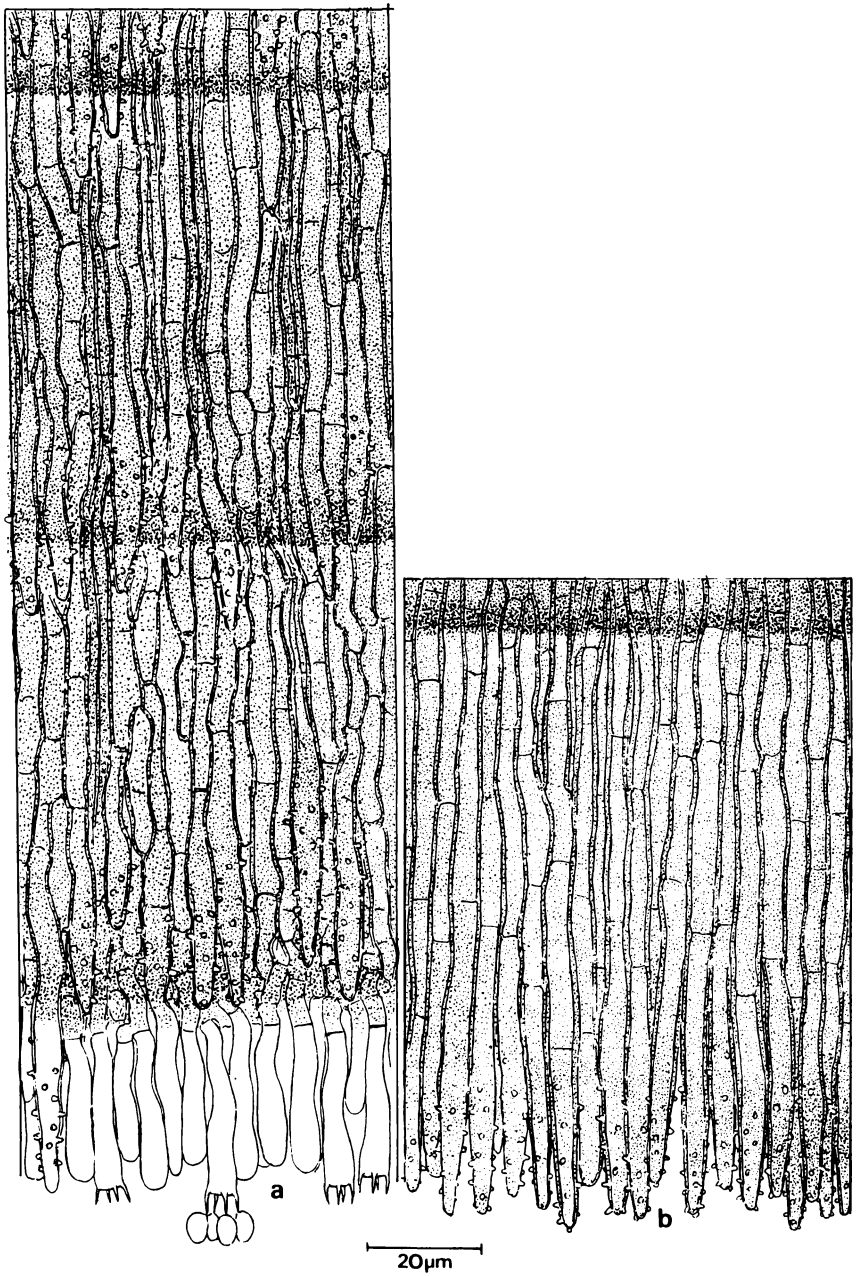


Fig. 864. *Xylobus frustulatus* a) section through fruitbody with basidia (in June), b) the same but with acanthocystidia only (in October). –Coll. a Sunhede 7507; b J. Eriksson 3878

Ypsilonidium Donk
Proc. Kon. Ned. Akad. Wet. Ser. C 75:371, 1972. — *Uthatobasidium* sect. *Ypsilonidium* Donk, Fungus 28:21, 1958.

Fruitbodies loosely adnate, terrestrial or herbicolous, rarely or not (?) growing on wood, with the hymenium and tissue similar to that of the genus *Botryobasidium;* hyphal system monomitic, hyphae without clamps, thin to moderately thick-walled, branching at more or less right angles, subhymenial hyphae short-celled; cystidia absent; basidia short-cylindrical, with two sterigmata about as long as the basidia; spores smooth, thin-walled or with slight wall thickening, repetitive, inamyloid, indextrinoid, acyanophilous.

Type species: *Corticium sterigmaticum* Bourd.

Remarks. The generic scope accepted here is exclusively that of Donk (1972). However, the knowledge about the relationship between *Thanatephorus, Uthatobasidium* and *Ypsilonidium* and between these genera and the Heterobasidiomycetes is far from sufficient. It should be noted that Talbot (1980) emended *Ypsilonidium* to cover also species with 1–2 septate spores, but according to the description and figure of e.g. *Y. anomalum* Talbot, this species is better placed in Dacrymycetales.
Both *Thanatephorus* and *Uthatobasidium* are microscopically similar to *Ypsilonidium* but the former houses parasitic fungi which are connected to a *Rhizoctonia* state while *Uthatobasidium* is saprobic, without such connection and further separated from *Ypsilonidium* by its four sterigmata.
Two species are accepted in the genus one of which is found in Northern Europe.

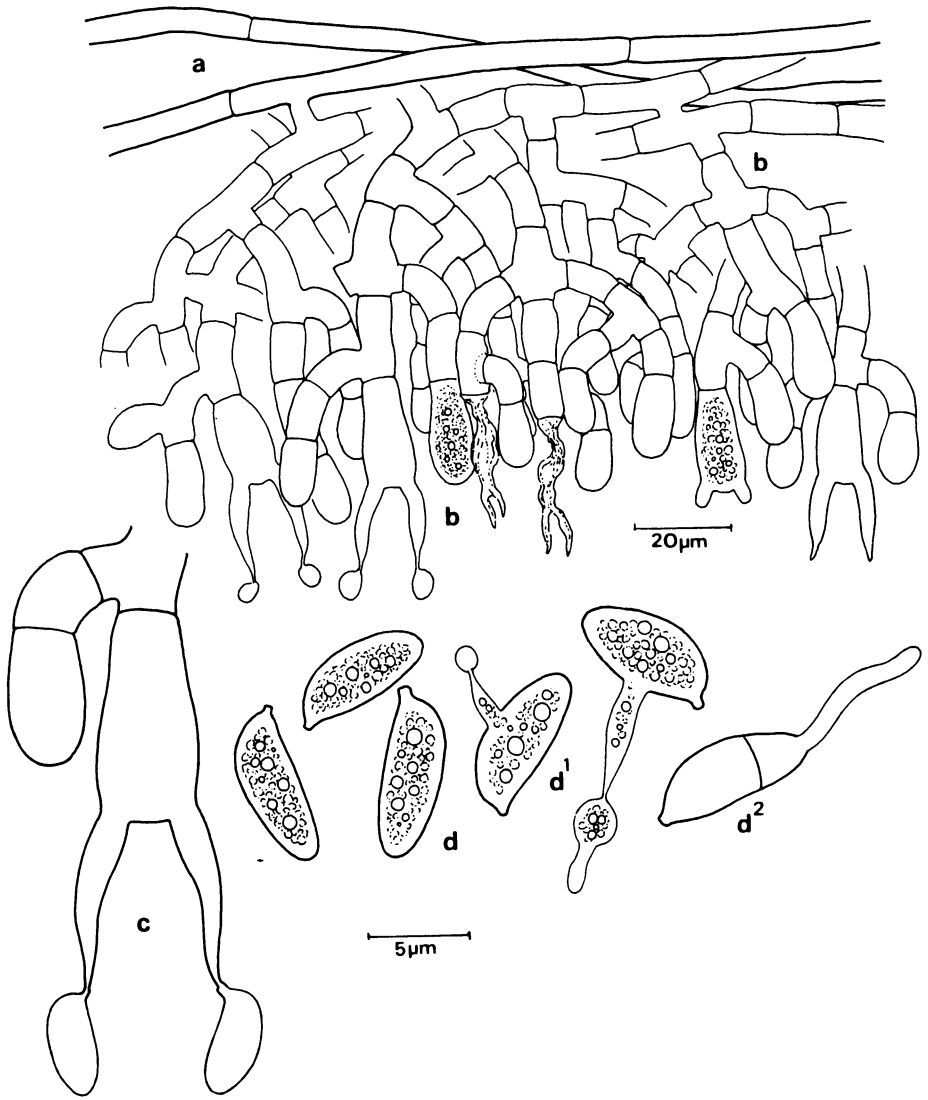


Fig. 865. *Ypsilonidium stergmaticum* a) basal hyphae, b) subhymenial hyphae and basidia, c) basidium, d) spores, d1) spores with repetition, d2) growing spore. –Coll. Nannfeldt 1950–08–10

Ypsilonidium sterigmaticum (Bourd.) Donk Fig. 865
Proc. Kon. Ned. Akad. Wet. Ser. C 75:371, 1972 — *Corticium sterigmaticum* Bourd., Rev. Sci. Bourb. Centr. Fr. 35:4, 1922.

Fruitbody loosely adnate, always (?) terrestrial with the basidia growing upwards, hypochnoid to mucedinoid and finally more or less subpellicular, whitish to pale ochraceous.
Hyphal system monomitic, basal hyphae hyaline, straight and uniform, about 10 μm wide, parallel next to the substratum, thin to moderately thick- walled, other hyphae more or less vertically arranged in a very thin tissue, all hyphae without clamps.
Basidia short-cylindrical, 15–20×10–12 μm, regularly with 2 stout sterigmata which are 15–20 μm long when fully developed.
Spores ellipsoid, sligthly curved, mostly with the adaxial side convex, thin-walled, smooth, approximately 15×5–7 μm, with oily inclusions in the protoplasm, producing secondary spores.
Habitat and distribution. Rare species found only once in the Nordic countries viz. Sweden, Gästrikland, under *Rheum* on bare soil.
Remarks. Determined without difficulty due to its occurence on soil, basidia with two sterigmata and repetitive spores. The holotype (Bourdot 17697, PC!) is rather scanty and the number of repetitive spores seen are few, but it is a well preserved specimen kept in two matchboxes.

References

In the text there are numerous references to smaller papers or other books in which the proper species has been treated. Such references are not repeated here.
In the following list there are included more general books and papers on larger groups of corticioid and related species. The style of citing references is not consistent in the flora because of the rather long period of writing. We can only ask for forgiveness on this matter and hope that the reader will avoid too much confusion.

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The names and numbers in boldface indicate accepted genera and species and where they are described, respectively. In a few cases, there are two boldface-numbers following a generic name. The last number will then indicate where one or several additional species in the genus are described.

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