

# The Corticiaceae of North Europe

By

John Eriksson, Kurt Hjortstam and Leif Ryvarden

with drawings by

John Eriksson

Volume 7

Schizopora — Suillosporium

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We deeply acknowledge the financial support from The Swedish Research Council without which the flora could not have been written.

New taxa and combinations proposed in this volume:

<i>Sistotrema efibulatum</i> (Erikss.) Hjortst.	comb.nov.	p. 1337
<i>Sistotrema octosporum</i> (Schroet. ex Höhn. & Litsch.)		
Hallenb.	comb.nov.	p. 1349
<i>Sistotremella</i> Hjortst.	gen.nov.	p. 1379
<i>Sistotremella hauerslevii</i> Hjortst.	spec.nov.	p. 1379
<i>Sistotremella perpusilla</i> Hjortst.	spec.nov.	p. 1381

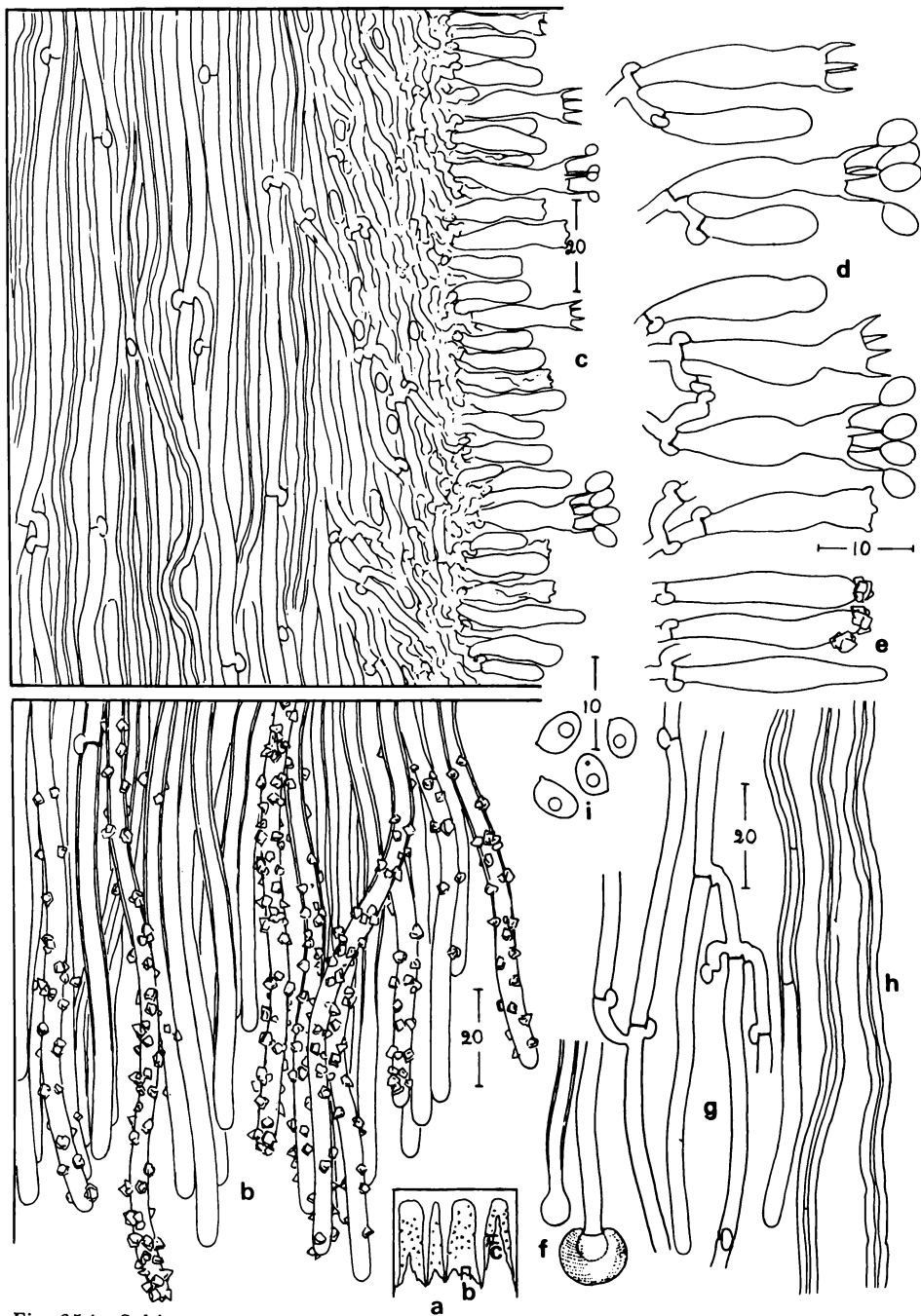


Fig. 654. *Schizopora paradoxa*. a) section through fruitbody showing position of sections b and c b) section through the dissepiment c) part of hymenium and trama d) basidia e) cystidial elements f) capitate hyphae from the dissepiment g) generative hyphae h) skeletal hyphae i) spores. — Coll. Nordin 1752.



**Schizopora** Velen.,

Česká Houby p. 638, 1922; emend. Donk, Persoonia 5 p. 76, 1967. - S. Domanski, Acta Soc. Bot. Pol. 38:2 p. 255-269, 1969. - Kotlaba & Pouzar, Česká Mykol. 33 p. 19-35, pl. I-II, 1979 - N. Hallenberg, Mycotaxon 18 p. 303-313, 1983.

**Fruitbodies** annual or living 2-3 years, resupinate or pseudopileate (i.e. forming on vertical substrata small nodules of pore layer but without pileus trama), adnate, effuse, and may become large, 1-5 mm thick, of firm consistency, white-yellowish-ochraceous-brownish; hymenophore varying from poroid with rounded or angular pores, often with lacerate-denticulate pore walls to more or less irpicoid with flat, irregular teeth; margin normally weakly developed, often lacking.

Hyphal system normally dimitic but skeletal hyphae in some cases few; generative hyphae 2-3  $\mu\text{m}$  wide, with thin or somewhat thickened walls, more or less branched, always with clamps, skeletal hyphae 2.5-4  $\mu\text{m}$  wide, straight or winding, not branched, without primary septa; cystidial organs of various kinds, usually capitate, often with a globular encrustation; basidia suburniform, with 4 sterigmata; spores 3-6  $\mu\text{m}$  long, ellipsoid, hyaline, thin-walled, smooth, non-amyloid, non-cyanophilous.

**Type species:** *Polyporus laciniatus* Velen. - = *Schizopora paradoxa* (Fr.) Donk.

**Remarks.** *Schizopora* agrees with *Fibrodontia* and *Hyphodontia* in several respects, e.g. in the nature of hyphae, shape of basidia and spores. The difference mainly concerns the microstructure of the fruitbody and the interpretation of the thick-walled hyphal elements. In *Hyphodontia* such elements occur only as cystidia, which are always easily distinguished from the hyphae. They are broader than the hyphae and occur in the hymenium. In *Fibrodontia* the thick-walled hyphae agree in several respects with the cystidia of *Hyphodontia*, but they are narrower and occur in the core of the hymenial aculei and are therefore better described as skeletal hyphae. In *Schizopora* they are fairly typical skeletals even if intermediate hyphae occur. *Fibrodontia* and *Schizopora* are best separated by their macrostructure. *Fibrodontia* has odontoid, rather loose fruitbodies while *Schizopora* has poroid or irpicoid fruitbodies of a very tough consistency. In N. Europe only one species, *S. paradoxa*, see remarks below. In C. Europe there is another species, *S. carneolutea* (Rodw. & Clel.) Kotl. & Pouz., (see fig. 659—660) distinguished by having smaller fruitbodies, smaller pores and smaller spores, but no doubt very close to *S. paradoxa*. The genus has a world-wide distribution in temperate and tropical zones.

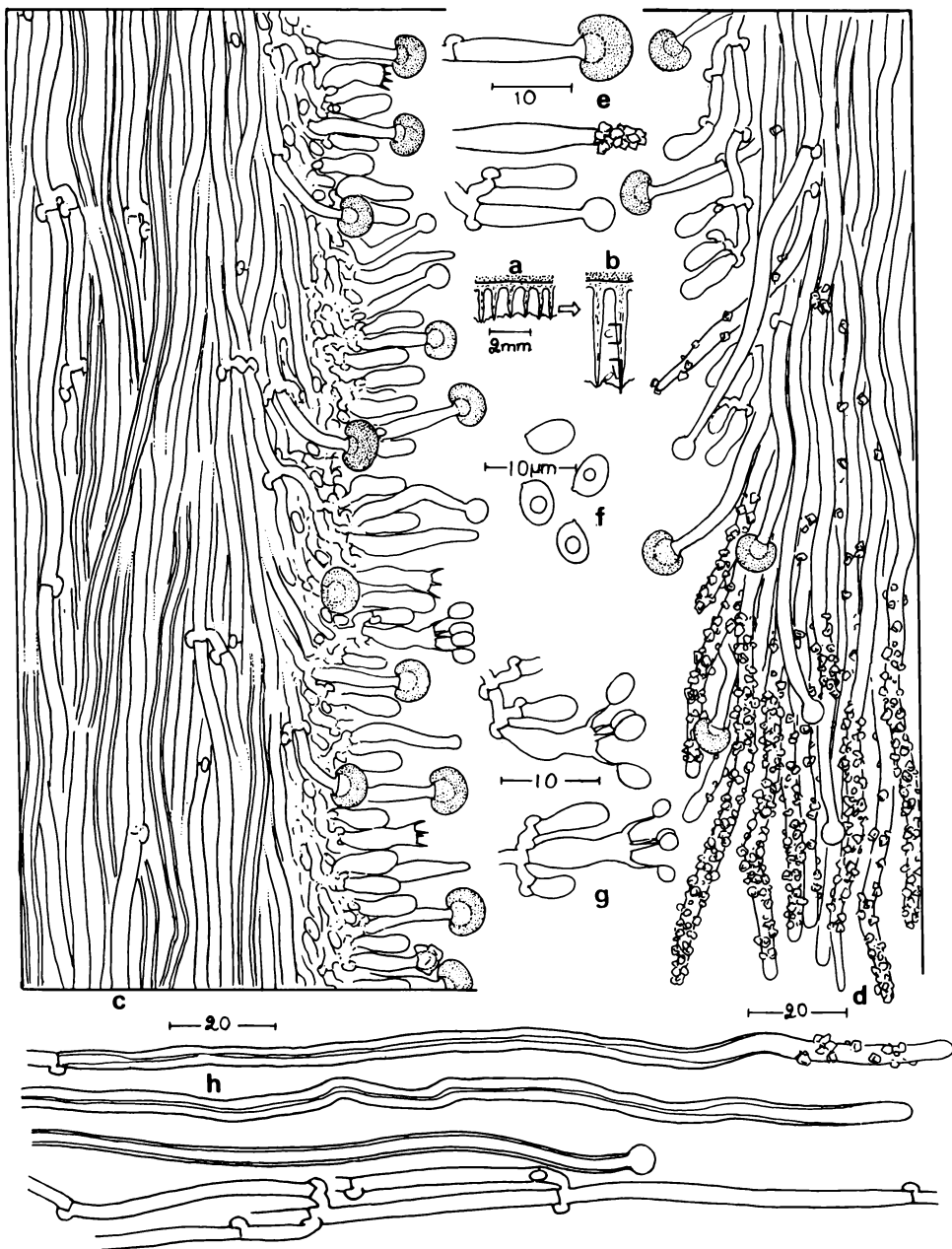


Fig. 655. *Schizopora paradoxa*. a-b) sections through fruitbody showing position of sections c and d c) section through hymenium and trama d) section through dissepiment e) cystidial elements in the hymenium f) spores g) basidia h) skeletal and generative hyphae. — Coll. Eriksson 6440.

**Schizopora paradoxa** (Fr.) Donk,

Fig. 654-58

Persoonia 5 p. 76, 1967. - *Hydnum paradoxum* Fr., Syst. mycol. 1 p. 424, 1821; Elench. fung. 1 p. 150, 1828.

**Fruitbody** resupinate, often large, on vertical substrata often with small nodules with fertile undersides but no real pilei, tough, white to cream-coloured or darkening with age (greyish-ochraceous-brownish), 1-5 mm thick; hymenophore usually poroid with lacerate-denticulate pore walls, pores of varying sizes, often irregular or somewhat labyrinthine, on sloping substrata more or less prolonged, or split into irregular teeth in an irpicoid way; near the margin the pores are shallow or net-like; margin normally not differentiated.

**Hyphal system** dimitic but skeletal hyphae may be few; most hyphae with thin or somewhat thickened walls, more or less branched, 2-3  $\mu\text{m}$  wide, with clamps at all septa; skeletal hyphae 3-4(-5)  $\mu\text{m}$  wide, straight or sinuous, hyaline or yellow, reaching a length of 100-350  $\mu\text{m}$ ; hyphal ends on the edges of the dissepiments encrusted with granular crystals.

**Cystidia** or rather cystidioid hyphae present in variable numbers, usually capitate and provided with a rounded cap of a crystalline or resinoid substance.

**Basidia** suburniform, 15-20 x 4-5  $\mu\text{m}$ , with 4 sterigmata and a basal clamp.

**Spores** 5-6(-6.5) x 3.5-4  $\mu\text{m}$ , ellipsoid, smooth, thin-walled, usually with one oil-drop.

**Habitat.** On decayed frondose wood in all kinds of deciduous forests, as well as in less fertile ones with deciduous trees mixed in conifer communities.

**Distribution.** Very common in Denmark, S. Sweden up to the Lake Mälaren-region, S. Norway along the coast to Sogn and Fjordane, and in S. Finland, but occurs also in coastal areas northwards.

**Remarks.** *S. paradoxa* is here treated in a sensu lato. There is a considerable variation in connection with differences in the biotope, whether vertical or horizontal substrata, age of fruitbodies, a.s.o. but there is also a differentiation connected with the geographical distribution, which makes it probable already at a study of herbarium material, that the taxon is heterogeneous. In the northern part of its area it has normally a more irpicoid fruitbody with a coarser hymenial pattern and a lighter (whitish) colour, while in the southern part the dominating form is more poroid and has a darker colour, at least in the herbarium. There is also a difference in microscopical characteristics, e.g., in the frequency of capitate cystidiols. After having made a compatibility study of these two forms, Hallenberg (1983) has found reasons to treat them as two separate species, a more northern *S. paradoxa* and a southern *S. radula*. An investigation of the large Nordic herbarium material shows, however, that it is still in many cases difficult or even impossible to keep them separate with certainty, and for practical reasons we therefore prefer to retain *S. paradoxa* in a wide sense.



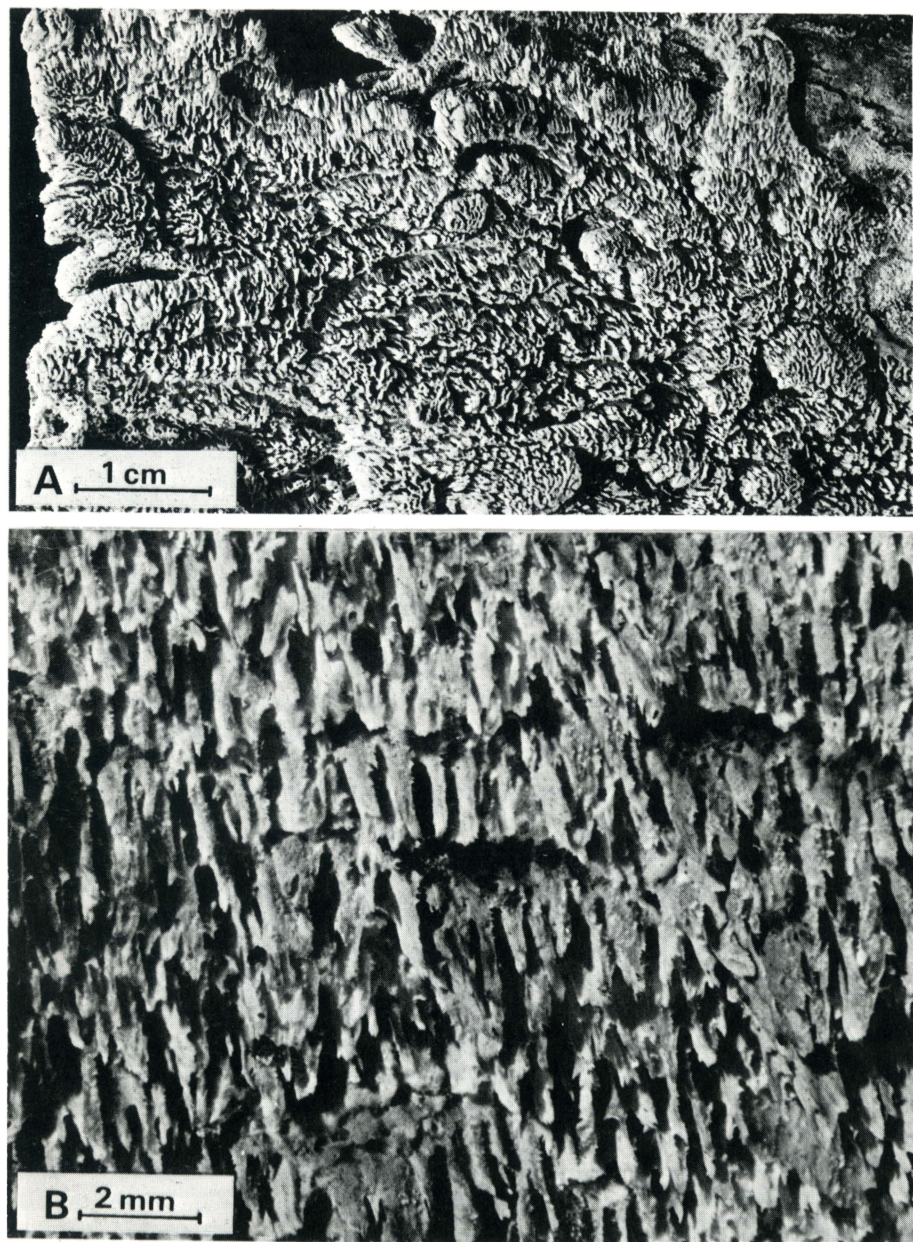


Fig. 656. *Schizopora paradoxa*. — Coll. Nordin 10012. Photo T. Hallingbäck.



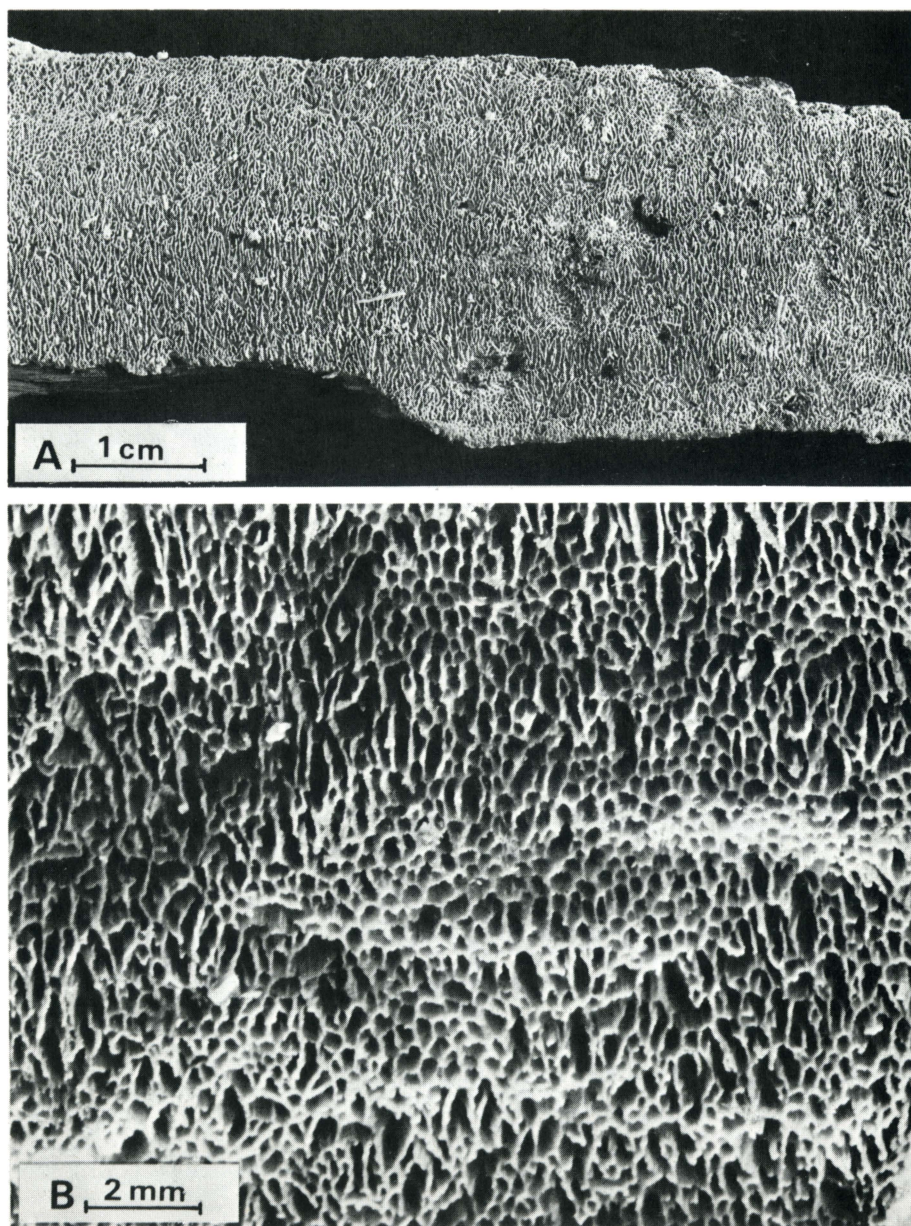


Fig. 657. *Schizopora paradoxa*. — Coll. Eriksson 6440. Photo T. Hallingbäck.



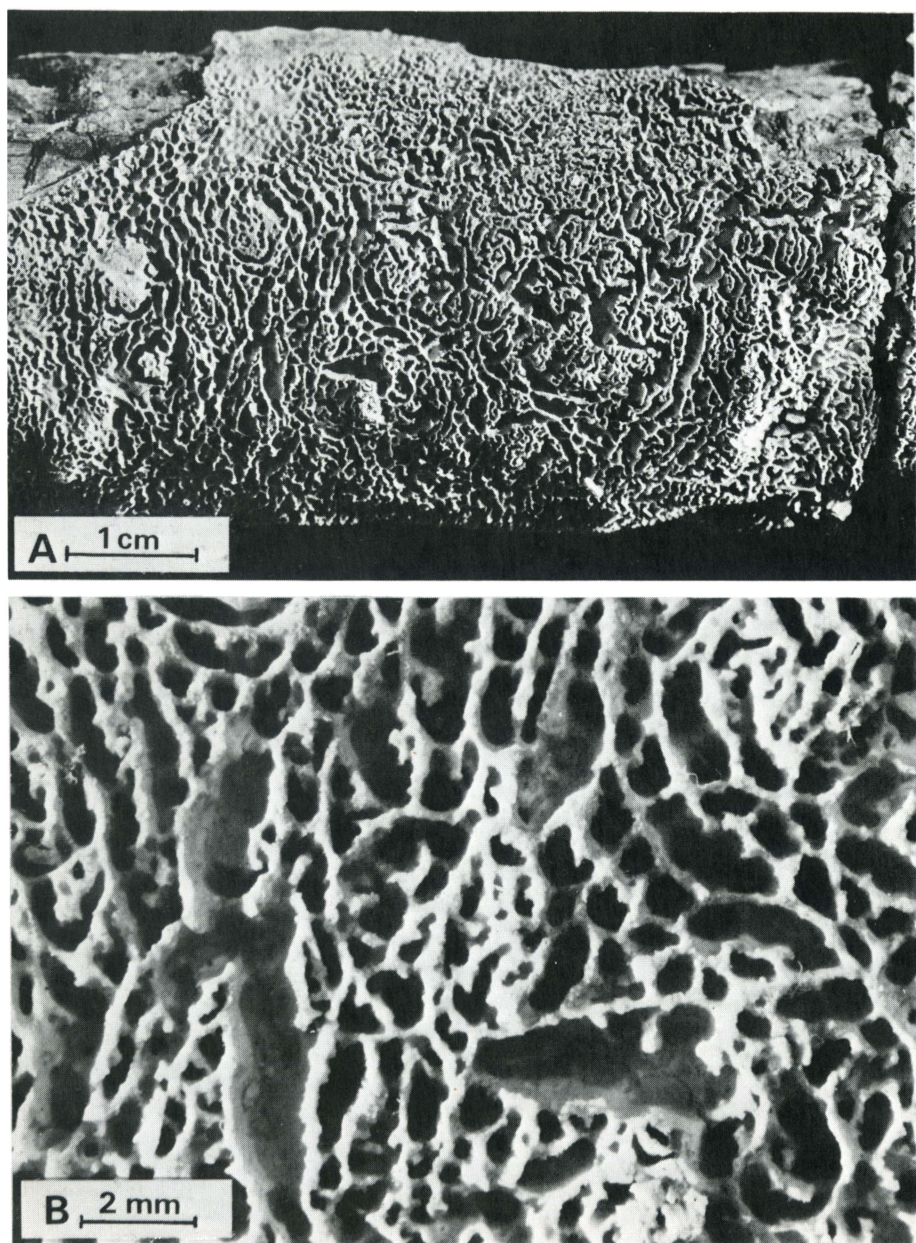


Fig. 658. *Schizopora paradoxa*. — Coll. Nordin 10019. Photo T. Hallingbäck.

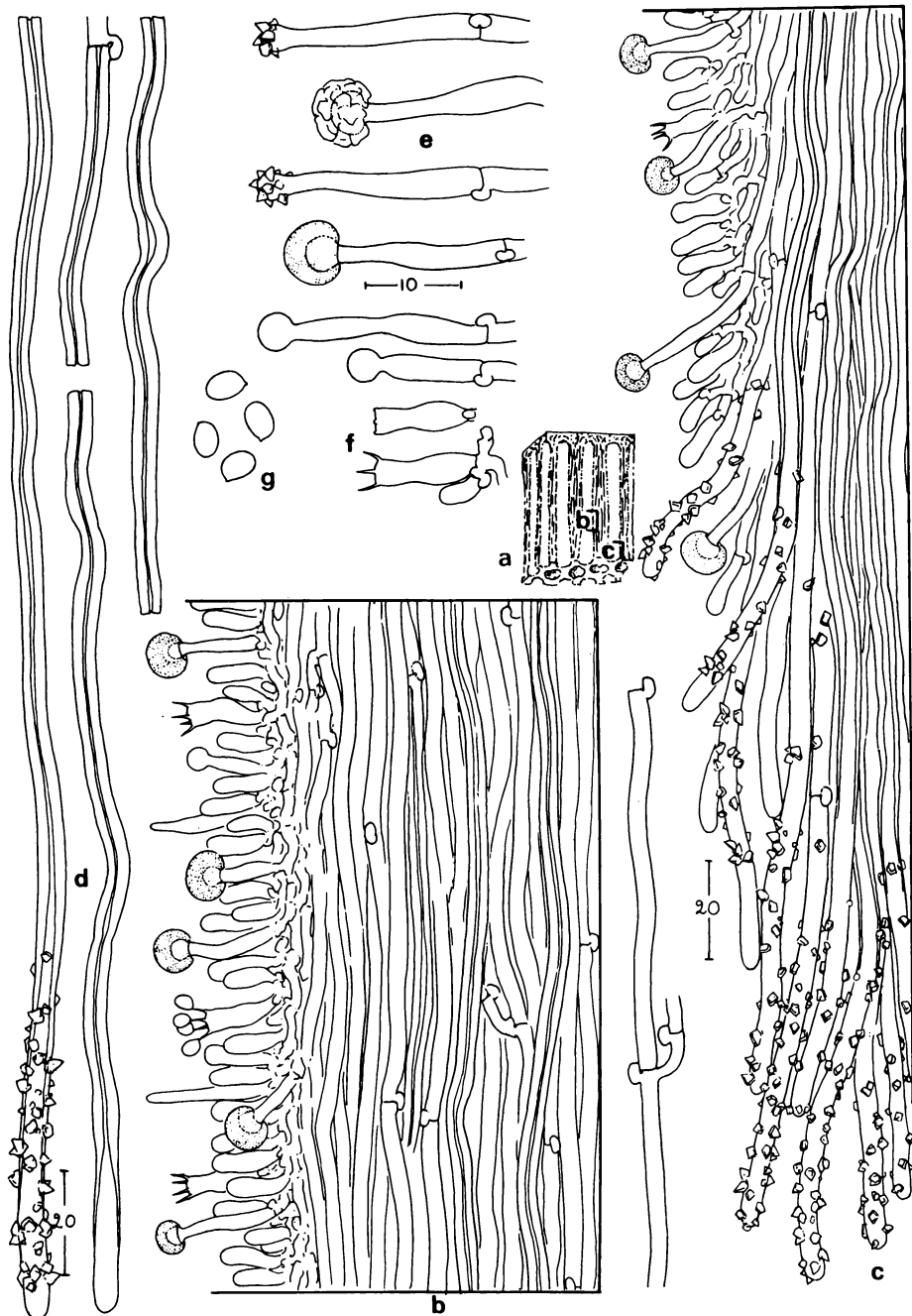


Fig. 659. *Schizopora carneo-lutea*. a) section through fruitbody showing position of sections b and c b) section through hymenium c) section through dissepiment d) skeletal hyphae e) cystidial elements in the hymenium f) basidia g) spores.  
 — Coll. Kotlaba & Pouzar 1967-08-16.



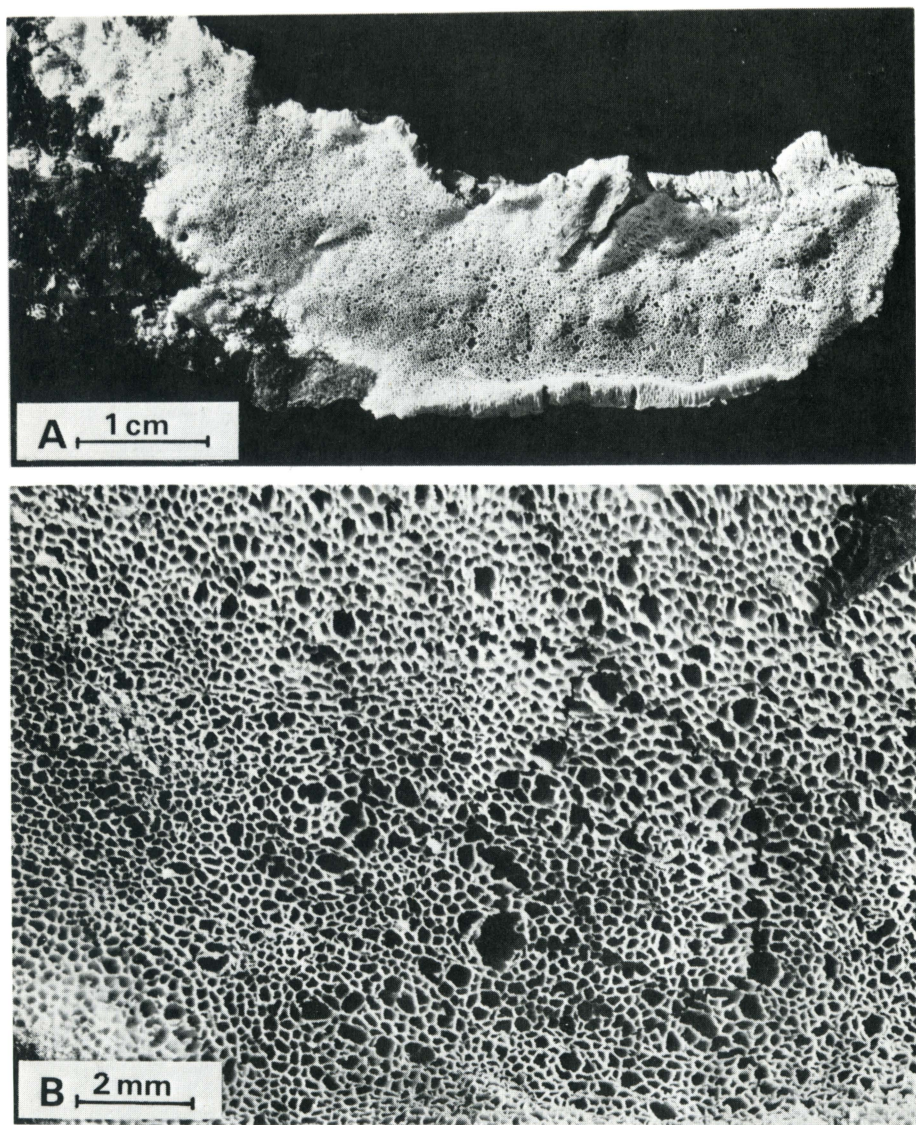


Fig. 660. *Schizopora carneo-lutea*. — Coll. H. & M.A. Jahn & W. Frost. 1976-10-03.  
Photo T. Hallingbäck.

**Scopuloides** (Masse) v Höhn. & Litsch.,  
Wiesner-Festschr. 57, 58, 1908. - *Peniophora* subgenus *Scopuloides* Masse,  
J. Linn. Soc. London (Bot.) 25, p. 154, 1890.

**Fruitbodies** resupinate, closely adnate, totally attached, odontoid; hyphal system monomitic; subiculum thin, composed of parallel arranged hyphae, thin-walled or with slightly thickened walls, subhymenial layer rather dense but not firm; all hyphae without clamps; cystidia numerous, conical, thick-walled, abundantly encrusted in the upper part; projecting hyphal ends present, usually septate and encrusted, with obtuse apex; basidia small, slightly thickened towards the base, normally with 4 sterigmata, without basal clamp; spores smooth, thin-walled, in the type species shortallantoid, not amyloid, not dextrinoid, not cyanophilous.

**Type species:** *Peniophora hydroides* Cooke & Masse in Cooke.

**Remarks.** *Scopuloides* agrees in some respects with *Phlebiopsis* and the main difference is the nature of subiculum. The type of the latter genus (*Thelephora gigantea* Fr.) has two distinct layers of subicular hyphae. The zone next to the substrata consists of a rather loose tissue and can easily be studied in vertical sections, while the intermediate, and somewhat darker zone, is very dense and when dry hard to section. Other separating characteristics between the two genera are more vague, but *S. hydroides* is always odontoid and the margin is undifferentiated, never loosening from the substratum. Jülich 1982, incorporated *Peniophora septocystidia* Burt in *Scopuloides* with reference to the septate cystidia and the short-allantoid spores. However, the septate organs in *Scopuloides hydroides* are merely a part of hyphae which penetrate the subhymenium and project above the basidia. We are still of the opinion that the resemblance of *P. septocystidia* with *Scopuloides* is superficial and that the species is better placed in *Phanerochaete* (Eriksson & al. 1978, p. 1023), even if its place in this genus is rather isolated.

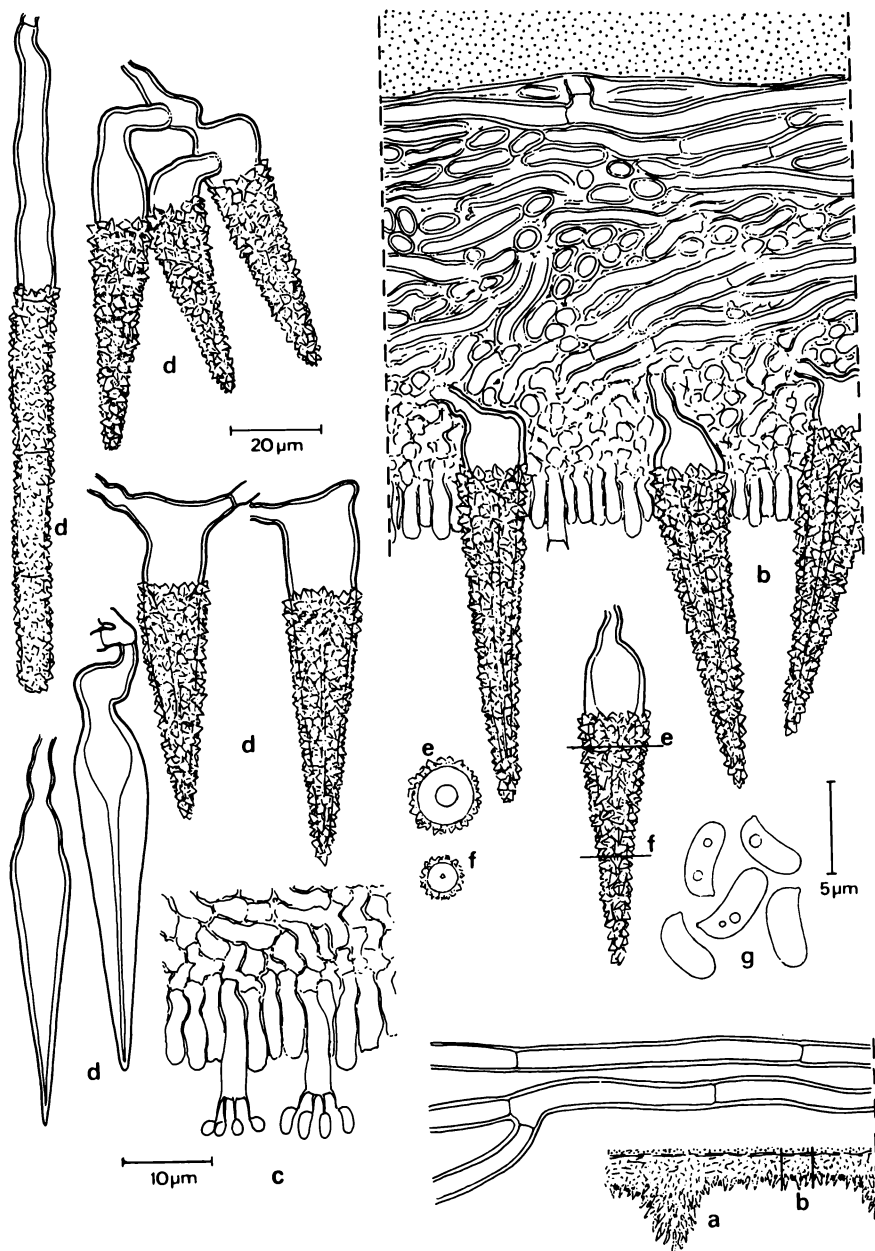


Fig. 661. *Scopuloides hydroides*. a) section through fruitbody showing position of section b) b) section through fruitbody c) basidia d) cystidia e-f) horizontal sections through cystidium g) spores. — Coll. Hjortstam 3114.

Fig. 661, 669 A-D

**Scopuloides hydroides** (Cooke & Massee in Cooke) Hjortst. & Ryv., Mycotaxon 9, p. 509, 1979. - *Peniophora hydroides* Cooke & Massee in Cooke, Grevillea 16, p. 77, 1888. - *Phlebia hydroides* (Cooke & Massee in Cooke) M.P. Christ., Dansk Bot. Ark. p. 175, 1960.

**Fruitbody** resupinate, effuse, subgelatinous, semitranslucent when fresh and wet, whitish or greyish when dried, thin, hymenium odontoid and at least in older specimens distinctly cracked in irregular pieces, individual aculei crowded, velutinous by projecting cystidia and hyphal ends (lens 50 x), margin thinning out, usually with numerous projecting cystidia.

**Hyphal system** monomitic, subiculum as a rule very thin and composed of relatively long-celled hyphae, parallelly arranged next to the substratum, with somewhat thickened walls, 4-7  $\mu\text{m}$  wide, subhymenium with densely interwoven hyphae, all hyphae without clamps.

**Cystidia** (metuloids, lamprocystidia) basally thick-walled, about 40-60 x 8-12  $\mu\text{m}$ , often projecting 10-30  $\mu\text{m}$  above the basidia, conical, more rarely obtuse, strongly encrusted. Hyphal ends present, especially in the top of the hymenial aculei, usually projecting 20-50  $\mu\text{m}$  or more, septate and strongly encrusted.

**Basidia** in a dense palisade, subclavate, 12-15 x 3.5-4.5  $\mu\text{m}$ , thin-walled or basally thickened, with 4 sterigmata, basal clamp lacking.

**Spores** short-allantoid, 3.5-4(-5) x 1.8-2(-2.2)  $\mu\text{m}$ , smooth, thin-walled.

**Habitat and distribution.** On both corticate and decorticate wood of frondose trees, rarely seen on coniferous wood. A frequent species in herb-rich, deciduous forests in the whole area.

**Remarks.** Well distinguished species because of the encrusted cystidia, the small spores, the lack of clamps and the odontoid hymenium. The morphology is quite homogeneous in North Europe. According to Jülich (1981) the species is a synonym of *Peniophora rimosa* Cooke (Grevillea 9, p. 94, 1881) but after a close examination of the types of the two taxa, we prefer to retain the epithet hydroides for the species in North Europe. However, microscopically they are quite similar, though slightly different in spore-size, they differ considerably in outer appearance. The aculei of *P. rimosa* are typically cylindrical and scattered over the hymenium, not crowded and penicillate as in *P. hydroides*. With reference to the numerous collections investigated by us from the N. European area no such hymenial deviation has been found.



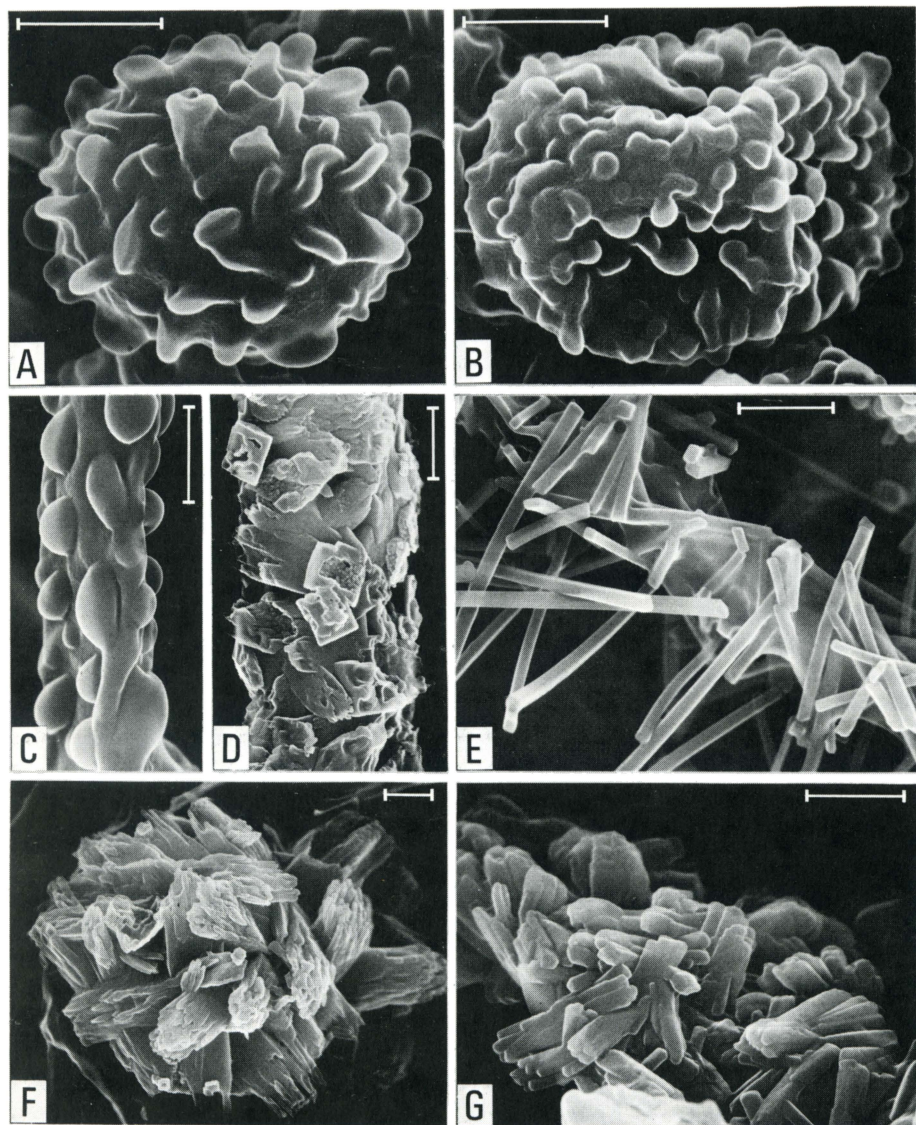


Fig. 662. SEM pictures of A, C, D, F) *Scytinostromella heterogenea* (coll. Hallingbäck 31.X.1978, GB 24047) and B, E, G) *S. nannfeldtii* (type material). A, B) spores. C-E) subhymenial hyphae. C) with excreted, dried up drops. D, E) crystalline matter of different shapes. F) encrusted cystidial top seen from above. G) encrusted hyphae. — Scale lines 1  $\mu\text{m}$ . Photo: Stellan Sunhede.

**Scytinostromella** Parm.,

Consp. Syst. Cort. p. 171, 1968.

**Fruitbodies** resupinate, closely adnate or detachable, membranaceous or even pellicular (athelioid), in the living state ceraceous and soft, when dried crustose or brittle, light-coloured, often with rhizomorphic strands in the subiculum and in the periphery of the fruitbody; hyphal system dimitic, the generative ones thin-walled, much branched and with clamps, other thin-walled hyphae straight, with sparse septations and branches, with gradually thickening walls finally developing into fairly typical skeletal- or fibre-hyphae, yellowish in Melzers reagent, but not strictly dextrinoid, cyanophilous reaction of hyphal walls weak or indistinguishable; cystidia present, either as thinwalled, enclosed or projecting gloeocystidia, or as thickwalled, encrusted pseudocystidia; basidia clavate or suburniform, somewhat sinuous and often with a median constriction, with 4 sterigmata and basal clamp; spores mostly 4-6  $\mu\text{m}$  long, ellipsoid, asperulate, with somewhat thickened walls, amyloid, acyanophilous.

**Type species:** *Peniophora heterogenea* Bourd. & Galz.

**Remarks.** The genus is well delimited and easily recognized by its dimitic hyphae, amyloid and asperulate spores, presence of cystidia and rhizomorphic strands. There is a variation in the nature of the fruitbody, which in three species (*S. cerina*, *S. nannfeldtii*, and Sunhede 7416) is adnate, more or less crustose, in one species (*S. heterogenea*) pellicular - membranaceous with a soft cottony subiculum and in one (*S. humifaciens*) truly pellicular (=athelioid). Also the cystidia vary, from pseudocystidia with a long, thick-walled hyphal base in *S. heterogenea*, to thin-walled gloeocystidia in the other species. The basidia are often sinuous - constricted, sometimes even urniform but in *S. cerina* more clavate. In the spores the variation in size, shape, and surface structure is small. The hyphal system is usually described as dimitic, e.g., by Parmasto, but, as noticed by Freeman & Petersen (Mycologia 71 p. 88), the skeletal portion does not fully agree with typical skeletals, as both branches and clamps can be found, most easily in *S. cerina*, but also in others. Normally skeletal hyphae remain thin-walled at the tip as long as they grow, and the thickening of the wall occurs just behind the growing zone, but in *Scytinostromella* the thick-walled hyphae are formed from special thin-walled hyphae, mostly straight and with sparse clamps and branches, and these hyphae gradually get thickened walls. Whether *Scytinostromella* should be placed in Corticiaceae or in Lachnocladiaceae, is not definitely settled. It agrees in many respects well with Corticiaceae, but the structure of the skeletal hyphae could point to *Scytinostroma*, which usually is referred to Lachnocladiaceae. In *Scytinostroma* the fibre-hyphae are dextrinoid, in this genus not, but the pseudocystidia of *S. heterogenea*, which constitutes the fibre-system of this species, are in

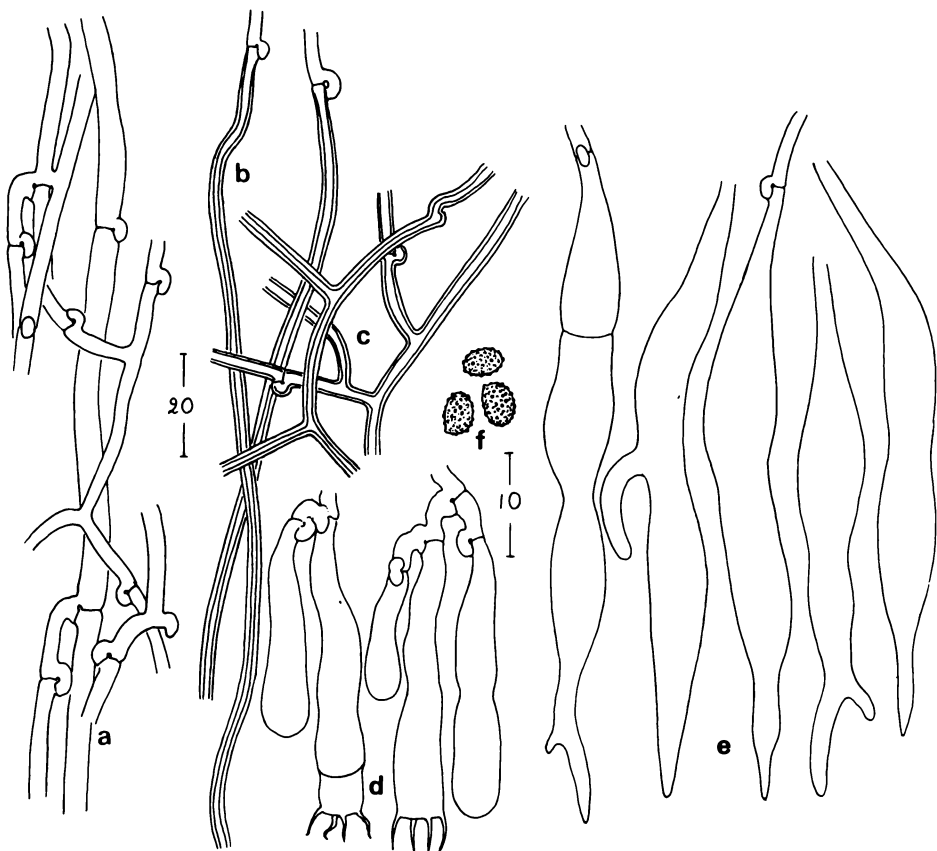


Fig. 663. *Scytinostromella cerina*. a) generative hyphae b) skeletal hyphae c) branched thick-walled hyphae d) basidia e) gleocystidia f) spores. — Coll. Murrill 16175.

some specimens dextrinoid in the apical part. In the Nordic flora there are 2 species described and evidently also one not yet described. Two other species are known from America. *S. humifaciens* is treated here as it belongs to the temperate zone, and may be found also in N. Europe. The fourth species, *S. cerina* (Bres.) Hjortst. & Ryv., Mycotaxon 10 p. 287, belongs to the tropical zone. The micro-morphology of this species is shown in fig. 663.

#### Key to the species:

1. Cystidia (pseudocystidia) from thick-walled hyphae .. 1. ***S. heterogenea***
1. Cystidia (gloeocystidia) from thin-walled hyphae. no pseudocystidia . 2
2. Fruitbody athelioid, cystidia pointed. .... 2. ***S. humifaciens***
2. Fruitbody not athelioid, cystidia not pointed ..... 3
3. Spores oblong 4.5-6  $\mu\text{m}$  long ..... 3. ***S. nannfeldtii***
3. Spores subglobose-ellipsoid,  
up to 4  $\mu\text{m}$  long ..... 4. ***Scytinostromella* sp.** Sunhede 7416

Fig. 662 A, C, D, F, 664-65

#### 1. *Scytinostromella heterogenea* (Bourd. & Galz.) Parmasto,

Consp. syst. Cort. p. 171, 1968 — *Peniophora heterogenea* Bourd. & Galz., Bull. Soc mycol. France 28 p. 293, 1913. Lectotype: Galzin 8301 (PC).

**Fruitbody** effuse, subpellicular to membranaceous, easily separated from the substratum, to which it is attached by a loose, cottony subiculum; hymenium smooth, under the lens with projecting cystidia, at first white, then yellowish, in the herbarium often darkening to pale buff; white rhizomorphic strands present in the subiculum and in the periphery; no differentiated margin.

**Hyphal system** dimitic, generative hyphae thin-walled, 1.5-4  $\mu\text{m}$  wide, in the sub-hymenium richly branched and clamped in, the subiculum straighter and with more sparse clamps and branches, and of pseudoskeletal hyphae, 1.5-2.5  $\mu\text{m}$  wide, straight and thick-walled, rarely with clamps and branches; rhizomorphs composed of pseudoskeletal and generative hyphae of varying width (to 5  $\mu\text{m}$ ), often encrusted by crystals or by rounded, resinous bodies.

**Cystidia** of two kinds: a) pseudocystidia, formed by thick-walled hyphae, developed from thin-walled hyphae in the subiculum, bedding down towards and often penetrate the hymenium; apical part 79-100 x 10-15  $\mu\text{m}$ , encrusted by crystalline matter, b) gloeocystidia developed from generative hyphae, 60-100 x 5-12  $\mu\text{m}$ , thin-walled, generally fusiform, often with apical schizopapillae, protoplasm with droplike, granular, or irregular oily contents with sulfoaldehyde reaction, strongly stained in cotton blue, esp. in the apical part.

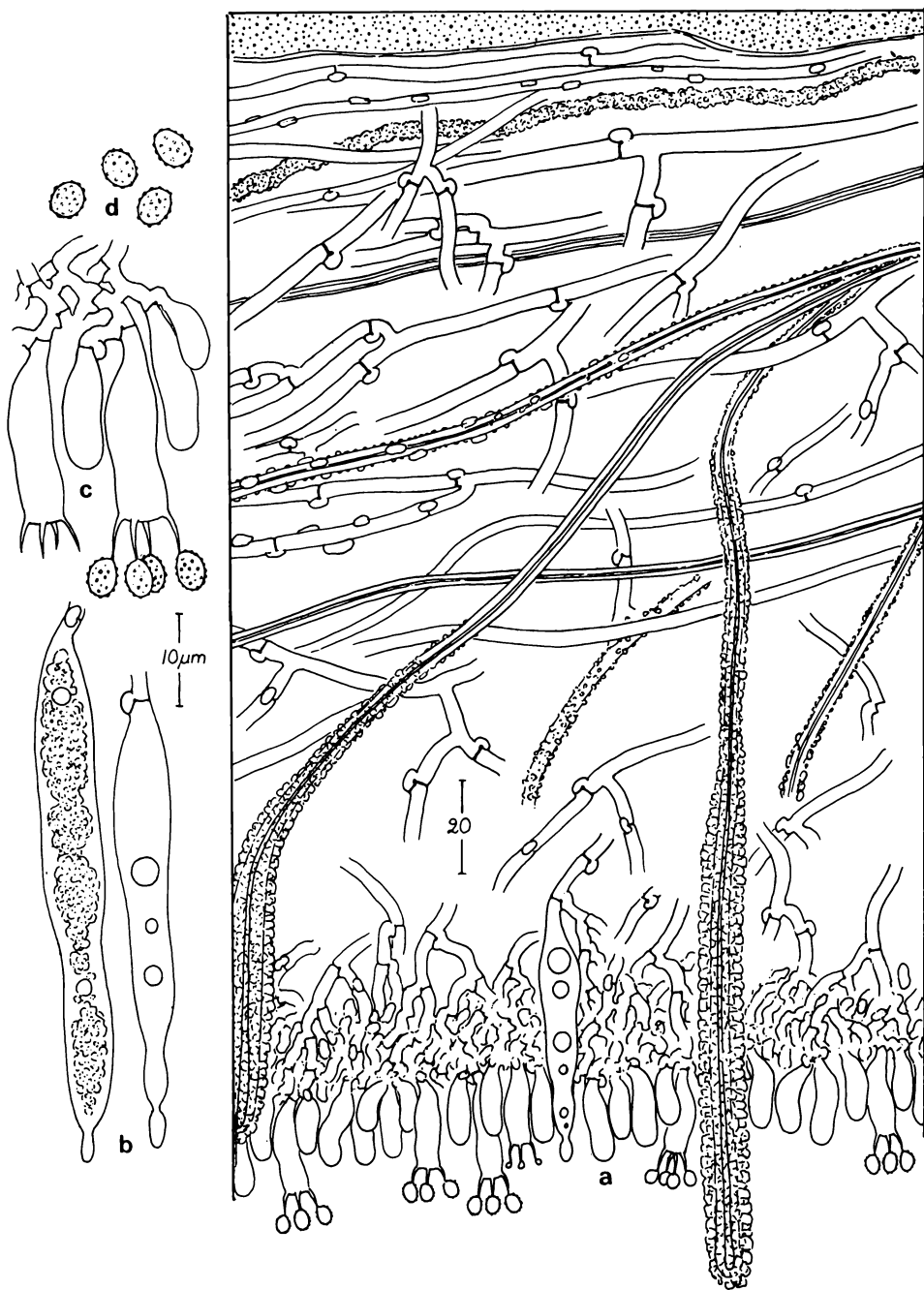


Fig. 664. *Scytinostromella heterogenea*. a) section through fruitbody b) gloeocystidia c) basidia d) spores. — Coll. Hallingbäck 24047.

**Basidia** 15-20 x 3.5-5  $\mu\text{m}$ , clavate — suburniform, often constricted, with a basal clamp and normally 4 sterigmata.

**Spores** 3.5-5 x 2.5-3.5  $\mu\text{m}$ , subglobose — ellipsoid, with thin or somewhat thickened walls, asperulate with small, mostly rounded warts, some oval or oblong, amyloid.

**Habitat.** On decayed wood in humid forests. Most of the collections are from much decayed wood of *Picea*, but it is also found on *Pinus* and on deciduous wood (*Salix*, *Alnus*).

**Distribution.** Uncommon or rare but widely distributed, in Scandinavia from Denmark in the south to N. Lapland in the north, but also in other parts of the N. hemisphere (Eur., N. Am.).

**Remarks.** Uniform species, differing from the rest of the genus in the nature of the cystidia, as those developing from the subiculum are pseudocystidial and provided with a crystalline encrustation. Those from the thin-walled hyphae of the subhymenium agree better with the cystidia of the other species.

Fig. 666

**2. *Scytinostromella humifaciens*** (Burt) Freeman & Petersen, Mycologia 71 p. 86, 1979. — *Peniophora humifaciens* Burt, Ann. Missouri Bot. Gard. 12 p. 225, 1926. — *Amylosporomyces humifaciens* (Burt) Rattan, Resup. Aphylloph. N.W. Himalayas. p. 245, 1977.

Holotype: Humphrey 6266 (FH):

**Frutibody** effuse, athelioid, smooth, soft and light-coloured when fresh, when dried very brittle, pale buff-coloured, with brown rhizomorphic strands in the subiculum and in the periphery of the fruitbody; hyphal system composed of thin-walled generative hyphae, 1.5-4  $\mu\text{m}$  wide, and thick-walled fibre-hyphae, 1-2  $\mu\text{m}$  wide; rhizomorphic strands composed of thin-walled hyphae of various types, some very narrow and sparsely septate, some wide, more closely branched, cystidia (gloeocystidia) thin-walled, pointed, with oily contents and evidently also resinuous excretions, 45-60 x 3.5-5  $\mu\text{m}$ ; basidia clavate-suburniform, 15-20 x 3-5  $\mu\text{m}$ , with a basal clamp and 4 sterigmata; spores broadly ellipsoid, 3.5-4.5 x 3-3.5  $\mu\text{m}$ , asperulate with rounded or oblong warts, amyloid. *S. humifaciens* is so far known only from W. Canada and N.W. USA, but may very likely be found also in N.W. Europe. It seems to be restricted to coniferous wood.

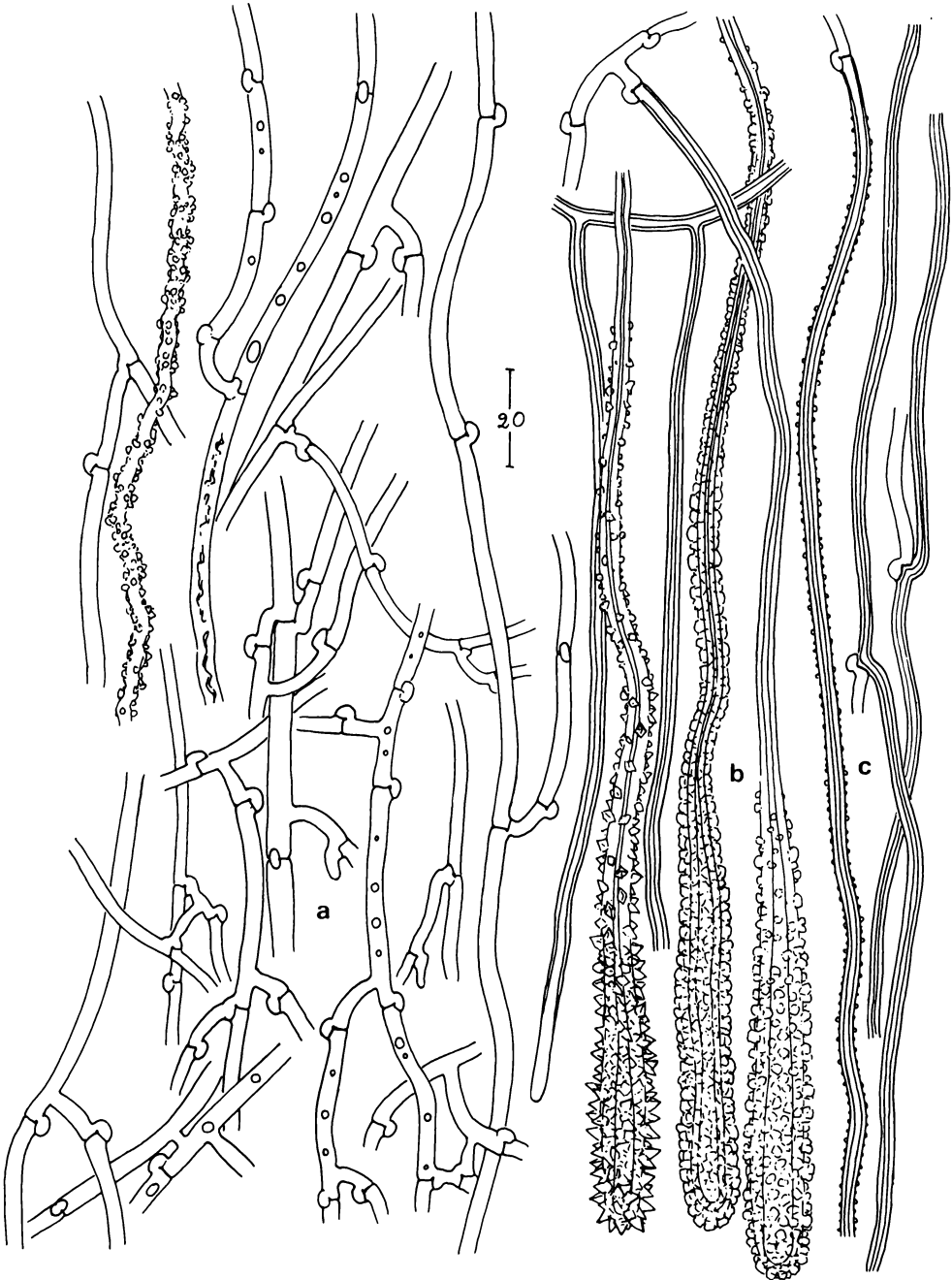


Fig. 665. *Scytinostromella heterogenea*. a) generative hyphae b) pseudocystidia c) skeletal hyphae with connection to generative ones from which they originated.

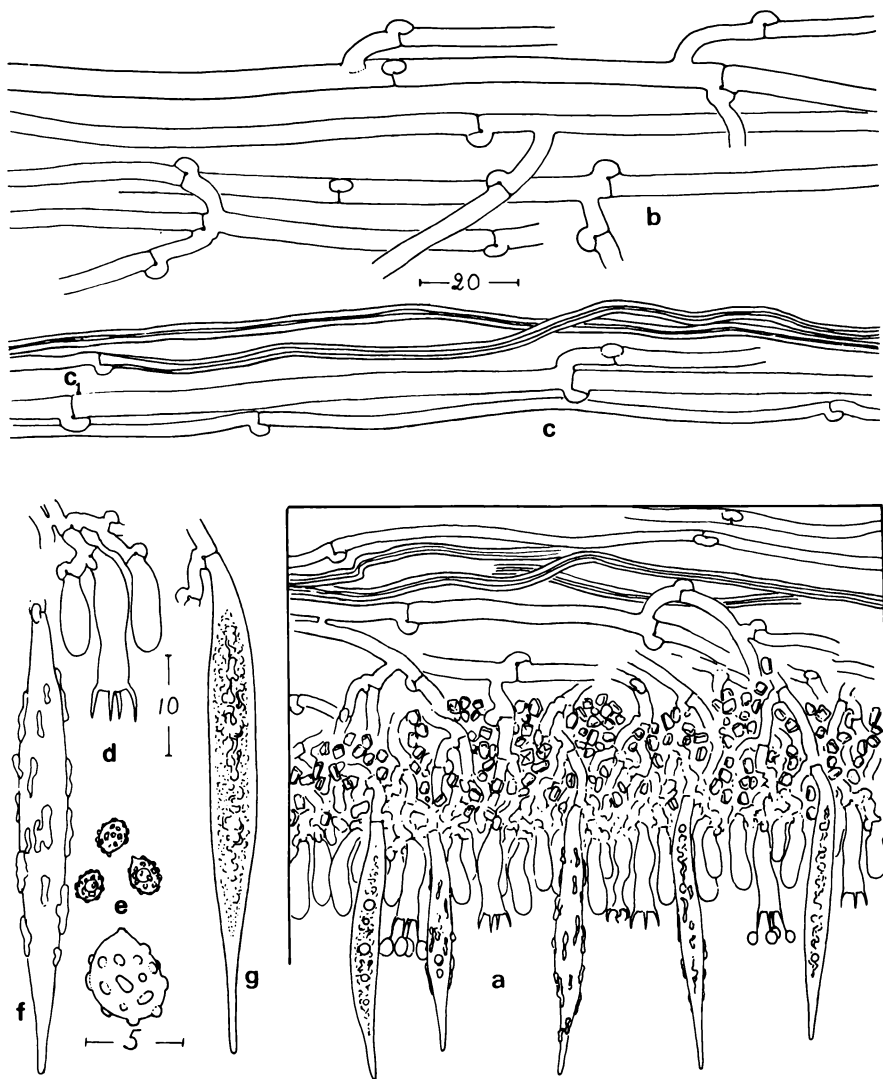


Fig. 666. *Scytinostromella humifaciens*. a) section through fruitbody b) generative hyphae c) skeletal and generative hyphae from a rhizomorph, at  $c_1$  transition from generative to skeletal hyphae d) basidia e) spores f) cystidium with encrustation g) cystidium with oily content. — From the holotype.



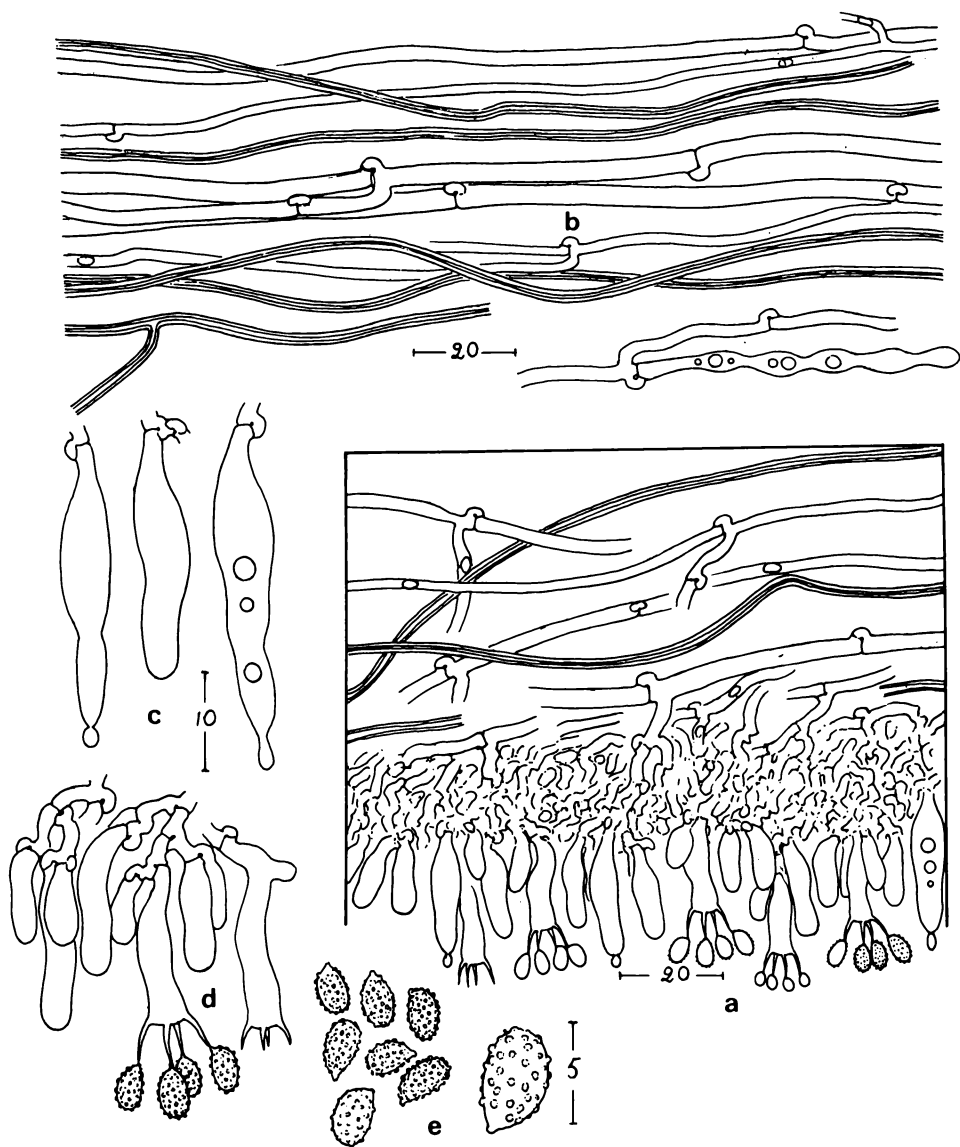


Fig. 667. *Scytinostromella nannfeldtii*. a) section through fruitbody b) skeletal and generative hyphae c) cystidia d) basidia e) spores. — Coll. Eriksson & Strid 10585.

**3. *Scytinostromella nannfeldtii*** (John Erikss.) Freeman & Petersen loc. cit. p. 90 — *Gloeocystidiellum nannfeldtii* John Erikss., Sv. Bot. Tidskr. 52 p. 14, 1958.

Holotype: J. A. Nannfeldt 10908 (UPS).

**Fruitbody** effuse, adnate, ca. 0.1 mm thick, whitish to pale argillaceous or pale buff, young fruitbodies often starting as a loose network of thin rhizomorphic strands, then becoming continuous; rhizomorphs sometimes also in the periphery of the fruitbody.

**Hyphal system** dimitic; generative hyphae 1.5-4  $\mu\text{m}$  wide, thin-walled, richly branched and forming a dense subhymenium, pseudoskeletal hyphae in the subiculum and in the rhizomorphic strands, which also contain thin-walled hyphae of varying width (to 4  $\mu\text{m}$ ).

**Cystidia** (gloeocystidia) 30-50 x 5-7(-10)  $\mu\text{m}$ , thin-walled, with drop-like or granular contents, subcylindrical — fusiform, as a rule tapering to the apex, which often bears a schizopapilla; weakly positive reaction in sulfo-benzaldehyde. No other cystidia.

**Basidia** clavate — subcylindrical — suburniform, often somewhat sinuous or constricted, rarely pleural, 20-25 x 4-5  $\mu\text{m}$ , with 4 sterigmata and with a basal clamp.

**Spores** 4.5-5.5 x 2.5-3.5  $\mu\text{m}$ , ovoid — ellipsoid, thin-walled — asperulate with small, rounded warts, amyloid, acyanophilous.

**Habitat and distribution.** Rare species growing on decayed wood (*Picea*), debris, leaves etc. Hitherto only found a few times in N. Finland (Pisavaara Nat. Park, Oulanka Nat. Park and in Sodankylä par.), in N. Sweden (Åre Par.), and in N. Norway (Rana). Outside Scandinavia it is reported from Alaska (McKinley Nat. Park). It seems to be a high-boreal species.

**Remarks.** Distinguished from the other species in the genus by its more adnate fruitbody and the size and shape of the spores. Its affinity to the genus is certain.

Two of the collections studied were attacked by a *Sterigmatomyces* sp., probably the same which occurs on *Trechispora* spp., e.g. *T. stellulata*, and then incorrectly interpreted as an echinocystidioid structure.

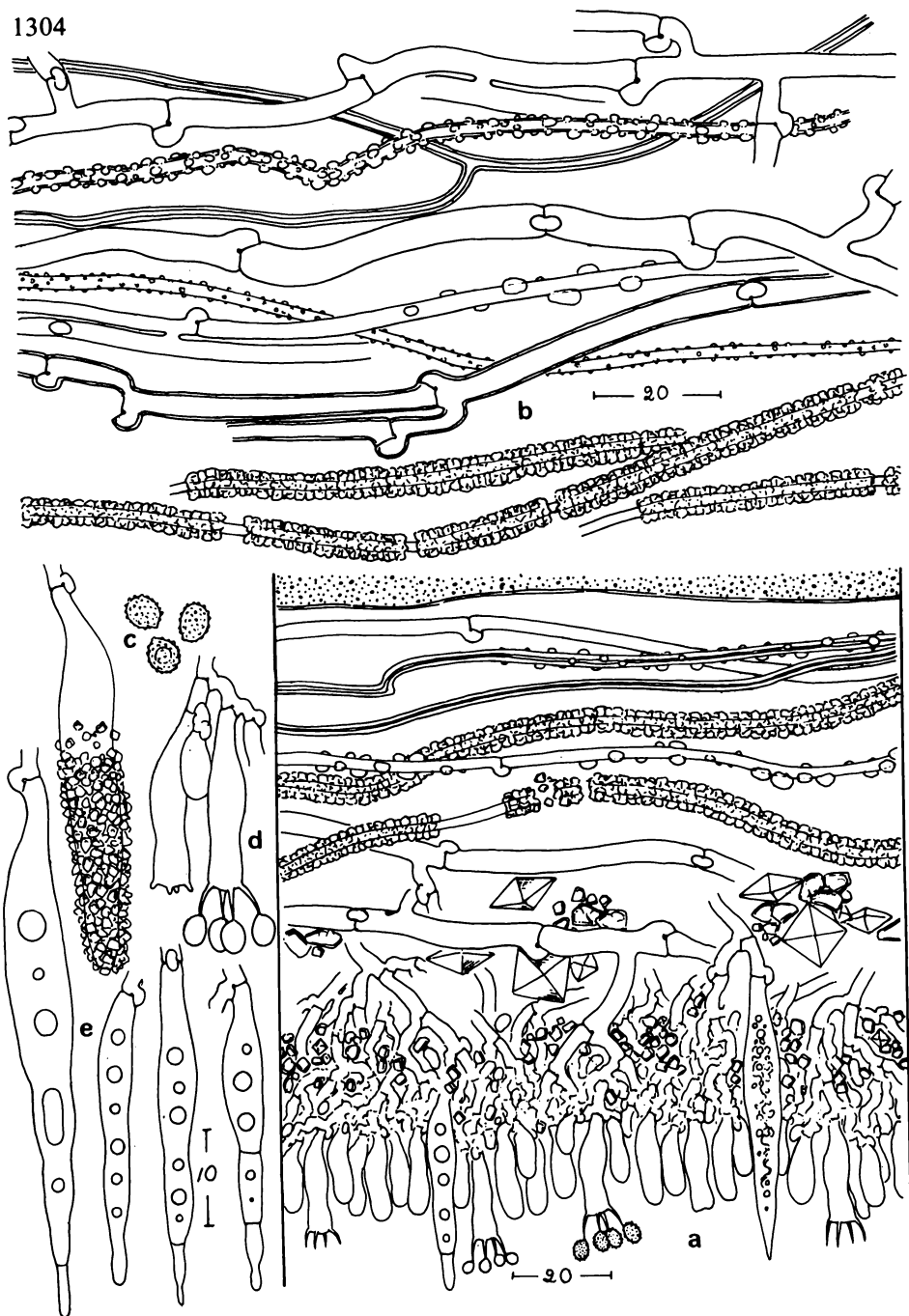


Fig. 668. *Scytinostromella* sp. a) section through fruitbody b) generative and skeletal hyphae with variable wall thickness and encrustation c) spores d) basidia e) cystidia. — Coll. Sunhede 7416.

**4. Scytinostromella** sp. Sunhede 7416.

Fig. 668

**Fruitbody** effuse, adnate, ca. 0.1 mm thick, white with a yellowish tint, when dry, shrunken with broad fissures; white rhizomorphic strands in the periphery, of the fruitbody.

**Hyphal system** dimitic, with thin-walled, clamped generative hyphae of very variable width and shape, often encrusted, and thick-walled pseudoskeletal fibre-hyphae, 1.5-2  $\mu\text{m}$  wide with few clamps and branches.

**Cystidia** (gloeocystidia) 40-70 x 5-7  $\mu\text{m}$ , tapering towards the apex, thin-walled, originating from subhymenial hyphae with a plasmatic content of oil-drops or granular matter; one cystidium with crystalline encrustation found; adventitious septa often present; no distinct schizopapillae found.

**Basidia** clavate — suburniform, 15-20 x 3-4  $\mu\text{m}$ , with 4 sterigmata and a basal clamp.

**Spores** ellipsoid, (3-)3-4 x 2.25-3  $\mu\text{m}$ , asperulate with small, rounded or oblong warts, amyloid.

**Habitat and distribution.** Found only once on the exoperidium of an old fruitbody of *Geastrum coronatum* Pers. Öland in Råpplinge par., near Borgholm, 1980. 11.11, S. Sunhede 7416.

**Remarks** Resembles *S. nannfeldtii* in its external appearance but differs in the shape of the spores, which are more rounded, in the more varied nature of the hyphae, and in the shape of the cystidia. In the microscope it seems to be closer to *S. heterogenea* (shape and size of spores, presence of a well developed subiculum) but lacks the pseudocystidia, characteristic for this species. The only locality known is summer-warm, dry and rich in  $\text{CaCO}_3$ , and therefore very different from all known localities of *S. nannfeldtii*.

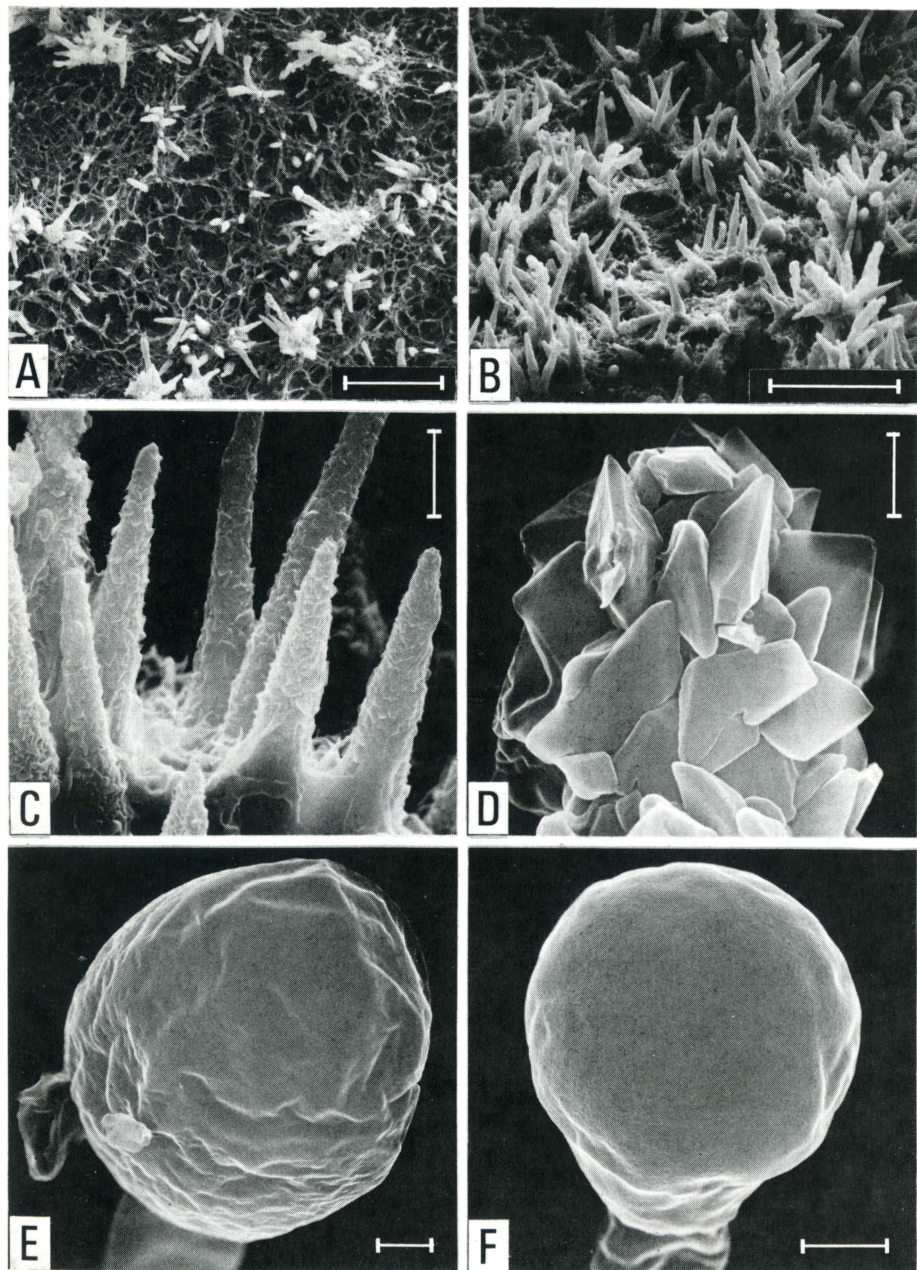


Fig. 669. SEM pictures of A-D) *Scopuloides hydroides*, (coll. Hjortstam 4364), E) *Sistolotrema pistilliferum* (coll. Hjortstam 2334), and F) *Sphaerobasidium minutum* (coll. Hjortstam 2757). A,B) young and somewhat older hymenium with cystidia. C) cystidia. D) apical part of cystidium with crystals. E,F) sphaeroid tops of cystidia. — Scale A,B) 100  $\mu$ m, C) 10  $\mu$ m, D-F) 1  $\mu$ m. Photo: Stellan Sunhede.

**Sistotrema** Fr.,

Syst. mycol. 1 p. 426, 1821. - *Urnobasidium* Parm., Consp. Syst. Cort. p. 38, 1968. - *Galziniella* Parm., Consp. Syst. Cort. p. 39, 1968.

**Fruitbodies** resupinate - subpileate - stipitate, mostly white, soft, when dried brittle, hymenium smooth, grandinoid, odontoid, poroid, or even sublamellate; hyphae monomitic, thin-walled or basal hyphae with slightly thickened walls, hyphal contents as a rule with oily inclusions; cystidia mostly lacking but in some species present as enclosed gloecystidia or even as projecting leptocystidia; basidia urniform, mostly with 6-8, seldom 2-4 sterigmata; spores smooth, globose-ellipsoid-oblong-allantoid, thin-walled, non-cyanophilous, non-amyloid and non-dextrinoid. Growing on wood, often much decayed, on bark of dead, but still attached branches as well as on soil, humus and all other kinds of plant debris.

**Type species:** *Sistotrema confluens* Fr.

**Remarks.** Well delimited genus, characterized above all by the urniform basidia with as a rule 6-8 sterigmata. The rich occurrence of oily inclusions in the protoplasm, usually as oil-drops, are of importance for the delimitation. *S. heteronemum*, which differs from the others in having cyanophilous hyphal walls and parts of the basal hyphae pigmented brown, is the only species, the belonging of which to the genus does not seem fully certain. It shows in these characteristics affinity to *Botryobasidium*. The genus was originally designated to one species by Fries, but especially the use of microscopical characteristics has since then widened its scope. Rogers (1944) restricted the name to the pileate *S. confluens* and its allies and placed all the others in the non-pileate *Trechispora* s. Rogers. However, the relationship between *S. confluens* and e.g. *S. dennisii* and *S. muscicola* are very close, why such a delimitation can not be accepted. *S. sernanderi* has been placed in *Urnobasidium*, characterized by narrow, 4-spored basidia, but it is so close to *S. coroniferum* that it is impossible to maintain this segregation. The type of *Galziniella* seems remarkable in having basidia with 1-4 sterigmata, but studies of the type shows that it in all other respects is a typical *Sistotrema* and also agrees in many respects (number of sterigmata; size and shape of the spores, nature of hyphae) with a specimen here reported as a deviating collection of *S. sernanderi*. As the delimitation of *Sistotrema* towards other genera seems to be clearer than is usual among the corticioid fungi, it is of considerable interest to study the variation within the genus. It can serve as an evaluation of the characteristics used in the taxonomy of the corticioids. As often before, a considerable variation of the hymenium is met with, while other characteristics, such as nature of hyphae, are more constant. Spores vary in shape but are uniform in other res-

pects. Cystidia occur in a few species and vary in nature. Even if the 6-8 number of sterigmata is a striking characteristic, the number within the genus is unusually variable, 1-8.

As to taxonomy at species level all kinds of difficulties are met with. The appearance of the fruitbodies varies with age as they as a rule start spore production very early. Very little is known about the effect of growth conditions on the shape of the fruitbody etc. It is therefore one of the most difficult genera as to species determination, fully comparable with, *Athelia*, *Phanerochaete* and *Phlebia*. Even if this presentation is based on very extensive material and is a result of considerable work, it is evident that only parts of the problems are solved. Some of them could possibly be tackled by compatibility tests, but such tests can contribute to the solving of the taxonomical problems only when they are combined with good knowledge of the micromorphology, ecology and variation of the species studied. In combination with the micromorphological investigations compatibility tests and other investigations of sterile cultures have been performed by Nils Hallenberg at the Institute of Botany, Univ. of Göteborg. Some results have been used in the flora but the whole investigation will be published separately. A provisional grouping of the species into more or less natural entities is as follows:

1. *S. confluens*-gr. Hymenium poroid-irpicoid. Spores globose- subglobose-ellipsoid. No cystidia. - *confluens*, *dennisii*, *musciola*, *alboluteum*.
2. *S. raduloides* -gr. Hymenium irpicoid-hydroid. No cystidia. Spores subcylindrical-subfusoid. - One species.
3. *S. brinkmannii*-gr. Hymenium grandinioid-smooth. No cystidia. *brinkmannii*, *diademiferum*, *oblongisporum*, *octosporum*, *suballantosporum*.
4. *S. coroniferum*-gr. With gloeocystidia, spores ellipsoid- suballantoid. - *coroniferum*, *resinicytidium*, *sernanderi*.
5. *S. efibulatum*-gr. Hyphae without clamps, spores pyriform- ellipsoid. No cystidia. - *efibulatum*, *pyrosporum*.
6. *S. autumnale*-gr. No cystidia, spores large (8-18 x 5-8 um). - *autumnale*, *intermedium*, *eximum*.
7. *S. pistilliferum*-gr. With or without cystidia. Spores subangular. - *pistilliferum*, *subangulisporum*.
8. *S. subtrigonospermum*-gr. No cystidia Sp. tetrahedral. - One species.
9. *S. heteronemum*-gr. Hyphae cyanophilous, basal hyphae brown. - One species.

# Key to the species

As there is a considerable variation within the species and as there are still several specimens which have not been possible to include among the described taxa, this key is in no way complete but may hopefully serve as an instrument for at least a preliminary classification.

1. Frb. stipitate, sublamellate, irpicoid or more or less poroid, on the ground ..... 4. **S. confluens**
1. Frb. resupinate, poroid - hydroid, grandinioid or smooth, on wood . 2
2. Frb. distinctly poroid or hydroid ..... 3
2. Frb. grandinioid or smooth ..... 6
3. Spores ellipsoid, subfusiform or suballantoid ..... 4
3. Spores more or less globose ..... 5
4. Frb. poroid, spores 4-4.5 x 2-2.5  $\mu\text{m}$ . ..... 6. **S. dennisii**
4. Frb. hydroid-odontioid, spores 7-9 x 3-3.5  $\mu\text{m}$ . ..... 16. **S. raduloides**
5. Frb. poroid, spores 4.5-6  $\mu\text{m}$  in diam. .... 1. **S. alboluteum**
5. Frb. hydroid or poroid-hydroid, spores 3.5-4.5  $\mu\text{m}$  in diam. .... 11. **S. muscicola**
6. Hyphae without clamps ..... 7
6. Hyphae with clamps ..... 9
7. Spores large, 9-11  $\mu\text{m}$  long ..... 15. **S. pyrosporum**
7. Spores normally less than 7  $\mu\text{m}$  long ..... 8
8. Spores subglobose-subangular ..... 20. **S. subangulisporum**
8. Spores ovoid-ellipsoid ..... 8. **S. efibulatum**
9. Gloeocystidia or projecting cystidia present ..... 10
9. Cystidial organs lacking ..... 14
10. With projecting, capitate cystidia, spores globose-subangular ..... 14. **S. pistilliferum**
10. With more or less enclosed gloeocystidia, spores ellipsoid-suballantoid ..... 11
11. Basidia with (1-2)-4 sterigmata ..... 18. **S. sernanderi**
11. Basidia with (4)-6-8 sterigmata ..... 12
12. Spores 4-5.5  $\mu\text{m}$  long, gloeocystidia yellow brown hymenium more or less tuberculate when fresh ..... 17. **S. resinicystidium**
12. Spores 5-6.5  $\mu\text{m}$  long, gloeocystidia hyaline or faintly yellowish, hymenium smooth ..... 13
13. Spores suballantoid, adaxial side more or less concave, 2-2.5  $\mu\text{m}$  wide ..... 5. **S. coroniferum**
13. Spores ellipsoid-subreniform, 2.5-3.5  $\mu\text{m}$  wide, adaxial side straight or convex ..... 27. **Sistotrema sp.** Olsson 5777
14. Spores 8-15 (18)  $\mu\text{m}$  long never suballantoid ..... 15
14. Spores shorter than 8  $\mu\text{m}$  or when longer, suballantoid ..... 18
15. Spores 10-15 (-18) x 5-8  $\mu\text{m}$ , basidia with 2 sterigmata . 2. **S. autumnale**



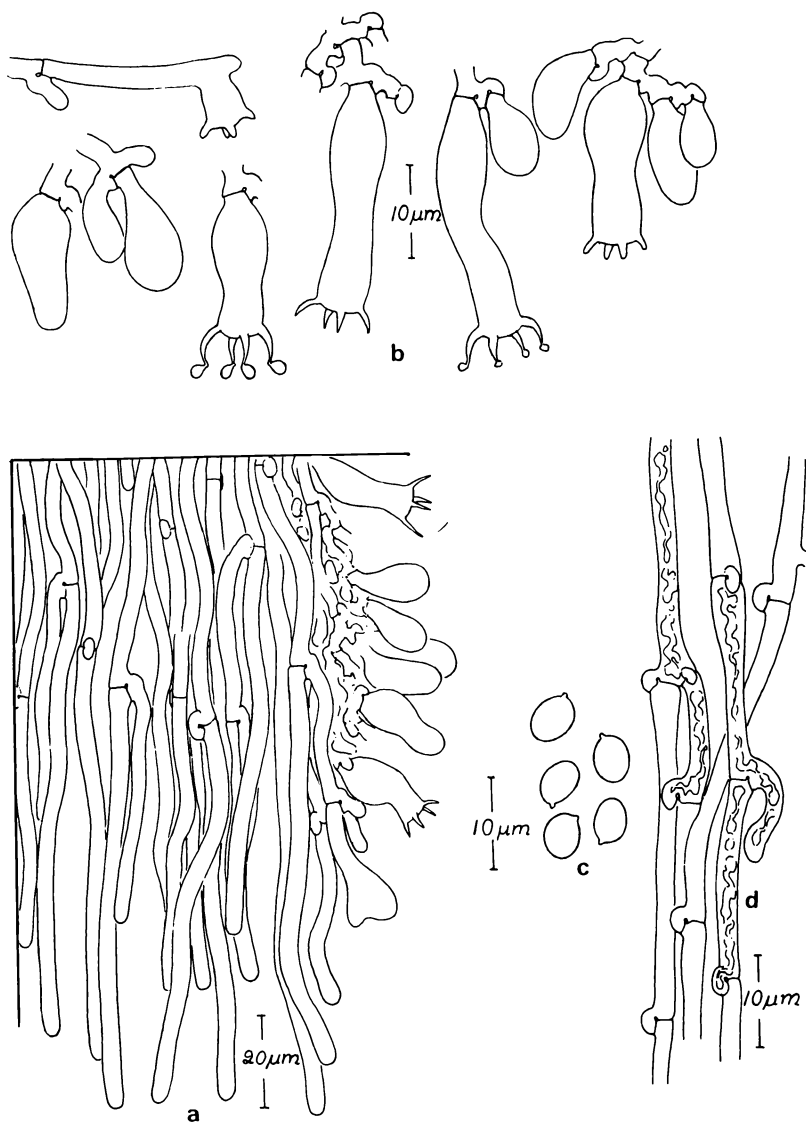


Fig. 670. *Sistotrema alboluteum* a) section through the dissepiment b) basidia  
c) spores d) hyphae with oily content. — Coll. Ryvarden & Johansen 17331.

15. Spores smaller ..... 16
16. Spores amygdaliform,  $9 \times 5 \mu\text{m}$ , basidia with 4,  
rarely 2-3 sterigmata ..... 10. **S. intermedium**
16. Spores ellipsoid, basidia with 2 or more sterigmata ..... 17
17. Basidia with 2, rarely 3(-4) sterigmata, spores  $8-10 \times 5 \mu\text{m}$ , not known  
from N.Europe and not described here see fig. 673 ..... **S. eximum**
17. Basidia with 6, rarely 4 sterigmata,  
spores  $9-10 \times 4-4.5 \mu\text{m}$ ..... 26. **Sistotrema sp.** K.-H. Larsson
18. Spores tetrahedral,  $4.5-5 \times 3-4.5 \mu\text{m}$  ..... 21. **S.subtrigonospermum**
18. Spores shaped otherwise ..... 19
19. Spores thick-walled, distinctly cyanophilous see ..... **Sistotremella**
19. Spores thin-walled, acyanophilous ..... 20
20. Hyphae cyanophilous, basal ones pigmented light brown,  
spores  $5-5.5 \times 2.5 \mu\text{m}$ . ..... 9. **S. heteronemum**
20. Hyphae not cyanophilous, basal ones hyaline ..... 21
21. Hymenium grandinioid ..... 22
21. Hymenium smooth ..... 23
22. Spores  $4-4.5 \times 2-2.5 \mu\text{m}$  ..... 3. **S.brinkmannii**
22. Spores  $5.5-8 \times 3-4 \mu\text{m}$  ..... 29. **Sistotrema sp.** Ryv. 15372
23. Spores up to  $2 \mu\text{m}$  wide ..... 24
23. Spores  $2 \mu\text{m}$  or wider ..... 25
24. Spores  $5-6 \times 1.5-2 \mu\text{m}$  ..... 12. **S.oblongisporum**
24. Spores  $3-4 \times 1-1.5 \mu\text{m}$  ..... 23. **Sistotrema sp.** B.&J.Eriksson 4452
25. Basidia with 4 sterigmata ..... 22. **Sistotrema sp.** Blomdahl 565
25. Basidia with 5-8 sterigmata ..... 26
26. Spores  $6.5 \mu\text{m}$  or longer ..... 27
26. Spores up to  $6.5 \mu\text{m}$  long ..... 28
27. Fruitbody totally adnate ..... 28. **Sistotrema sp.** Romell 3963
27. Fruitbody athelioid and soft,  
not known from N. Europe ..... 19. **S. suballantosporum**
28. Basidia  $8-10 \times 6-7 \mu\text{m}$ ..... 24. **Sistotrema sp.** Eriksson 2422
28. Basidia  $15 \mu\text{m}$  or longer ..... 29
29. Spores ovoid-subglobose  $4-5, 5 \times 3-3.5 \mu\text{m}$  ..... 7. **S. diademiferum**
29. Spores differently shaped ..... 30
30. Hymenium loose, porulose to fibrillose, often on mosses, ferns and or-  
ganic debris ..... 13. **S. octosporum**
30. Hymenium continuous, more or less athelioid, only known from  
wood ..... 25. **Sistotrema sp.** Hauerslev 3035

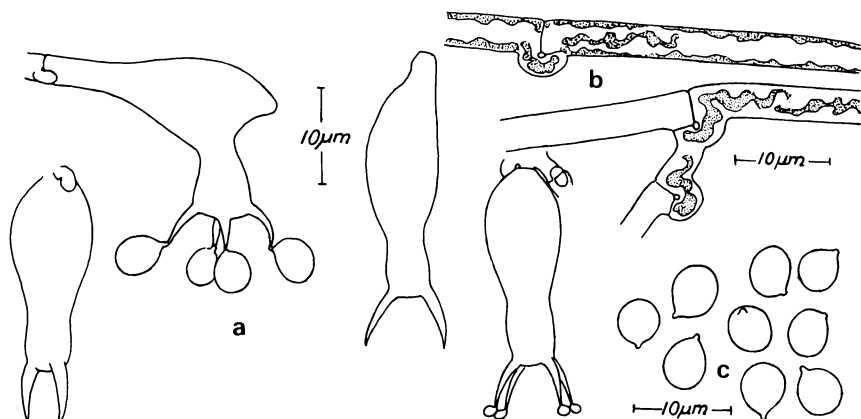


Fig. 671. *Sistotrema alboluteum*. a) basidia b) hyphae c) spores. — Coll. Hjortstam 12059.

**1. *Sistotrema alboluteum*** (Bourd. & Galz.) Bond. & Sing. Fig. 670-72  
Ann.Mycol. 39 p. 47, 1941. — *Poria albolutea* Bourd. & Galz., Bull. Soc.  
Mycol. France 41 p. 217, 1925. — *Trechispora onusta* Karst. p.p., Hedw. 29  
p. 147, 1890; Krit. Öfvers. Finl. Basidsv., tillägg II p. 25, 1893; Rogers, My-  
cologia 36 p. 80, 1944. — *Sistotrema eluctor* Donk, Persoonia 5 p. 102, 1967.

**Fruitbody** resupinate, loosely adnate, effuse, 1-2 mm thick, soft when fresh, brittle when dried, poroid with angular pores, 1-4 per mm, dissepiments thin, in young specimens with fimbriate edges, often lacerate in more developed ones, esp. when growing on vertical substrata, in the beginning cream-coloured but turning yellow or vitellinous; subiculum very thin and fragile, in the youngest stage arachnoid; margin similar, not esp. differentiated; thin, rhizomorphic strands sometimes present.

**Hyphal system** monomitic; hyphae 2-8  $\mu$ m wide, thin-walled, with oily contents as drops or irregular bodies, straight and sparsely branched in the subiculum and the inner part of the dissepiments, densely branched in the subhymenium.

**Cystidia** none.

**Basidia** 20-30 x 7-10  $\mu$ m, urniform, in the young stage globose — ovoid — obovoid, with 2-4 sterigmata and a basal clamp.

**Spores** globose, with thin or slightly thickened walls, 4.5 -6  $\mu$ m in diam.

**Habitat and distribution.** On soil, much decayed wood and other kinds of debris, mainly in deciduous forests. Rare species, collected several times in Sweden, from Småland in the south to Dalsland and Uppland in the north. Some few specimens seen from S. Norway and S. Finland. One specimen from Kuusamo in N. Finland deviates in the shape of the spores, which are not fully globose but rather ellipsoid-ovoid, but agrees well in other respects (fig. 670).

**Remarks.** Characteristic species, easily recognized by its yellow, fragile, poroid fruitbody with smooth, globose spores with slightly thickened walls. In the herbarium material both hyphae and basidia are often more or less collapsed. In the few specimens in which we have been able to count the sterigmata accurately, they have been 2 or 4, never 6. Bourdot & Galzin don't report the number while Rogers states «more than 4». The nomenclature is complicated and controversial. The common opinion nowadays is that *Trechispora onusta* Karst. is a synonym of *Poria candidissima* (Schw.) Cke. The fact is that Karsten described a fungus with poroid hymenium and globose, echinulate («aculeatae») spores, and when Rogers in the New York herbarium found a duplicate from Karsten in which these spore characteristics were found, the matter seemed to be definitely solved. A study of the material in Helsinki gives a different impression. There is in this herbarium a specimen which apparently is a lectotype (here called specimen A). Its label fits the protologue, and the material is a poroid fungus, the colour of which fits Karsten's word «vitellinous» very well. Eriksson in 1952 had already marked this specimen as «typus». Bourdot & Galzin, who got a duplicate, published the species under the name *Poria onusta* (Karst.) Sacc., and described it as having smooth, round spores. L. Romell used the name in the same way in his herbarium (now in S) and so did Rogers (1944). It was at that time accepted that *Poria onustas* sensu. Bourd. & Galz. was really Karsten's species, but that he was mistaken as to the spores as he reported them as echinulate. There is, however, a second specimen in Helsinki, which judging from the label is a duplicate of spec. A. It is labelled «Mla, in ligno Salic. Capr. 22 Oct. 1886» in Karsten's hand (spec. B). The material is very much fragmented, but among the scraps of much decayed, deciduous wood there are pieces of fungal material. Most of it is *Amphinema byssoides*. There are also poroid ochre-yellow pieces, which are *Poria onusta* s. Bourd. & Galz. but there are in addition still smaller fragments of a whitish fungus with echinulate spores. It could be *Trechispora farinacea* s.lato. It seems thus clear that *Trechispora onusta* is a mixture of at least 4 species. Donk accepted an opinion by Lowe and therefore published a new name, *Sistotrema eluctor* for *Poria onusta*. After having studied *Poria albolutea* Bourd. & Galz. we find that this species also must be taken into consideration as the description of it in no way differs from our species. Especially important must be the size and shape of the spores. Bourdot & Galzin added two varieties of it, var. *stenospora* which we consider synonymous with *Sistotrema dennisii*, and var. *microspora* which comprised two taxa: a) *liospora*, which agrees with *albopallescens* (here included in *S. muscicola*); and b) *xystrospora*, which is *S. muscicola*. Bourdot's observation of echinulate spores is evidently a mistake. There is in Bourdot's herbarium also a specimen labelled *P. albolutea* var. *media* («Sur humus, dans des troncs de rats; Buisson, 26. XII 1913, Bourdot

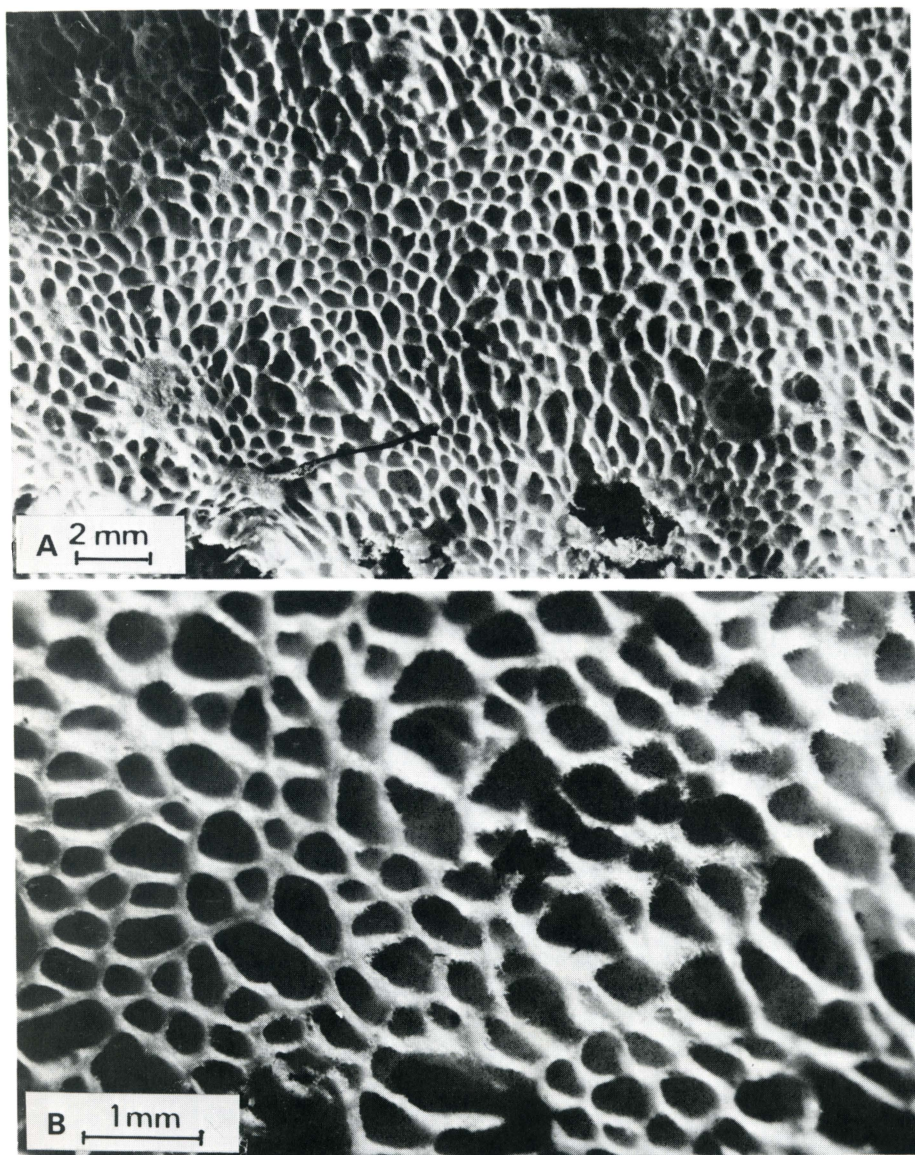


Fig. 672. *Sistotrema alboluteum*. — Coll. Hjortstam 12059. Photo T. Hallingbäck.

12393, Galzin 15018», PC), lectotypus of *Poria albolutea* Bourd. & Galz., designated here. There is no var. *media* described by Bourdot & Galzin and it seems probable that the authors by var. *media* meant a medial or «normal» *albolutea*. It agrees with the description of *P.albolutea* and also with the species here treated. In any case there is nothing preventing its choice as a lectotype of *Poria albolutea*, which is thus an older synonym of *S. eluctor*.

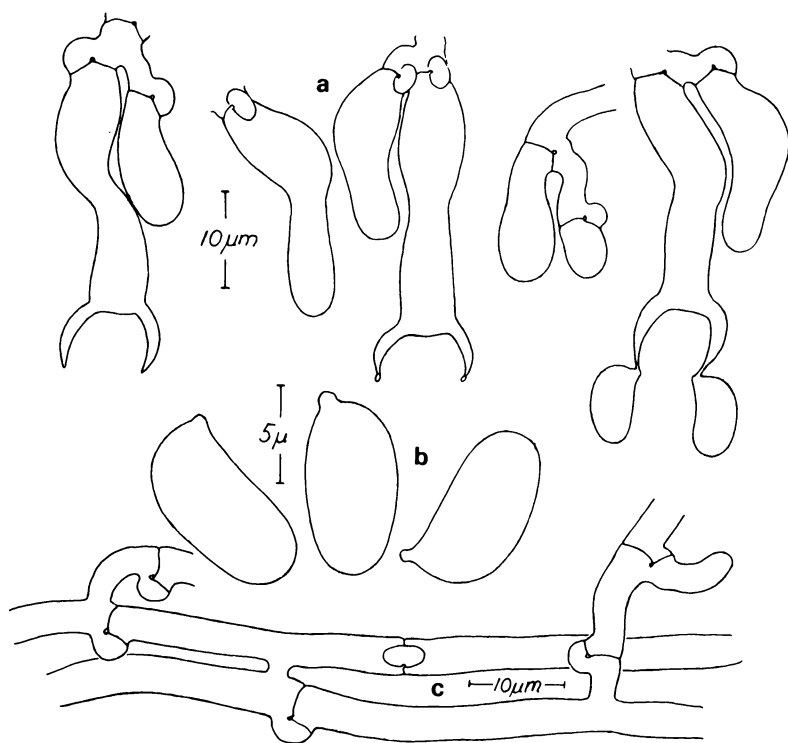


Fig. 673. *Sistotrema eximum*. a) basidia b) spores c) spores. — From the holotype.

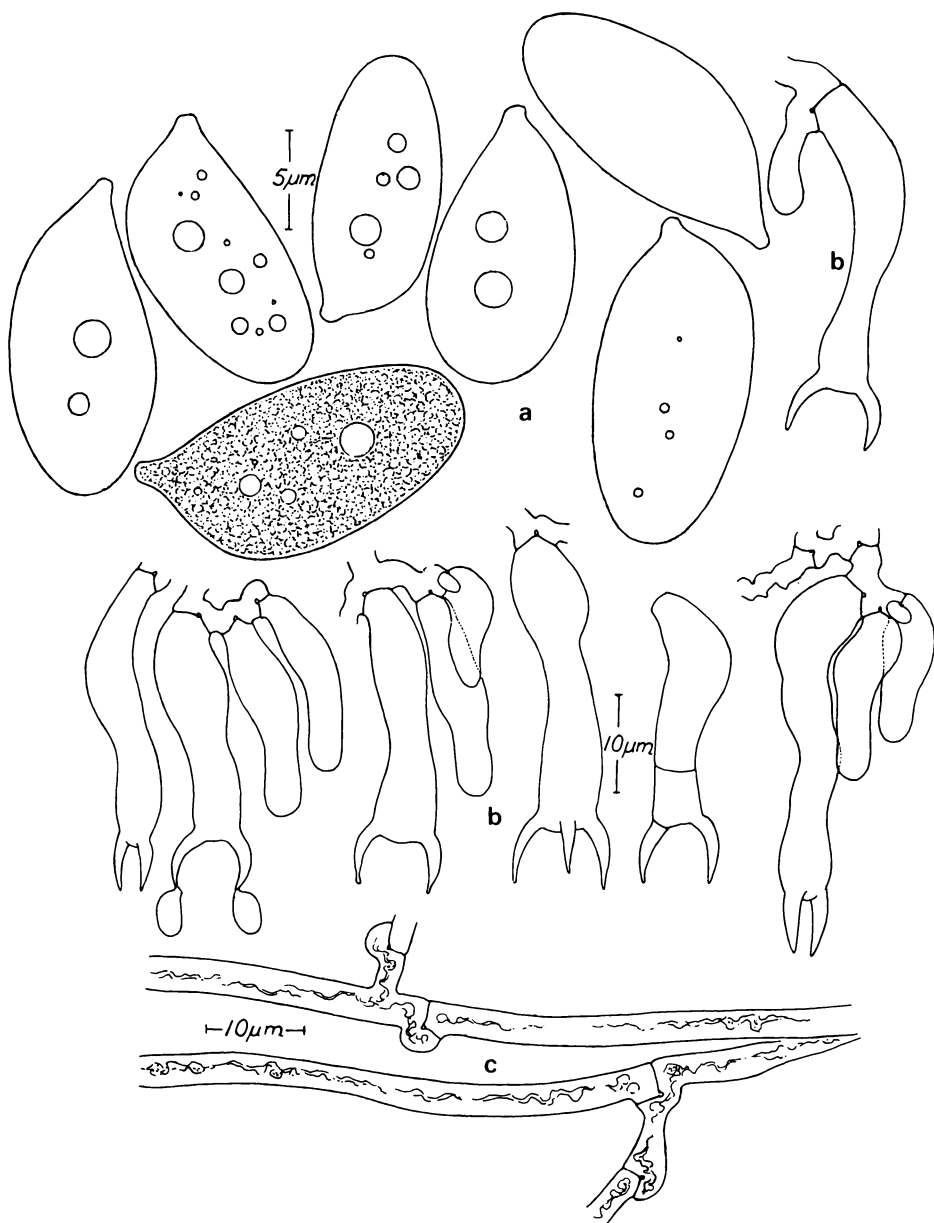


Fig. 674. *Sistotrema autumnale*. a) spores b) basidia c) hyphae with oily content.  
— From the holotype.

**2. Sistotrema autumnale** Ryv. & Solh.

Fig. 674

Mycotaxon 6 p. 378, 1977.

**Fruitbody** resupinate, adnate, to begin with arachnoid to porose or reticulate, then denser, partly even subathelioid, soft and fragile when dried, whitish. ca. 0.1—0.2 mm thick; hymenium smooth; no differentiated margin.

**Hyphal system** monomitic; hyphae with clamps, 3-4(-5)  $\mu\text{m}$  wide, thin-walled, with rich contents of oil-drops when fresh and irregular oil-bodies in the dry material.

**Cystidia** none.

**Basidia** narrowly urniform to subcylindrical, 25-50 x 5-7  $\mu\text{m}$ , with 2 (very rarely 4) sterigmata and with a basal clamp.

**Spores** 10-15(-18) x 5.5-8  $\mu\text{m}$ , ellipsoid to subfusiform, tapering towards a marked apiculus, thin-walled, with several oil-drops in the granular protoplasm.

**Habitat.** On decayed wood of *Alnus*, *Betula*, *Salix*, and *Sorbus*, both in continental and coastal climates, September — October.

**Distribution.** Hitherto collected only in Norway, from Akershus in the S. to Nordland in the N., both inland and on the coast.

**Remarks.** The species is easily recognized thanks to its very large spores and the bisterigmatic basidia. It is close to the North-American *S. eximum* (Jacks.) Ryv. & Solh., which also has predominantly bisterigmatic basidia but with smaller (8-10  $\mu\text{m}$  long) spores with a less tapering base. It is also close to *S. intermedium*, but in this species the number of sterigmata is 4, and the spores are smaller and somewhat amygdaliform, 6-9 x 4-5  $\mu\text{m}$ .

**3. Sistotrema brinkmannii** (Bres.) John Erikss.,

Fig. 675-79

K. Fysiogr. Sällsk. Lund Förh. 18(8) p. 17, 1948. — *Odontia brinkmannii* Bres., Ann. Mycol. 1 p. 88, 1903. — *Trechispora brinkmannii* (Bres.) Rogers & Jacks., Farlowia 1 p. 288, 1943.

**Fruitbody** resupinate, effuse, small to moderate in size, soft, when dried very brittle, in the living state white, in the herbarium white-cream-coloured-pale ochraceous; subiculum starting as a delicate, porulose layer, under the lens finely fibrillose; hymenium becoming more or less grandinoid with sparse to dense aculei, rounded-conical-subcylindrical, usually less than 1 mm long; margin not especially differentiated.

**Hyphal system** monomitic, hyphae with clamps, 3-6  $\mu\text{m}$  wide, those of the subiculum loosely interwoven in an open texture, in the subhymenium denser and more richly branched, some straight basal hyphae with somewhat thickened walls, other hyphae thin-walled; protoplasm rich in oily inclusions as drops (in the living state) or irregular strands; crystalline matter frequent, esp. abundant in old fruitbodies, which finally get a chalky consistency.



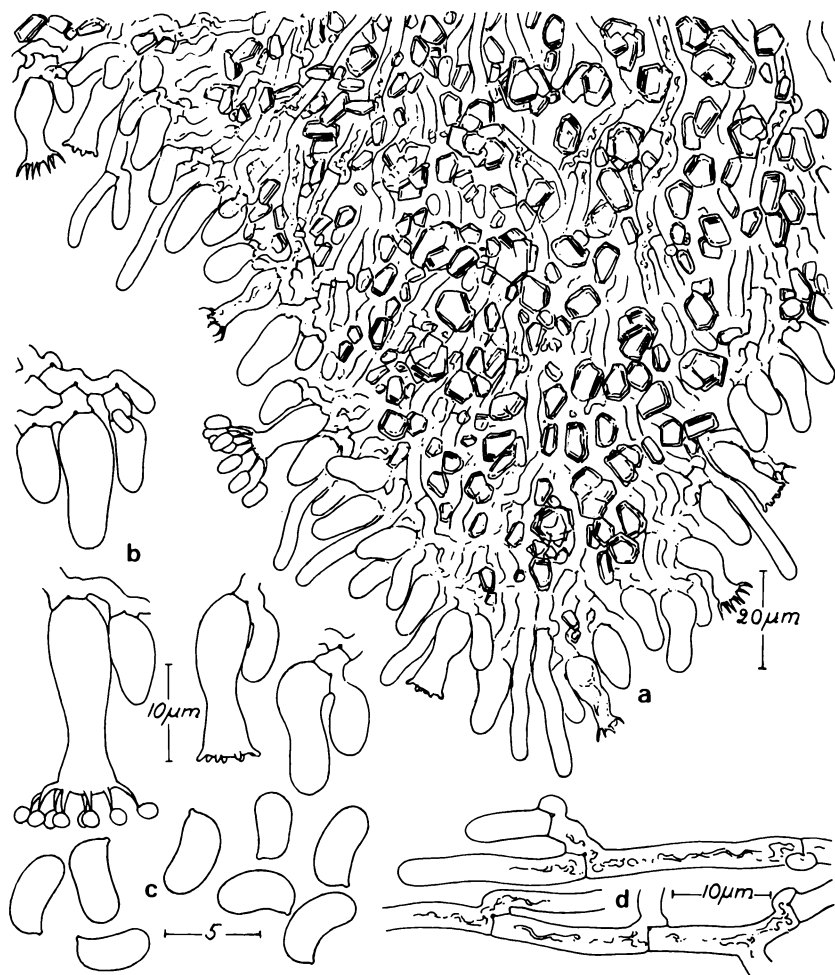


Fig. 675. *Sistotrema brinkmannii*. a) section through part of fruitbody b) basidia c) spores d) hyphae. — Coll. Lundell 963.

**Basidia** 12-20(-24) x 3-5(-7)  $\mu\text{m}$ , at first ovoid, then urniform, with 6-8 sterigmata (in single basidia rarely 4) and with a basal clamp.

**Spores** (3.5-)4-4.5(-5.5) x 2-2.2(-2.5)  $\mu\text{m}$ , smooth, thin-walled, suballantoid with the abaxial side always convex and the adaxial side more or less concave, non-amyloid, non-cyanophilous, sometimes with 1 or 2 oil-drops.

**Habitat.** Mostly on much decayed wood, but may be found on all kinds of debris as well as on peat, soil, old paper, dead fruitbodies of Aphyllophorales a.s.o. Develops rapidly during humid periods and may be found from early spring to late autumn.

**Distribution.** Very frequent, both in deciduous and coniferous forests, in gardens etc. in all parts of N. Europe but seems to be more frequent southwards.

**Remarks.** Bresadola, when describing the species, placed it in *Odontia* and as there is authentic material left, there is so far no trouble in finding out the nature of the species. The difficulty of making determinations within this very complicated species has resulted in a considerable widening of the species concept of *S. brinkmannii* (e.g. Biggs 1937, Rogers 1944). Biggs, in her classical, very well performed study, used the name *S. coronilla* v. Höhn (v. Höhn. & Litsch., Ann. mycol. 4 p. 291, 1906) for this widened *S. brinkmannii*. By means of compatibility tests she divided it into four groups and she also made a simple description of the fruitbodies, basidia and spores of each group, and it is therefore possible to use her results for taxonomical purposes also. From her drawings (fig. 26) it can be stated that group IV is identical with *S. diademiferum* and that group I cannot be included in *S. brinkmannii*. This group is described as having ellipsoid, not curved spores, which is also confirmed by us by an investigation of the preserved material (in TRTC). Single spores may be slightly curved but the majority of them are not and the difference from *S. brinkmannii* is clear. In the plentiful Nordic material of this species 4 specimens are found which agree well with Biggs's group I. One group only, gr. II, fits the type of *S. brinkmannii* as to macro- and micromorphological characteristics (odontioid-grandinioid hymenium, size and shape of the spores, conspicuous crystalline hyphal encrustation). It seems natural to include this homothallic form in the species concept of *S. brinkmannii*. However, in a series of compatibility tests performed for this flora-project, 8 fruitbodies (collected in Scandinavia from Jutland to Torne Lappmark in the North) were found to match *S. brinkmannii* but to be heterothallic. We find it therefore necessary to include both homo- and heterothallic forms in this species but require the concordance of the following morphological criteria: fruitbody grandinioid-odontioid at least in the mature stage, spores ca. 4—5 x 2  $\mu\text{m}$ , adaxially clearly concave (reniform), hyphae forming a loose texture, at least

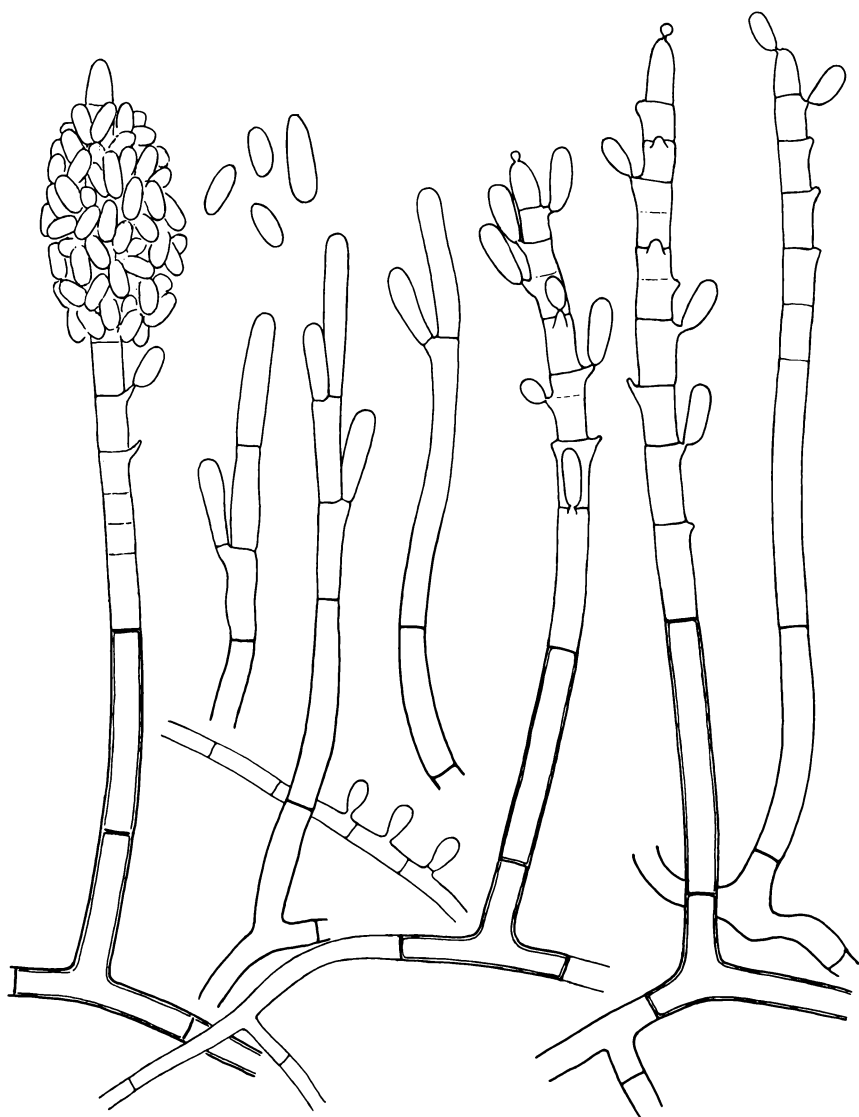


Fig. 676. *Zakatoshia hirschiopori*. Conidiophores and conidia. — Coll. Hallenberg 4459.

in the young stage. The name *S. coronilla*, as used by Biggs, has long been doubtful. v. Höhnelt described *Corticium coronilla* with not only urniform basidia but also with a strange kind of «sporulating cystidia» or «auriculariaceous basidia», which, judging from the illustration, gives a clear impression of being a parasitic imperfect fungus. The problem was solved in the autumn of 1981 when N. Hallenberg, during a collecting trip in Austria for this flora-project, made a collection of a *Sistotrema*, infected by such a fungus. Material sent to W. Gams was determined by him as *Zakatoshia hirschiopori* Sutton. It is not possible to decide from the description which *Sistotrema* sp. v. Höhnelt had in his material, but judging from the reported shape of the spores it was not *S. brinkmannii*.

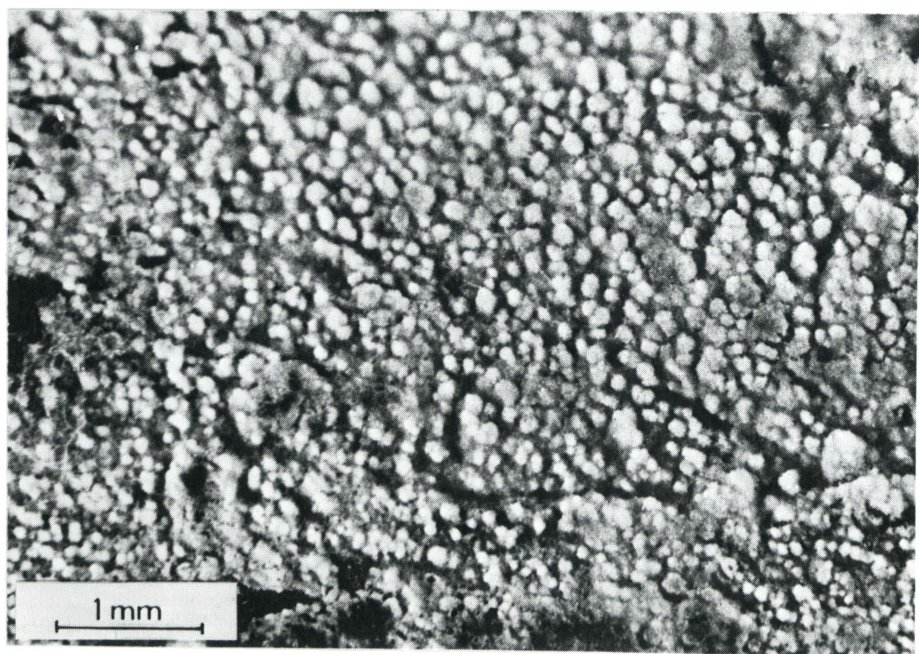


Fig. 677. *Sistotrema brinkmannii*, living fruitbody. — Coll. and photo T. Hallingbäck.



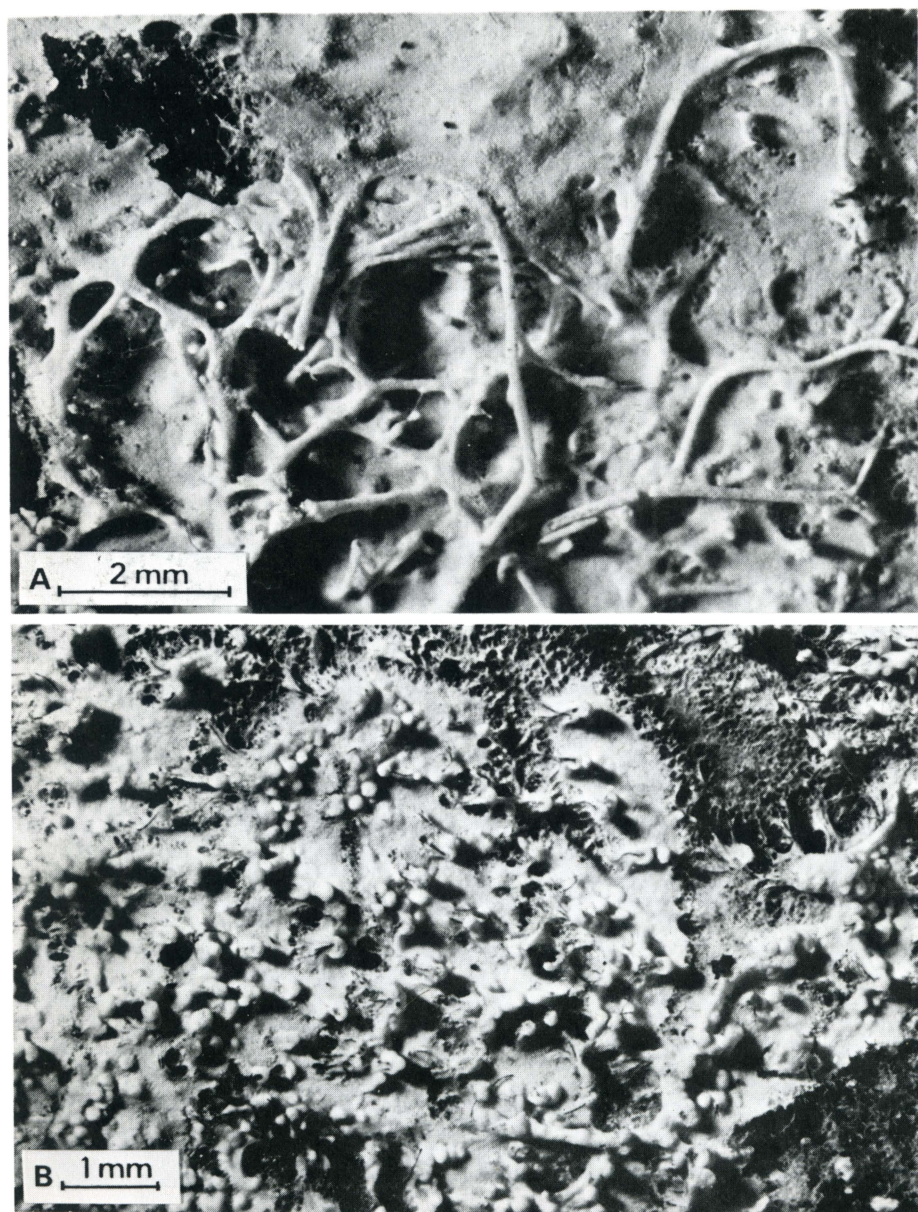


Fig. 678. *Sistotrema brinkmannii*. — Coll. Hjortstam 1967-03-18. Photo T. Hallingbäck.

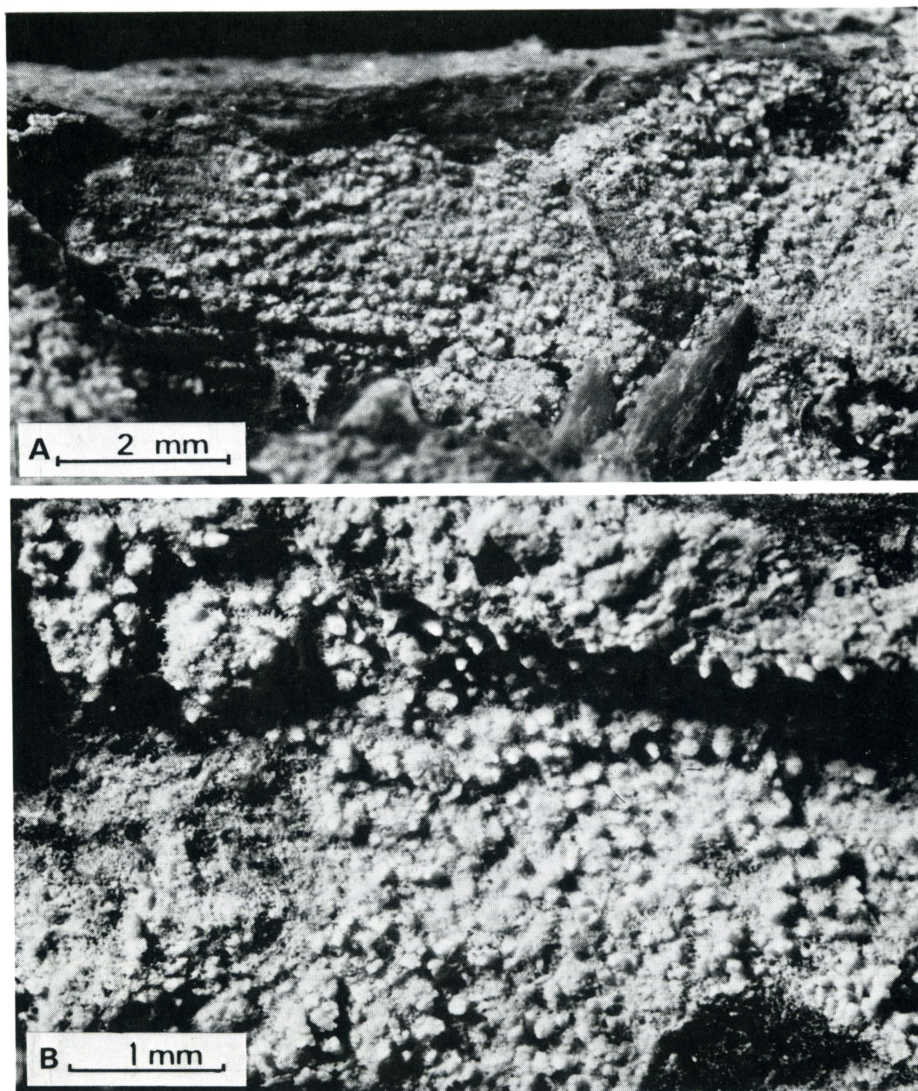


Fig. 679. *Sistotrema brinkmannii*. From the lectotype. Photo T. Hallingbäck.



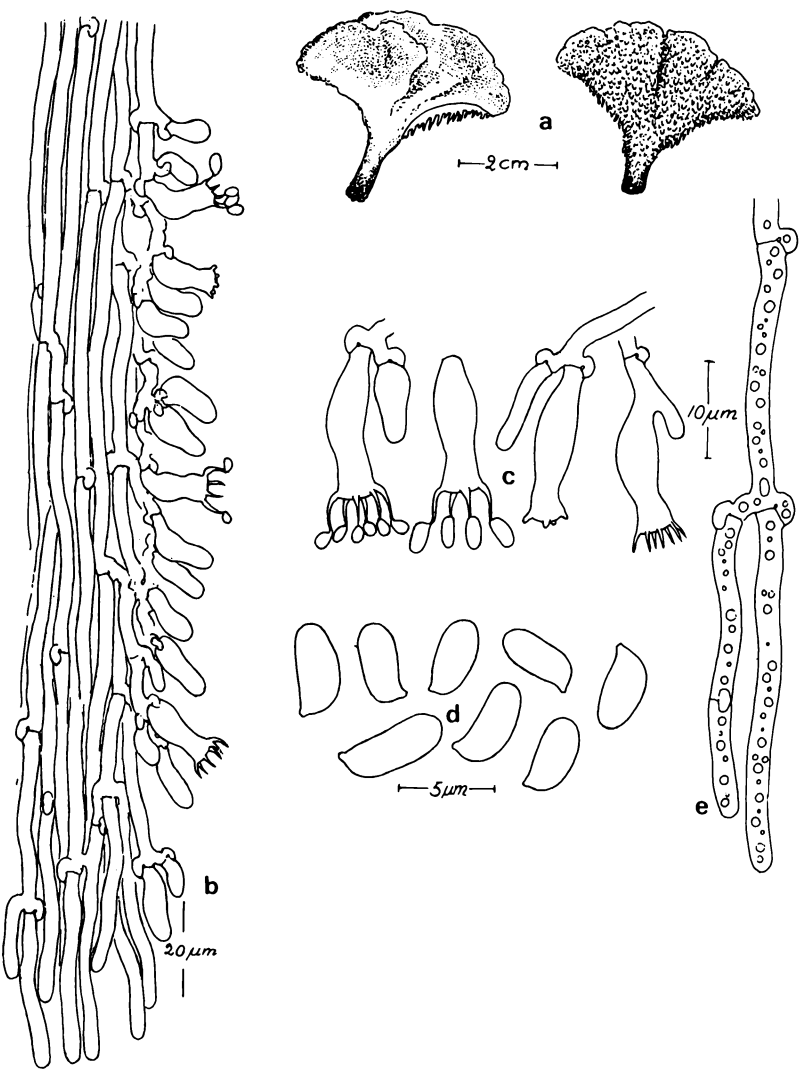


Fig. 680. *Sistotrema confluens*. – Coll. Jeppson 1699. Photo T. Hallingbäck.

**4. Sistotrema confluens Fr.,**

Fig. 680-81

Syst. mycol. 1 p. 426, 1821.

**Fruitbody** generally pileate but may sometimes be resupinate on underside of leaves etc., mostly 1-2 cm wide, more or less flabellate and often radially incised, with a lateral, seldom central, tapering stipe with blackish base; pilei as a rule concrescent with several stipes; the whole fungus in the living state white or pale cream-coloured, but with age or when bruised turning yellow or brownish, soft in the living state, young fruitbodies very brittle when dried, old ones more tough; upperside of the fruitbody smooth or irregularly-concentrically wavy or wrinkled, under the lens appressed tomentose; hymenophore varying from reticulate pores or flattened, irpicoid plates, sometimes lamelloid, to 1-2 mm long cylindrical spines; smell distinct and characteristic, described by some people as vanilla, by others as «disagreeable».

**Hyphal system** monomitic; hyphae thin-walled, 2-3  $\mu\text{m}$  wide, with many oil-drops; hyphal inflations (to 5 or 7  $\mu\text{m}$ ) sometimes present; hyphal direction mainly parallel in the trama of the stipe, pileus and hymenophore.

**Cystidia** none.

**Basidia** when young subglobose, when mature urniform, (12-)-14 - 18(-22) x 3.5 - 4.5(-6)  $\mu\text{m}$  with 6-8 sterigmata (a few with 4 sterigmata seen) and basal clamp.

**Spores** 4.5-6 x 2-2.5  $\mu\text{m}$ , narrowly ellipsoid — subballantoid, smooth, thin-walled.

**Habitat.** On the ground among mosses and fallen leaves and other litter in deciduous or coniferous forests, less often in open fields.

**Distribution.** Found in S. Scandinavia to the Swedish province of Dalarna and S. Finland in the north, mostly rare but locally, especially on fertile soil more frequent, e.g. in Uppland (Sweden).

**Remarks.** Characteristic species but under the microscope very close to e.g. *S. muscicola*, *alboluteum*, and *dennisii*. The former species is reported to have the same smell of vanilla in the living state (T. Nathorst-Windahl in Lund. & Nannf. Fung. exs. suec. n. 1415 a). Fries described it as «inodorum». The smell of vanilla is only perceptible from fresh, living material.



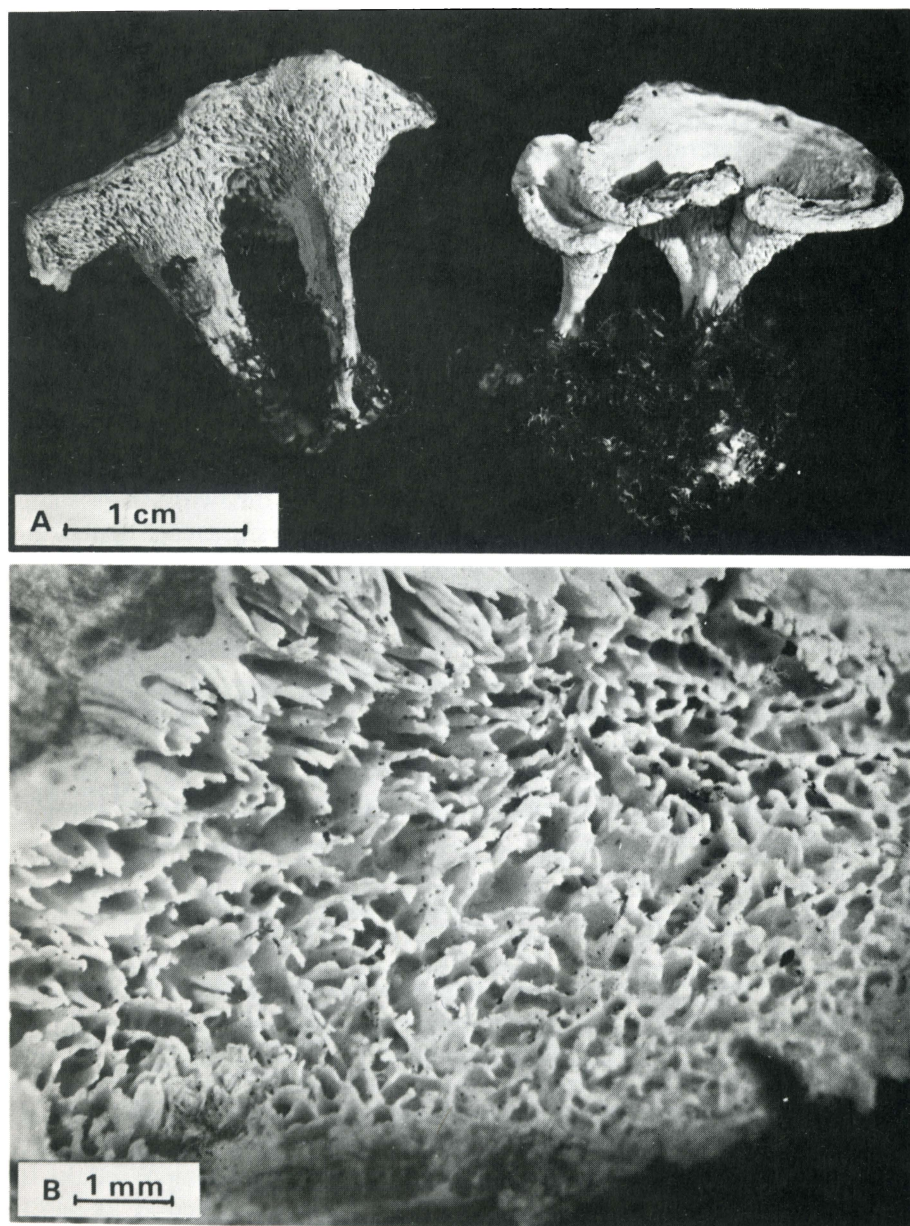


Fig. 681. *Sistotrema confluens*. a) fruitbody b) section through hymenium on a spine c) basidia d) spores e) hyphae with oily drops. — Coll. Jeppson 1974-10-04.

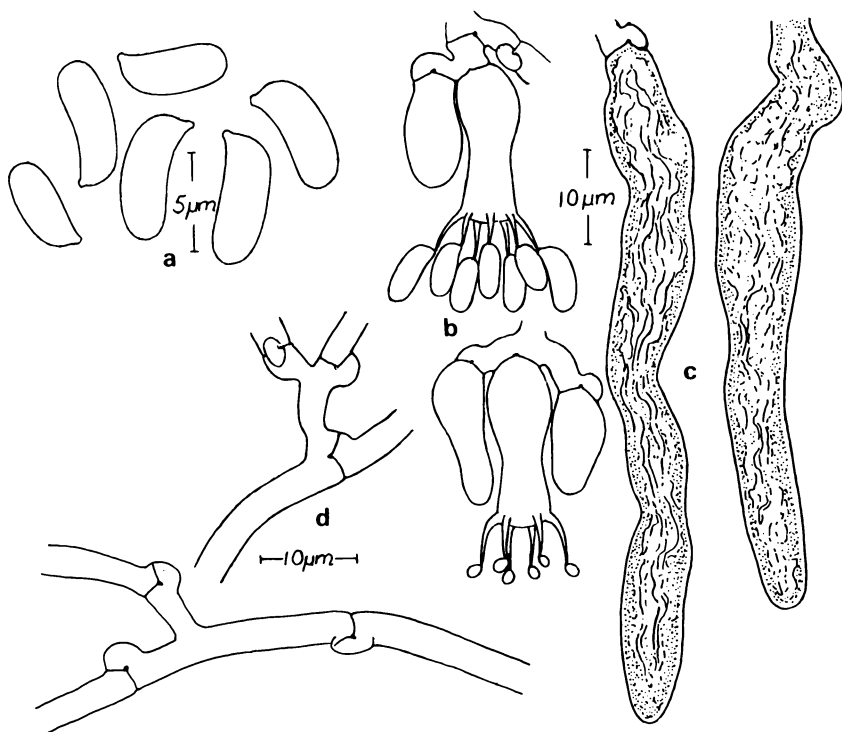


Fig. 682. *Sistotrema coroniferum*. a) spores b) basidia c) gloeocystidia d) hyphae.  
— From the lectotype.

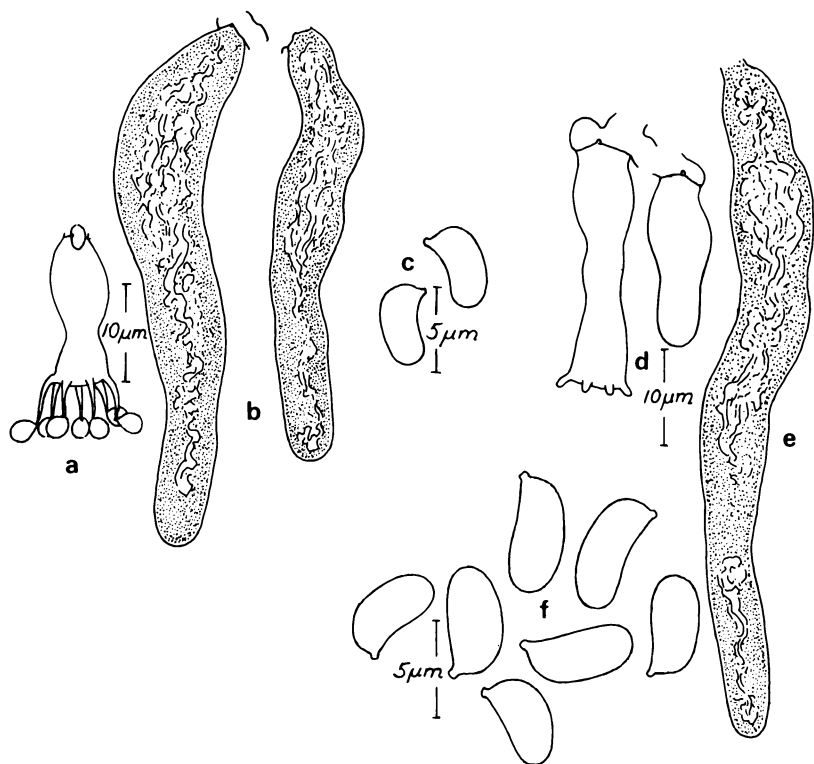


Fig. 683. *Sistotrema coroniferum*. a, d) basidia b, e) cystidia c, f) spores. — Coll. a-c) Hallenberg 2753, d-f) Eriksson 10099.

**5. *Sistotrema coroniferum*** (v. Höhn. & Litsch.) Donk, Fig. 682-83  
 Fungus 26 p. 4, 1956. — *Gloeocystidium coroniferum* v. Höhn & Litsch.,  
 Sitz. — Ber. Akad. Wien, Math.-nat. Kl. 116 p. 825, 1907

Holotypus: Austria, Wiener Wald, Bartberg, Pressbaum. F.v. Höhnelt (FH).

**Fruitbody** resupinate, smooth, loosely adnate and as a rule detachable in small pieces or even subathelioid, mostly rather thin (50–100  $\mu\text{m}$ ), soft when fresh, brittle when dried, white and usually remaining so also in the herbarium; no differentiated margin; no rhizomorphic strands.

**Hyphal system** monomitic; all hyphae with clamps, subhymenial ones thin-walled, short-celled and richly branched, 3–4  $\mu\text{m}$  wide, basal hyphae wider (4–6  $\mu\text{m}$ ), straight, with sparse branches, with thin or slightly thickened walls, in some specimens with ampullate inflations near septa.

**Gloeocystidia** 60–100 x 6–10  $\mu\text{m}$ , thin-walled, flexuose, often constricted, obtuse, enclosed or somewhat projecting (20–40  $\mu\text{m}$ ), varying in number, often few and irregularly distributed in the hymenium, difficult to find, areas of hymenium with groups of several cystidia may alternate with spaces with few or none; contents grainy or oily, hyaline or yellowish, in the dry material forming irregular strings of contracted oil-rich protoplasm.

**Basidia** urniform, 15–20(–25)  $\mu\text{m}$  long, 4–5  $\mu\text{m}$  at the narrowest, 6–8  $\mu\text{m}$  in the basal part, with usually 6, often 7, and rarely 4 or 8 sterigmata; a basal clamp present.

**Spores** (4.5–)5–6(–7) x 2–2.5  $\mu\text{m}$ , subballantoid, adaxial side somewhat concave, but may be straight in some spores, thinwalled, smooth.

**Habitat.** On much decayed, moist wood of conifers (esp. *Picea*) but also of deciduous trees (e.g. *Fagus*, *Betula*, *Populus*, and *Salix*).

**Distribution.** Not common but found in all parts of N. Europe, from Denmark to N. Sweden (Muddus Nat. Park) and N. Finland (Pisavaara Nat. Park) but not yet found in Norway. Evidently widespread in the N. Hemisphere.

**Remarks.** The presence of gloeocystidia should make this species easily recognized as there are so far only two other gloeocystidiolate ones. However, the gloeocystidia are often few and in addition often difficult to recognize, esp. in dry material, as they are easily confused with segments of oil-rich hyphae. It differs from *S. resinicystidium* in several respects. The fruitbody is white also in the dry material. It is smooth and brittle, easily detachable, at least in small parts. The hymenium is smooth or nearly so, not densely tuberculate-grandinoid under the lens. The gloeocystidia are colourless or pale yellow with stringy, oily contents. The neck of the basidium is shorter, not prolonged into a tube. The spores are subballantoid, most of them with a clearly concave adaxial side. As a matter of fact *S. coroniferum* and *S. resinicystidium* don't seem to be very closely related, which clearly is the case with *S. coroniferum* and *S. sernanderi*. The only differences between them

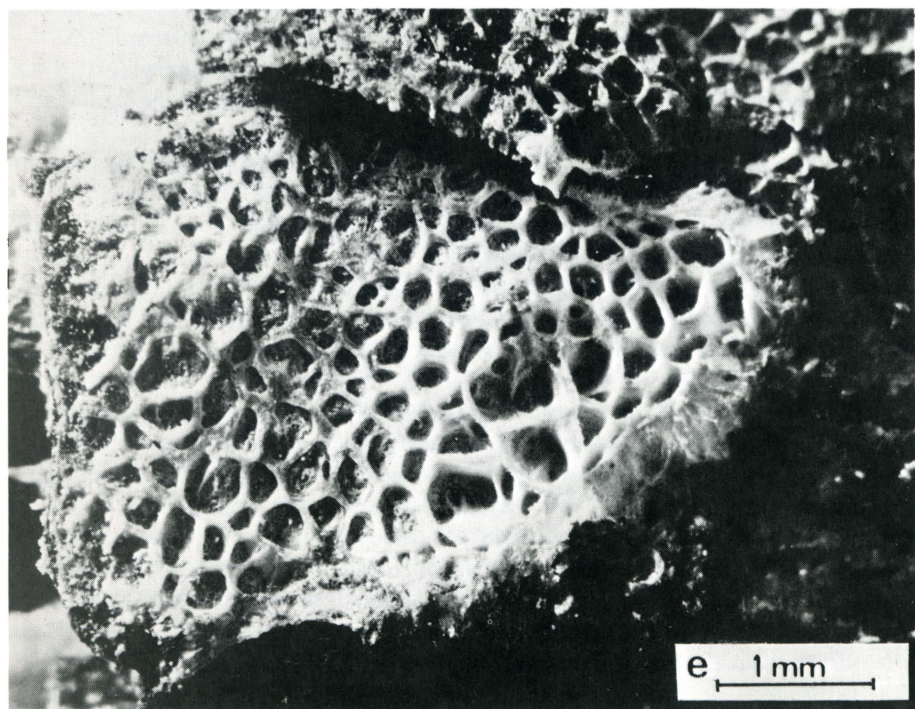
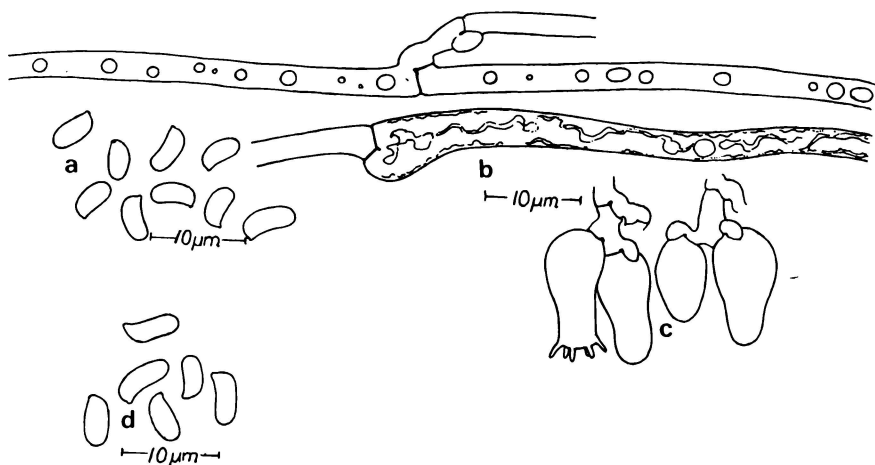


Fig. 684. *Sistotrema dennisi*. a & d) spores b) basidia c) basidia e) fruitbody. — Coll. a-c, e) Lundell 2046, d) from the holotype.

are the number of sterigmata (4 in the latter) and the width of the basidia. The material of *S. coroniferum* studied varies in some respects and the limit towards *S. sernanderi* may sometimes seem doubtful. *Sistotrema* sp. Olsson 5777 has as a rule 4 ster. (in a few basidia 1 or 2) and larger, esp. broader spores. In this respect it agrees with *Sistotrema* sp. Blomdahl 565, in which, however, no cystidia are found. Spec. Hallenberg 2753 has shorter, more curved spores, more like those of *S. brinkmannii*. The type material in FH is small but in good condition. Its label fits the protologue except for the year of collecting, which is 1906 and in the protologue 1902. It is probably a printing error. The specimen is no doubt a lectotype.

#### 6. *Sistotrema dennisii* Malencon,

Fig. 684

Kew Bull. 31 p. 490, 1976. — *Poria albolutea* Bourd. & Galz. var. *stenospora* Bourd. & Galz., Hym. de France. (XI, pore's) p. 218, 1925.

**Fruitbody** resupinate, loosely attached, effused but generally small, soft and delicate, brittle when dried, white or cream-coloured where fresh drying to various shades of yellow; hymenophore poroid with rounded to angular pores with thin, more or less lacerate dissepiments, pores regular on horizontal substrate, more or less split and irregular on vertical sides; no particular smell is observed.

**Hyphal system** monomitic; hyphae fibulate, 2–5  $\mu\text{m}$  wide, thin-walled, straight and sparsely branched in the vegetative tissues (subiculum, inner parts of the dissepiments), richly branched and intertwined in the subhymenium. Rich oily inclusions in all hyphal elements.

**Cystidia** none.

**Basidia** 14–20 x 5–7  $\mu\text{m}$  or sometimes longer, urniform, when young ovoid, with normally six (6) sterigmata; with a basal clamp.

**Spores** suballantoid, 4–5.5(–6) x 2–2.25(–2.5)  $\mu\text{m}$ , thin-walled, smooth.

**Habitat and distribution.** Very rare in N. Europe (found once in Denmark, Sjælland, Rørvig by K. Hauerslev and twice in Sweden, Femsjöpar. in Småland by S. Lundell on living bases of *Calluna* and in Kålleröd in Västergötland by T. Nathorst-Windahl on heaped up twigs of spruce and *Calluna*). Like *S. muscicola* it seems to be a humus-fungus which may develop its fruitbodies on any kind of substrate present. The type specimen was collected in a *Pinus pinea*-plantation on needles a.s.o. but also on a fruitbody of *Astraeus hygrometricus*.

**Remarks.** Malencon was of the opinion that *S. dennisii* is different from *Poria albolutea* var. *stenospora* but judging from the restricted material we have seen, we still think they must belong to the same taxon. In any case we have not been able to find any reliable characteristics which can be used for separation.

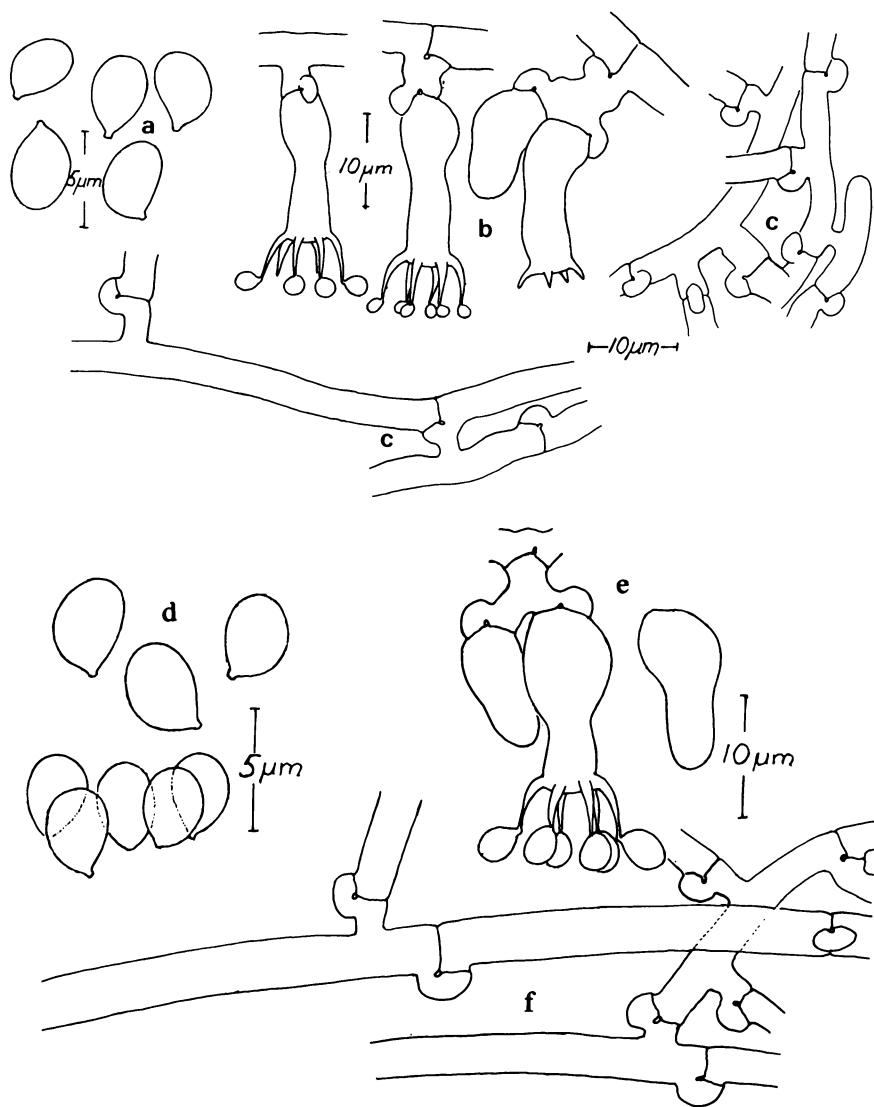


Fig. 685. *Sistotrema diademiferum*. a & d) spores b & e) basidia c & f) hyphae. — Coll. a-c Hallenberg 24650, d-f) Bourdot 7734.



**7. *Sistotrema diademiferum*** (Bourd. & Galz.) Donk, Fig. 685-86  
*Fungus* 26 p. 4, 1956. — *Corticium diademiferum* Bourd. & Galz., — Bull.  
*Soc. Mycol. France* 27 p. 244, 1911.

**Fruitbody** resupinate, effuse, thin, closely adnate, whitish, greyish white or pale yellow when dried, texture loose and in the dry state brittle; young fruitbodies finely porulose under the lens, then more or less continuous; no differentiated margin; no obvious hyphal strands.

**Hyphal system** monomitic; all hyphae with clamps, thin-walled, less filled with oily inclusions than what is normal in the genus; subhymenial ones short-celled, richly branched, mostly 2-3  $\mu\text{m}$  wide, sometimes wider; basal hyphae straight, sparsely branched, 3-4 (-5)  $\mu\text{m}$  wide.

**Cystidia** none.

**Basidia** urniform, 15-21 x 5-7  $\mu\text{m}$ , mostly with 6 sterigmata, sometimes 7, rarely 4 or 8; with a basal clamp.

**Spores** (3.5-)4-5.5(-6) x (2.5-)3-3.5  $\mu\text{m}$ , ovoid — subglobose, smooth, thin-walled.

**Habitat.** On coniferous and deciduous wood and bark, mostly seen on fallen twigs and branches, less often on trunks; in varying biotopes, e.g. *Vaccinium*-conifer forest, herb-mixed conifer forests, herb-rich coniferous and deciduous forests.

**Distribution.** Collected several times in N. Europe, from Denmark to N. Sweden (Muddus Nat.Park), N. Finland (Pisavaara Nat.Park), and to W. Norway (Hordaland). In Sweden hitherto found in the following provinces: Halland, Småland, Västergötland, Dalsland, Uppland, Jämtland, Lule Lappmark. Bourdot & Galzin (1926) reported it from several substrates in France and England. We have seen material from the Carpathian Mts.

**Remarks.** In herb. Bourdot (PC) there are two specimens of *Corticium diademiferum*. One, from 1908, has been destroyed by  $\text{HgCl}_2$ -preparation, but the other: «sur chene, Chateau Charles, Allier, 1904.08.17», is in good condition. Bourdot & Galzin (1911) only reported one locality (jul.aug. ad ramos delapsos *Quercus*, Allier) and the mentioned specimen and the collection mentioned above may well originate from this locality. It is as close to a holotype as possible and we therefore choose it as lectotype. The species is close to *S. octosporum* and differs chiefly in the shape of the spores and in the less oil-rich hyphae. Of the collections from Muddus determined as *S. diademiferum* by Eriksson (1958) only the first one is this species. The two others belong to *Sistotremella*.

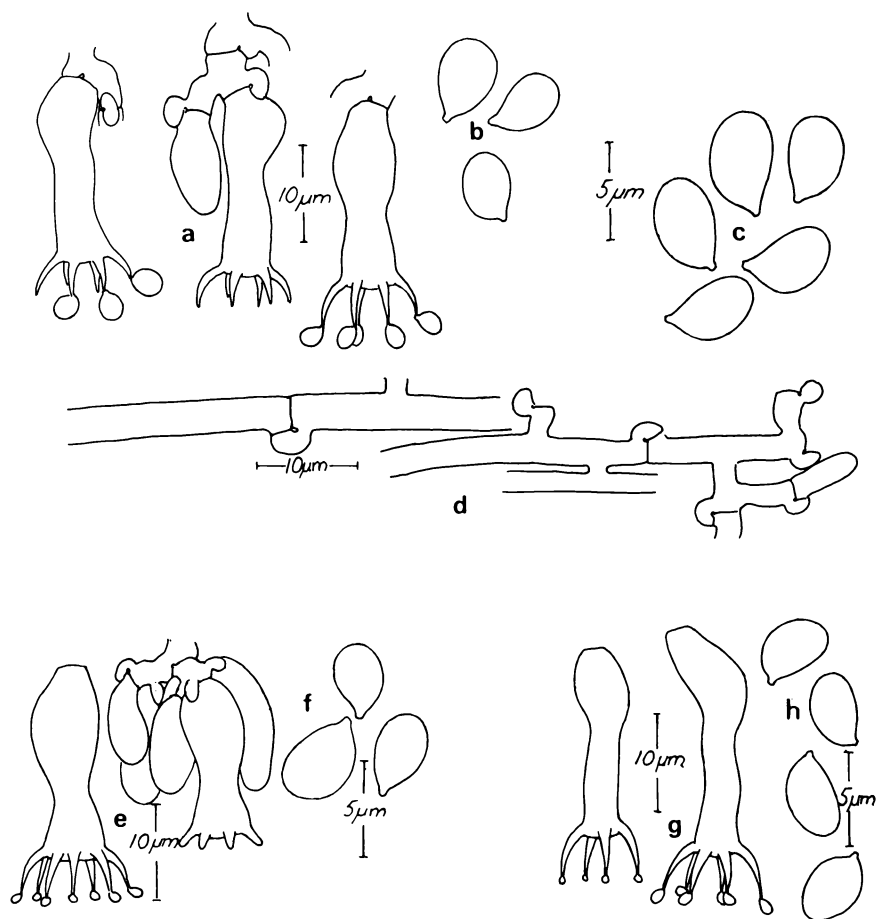


Fig. 686. *Sistotrema diademiferum*. a, e, g) basidia b, c, f, h) spores d) hyphae. — Coll. a, b) Eriksson 6291, c, d) Biggs 661 e, f) Kujala & Eriksson 9429, g, h) Hjortstam 12238.

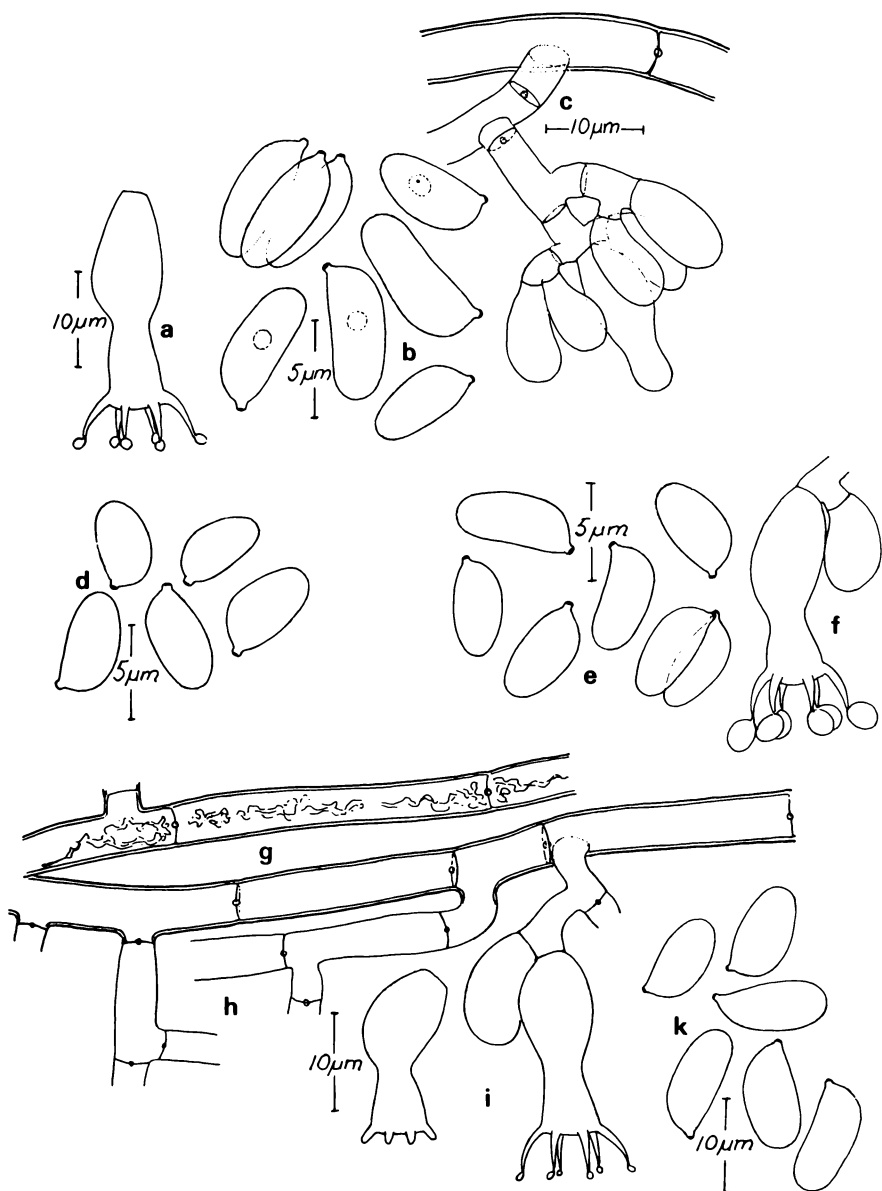


Fig. 687. *Sistotrema efibulatum*. a, f, i) basidia b, d, e, k) spores c) basal and sub-hymenial hyphae g) hyphae with oily contents h) empty basal hyphae. — Coll. a-c) Nilsson & Eriksson 4307, d) Morander & Eriksson 2570, e-f) Nilsson & Eriksson 4286, g-k) from the holotype.

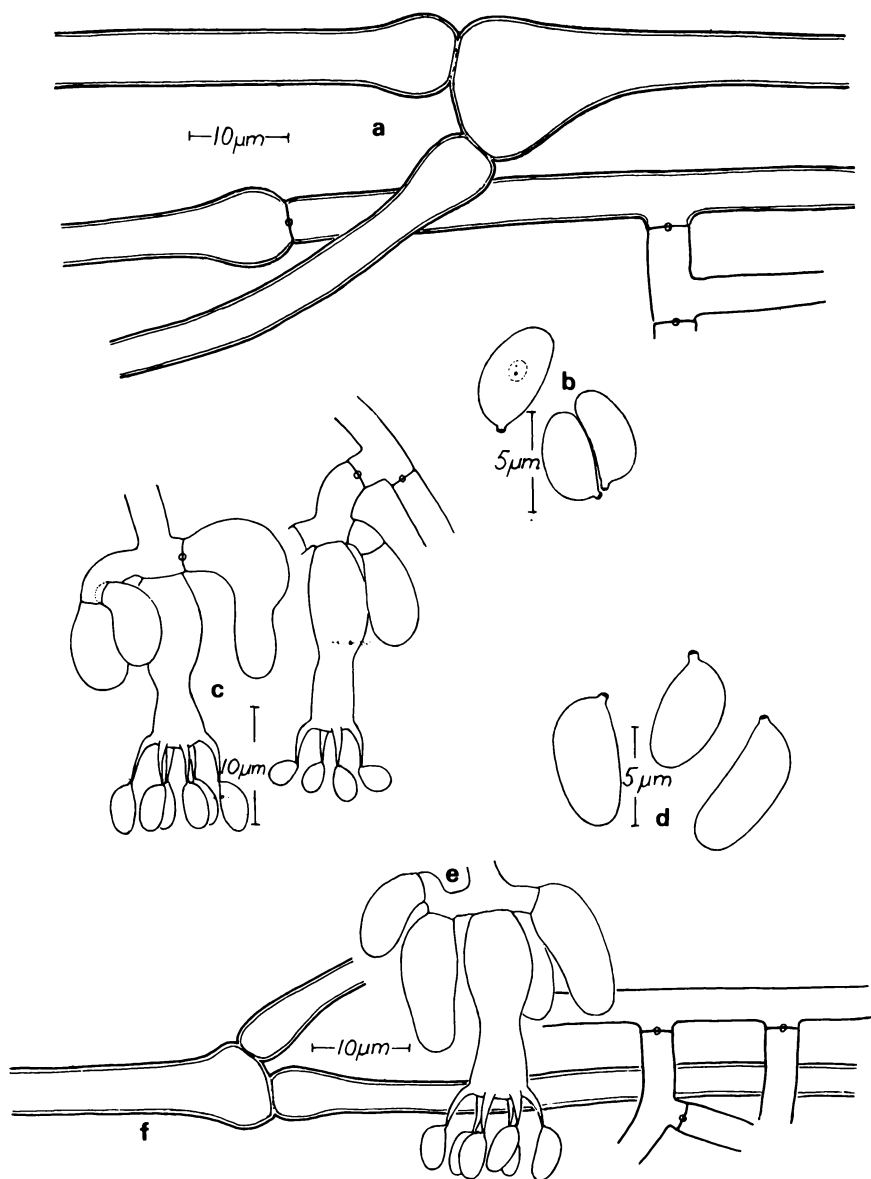


Fig. 688. *Sistotrema efibulatum*. a, f) hyphae b, d) spores c, e) spores. — Coll. a-c) Nilsson & Eriksson 4309, d-f) Nilsson & Eriksson 4280.

**8. *Sistotrema efibulatum*** (John Erikss.) Hjortst. n. comb. Fig. 687-88  
Basionym: *Sistotrema commune* John Erikss. f. *efibulatum* John Erikss., Sv.  
Bot. Tidskr. 43 p. 314, 1949.

**Fruitbody** resupinate, effuse, smooth, thin, greyish-white, finely porulose when dried; no rhizomorphic strands; no differentiated margin.

**Hyphal system** monomitic; all hyphae without clamps; basal hyphae 4-6  $\mu\text{m}$  wide, with more or less thickened walls, straight, with sparse septa and ramifications, some basal hyphae with inflations near septa (8-15  $\mu\text{m}$  wide); subhymenial hyphae 2-3  $\mu\text{m}$  wide, thin-walled, densely branched; dolipores often easily seen (in phase).

**Cystidia** none.

**Basidia** urniform (15-)18 — 22(-25)  $\times$  5-7  $\mu\text{m}$ , normally with 6 sterigmata; no basal clamp.

**Spores** (4.5-)5 — 6(-7.5)  $\times$  2.5-3  $\mu\text{m}$ , ovoid to ellipsoid, smooth, thin-walled, often clinging together in groups of 2 or more.

**Habitat and distribution.** Collected several times in the neighbourhood of Uppsala (Sweden) but other collections are few, in Sweden found in Halland (Ö. Karup par.), Västergötland (Bergstena par.), and Närke (St. Mellösa par.) in Denmark from several localities and twice in Norway (Akershus). *S. efibulatum* seems to be favoured by less acid conditions in the soil. Most of the collections are made from twigs of pine and spruce on the ground, but two are from herbs (*Aconitum* and *Anthriscus*) and one from dead fronds of *Pteridium*. It is not found on mosses, which is a common substrate for *S. octosporum*. It was originally described as a non-fibulate form of *S. octosporum*. It differs, however, not only in the lack of clamps. The herbarium specimens are all grey — whitish-grey, not yellowish as most of the well developed specimens of *S. octosporum* are. The hyphae and other cells (spores, basidia) are less rich in oil-drops, making it possible — in good herbarium material — to discern nuclei in phase without fixing or staining. There are evidently two nuclei per hypha-cell.

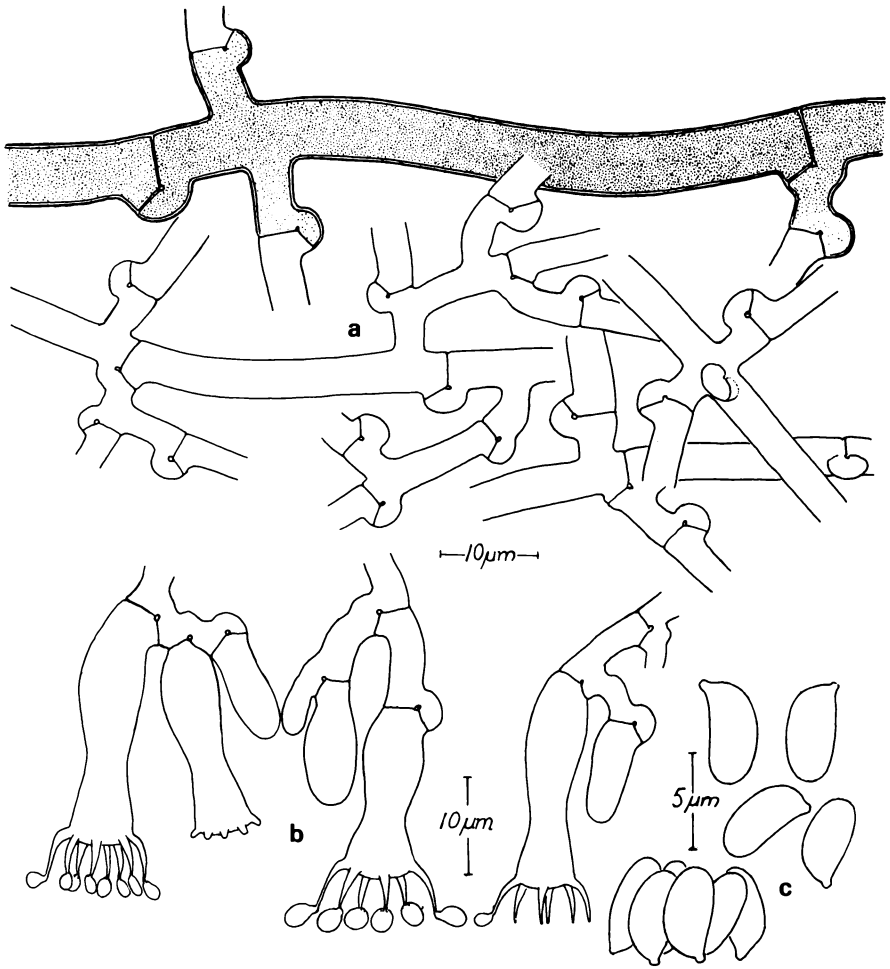


Fig. 689. *Sistotrema heteronemum*. a) hyphae b) basidia c) spores. — Coll. Hjortstam 12826.

**9. *Sistotrema heteronemum*** (John Erikss.) Strid Fig. 689  
*Wahlenbergia* 1 p. 76, 1975. — *Botryobasidium heteronemum* John Eriksson, Sv. Bot. Tidskr. 52 p. 13, 1958.

**Fruitbody** resupinate, loosely adnate, thin, smooth, first fibrillose-reticulate, then porulose, at last rather continuous, white to pale yellowish; margin not differentiated but often cobweb-like and sometimes fine rhizomorphic strands in the periphery of the fruitbody.

**Hyphal system** monomitic; all hyphae with clamps, basal ones 6-10  $\mu\text{m}$  wide, straight and sparsely branched, pigmented light brown, subhymenial ones (2)4-6  $\mu\text{m}$  wide, hyaline, thin-walled, richly branched; all thin-walled hyphae cyanophilous.

**Cystidia** none.

**Basidia** urniform, 18-25(-30) long, 6-7  $\mu\text{m}$  wide at the broadest part, 3.5-5  $\mu\text{m}$  at the narrowest, with 6-8 sterigmata.

**Spores** (4.5-)5 — 5.5(6) x 2.2-2.5(-3)  $\mu\text{m}$ , narrowly ellipsoid, adaxial side straight, somewhat convex or in some spores slightly concave, with marked apiculus, thin-walled, smooth, not amyloid, evidently cyanophilous but reaction very indistinct because of the thin wall.

**Habitat and distribution.** Very rare species, growing on various kinds of organic debris on the ground, such as dead ferns and *Larix*-cones but also on decayed deciduous wood. In the Nordic countries known from Norway (Sør-Trøndelag) and Sweden (Dalsland, Gästrikland — type-locality, and from Norrbotten), also known from Czechoslovakia.

**Remarks.** Characteristic species and easily recognized, preferably by its pigmented basal hyphae, but still problematic as to its generic position. It joins characteristics of *Sistotrema* and *Botryobasidium*. Its basidial shape matches well the former genus, but no doubt the same type of basidium can be seen in *Botryobasidium*, e.g. *B. subcoronatum*. Eriksson loc.cit. stressed the pigmentation of the basal hyphae, which is rather a characteristic of *Botryobasidium* than of *Sistotrema*. He discussed the matter with M.A. Donk in 1958 who was more in favour of a place in *Sistotrema*, an idea later accepted by Å. Strid. The cyanophilous reaction of the hyphae definitely seems to point to *Botryobasidium*, but we prefer to postpone the matter until more information becomes available.



**10. *Sistotrema intermedium*** Hjortst., Mycotaxon 17 p. 578, 1983. Fig. 690  
**Fruitbody** resupinate, closely adnate, at first porulose, then continuous but cracking when dry, smooth or somewhat tuberculate under a lens, white to pale cream-coloured, margin not especially differentiated.

**Hyphal system** monomitic, basal hyphae distinct, straight, with somewhat thickened walls, usually smooth but may be slightly encrusted, 3-5  $\mu\text{m}$  wide, with oily inclusions in the cell plasma, subhymenial hyphae thin-walled, short-celled, richly branched, all hyphae with clamps.

**Cystidia** none.

**Basidia** narrowly urniform, 30-40 x 6-7  $\mu\text{m}$ , with 4, rarely 2-3 stout sterigmata and a basal clamp.

**Spores** 8-9(-11) x 4,5-5(-6,5)  $\mu\text{m}$ , subamygdaliform, thin-walled, hyaline, smooth, adaxial side convex.

**Habitat and distribution.** According to the known specimens, growing only on *Salix* and found in the northern parts of Finland, Sweden and the middle of Norway.

**Remarks.** *S. intermedium* is most closely related to *S. autumnale* and *S. eximum*. From the former it can be distinguished by its decidedly smaller and subamygdaliform spores and by basidia with normally 4 sterigmata, besides the fruitbody is not athelioid. The latter species has distinctly ellipsoid spores and basidia with only 2 sterigmata.

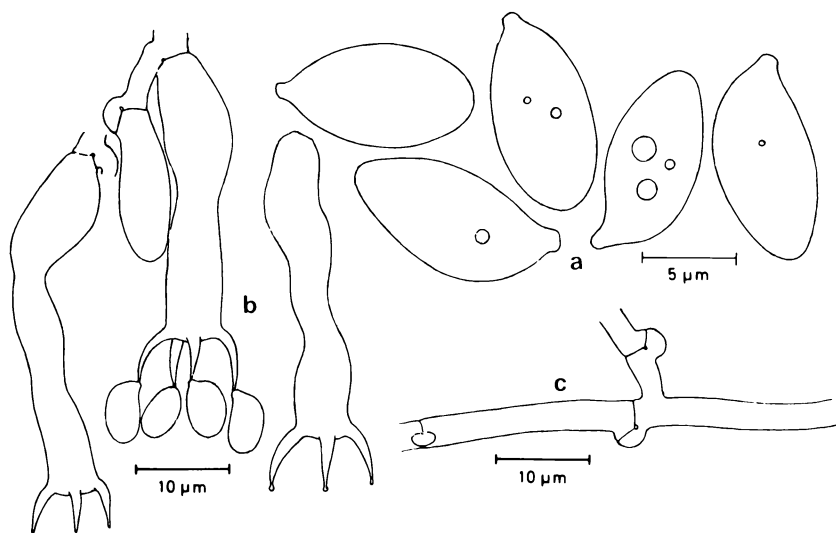


Fig. 690. *Sistotrema intermedium*. a) spores b) basidia c) hyphae. — From the holotype.

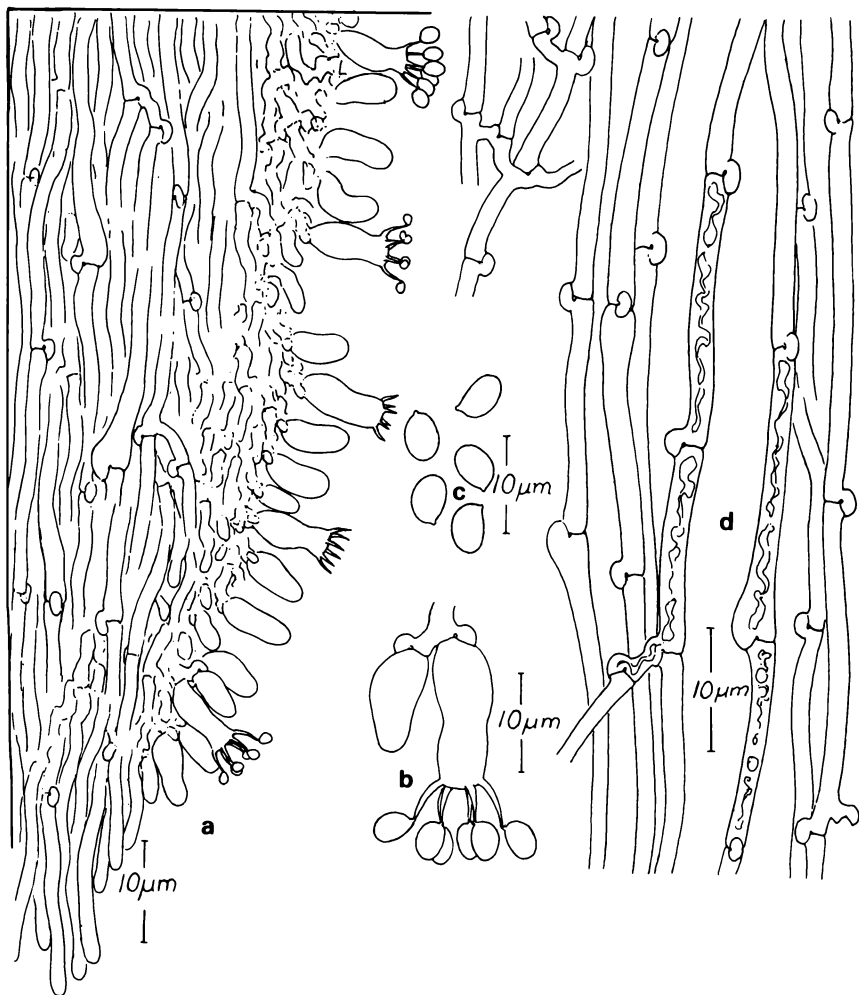


Fig. 691. *Sistotrema muscicola*. a) section through fruitbody b) basidia c) spores d) hyphae, partly filled with oily content. — Coll. Nathorst-Windahl, Fung. exs. succ. no. 1415/b.

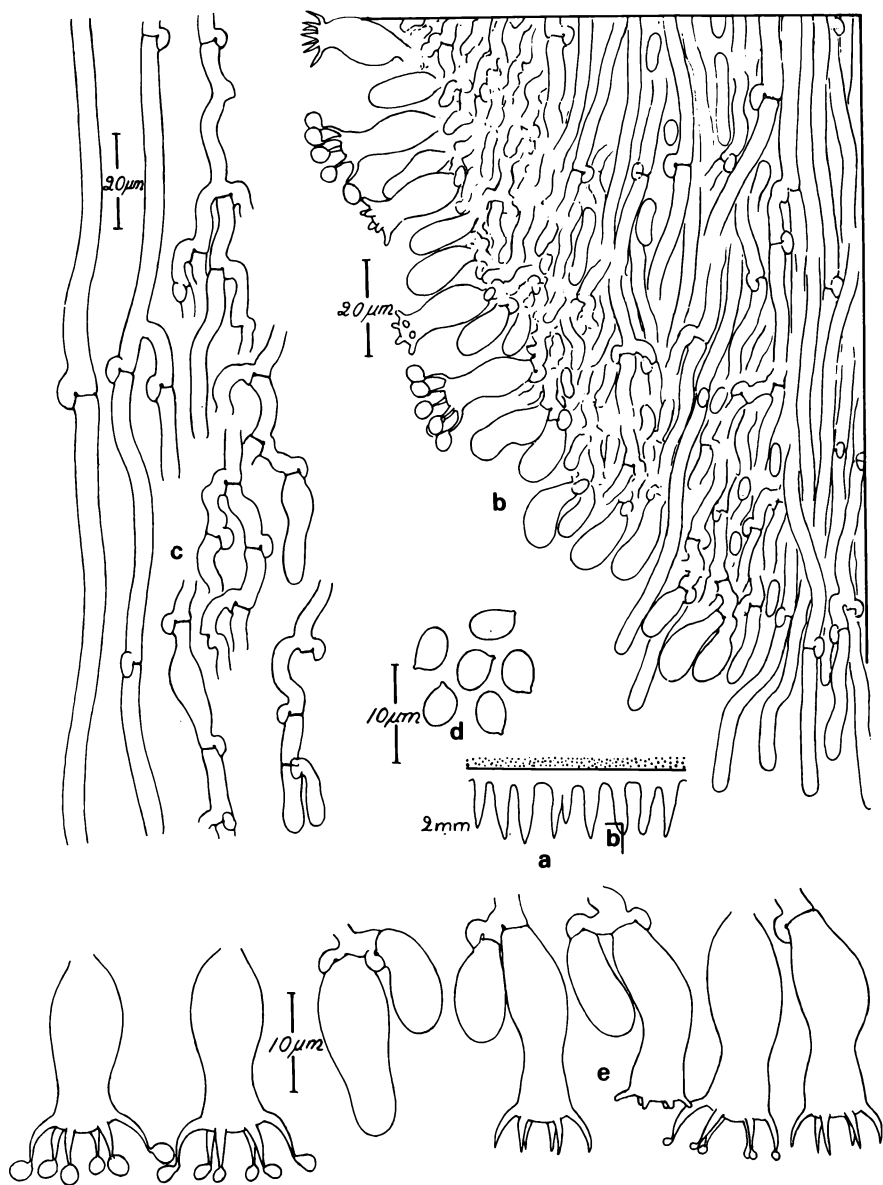


Fig. 692. *Sistotrema muscicola*. a) section through fruitbody showing position of section b) section through fruitbody c) hyphae d) spores e) basidia. — Coll. Jeppson 1576.

Fig. 691-94

**11. Sistotrema muscicola** (Pers.) Lund. In Lund. & Nannf., Fungi exs. suec. n. 145, 1947; Malencon, Kew Bull. 31:3 p. 494, 1976. — *Hydnum muscicola* Pers., Myc. eur. II p. 181, 1825. — *Grandinia muscicola* (Pers.) Bourd. & Galz., Bull. Soc. Mycol. France. 30 p. 252, 1914. — *Trechispora muscicola* (Pers.) Rogers, Mycologia 36 p. 83, 1944. — *Poria albopallescens* Bourd. & Galc., Hym. de France. XI (pores) p. 216, 1925; Hym. de France. p. 656, 1928. — *Poria albolutea* var. *liospora* Hym. de France. XI (pores) p. 218, 1925; hym. de France. p. 658, 1928.

Lectotype: (designated here) *Hydnum muscicola* det. C.H. Persoon. Herb. Leyden 911.81.9 (L).

**Fruitbody** resupinate, effuse, mostly small, when fresh soft and delicate, easily squeezed, when dried brittle, white-cream to sulphur-yellow (old herbarium material buff-coloured to brown); hymenium hydroid-irpicoid with teeth 1-2 mm long, cylindrical, conical or more or less flattened, or poroid, at first reticulate with thin, fimbriate or more or less lacerate dissepiments, 1-2 mm high; pores mostly angular, 2-4 /mm; subiculum thin, porulose, the young state arachnoid; margin similar.

**Hyphal system** monomitic; hyphae fibulate, 2-5  $\mu\text{m}$  wide, thinwalled, those of the subiculum and the vertical hyphae of the hymenophore straight with sparse clamps and branches; subhymenial hyphae densely branched and intertwined; hyphal protoplasm with numerous oil-drops or in the dried material with irregular strands of oily matter and contracted protoplasm; generally no rhizomorphic strands.

**Cystidia** none.

**Basidia** urniform, in the young state ovoid, when mature 14-20 x 4-7  $\mu\text{m}$ , sometimes longer, normally with 6 sterigmata; with a basal clamp.

**Spores** globose— ellipsoid, 3-4.5 x 2.5-3.5  $\mu\text{m}$ , thin-walled, smooth.

**Habitat.** On all kinds of debris and litter, small sticks, leaves and other plant material on the ground, on much decayed frondose or coniferous wood, and also on humus, living mosses and lichens, often together with *Tylospora*, *Amphinema* and other fungi with similar ecological demands.

**Distribution.** Rare in N. Europe but scattered throughout the whole area, from Denmark to N. Finland. Outside N. Europe it seems to be widely distributed in the north temperate zone. Malencon found it to be frequent («assez commun») in Morocco.

**Remarks.** Persoon described a hydroid species and Bourdot & Galzin also accepted it. Later authors (e.g. Lundell, Christiansen, and Malencon) allow the shape of the hymenophore to vary from hydroid to poroid, thus including what Bourdot & Galzin called *Poria albopallescens*. Lundell based his idea on the material received from T. Nathorst-Windahl and distributed in Fung. exs. suec. (n. 1415 a, b), which contains both forms, collected in the same locality. However, a closer investigation of this material shows

that the hydroid and the poroid parts of the material differ not only in the configuration of the hymenium but also in the colour of the fruitbodies and in the shape of the spores. The poroid parts are pale yellow and have almost perfectly globose spores while the hydroid parts are white and have somewhat elongated, short-ellipsoid spores. The two forms appear therefore more as two different taxa than one variable species. Most of the Nordic material can evidently be sorted out along these lines, but it is very clearly not possible to sort out all collections. The assessment of the spore-shape easily becomes a matter of opinion and no doubt there are intergrades in the shape of the hymenophore and in the colour of the fruitbodies. Morphological criteria alone are not sufficient and we have therefore come to the conclusion that *S. muscicola* is a form-complex, for the treatment of which compatibility and other experimental methods must be used. The Leiden specimen of *Hydnum muscicola* is very scarce but fully determinable. The Paris material of *Poria albopallescens* seen is very scanty. The specimen we have chosen as a lectotype is small but corresponds clearly to the original description of the species. The poroid form (*P. albopallescens*) reminds of *S. alboluteum*, but differs especially in the smaller size of the spores and in the colour of the fruitbody, which at least in dried material is much paler.

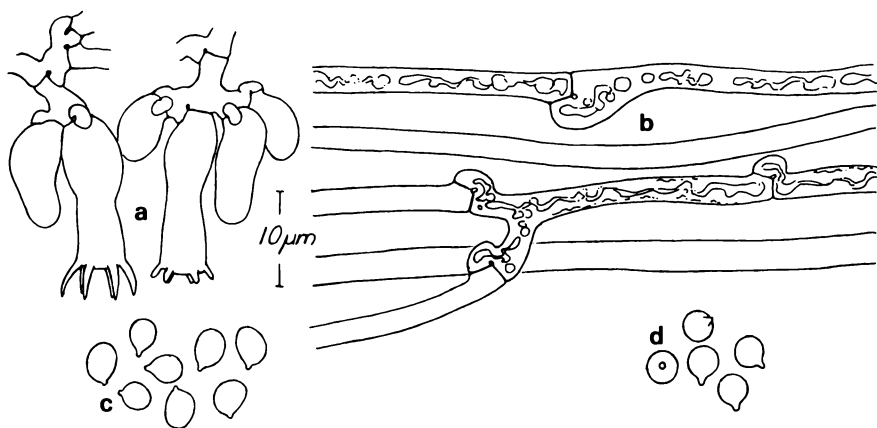


Fig. 693. *Sistotrema muscicola* (poroid form — *S. albo-pallescens*). — a) basidia b) hyphae c, d) spores. — Coll. a-c) Hjortstam 16834, d) Nathorst-Windahl, Fung. exs. succ. no. 1415/a.

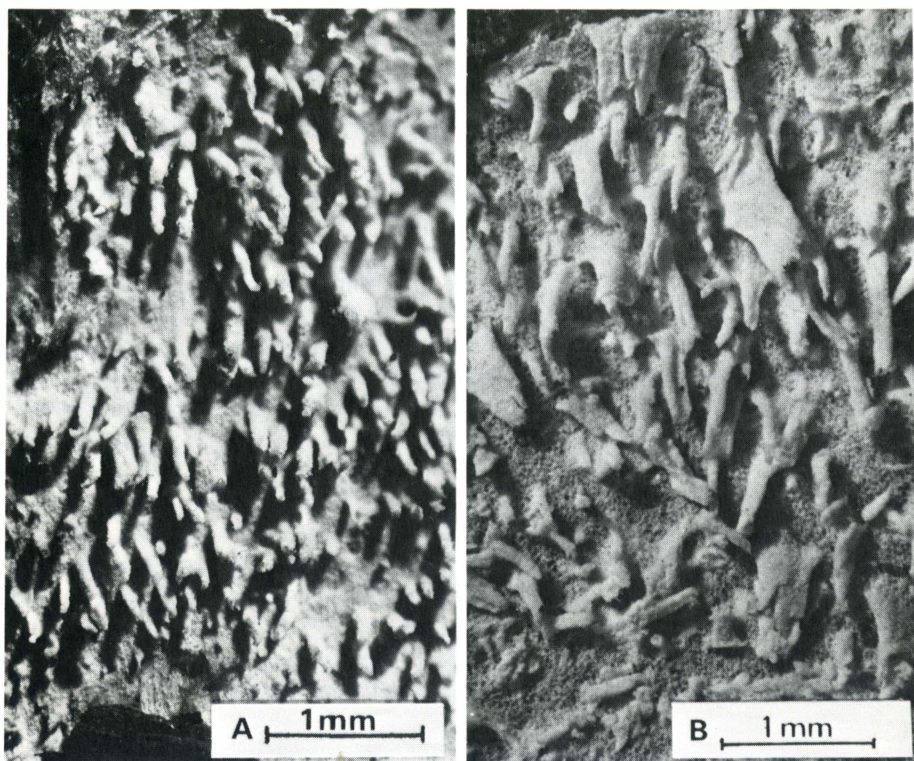


Fig. 694. *Sistotrema muscicola*. — Coll. A) Nathorst-Windahl 1941-10-21  
B) Nathorst-Windahl, Fung. exs. succ. no. 1415/b. Photo T. Hallingbäck.

**12. *Sistotrema oblongisporum*** M.P. Christ. & K. Hauersl.  
in M.P. Christ., Dansk Bot. Ark. 192 p. 82, 1960.

Fig. 695-97

**Fruitbody** resupinate, closely adnate, smooth, effused, very thin, greyish-whitish grey, ceraceous, young fruitbodies pruinose, when dried more developed ones reticulately cracked under the lens; no differentiated margin.

**Hyphal system** monomitic, hyphae 2.5-3.5  $\mu\text{m}$  wide, all hyphae with clamps; basal ones straight, glued to the substrate, with sparse septa; sub-basidial ones richly branched into a dense tissue.

**Cystidia** none.

**Basidia** 15-18(-22) x 4-6  $\mu\text{m}$ , first rounded-ovoid, when mature urniform with a rounded basal part and a cylindrical neck, 3-4  $\mu\text{m}$  wide, with a basal clamp and normally 6-8 sterigmata.

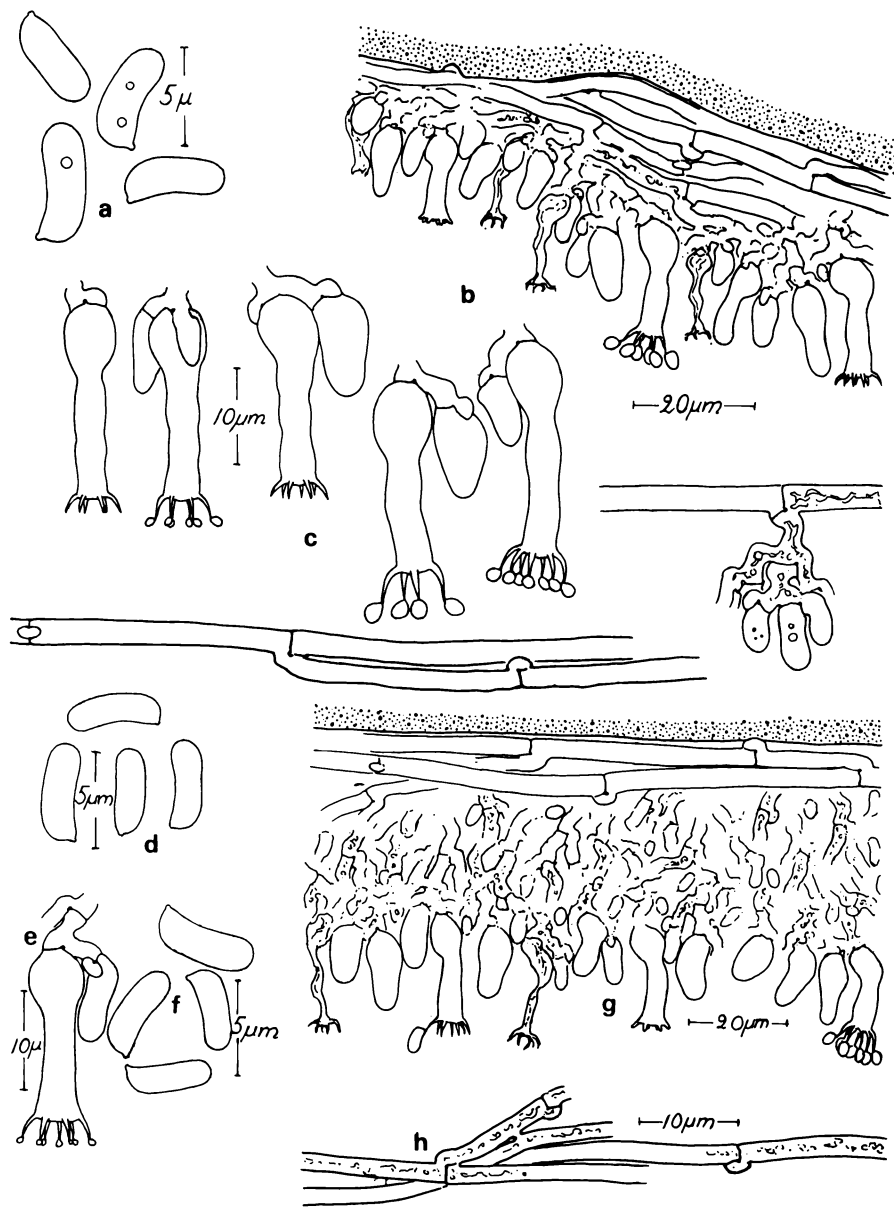


Fig. 695. *Sistotrema oblongisporum*. a, d, f) spores b, g) section through fruit-bodies c, e) basidia h) hyphae. — Coll. a-c) Kujala 865, d) Nannfeldt 9061, e-h) from the holotype.



**Spores** (4.5-)5-6 x 1.5-2  $\mu\text{m}$  suballantoid with a more or less concave adaxial side, thin-walled, smooth.

**Habitat.** On smooth bark of only slightly decayed, fallen or hanging branches of deciduous trees. Some collections of conifer branches (*Picea*, *Pinus*) also seem to belong here.

**Distribution.** A common species, esp. in the southern part of Scandinavia but also found northwards, even in the subalpine region of Lapland. Typical *S. oblongisporum* is also collected in W. Canada (Vancouver Isl.) and is very likely a widespread and frequent species.

**Remarks.** The species as it is here described and delimited, is as a rule readily recognized by the naked eye or under the lens from its thin, dense, smooth, greyish fruitbodies, in a characteristic way lining dead branches of deciduous trees, esp. branches 1-2 cm thick. On other substrates, e.g. uneven old bark, it may be more difficult to recognize. In the size and shape of spores there is in *S. oblongisporum*, in the wide sense we have found it necessary to use, an unbroken series from slightly longer and straighter, perhaps also somewhat narrower spores like those in the type collection, to spores very close in size and shape to those of *S. brinkmannii*. Incompatibility tests have shown (Hallenberg in separate publication) that forms of *S. oblongisporum* with the latter spore shape are not compatible with *S. brinkmannii*. The question remaining to be answered before *S. oblongisporum* can be considered as a natural and well defined taxon, is if the two

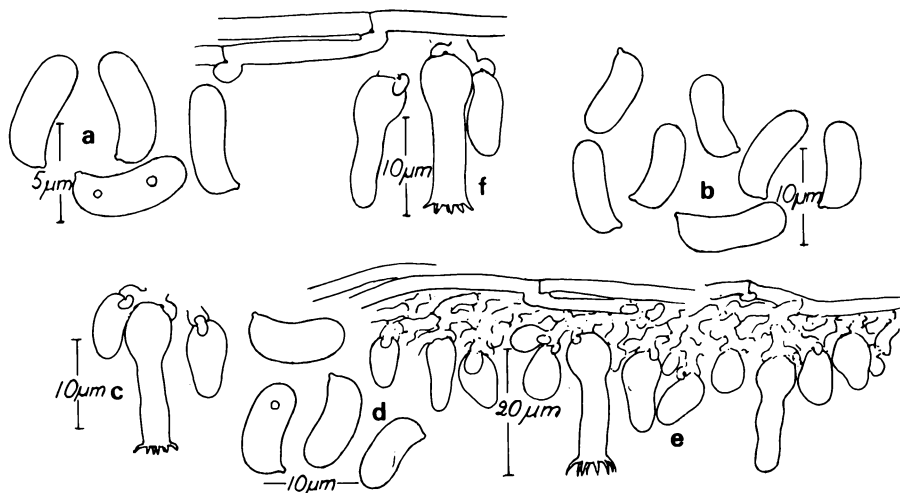


Fig. 696. *Sistotrema oblongisporum*. a, b, d) spores c, f) basidia e) section through fruitbody. — Coll. a, f) Nordin 21431, b) Stordal 4817, c-e) Larsson & Hjortstam 18216.

spore forms belong to two incompatible strains or not. The differences between the extremes of this series are as a matter of fact not greater than within several other species of the genus. The long-spored forms seem to be more frequent in the southern part of the area. In culture some strains of the short-spored form produce chains of inflated cells which eventually may form more compact structures. (Biggs: bulbills, Boidin: cellules sphériques). Such structures also occur in the Swedish material, in both homo- and heterothallic specimen are seen both in herbarium material and in cultures. To some degree they resemble the inflated cells in the *Aegerita* state of *Bulbillomyces*. The structures of *Sistotrema* do not seem to be diaspores but rather comparable with sclerotial structures as a mean of survival. In a detailed study by Weresub and LeClair (Can. journ. bot. 49 p. 2203, 1971) they are treated under the name *Burgoa verzuoliana* Goid.

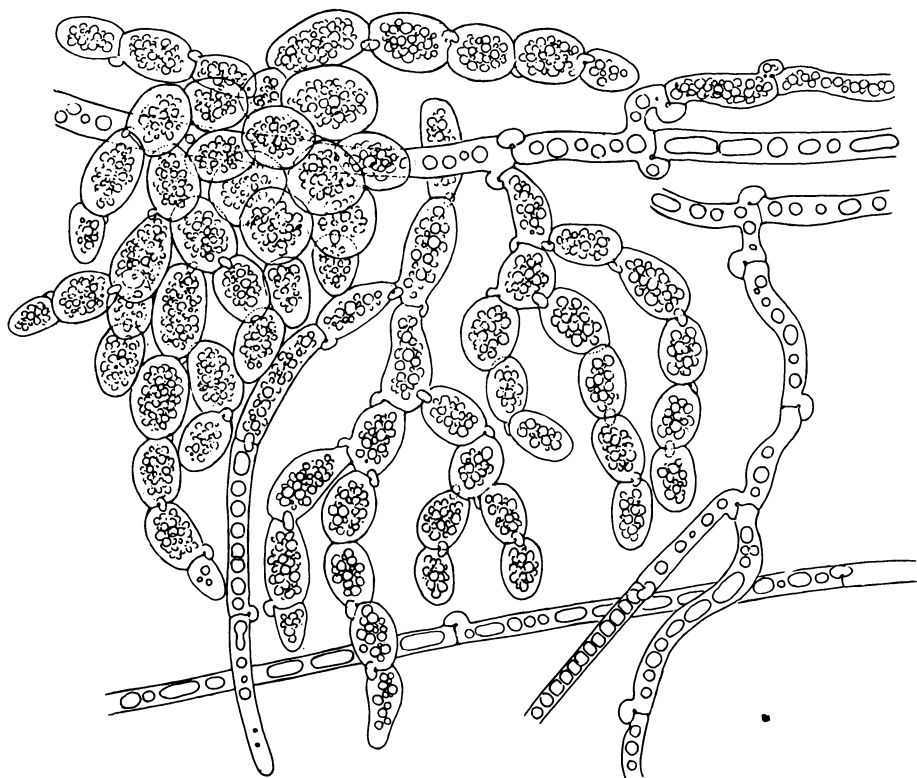


Fig. 697. *Burgoa* sp. From mycelium GB 244.

Fig. 698-99

**13. *Sistotrema octosporum*** (Schroet. ex. Höhn. & Litsch.) Hallenb. comb.nov. Basionym: *Corticium octosporum* Schroet. ex. Höhn. & Litsch., Ann. Mycol. 4 p. 292, 1906. — *Sistotrema commune* John Erikss., Sv.Bot. Tidskr. 43 p. 312, 1949. — *Corticium muscicola* Bres., Ann. Mycol. I p. 96, 1903, non *Sistotrema muscicola* (Pers.) Lund. in Lund. & Nannf., Fungi exs.suec. no. 1415, 1947. — *Sistotrema subpyriforme* M.P. Christ., Dansk Bot.Ark. 19 p. 84, 1960.

**Fruitbody** resupinate, effuse, smooth, fibrillose—porulose, loose and soft in the living state, fragile when dried, the living fungus white but often turning yellowish in the herbarium; no differentiated margin.

**Hyphal system** monomitic, all hyphae with clamps, basal ones wide (4-7  $\mu\text{m}$ ), long-celled, sparsely branched and with somewhat thickened walls, subbasidial hyphae narrower (3-4  $\mu\text{m}$ ), short celled, richly branched, thin-walled; protoplasm with a rich content of oil-drops in fresh material, turning to irregular concretions in the dried material.

**Cystidia** none.

**Basidia** urniform, 15-20(-30)  $\mu\text{m}$  long, 5-7  $\mu\text{m}$  wide in the basal part, 3-5  $\mu\text{m}$  in the narrowest, waist-like part, apically 5-6  $\mu\text{m}$ , with a basal clamp, normally with 6 sterigmata.

**Spores** (4.-)4.5-5.5(-7) x (2-) 2.5-3  $\mu\text{m}$ , narrow to ovate oblong, tapering towards the apiculus, adaxial side normally slightly convex, in longer spores straight or slightly concave, abaxial side convex; spore wall smooth, thin.

**Habitat.** Mainly in conifer and mixed forests, on undersides of mosses, esp. *Hylocomium splendens*, but also *Pleurozium schreberi*, *Dicranum* spp, *Rhytidiadelphus* spp etc. on the underside of dead fern fronds lying close to the ground in humid localities, or on small twigs and other kinds of debris on the ground. It seems to be more common in moderately alkaline soils in herb— and fern-rich forests than in the more acid *Vaccinium* forests. It belongs rather to the fungus flora of the humus layer than to the wood fungi. It can be found as soon as the snow has melted and develops rapidly during wet periods in summer and autumn.

**Distribution** uneven and not fully known, but it is evidently frequent in suitable localities at least in S. Scandinavia. Eriksson (1949) found it to be quite frequent in Uppland but didn't find it in Swedish Lappland (1959) nor Eriksson & Strid (1969) in Finnish Lappland. There are now many collections from S. Scandinavia but knowledge is still incomplete.



Fig. 698. *Sistotrema octosporum*. a, e) basidia c) hyphae b, d, f) spores. — Coll. a-b) Nilsson & Eriksson 4290, c-e) Jaap 303, f) Haglund & Eriksson 4097.

**Remarks.** *S. octosporum* is, as a rule, determined without difficulty. The loose texture, the wide basal hyphae and the shape of the spores together with the yellowish colour of the dried fungus as well as the ecology of the species are usually sufficient. There is, however, a variation in the spore shape between narrowly ovoid spores, ca. 5  $\mu\text{m}$  long, to a more oblong shape with a length reaching 6 or even 7  $\mu\text{m}$ . So far as we can judge from fairly plentiful herbarium material this is a variation within one taxon. Monospore mycelia of the normal-spored form has been tested and found to be incompatible with *S. brinkmannii*, *S. oblongisporum* and all other tested mycelia. The holotype of this species was obtained by Hallenberg from FH and represents with certainty the same as have been named *S. commune* John Erikss. The material, however, is very scanty and extreme carefulness is needed to make a preparation. It is therefore suggested that a neotype shall be chosen, preferably from Germany from where it has been originally described.

Two species of *Sistotrema*, described by Parmasto (Eesti NSV Tead. Akad. 1965 p. 230) as *S. camshadalicum* and *S. estonicum*, agree in several respects, both in the descriptions and illustrations with forms of *S. octosporum* s.l. We have seen the type of *S. camshadalicum*, which does not fully agree with the type of *S. octosporum*, but fits well in the series of variations within *S. octosporum* s.l.

One of the forms which we have included in *S. octosporum* s.l. is *S. subpyriforme* M.P. Christiansen. It is in several ways problematic. Christiansen determined it first as *S. octosporum* but changed his mind and described it as a new species, based on a more pyriform spore shape. The type material is extremely scarce, nowadays practically totally lacking. It consists of a small twig of *Thuja* on the side-branches of which there are white fruitbodies of *Tylospora asterophora* (Bon.) Donk and on the main-branch barely visible debris of a *Sistotrema*. We have seen spores and pieces of basal hyphae — judging from them it can hardly be separated from *S. octosporum*, but the fruitbody is evidently more closely attached and denser in structure and is by no means a typical *S. octosporum*. We find it necessary to leave it as *S. octosporum* s.l. together with several other collections which differ in one way or other. Such forms are presented in the illustrations as examples of the variation.

**14. *Sistotrema pistilliferum* Hauersl.,**

Friesia 10 p. 318, 1974.

Fig. 669E, 700

**Fruitbody** resupinate, effuse, totally adnate, thin, smooth, white, soft; margin indistinctly thinning out.

**Hyphal system** monomitic; hyphae 2-3.5  $\mu\text{m}$  wide, with clamps, thin-walled, protoplasm at least partly with oily inclusions as drops or irregular bodies.

**Cystidia** (25-)40-70  $\mu\text{m}$  long, thin-walled, with a basal clamp, narrow, 2-4  $\mu\text{m}$  wide except for the inflated apical part which may be 6-7  $\mu\text{m}$  wide, in phase somewhat light-refracting.

**Basidia** mostly 20-25 x 4-6  $\mu\text{m}$ , generally with 6-7 sterigmata and a basal clamp.

**Spores** 4-5  $\mu\text{m}$ , subglobose — subangular, smooth, thinwalled.

**Habitat and distribution.** Extremely rare species, found only a few times in Denmark, Norway (Hordaland) and Sweden (Västergötland). As it is a small, inconspicuous species it may be overlooked, but must still be rarer than many other inconspicuous species. As far as can be judged from the few specimens collected it is in no way specialized to substrate (*Pinus*, *Fagus*) or biotope.

**Remarks.** Very characteristic species. It may in some way be related to *S. subangulisporum*, which, however, lacks both cystidia and clamps.

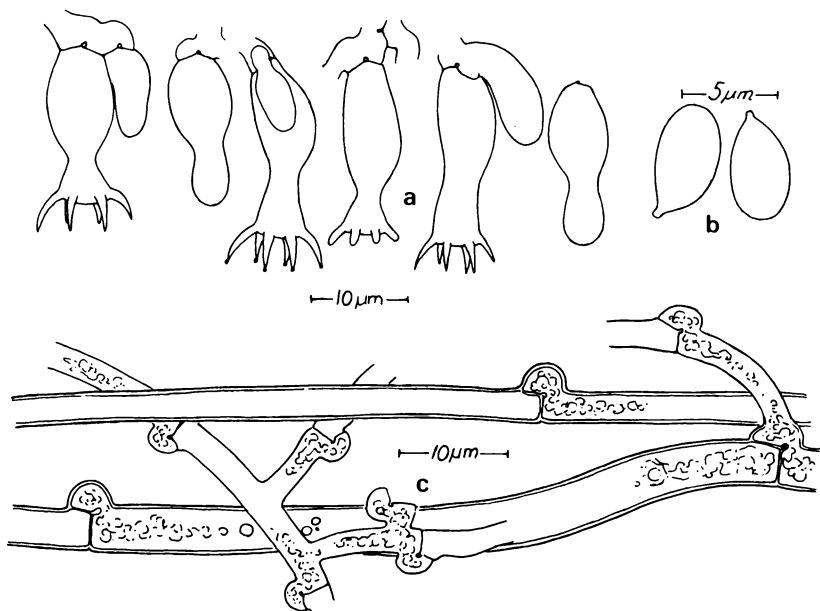


Fig. 699. *Sistotrema octosporum*. a) basidia b) spores c) hyphae. — Coll. Sivertsen 1979-10-19.

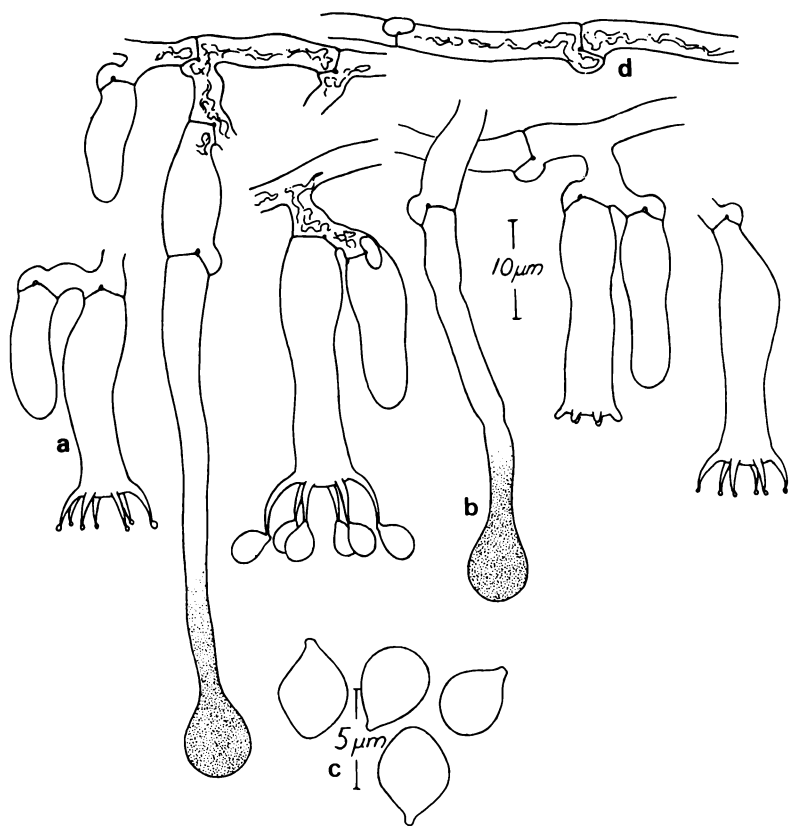


Fig. 700. *Sistotrema pistilliferum*. a) basidia b) cystidium c) spores d) hyphae. — Coll. Hjortstam 10198.



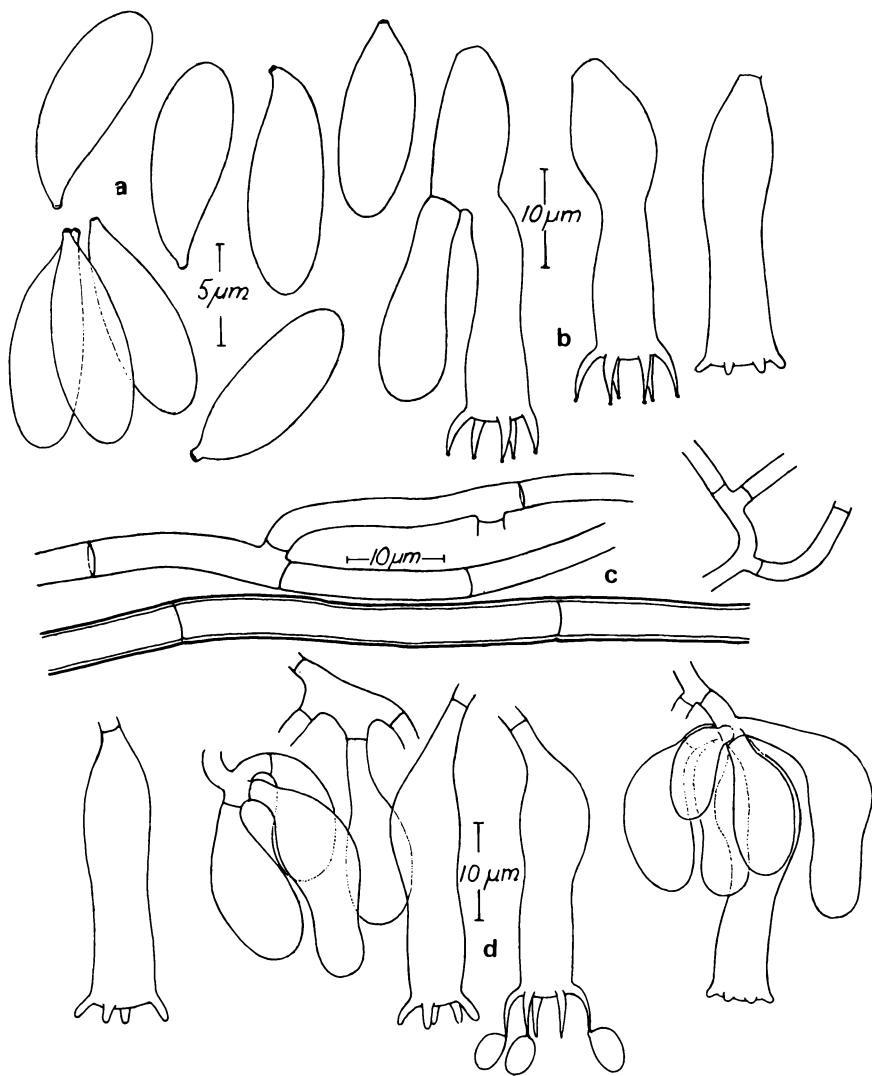


Fig. 701. *Sistotrema pyrosporum*. a) spores b, d) basidia c) hyphae. — Coll. Hauerslev 4824.

**15. *Sistotrema pyrosporum* Hauersl.**

Fig. 701

Friesia 10 p. 319, 1974.

**Fruitbody** very small and thin, closely adnate, visible as a small greyish spot on the substrate, probably ceraceous and continuous in the living state, porulose — reticulate when dried; no differentiated margin.

**Hyphal system** monomitic, all hyphae without clamps; basal hyphae straight, 4-7  $\mu\text{m}$  wide, with sparse septa and branches, and with thickened walls, subhymenial ones narrower, 2-3  $\mu\text{m}$ , thin-walled, richly branched and densely intertwined, partly inflated.

**Cystidia** none.

**Basidia** (20-)25-35(-40)  $\mu\text{m}$  long, basally 6-7.5  $\mu\text{m}$  wide, proximal part 5-6  $\mu\text{m}$ , urniform — subcylindrical, tapering towards the base, which sometimes is prolonged into a hyphalike part; with (4-)6 sterigmata.

**Spores** 9-11 (-12) x 4-4.5(-5)  $\mu\text{m}$  subfusiform — fusiform — narrowly pyriform, thin-walled smooth.

**Habitat and distribution.** Found three times in Denmark (Rørvig in Sjælland) on undersides of needles of *Pinus* in a pine plantation. Species of *Sistotrema* are not usually very specialized and it is therefore likely that this species can be found also on other kinds of small debris on the ground.

**Remarks.** *S. pyrosporum* is in some respects very similar to *S. efibulatum*, from which it differs above all by its larger spores. There seems, however also to be a clear difference in the nature of the subhymenial hyphae (more intertwined, often inflated), of the basidial fascicles and of the basidial bases. We therefore find it necessary to treat *S. pyrosporum* as a species of its own. More material is, however, needed for a full knowledge of its intra-specific variation. The nature of the basidial fascicles is not fully clear. Investigation of living material will probably give a better result.

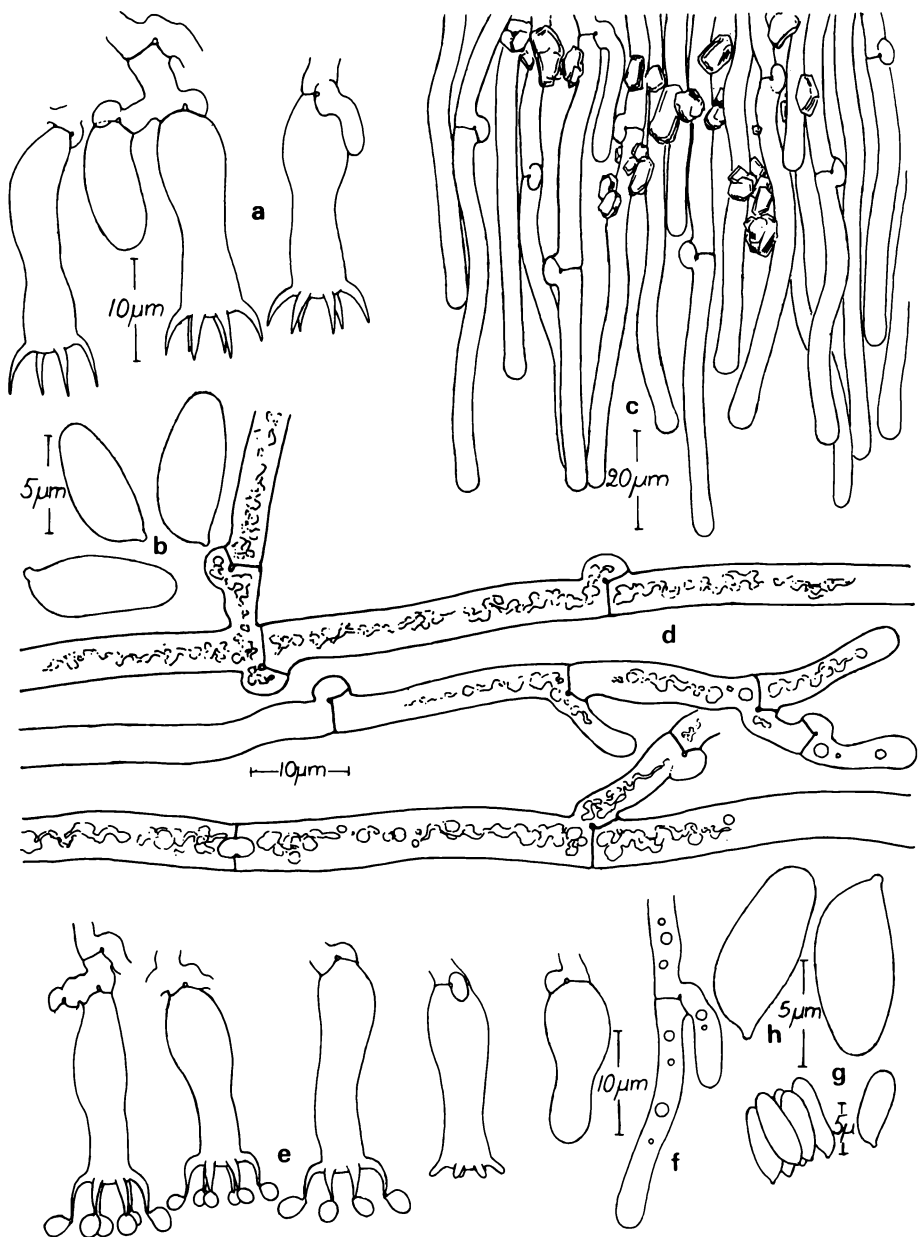


Fig. 702. *Sistotrema raduloides*. a, e) basidia b, g, h) spores (g agglutinated ones) c) apical hyphae from hymenial spine d) subicular hyphae f) subhymenial hyphae. — Coll. a-d) Hallenberg 2269, e-h) Nannfeldt 10065.

**16. *Sistotrema raduloides* (Karst.) Donk.**

Fig. 702-03

Fungus 26 p. 4, 1956. — *Hydnum raduloides* Karst., Symb. Myc. Fenn. XII, Medd. Soc. F. Fl. Fenn. 9 p. 110, 1883. *Hydnum populium* Peck, NY St. Mus., Ann. Rep. 53p. 846, 1900. — Gilbertson, Mycologia. 54 p. 667, 1962.

**Fruitbody** resupinate, closely adnate, effuse, when young lightcoloured with small papilliform aculei, the mature fungus pale buff, odontoid — hydroid, with normally cylindrical, rarely irregular teeth, 1-4 mm long, as a rule conically acute but sometimes obtuse; hymenial surface pruinose; subiculum thin, at first arachnoid then finely porulose and finally membranaceous; margin indeterminately thinning out, sometimes finely fibrillose.

**Hyphal system** monomitic; hyphae with clamps and oily inclusions, basal hyphae and those of the central part of the aculei 2-6  $\mu\text{m}$  wide, with somewhat thickened walls, straight and sparsely branched, subhymenial hyphae thin-walled, 2-3  $\mu\text{m}$  wide, richly branched.

**Cystidia** none.

**Basidia** urniform, 18-23 x 5-7  $\mu\text{m}$ , with (4-)6-8 sterigmata and with a basal clamp.

**Spores.** (6-)7-9 x (2.5-)3-3.5  $\mu\text{m}$ , subcylindrical — subfusiform apically obtuse, often broader below the middle, thin-walled, often clinging together in groups of 4-6.

**Habitat.** On much decayed deciduous wood with a preference for *Populus tremula* but also on other kinds of deciduous wood (e.g. *Betula*, *Quercus*, *Malus*), rarely on coniferous wood (*Picea*).

**Distribution.** *S. raduloides* seems to have a mainly eastern distribution in N. Europe. It is found in the east part of Sweden (Uppland — from where there are several collections, and Ångermanland), several times in Finland, once in SE. Norway and has also been collected in Estonia. From outside N. Europe we have seen material from Poland (on *Acer*, *Carpinus*, *Populus*, *Picea*) and from North-America (on *Populus* spp. and coniferous wood). Its total distribution points towards a preference for a more or less continental climate. However, recently a collection has been made in SW. Sweden (Halland, ca. 10 km. S of Falkenberg, on *Malus*, 1982.07.13, S. Sunhede) where the climate is far from continental.

**Remarks.** Easily recognized species with little variation, at least in N. Europe. The N. American material is more variable, esp. in the configuration of the hymenium, from totally smooth over to equally hydroid as the N. European material. The American specimen is often also somewhat light coloured, more yellow than the European, which is, in the dry state, paler buff.

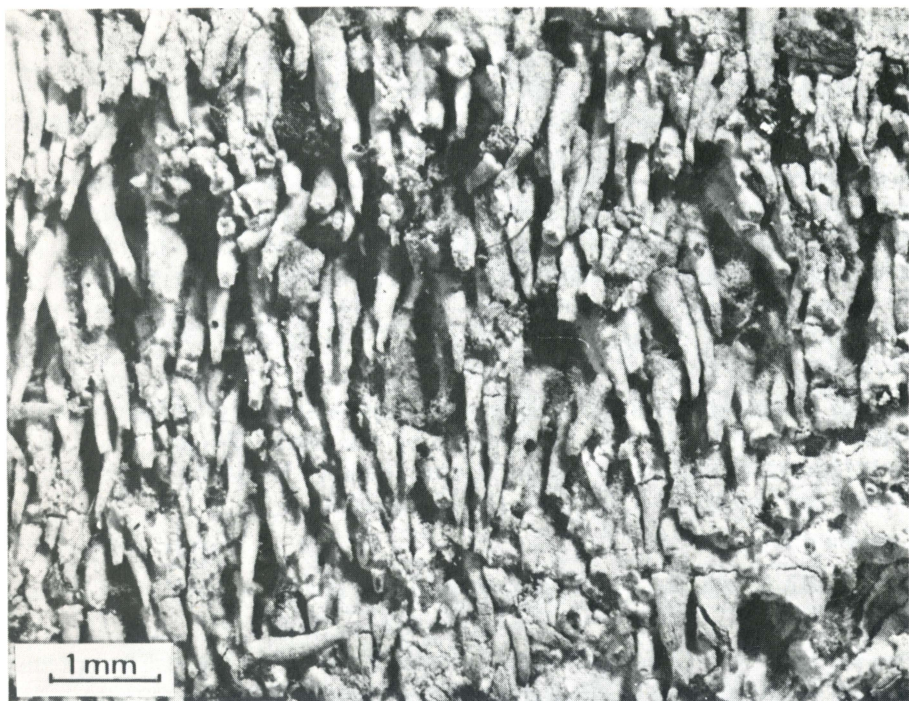


Fig. 703. *Sistotrema raduloides*. — Coll. Laurila (herb. Eriksson 5788). Photo T. Hallingbäck.

**17. *Sistotrema resinicystidium* Hallenb.,**  
Mycotaxon 11 p. 466, 1980.

Fig. 704

**Fruitbody** resupinate, adnate thin (50-100  $\mu\text{m}$  when dried), effuse, when young hypochnoid-porulose, then continuous and of firm consistency; hymenium almost smooth to more or less tuberculate-grandinioid, in the living state white-cream coloured, when dried darkening, pale buff to pale ochraceous; margin not especially differentiated.

**Hyphal system** monomitic; all hyphae with clamps, often with oily contents; basal hyphae few, 2-4.5  $\mu\text{m}$  wide, with thin or slightly thickened walls, straight and sparsely branched, subhymenial hyphae about 2-2.5  $\mu\text{m}$ , very thin-walled, richly branched.

**Gloeocystidia** present and usually fairly numerous, as a rule not more than 50  $\mu\text{m}$  long and 8  $\mu\text{m}$  wide, sinuous, often with moniliform constrictions, thin-walled, in herbarium material filled with a yellow-brown substance, which is homogeneous in most cases but sometimes granular (in phase), darkening to brown in sulfovanillin but without distinct aldehyde-reaction.

**Basidia** 17-30  $\mu\text{m}$  long, narrowly urniform to almost tubelike, with a widened, rounded basal part, 5-6  $\mu\text{m}$  wide, and a tubular neck, 3.5-4.5  $\mu\text{m}$  wide, (4-)6-7(-8) sterigmata and a basal clamp.

**Spores** 4-5.5 x 2-3  $\mu\text{m}$ , ellipsoid-subovoid, often broadest below the middle, adaxial side straight or somewhat convex, in a few spores slightly concave, thin-walled, smooth.

**Habitat and Distribution.** On decayed deciduous and coniferous wood (*Quercus*, *Betula*, *Picea*, and *Pinus*). Rare species but widely distributed in the north hemisphere. In Sweden found in the provinces of Småland, Västergötland, and Södermanland, in Norway in Sør-Trøndelag. We have seen no material from Denmark or Finland. Outside N. Europe hitherto found only in Iran and Br. Columbia.

**Remarks.** Easily recognized species. Differs in several respects from *S. coroniferum*, which also has gloecystidia, in the structure and colour of the hymenial surface, density of the fruitbody, shape of spores and basidia and nature of the gloecystidial contents. The few specimens seen are remarkably uniform, much more than is usual for species of this genus. From *S. sernanderi*, which also has gloecystidia, it differs in the number of sterigmata above all.

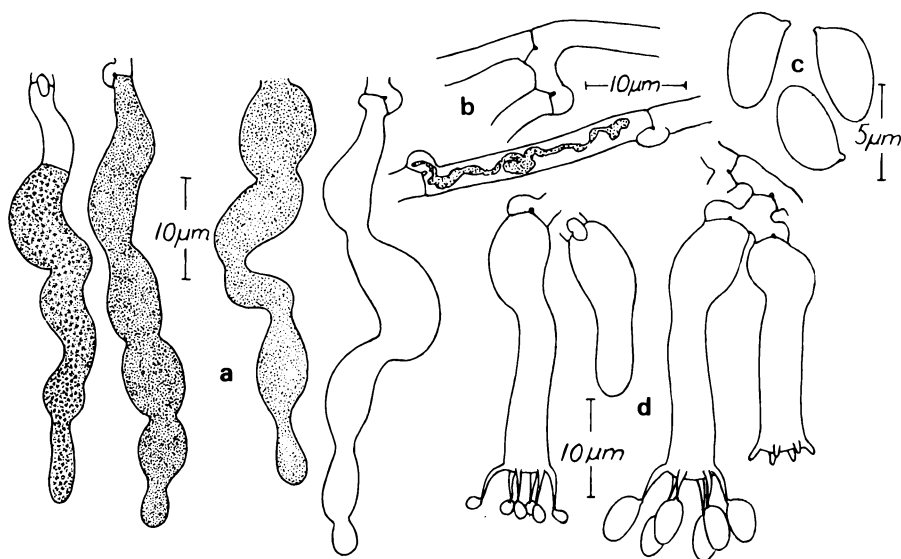


Fig. 704. *Sistotrema resinicystidium*. a) gloecystidia b) hyphae c) spores d) basidia. — From the holotype.

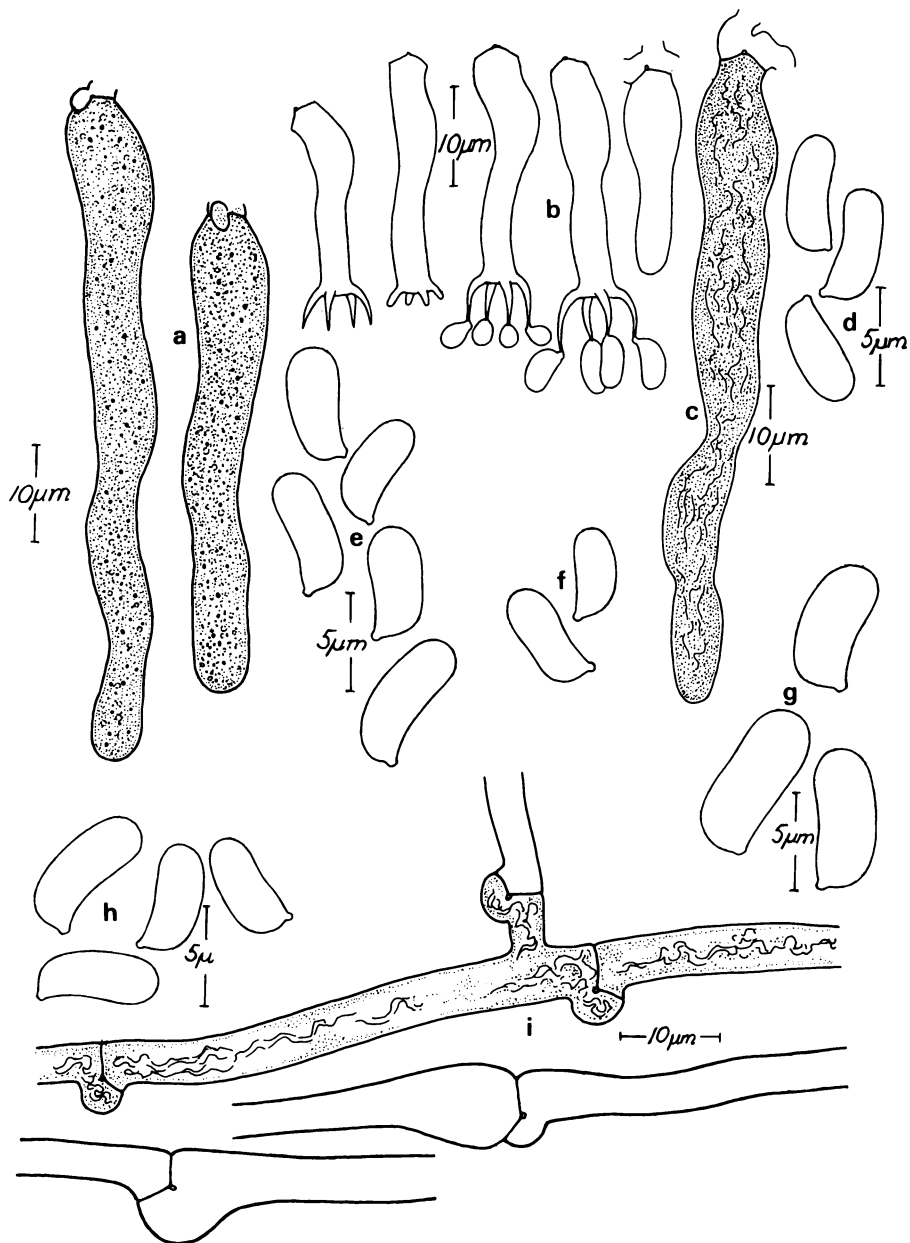


Fig. 705. *Sistotrema sernanderi*. a) gloecystidia (a from a living specimen) b) basidia d-h) spores i) hyphae. — Coll. a) Hallingbäck 30779, b-e) Strid 3247, f) Hjortstam 15725, g) Romell 1500, h-i) Strid & Eriksson 5963.



**18. *Sistotrema sernanderi*** (Litsch.) Donk, Fig. 705-06  
*Fungus* 26 p. 4, 1956. — *Gloeocystidium sernanderi* Litsch., Sv. Bot. Tidskr.  
 25 p. 437, 1931. — *Urnobasidium sernanderi* (Litsch.) Parm., Consp. syst.  
 Cort. p. 38, 1968.

**Fruitbody** resupinate, effuse, adnate or partly detachable, white to pale cream coloured, of moderate size and thickness, smooth or somewhat tuberculate under the lens, often reticulate-porulose, when mature continuous; margin generally not differentiated, but sometimes somewhat fibrillose or even cobwebby.

**Hyphal system** monomitic, all hyphae with clamps; basal hyphae straight with sparse clamps and septa, mostly 5-7  $\mu\text{m}$  wide, with thin or somewhat thickened walls, often with ampullate swellings near septa, anastomoses frequent; subhymenial hyphae 3-5  $\mu\text{m}$  wide, richly branched, oily inclusions in the hyphal protoplasm, in living hyphae as oil-drops, in herbarium material as irregularly extended bodies.

**Gloeocystidia** 50-80 x 5-8  $\mu\text{m}$ , tube-like, thin-walled, more or less flexuose, apically obtuse, filled with hyaline or light coloured, grainy or oily contents, in the dry material forming irregular strings.

**Basidia** narrowly urniform to cylindrical, 15-30 x 3.5-6  $\mu\text{m}$  wide, with (1-2-) 4 sterigmata and a basal clamp.

**Spores** 5-7(-9) x 2-3.5  $\mu\text{m}$ , narrowly ellipsoid-suboblong-subballantoid, adaxial side in mature spores slightly concave, thin-walled, smooth.

**Habitat.** Generally found on wet, much decayed coniferous or deciduous wood, but also on other kinds of humid debris.

**Distribution.** Less common but collected several times in N. Europe and is evidently distributed in all forested parts of the area, from Denmark to N. Finland, and probably also in most parts of the northern temperate zone. Also reported from S. America.

**Remarks.** As already stated by Litschauer, *S. sernanderi* is very close to *S. coroniferum*. In this species there is a variation in the shape of the spores, but the majority of the studied specimens agree perfectly with *S. sernanderi*. As a matter of fact there seems to be no other clear difference than the number of sterigmata. In *S. sernanderi* there are normally 4 sterigmata, but basidia with 2 are often seen, while in *S. coroniferum* the number is normally 6 to 8, but single basidia with 4 are easily found and even basidia with 1 or 2 are seen. The narrow shape of the basidia seems very characteristic for *S. sernanderi*, but such basidia are also seen in specimens of *S. coroniferum* where 6-8 sterigmatic basidia mix with narrow ones having 2 or even 1 sterigmata.

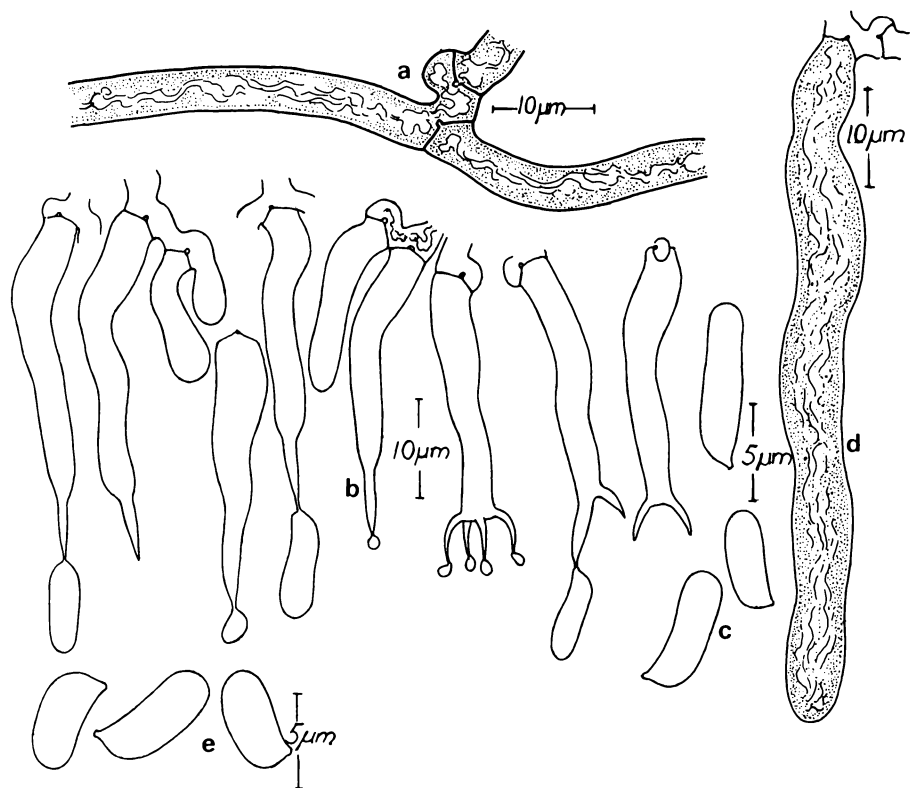


Fig. 706. *Sistotrema sernanderi*. a) hyphae, b) basidia c, e) spores d) gloecystidium. — Coll. a-d) Eriksson 11178 (specimen with deviating basidia and longer spores, e) Romell 1500, spores wider than normal.

**19. Sistotrema suballantosporum** Hallenb.

Fig. 707

Mycotaxon 11 p. 468, 1980.

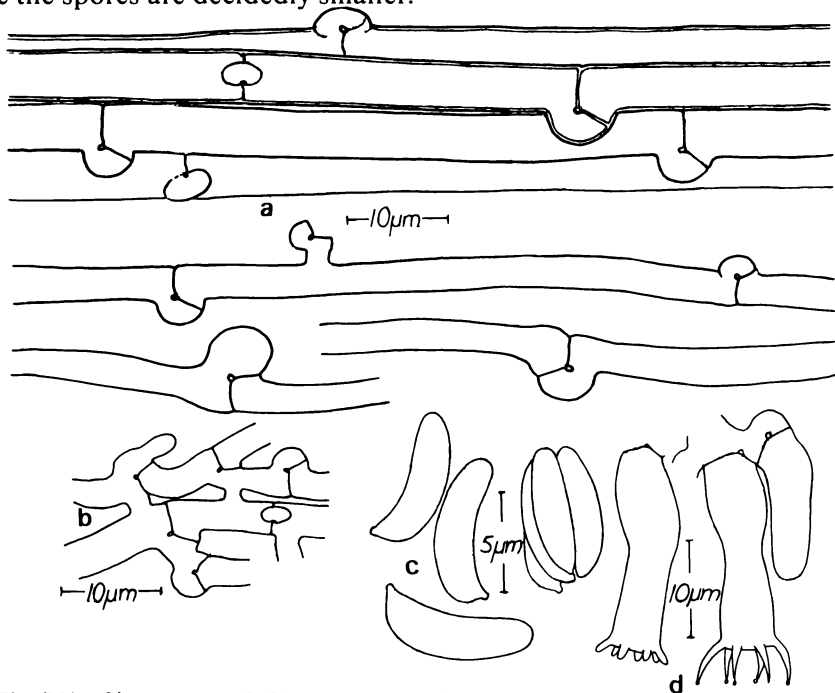
**Fruitbody** resupinate, effused, athelioid, thin, smooth with continuous hymenium; margin thinning out, partly arachnoid.**Hyphal system** monomitic; hyphae with clamps; basal ones 3.5-5.5  $\mu\text{m}$  wide, with somewhat thickened walls, straight, sparsely branched and loosely interwoven, clamps often ampullately widened, some basal hyphae joined into branched strands; subhymenial hyphae thin-walled, 2.5-4  $\mu\text{m}$  wide, with many oil-drops.**Basidia** urniform, 14-30 x 4.5-6.5  $\mu\text{m}$ , with 4-8 sterigmata and a basal clamp.**Spores** subfusoid-suballantoid, smooth, thin-walled, 7-9 x 2-2.5  $\mu\text{m}$  non-amyloid, non-cyanophilous.**Habitat and distribution.** Described from Iran and not found in N. Europe.**Remarks.** The species seems in some respects, esp. the spores, to take a place at the end of a series of long-spored specimens within *S. octosporum* including also *S. subpyriforme* M.P. Christ., but differs in the athelioid fruitbody. In this respects it resembles *Sistotrema* sp. Hauerslev 3035, but here the spores are decidedly smaller.

Fig. 707. *Sistotrema suballantosporum*. a) basal hyphae b) subhymenial hyphae c) spores d) basidia. — From the holotype.

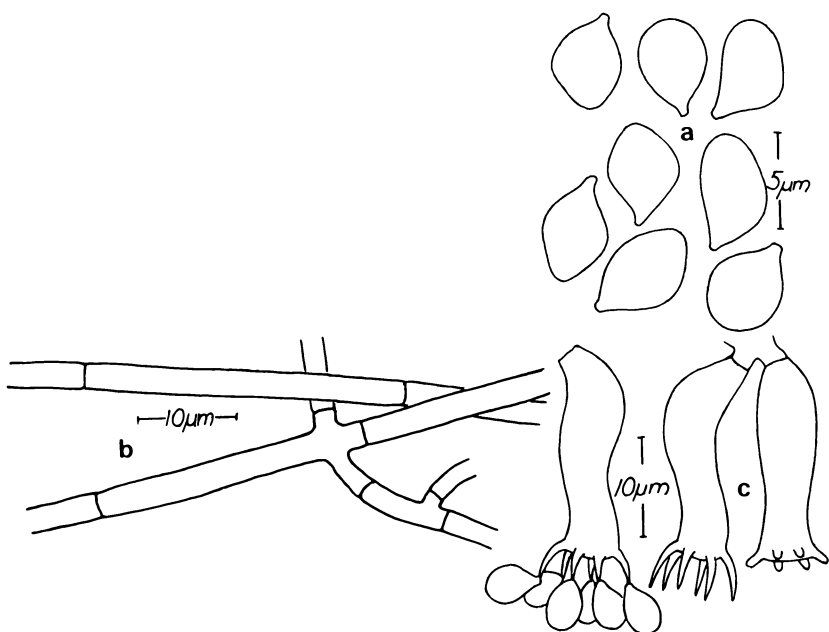


Fig. 708. *Sistotrema subangulisporum*. a) spores b) hyphae c) basidia. — Coll. Hjortstam 16904.

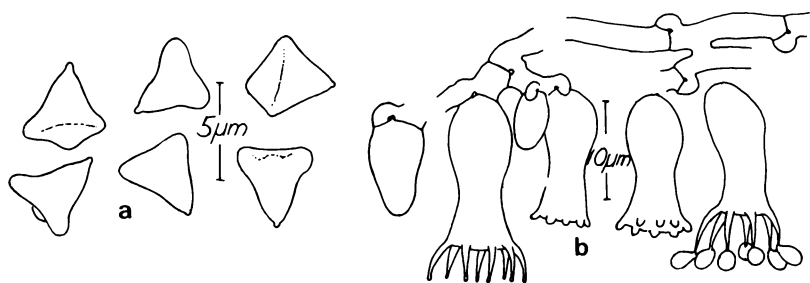


Fig. 709. *Sistotrema subtrigonospermum*. a) spores b) basidia and hyphae. — From the holotype.

**20. *Sistotrema subangulisporum*** K.H. Larss. & Hjortst., Fig. 708  
Mycotaxon 5 p. 479, 1977.

**Fruitbody** resupinate, effuse, closely adnate, thin, smooth, whitish and ceraceous in the living state, yellowish when dried; without differentiated margin.

**Hyphal system** monomitic; hyphae with thin or somewhat thickened walls, 2-3  $\mu\text{m}$  wide, without clamps.

**Cystidia** none.

**Basidia** urniform, 20-25 x 5  $\mu\text{m}$ , with 6(-8) curved sterigmata; without a basal clamp.

**Spores** 5-6 x 3-4  $\mu\text{m}$ , subglobose-subangular, tapering towards the apiculus, smooth, with thin or slightly thickened walls.

**Habitat and distribution.** On decayed or decorticate wood of *Pinus* in mixed forests (*Pinus*, *Picea*, *Quercus*, *Betula*, *Sorbus*) as well as in wet forests with *Sphagnum*. Very rare species, hitherto found only a few times in the province of Västergötland in SW. Sweden, and once in Norway.

**Remarks.** Easily recognized species because of the simple septate hyphae and the subangular spores. The shape of the spores points at an affinity to *S. pistilliferum*.

**21. *Sistotrema subtrigonospermum*** Rogers, Fig. 709  
Univ. Iowa Stud. Nat.Hist. 17 p. 22, pl. 2, fig. 10, 1935. *Trechispora subtrigonosperma* (Rogers) Rogers & Jacks. Farlowia 1 p. 328, 1943.

**Fruitbody** totally resupinate, adnate, effuse, very thin and delicate («like a bloom»), greyish-white; no differentiated margin.

**Hyphal system** monomitic; all hyphae with clamps, 2.5-5  $\mu\text{m}$  or sometimes wider, densely branched and anastomosing.

**Cystidia** none.

**Basidia** at first subglobose, at maturity urniform, 12-18 x 4-6  $\mu\text{m}$ , with 6-8 sterigmata and a basal clamp.

**Spores** tetrahedral, 4.5-5 x 3-4.5  $\mu\text{m}$ , smooth, thin-walled.

**Habitat and distribution.** Very rare species. In N. Europe collected only twice (Denmark: Sjaelland, L. Dyrehave, K. Hauerslev (C), and Sweden: Muddus Nat. Park, B.&J. Eriksson). There is only one other specimen from Europe (Spain: Mallorca, H. Knudsen, C). It occurs on both coniferous and deciduous wood. There seems to be no material of the Muddus specimen left in UPS but the description and figure in Eriksson (Symb. Bot. Ups. 16(I):61-62, 1958) leave no doubt about the determination.

**Remarks.** Easily determined because of the characteristic spores.

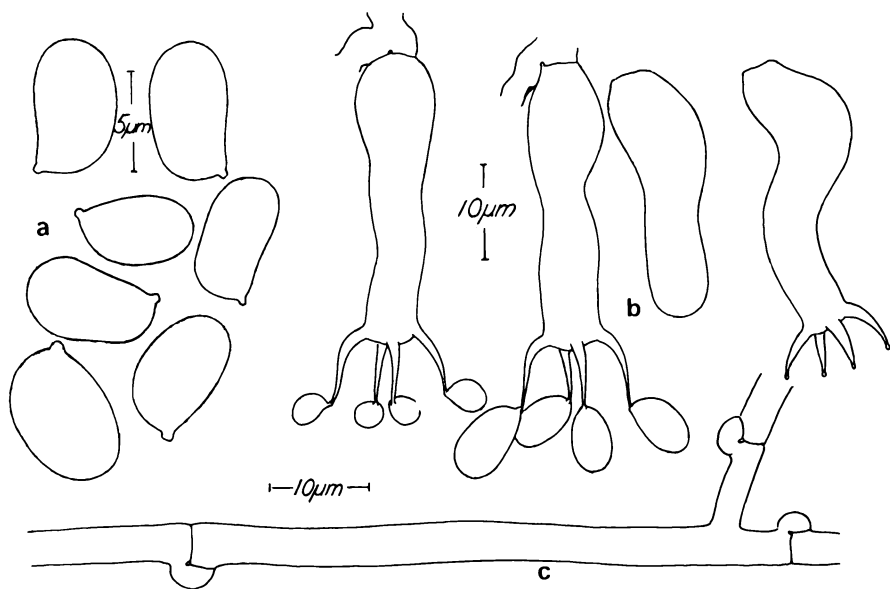


Fig. 710. *Sistotrema* sp. Blomdahl 565. a) spores b) basidia c) basal hyphae. — Coll. Blomdahl 565.

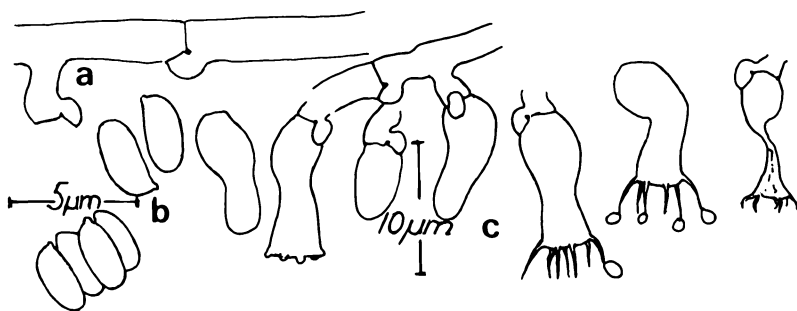


Fig. 711. *Sistotrema* sp. B. & J. Eriksson 4452. a) part of basal hyphae b) spores c) basidia. — Coll. B. & J. Eriksson 4452.

Fig. 710

**22. Sistotrema sp.** Blomdahl 565. One specimen, collected in Norway: Larvik, Fritzøehus forest, on *Fagus sylvatica*, 1979.10.09 by Erik Blomdahl. It is thin, grey-yellowish, pruinose, very closely attached and grows mainly on an old dead, more or less gelatinized resupinate fungus. The material is not good but spores and basidia can be seen as well as portions of the hyphae. It differs from most other species of the genus in the shape of the spores and in the number of sterigmata which always seems to be 4. The spores are ellipsoid to reniform,  $5.5\text{--}7 \times 3\text{--}4.5 \mu\text{m}$ , the basidia urniform,  $25\text{--}30 \times 5\text{--}8 \mu\text{m}$ , hyphae thinwalled, ca.  $4 \mu\text{m}$  wide; no gloeocystidia seen. The specimen cannot be placed in any of the described species.

Fig. 711

**23. Sistotrema sp.** B. & J. Erikss 4452.

**Fruitbody** resupinate, closely adnate, very thin and delicate, effuse, argillaceous when dried, pruinose; without differentiated margin. Hyphal system monomitic; all hyphae thin-walled and with clamps, basal ones  $2\text{--}3 \mu\text{m}$  wide, straight, parallel with and closely attached to the substrate; subhymenial hyphae very scarce. Cystidia none. Basidia urniform,  $8\text{--}10\text{--}(15) \times 3\text{--}4 \mu\text{m}$ , with  $(6\text{--}7)\text{--}8$  ster. and a basal clamp. Spores short-cylindrical to narrowly ellipsoid,  $3\text{--}4 \times 1\text{--}1.5 \mu\text{m}$ , smooth, thin walled, non-amyloid, non-cyanophilous. Found only once (Sweden, Lule Lappmark, Jokkmokk Par., S of Muddus Nat. Park, near the Njuoravuolle cabin on St. Lule älv, 1950.06.20, B. & J. Eriksson 4452). It seems definitely to be a good species of its own. The material is, however, too scarce for a type specimen, and we therefore refrain from formally describing a new species.



**24. Sistotrema sp. Eriksson 2422.**

Fig. 712

**Frutibody** extremely thin the naked eye, like a hardly visible bloom under the lens or as a thin pruina; no differentiated margin. Hyphal system monomitic; hyphae 2-3  $\mu\text{m}$  wide, thin-walled, with clamps. Cystidia none. Basidia at first globose-subglobose, then pyriform, when mature short, urniform, 8-10 x 6-7  $\mu\text{m}$ . Spores narrowly ellipsoid-subcylindrical, 4.5-6 x 2-2.5  $\mu\text{m}$ . Only one collection: Skåne, Båstad, Paulins udde, on fallen branch of *Prunus spinosa*, 1948.03. 24, B. & J. Eriksson 2422 (GB). This single specimen seems to represent a species of its own. Its closest relative is *S. oblongisporum*, with which it agrees in its outer appearance and choice of substrate (on bark of deciduous wood) but it differs in the shape of the basidia and the spores as well as of the basal hyphae.

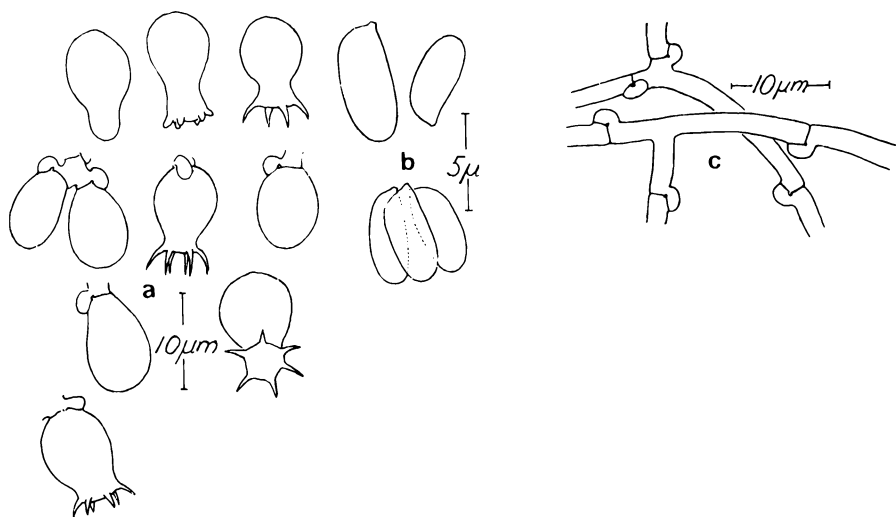


Fig. 712. *Sistotrema* sp. Eriksson 2422. a) basidia b) spores c) hyphae. — Coll. Eriksson 2422.

**25. *Sistotrema* sp. Hauerslev n. 3035 (C).**

Fig. 713

**Fruitbody** smooth, continuous, more or less athelioid, white to slightly yellowish. Basidia varying in size, (16-)20-25(-35) x 5-6.5  $\mu\text{m}$ , with 4-6 rarely 8 sterigmata. Spores 4.5-6.5 x 2-2.5  $\mu\text{m}$ , narrowly ellipsoid — subcylindrical-subballantoid, with straight or only slightly curved adaxial side. Hyphae 3-5  $\mu\text{m}$ , often ampullate to 7-10  $\mu\text{m}$ , basal ones straight, subhymenial ones richly branched. The specimen reminds in the shape of the spores of *S. sernanderi* and *S. coroniferum*, but lacks gloeocystidia and deviates also in the number of sterigmata. From *S. octosporum* even in its wide sense, it differs e.g. in the nature of the hymenium. This is one among many specimens which cannot be placed in any of the already described taxa.

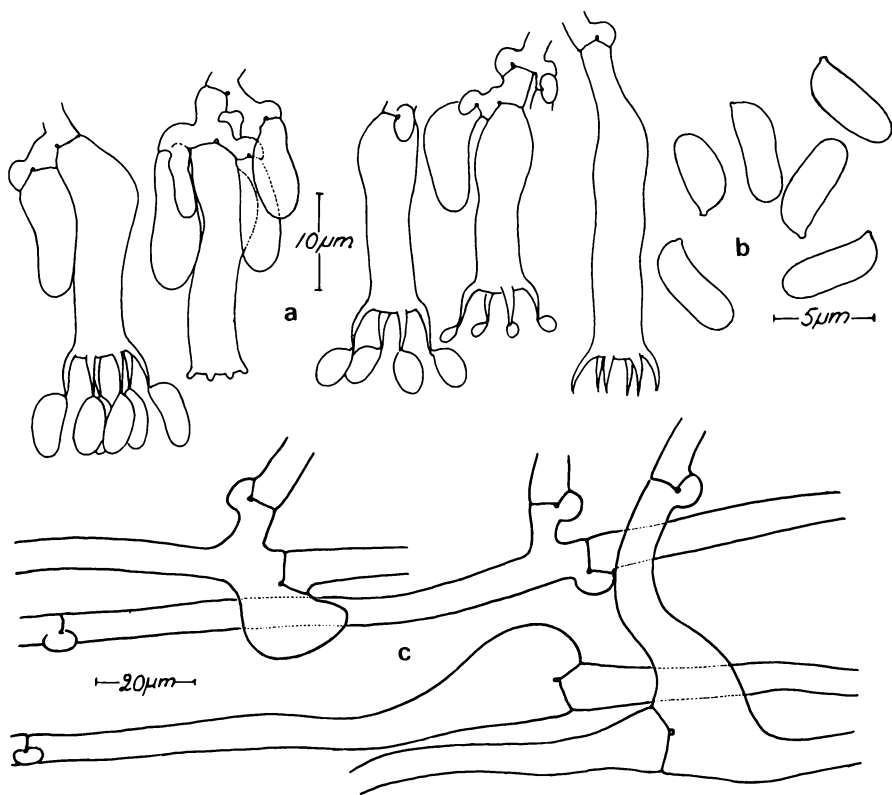


Fig. 713. *Sistotrema* sp. Hauerslev 3035. a) basidia b) spores c) hyphae with ampullate swellings. — Coll. Hauerslev 3035.

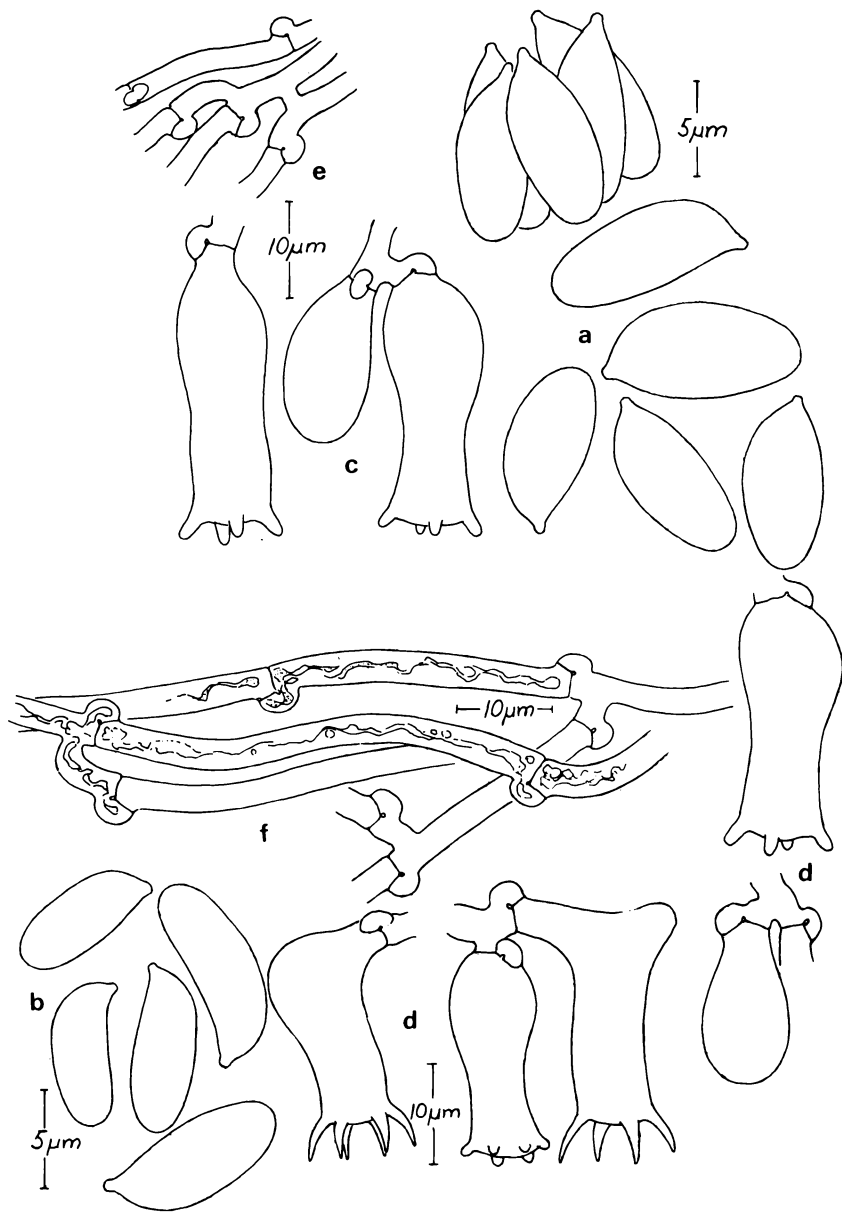


Fig. 714. *Sistotrema* sp. K.-H. Larsson 2242. a, b) spores c, d) basidia e, f) hyphae. — Coll. a, c, e) Larsson 2242, b, d, f) Larsson & Hjortstam 9974.

**26. Sistotrema sp.** K.-H. Larss. 2242.

Fig. 714

**Fruitbody** effuse, thin, greyish white, pruinose, smooth, without differentiated margin.

**Hyphal system** monomitic, hyphae thin-walled, smooth, 2.5-3 (-5)  $\mu\text{m}$ , forming a net closely attached to the substrate, all hyphae with clamps.

**Cystidia** none.

**Basidia** sublateral, obpyriform when immature, then as a rule pyriform, finally more or less urniform, truncate, 20-30 (40)  $\times$  6-7(-8)  $\mu\text{m}$ , with (4-) 6 sterigmata.

**Spores** narrowly obovate to ellipsoid, mostly tapering towards the apiculus, thin-walled, hyaline, smooth. 9-10  $\times$  4-4.5 (-5.5)  $\mu\text{m}$ .

**Habitat and distribution.** On dead rhachis of *Athyrium filix-femina*. Found only twice (Norway: Akershus, Nannestad, and Sweden: Västergötland, V:a Tunhem parish).

**Remarks.** Differs from other species by its very thin fruitbody, large spores and truncate basidia. In shape and size of the spores it resembles large-spored varieties of *S. octosporum* but differs in the nature of the fruit-body and in the shape of the basidia.

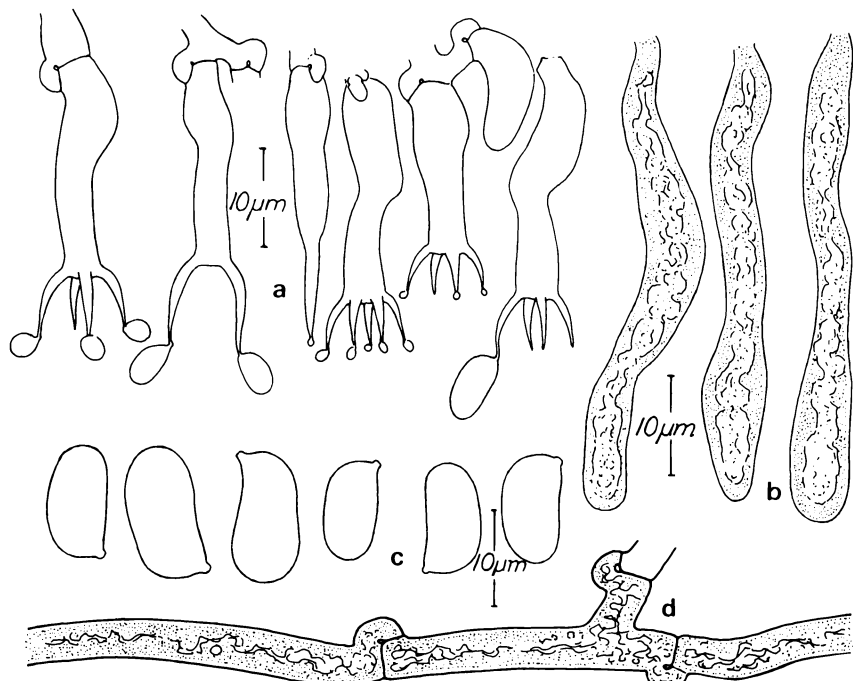


Fig. 715. *Sistotrema* sp. Olsson 5777. a) basidia b) gloeocystidia c) spores d) basal hyphae. — Coll. Olsson 5777.

27. *Sistotrema* sp. O. Olsson 5777

Fig. 715

**Fruitbody** resupinate, effus, adnate, smooth, thin, white to pale cream-coloured, without differentiated margin. Hyphal system monomitic; hyphae with clamps, thin-walled, 2.5-5  $\mu\text{m}$  wide, with much oily content.

**Gloeocystidia** numerous, 60-110 x 6-10  $\mu\text{m}$ , with colourless, oily contents. Basidia urniform, 15-25 x 3.5-5  $\mu\text{m}$ , with (2-)4(-6) sterigmata and a basal clamp. Spores 5-6.5(-7) x 2.5-3.5  $\mu\text{m}$ , ellipsoid-subreniform, thinwalled, non-amyloid, non-cyanophilous. Found only once, Göteborg: The European arboretum of the Botanical Gardens. 1962,05,16. O. Olsson 5777. Agrees in several respects with *S. coroniferum* but differs in the shape of the spores, which are decidedly broader. The single collection seen is small but well developed.

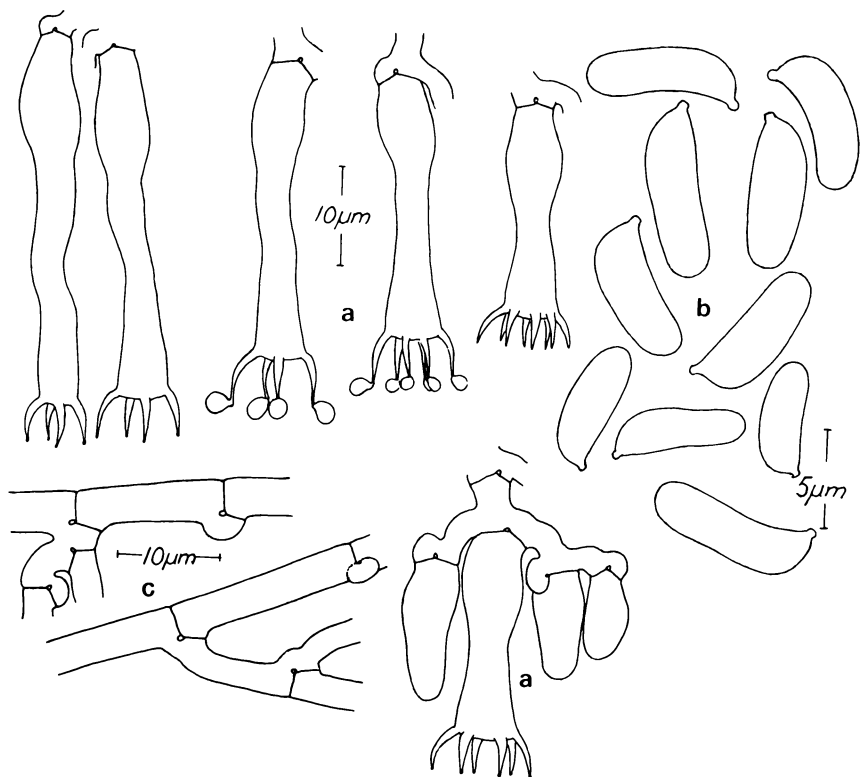


Fig. 716. *Sistotrema* sp. Romell 3963. a) basidia b) spores c) hyphae. — Coll. Romell 3963.

**28. Sistotrema sp.** Romell 1963.

Fig. 716

**Fruitbody** resupinate, totally adnate, effuse, white, smooth, 50-75  $\mu\text{m}$  thick when dried, hymenium continuous, smooth; margin indeterminately thinning out; no rhizomorphic strands. No gloeocystidia seen. Basidia narrowly urniform to subcylindrical, 20-35 x 3-6  $\mu\text{m}$ , somewhat wider in the apical and basal parts, with 4-8 sterigmata and a basal clamp. Spores subcylindrical-subballantoid, smooth, thin-walled, (5.5-)-6.5-8(-9) x 2-2.7(-3)  $\mu\text{m}$ . Hyphae thin-walled, 3.5-6  $\mu\text{m}$  wide, with clamps. Two specimens seen: Stockholm. Frescati-Experimentalfältet, on *Populus tremula*, 1918.02.25.L. Romell 1963 and Västergötland: Medelplana par., Råbäck; Kinnekulle, on deciduous wood, 1976.10.30. K. Hjortstam 7535. The two specimens agree quite well, even if the spores are slightly narrower in the latter. Romell gave his specimen the provisional name *Corticium cretaceum* v. *niveum*. It was revised by V. Litschauer to *Gloeocystidium coroniferum* v. Höhn. & Litsch. We cannot, however find any gloeocystidia, and therefore no place for these specimens among the already described species. In the microscopical details it is close to *S. subballantosporum*, but differs in the adnate fruitbodies. In some respects it agrees with *Sistotrema* sp. Hauerslev 3035 but in this one the spores are clearly smaller and the fruitbody somewhat atheliod.

**29. Sistotrema sp.** Ryvarden 15372.

Fig. 717

**Fruitbody** resupinate, closely adnate, white with a slight tint of yellow in the dried state, hymenium distinctly grandinoid, densely continuous; margin indeterminately thinning out; basidia 15-20 x 4-5  $\mu\text{m}$ , with 4 ster., spores 5.5-8 x 3-4  $\mu\text{m}$ , ellipsoid to subreniform, smooth, thin-walled; hyphae 3-4  $\mu\text{m}$  wide, densely branched, tissue with a rich content of Ca-oxalate crystals. Judging from the single specimen seen (Spain: Santander Prov., ca. 5 km S of Cavadonga, on *Alnus incana*, 1977.11.14) it is a species of its own. In some respects, esp. the shape of the spores and the number of sterigmata it agrees with *Sistotrema* sp. Blomdahl 565, but the external morphology is totally different and they cannot possibly be placed in the same taxon. Even if this specimen does not represent the Nordic Corticiaceae we mention it as an interesting member of a critical group.

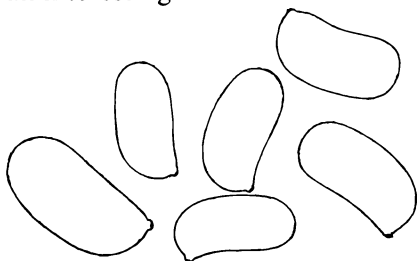


Fig. 717. *Sistotrema* sp. Ryvarden 15372. Spores. Coll. Ryvarden 15372.

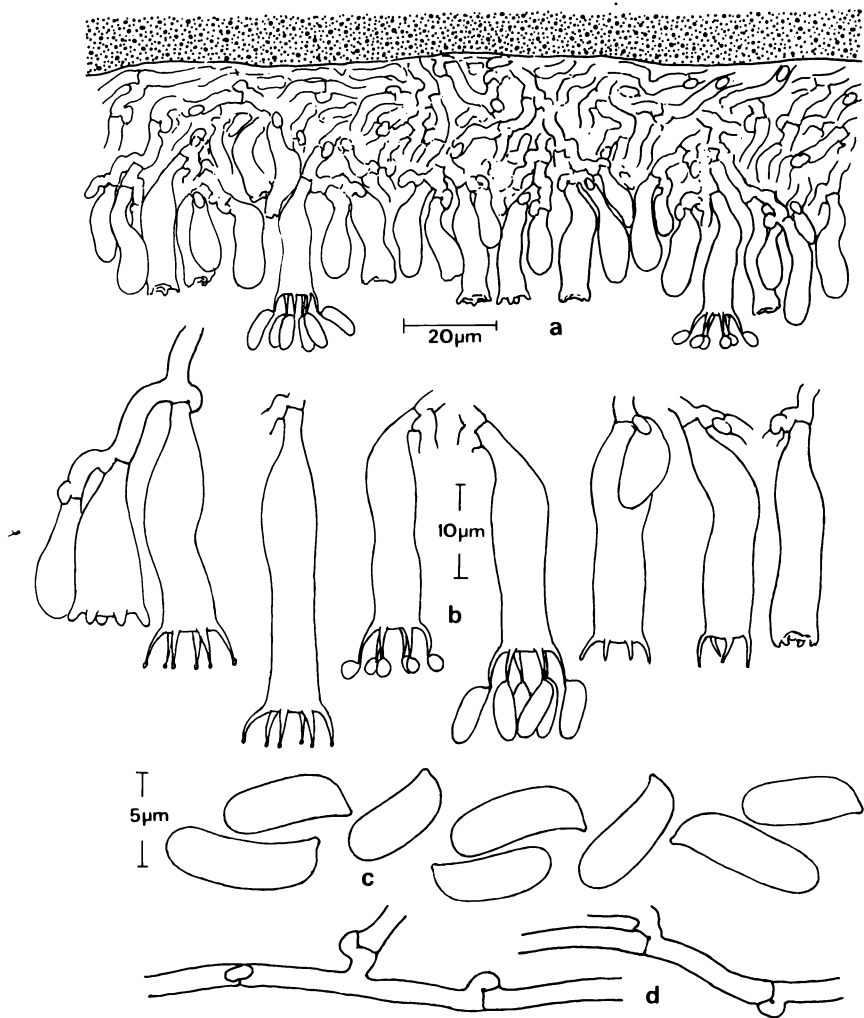


Fig. 718. *Sistotremastrum niveocreameum*. a) section through fruitbody b) basidia c) spores d) hyphae. — Coll. Hjortstam 1014.



**Sistotremastrum** John Erikss.,  
Symb. Bot. Ups. 16:1, p. 62, 1958.

**Fruitbodies** white or whitish (at least in N. European species), effuse, totally resupinate, ceraceous in the living state, brittle when dried; hyphal system monomitic, hyphae with clamps; basidia normally subclavate-tubular, often slightly constricted; spores narrowly ellipsoid-subcylindrical-suballantoid.

**Type species:** *Corticium suecicum* Litsch. in John Erikss.

**Remarks.** In the white fruitbodies and the number of sterigmata this genus resembles *Sistotrema*, but still these genera do not seem to be very closely related. The basidia of *Sistotremastrum* are of the type normal for Corticia-ceae while in *Sistotrema* they develop in two steps and as a consequence become more or less urniform. The hyphae of the latter genus are characteristically rich in oily inclusions, not so in *Sistotremastrum*. One peculiarity of this genus is the appearance of the postmature basidia. They do not collapse completely after the spores discharge, only in the uppermost part, which becomes folded in, with the shrunken sterigmata more or less turned inwards. Even if this characteristic may be of restricted taxonomic value, it is of interest for the recognition of specimens. It is more evident in *S. suecicum* than in *S. niveocreameum* but can also be seen in this species. *S. niveocreameum* is by Oberwinkler (1962) and later by Jülich (1980) referred to *Paullicorticium* but its affinity to the type species of this genus is no doubt much less than to *S. suecicum* and therefore we prefer to maintain *Sistotremastrum* in its original scope.

Key to species:

1. Spores subcylindrical-allantoid, 6-9  $\mu\text{m}$  long, normally on deciduous wood ..... 1. *S. niveocreameum*
2. Spores narrowly ellipsoid, 4.5-6  $\mu\text{m}$  long,  
on coniferous wood ..... 2. *S. suecicum*

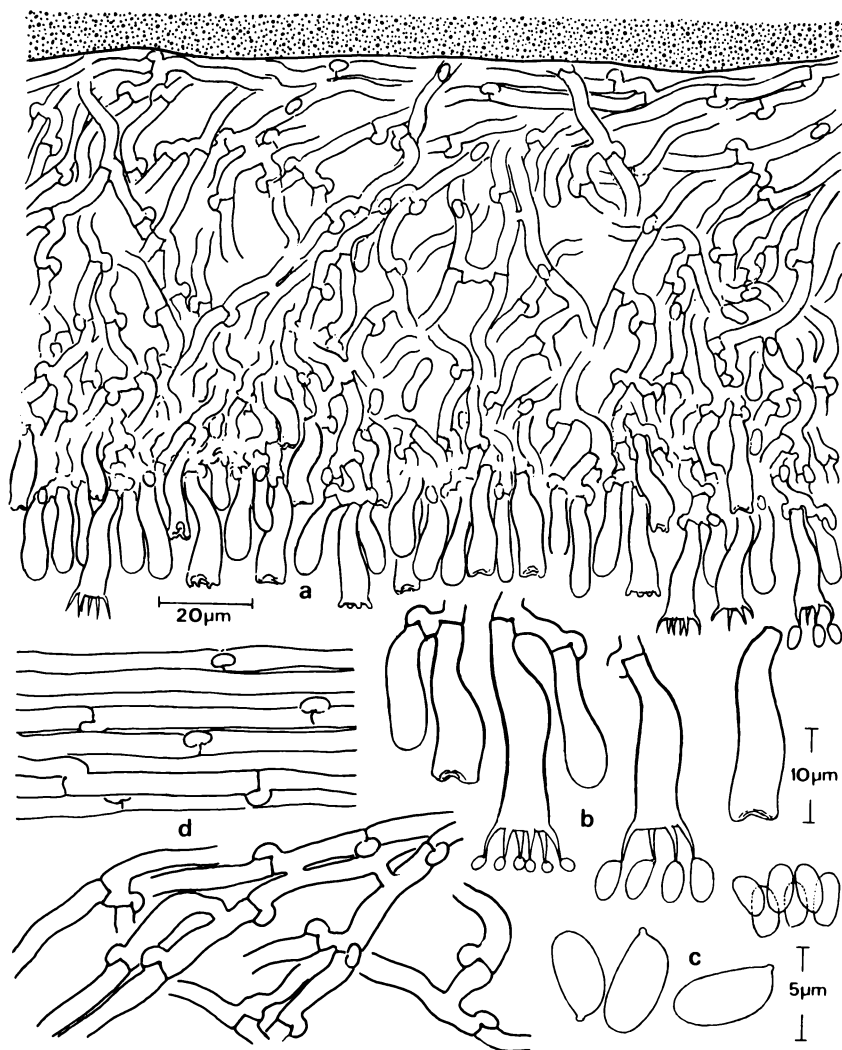


Fig. 719. *Sistotremastrum suecicum*. a) section through fruitbody b) basidia c) spores d) hyphae. — Coll. a-c) Fagerström 1979-1026. d) Eriksson 3190.

**1. *Sistotremastrum niveocreum*** (v. Höhn. & Litsch.) John Erikss., Fig. 718  
Symb. Bot. Ups. 16 (1) p. 62, 1958 — *Corticium niveocreum* v. Höhn. & Litsch., Sitzb. Akad. Wiss. Wien, Math.-nat. Kl. 117 p. 1117, 1908. — *Corticium niveocreum* v. Höhn. & Litsch., Österr. Cort. in Wiesner Festschr. p. 65, 1908 (nomen nudum). Holotypus: Austria, Wienerwald, Saagberg bei Unter-Tullnerbach, an morschem Buchenholz, 1905.03.11, leg. F.v. Höhnel (W).

**Fruitbody** resupinate, adnate, mostly thin (ca. 100  $\mu$ m), ceraceous and continuous when fresh, when dried mostly porulose due to shrinking, white or when dried yellowish; no differentiated margin; no rhizomorphs.

**Hyphal system** monomitic; all hyphae with clamps, 2-3  $\mu$ m wide, hyaline, richly branched, few straight basal hyphae.

**Cystidia** none.

**Basidia** obconical to tubular, sometimes somewhat constricted, 15-26 x 4-6(-7)  $\mu$ m, with 4-6 sterigmata and basal clamps.

**Spores** 6-9 x 2.5-3(-4)  $\mu$ m, narrowly ellipsoid-subcylindrical-subballantoid, thin-walled, smooth.

**Habitat.** On decayed wood of deciduous trees (e.g. *Quercus*, *Corylus*, *Alnus*) and sometimes on *Picea*, in humid localities, usually in more fertile biotopes.

**Distribution.** Not rare in S. Scandinavia (Denmark, S. Sweden, S.E. Norway), rarer northwards, found once in N. Sweden (Västerbotten) and once in Finland.

**Remarks.** Distinguished from *S. suecicum* e.g. by its thinner fruitbodies, and in size and shape of the spores. By some authors placed in *Paullicorticium*, obviously for the reason that some of the basidia use to be obconical, but most of the basidia conform in shape to those of *S. suecicum* and also in other respects it fits this species very well. In any case it is much closer to the type species of this genus than to that of *Paullicorticium*. We do not think that an acceptable solution of the problem is to join the two genera.

**2. *Sistotremastrum suecicum*** Litsch. ex Erikss., Fig. 719  
Symb. Bot. Ups. 16:1, p. 62, 1958. — *Corticium calceum* Bourd. & Galz., Hym. de Fr. p. 237, 1928. Non *Thelephora calcea* Fr., Elench. fung. I p. 215, 1828.

Holotypus: Lundell & Nannf. Fung. exs.suec. 464: Uppland. Bondkyrka par., Malma skog, NW of Hälltorpet (near Uppsala), 193301-04, S. Lundell (UPS).

**Fruitbody** resupinate, smooth, adnate or detachable in small pieces, white or cream-coloured, in age in the herbarium sometimes discoloured to argillaceous or pale buff; ceraceous and continuous when fresh, specimens on

naked wood when dried as a rule longitudinally cracked and often also transversely into small squares or irregular pieces; no differentiated margin.

**Hyphal system** monomitic; hyphae 2-3  $\mu\text{m}$  wide, with clamps, with thin or slightly thickened walls, rarely forming a basal layer or strands of parallel hyphae; no definite distinction between subhymenial and tramal hyphae.

**Basidia** 16-21 x 4-6  $\mu\text{m}$ , clavate-tubular, often somewhat constricted, with slightly thickened walls, usually with 6, less often 4 sterigmata and with basal clamp; after spore discharge basidia often remain dilatated with only the uppermost part collapsed.

**Spores** 4.5-6 x 1.5-2  $\mu\text{m}$ , narrowly ellipsoid, thin-walled.

**Habitat.** Mostly on coniferous wood, esp. of *Pinus*, but not rare on *Picea*, few collections from *Juniperus* and deciduous wood. In old days, when wooden fences occurred everywhere in the countryside, it was one of the species which could be seen regularly in old, more or less fallen fences. It seems to be favoured by fairly open sites and also to grow well in fairly dry ones. It is often seen together with *Phlebia cretacea*, *Aleurodiscus lividocaeruleus*, and *Xenasmatella filicina*.

**Distribution.** A common species in coniferous forests in most parts of Sweden, at least in the northern part, apparently common in Norway and Finland, but rare in Denmark. Outside N. Europe it seems to be widely spread in the north temperate zone, esp. in N. America.

**Remarks.** Uniform, easily determined species. *Corticium calceum* (Fr.) in Bourd. & Galz. is clearly the same species. Bourdot and Galzin were of the opinion that their material agreed with Fries's description in *Epicrasis*, but his first description, in *Elenchus*, shows that *Th. calcea* comprised several taxa and that he got the name from *Thelephora calcea* Pers., which he included as a synonym, but which now is referred to Tremellaceae.

**Sistotremella** Hjortst. gen. nov.

Generi *Sistotremati* affinis, sed differt sporis crassitunicatis cyanophilisque, hyphis cyanophilis.

**Type species:** *Sistotremella perpusilla* Hjortst.

**Fruitbodies** resupinate, effuse, closely adnate, smooth and crustaceous in the living state, when dried forming a pruina or a very thin crust on the substrata; hyphal system monomitic, hyphae with or without clamps, forming a thin, dense subhymenial layer with few straight basal hyphae; cystidia none or present as gloeocystidia; basidia urniform with 6-8 sterigmata; spores small, ellipsoid, thick-walled, cyanophilous.

**Remarks.** Close to *Sistotrema* but differs in the nature of the spores, which are thick-walled and cyanophilous. The hyphae do not show the oil-rich contents normally seen in *Sistotrema*. As the spore characteristic is found to be useful in generic arrangements among Corticiaceae as well as among other Basidiomycetes, we have found it necessary to describe a new genus. A characteristic of interest in *Sistotremella* as well as in some other genera of Corticiaceae with thick-walled spores (e.g. *Hypochnicium*, *Intextomyces*) is the richness of spores deposited in the dried fruitbodies. Only two species are hitherto known.

## Key to the species

- |   |                          |
|---|--------------------------|
| 1. Hyphae without clamps, gloeocystidia present ..... | 1. <b>S. hauerslevii</b> |
| 1. Hyphae with clamps, gloeocystidia absent .....     | 2. <b>S. perpusilla</b>  |

**1. Sistotremella hauerslevii** Hjortst. spec. nov.

Fig. 720

Fructificatio tenuis, levis, effusa, adnata, argillacea, sicco crustacea, margine indeterminato, pruinato; hyphae 2-3  $\mu\text{m}$  latae, efibulatae, tenuitunicatae, cyanophilae, subhymeniales dense intricatae, basales rectae infrequentes; gloeocystidia 25-30(-70)  $\times$  3.5-6  $\mu\text{m}$ , frequentia, tenuitunicata, interdum septata, plasmatibus oleosogranulosis; basidia 12-18  $\times$  2.5-6  $\mu\text{m}$ , urniformia, 6-8 sterigmatibus; sporae 3.5-4  $\times$  2-2.5  $\mu\text{m}$ , ellipsoideae, leves, crassitunicatae, cyanophilae.

Holotypus: Denmark. Sjaelland, Rørvig, Hov Skov, decayed deciduous wood. 1976.10.30. K. Hauerslev (C).

**Fruitbody** resupinate, closely adnate, forming a very thin argillaceous, smooth crust on the wood, in the living state evidently waxy; margin pruinose, not especially differentiated.

**Hyphal system** monomitic; hyphae thin-walled, 2-3  $\mu\text{m}$  wide, without clamps, cyanophilous, basal ones fairly straight with few branches, subhymenial part composed of short-celled hyphal branches in a dense tissue.

**Gloeocystidia** 25-30 (-70)  $\times$  3.5-6  $\mu\text{m}$ , numerous, thin-walled, sometimes septate, tubiform, often constricted or winding, some few branched ones seen; protoplasm oily, in phase often granular, colourless or very pale yellow.

**Basidia** 12-18  $\times$  3.5-6  $\mu\text{m}$ , urniform, with 6-8 sterigmata, without a basal clamp, some few basidia observed as being subpleural.

**Spores** 3.5-4  $\times$  2-2.5  $\mu\text{m}$ , ellipsoid, smooth, thick-walled, cyanophilous.

**Habitat and distribution.** Hitherto found only once.

**Remarks.** The gloeocystidia resemble those of *Sistotrema coroniferum* but in other respects *S. hauerslevii* differs very clearly from this species.

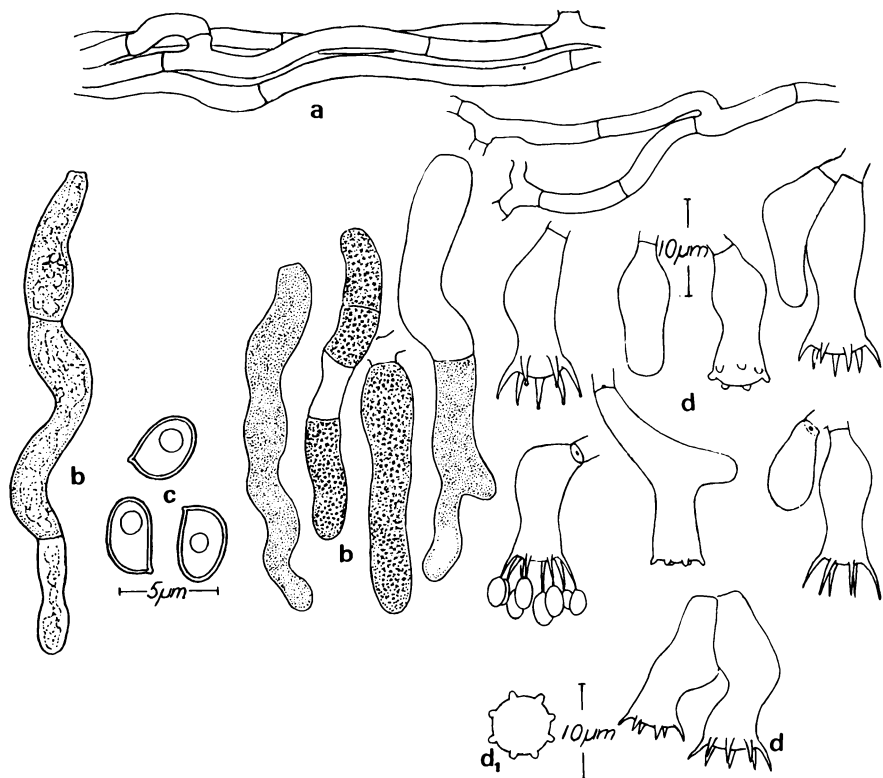


Fig. 720. *Sistotremella hauerslevii* a) hyphae b) gloeocystidia c) spores d) basidia,  $d_1$  seen from above. — From the holotype.

## 2. *Sistotremella perpusilla* Hjortst. spec.nov.

Fig. 721

Fructificatio resupinata, effusa, dense adnata, tenuissima, levis, ceracea, sicco pruinata, albogrisea, margine indeterminato; cystidia nulla; basidia urniformia, 8-12 x 3-5  $\mu\text{m}$ , 6-8 sterigmatibus; sporae 3-5 x 2-2.5  $\mu\text{m}$ , ellipsoideae, crassitunicatae, cyanophilae.

Holotypus: Sweden, Västergötland, Flo par., W of Jonstorp mossen, Hunneberg forest reserve, on *Picea abies*. 1980.06.27. Hjortstam & Larsson 11409 (GB).

**Fruitbody** resupinate, effuse, closely adnate, smooth, ceraceous when fresh, when dried forming a greyish-white pruina on the wood; no differentiated margin.

**Hyphal system** monomitic; hyphae 1.5-2  $\mu\text{m}$  wide, all with clamps; sparse and straight basal hyphae, short-celled, densely interwoven.

**Cystidia** none.

**Basidia** urniform, 8-12 x 3-5  $\mu\text{m}$ , with 6-8 sterigmata and a basal clamp.

**Spores** short-ellipsoid, thick-walled, smooth, 3-5 x 2-2.5  $\mu\text{m}$ , cyanophilous.

**Habitat and distribution.** Known for more than 20 years in Denmark by K. Hauerslev and in Sweden by John Eriksson. Owing to its small size it is easily overlooked and probably not too rare. Grows on much decayed wood, both of conifer and deciduous trees. Found in Denmark in the south to Muddus Nat. Park in the north. Recently also collected in W. Germany.

Paratypes: Denmark, Sjaelland; K. Hauerslev n:o 1614, 6053, 3646, 5716, and K. Hauerslev 1973.04.22 s.n., all in herb C-Sweden, Småland: J. Eriksson 3229. Västergötland: KH Larsson 2282, 2328, 3506, Hjortstam 8623. Halland: KH Larsson 3474. Uppland: T. Hallingbäck 1981.10.13. s.n. Lappland: E. Olsson & J. Eriksson 7131. — Norway, Hordaland: J. Stordal & J. Eriksson 6074 (UPS). Sør-Trøndelag: Hjortstam 12775.

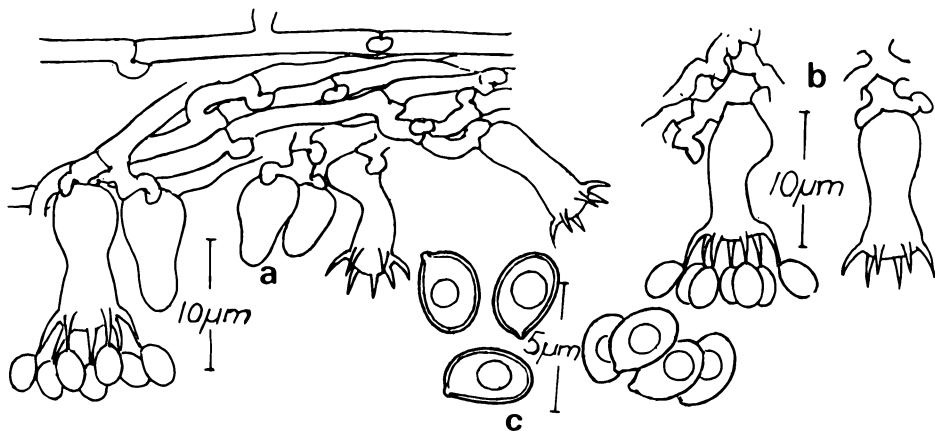


Fig. 721. *Sistotremella perpusilla*. a) part of fruitbody b) basidia c) spores. — Coll. Hallingbäck 30169.

**Sphaerobasidium** Oberw.,  
Sydowia Ann. Mycol. ser. II 19 p. 57, 1965.

**Fruitbodies** extremely thin, consisting only of a net of hyphae, attached to the substrata, in the living state appearing as a greyish bloom, when dried as a fine pruina; hymenial elements scattered on the hyphal net; hyphal system monomitic, all hyphae thin-walled, with clamps; cystidia small, numerous, narrowly conical and with an apical head, excreting an oily-resinous matter; basidia subglobose-obconical with 4 sterigmata and basal clamp; spores narrowly ellipsoid, adaxially adpressed, thin-walled, non-amyloid, non-dextrinoid, non-cyanophilous.

**Type species:** *Xenasma minutum* John Erikss.

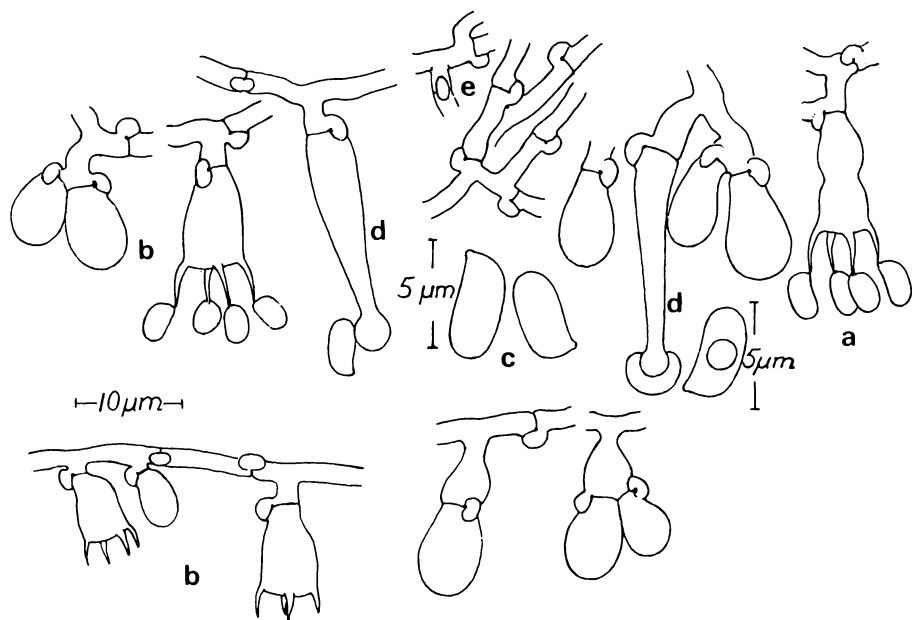


Fig. 722. *Sphaerobasidium minutum*. a) basidium with median constriction b) basidia c) spores d) cystidia e) hyphae. — Coll. a) Hjortstam 728, b-e) Eriksson 3371.



**Remarks.** *Sphaerobasidium* is similar to *Repetobasidium* in several respects. In both genera basidia and cystidia develop directly from the basal hyphae. Repetition of basidia can, however, not normally be found in the former but at least in some basidia of one specimen (Hjortstam 11728) one node of repetition was observed, but without a series of clamps so characteristic of *Repetobasidium*. It has not been possible to prove that in this case the first basidium had developed sterigmata and spores. The type species was referred to *Xenasma* Donk as it was provided with short basidia borne directly by basal hyphae, but as *Xenasma* then became restricted to species with inter alia pleurobasidia a new genus was needed. In some respects, e.g. in the shape of the basidia, *Sphaerobasidium* comes very near some species now referred to *Paullicorticium* and it is possible that some species could be removed from this genus to *Sphaerobasidium*. The type species, however, differ too much from each other to allow them to be merged into one genus.

***Sphaerobasidium minutum*** (John Erikss.) Oberw. ex. Jülich, Fig. 669F, 722 Persoonia 10(3) p. 335, 1979; Oberwinkler, Sydowia 19 p. 57, 1965 — *Xenasma minutum* John Erikss., Symb. Bot. Ups. 16(1) p. 65, 1958.

**Fruitbody** resupinate, adnate, effused, forming small or confluent, very thin and inconspicuous patches on the wood, in the living state as a greyish bloom, when dried as a thin pruina, no differentiated margin.

**Hyphal system** monomitic, hyphae thin-walled, 1-2  $\mu\text{m}$  wide, with clamps, forming a net of branches at more or less right angles, densely attached to the substrate.

**Cystidia** numerous, 15-25(-35)  $\mu\text{m}$  long, 4-5  $\mu\text{m}$  wide at the base, conical, tapering towards the apex which, with few exceptions, is formed as a globose head, 3-4  $\mu\text{m}$  wide, covered with an excreted cap of oily resinuous matter, sticky in the living fungus and often with attached spores..

**Basidia** subglobose— obconical, mostly borne singly on the hyphae, when fully developed 7-9 x 5-6  $\mu\text{m}$ , with 4 sterigmata and a basal clamp.

**Spores** (3.5-)4-5.5 x (2.5-)3-3.5  $\mu\text{m}$ , narrowly ellipsoid, adaxial side straight or slightly depressed, thin-walled.

**Habitat.** On old, decorticated coniferous wood (*Pinus*, *Picea*, and *Abies*) lying on the ground in forests, also on wooden fences a.s.o.

**Distribution.** Widely distributed in the north temperate coniferous forests, but in varying frequency, like other very small corticioid fungi depending on suitable humidity and being therefore periodical. Being very inconspicuous it is besides easily overlooked. It is therefore usually found in well investigated areas where trained corticiologists have been collecting.

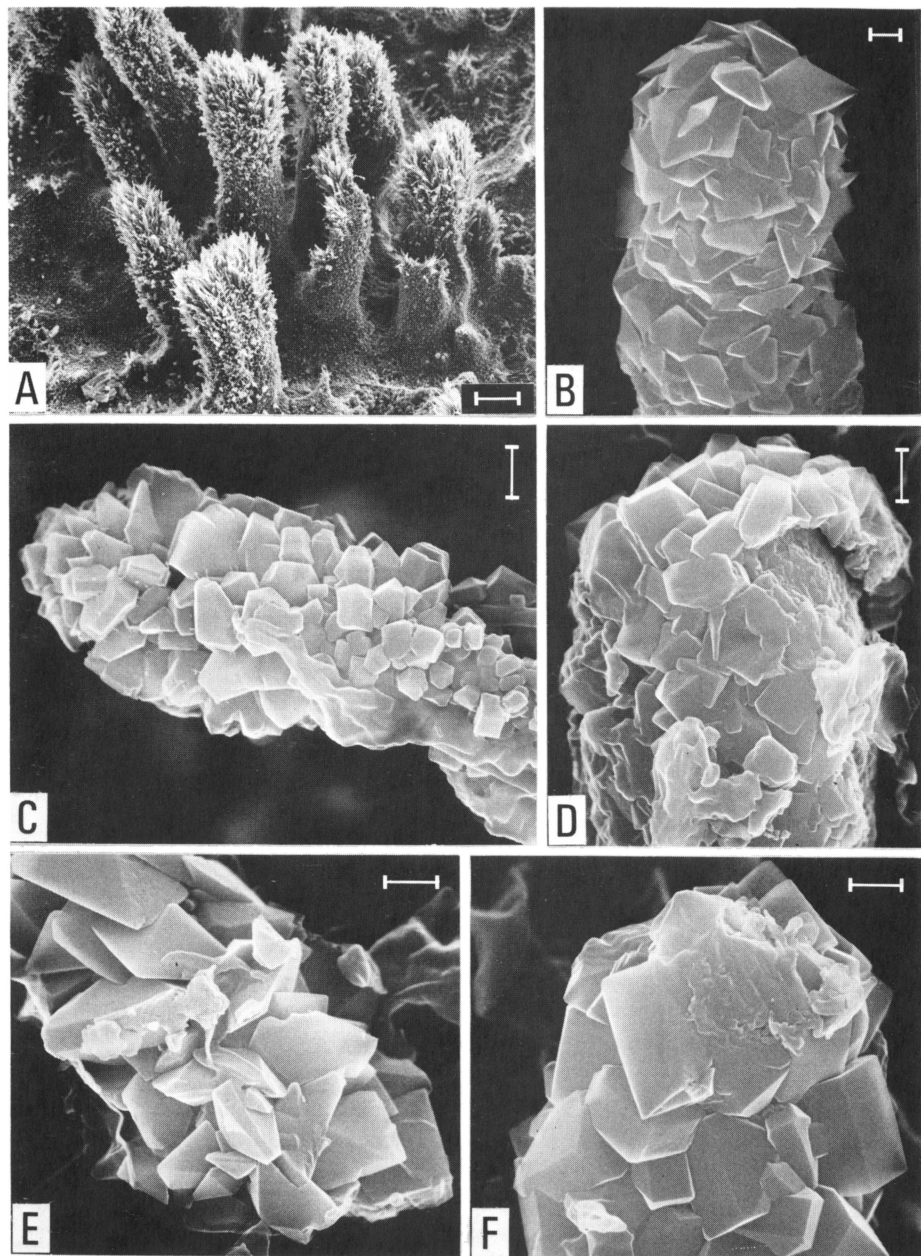


Fig. 723. SEM pictures of *Steccherinum* spp. A,B) *S. laeticolor* (coll. Eriksson 12657), detail of fruitbody and top of cystidium. C-F) apical part of cystidia. C,E) *S. robustius* (coll. Hjortstam 9434, dupl.). D) *S. ochraceum* (coll. Eriksson 24.X.1965, Tjolöholm, dupl.). F) *S. litschaueri* (coll. Ryvarden 7886, dupl.). — Scale A) 100  $\mu$ m, B-F) 1  $\mu$ m. Photo: Stellan Sunhede.

**Steccherinum** S.F. Gray,  
Nat. Arr. Br. Pl. 1p. 651, 1821.

**Fruitbodies** resupinate, firmly adnate or detachable, effused, reflexed to subpileate or pileate, in consistency tough membranaceous, hymenium odontoid to hydroid, cream-coloured to a shade of pinkish, reddish-orange or brownish, aculei distinctly conical or more rarely cylindrical or flattened, scattered to crowded, smooth or with fimbriate apices, in some species with verruculose sides, subiculum mostly rather thin but well developed, whitish, cream-yellowish or sometimes pale brown, margin with hairy filaments, paler than the fertile part, often rhizomorphic with pale ochraceous or brownish strings; hyphal system dimitic or pseudodimitic, generative hyphae thin-walled, with or without clamps, skeletal hyphae thick-walled, without clamps, some characteristically encrusted at the apices and penetrating the hymenial layer as pseudocystidia, as a rule numerous and thick-walled, mostly in the aculei but also in the smooth hymenium between the aculei, rarely as more or less well differentiated metuloids, encrusted part cylindrical or more rarely conical, with blunt or slightly pointed apices; basidia, subclavate, with four sterigmata and with a basal clamp in most species, spores ellipsoid to subcylindrical, thin-walled and smooth, non-amyloid, non-dextrinoid and without a visible cyanophilous reaction. **Type species:** *Hydnum ochraceum* Pers.:Fr.

**Remarks.** The genus *Steccherinum* is above all characterized by its odontoid hymenium, encrusted cystidia, and relatively uniform and small, thin-walled spores. The hyphal system is considered as dimitic, but this is largely a matter of definition. The thick-walled hyphae with no or sparse clamps are usually described as skeletal, but in some species of this genus they could as well be described as pseudocystidia. They are often, e.g., in the subiculum of *S. ochraceum* and *S. robustius*, kept together by richly branched 'generative hyphae' with more or less thickened walls. They function as 'binding hyphae' and in these cases there are three distinct kinds of hyphae. The nature of hyphae cannot, neither in *Steccherinum* nor in several other genera, be described schematically as mono-, di- or trimitic, as intermediate systems are often found. *Mycoleptodon microcystidius* M.P. Christ. (1953), does not belong to *Steccherinum* but is very similar to or conspecific with *Mycoacia aurea*. The specimens seen in this case are in a poor condition. In the protologue no holotype was mentioned and therefore a lectotype has been selected. Formalistically such a type ought to be chosen from the first mentioned specimen. However, Christiansen (op. cit.) stated that the Stensgaard specimen (from 1861) was in poor condition, especially the part of the collection preserved at Botanical Museum. The other, at 'Landbohøjskolens plante-patologiske Afdeling' can, accord-

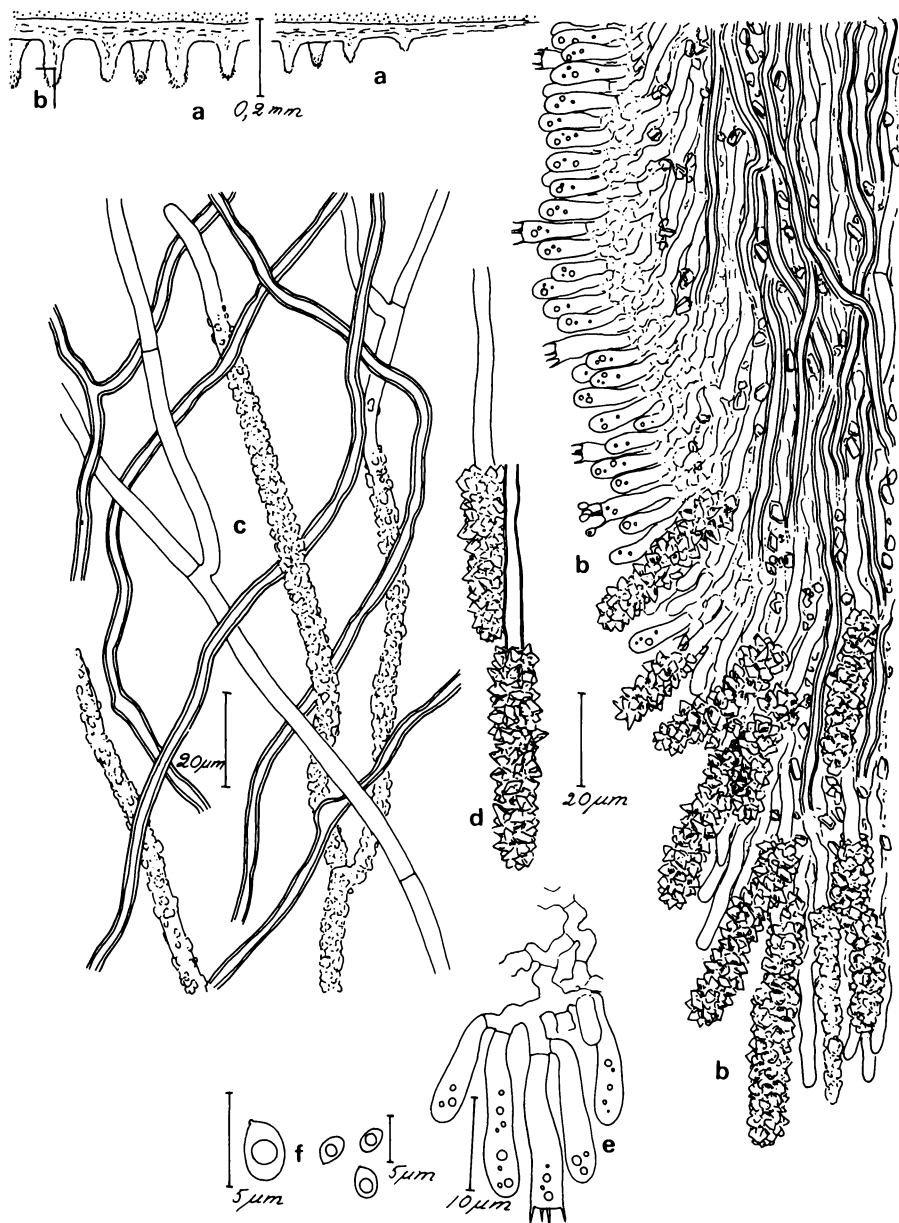


Fig. 724. *Steccherinum cremeoalbum*. a) section through fruitbody showing position of section b) section through a aculeus c) generative and skeletal hyphae d) pseudocystidia e) basidia f) spores. — Coll. Nordin 5752.

ing to Christiansen, be identified. In the end of the remarks (in Danish p. 329) he mentioned two other specimens which were collected more recently and of which the last one is best preserved and is here designated as lectotype: Hareskoven 1949-10-05 no. 455. Essential characteristics are in accordance with the description and the specimen undoubtedly represents Christiansen's concept of the species.

#### Key to species in North Europe

1. Hyphae without clamps ..... 2
1. Hyphae with clamps ..... 3
2. Fruitbody loosening from the substratum, ochraceous-buff, aculei cylindrical, 0.4-0.6 mm long, spores 3-3.5x2-2.5  $\mu\text{m}$  ..... 6. **S. subcrinale**
2. Fruitbody not easily loosening, cream- coloured, aculei more or less conical, 0.1-0.3 mm long, spores 3.5-4x2  $\mu\text{m}$ ..... 1. **S. cremeoalbum**
3. Fruitbody widely effuse, reddish-orange, aculei 1-3 mm long, pseudocystidia often of the metuloid type, spores 4-4.5x2.5-3  $\mu\text{m}$  ..... 5. **S. robustius**
3. Not with the combination of above characteristics ..... 4
4. Fruitbody resupinate to pileate, ochraceous-salmon-coloured, aculei 0.5-1 mm long, not rhizomorphic ..... 4. **S. ochraceum**
4. Fruitbody normally pale brown-violaceous or pale ochraceous, rhizomorphs present ..... 5
5. Fruitbody loosely adnate, normally pale violaceous or grey-reddish, margin filamentous, rhizomorphs pale brown or violaceous, often several cm long, spores 3.2-3.5 x 2.2-2.5  $\mu\text{m}$ , on deciduous wood ..... 2. **S. fimbriatum**
5. Fruitbody closely adnate, white to cream- coloured, rhizomorphs often indistinct, if present then of a pale colour, spores 4.5-5 x 2-2.2  $\mu\text{m}$ , normally on coniferous wood ..... 3. **S. litschaueri**

**1. *Steccherinum cremeoalbum* Hjortst.,**  
Mycotaxon 19 p. 507, 1984.

Fig. 724-25

**Fruitbody** resupinate, closely adnate, effuse, thin, not easily separated from the substratum, whitish-cream, at first grandinioid, then somewhat odontoid, aculei 0.1-0.3 mm long and 4-6 per mm, mostly conical and slightly fimbriate at the tip, concolorous with the smooth hymenium between the aculei, margin distinctly fibrillose, rhizomorphs whitish, usually paler than the hymenium.

**Hyphal system** dimitic, generative hyphae simple septate, thin-walled, more or less encrusted, 2-3(-4)  $\mu\text{m}$  wide, skeletal hyphae thick-walled, sparsely branched, partly richly encrusted, 2.5-3.5  $\mu\text{m}$  wide.

**Cystidia** (Pseudocystidia) numerous, encrusted towards the widened tip,

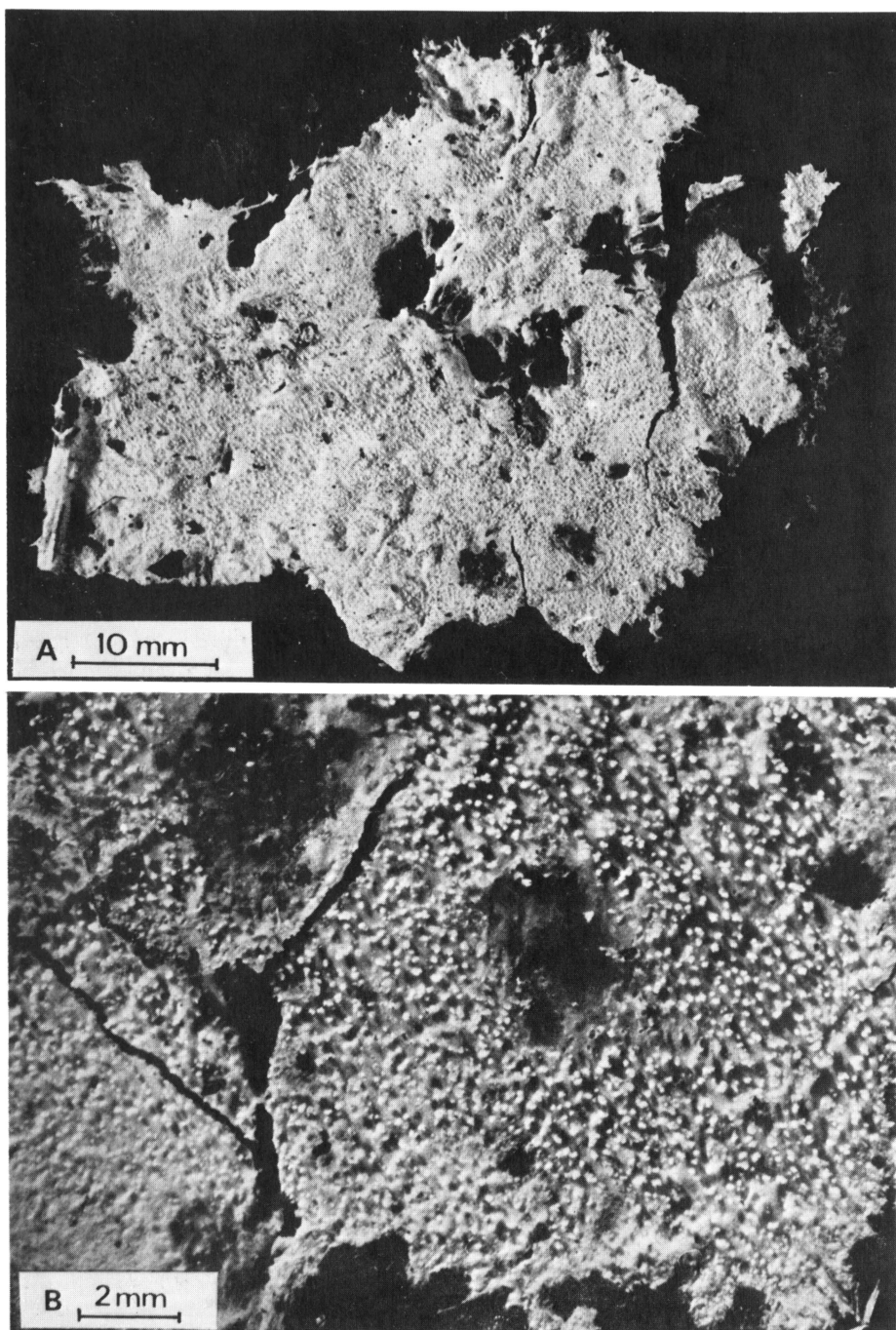


Fig. 725. *Steccherinum cremeoalbum*. — From the holotype.

usually very long with the encrusted part 40-60 x 7-10  $\mu\text{m}$ . Fig. 726-29

**Basidia** subclavate, 18-20 x 4-5  $\mu\text{m}$ , slightly constricted and with four sterigmata, without basal clamp.

**Spores** subglobose, thin-walled, smooth, (3.4-)3.5-4 x 2-2.2  $\mu\text{m}$ .

**Habitat and distribution.** This species is known from only one collection in Sweden (Västmanland) and one in Denmark (Sjælland).

**Remarks.** The species resembles *S. subcrinale* in lacking clamps and having similar spores, though slightly larger. Further more, the shortcelled terminal hyphae which are very conspicuous in *S. subcrinale* are lacking and the aculei are much shorter.

## 2. *Steccherinum fimbriatum* (Pers.:Fr.) John Erikss.,

Symb. Bot. Ups. 16 p. 134, 1958. - *Hydnum fimbriatum* Pers.:Fr., Syst. mycol. I p. 421, 1821. - non *Hydnum fimbriatum* (Banker) Sacc. & Trott.

**Fruitbody** strictly resupinate, loosely adnate, often widely spread over the substratum, hymenium odontoid, fairly soft but tough, in the living state usually pale violaceous or grey-reddish, in the herbaria dark ochraceous or sometimes greyish, even yellowish-grey, aculei conical, penicillate, about 0.2-0.3 mm long and 4-5 per mm, subiculum concolorous or slightly paler, 0.1-0.2 mm thick, margin more or less filamentous to rhizomorphic with several cm long threads composed of generative and skeletal hyphae.

**Hyphal system** dimitic, generative hyphae thin-walled, 3.5-4  $\mu\text{m}$  wide, with clamps and sparse ramifications, in the aculeal trama together with skeletal, skeletal hyphae thick-walled, (2.5-)3  $\mu\text{m}$  wide, rarely branched, without clamps, interwoven with generative hyphae, subhymenial layer thin, with short-celled hyphae, always with clamps.

**Cystidia** (Pseudocystidia) numerous in the aculei, more rare or lacking in the hymenial layer between the aculei, strongly encrusted towards the obtuse apex, the encrusted part normally 40-50 x 8-10  $\mu\text{m}$ .

**Basidia** subclavate, slightly sinuous, 18-20 x 4-4.5  $\mu\text{m}$ , with four sterigmata and a basal clamp.

**Spores** ellipsoid, smooth, thin-walled, 3.2-3.5(-4) x (2-)2.2-2.5  $\mu\text{m}$ .

**Habitat and distribution.** On bark as well as on decorticated deciduous wood, more rarely observed on *Juniperus* and other coniferous substrata. *S. fimbriatum* seems to prefer fertile deciduous biotopes and is the most common species of the genus in the Nordic countries. There are numerous collections from Scandinavia and according to Strid (1975), it is rather common in the northern part, especially in rich alder vegetation along the coast.

**Remarks.** Already in the field an easily recognized species due to its pale violaceous colour and the rhizomorphic margin. According to the collec-

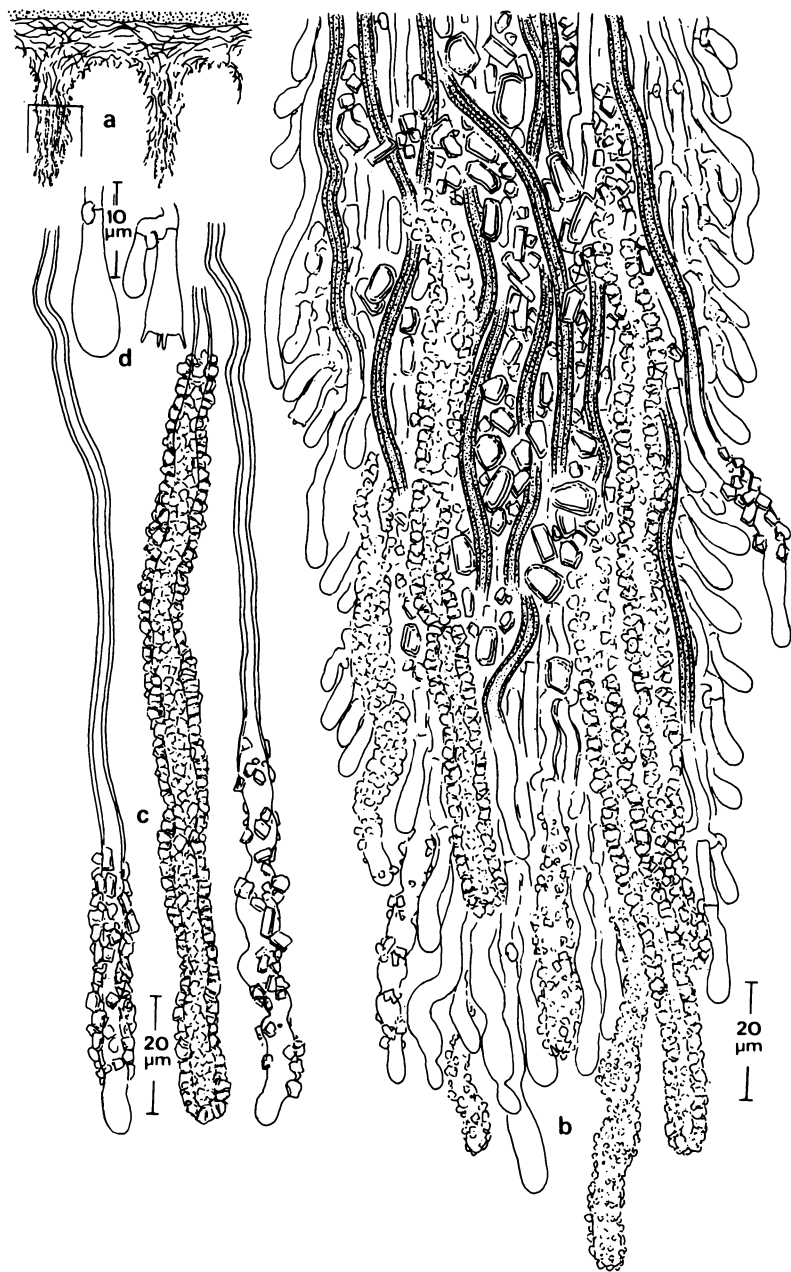


Fig. 726. *Steccherinum fimbriatum*. a) section through fruitbody showing position of b) section through aculeus c) pseudocystidia d) basidia. — Coll. Strid 371.



tions investigated in the herbaria from various localities in Europe, USSR, and North America it is a well characterized species, in both macro- and micromorphology.

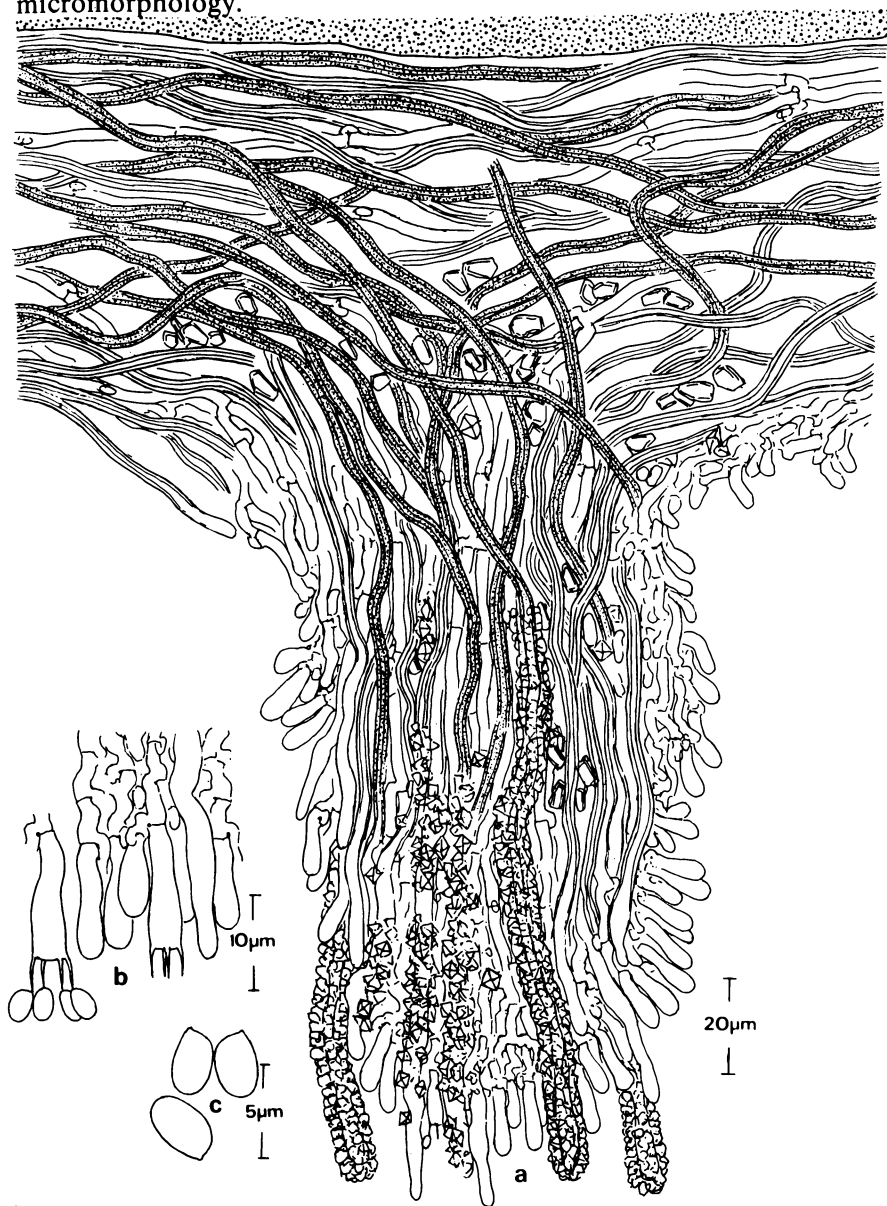


Fig. 727 *Steccherinum fimbriatum*. a) section through fruitbody near the margin b) basidia and subhymenial hyphae c) spores. — Coll. Strid 371.

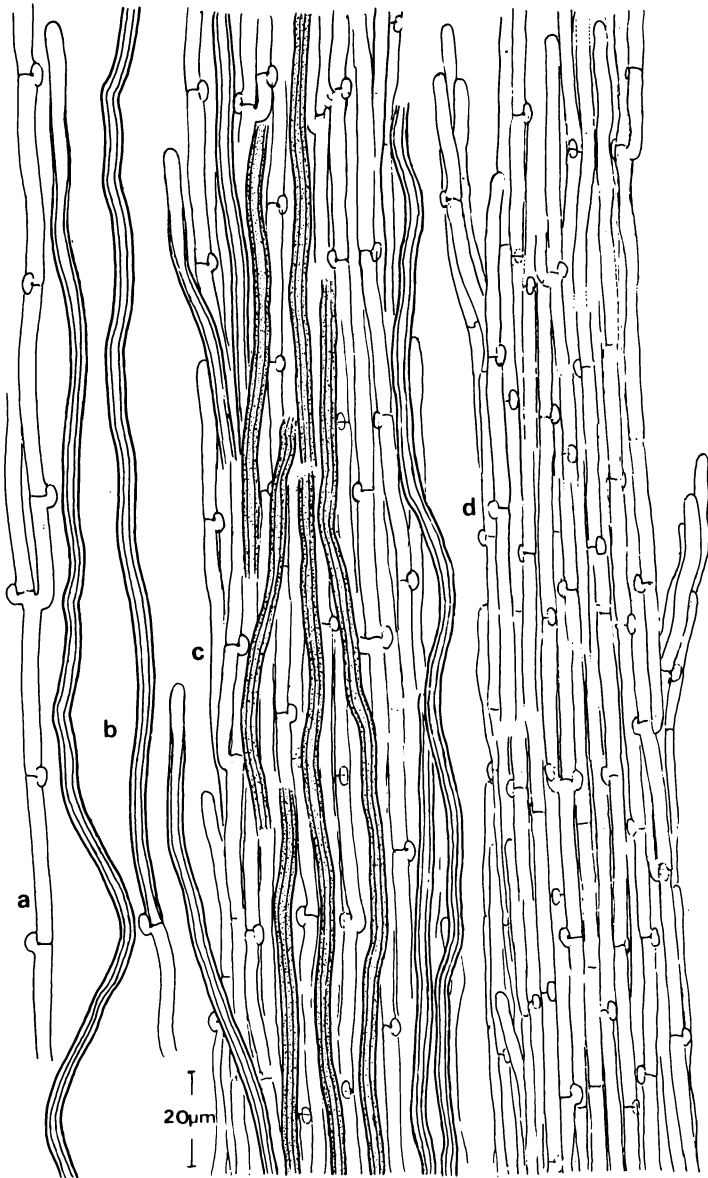


Fig. 728. *Steccherinum fimbriatum*. a) generative hyphae b) skeletal hyphae c) section through a rhizomorph d) apical part of a rhizomorph. — Coll. Hjortstam 1004.

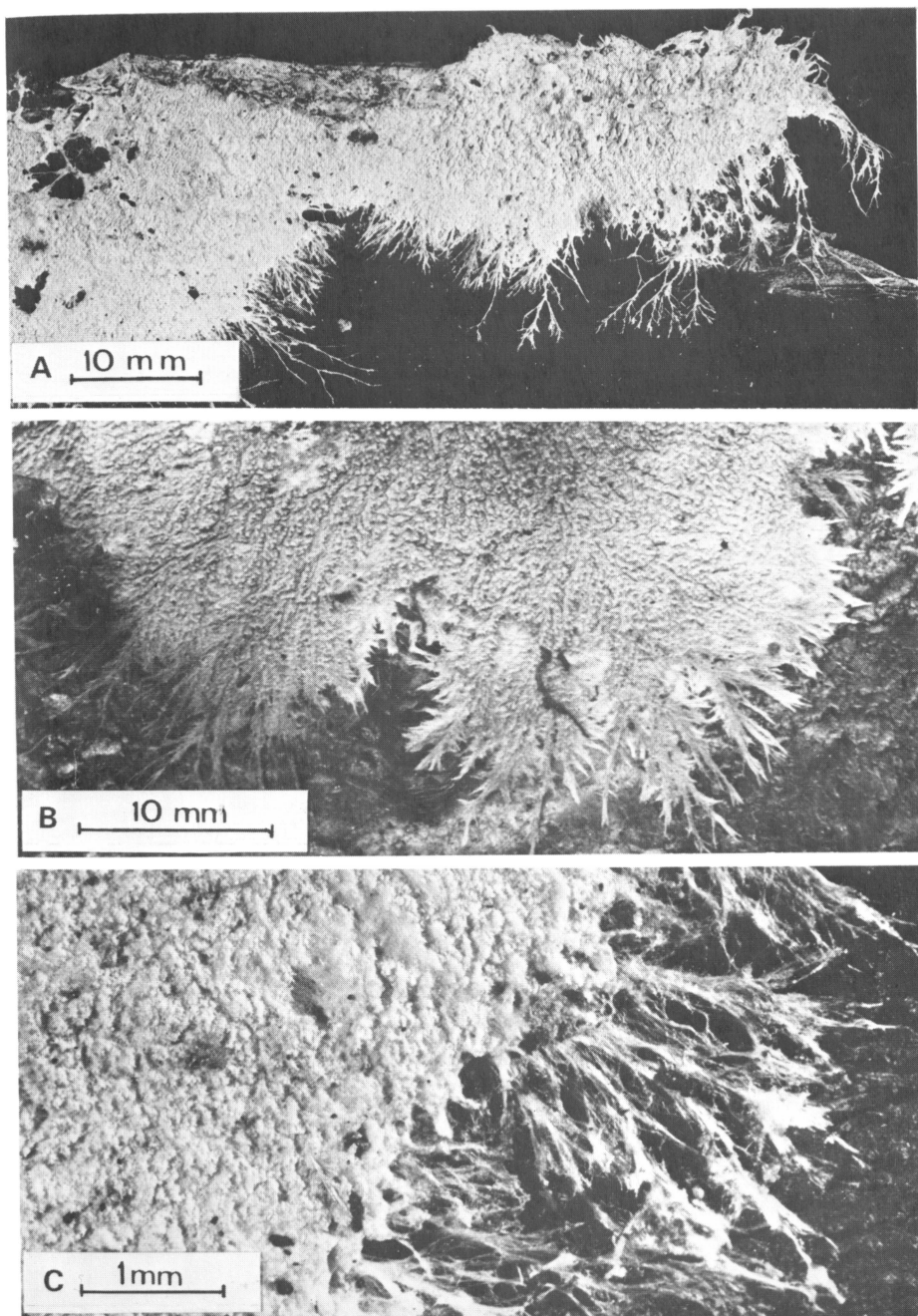


Fig. 729. *Steccherinum fimbriatum*. — A & C) Coll. Hjortstam 12064. B) Coll. Hallingbäck. Photo T. Hallingbäck.

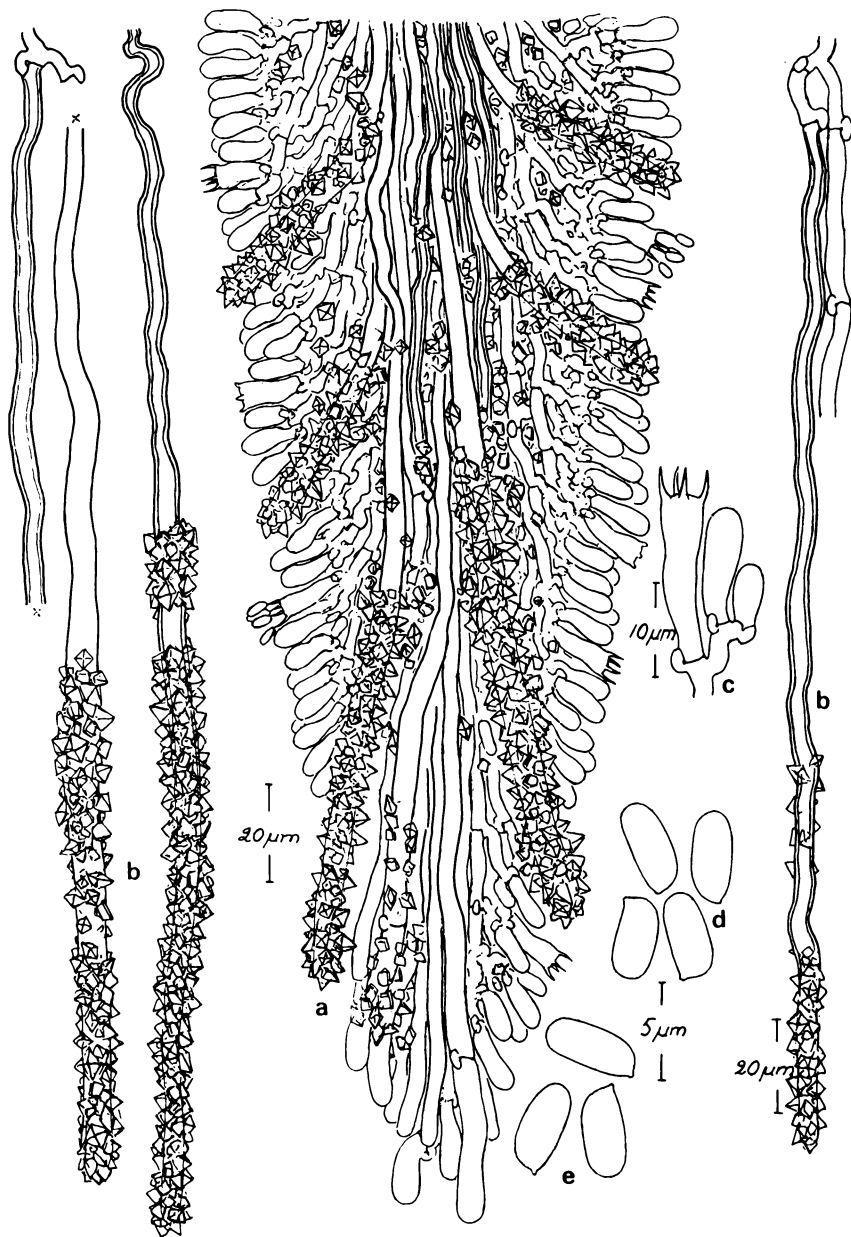


Fig. 730. *Steccherinum litschaueri*. a) section through aculeus b) pseudocystidia c) basidia d, e) spores. — Coll. a-d) Ohenoja 1974-09-14, e) B. & J. Eriksson 3148.

Fig. 723F, 730-31

**3. *Steccherinum litschaueri*** (Bourd. & Galz.) John Erikss.,  
Symb. Bot. Ups. 16 p. 134, 1958. - *Mycoleptodon litschaueri* Bourd. & Galz.,  
Hym. de France p. 441, 1928.

**Fruitbody** strictly resupinate, closely adnate, effuse, medium- sized, when dried more or less membranaceous, white to pale ochraceous, margin fimbriate, indistinctly rhizomorphic, not or only slightly loosening from the substratum, hymenium odontoid to hydroid, aculei scattered, usually 0.4-1 mm long, smooth, subcylindrical, when dried often darker than the hymenium, subiculum thin, concolorous.

**Hyphal system** dimitic with clamped generative hyphae, 3.5-4  $\mu\text{m}$  wide, often richly branched, skeletal hyphae mainly in the aculeal trama, normally 3.5-5  $\mu\text{m}$  wide.

**Cystidia** (Pseudocystidia) numerous in the aculei, often more than 200  $\mu\text{m}$  long, thick-walled and with a width of 4-7  $\mu\text{m}$ , not differentiated from the skeletal, widened towards the apex and strongly encrusted in the upper part.

**Basidia** subclavate, 15-20 x 4.5-5  $\mu\text{m}$ , with four sterigmata and a basal clamp.

**Spores** subcylindrical to cylindrical, smooth, thin-walled (4-) 4.5-5.5 x 2-2.2  $\mu\text{m}$ .

**Habitat and distribution.** The species must be very rare in N. Europe and has been collected only a few times in the continental parts of the area (S.E. Norway, Lule Lappmark and Uppland in Sweden and Finland). It is known from both coniferous and deciduous wood (*Alnus*).

**Remarks.** The species is by Maas Geesteranus placed in synonymy with the American species *S. ciliolatum*. After comparison of the types we have found that they differ in many respects and that such a synonymy cannot be based on morphology alone. They differ above all in the structure of the hymenium and in the shape of the spores. In *S. litschaueri* the aculei are regularly cylindrical and not fimbriate in the apex while in *S. ciliolatum* they are irregularly conical and more or less fringed and fimbriate. The spores are in *S. ciliolatum* more rounded with convex sides, while in *S. litschaueri* the sides are almost parallel. Until it is experimentally proved that they are identical they should be kept separate.

4. *Steccherinum ochraceum* (Pers.:Fr.) S.F. Gray, Fig. 723D, 732-34  
 Nat. Arrang. Br. Pl. 1 p. 651, 1821. - *Hydnum ochraceum* Pers.: Fr., Syst.  
 mycol. 1 p. 414, 1821.

**Fruitbody** effuse, usually small to medium sized, resupinate or with revolute margin, not distinctly pileate or seriate, reflexed part 0.5-1.5 cm with the upperside smooth or somewhat zonate, velutinous, hymenium odontoid, pale ochraceous to salmon-coloured, aculei more or less conical to almost cylindrical, as a rule simple, rarely branched, in younger fruitbodies scattered and about 3-5 per mm, in more developed ones slightly crowded, approximately 0.5-1 mm long, young aculei apically fimbriate, subiculum whitish, tough, in dried specimens 0.2-0.5 mm thick, margin usually distinct, felted, whitish to pale ochraceous, 0.5-1 mm wide, rhizomorphs normally not present.

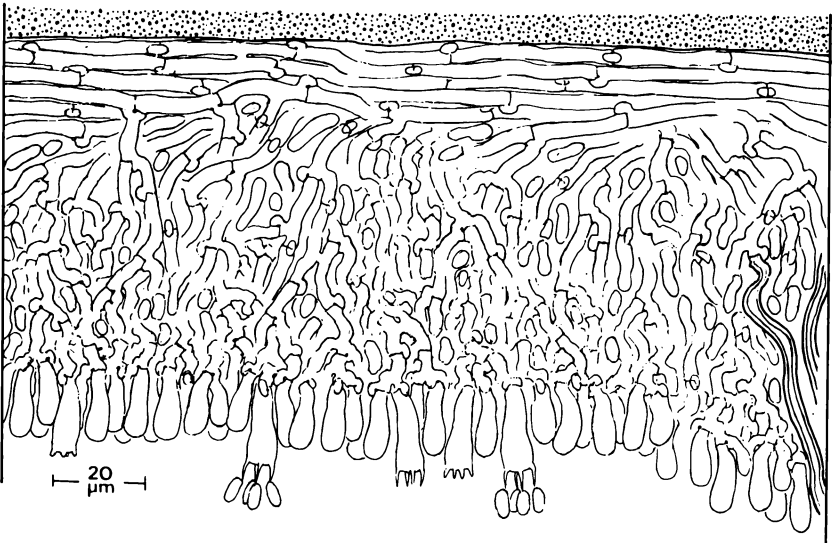


Fig. 731. *Steccherinum litschaueri*. Section through the smooth hymenium between the aculei. — Coll. B. & J. Eriksson 3148.

**Hyphal system** dimitic, true generative hyphae thin-walled, more or less branched, 2.5-3.5  $\mu\text{m}$  wide, with clamps, in the aculeal trama parallel together with skeletal or/and pseudocystidia, in the subiculum mixed with skeletal, which are thick-walled, 2-2.5  $\mu\text{m}$ , without septa and clamps, and bound together by richly branched, clamped generative hyphae with thickened walls.

**Cystidia** (Pseudocystidia) numerous, especially in the aculei, but also occurring frequently in the hymenial layer between the aculei, strongly encrusted in the widened upper part, generally more than 100  $\mu\text{m}$  long and with a width in the encrusted part of 7-10(-12)  $\mu\text{m}$ , blunt, projecting 20-30  $\mu\text{m}$  above the basidia.

**Basidia** subclavate, thin-walled, 15-20 x 5  $\mu\text{m}$ , with four sterigmata and a basal clamp.

**Spores** ellipsoid, smooth, thin-walled, 3.2-3.5(-4) x (2-)2.2-2.5  $\mu\text{m}$ .

**Habitat and distribution.** On deciduous wood of various trees, *Corylus*, *Fagus*, *Quercus*, *Tilia*, *Ulmus*, in fertile and herb-rich biotopes, often in virgin deciduous woods. A southern species in N. Europe reaching Uppland in Sweden. In Norway mostly in the S.E. part in the vicinity of Oslo, but with a very isolated locality at Alta, Finnmark at 70° N. According to Christiansen not rare in Denmark, but not yet reported from Finland where it can be expected at least in the S.E. part.

**Remarks.** Characteristic species due to the colour, the dense odontoid hymenium and the small spores. To the naked eye quite similar to *Junghuhnia nitida*, and in the field often confused with this species. Though easily delimited from most species of *Junghuhnia* by its odontoid hymenium, it agrees in practically all respects with *J. nitida* and must be judged as closely related to this species. It should be noted that young fruitbodies of *J. crustacea* (type species of *Junghuhnia*) are irregularly hydroid. Among the Nordic species its closest relative is *S. robustius*, but it is easily distinguished already in the field as *S. robustius* is much larger, more brightly coloured, and practically always totally resupinate. There is therefore no doubt that they are two clearly different taxa.

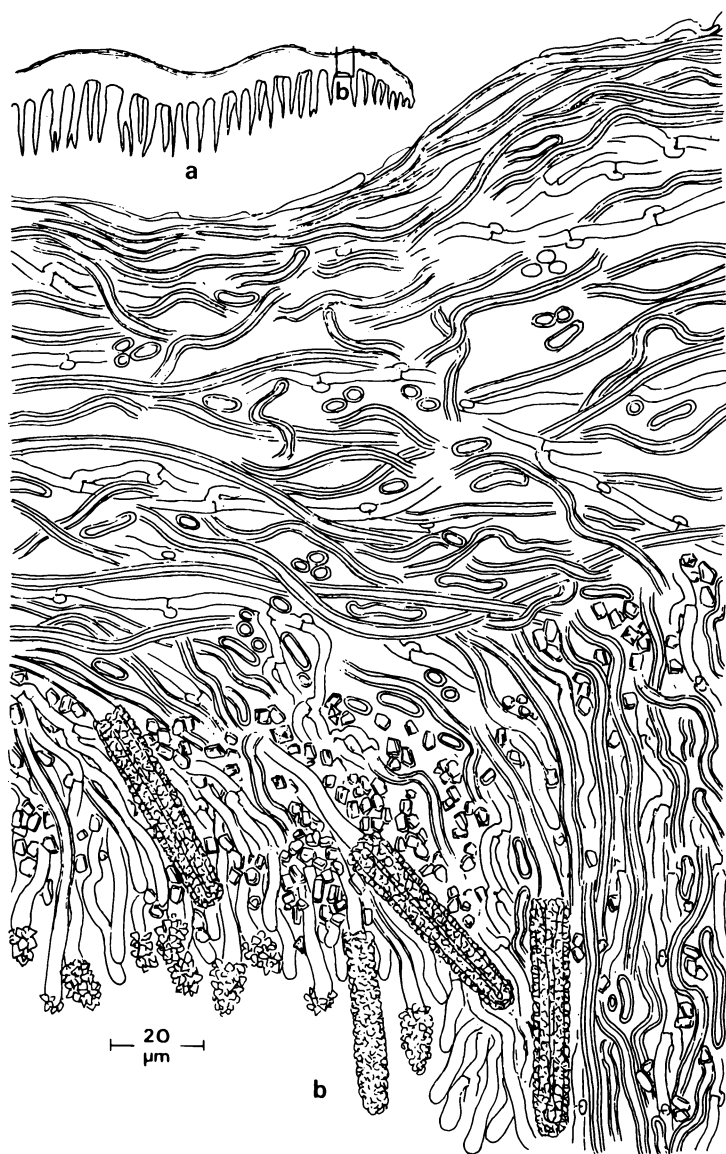


Fig. 732. *Steccherinum ochraceum*. a) section through part of aculeus b) pseudocystidia c) basidia and part of subhymenial layer d) spores. — Coll. Hallenberg 1978.



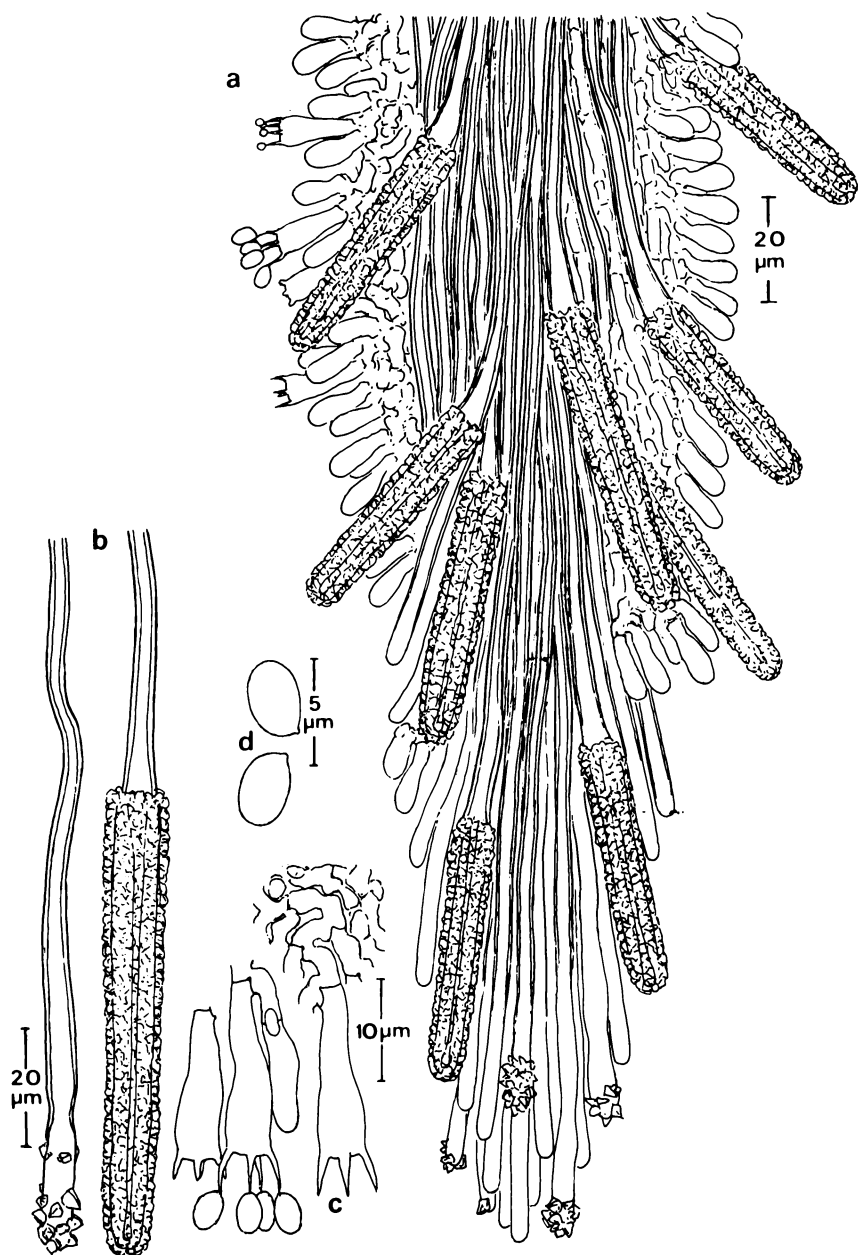


Fig. 733. *Steccherinum ochraceum*. a) section through fruitbody showing position of section b) b) section through smooth hymenium between the aculei. — Coll. Hal- lenberg 3978.

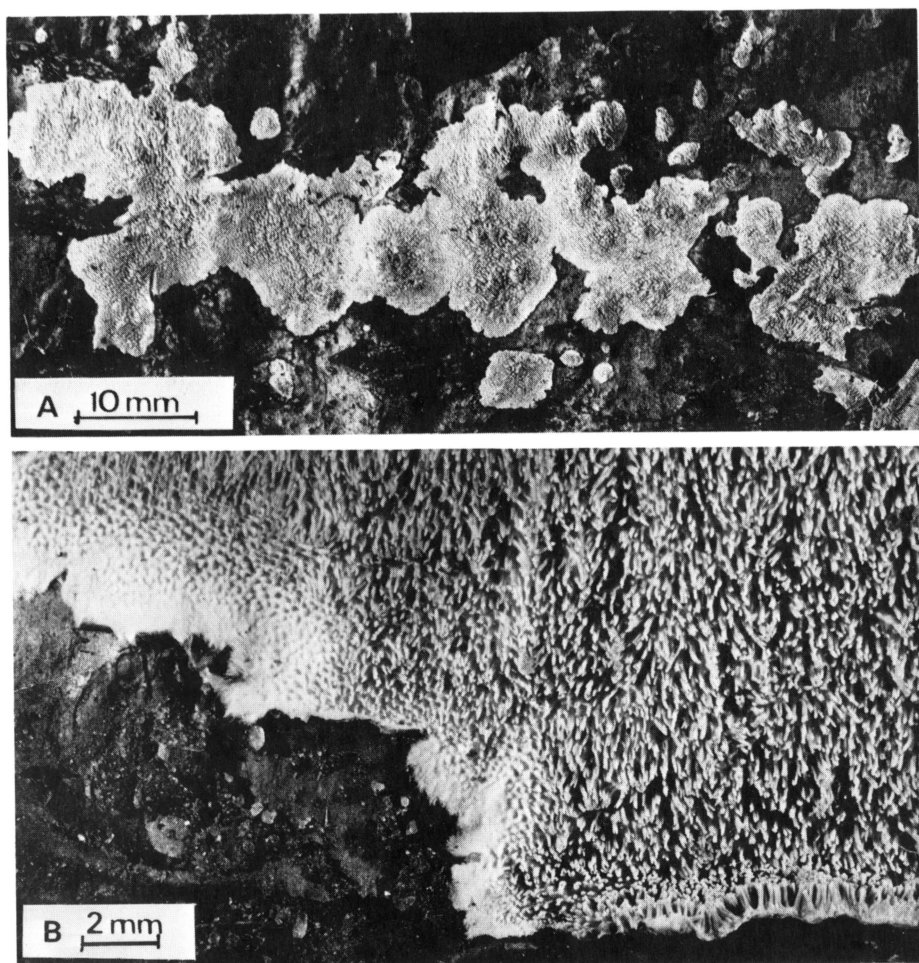


Fig. 734. *Steccherinum ochraceum*. A) Coll. Eriksson 10342 B) Coll. Eriksson 6569. Photo T. Hallingbäck.

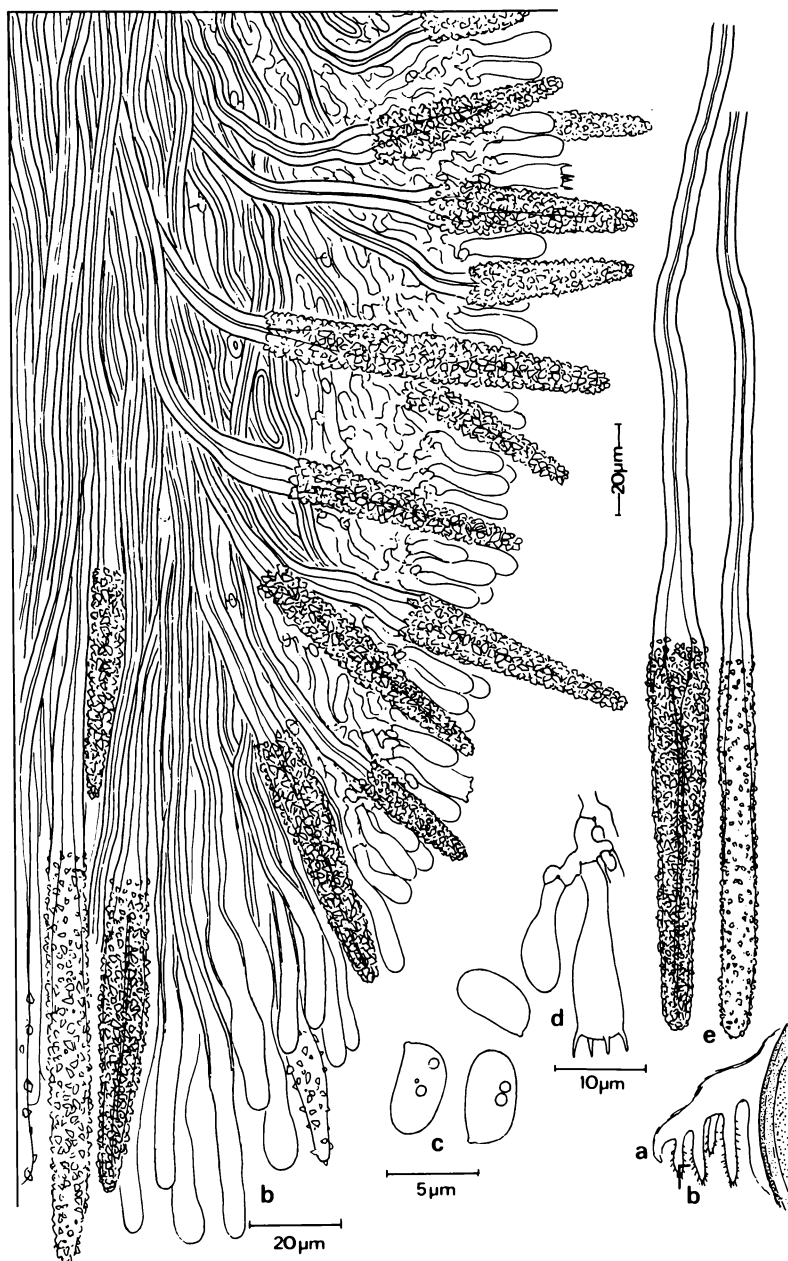


Fig. 735. *Steccherinum oreophilum*. a) section through fruitbody showing position of section b) section through part of aculeus c) spores d) basidia e) pseudocystidia. — Coll. Doll 1966-08-25.

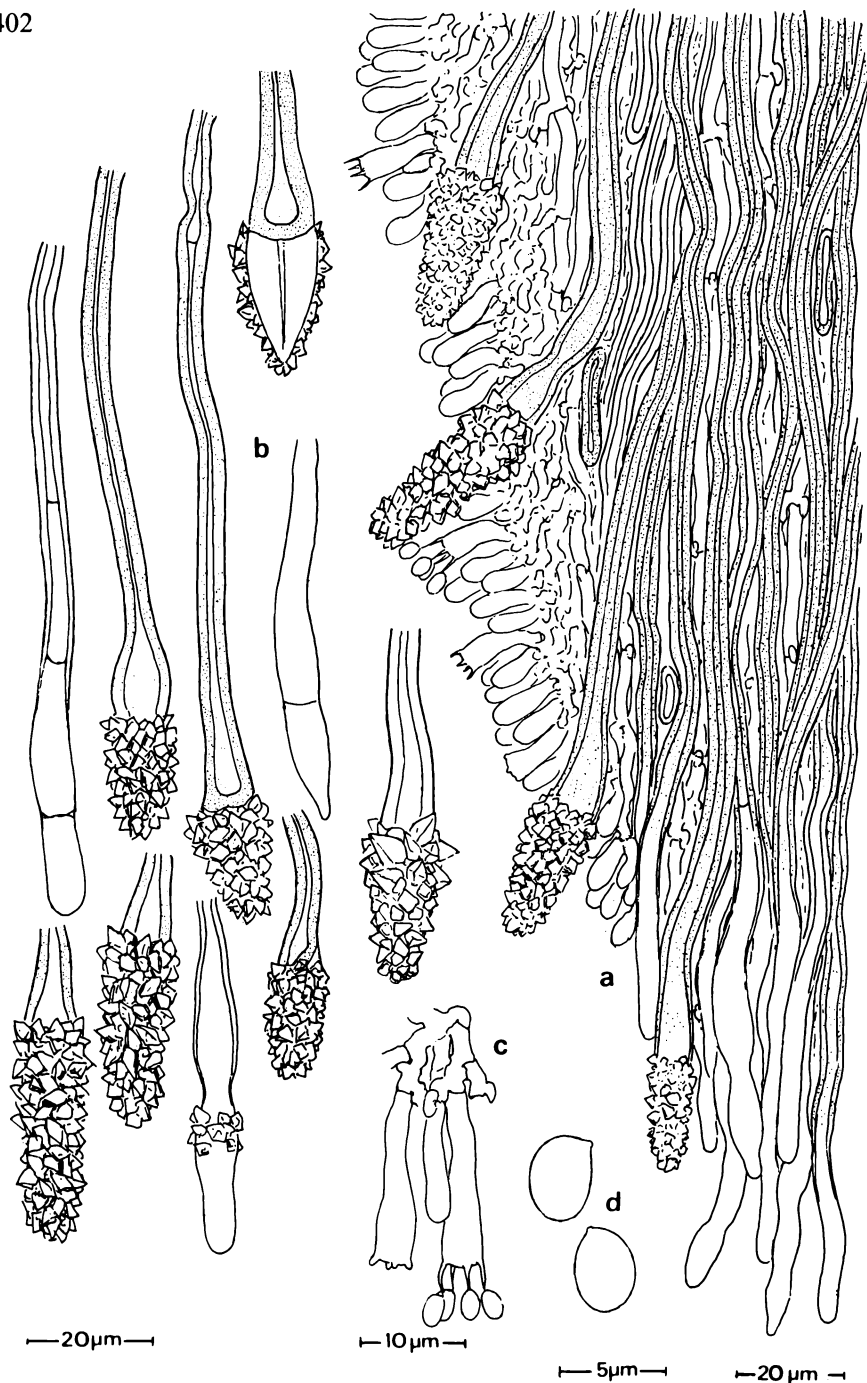


Fig 736. *Steccherinum robustius*. a) section through apical part of an aculeus b) pseudocystidia c) basidia d) spores. — Coll. Living material, Kinnekulle, Sweden.

**Steccherinum oreophilum** Linds. & Gilbn.,  
Mycologia 69 p. 194, 1977.

Fig. 735

**Remarks.** This species is previously only known from North America (Arizona, U.S.A. and Quebec, Canada) but recently found among extra-Scandinavian specimens in the herbarium of Göteborg. The specimen is collected by R. Doll in East Germany, Primank, on *Fagus*, 1966-02-25. The material consists of very small fruitbodies on a twig of a deciduous tree. *S. oreophilum* is easily recognized by its small, effuse-reflexed fruitbodies with hydroid to subirpicoid hymenium. In the European specimen the aculei are somewhat coralloid. In its micromorphology distinguishable in having numerous, thick-walled and subulate cystidia, with encrusted part 80-100  $\mu\text{m}$  long, and spores narrowly ellipsoid, 5-6 x 3  $\mu\text{m}$ . For further information see Lindsey and Gilbertson in the original description and Ginns (1982) who reported the species from Quebec and gave a detailed description of its cultural characteristics.

Fig. 723C,E, 736-39

**5. *Steccherinum robustius*** (John Erikss. & Lund.) John Erikss.  
Symb. Bot. Ups. 16 p. 134, 1958. - *Mycoleptodon robustior* Erikss. & Lund.  
in Lund. & Nannf. Fung. exs. suec., no. 2147 p. 26, 1953.

**Fruitbody** resupinate, widely effuse, normally several dm and in some cases a meter or more in length, not reflexed or pileate but at the margin slightly loosening and detachable in pieces, hymenium odontoid to hydroid, in the living state reddish-orange, in the herbaria fading into pale orange or dirty-yellow to greyish, aculei elongate-conical, sometimes flattened, especially near the edge, crowded, (0.5-)1-3 mm long, 3-4 per mm, of firm consistency, rarely fimbriate but often verruculose along the sides, subiculum yellowish, in section whitish, thin, in dried specimens about 0.1-3 mm thick, margin yellowish, especially when fresh, 1-5 mm broad, fimbriate, rhizomorphs sparse.

**Hyphal system** dimitic, generative hyphae thin or slightly thick-walled, branched 3(-4)  $\mu\text{m}$  wide, with clamps, skeletal hyphae thick-walled, without clamps but with simple, adventitious septa, 2.5-3  $\mu\text{m}$  wide, hyaline to slightly yellowish (in KOH), in the aculeal trama often present as pseudocystidia, in the subiculum transitional stages are easily observed between thin-walled and clamped generative hyphae and clampless skeletals, hyphae from the marginal zone usually more or less encrusted.

**Cystidia** (Pseudocystidia) numerous, strongly encrusted towards the widened apex, in the thickening hymenium present as metuloids (as in *Peniophora*), usually with a distinct pale yellow colour (in KOH), encrusted part 20-30 x 8-12(-15)  $\mu\text{m}$ .

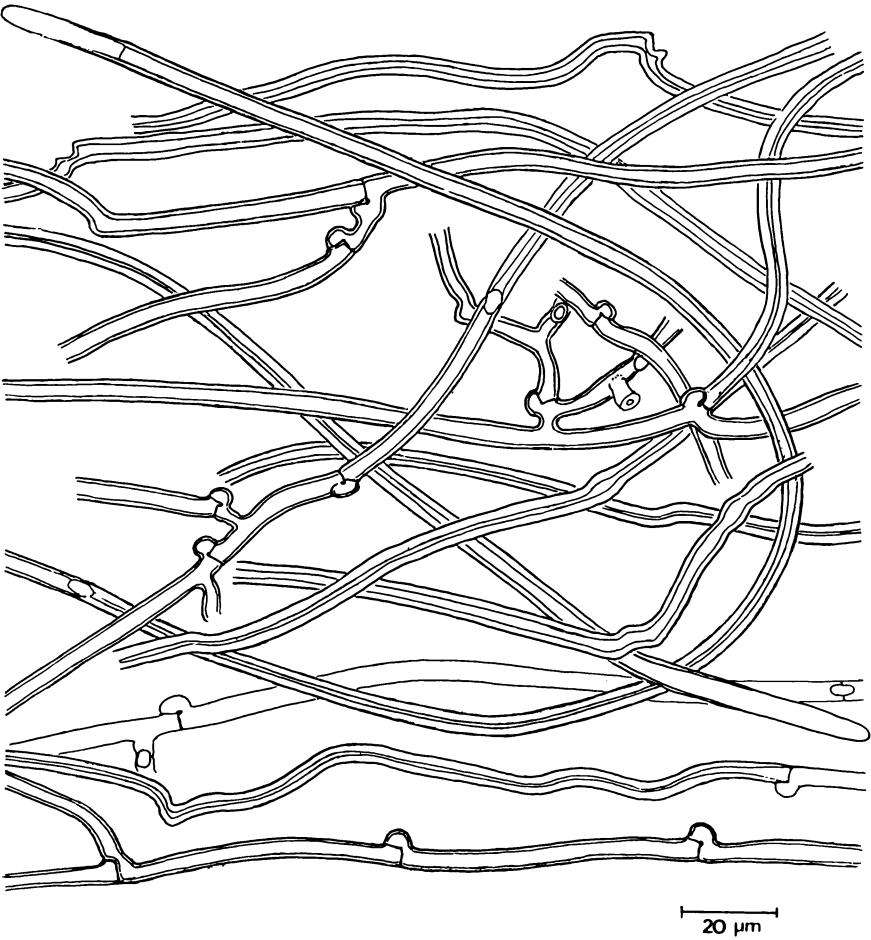


Fig. 737. *Steccherinum robustius*. Hyphae from the subiculum. From the lectotype.

**Basidia** subclavate, 20-35 x 4.5-5  $\mu\text{m}$ , with four sterigmata and a basal clamp.

**Spores** ellipsoid, thin-walled, smooth (3.8-)4-4.5 x (2.2-)2.5-3  $\mu\text{m}$ .

**Habitat and distribution.** In N. Europe the species is restricted to very fertile and herb-rich natural forests with *Ulmus* and *Fraxinus*, on humid and calcareous soil. In its main distribution similar to *S. ochraceum* but much rarer, and considerably more fastidious as to the ecological conditions. It can yearly be collected in Vårdsätra Nature Park, near Uppsala from where most of the collections are known. Other Swedish localities are Skåne (Dalby Söderskog and Örups almskog), Västergötland (Kinnekulle), and Västmanland (the archipelago of Mälaren). According to Christiansen a few collections are known from Denmark (Sjaelland). Not known from Norway and Finland. Outside Scandinavia we have seen material from Estonia and Russia. The specimen from Iran, reported by Hallenberg is somewhat doubtful. The aculei are coralloid and no spores have been observed.

**Remarks.** *S. robustius* is easily recognized, already in the field, by its large fructifications with a bright reddish - orange colour. Microscopically recognized by the large metuloids and slightly larger spores when compared with *S. ochraceum*. Maas Geesteranus introduced a wrong application of the species and placed it in synonymy with *S. laeticolor* (Berk. & Curt.) Banker and this name has since been commonly used. After examination of the type specimen of *Hydnum laeticolor* (Herb. Berk. 1879, No. 2930, Car. Inf., deposited in Kew) we are convinced that it represents a different taxon. The consistency of *S. laeticolor* is rather loose and brittle, the aculei considerably smaller (0.5-1.5 mm long), subcylindrical to conical and distinctly ciliolate at the apices, while in *S. robustius* they are tough, not brittle, as a rule conical and smooth, generally 3 mm long. One of the most striking characteristics are the different cystidia. In *S. laeticolor* they are of nearly uniform width, not with a metuloid appearance, hyaline and with an encrustation of much smaller crystals. Furthermore, the spores of *S. robustius* are larger and ellipsoid, not narrowly ellipsoid to subcylindrical as *S. laeticolor*. Two other species were mentioned by Maas Geesteranus in the synonym-list under *S. laeticolor* viz.: *Hydnum floridanum* Berk. & Cooke and *H. parasitans* Berk. & Curt. The latter is evidently the same as *S. laeticolor* but the former is more like *S. robustius* in its macromorphology, but has smaller spores. Both specimens have grown on vertical substrata and are besides in a rather poor condition.

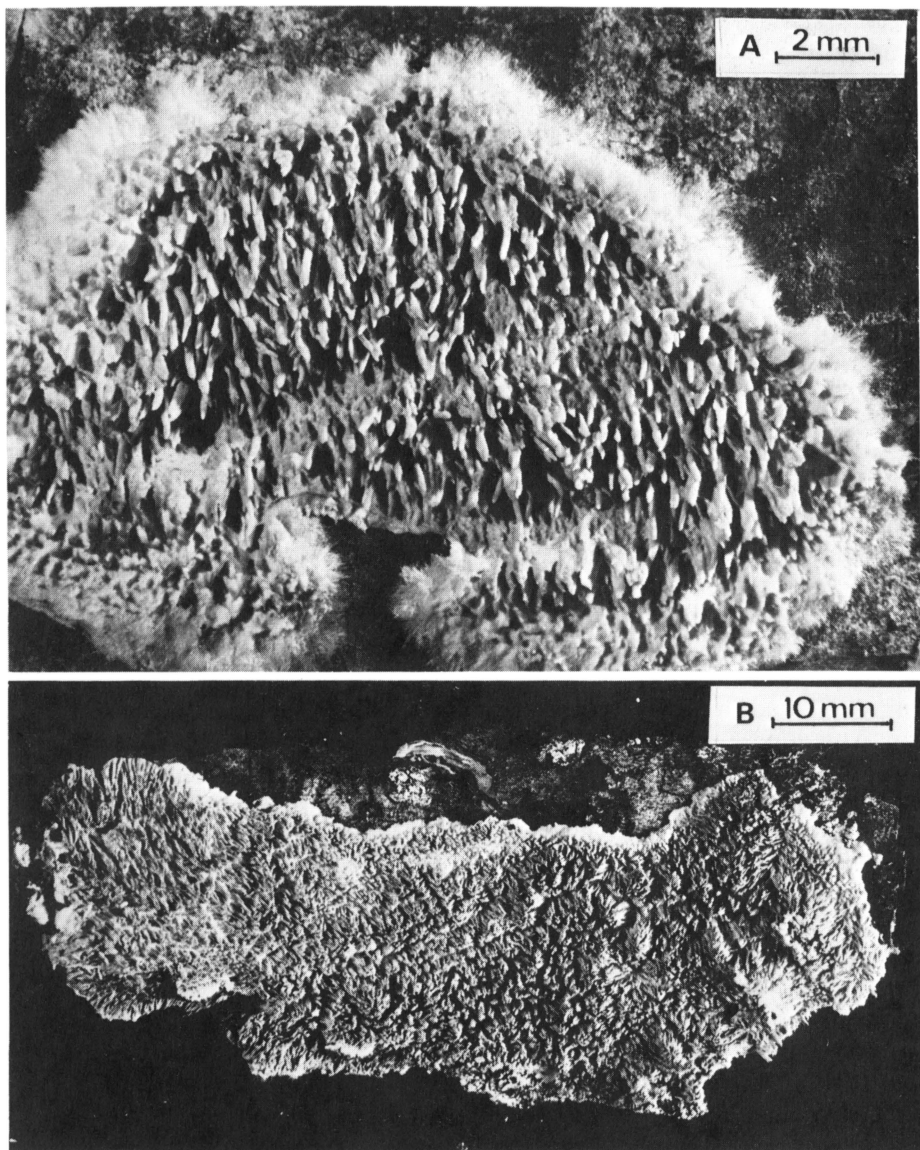


Fig. 738. *Steccherinum robustius*. Coll. A) Hjortstam 9400, B) Strid & Eriksson 10362. Photo T. Hallingbäck.



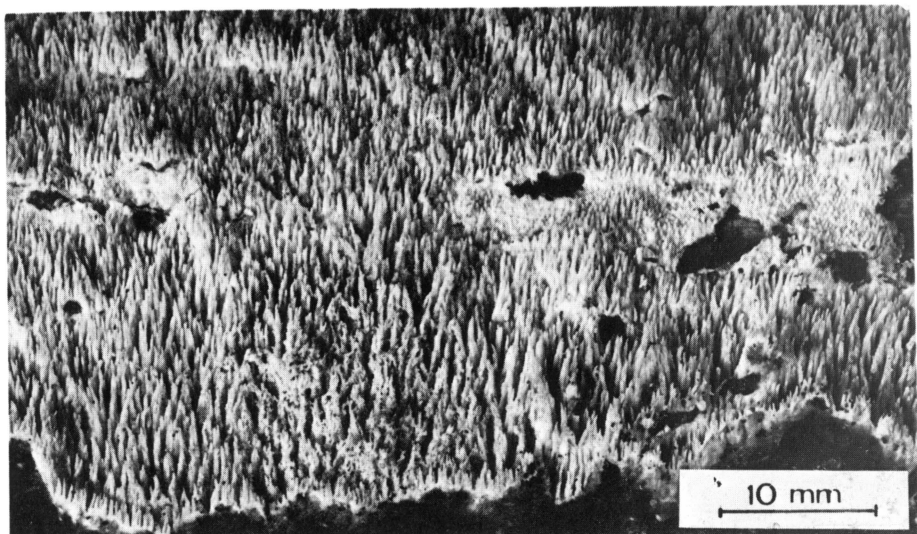


Fig. 739. *Steccherinum robustius*. Living fruitbody. — Coll. Hallingbäck.  
1983-09-07. Photo T. Hallingbäck.

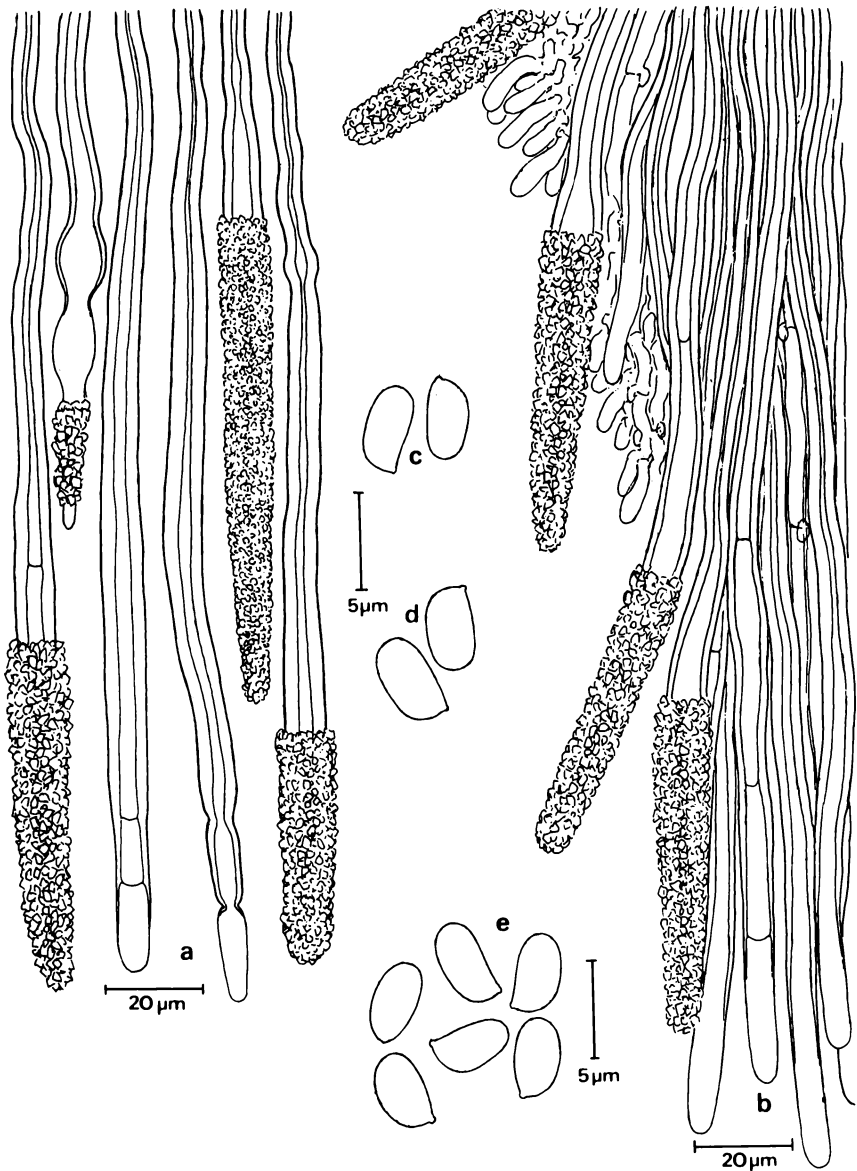


Fig. 740. *Steccherinum laeticolor*. a) cystidia b) apical part of an aculeus c-e) spores. — Coll. a, b, d) From the lectotype c) From the lectotype of *Hydnum floridanum* Berk. & Ck. e) B. & J. Eriksson 12657 (Canada).

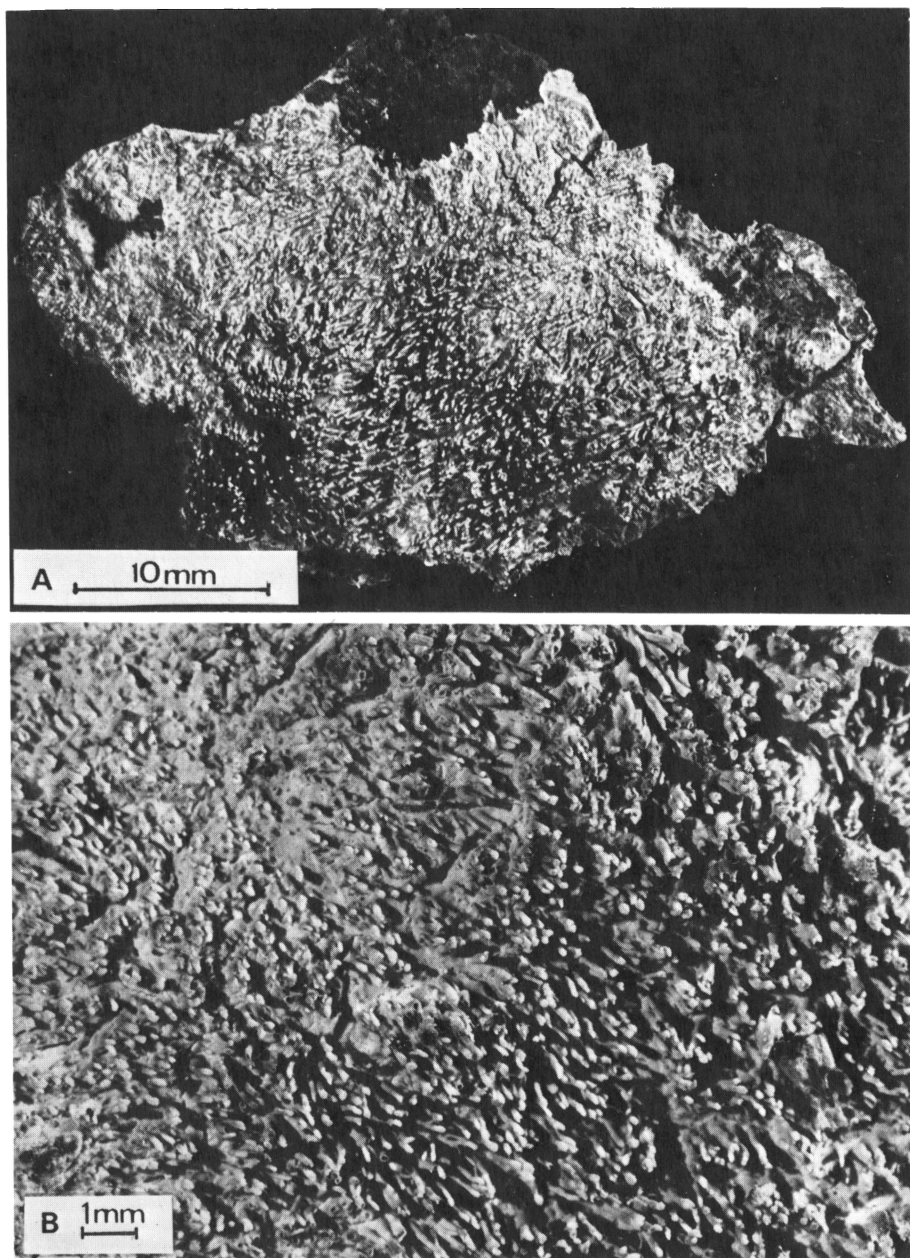


Fig. 741. *Steccherinum laeticolor*. — Coll. B. & J. Eriksson 12657 (from Canada).

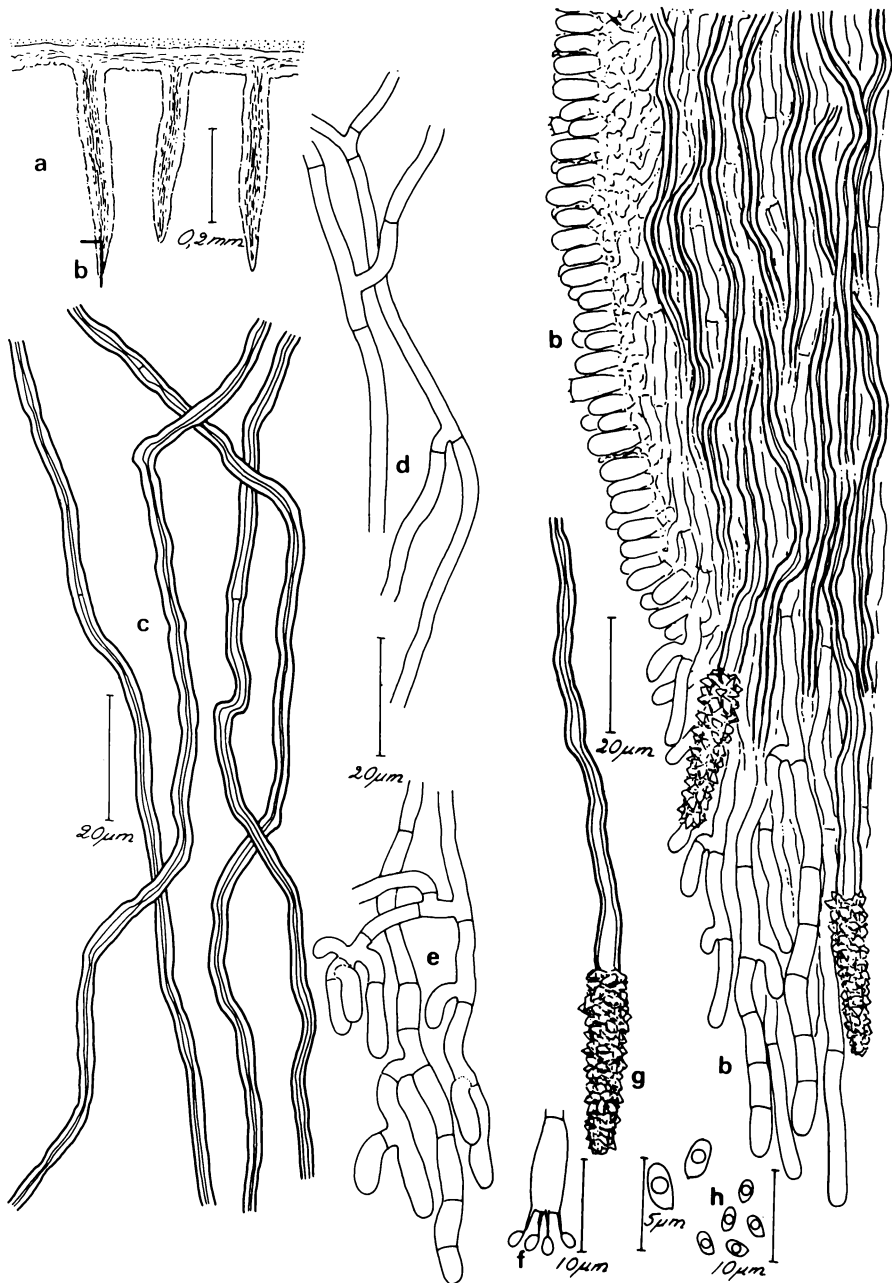


Fig. 742. *Steccherinum subcrinale*. a) section through fruitbody with position of section b) b) section through aculei c) skeletal hyphae d) hyphae e) hyphae from apical part of aculeus f) basidium g) pseudocystidia h) spores. — Coll. Johansen 866/74.

**6. *Steccherinum subcrinale* (Peck) Ryv.,** Fig. 742-44  
 Norw. J. Bot. 25 p. 294, 1978. - *Hydnum subcrinale* Peck, N.Y. State Mus.  
 Bull. 167, p. 27, 1913. - *Mycoleptodon kavinae* Pilat, Bull. Soc. Mycol.  
 France 51, p. 400, 1936, fide Ryvarden.

**Fruitbody** loosely resupinate, pliable and easily separated from the substratum, ochraceous buff-isabelline-cinnamon buff, aculei 0.4-0.6 mm long and 4-7 per mm, cylindrical and at least when dried, conspicuously sinuous, smooth or very slightly penicillate in the apices, subiculum concolorous or whitish, thin, soft cottony, generally with ochraceous rhizomorphs.

**Hyphal system** dimitic with hyphae of three types 1) generative hyphae thin-walled, straight and uniform, regularly branched, as a rule 2-4  $\mu\text{m}$  wide 2) hyphae next to the subhymenial layer strikingly short-celled and frequently branched, in some cases also basidia-bearing, often easily observed as terminal hyphae in the aculei 3) skeletal hyphae thick-walled, rarely branched, 2-4  $\mu\text{m}$  wide, partly penetrating the basidial layer as encrusted cystidia but occurring also in the hymenial tissue between the aculei, all hyphae without clamps.

**Cystidia** (Pseudocystidia) frequent in the aculei, apically widened, obtuse, and usually encrusted, rare or lacking in the hymenium between the aculei, encrusted part 20-40 x 6-8  $\mu\text{m}$ .

**Basidia** subclavate, (13-)15-20 x 4-5  $\mu\text{m}$ , with four sterigmata and without a basal clamp.

**Spores** ellipsoid, thin-walled, smooth, (2.5-)3-3.5 x 2-2.2(-2.5)  $\mu\text{m}$ , often with a central oil-drop.

**Habitat and distribution.** A very rare species in N. Europe where it has been found a few times in Denmark (Sjaelland) and Norway (Akershus). Found on fallen trunks and branches of *Picea*, *Fagus*, and *Betula*.

**Remarks.** *S. cremeoalbum* and *S. subcrinale*, takes an isolated position in the genus. Judging from their hyphal characteristics they are undoubtedly closely related. For further information see Ryvarden (1978).

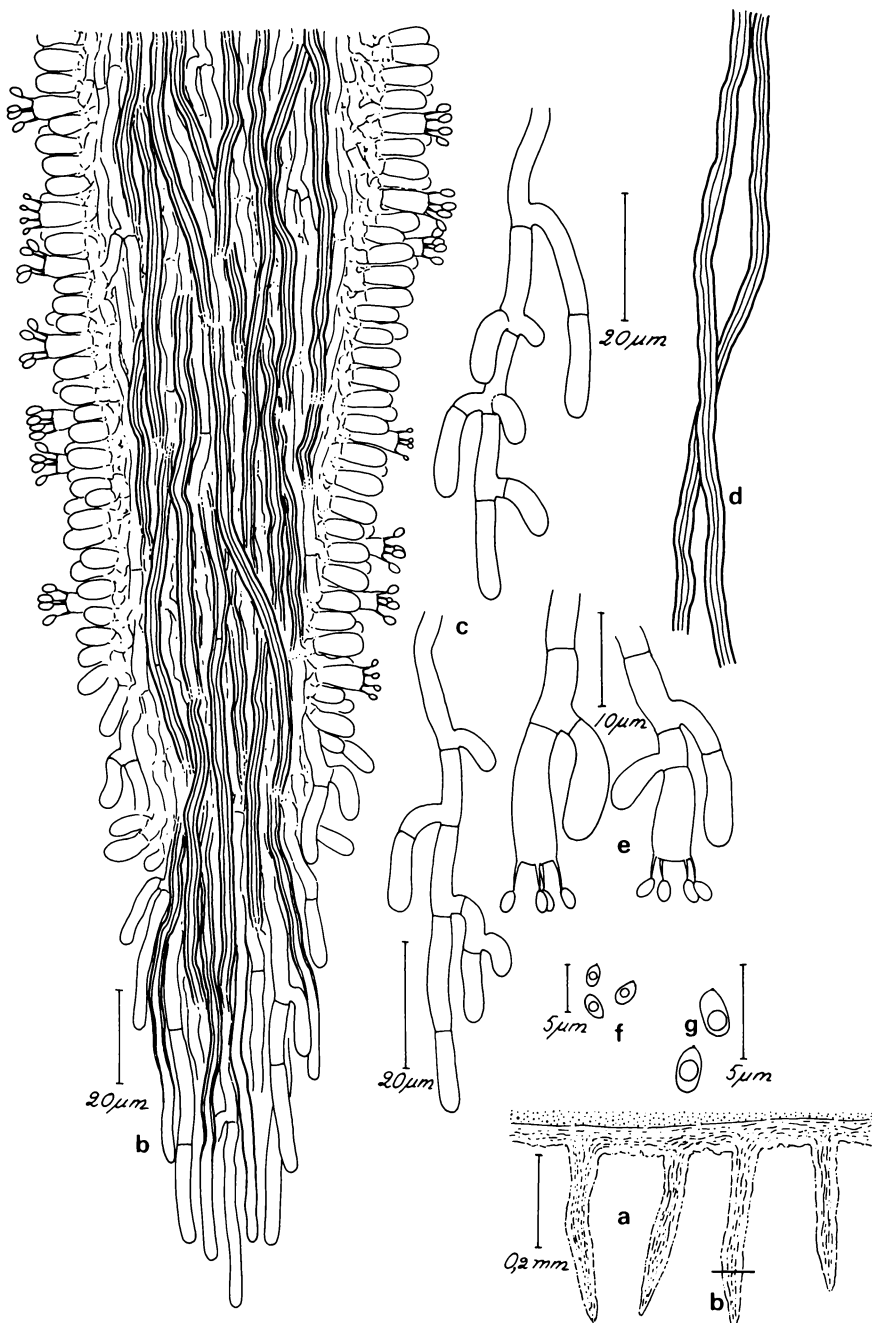


Fig. 743. *Steccherinum subcrinale*. a) section through fruitbody with position of section b) section through apical part of an aculeus c) hyphae d) skeletal hyphae e) basidia f, g) spores. — Coll. B. & J. Eriksson 8124 (Br. Col. Canada).

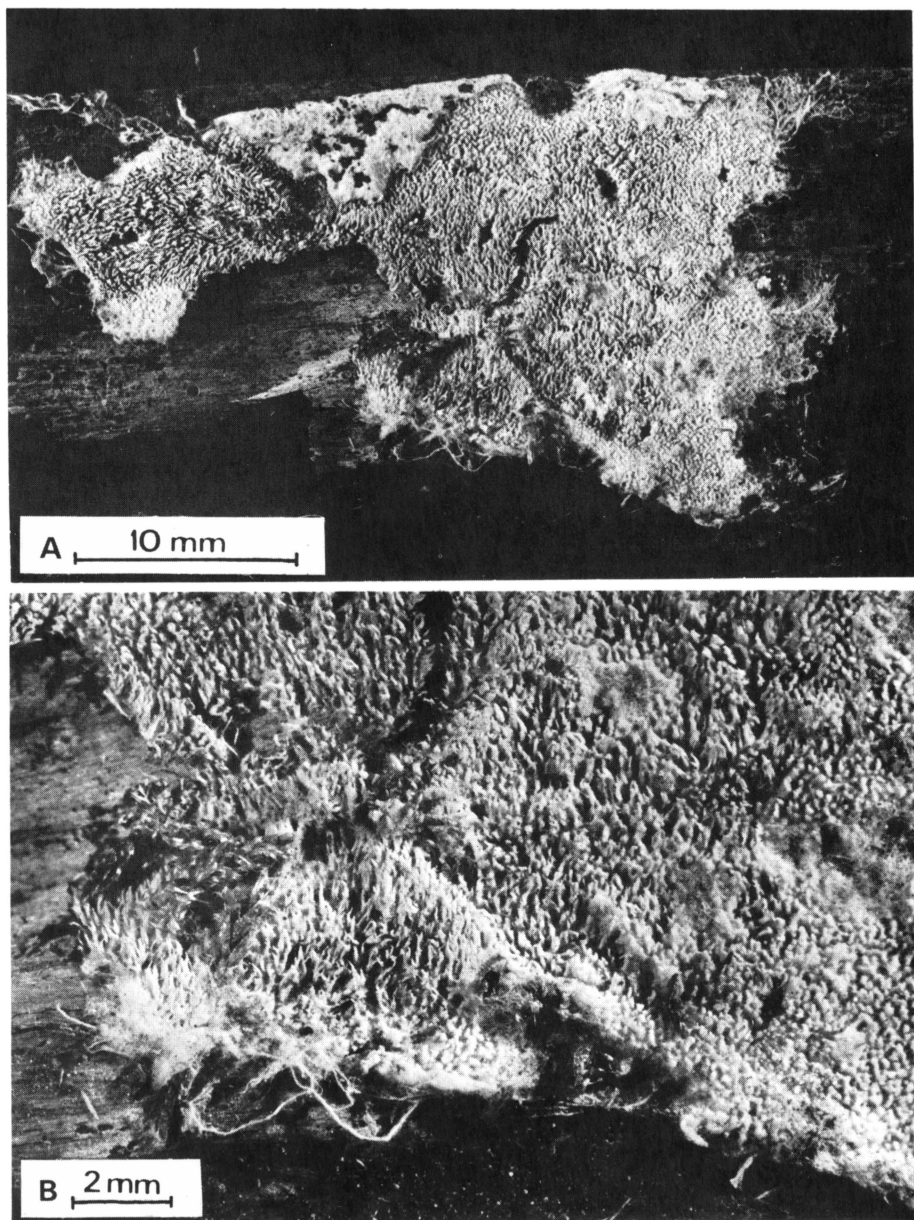


Fig. 744. *Steccherinum subcrinale*. — B. & J. Eriksson 8124. Photo T. Hallingbäck.

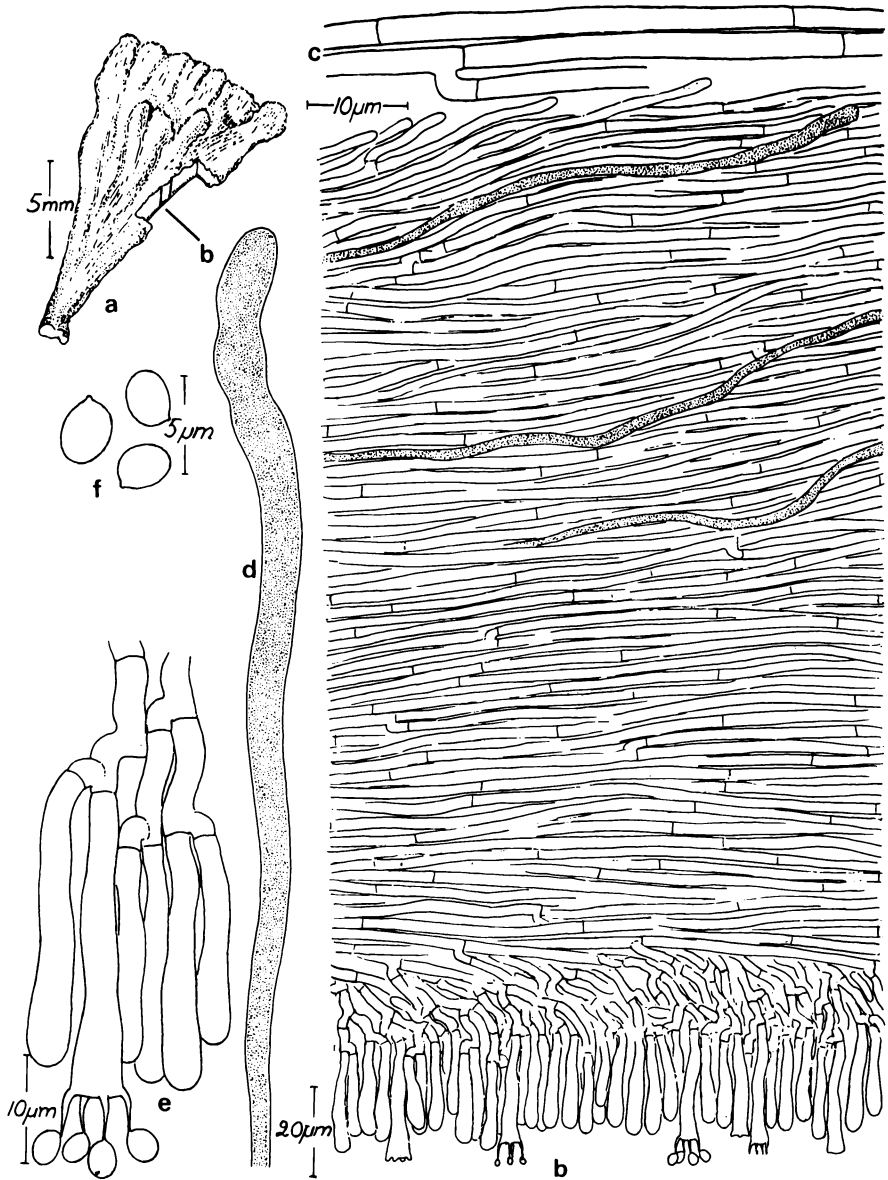


Fig. 745. *Stereopsis vitellina*. a) small fruitbody showing position of section b b) section through fruitbody c) tramal hyphae d) oeliferous hyphae e) basidia f) spores. — Coll. Lundell 1943-11-16.



**Stereopsis** Reid,  
Nova Hedw. Beiheft 18 p. 290, 1965.

**Fruitbodies** spatulate-flabellate, often lobed but varying to a more irregular shape or even forming small rosettes, soft in the living state, brittle when dried, upperside smooth to radiately or irregularly rugose, hymenium smooth or with radial ridges; hyphal system monomitic, hyphae thin-walled, with or without clamps; gloeocystidia or oleiferous hyphae may be present in the hymenium or in the tramal part; basidia clavate, elongate, with 2-4 sterigmata, with or without basal clamp; spores ellipsoid - subglobose, smooth, thin-walled, non-amyloid, non-dextrinoid, non-cyanophilous. Similar to *Cotylidia* but differs by the absence of cystidia in the hymenium. One species in N. Europe.

**Type species:** *Stereum radicans* Berk.

**Stereopsis vitellina** (Plowr.) Reid, Fig. 745  
Beih. Nova Hedw. 18 p. 326, 1965. — *Thelephora vitellina* Plowr., Journ. Bot. London 39 p. 385, 1901. — *Cotylidia vitellina* (Plowr.) Lund. in Lund. & Nannf., Fungi exs. succ. no. 102 (corr. label), 1947.

**Fruitbody** 2-3 cm. long, variable in width and shape, on vertical substrata ligulate-flabelliform, ca. 1 mm thick, with thin, more or less incised margin, basally tapering to a stipelike part, on horizontal substrata usually thicker, clavate or forming multi-layered structures, sometimes rosette-like and with a thicker, more even margin, upperside smooth or generally uneven with radial ridges, silky or fibrillose, hymenium glabrous, smooth or radially rugulose, colour varying in shade from cream or lemon-coloured in the living fungus to orange yellow or pale ochraceous in the herbarium, stipe often darker than the pileus and hymenial side more coloured than the upperside.

**Hyphal system** monomitic, hyphae 2-3  $\mu\text{m}$  wide, thin-walled, straight and parallel in the trama, richly branched in the subiculum, oleiferous hyphae in the upper part of the trama, somewhat sinuous and with oily, hyaline or pale yellow content.

**Cystidia** none.

**Basidia** narrowly clavate, 25-35(-40) x 4-5  $\mu\text{m}$ , with 4 sterigmata and a basal clamp.

**Spores** broadly ellipsoid, 3-4 x 2.2-2.5  $\mu\text{m}$ , thin-walled, smooth.

**Habitat.** Mostly on humid, naked soil, e.g. on the vertical sides of cart-ruts, in mole- and vole-galleries, under roots of blown down trees, but also on the ground in forests.

**Distribution** Rare species and collected a few times in the southern parts of Finland, Sweden and Norway, and once in Denmark.

**Stereum** Pers., Neues Mag. Bot. 1 p. 110, 1794

**Fruitbodies** annual or perennial, resupinate, orbicular, effuse, reflexed to pileate, rather tough to hard, pileus at first tomentose, later in most species becoming glabrous in zones and exposing a dark coloured cuticle, tomentum white to rusty brown, hispid or velutinous; hymenium smooth to slightly tuberculate, yellow, clay- coloured, orange to beige, in some species bleeding when cut or squeezed, fluid first yellow or purplish red, later discoloured, hymenial layer homogeneous or stratose, context thin and dense, in almost all species separated from the tomentum by a thin, brown zone becoming the cuticle on the exposed parts of the pileus; hyphal system monomitic but composed of two kinds of simple-septate hyphae; hymenial hyphae thin- to moderately thick-walled, hyaline to yellowish, frequently branched, in cortex and tomentum thick-walled, yellowish brown and sparsely branched; cystidial elements of two kinds; pseudocystidia, normally originating from horizontal hyphae in the trama and bent into the hymenium, smooth, thick-walled except for in the apical part, often constricted and with one, seldom two, schizopapillae, hyaline to yellow to light brown, filled with an oily to granular substance; cystidioles, appearing as either acutocystidia with pointed apex or as acanthocystidia with protuberances near the apex, both types thin-walled and hyaline; basidia elongate-clavate, with four sterigmata; spores ellipsoid to narrowly ellipsoid to cylindrical, often slightly bent, thin-walled, smooth, hyaline, amyloid, non-cyanophilous; decay white, reaction of oxydase positive. Cosmopolitan genus with several widespread and common species.

**Type species:** *Stereum hirsutum* (Fr.) S.F. Gray.

**Synonym:** *Haematostereum* Pouz.

**Remarks.** The genus is well defined by the combination of a monomitic hyphal system with simple-septate hyphae, oleiferous pseudocystidia, acutocystidia or acanthocystidia, and smooth, amyloid spores. Within the genus there are more difficulties as many of the species are homothallic and probably forms 'microspecies'. The closest relative is *Xylobolus*, which has the same type of hyphal system, pseudocystidia, but shorter and more ellipsoid spores. Furthermore, *Xylobolus* has a brown context and a dense zone separating the context from a usually brown tomentum. It has also a white pocket rot of a type which is unknown in *Stereum*. Its oxidase reaction is negative (positive in *Stereum*). *Stereum* can in North Europe be separated into two groups: 1. *Stereum rugosum* group: hymenium bleeding, spores 8-12 x 3-4  $\mu\text{m}$ . *S. rugosum*, *S. sanguinolentum*, and *S. gausapatum*. 2. *Stereum hirsutum* group: hymenium not bleeding, spores 5-8 x 2-3  $\mu\text{m}$ . *S. hirsutum* and *S. subtomentosum*.

#### Key to *Stereum* in N. Europe

1. Hymenium bleeding when cut ..... 2
1. Hymenium not bleeding ..... 4
2. Acutocystidia present, mostly on *Quercus*,  
spores 6-10 x 3.5-4.5  $\mu\text{m}$  ..... 1. *S. gausapatum*
2. Acanthocystidia present, on various substrata ..... 3
3. On deciduous wood, spores 7-12 x 3-4.5  $\mu\text{m}$  ..... 3. *S. rugosum*
3. On coniferous wood, spores 6-10 x 2.5-4.5  $\mu\text{m}$  ..... 4. *S. sanguinolentum*
4. Tomentum hirsute to striate,  
on different kinds of deciduous trees ..... 2. *S. hirsutum*
4. Tomentum thin and adpressed, soft and velutinous, in N. Europe preferably on *Alnus* ..... 5. *S. subtomentosum*

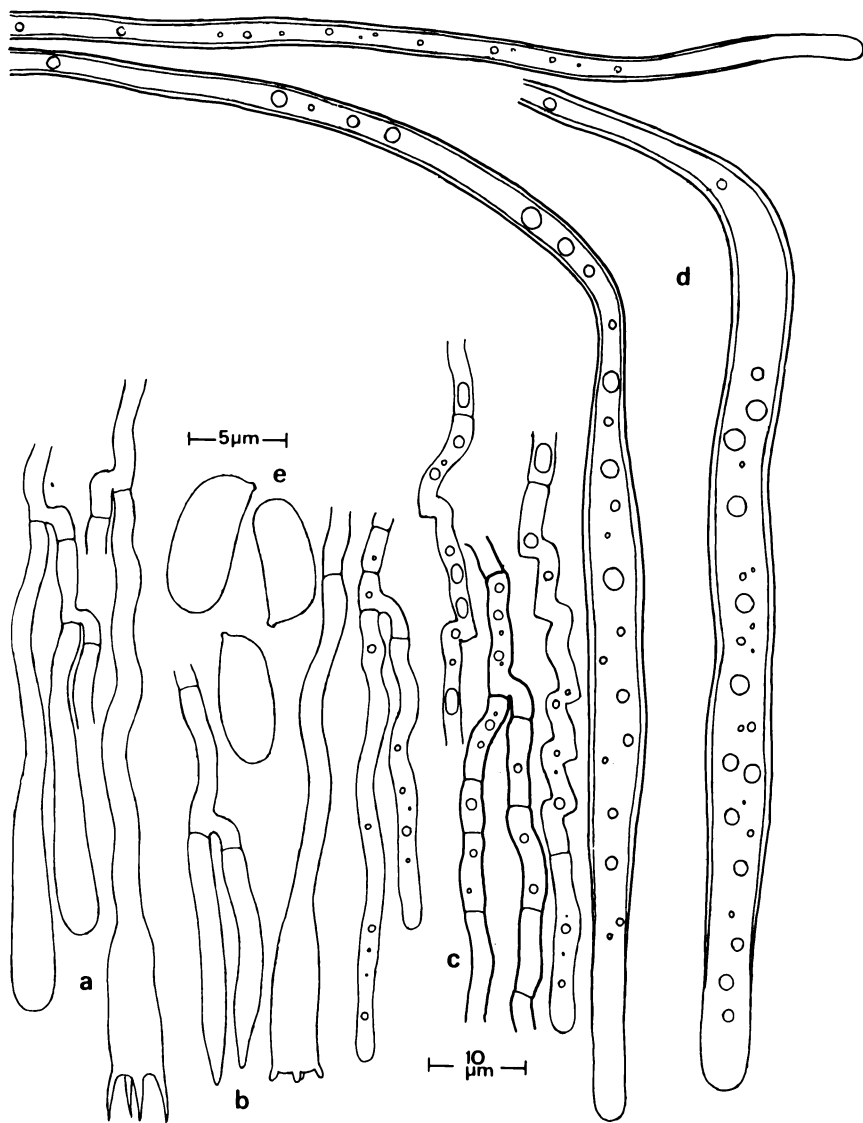


Fig. 746. *Stereum gausapatum*. a) basidia b) acutocystidia c) syb hymenial hyphae d) cystidia e) spores. — From living material, Göteborg, Sweden.

1. *Stereum gausapatum* (Fr.) Fr.,

Fig. 746-47

Hym. Europ. p. 638, 1874. - *Thelephora gausapata* Fr., Elenchus fung. p. 171, 1828.

**Fruitbody** effuse, resupinate to reflexed orbicular and confluent, tough when fresh, when dried rather hard, usually up to 1 mm thick; pileus dimidiate to broadly attached, lobed, often fused laterally with adjacent pilei, up to 2 cm wide, tomentous or velutinous in narrow zones, grey to pale brown or by age almost rusty brown, tomentum zonewise disappearing and exposing a glabrous dark-brown cortex, margin paler than the rest of the surface; hymenium smooth to tuberculate, in larger specimens partly folded radially, wood- coloured to pale olivaceous or buff, darker by age, bleeding when cut or touched, fluid distinctly reddish, later discoloured in shades of brown; context pale ochraceous, up to 0.5 mm thick and separated from the tomentum by a 25-75  $\mu\text{m}$  thick dark-brown zone of compacted hyphae.

**Hyphal system** monomitic, with two kinds of simple-septate hyphae, hymenial hyphae thin to thick-walled and with transitions to pseudocystidia. Hyphae of cortex and tomentum thick-walled, not or sparsely branched, in cortex strongly pigmented and glued together by a resinous substance.

**Cystidia** of two kinds: 1) Pseudocystidia, apically thin-walled but otherwise thick-walled, hyaline to yellowish and with a grainy to oily content, 5-10  $\mu\text{m}$  wide and often more than 150  $\mu\text{m}$  long. 2) Acutocystidia 20-30 x 2-4  $\mu\text{m}$ , projecting slight above the basidia and easily observed in thin sections.

**Basidia** elongated clavate, 30-60 x 4-6(-8)  $\mu\text{m}$ , with four sterigmata.

**Spores** ellipsoid to narrowly ellipsoid, thin-walled, smooth, 6-9(-10) x 3.5-4.5  $\mu\text{m}$ , amyloid.

**Habitat and distribution.** In North Europe found only on *Quercus*, usually on standing trunks and still attached branches, more rarely on fallen branches and other debris of oak. A southern species in the area, restricted to the *Quercus*-zone. It is wide spread and following *Quercus* in the whole of Europe.

**Remarks.** *S. gausapatum* is easily recognized in the field by the bleeding reaction of the hymenium and by the host. Dried specimens can be separated from *S. hirsutum* by the colour of the hymenium which is buff to clay-coloured in *S. gausapatum*, yellow to pale orange in *S. hirsutum*. *S. rugosum* is separated by a harder and thicker fruitbody and microscopically by presence of acanthocystidia.

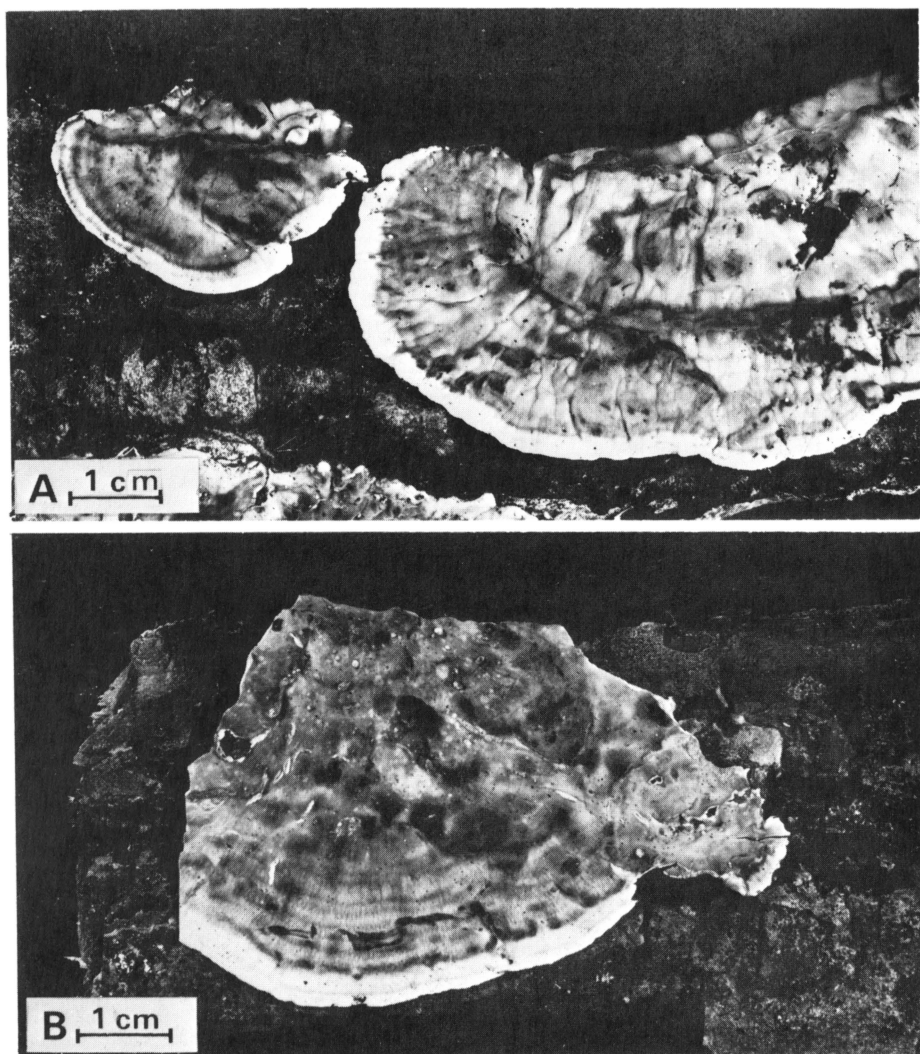


Fig. 747. *Stereum gausapatum*. A) living fruitbody, B) dried fruitbody. — Coll. Eriksson 8890.

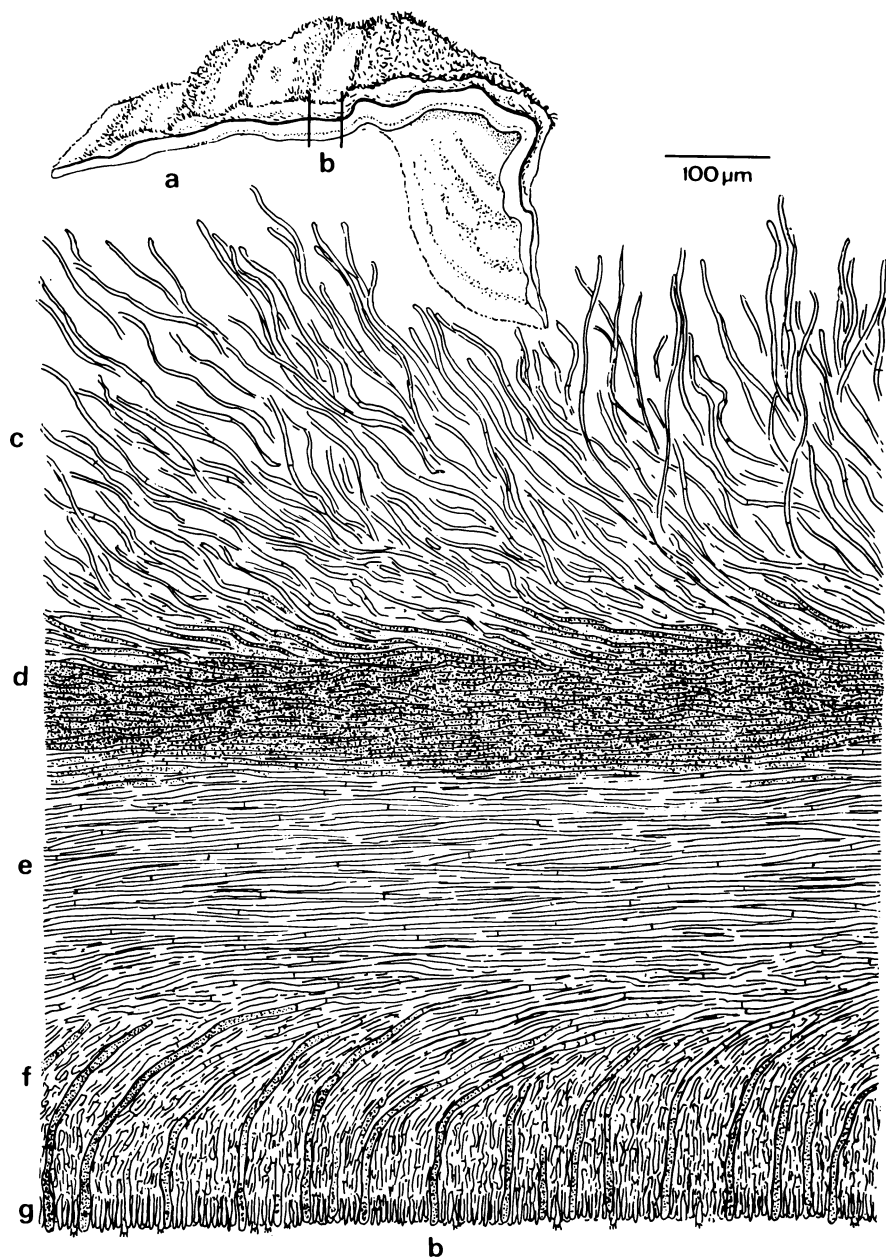


Fig. 748. *Stereum hirsutum*. a) section through fruitbody showing position of section b) section through fruitbody with single-layered hymenium c) tomentum d) cortex e) trama f) pseudocystidiate layer g) hymenium. — Coll. Ryvar-den 19061.

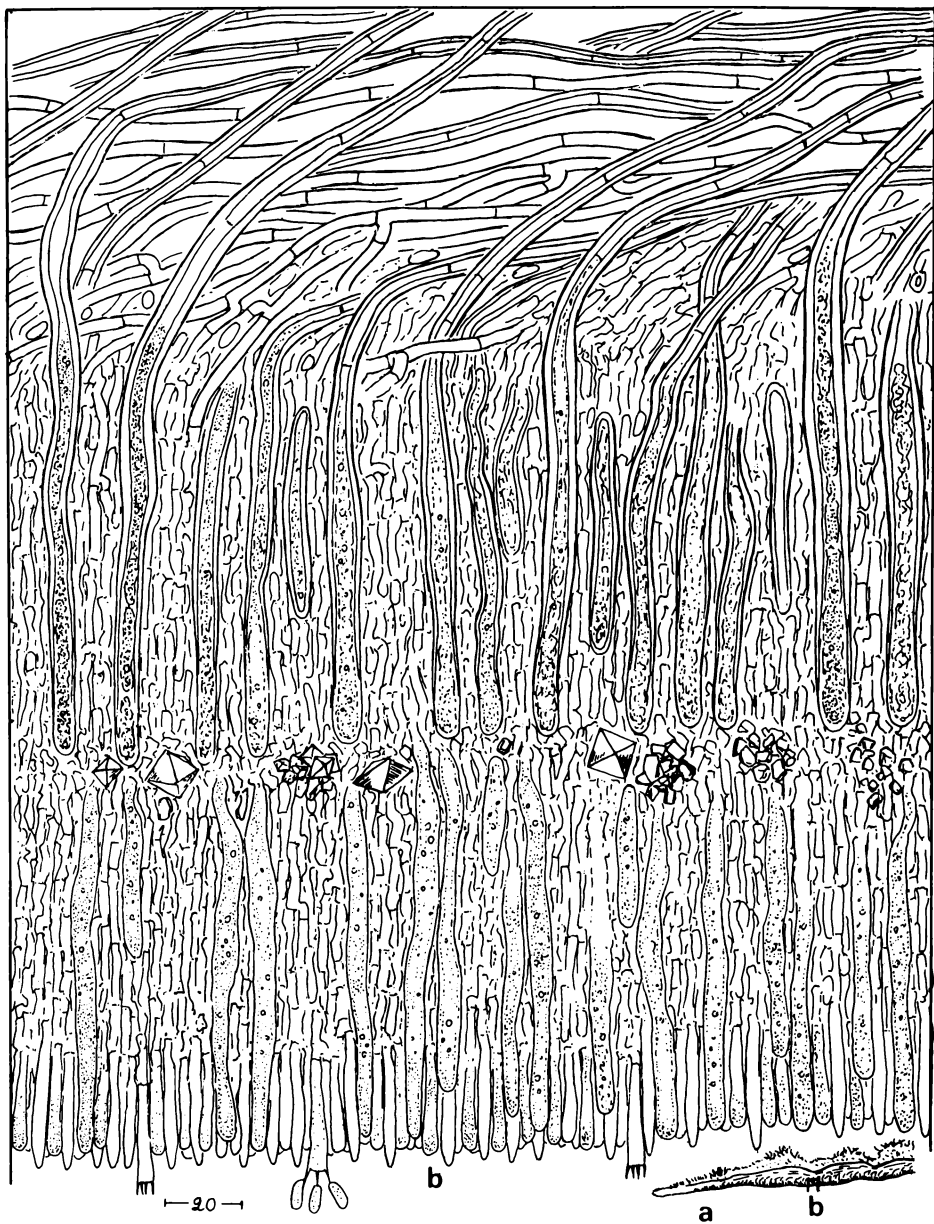


Fig. 749. *Stereum hirsutum*. a) section through fruitbody with position of section b) b) section through two-layered hymenium. — From living fruitbody, Göteborg, Sweden.



**2. *Stereum hirsutum*** (Willd.: Fr.) S.F. Gray, Fig. 748-53  
Nat. Arr. Br. Pl. p. 653, 1821. - *Thelephora hirsuta* Willd.: Fr., Syst. mycol. I  
p. 439, 1821.

**Fruitbody** resupinate, orbicular, with distinct margin, effused reflexed to distinctly pileate, tough when fresh, harder when dried, up to 2 mm thick; pileus up to 3 cm wide, dimidiate to broadly attached and often fused laterally to adjacent fruitbodies or densely imbricate, often lobed and wavy, tomentose-hirsute-hispid, generally zonate, at first white, then greyish to unevenly dirty brown, by age the tomentum disappear zonewise and expose a brown and glabrous cortex; hymenium smooth to tuberculate, greyish to yellowish or pale orange with a white margin in actively growing specimens, later more yellow to ochraceous, in dead and hibernating specimens almost buff; context yellow to ochraceous, up to 1 mm thick.

**Hyphal system** monomitic, hyphae simple-septate, and of two kinds, in the hymenium thin-walled to slightly thick-walled and frequently branched, in the trama thick-walled, less branched, generally 4-6  $\mu\text{m}$  wide, in the cortex yellowish-brown and thick-walled, in the tomentum thick-walled and with numerous adventitious septa, often 5-8  $\mu\text{m}$  wide.

**Cystidia** of two kinds 1) Pseudocystidia abundant, arising from the trama and forming a fairly dense layer next to the hymenium, not or rarely projecting above the basidia, 7-10  $\mu\text{m}$  wide and often more than 100  $\mu\text{m}$  long. In the upper part filled with an oily content, thick-walled except for in the apical part, sometimes with a schizopapillae. 2) Acutocystidia numerous, 20-30 x 2-4  $\mu\text{m}$ , projecting slight above the basidia and easily observed in a thin section.

**Basidia** elongated clavate, 25-60 x 3-5  $\mu\text{m}$ , with four sterigmata.

**Spores** narrowly ellipsoid to cylindrical, thin-walled, smooth, 5-8 x 2-4(-3.5)  $\mu\text{m}$ , amyloid.

**Habitat and distribution.** On deciduous wood but occasionally also on *Picea* and *Pinus*. Common in the southern part of the area, towards the north restricted to more sheltered and favourable localities.

**Remarks.** *S. hirsutum* is usually easy to recognize by its white to woolly grey and hirsute tomentum and the yellow to orange hymenium. *S. subtomentosum* is similar but well distinguished by usually larger and more spatulate fruitbodies with a softer and more adpressed and velutinous tomentum. The latter is mainly restricted to *Alnus* in the area.

Under the name *Stereum rameale* (Pers.) Fr., Jahn (1971) reports a specimen from Norway. We have studied this material and have found that it is only an old specimen of *S. hirsutum*, which has lost the tomentum of the upperside, evidently being eaten by insects. *S. rameale* s. Jahn is thus not found in N. Europe. Whether or not it shall be accepted as a good species, does not seem to be fully clear.

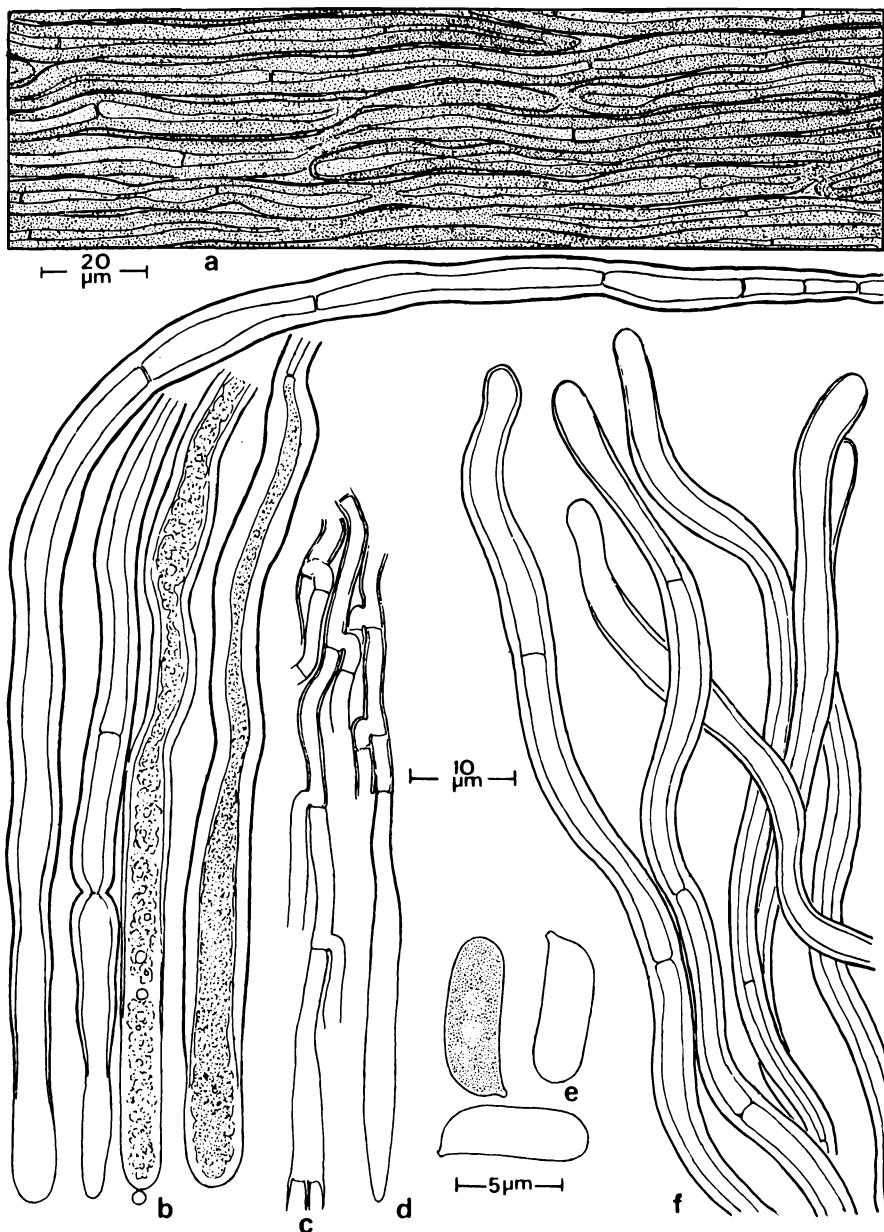


Fig. 750. *Stereum hirsutum*. a) longitudinal section through cortex b) pseudocystidia c) basidium and subhymenial hyphae d) acutocystidium e) spores f) hyphae from tomentum. — From living fruitbody, Göteborg, Sweden.

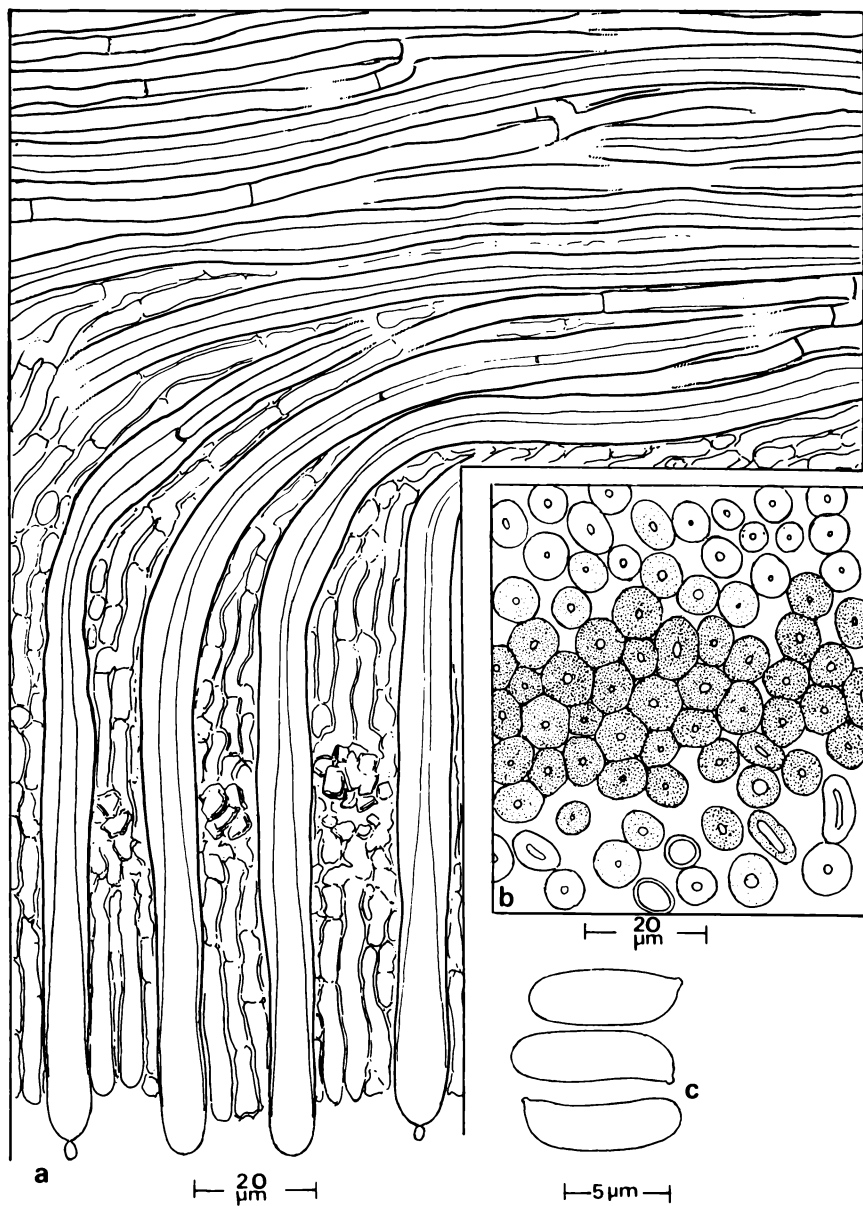


Fig. 751. *Stereum hirsutum*. a) section through hymenium b) vertical section through cortex of young fruitbody c) spores. — Coll. Høeg 1928-04-06.

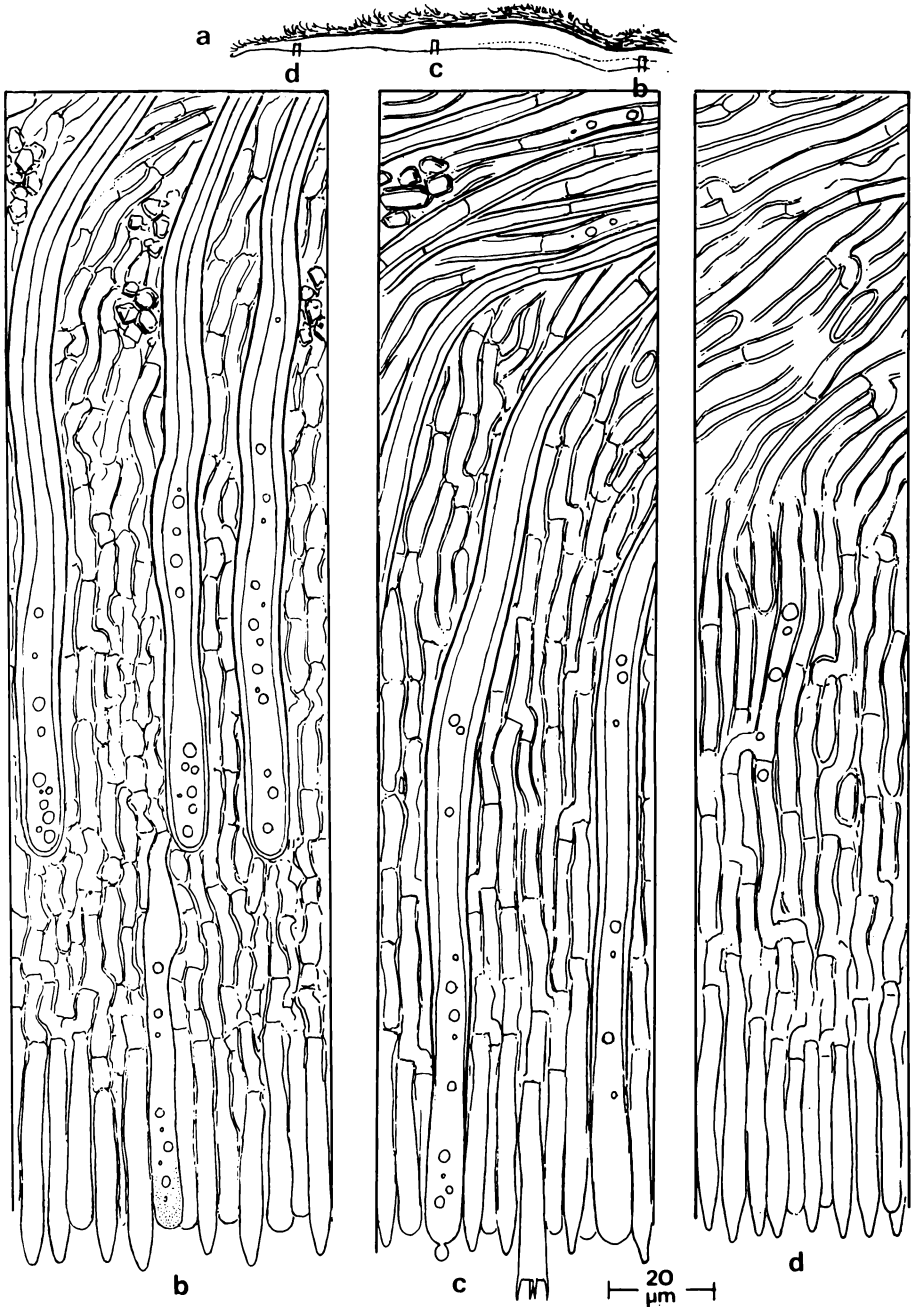


Fig. 752. *Stereum hirsutum*. a) section of fruitbody showing positions of sections b-d b) inner two-layered hymenium c) middle fertile hymenium d) marginal, sterile hymenium. — Coll. Ryvarden 19068.

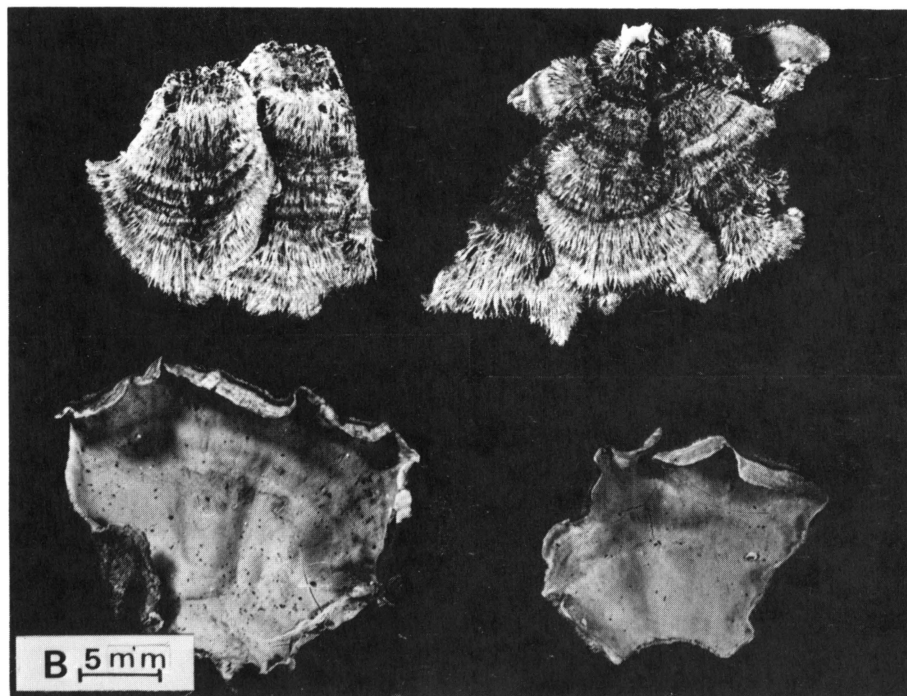
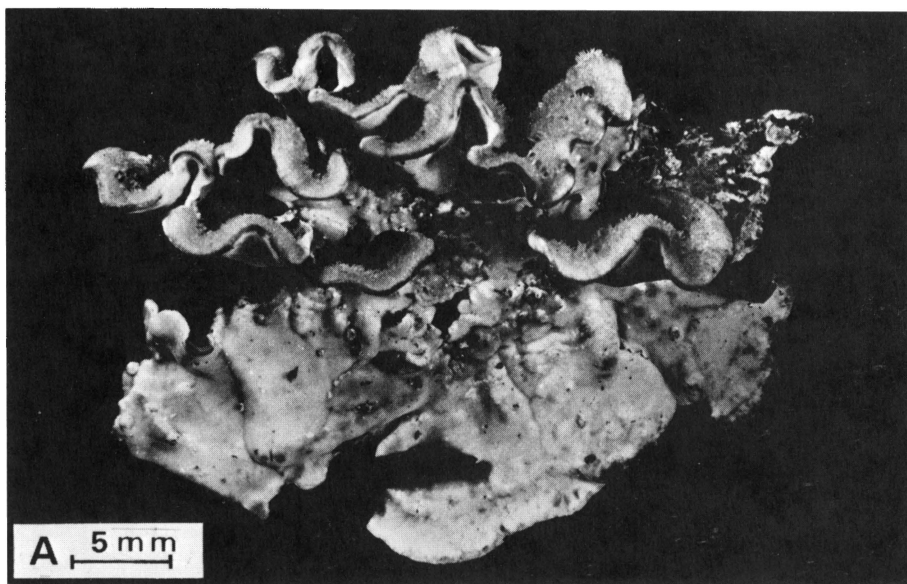


Fig. 753. *Stereum hirsutum*. A) Coll. Hallingbäck 1983-04-25. B) Coll. Hjortstam 12074. Photo T. Hallingbäck.

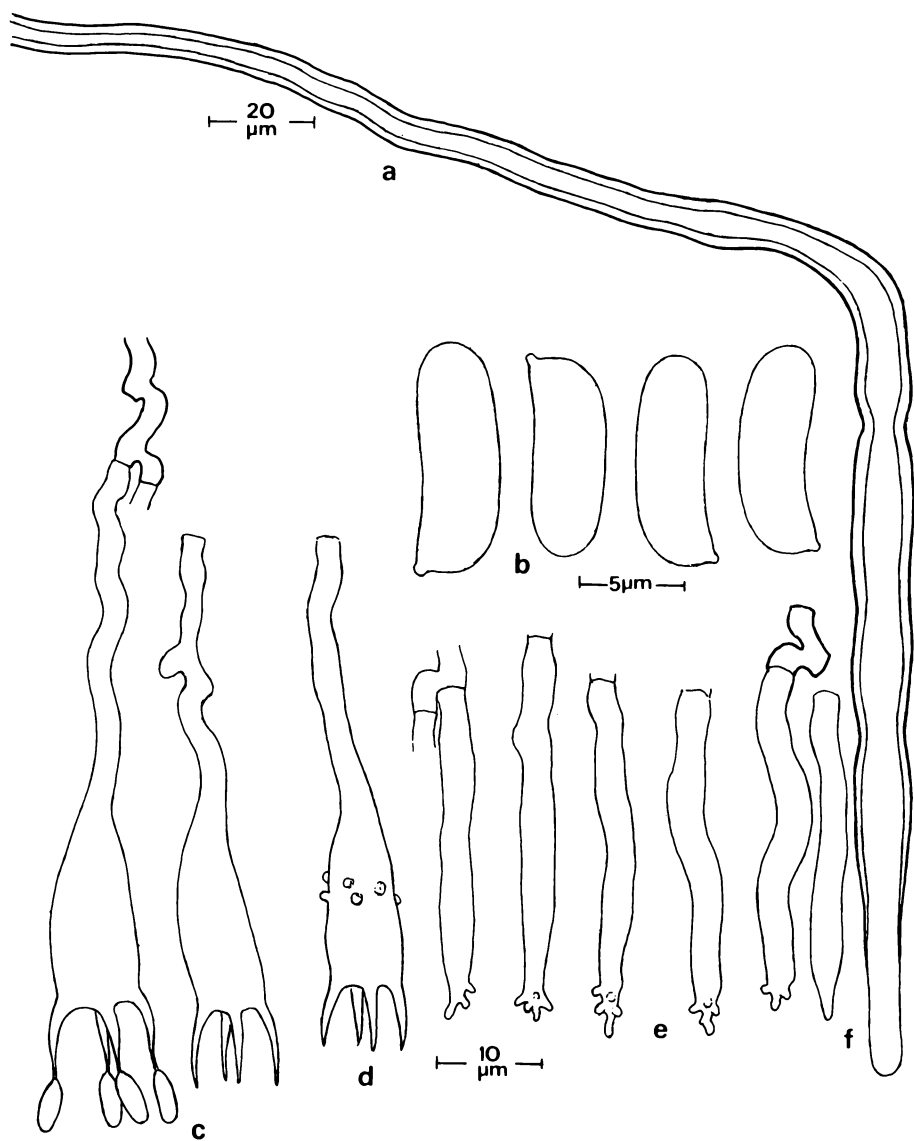


Fig. 754. *Stereum rugosum*. a) pseudocystidia b) spores c) basidia d) acanthobasidium e) acanthocystidia f) acutocystidium. — From living fruitbody, Göteborg, Sweden.

### 3. *Stereum rugosum* (Pers.:Fr.) Fr.,

Fig. 754-55

Epicr. p. 552, 1838. - *Thelephora rugosa* Pers.:Fr., Syst. mycol. 1 p. 439, 1821.

**Fruitbody** resupinate to effused reflexed, coriaceous to very hard, first as rounded and orbicular patches, usually with a loosening margin, then with a narrow reflexed pileus forming dense imbricate clusters; pileus lacking to narrow, undulate to lobate, often fused laterally, rarely more than 1 cm wide, mostly narrow, first finely depressed tomentose and greyish, soon becoming glabrous and dark brown, finally black in narrow and sharp zones and with a distinct cortex in section, margin white to pale ochraceous and rounded; hymenium smooth, tuberculate to undulating, pale ochraceous to buff, with age pale yellowish brown, often with black spots in old specimens, bleeding when cut or touched in fresh state, fluid first reddish, but soon blackish brown. In section the fruitbody is distinctly stratose, each zone clearly defined by a thin dark line, totally up to 2 mm thick, ochraceous in younger parts, darker and often greyish to dirty brown in old parts as the content of the pseudocystidia becomes oxidized with age to a dark-coloured substance.

**Hyphal system** monomitic with simple-septate hyphae of two kinds, hymenial hyphae thin-walled, 3-4  $\mu\text{m}$  wide, branching frequent, tramal hyphae thick-walled, horizontal, 3-6  $\mu\text{m}$  wide, hyphae in the tomentum are of an intermediate type, sparingly branched, hyaline to yellowish and in cortex pale brown and fairly thick-walled.

**Cystidia** of two kinds 1) Pseudocystidia thick-walled, except for in the apical part, slightly projecting, smooth, more or less constricted, hyaline to yellowish, with oily content, 5-12  $\mu\text{m}$  wide, usually more than 100  $\mu\text{m}$  long. 2) Acanthocystidia easily observed, 30-35 x 3-4  $\mu\text{m}$ , projecting slight above the basidia.

**Basidia** elongated clavate, 30-50(-100)  $\mu\text{m}$  x 6-8  $\mu\text{m}$  with four sterigmata.

**Spores** narrowly ellipsoid to cylindrical, slightly bent, thin-walled, smooth, 7-12 x 3-4.5  $\mu\text{m}$ , amyloid.

**Habitat and distribution.** On deciduous wood of many kinds, especially on standing, dead trunks where it can cover large areas. *Corylus*, *Betula*, and *Alnus* are seemingly the most common hosts, but also known from most other deciduous trees in the area. A very common species, although probably rare in the northernmost Scandinavia.

**Remarks.** *S. rugosum* is as a rule easy to determine by its hard resupinate to subresupinate and orbicular fruitbodies, often covering large areas of dead and standing trees. Its pileus becomes glabrous rather soon and the fruitbodies is perennial and harder than for other species dealt with here.

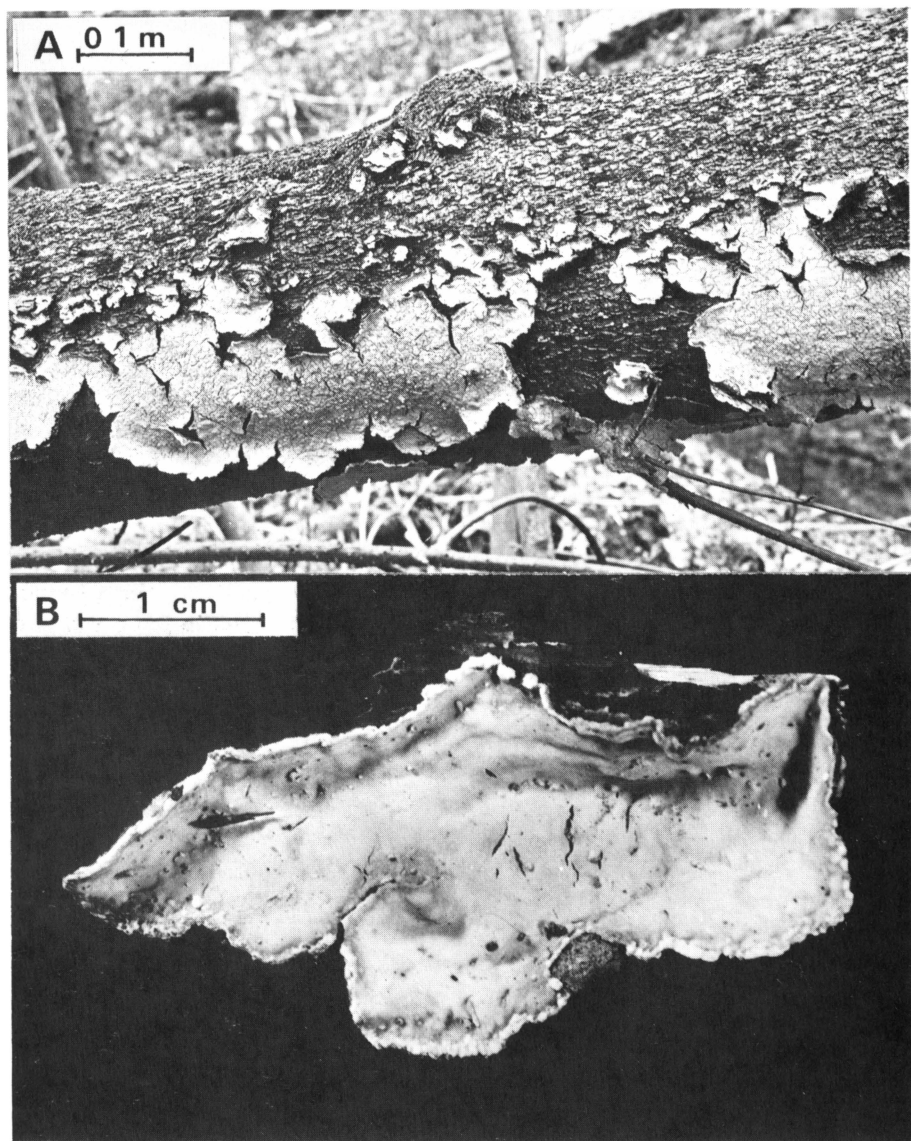


Fig. 755. *Stereum rugosum*. A) Living specimens, Göteborg, Sweden B) Coll. Morander 2017. Photo T. Hallingbäck.



4. **Stereum sanguinolentum** (Alb. & Schw. : Fr.) Fr., Fig. 756  
Episc. p. 549, 1838. - *Thelephora sanguinolenta* Alb. Schw. : Fr., Syst. my-  
col. I p. 440, 1821.

**Fruitbody** annual, more rarely perennial, resupinate and orbicular with a slightly loosening margin, effused reflexed to distinctly pileate, often covering large areas on the lower side of logs, up to 1 mm thick, tough when fresh, hard to coriaceous when dried; pileus absent or present, narrow and mostly less than 10 mm wide, often fused laterally, undulate, lobed and incised, or as dense imbricate clusters, finely adpressed tomentose to hirsute, especially with age, greyish white to brownish, soon becoming glabrous in zones and exposing a brown cortex in narrow bands, when old almost completely glabrous, dark brown to almost black with narrow and sharp zones; hymenium smooth, undulate or tuberculate, in colour beige to buff, with age dark brown, when fresh strongly bleeding when cut, bleeding parts dark brown when dried, margin narrow, white to pale buff: context beige to ochraceous often with small dark spots, separated from the tomentum by a thin dark brown zone, less than 50  $\mu\text{m}$  thick.

**Hyphal system** monomitic with two kinds of simple septate hyphae, hymenial hyphae thin to thick-walled, 2-6  $\mu\text{m}$  wide, in the tomentum, cortex and trama thick-walled hyphae, hyaline to pale brown and 3-6  $\mu\text{m}$  wide.

**Cystidia** of two kinds: 1) Pseudocystidia thick-walled, except for in the apical part, projecting very slight above the basidia, filled with an oily to grainy, pale brown content, hyaline in the hymenium, in the basal part yellowish and 3-6  $\mu\text{m}$  wide, in the upper part 4-10  $\mu\text{m}$  wide, usually longer than 100  $\mu\text{m}$ . 2) Acanthocystidia 30-40  $\mu\text{m}$  long and 3-5  $\mu\text{m}$  wide, projecting above the basidia.

**Basidia** elongate-clavate, 25-40 x 5-6  $\mu\text{m}$ , with four sterigmata.

**Spores** narrowly ellipsoid to cylindrical, often slightly bent, thin-walled, smooth (6-)7-10 x (2.5-)3-4.5  $\mu\text{m}$ , amyloid.

**Habitat and distribution.** On coniferous wood, especially common on newly dead logs and stumps of *Picea*, but also on living trees of both *Picea* and *Pinus*, often high above the ground. It is often transferred to the host by an hymenoptera (*Sirex* sp.). Very common in the natural *Picea* forests, less common in *Pinus* forests and known throughout the boreal conifer zone.

**Remarks.** The species is usually easy to recognize because of its bleeding reaction and occurrence on coniferous wood, being the only bleeding species on this type of substrata. Its closest relative is *S. rugosum* but the acanthocystidia are seemingly more abundant in *S. sanguinolentum* and the spores slightly smaller. *S. rugosum* is also more yellowish buff, thicker and harder, while *S. sanguinolentum* is beige brownish and annual with a thin and pliable fruitbody. *S. sanguinolentum* is a fungus which infect living

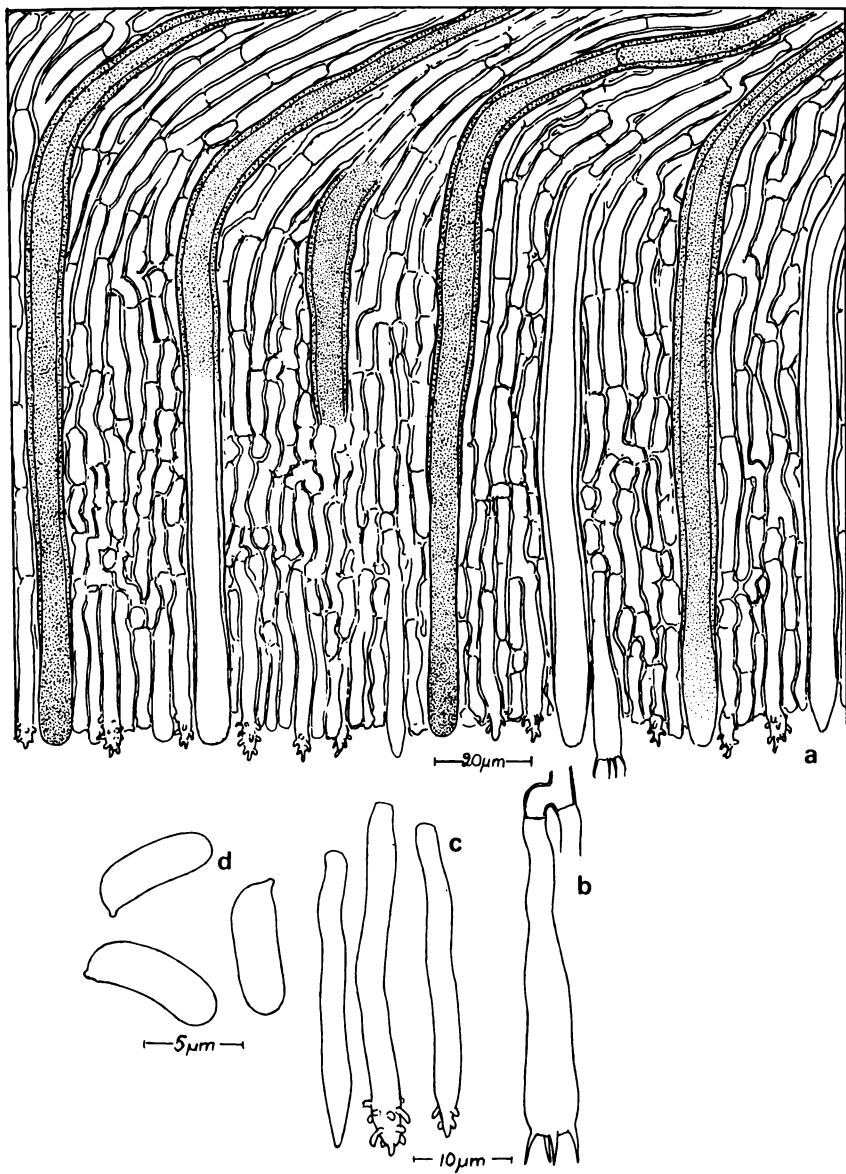


Fig. 756. *Stereum sanguinolentum*. a) section through hymenium b) basidium c) cystidia d) spores. — Coll. Hjortstam 12722.

trees often through broken tops and the attached wood becomes coloured in bluish-greyish zones. The fungus is itself attacked by a tremellaceous fungus, *Tremella encephala*, which in Europe is obligate on the species.

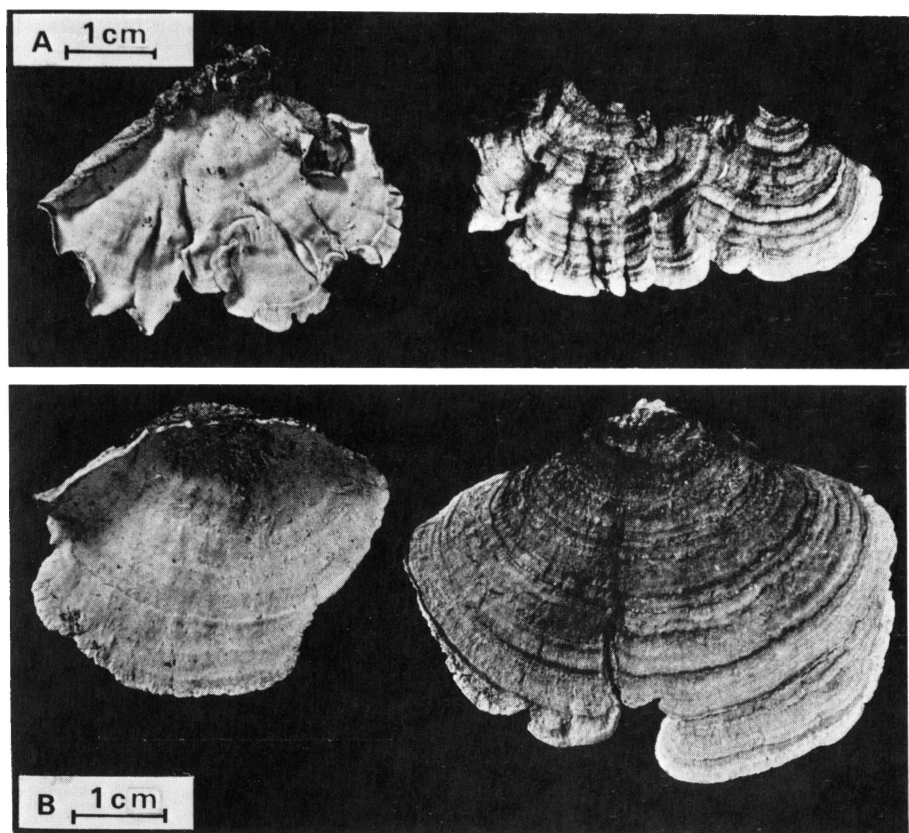


Fig. 757. *Stereum subtomentosum*. A) From Sweden. — Coll. Degelius & Sandberg 10421 B) from Canada. — Coll. B. & J. Eriksson 7144.

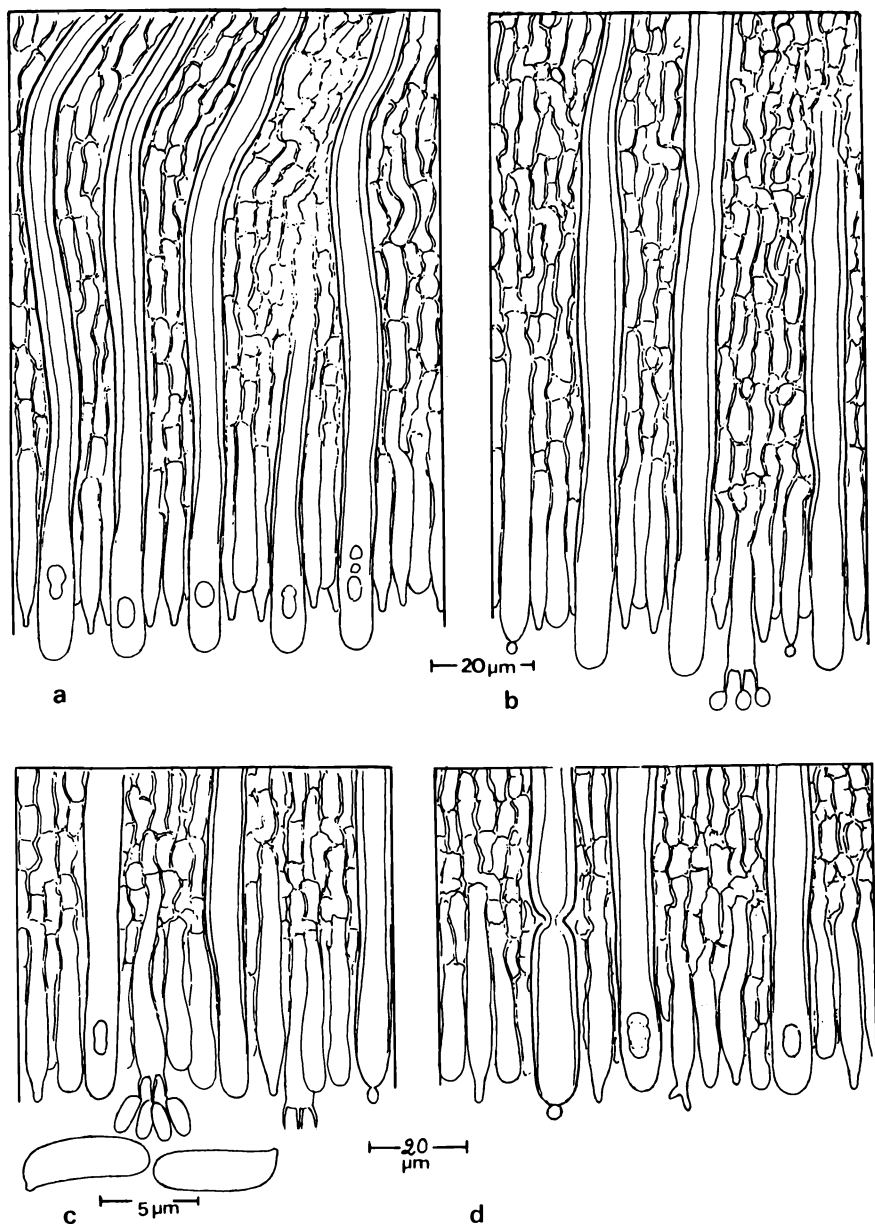


Fig. 758. *Stereum subtomentosum*. Sections through hymenium. a) From *Alnus*. — Coll. Strid & Eriksson 10423 (Uppland, Sweden) b) from *Tilia*. — Coll. B. & J. Eriksson 9233 (Quebec, Canada) c) from *Betula*. — Coll. B. & J. Eriksson 7321 (NW. Territory, Canada) d) from *Alnus*. — Coll. Hjortstam 10414 (Öland, Sweden).

**5. *Stereum subtomentosum* Pouz.,**

Fig. 757-58

Ceska Mykol. 18 p. 147-148, 1964. - *Stereum ochroleucum*\* *arcticum* Fr., Hym. Europ. p. 639, 1874.

**Fruitbody** annual, normally reflexed with a distinct pileus, single or more commonly in dense, imbricate clusters, coriaceous and tough, pileus up to 5 cm wide and 3-7 cm long in fused fruitbodies, fanshaped to spatulate with a distinctly tapering and often short stipe-like base, or more broadly attached margin, lobed and undulate involute, especially when dried, first finely adpressed tomentose to velutinous, yellowish grey to pale brown in narrow zones, with age some old specimens often more hirsute and grey with a greenish tint at the base because of algae in the tomentum, some of the zones may be separated by dark bands reflecting distinct stages in the development, margin thin and light-coloured; hymenium smooth, tuberculate or undulate, light beige to ochraceous, becoming immediately yellowish when cut or wounded in fresh condition; context beige to ochraceous and separated from the tomentum by a distinct dark brown zone of agglutinated hyphae.

**Hyphal system** monomitic consisting of two kinds of simple septate hyphae, in the subhymenium thin-walled and abundantly branched, in the cortex and the tomentum, thick-walled and sparsely branched, 3-10  $\mu\text{m}$  wide, often with adventitious septa of contracted protoplasm.

**Cystidia** of two kinds: 1) Pseudocystidia thick-walled except in the apical part, often constricted and provided with an apical appendix, projecting slight above the basidia, filled with a yellowish content, 4-12  $\mu\text{m}$  wide, usually longer than 100  $\mu\text{m}$ . 2) Acutocystidia numerous, about 35-40 x 4-5  $\mu\text{m}$ , projecting slight above the basidia.

**Basidia** clavate, 25-40 x 4-6  $\mu\text{m}$ , with four sterigmata.

**Spores** cylindrical to narrowly ellipsoid, often slightly bent, thin-walled, smooth, 5.5-8 x 2-3  $\mu\text{m}$ , amyloid.

**Habitat and distribution.** In N. Europe generally on *Alnus incana* and *A. glutinosa*, but in the south of the area also on *Fagus*, mostly on standing, dead trunks, often abundant. From C. Europe also reported on other hosts as *Salix*, *Betula*, *Carpinus*, and *Populus*. Characteristic species in the alder border along the Swedish east coast as well as in such subcoastal localities. Rather common in C. parts of E. Norway and scattered up to Finnmark and Troms. Quite rare in W. Sweden while more common in the south and in Denmark.

**Remarks.** *S. subtomentosum* is rather easy to recognize in the field because of the large and often distinctly fanshaped to spatulate fruitbodies with a soft and velutinous tomentum and by its yellowish bleeding reaction when fresh. It is similar to *S. ostrea* which, however, has a tropical or subtropical distribution and is separated by its oyster-like fruitbody, and more brownish colour.

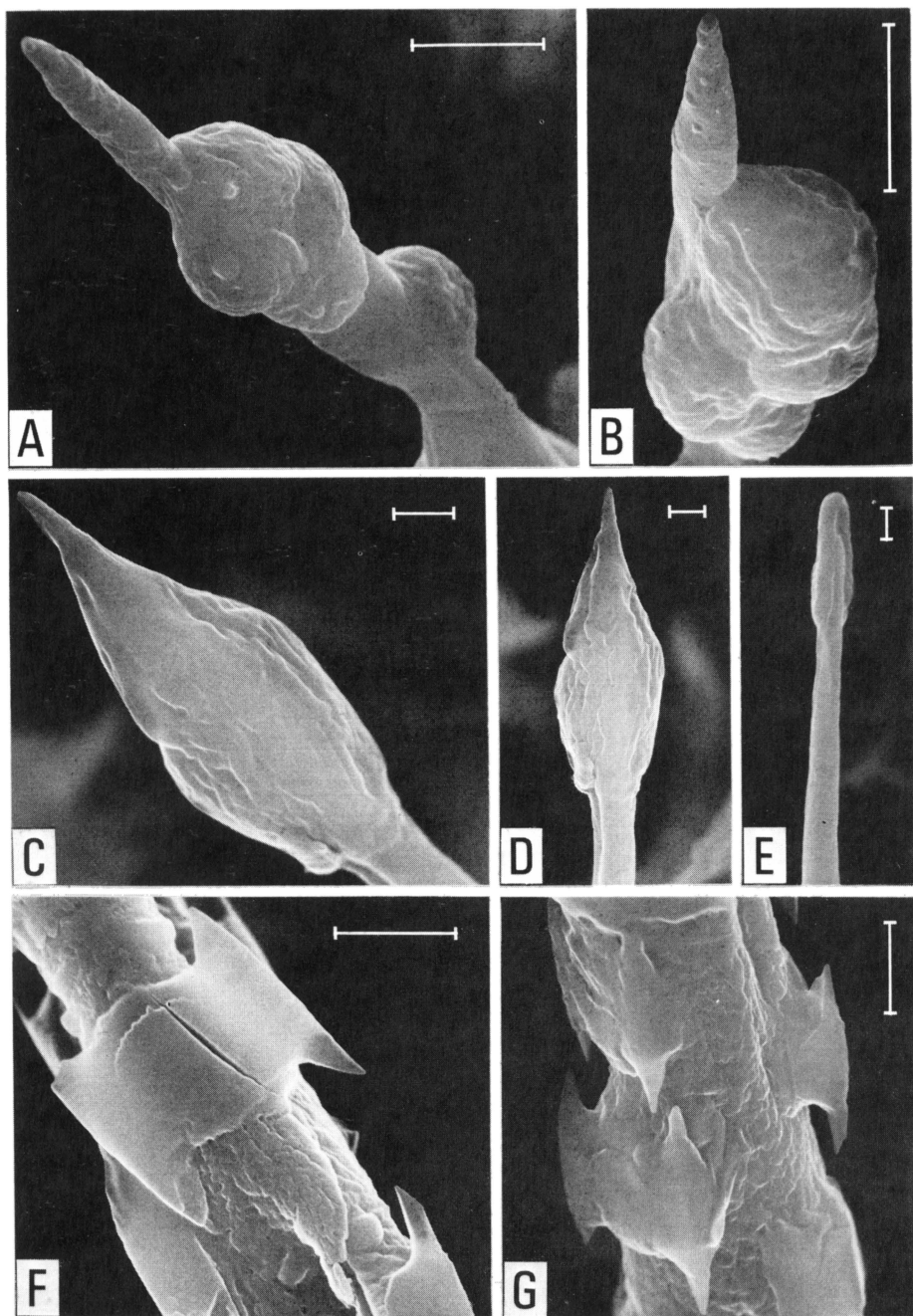


Fig. 759. SEM pictures of A,B) *Subulicium lautum* (coll. Hjortstam 12458), C-E) *S. rallum* (coll. Hjortstam 12741), and F,G) *Subulicystidium longisporum* (coll. Hjortstam 12647). A-E) cystidia with dried up droplets of exudate. F,G) cystidial ornamentation. — Scale A,B) 5  $\mu$ m, C-G) 1  $\mu$ m. Photo: Stellan Sunhede.

**Subulicium** Hjortst. & Ryv.,  
Mycotaxon 9 p. 511, 1979.

**Fruitbodies** thin, inconspicuous, as a rule of small dimensions, under a lens (50 X) pilose by protruding cystidia, in the living state whitish, when dried greyish white; hyphal system monomitic, hyphae thin or with thickened walls, without clamps; cystidia frequent, subulate, thick-walled, terminal or lateral, encrusted with crystalline or resinous matter; basidia broadly clavate, generally 3(-4) times longer than wide, broader in the middle part, with four sterigmata and without basal clamp; spores globose to subglobose, thin-walled or with slightly thickened walls, non-amyloid, non-dextrinoid, and without visible cyanophilous reaction.

**Type species:** *Peniophora lauta* Jacks.

**Remarks.** The genus was introduced with only one species and is somewhat similar to *Subulicystidium*. It differs, however, from this genus, primarily in lacking clamps and having globose spores. Furthermore, the cystidia are encrusted with resinous matter, not with rectangular plates longitudinally arranged. The basidia of *S. lautum* differ considerably from those of *S. longisporum*. They are broadly clavate, and somewhat constricted at the attachment of the sterigmata, while in *S. longisporum* they are more distinctly suburniform, and slightly widened towards the sterigmata.

#### Key to the species

1. Hyphae, cystidia, and basidium-base strongly encrusted with crystalline matter, cystidia terminal ..... 3. **S. rallum**
1. Hyphae, cystidia, and basidium-base smooth, cystidia generally lateral ..... 2
2. Spores 6-7  $\mu\text{m}$  in diam., cystidia commonly 100-120  $\mu\text{m}$  long ..... 1. **S. lautum**
2. Spores 4-5  $\mu\text{m}$  in diam., cystidia generally 60-80  $\mu\text{m}$  long .... 2. **S. minus**

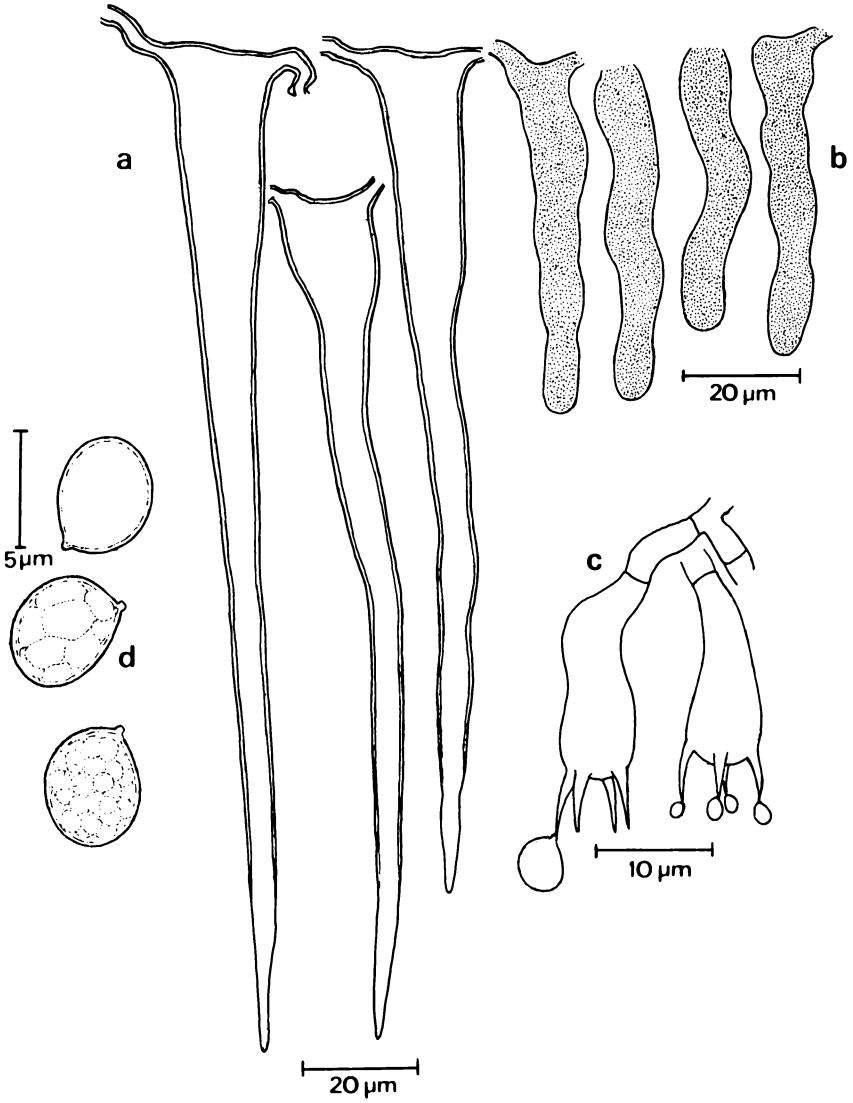


Fig. 760. *Subulicium lautum*. a) cystidia b) young cystidia c) basidia d) spores.  
— Coll. Sivertsen & Sveum (Norway).



**1. *Subulicium lautum***(Jacks.) Hjortst. & Ryv., Fig. 759A,B, 760  
Mycotaxon loc. cit. p. 513. - *Peniophora lauta* Jacks., Can. Journ. Res. C.  
26, p. 129, 1948.

**Fruitbody** resupinate, as a rule thin and of small dimension, under the lens pilose by protruding cystidia, thus reminding of *Subulicystidium* or *Lit-schauerella*.

**Hyphal system** monomitic, all hyphae without clamps, thin-walled, without or with only slight encrustations, 3-3.5(-4)  $\mu\text{m}$  wide, in well developed specimens a dense subiculum is distinguishable consisting of closely packed hyphae next to the substratum.

**Cystidia** numerous, of subicular origin, often projecting 50  $\mu\text{m}$  or more above the basidia, mostly lateral (plagiocystidia), smooth, thick-walled except in upper part, 100-120 (-150)  $\mu\text{m}$  long and 10-13  $\mu\text{m}$  wide near base, commonly with a globe of excreted matter, easily seen under a lens with strong magnification.

**Gloeocystidia**, 30-40 x 5-7  $\mu\text{m}$  may occur now and then in almost all known collections. They are easily observed because of their denser protoplasm and may represent only a juvenile state of the ordinary cystidia.

**Basidia** broadly clavate, wider in the middle part, 25(-30) x 6-8  $\mu\text{m}$ , with four sterigmata, approximately 7-9  $\mu\text{m}$  long.

**Spores** globose to subglobose, smooth, thin or slightly thick-walled, 6-7  $\mu\text{m}$  in diam. or 6-8 x 4.5-7  $\mu\text{m}$ .

**Habitat and distribution.** Mostly on coniferous wood but also on dead or decaying ferns (*Athyrium felix-femina*). It seems to belong to the group of species which prefer old and more or less virgin forests. A handful of specimens have been collected in Denmark (Sjaelland) and it is further known from Norway (Akershus, Sør-Trøndelag, Oppland, Nordland) and Sweden (Västergötland, Västerbotten). Outside N. Europe only known from Poland (Leg. Hallenberg & Larsson, herb. GB) and Canada (type locality).

**Remarks.** The species is easy to determine because of its subulate, thick-walled and generally lateral cystidia, its subglobose spores and its hyphae without clamps. When Jackson described the species he noted that the size of cystidia and appearance of spores varied. Also in the Nordic specimens these variabilities can be observed but spore sizes are apparently overlapping.

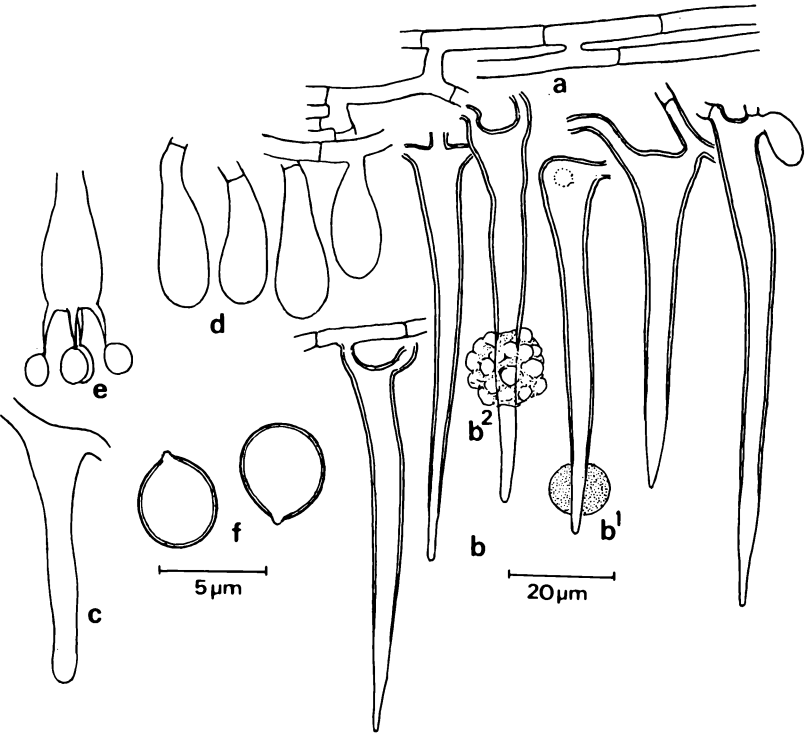


Fig. 761. *Subulicium minus*. a) subhymenial hyphae b) cystidia, b<sub>1</sub>) with oily globule b<sub>2</sub>) globule with attached spores c) young cystidium d) young basidia e) basidium f) spores. — From the holotype.

**2. Subulicium minus** Hjortst.,  
Mycotaxon 19 p. 511, 1984

Fig. 761

**Fruitbody and hyphae** in *S. lautum* but differing in size of cystidia, basidia, and spores.

**Cystidia** numerous, thick-walled, lateral, usually 60-80  $\mu\text{m}$  long and 7-8  $\mu\text{m}$  wide near the base.

**Basidia** subclavate to broadly clavate, 15-20 x 4.5-5.5  $\mu\text{m}$ , with four sterigmata.

**Spores** globose to subglobose, thin-walled or with slightly thickened wall, smooth, 4-4.5  $\mu\text{m}$  in diam. or 4.5-5 x 4  $\mu\text{m}$ .

**Habitat and distribution.** This species is known from only one locality in Sweden (Omberg, Storpissan) and has there been collected twice on *Picea*.

**Remarks.** Inconspicuous species separable from *S. lautum* by its smaller cystidia and spores.

**3. Subulicium rallum** (Jacks.) Jülich & Stalpers, Fig. 759C-E, 762  
Ver. Kon. Ned. Weten. Natuur 2(74) p. 223, 1980. - *Peniophora ralla* Jacks.,  
Can. Journ. Res. C.p. 136, 1948.

**Fruitbody** very thin and inconspicuous, pilose under the lens (50 X), though less pronounced than in the former species.

**Hyphal system** monomitic, hyphae thin-walled, without clamps, branched at right angles, mostly strongly encrusted, 3.5-4  $\mu\text{m}$  wide.

**Cystidia** numerous, terminal, subulate, thin-walled or with slight wall thickening, usually 40-60  $\mu\text{m}$  long and 4-5  $\mu\text{m}$  wide near the base.

**Basidia** broadly clavate, basally encrusted, 15-25 x 4.5-6  $\mu\text{m}$ , with four sterigmata and without basal clamp.

**Spores** globose to subglobose, thin-walled, smooth, 5-6  $\mu\text{m}$  in diam.

**Habitat and distribution.** A very rare species and hitherto only known from three localities in Norway (Akershus, Oppland, Sør-Trøndelag) on both deciduous and coniferous wood. It seems, as the other species in the genus, to be favoured by old forests.

**Remarks.** The species does not fully agree with the generic description of *Subulicium* nor with *Subulicystidium*. It differs from the former by having strongly encrusted, terminal cystidia and thin-walled spores and from the latter in the morphology of the cystidia.

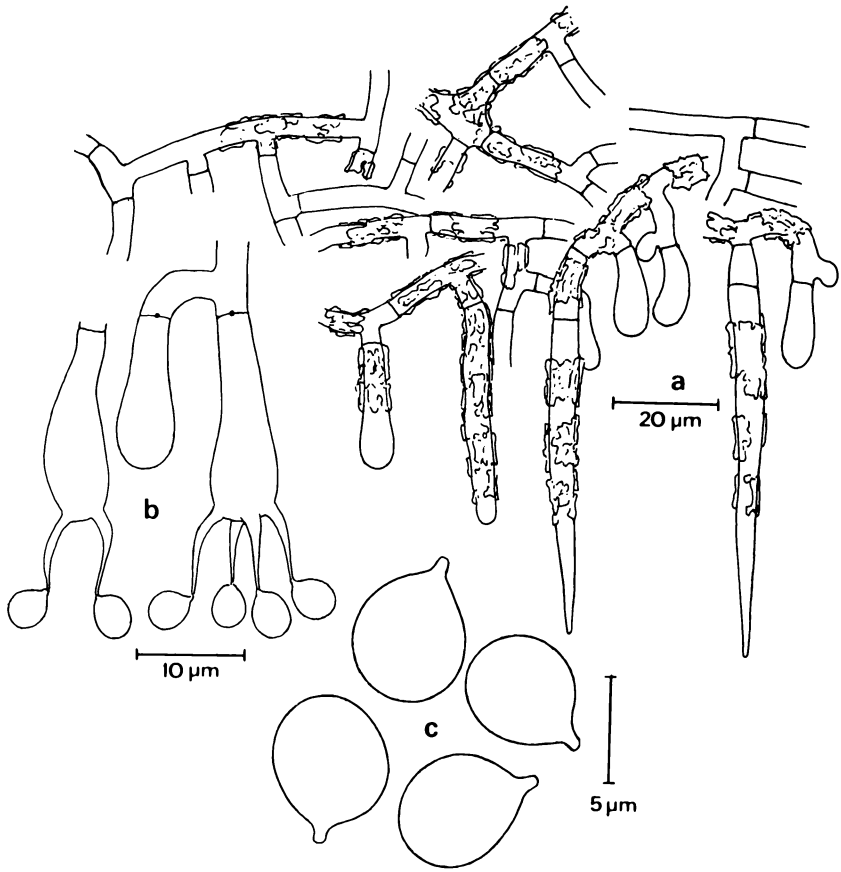


Fig. 762. *Subulicium rallum*. a) cystidia b) basidia c) spores. — a) Coll. Hjortstam 12741, b-c) Nakken 733.

**Subulicystidium** Parm.,

Consp. Syst. Cort., pp. 120-121, 1968.

**Fruitbodies** resupinate, effuse, soft and rather loosely attached to the substrata, arachnoid to cottony or sometimes submembranaceous, smooth but velutinous by projecting cystidia, whitish to pure white; margin undifferentiated, concolorous, rhizomorphs absent; hyphal system monomitic, hyphae with clamps at all septa, with thin or slightly thickened walls, richly encrusted, branching at  $\pm$  right angles; cystidia very numerous, subulate, arising from the subicular hyphae, usually terminal but in some cases more or less lateral, with remarkable encrustations, lengthwise arranged in a  $\pm$  spiral manner; basidia subclavate, rather small, usually somewhat suburniform, with a median constriction; spores considerably varying in size and appearance, in the Nordic specimens usually fusiform and sigmoid, non-amyloid.

**Type species:** *Hypochnus longisporus* Pat.

**Remarks.** The genus reminds somewhat of *Hyphodontia*, preferably in the morphology of hyphae and basidia and is placed by Parmasto (1968) in the tribe Hyphodontiae. Owing to its cystidial encrustation and shape of spores it is, however, a rather isolated genus in Corticiaceae. According to Jülich (1969) and Liberta (1980) repetobasidia are occurring but in the Nordic material investigated (including fresh material) this can not be confirmed.

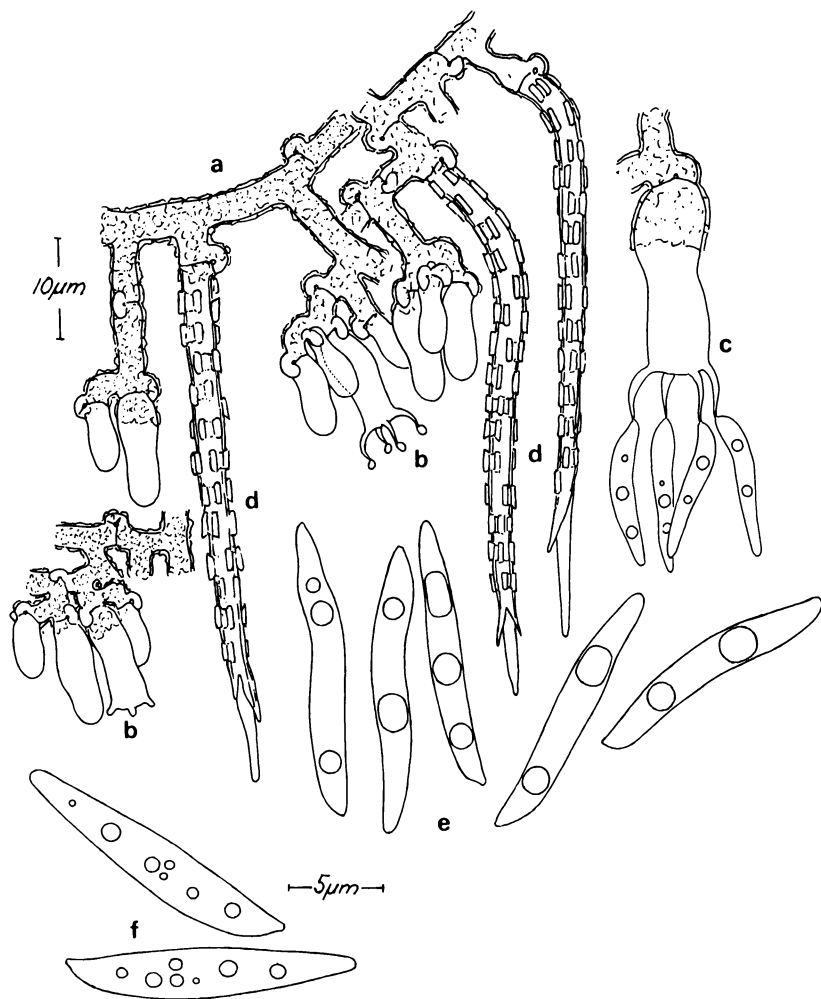


Fig. 763. *Subulicystidium longisporum*. a) hyphae b) basidia c) basidium d) cystidia e-f) spores. — Coll. a-e) Hallenberg 4077, f) Hjortstam 11511.

Fig. 759F,G, 763-65

**Subulicystidium longisporum** (Pat.) Parm., loc. cit. p. 121. -

*Hypochnus longisporus* Pat., J. Bot. Paris 8, p. 221. 1894.

**Fruitbody** resupinate, effuse, often very thin and small, under the lens (50 X) hispid or velutinous because of projecting cystidia, whitish to pure white, in the herbarium usually somewhat yellowish or pale sordid.

**Hyphal system** monomitic, hyphae thin-walled or with slightly thickened walls, hyaline, somewhat cyanophilous, 3-4  $\mu\text{m}$  wide, encrusted; subiculum little developed, composed of rather long-celled hyphae, branching at right angles; all hyphae with clamps.

**Cystidia** numerous, of subicular origin, subulate, 40-80 (-100)  $\times$  3-4  $\mu\text{m}$ , mostly of uniform width but sometimes basally thick-walled except for the apical, acute part,  $\pm$  cyanophilous, provided with a characteristic encrustation of unknown matter, in the microscope at low magnification in KOH visible as longitudinal ridges, at higher magnification as rectangular plates dissolving in sulfovanillin. In phasecontrast the crystalline plates appear to have concave horizontal sides, and are hardly of a simple crystalline matter as their shape seems to be genetically determined.

**Basidia** subclavate-suburniform, 10-15  $\times$  3.5-4.5  $\mu\text{m}$ , often with a membrane-like encrustation in the basal part, four sterigmata and a basal clamp.

**Spores** 12-15 (-25)  $\times$  (2-) 2.5-3  $\mu\text{m}$ , thin-walled, usually sigmoid but may be narrowly fusiform, with varying numbers of oil-drops in the protoplasm.

**Habitat.** On decayed wood of deciduous trees and other debris on the ground in humid, mostly herb-rich biotopes. Also collected on herbs (*Aconitum*).

**Distribution.** In N. Europe frequently collected in all parts of the area where suitable biotopes occur, mostly in deciduous forests.

**Remarks.** Easily recognized because of characteristic cystidia and spores. The variation, especially in size and shape of the spores, is considerable already within N. Europe, and becomes confusingly larger when tropical material is studied. Attempts to germinate spores from Nordic material have not been successful.

**Anamorph:** *Aegerita tortuosa* Bourd. & Galz., Hym. de France, p. 298, 1928. The anamorph consists of small semiglobose bodies, much similar to *Aegerita candida* in morphology, but considerably smaller, about 0.1-0.3 mm in diam. They are pure white and composed of intermingled and sinuous hyphae with clamps at all septa. Cystidia, typical for *S. longisporum* are numerous in the anamorph and project 30-40  $\mu\text{m}$ . The anamorph seems to be rare but may be overlooked. It is found twice: Sweden. Närke, Herrfallsång (N. Hallenberg 1982). Norway. Sør-Trøndelag, Dovre Nat. Park (K. Hjortstam 1983). Both collections are from rather wet biotopes. There is reason to believe that it, as *A. candida*, is adapted to water dispersal.

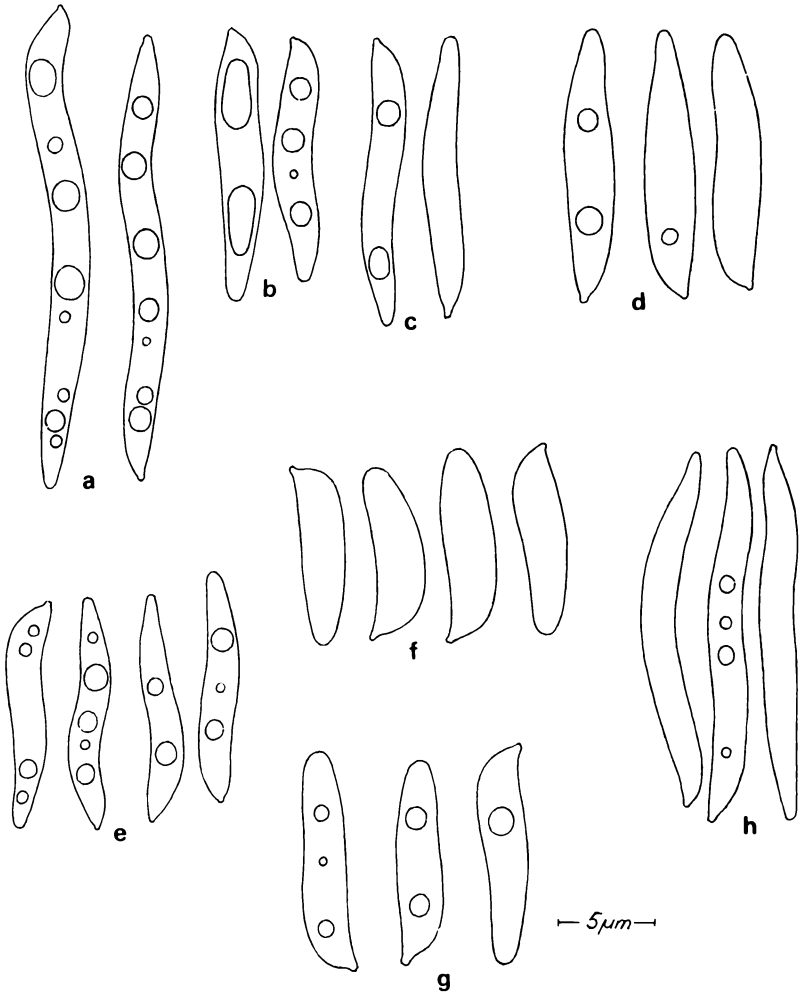


Fig. 764. *Subulicystidium longisporum*. Spores. — Coll. a) Hjortstam 2675 b) Hjortstam 12642 c) Eriksson 5682 d) Hjortstam 12472 (all from Sweden) e) Hallenberg 2448 (Iran), f) Cain 11674 (Canada) g) Gilbertson 9149 (USA) h) Eriksson 2245 (Sweden).



**Suillosporium** Pouz.,  
Ceska Mykol. 12 p. 31, 1958

**Fruitbodies** thin, loosely attached, flocculose, whitish; hyphal system monomitic, hyphae with thin or slightly thickened walls, basal hyphae narrow and relatively long-celled, subhymenial ones with short, almost isodiametric cells, all hyphae with clamps, not dextrinoid, not cyanophilous; cystidia thin-walled, regularly septate and with clamps at each septum, encrusted; basidia at first rounded, then obconical, thin-walled, with basal clamp and 4 fairly short sterigmata; spores subfusiform, with more or less distinct suprahilar depression, smooth, with thickened walls, weakly cyanophilous, non-dextrinoid, non-amyloid.

**Type species:** *Pellicularia cystidiata* Rogers.

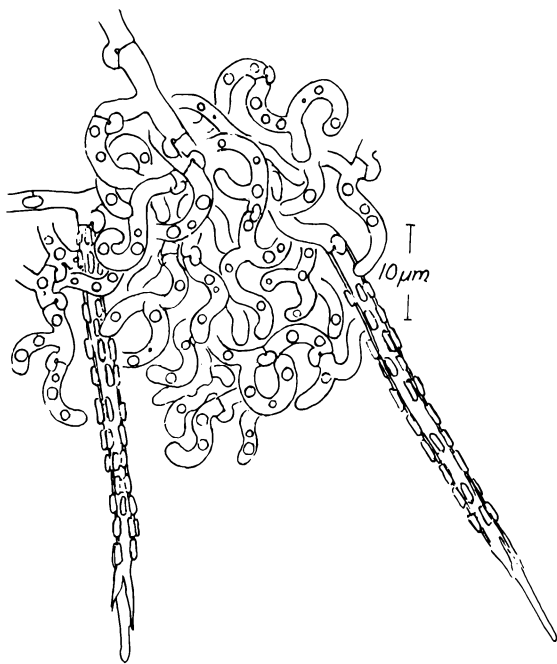


Fig. 765. *Aegerita tortuosa*, anamorph of *Subulicystidium longisporum*. — Coll. Hallenberg 4064.

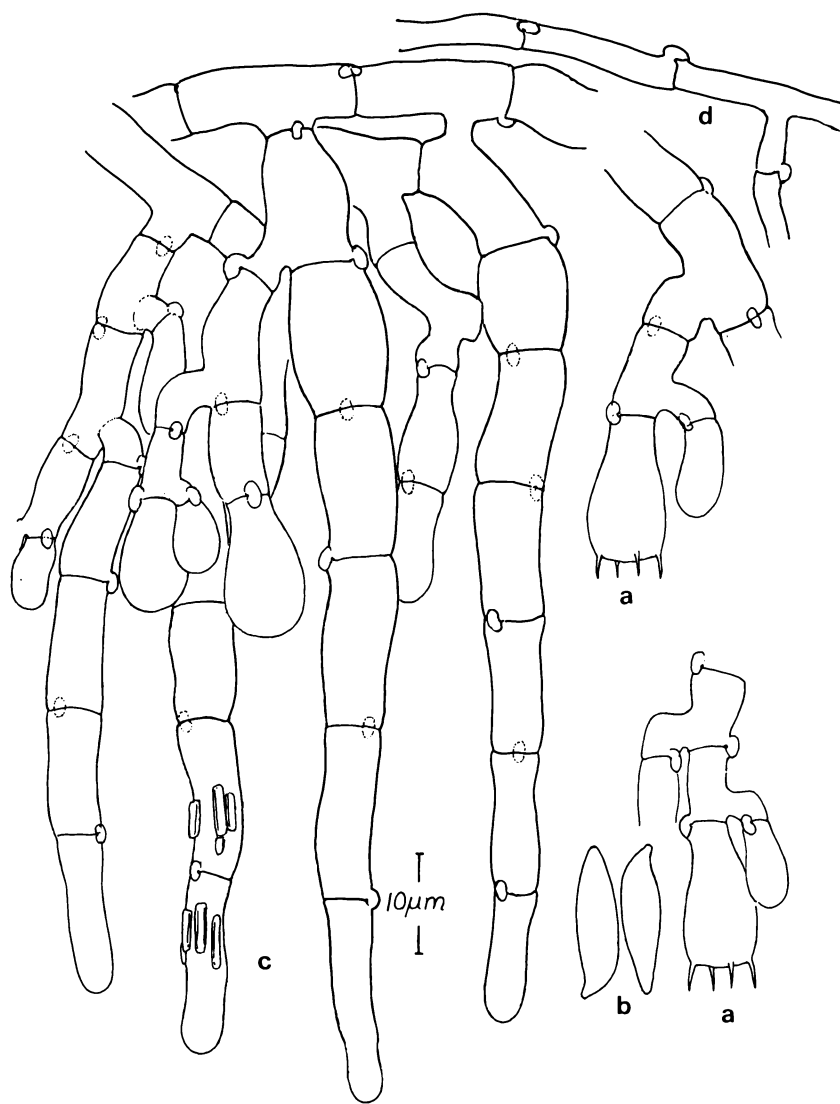


Fig. 766. *Suillosporium cystidiatum*. a) basidia b) spores c) cystidia d) basal hyphae. — Coll. a-c) Weresub 73165 d) Larsson & Hallenberg 1277.

**Remarks.** The genus was earlier referred to Coniophoraceae and considered closely related to *Coniobotrys ochroleucus* (*Jaapia ochroleuca*). It was, however, removed from that family by Ginns in his monograph of Coniophoraceae. Evidently *S. cystidiatum* has nothing in common with species of that family, which above all are characterized by pale to dark brown, distinctly thick-walled spores with strong dextrinoid and cyanophilous reaction. On account of the nature of basidia and cystidia the genus seems to be fairly isolated but with possible relationship to *Botryobasidium*.

**Suillosporium cystidiatum** (Rogers) Pouz., loc.cit.  
*Pellicularia cystidiata* Rogers, Farlowia 1 p. 101, 1943.

Fig. 766

**Fruitbody** resupinate, thin, loosely attached but not easily separable from the substratum, hypochnoid, flocculose due to the projecting cystidia, whitish, in the herbarium pale ochraceous.

**Hyphal system** monomitic, basal hyphae hyaline, straight, strikingly narrow in comparison with other hyphae, about (1.5-) 2-3  $\mu\text{m}$  wide, some cells slightly ampullate, subhymenial hyphae short-celled, mostly isodiametric, widened up to 12  $\mu\text{m}$ , all hyphae with clamps.

**Cystidia** numerous, thin-walled, cylindrical, obtuse, 2-6 septate, with clamps, 70-100  $\mu\text{m}$  long and 5-10  $\mu\text{m}$  wide at the base, more or less encrusted.

**Basidia** at first subglobose, then obconical, thin-walled, 17 x 10  $\mu\text{m}$ , with a narrow base, 4-5  $\mu\text{m}$ , bearing 4 sterigmata, 3-5  $\mu\text{m}$  long.

**Spores** subfusiform, with suprahilar depression, hyaline, smooth, with somewhat thickened walls, 13-14(-17) x 3.5-4.5  $\mu\text{m}$ , weakly cyanophilous.

**Habitat and distribution.** Very rare species in N. Europe and known only from Sweden (Småland, Värnamo. Eriksson 1959.08.26, on decayed fence of coniferous tree). Other collections studied (from North America and Poland) were collected from various kinds of coniferous trees.

**Remarks.** Owing to its highly characteristic spores and septate cystidia the species is easily recognized. In the North American material the spores were observed to be somewhat longer, up to 15-17  $\mu\text{m}$ , and the cystidia were broader with more or less barrel-shaped cells in some cases.

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