The genus Aleurodiscus (Basidiomycotina)

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Synopsis Fungorum 12
Fungiflora - Oslo - Norway

Abstract

71 species of *Aleurocystidiellum* and *Aleurodiscus* s. lato are described and illustrated, mainly on basis of types or authentic specimens. Dichotomous and synoptic keys are provided for all species and related genera. A nomenclator to all names published in the genera is provided. Generic divisions within *Aleurodiscus* are shown to be untenable because of transitions in all series of characters used in previous attempts to subdivide the genus.
The following genera are placed in synonymy with *Aleurodiscus*: *Acanthophysellum, Acanthophysium, Gloeosoma*, *Acanthobasidium* and *Aleurobotrys*.

Aleurodiscus andinus Núñez & Ryvarden, *Aleurodiscus cupulatus* Núñez & Ryvarden, *Aleurodiscus fuegianus* Núñez & Ryvarden, *Aleurodiscus microcarpus* Núñez & Ryvarden, *Aleurodiscus parvisporus* Núñez & Ryvarden, and *Aleurodiscus rimulosus* Núñez & Ryvarden are described as new.
The following combinations are proposed: *Aleurodiscus antarcticus* (Spegazz.) Ryvarden, *Aleurodiscus bisporum* (Boidin & Lanq.) Núñez & Ryvarden, *Aleurodiscus buxicola* (Boidin & Lanq.) Núñez & Ryvarden, *Aleurodiscus phragmitis* (Boidin & Lanq.) Núñez & Ryvarden, *Aleurodiscus propinquum* (Boidin & Gilles.) Núñez & Ryvarden, and *Aleurodiscus thoenii* (Boidin & Gilles) Núñez & Ryvarden.

Aleurodiscus pateriformis G.H. Cunn. and *A. piceinus* Lyon & P. A. Lemke are placed in synonymy with *A. parmuliformis* G. H. Cunn. and *A. farlowii* Burt, respectively.

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1. Introduction

The genus *Aleurodiscus* was described by Schröter (1888) with *Peziza amorpha* Pers. as type species. The reddish, almost cupulate to cyphelloid basidiocarp and large ornamented basidiospores make this a distinct species and soon after mycologists started to add further species with similar characters. Lemke (1964:215) provided a good review of the different authors who have treated the genus in one way or another, redefining its circumscription, dividing it into sections and adding species. This historical review will not be repeated here.

Since Lemke's North American monographic publications on the genus both *s. lato* (1964a) and *s. stricto* (1964b), no comprehensive treatment of the genus has been published. However, several authors (Oberwinkler 1966, Parmasto 1968, and Boidin et al. 1985) have split the genus, discussed its circumscription, and added more species (see especially Boidin et al. 1968 and 1985, Ginns 1982 and 1990, and Ginns & Bandoni 1991).

During our tropical work we often encountered specimens of *Aleurodiscus s. lato* and felt the need to have a world synopsis for identification purposes. This book is the result.

For most species we have studied type material, while for the more common and accepted species we have used fresh specimens conforming to the concepts laid down in numerous publications and local mycofloras (see Eriksson et al. 1976, Lemke 1964, Telleria & Melo 1995, Rattan 1977, Gilbertson 1974, and Ginns & Lefebvre 1993, to mention a few recent publications). It is obvious that our knowledge of the geographical distribution of species is very inadequate, as it is for corticioid species in general. Thus we have not included long lists of specimens seen by us, but have only cited countries and areas from where different species have been reported. In the future we must expect numerous changes and a widening of the distribution given here, as more mycologists are attracted to the genus and corticioid species in general.

2. Taxonomic Arrangement

As mentioned above, many authors have tried to divide the genus into sections or subgenera and several new genera have been described based on species split off from *Aleurodiscus s. lato*. However, all these authors have only examined and treated small groups of species and have not looked into the overall variation in basic characters on a worldwide scale. Doing this soon reveals that it is very difficult to find acceptable and reasonable separating characters without being inconsistent, ie. without making use of a set of characters whose importance changes from one part of the genus to another.

The truth is that, when it comes to making taxonomic arrangements in the corticioid fungi, we are still at the Linnean stage. Instead of counting stamens, we take available characters without knowing whether they reflect early, basic characters (so called 'primitive'), or whether they are advanced and have evolved several times in different groups as a response to the same environmental selection pressure. Thus *Aleurodiscus*, as well as most other corticioid genera, is a pragmatic 'sorting box'. No doubt future investigations using modern techniques will reveal that the genus is strongly polyphyletic, which is probably also the case for most other corticioid genera where few characters are available for classification. This will raise several serious problems, since in addition to the elucidation of the evolutionary history of the corticioid fungi, there is also a desperate need for identification manuals with good drawings. We may in the end be faced with two parallel systems: one accepting wide genera based on observable macro- and microscopical characters; and one based on DNA analysis, possibly deviating widely from the system as we know it today. See Langer et al. (1997) for a discussion of this point.

However, whatever may be discovered about the phylogeny of the species currently included in *Aleurodiscus s. lato*, there is currently a need for an identification manual, and this need is hopefully answered with this book.

In the following short discussion we have tried to demonstrate that whatever characters are used for the delimitation of genera within *Aleurodiscus s. lato*, there will always be a handful of species which fail to fall into any of these smaller, segregate genera. As a result, it is our opinion that very little is achieved by splitting *Aleurodiscus*. A taxonomic and evolutionary discussion may be undertaken perfectly adequately without making formal taxa. We do not achieve any deeper evolutionary insight by taking a number of species and calling them a 'genus' than we do by simply pointing out probable relationships between

them, based on this or that set of characters.
Below we give a list of subgenera and sections proposed for the species included in *Aleurodiscus s. lato* as circumscribed here. We have not tried to place the accepted species into different subgenera and sections. We feel this is far too premature given the current state of knowledge. Following this we give a list of genera which have been based on species in *Aleurodiscus s. lato*. We have treated all these segregate genera as synonyms, based on the arguments given above and below.

3. Infrageneric subdivision of Aleurodiscus s. lato

Aleurodiscus subgenus ***Pseudophysium*** Pilát, Ann. Mycol. 24: 207, 1926.
Type species: *Peziza amorpha* Pers.: Fr.
Pilát's subgeneric name is invalid since the principle (article 22 in ICBN) of automatic typification when splitting a taxon in two or more lower units, automatically establishes *Aleurodiscus* subgenus *Aleurodiscus* without an author name. According to the principles in ICBN, this automatic name is based on the same type species as the original genus. This rule did not exist when Pilát proposed his subgenus name, but it nevertheless makes the name invalid. The same principle applies to the sectional name *Eualeurodiscus* Ito (see below).

Aleurodiscus subgenus ***Acanthophysium*** Pilát, Ann. Mycol. 24: 207, 1926.
Type species: *Aleurodiscus apricans* Bourdot

Aleurodiscus sect. ***Stereopsis*** Pilát, Ann. Mycol. 24: 208, 1926.
Type species: *Thelephora disciforme* DC.: Fr.

Aleurodiscus sect. ***Disciopsis*** Pilát, Ann. Mycol. 24: 211, 1926.
Type species: *Peziza amorpha* Pers.: Fr.
Invalid name, see above.

Aleurodiscus sect. ***Corticiopsis*** Pilát, Ann. Mycol. 24: 213, 1926.
Type species: *Thelephora aurantia* Pers.: Fr.

Aleurodiscus sect. ***Eualeurodiscus*** Ito, Tokyo Bot. Mag. 43: 460, 1929.
Type species: *Peziza amorpha* Pers.:Fr. Invalid name, see above.

Aleurodiscus sect. ***Resupinodiscus*** Ito, Tokyo Bot. Mag. 43: 461, 1929.
Type species: *Corticium oakesii* Berk. & M.A. Curtis

Aleurodiscus sect. ***Effusodiscus*** Ito, Tokyo Bot. Mag. 43: 464, 1929.
Type species: *Thelephora aurantia* Pers.: Fr.
Invalid name, based on same type as Sect. *Corticiopsis* Pilát 1926.

4. Generic subdivision of Aleurodiscus s lato

The following genera, arranged according to priority, are based on type species referable to *Aleurodiscus s. lato*.

Aleurodiscus J. Schröt. in Cohn, Krypt.-Fl. Schles. 3: 429, 1888.
Type species: *Thelephora amorpha* Pers.: Fr.
Characters: basidiocarps cupulate; basidiospores ornamented; monomitic; generative hyphae with simple septa; acanthophyses and dendrohyphidia absent; cystidia and paraphysoid hyphae present.

Gloeosoma Bres., Ann. Mycol. 18: 51, 1920.
Type species: *Exidia vitellinina* Lév.
Characters: basidiocarps cupulate, fairly thick; large, ornamented basidiospores; monomitic; generative hyphae with clamps; acanthophyses present; known only from *Nothofagus* in South America.

Acanthophysium (Pilát) G. Cunn., Bull. New Zeal. Dept. Sci. Ind. Res. 145: 150, 1963. *Aleurodiscus* subgenus *Acanthophysium* Pilát, Ann. Mycol. 24: 207, 1926.
Type species: *Aleurodiscus apricans* Bourdot
Characters: thin adnate resupinate basidiocarps; basidiospores finely ornamented or smooth; monomitic; generative hyphae with simple septa; acanthophyses present.

The type species is unique in the genus in that both smooth and ornamented basidiospores are present which may present difficulties for those who want to adopt the genus. Many authors (Telleria & Melo 1995, Boidin et al. 1985) describe the basidiospores of *A. apricans* as smooth, while our examination showed that both smooth and finely ornamented basidiospores are present. This was pointed out by Bourdot (1910) and also shown by a figure in Bourdot & Galzin (1928). See the type species for further comments.

Aleurocystidiellum P.A. Lemke, Can. J. Bot. 42: 277, 1964.
Type species: *Stereum subcruentatum* Berk. & M.A. Curtis
Characters: orbicular to almost cupulate basidiocarps; basidiospores ellipsoid, finely ornamented; dimitic, with skeletal hyphae; generative hyphae with clamps; skeletocystidia present; no acanthophyses.

Acanthobasidium Oberw., Sydowia 19: 45, 1966.
Type species: *Aleurodiscus delicatus* Wakef.
Characters: basidiocarps thin and delicate, resupinate; basidiospores ornamented; monomitic; generative hyphae with clamps; acanthophyses present; basidia with lateral protuberances.

Acanthophysellum Parmasto, Izv. Akad. Nauk. Eston. SSR Ser. Biol. 16: 377, 1967.
Type species: *Corticium lividocoeruleum* P. Karst.
Characters: basidiocarps thin, adnate and resupinate; basidiospores smooth; monomitic; generative hyphae with clamps; acanthophyses present.

Aleurobotrys Boidin et al., Bull. Soc. Mycol. Fr. 101: 340, 1985.
Type species: *Aleurodiscus botryosus* Burt
Characters: basidiocarps thin, resupinate; basidiospores ornamented; monomitic; generative hyphae with simple septa; acanthophyses absent, dendrohyphidia with amyloid, coralloid, apical branches.

5. Evaluation of characters

1. Basidiocarps

All types of resupinate basidiocarps are present within *Aleurodiscus s. lato*. As was typical in early taxonomy, the type species of the two oldest genera (*Aleurodiscus* and *Gloeosoma*) both have fairly conspicuous, cupulate basidiocarps, setting them apart from the thinner, resupinate basidiocarps seen in most corticioid species.

However in current taxonomy the type of basidiocarp has been given less and less weight, the main emphasis being placed on the more conservative microscopical characters. Typical examples are *Sistotrema* and *Trechispora* where the basidiocarps vary tremendously from stipitate hydnoid, poroid, and resupinate-hydnoid to completely smooth and resupinate.

We see no logical argument for not following current taxonomy in our treatment of *Aleurodiscus s. lato.* Macromorphological features will therefore not be given any weight in the discussion about infrageneric splitting of the genus.

2. Basidiospores

The large ornamented basidiospores seen in many species of *Aleurodiscus s. lato* are unusual among the corticioid fungi and are for example present in the type species of both *Aleurodiscus* and *Gloeosoma*. However, as seen in the following synoptic keys, there is no sharp discontinuity in size, and thus it is difficult to use this character as a basis for splitting the genus.

As for ornamentation, it was previously seen as an important character and few corticioid genera contained both ornamented- and smooth-spored species. However, this has changed in recent times and current taxonomy provides many examples to the contrary, such as *Hypochnicium, Phlebiella, Botryobasidium*, and *Trechispora* (see Eriksson et al. 1976-88). Again we see no logical argument for giving this character more weight in *Aleurodiscus* than in the other genera mentioned above.

To underline the difficulty in using such a character, consider the type species of *Acanthophysellum* in which both smooth and ornamented basidiospores are reported. If splitting were based on ornamentation, where would such a species be placed and how could it be logically defended?

3. Acanthophyses

Acanthophyses are a prominent character which might be used for generic splitting. However, it should be mentioned that this character is neglected in *Stereum* which contains species without acanthophyses or pseudoacanthophyses as well as species with prominent acanthophyses.

The type species of *Aleurodiscus* does not have acanthophyses but gloeocystidia, and this is the case with many other species in the genus. If we feel that this is a basic character of evolutionary importance, what would be the consequences of using this character in splitting *Aleurodiscus s. lato*? As in *Stereum* a split based on the presence or absence of acanthophyses in *Aleurodiscus* would place otherwise quite similar species in different genera. We feel that little or nothing is gained by such a procedure. Acanthophyses and similar organs seem to have arisen several times in response to environmental stress. Such organs are typically present in many genera growing in an exposed environment and may have developed for protection or to absorb humidity. See the section below on ecology.

4. Hyphal septation

In *Aleurodiscus s. lato* as defined here, an almost equal number of species have simple septate hyphae as those with clamps. Within the Corticiaceae in a wide sense there are numerous genera where both types of septation are present such as *Hyphodontia, Sistotrema, Athelia,* and *Botryobasidium,* to mention just a few. There is therefore no logical reason to divide *Aleurodiscus* into smaller units based on this character alone.

5. Cystidia and hyphal system

There are many types of cystidia present in *Aleurodiscus*, although metuloids are absent. Dominant are gloeocystidia and similar smooth, hyaline cystidia. The presence or absence of such cystidia has usually not been used alone as a generic character in the Corticiaceae. A good example is *Hypochnicium*, which is characterized by thick-walled spores and includes species both with and without gloeocystidia or similar cystidia. Here we have assumed the thick-walled spores to be a more evolutionary stable character pointing to common ancestor seeing the cystidia as secondary characters. We do this even if we cannot prove this to be true and the same goes with the amyloid reaction of the basidiospores in *Aleurodiscus*. Both characters are known from numerous other genera both in the Aphyllophorales in a wide sense as well as in the Agaricales. The characters as such must have arisen several times in response to unknown factors.

The only cystidia that stand out as a special group are those in species like *Aleurocystidiellum subcruentatum* which has prominent pseudocystidia or skeletal cystidia of the kind found in *Stereum.* Their presence is the basic character for *Aleurocystidiellum*. This genus, if accepted, seems to be related to *Stereum* in having identical skeletocystidia, but easily separated from Stereum species by

its large ornamented basidiospores. With some doubt, we have decided to also put *Aleurocystidiellum* in synonymy with *Aleurodiscus* even if it has prominent thick-walled, usually encrusted cystidia and skeletal hyphae throughout the basidiocarp.

However, it should be noted that the presence or absence of skeletal hyphae is not used as a separating characters at generic level for some other corticioid genera. A good example is *Dacryobolus* where *D. karstenii* is dimitic with skeletocystidia, whilst they are absent in *D. sudans*, the type species.

Furthermore, there are many corticioid genera which include both species with a monomitic and dimitic hyphal system, examples being *Trechispora* (see Larsson 1994) and *Hyphodontia* in a wide sense (see Langer 1994). Many of the so-called tramal thick-walled cystidia seen in the latter genus could easily be called skeletocystidia since they arise at the very base of the subiculum and penetrate the whole basidiocarp projecting above the hymenium (see for example fig. 14, *Hyphodontia altaica*, in Langer 1994).

6. Conclusion

Whatever morphological character is chosen for a generic splitting of *Aleurodiscus s. lato* the resulting system will be artificial, since it is not possible to find a single set of characters which 'naturally' separates one group of species from another. Based on morphology alone, one cannot determine which characters are the basic ones reflecting true relationships, and which are secondarily adapted ones. The situation is clearly illustrated in the current system used for generic separation in the Corticiaceae. A character used for separating one genus may be completely ignored in the next. Far too often, a single character is used to define a genus and the result is a pragmatic sorting system, rather than a truly phylogenetic one. There is nothing wrong with a pragmatic sorting system, but there should be a general awareness that the current system may be no more than this.

Future DNA investigations will probably shed light on the true relationships between species currently placed in large, comprehensive genera. However, for the time being little is gained by advocating a narrow generic concept based on morphology alone.

6. Ecology

Many *Aleurodiscus* species have a distinct ecology, being restricted to one or a very few related hosts and growing on still-attached branches above the ground. It is a general rule among the basidiomycetes that species growing in such an exposed environment have a tendency to possess large basidiospores and a catahymenium (see Ryvarden 1991).This is certainly the case with most of the species described in this book.

The reason for this preference or development is unknown, but it has been suggested (Ryvarden 1991) that basidiospores landing on dry branches above the ground need ample nutrients in order to produce hyphae capable of penetrating deeply and rapidly into the wood. Still-attached branches dry out fast as soon as the rain stops, thus it is of fundamental importance for a fungus to establish itself as quickly as possible, i.e. whilst water is present on and close to the surface of the branch. Deep within the branch, protection against drought is better. If this explanation is correct, large basidiospores enable these species to establish themselves in ecological niches with little or no competition from other basidiomycetes. This may explain why *Aleurodiscus* is unique in having so many species with very large basidiospores, most of which are larger than in any other genus of basidiomycetes.

The occurrence of a wide range of sterile organs in the hymenium may also be explained by ecology. A catahymenium, as also found in other genera with exposed basidiocarps like *Corticium* and *Dendrothele*, gives the basidia and the subhymenium better protection against desiccation than an open euhymenium without such organs. This can be seen in *Gloeocystidiellum* which grows in a far more protected environment, i.e. on the lower side of fallen trunks or branches. These general comments are not of course applicable to all species described here, but the majority have this combination of large basidiospores, exposed habitats, and a catahymenium.

Below is a list of all species described here together with their known hosts. If more than three host species are known, more general terms have been used.

Host preference for species in *Aleurodiscus* s. lato

aberrans ..... hardwoods, *Pinus*
abietis ..... *Abies*, *Tsuga*
ahmadii ..... hardwoods
amorphus ..... *Abies*, *Picea*
andinus ..... *Bambusa chusquia*
apricans ..... ferns, *Rosaceae*, *Ericaceae*, *Arundinaria*
atlanticus ..... *Cedrus*
aurantius ..... hardwoods, *Taxus*
australiensis ..... *Eucalyptus*, *Philippa*
berggrenii ..... *Nothofagus*
bisporum ..... hardwoods
botryosus ..... hardwoods
buxicola ..... *Buxus sempervivens*
canadensis ..... hardwoods, gymnosperms
cerussatus ..... hardwoods, gymnosperms
coralloides ..... *Nothofagus*
coronatus ..... *Cysthodes fasciculata* (*Epacridaceae*)
cremicolor ..... hardwoods, ferns
croceus ..... hardwoods
cupulatus ..... *Pseudotsuga*
delicatus ..... *Cladium mariscus*
dendroideus ..... *Picea glauca*
dextrinocerrusatus ..... hardwoods, gymnosperms
diffissus ..... *Ericaceae*
disciformis ..... hardwoods
exasperatus ..... hardwoods
farlowii ..... gymnosperms
fennicus ..... *Picea*
fruticetroum ..... hardwoods
fuegianus ..... *Nothofagus*
gabonicus ..... hardwoods
gigasporus ..... *Keteleeria davidiana*
grantii ..... gymnosperms
ilexicola ..... *Ilex aquifolium*
lapponicus ..... hardwoods
laurentianus ..... *Abies*, *Picea*
limonisporus ..... *Nothofagus*
lividocoeruleus ..... hardwoods, gymnosperms
ljubarskyii ..... *Quercus*
macrocystidiatus ..... *Ericaceae*
mesaverdensis ..... *Pinus*
microcarpus ..... hardwoods

mirabilis ..... hardwoods
monilifer ..... *Cedrus atlanticus*
norvegicus ..... *Rosaceae*, *Ericaceae*, pine needles
oakesii ..... hardwoods
occidentalis ..... *Thuja plicata*
ochraceoflavus ..... *Leptospermum*
parmuliformis ..... hardwoods
parvisporus ..... hardwoods
patellaeformis ..... hardwoods
penicillatus ..... conifers
phragmitis ..... *Gramineae*
propinquum ..... *Philippa*
rimulosus ..... hardwoods
sparsus ..... *Eucalyptus*
spininger ..... gymnosperms
subglobosporus ..... *Abies veichii*
succineus ..... *Arbutus menziesii*
taxicola ..... *Taxus baccata*
tenuis ..... unknown
thoenii ..... *Gramineae*
thujae ..... *Thuja occidentalis*
tsugae ..... gymnosperms
utahensis ..... *Pinus longaeva*
vitellinus ..... *Nothofagus*
wakefieldiae ..... *Fagaceae*
weirii ..... gymnosperms
zealandicus ..... hardwoods

7. *Aleurodiscus*

J. Schröt. in Cohn, Krypt.-Fl. Schles. 3:429, 1888.
Basidiocarps of variable appearances, cupulate, corticioid or stereoid, margin variable, in some species distinctly delimited and ± reflexed, in others not differentiated, basidiospores amyloid, smooth or ornamented (warted or echinulate), small to large (very large compared with most other genera of Corticiaceae), hyphal system monomitic in most species, skeletal hyphae present in the subiculum in few species, basidia medium to large, with four (rarely two) prominent sterigmata, sterile elements, such as acanthophyses, dendrohyphidia, cystidia and paraphysoid hyphae, usually present, cystidia, when present, are thin-walled, clavate to moniliform to mammillate or occur as skeletocystidia in a few species. On both hardwoods and gymnosperms, often in exposed localities, such as dead still-attached branches, living or dead trunks in sunny and dry localities. All species so far reported have a white rot. Cosmopolitan genus.
Type species: *Thelephora amorpha* Pers.: Fr.
Remarks: *Aleurodiscus* as defined here is a very heterogeneous genus which, based on morphology alone, is difficult to separate both from *Gloeocystidiellum* (in a wide sense) and *Stereum*.

Gloeocystidiellum is only separated by having a euhymenium composed of a dense palisade of basidia, while *Aleurodiscus* usually has a catahymenium. In addition, gloeocystidia are the only sterile organs present in all *Gloeocystidiellum* species, while this is not the case in *Aleurodiscus*, where the presence of gloeocystidia is associated with additional sterile organs.

Stereum is also a closely related genus, and some of the species included here could be placed in *Stereum* although it would widen the concept of the genus. Species like *A. antarcticus* and *A. parmuliformis* suit the general aspect of a *Stereum* species, although their basidiospores are much larger than seen in the genus as defined today. However, variable basidiospore size has not been considered an important character and in genera like *Hyphoderma* there is a considerable variation in basidiospore size which has been treated as minor compared with other characters.

For those who would like to use a more narrow generic concept than applied here, we have supplied a simplified key to the genera proposed for species which we have placed in *Aleurodiscus*.

Key to genera proposed for *Aleurodiscus s. lato*

1. Acanthophyses absent ..... **Aleurodiscus s. str.**
1. Acanthophyses present 2

2. Encrusted skeletal cystidia present ..... **Aleurocystidiellum**
2. Encrusted skeletal cystidia absent 3

3. Coralloid botryophyses present ..... **Aleurobotrys**
3. Coralloid botryophyses absent 4

4. Acanthobasidia present **Acanthobasidium**
4. Acanthobasidia absent 5

5. Basidiospores longer than 20 um, basidiocarp thick and cupulate . **Gloeosoma**
5. Basidiospores shorter than 20 um, basidiocarp thin, adnate and flat 6

6. Basidiospores ornamented ..... **Acanthophysium**
6. Basidiospores smooth ..... **Acanthophysellum**

Key to genera similar to *Aleurodiscus*

1. Hyphal system dimitic 2
1. Hyphal system monomitic 5

2. Basidiospores ornamented, encrusted cystidia present 3
2. Basidiospores smooth, encrusted cystidia absent 4

3. Basidiocarps pellicular, often rhizomorphic, skeletals only present in the subiculum, basidiospores up to 6 µm long ..... **Scytinostromella**
3. Basidiocarps substereoid, skeletals also present in the subhymenium, basidiospores longer than 10 µm ..... **Aleurocystidiellum**

4. White pocket-rot fungi ..... **Xylobolus**
4. Laminar rot fungi ..... **Stereum**

5. Euhymenium present, basidiocarps ephemeral and always fertile 6
5. Catahymenium present, basidiocarps may be sterile during dry periods 11

6.With pleurobasidia ..... **Pseudoxenasma**
6. With terminal basidia 7

7. With repetobasidia ..... **Conferticium**

7. Without repetobasidia 8
8. Subiculum brown 9
8. Subiculum cream to ochraceous 10

9. With brownish metuloids ..... **Amylostereum**
9. Without brownish metuloids ..... **Laxitextum**

10. With conspicuous, often yellowish cystidia ..... **Gloeocystidiellum**
10. Without cystidia or with hyphoid cystidia ..... **Amylocorticium**

11. Basidiospores negative in Melzer's reagent, weakly amyloid in several species, catahymenium mainly consisting of dendrohyphidia 12
11. Basidiospores amyloid, catahymenium consisting of different sterile organs .. .. **Aleurodiscus**

12. Basidiocarps without a well-developed subiculum, dendrohyphidia heavily covered by crystals, some species with amyloid basidiospores ..... **Dendrothele**
12. Basidiocarps with a well-developed subiculum, dendrohyphidia mostly naked, basidiospores always negative in Melzer's reagent ..... **Corticium**

A key to genera of resupinate basidiomycetes with gloeocystidia and amyloid basidiospores is given in Wu (1995). In this key, the generic concept is much more narrow than is accepted here.

8. Synoptic keys to species of Aleurodiscus s lato.

Species with smooth basidiospores

Sorted by falling spore sizes in µm (presence of acanthophyses is indicated by A).

monilifer ..... 22-26 x 14-17
mesaverdensis ..... 19-28 x 12-17 A
ljubarskyii ..... 18-22 x 14-17
abietis ..... 18-20 x 16-18 A
limonisporus ..... 16-21 x 9-10
dendroideus ..... 16-18 x 9.5-11 A
farlowii ..... 15-19 x 11-14 A
fennicus ..... 15-17 x 8-10 A
antarcticus ..... 14-17 x 8-10
macrocystidiatus ..... 14-16 x 7-9 A
parmuliformis ..... 14-16 x 8-12
propinquus ..... 13-15 x 10-11.5 A
apricans ..... 12-15 x 7-10 A
fuegianus ..... 12-15 x 6-8
andinus ..... 12-14 x 7-8
diffisus ..... 12-18 x 5-7 A
canadensis ..... 12-18 x 9-13 A
succineus ..... 12-14 x 5-7 A
fruticetorus ..... 10-12 x 6-7 A
lapponicus ..... 10-12 x 6-7 A
buxicola ..... 9.5-14 x 8-13
bergrenii ..... 9-12 x 4-4.5 A
thoenii ..... 8-11 x 5-6 A
rimulosus ..... 8-10 x 5-6 A
dextrinoideocer. ..... 7-10 x 4-7 A
aberrans ..... 7-9 x 4-5 A
lividocoeruleus ..... 7-8 x 3-4 A
bisporus ..... 6-10 x 4.5-5.5 A
parvisporus ..... 5-6 x 4-5 A
ahmadii ..... 5-6 x 2.5-3 A

Basidiospores ornamented, no acanthophyses

amorphus ..... 24-28 x 18-22
cupulatus ..... 22-26 x 17-20
grantii ..... 22-32 x 18-24
aurantius ..... 18-21 x 12-14
atlanticus ..... 18-20 x 12-14
tsugae ..... 17-20 x 10-14
ilexicola ..... 16-20 x 10-11
thujae ..... 16-20 x 13-16
patellaeformis ..... 15-18 x 14-17
disciformis ..... 15-17 x 10-12
botryosus ..... 12-15 x 8-11
cremicolor ..... 12-14 x 6-8

Species with ornamented basidiospores and acanthophyses

gigasporus ..... 29-34 x 22-28
sparsus ..... 25-36 x 16-20
microcarpus ..... 25-30 x 12-14
zealandicus ..... 24-30 x 15-20
mirabilis ..... 24-28 x 14-17
wakefieldiae ..... 20-28 x 14-20
australensis ..... 20-26 x 14-18
croceus ..... 20-25 x 17-22
vitellinus ..... 20-30 x 18-24

exasperatus ..... 20-23 x 8-10
subglobosporus ..... 19-20 x 15-20
oakesii ..... 18-27 x 12-14
coralloides ..... 18-25 x 16-22
ochraceoflavus .. 18-20 x 12-15
tenuis ..... 16-20 x 12.5-15
coronatus ..... 16-22 x 10-12
penicillatus ..... 15-20 x 13-17
taxicola ..... 15-18 x 10-13
gabonicus ..... 14-18 x 11-14
occidentalis ..... 14-17 x 11-14
delicatus ..... 13-15 x 7-8
spiniger ..... 12-15 x 9-12
apricans ..... 12-15 x 7-10
phragmitis ..... 11-14 x 5.5-7
norvegicus ..... 10-15 x 5-7
laurentianus ..... 8-10 x 7.5-9
weirii ..... 5-7 x 5-7
utahensis ..... 4-5.5 x 2-3

Amyloid reaction (other than the basidiospores)
botryosus (coralloid apices of acanthophyses)
rimulosus (acanthophyses with amyloid protuberances)
abietis (" ")
farlowii (" ")
succineus (" ")
gabonicus (acanthophyses)
exasperatus (apical ends of acanthophyses)

Dextrinoid reaction
dextrinoideocerussatus (upper part of acanthophyses)

Skeletal hyphae present:
ahmadii, *cupulatus*, *fruticetorus*, *subcruentatum*, and *utahtensis*.

With *Tremella* species
T. mycetophiloides on *A. amorphus* and *A. grantii*
T. simplex with *A. amorphus* and *A. tsugae*
T. subencephala with *A. lividocoeruleus*

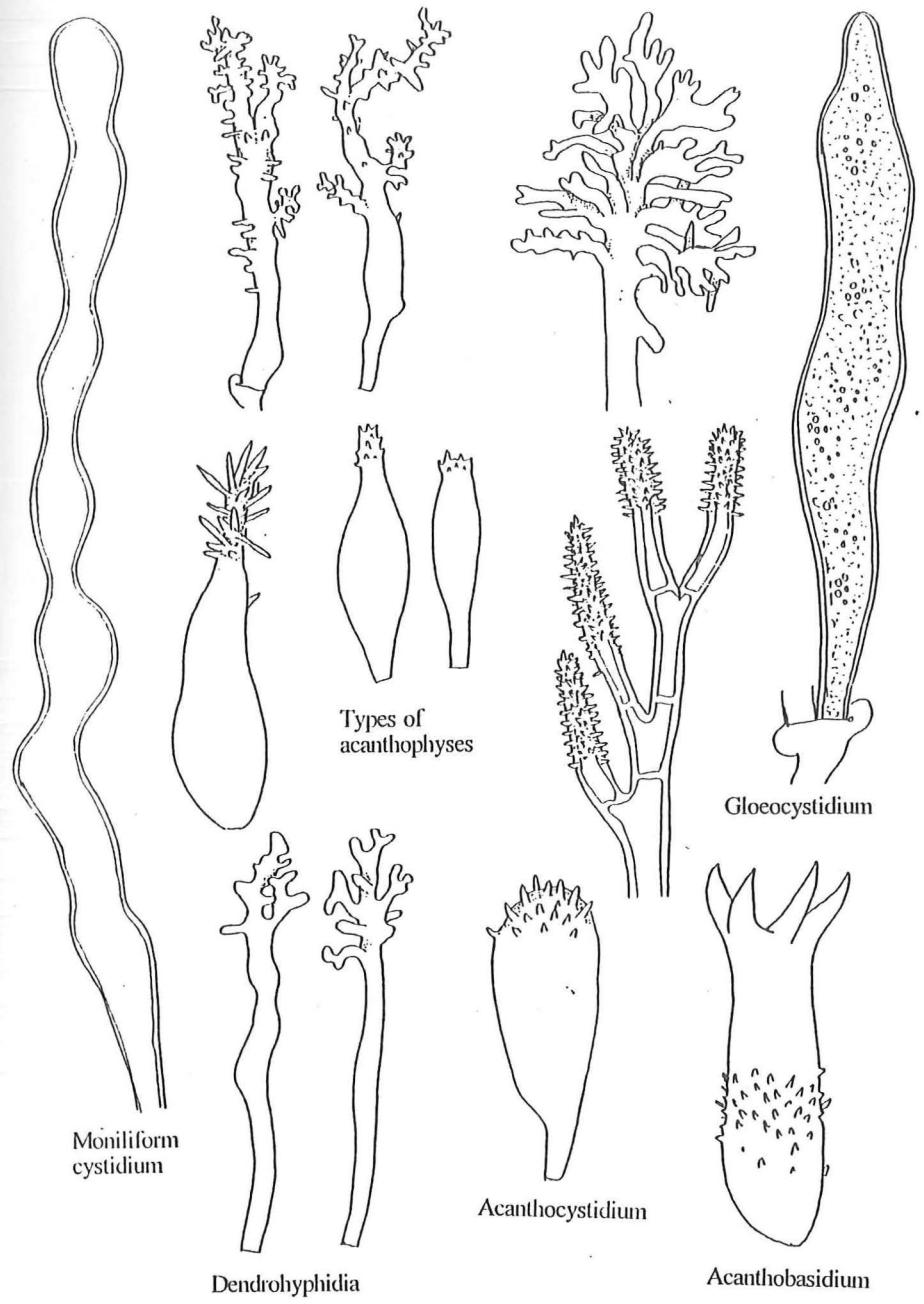


Fig. 1. Different sterile elements seen in *Aleurodiscus* s. lato.

9. Key to species

Before using the key, make two preparations, one in Melzer's reagent, the other in 3-5% KOH if you have a microscope with phase-contrast, if not in Cotton Blue or any other mounting medium.
1. In Melzer's reagent, are the basidiospores smooth or ornamented?
2. What type of septation is present on the generative hyphae? If clamps are observed, always follow the 'clamps present' alternative.
3. What types of sterile organs are present, if any? If in doubt about the terms, see fig. 1

MAIN KEY

1. Basidiospores smooth 2
1. Basidiospores ornamented 5

2. Generative hyphae with simple septa 3
2. Generative hyphae with clamps 4

3. Acanthophyses or dendrohyphidia absent Section ..... A
3. Acanthophyses or dendrohyphidia present Section ..... B

4. Basidiospores up to 12 (14) µm long Section C
4. Basidiospores longer than 12 µm Section ..... D

5. Acanthophyses or dendrohyphidia absent 5
5. Acanthophyses or dendrohyphidia present 7

6. Generative hyphae with simple septa Section ..... E
6. Generative hyphae with clamps Section ..... F

7. Generative hyphae with simple septa Section ..... G
7. Generative hyphae with clamps 8

8. Basidiospores shorter than 15 µm Section ..... H
8. Basidiospores longer than 15 µm Section 9

9. Species from New Zealand and/or Australia Section I
9. Species from other parts of the world Section ..... J

SECTION A

Basidiospores smooth, generative hyphae with simple septa, acanthophyses and dendrohyphidia absent

1. Species from Australia or New Zealand 2
1. Species from other parts of the world 3

2. Cystidia absent; basidiospores citriform, 16-21 µm long ..... **A. limonisporus**
2. Cystidia present and thick-walled, basidiospores ellipsoid, 14-16 µm long ..... **A. parmuliformis**

3. East Asian species on *Quercus*, basidiocarp pulvinate without free abhymenial surface, hymenial surface cream, few thick-walled cystidia in the hymenium ..... **A. ljubarskii**
3. South American species on *Nothofagus*. Basidiocarp discoid with brown hairs on the abhymenial side or effused and separable, slightly *Stereum*-like 4

4. Basidiocarp discoid with abhymenial brown hairs, hymenial surface yellow, straight slightly coloured skeletocystidia penetrating the hymenium ..... **A. antarcticus**
4. Basidiocarps effused, separable, abhymenial surface hardly visible, smooth and pale brown, hymenial surface pale brown, a few, slightly torulose, hyaline skeletocystidia penetrating the hymenium ..... **A. fuegianus**

SECTION B

Basidiospores smooth, generative hyphae with simple septa, acanthophyses and dendrohyphidia present

1. Basidiospores up to 10 µm long 2
1. Basidiospores longer than 10 µm 4

2. Acanthophyses with numerous protuberances, basidia 4-sterigmate 3
2. Acanthophyses with few apical protuberances, basidia 2-sterigmate, only known from Guadeloupe ..... **A. bisporus**

3. Basidiospores 4-5 µm wide, cystidia thin-walled, known only from New Zealand ..... **A. aberrans**
3. Basidiospores 5-6 µm wide, cystidia thick-walled, known only from Puerto Rico ..... **A. rimulosus**

4. On hardwood hosts, basidiospores 9-16 µm long 5
4. On coniferous hosts, basidiospores 15-20 µm long 10

5. Skeletal hyphae absent 6
6. Skeletal hyphae present in the basal layer ..... **A. fruticetorus**

7. Basidiospores ellipsoid, wide than 7 µm 8
7. Basidiospores cylindrical, 4-5 µm wide, New Zealand species ..... **A. bergrenii**

8. Acanthophyses present, widespread species on ericaceous hosts or dead wood 9
8. Acanthophyses absent, South American, Andean species on Poaceae,, numerous dendrohyphidia present ..... **A. andinus**

9. Acanthophyses thick-walled, known only from ericaceous hosts in western North America, ... **A. macrocystidiatus**
9. Acanthophyses thin-walled, known only from Europe and New Zealand ..... **A. apricans**

10. Basidiospores 11-18 µm wide 11
10. Basidiospores 8-10 µm wide ..... **A. fennicus**

11. Basidiospores ellipsoid, 15-19 x 11-14 µm ..... **A. farlowii**
11. Basidiospores subglobose, 18-20 x 16-18 µm ..... **A. abietis**

SECTION C
Basidiospores smooth, generative hyphae with clamps, acanthophyses and dendrohyphidia present, basidiospores up to 12 µm long (rarely to 14 µm)

1. Basidiospores up to 8.5 µm in longest dimension 2
1. Basidiospores 8-14 µm in longest dimension 4

2. Basidiospores subcylindrical to oblong ellipsoid 3
2. Basidiospores subglobose, 5-6 x 4-5 µm, Japanese species ..... **A. parvisporus**

3. Basidiocarp bluish to grey, resupinate, annual, skeletal hyphae absent, boreal species ..... **A. lividocoeruleus**
3. Basidiocarp pale grey, cupulate, perennial with stratified basidiocarp, skeletal hyphae present, Himalayan species ..... **A. ahmadii**

4. Basidiospores almost subglobose, 9.5-14 x 8-13 µm, on *Buxus* ..... **A. buxicola**
4. Basidiospores cylindrical to subcylindrical, up to 7 µm wide 5

5. Basidiospores 12-14 µm long, basidiocarp cupulate to orbicular, protuberances only in apical part of the acanthophyses, found only on *Arbutus* in western North America ..... **A. succineus**
5. Basidiospores up to 12 µm long, basidiocarp flat and corticioid, protuberances in upper third part of the acanthophyses, widespread species 6

6. Acanthophyses with dextrinoid branches or protuberances ..... **A. dextrinoideocerussatus**
6. Acanthophyses without dextrinoid branches or protuberances 7

7. Acanthophyses almost dendroid, African species ..... **A. thoenii**
7. Acanthophyses club-like with short spiny protuberances, temperate species ..... **A. cerussatus** (s. lato, including **A. lapponicus**)

SECTION D
Basidiospores smooth, generative hyphae with clamps, acanthophyses and dendrohyphidia present or absent, basidiospores longer than 12 µm, mostly considerably so

1 North American species 2
1. Species from other parts of the world 5

2. Basidiospores cylindrical, 5-7 µm wide, on ericaceous and hardwood hosts ..... **A. diffisus**
2. Basidiospores ellipsoid, 9-17 µm wide, on coniferous hosts 3

3. Basidiospores 19-28 x 12-17 µm. On *Pinus* ..... **A. mesaverdensis**
3. Basidiospores 12-18 µm long, on *Picea* 4

4. Acanthophyses dendroid and branched, faintly amyloid in Melzer's, basidiospores broadly ellipsoid ..... **A. dendroideus**
4. Acanthophyses with spiny to twisted, but unbranched protuberances, without reaction in Melzer's reagent, basidiospores oblong ellipsoid to subcylindrical ..... **A. canadensis**

5. Acanthophyses absent, moniliform cystidia present, basidiospores 22-26 µm long, on *Cedrus* in the Mediterranean area ..... **A. monilifer**
5. Acanthophyses present, cystidia pointed or clavate, basidiospores 13-15 µm, on hardwood on La Réunion ..... **A. propinquus**

SECTION E
Basidiospores ornamented generative hyphae with simple septa, acanthophyses absent

1. Dendrohyphidia present 2
1. Dendrohyphidia absent 3

2. Cystidia clavate, often with a few apical papillae ..... **A. aurantius**
2. Cystidia bulbous without papillae ..... **A. ilexicola**

3. Basidiocarp discomycete-like and centrally attached, cystidia hyphoid and of even thickness, often moniliform, basidiospores 24-28 x 18-22 µm..**A. amorphus**
3. Basidiocarp corticioid, basidiospores shorter than 20 µm 4

4. Basidiospores 12-14 x 6-8 µm, on hardwoods in Asia ..... **A. cremicolor**
4. Basidiospores 16-20 x 13-16 µm, on conifers in North America.....**A. thujae**

SECTION F
Basidiospores ornamented generative hyphae with simple clamps, acanthophyses absent

1. Basidiospores 22-32(39) µm in longest dimension 2
1. Basidiospores up to 22 µm in longest dimension 3

2. Thick-walled mostly unbranched hyphal ends present in hymenium, skeletal hyphae, dendrohyphidia or paraphysoid hyphae absent ..... **A. grantii**
2. Thick-walled hyphal ends absent, skeletal hyphae, dendrohyphidia or paraphysoid hyphae present ..... **A. cupulatus**

3. Skeletal hyphae absent 4
3. Skeletal hyphae present, often present as encrusted skeletocystidia, on bark of living conifers ..... **A. subcruentatum**

4. Basidiospores ellipsoid, basidiocarps discoid to stereoid, usually with lifted margin, widespread species 5
4. Basidiospores almost globose, basidiocarps corticioid with adnate margin, known from New Zealand only ..... **A. patellaeformis**

5. Basidiospores 15-20 µm long, surface white to pale buff, on coniferous hosts, east Asian species ..... **A. tsugae**
5. Basidiospores 15-17 µm long, surface usually pale grey, on *Quercus*, rarely on other hardwoods, circumpolar temperate species.....**A. disciformis**

SECTION G
Basidiospores ornamented generative hyphae with simple septa, acanthophyses present

1. Basidiospores longer than 16 µm 2
1. Basidiospores shorter than 16 µm 3

2. Dendrohyphidia present, known from temperate South America ..... **A. exasperatus**
2. Dendrohyphidia absent, known from temperate North America and Asia ..... **A. oakesii**

3. Apical ends of dendroid hyphidia or acanthophyses strongly amyloid ..... **A. botryosus**
3. Apical ends of sterile organs non-amyloid in Melzer's reagent ..... **A. apricans**

SECTION H
Basidiospores ornamented and shorter than 15 µm, generative hyphae with clamps acanthophyses present

1. Basidiospores shorter than 10 µm, on conifers in North America 2
1. Basidiospores 10-15 µm long, on conifers and hardwoods, widespread species 4

2. Basidiospores subglobose, 5-10 µm in diam, acanthophyses with few short apically protuberances, skeletal hyphae absent 3
2. Basidiospores subcylindrical to oblong ellipsoid, 4-5.5 x 2-3 µm, acanthophyses densely covered with protuberances in upper part, with skeletal hyphae ..... **A. utahensis**

3. Basidiospores 8-10 µm in diameter ..... **A. laurentianus**
3. Basidiospores 5-7 µm in diameter ..... **A. weirii**

4. Basidiospores ellipsoid to subcylindrical, 5-8 µm wide 5
4. Basidiospores ellipsoid, 9-12 µm wide, on conifers in western North America ..... **A. spiniger**

5. Basidia with two sterigmata, on woody plants, especially ericaceous hosts, acanthophyses with few apical protuberances ..... **A. norvegicus**
5. Basidia with 4 sterigmata, on monocotyledons 6

6. Basidiospores 13-15 x 7-8 µm, known only from *Cladium* in England..... **A. delicatus**
6. Basidiospores 11-14 x 5.5-7 µm, widespread, on many different hosts..... **A. phragmitis**

SECTION I
Basidiospores ornamented and longer than 15 µm, generative hyphae with clamps acanthophyses present, species from New Zealand and/or Australia.

1. Basidiocarp discomycete-like and cupulate 2
1. Basidiocarp corticioid, adnate 4

2. Basidiospores longer than 20 µm 3
2. Basidiospores 18-20 long ..... **A. ochraceoflavus**

3. Basidiospores 24-30 µm long, acanthophyses hyphoid with spiny protuberances, basidia smooth ..... **A. zealandicus**
3. Basidiospores 20-26 µm long, acanthophyses club-like with scattered small protuberances, basidia with few scattered protuberances ..... **A. australiensis**

4. Basidiospores up to 25 µm long 5
4. Basidiospores 25-36 µm long ..... **A. sparsus**

5. Basidiospores oval to subglobose, 16-22 µm wide, gloeocystidia absent ..... **A. coralloides**
5. Basidiospores elliptical or obovate, 10-12 µm wide, gloeocystidia present ..... **A. coronatus**

SECTION J

Basidiospores ornamented and longer than 15 µm, generative hyphae with clamps acanthophyses present, species from other parts of the world than New Zealand and/or Australia.

1. Basidiospores longer than 20 µm, on hardwoods 2
1. Basidiospores shorter than 20 µm, on conifers and hardwoods 7

2. Basidiocarp adnate to cupulate, in latter case rarely more than 1-1.5 cm in diameter, widespread species on different hardwoods 3
2. Basidiocarp pendant, substipitate, up to 2.5 cm in diameter, on *Nothofagus* in South America ..... **A. vitellinus**

3. Basidiospores longer than 25 µm, acanthophyses either club-like with small wart-like protuberances or in parts dendroid in the apical part, basidiocarps white to ochraceous, basidia smooth, species known hitherto only from China 4
3. Basidiospores shorter than 25 (occasionally up to 27) µm, if longer then basidiocarp pink to salmon-coloured, acanthophyses club like with numerous protuberances, basidia with small protuberances 5

4. Basidiospores allantoid to cylindrical, 25-30 x 12-14 µm, acanthophyses with small apical, wart like protuberances, basal hyphae very thick-walled ..... **A. microcarpus**
4. Basidiospores broadly ellipsoid, 29-34 x 22-28 µm, acanthophyses with spiny protuberances or apically with dendroid branches, basal hyphae thin- to slightly thick-walled ..... **A. gigasporus**

5. Basidiocarp cupulate or orbicular, yellow to pink, tropical & American species 6
5. Basidiocarp corticioid, bright pink when fresh, drying white to ochraceous, European species ..... **A. wakefieldiae**

6. Basidiocarp yellowish, basidiospores broadly ellipsoid, America .... **A. croceus**
6. Basidiocarp pink, basidiospores ellipsoid-citriform to semilunate, common pantropical species ..... **A. mirabilis**

7. On coniferous hosts 8
7. On hardwood hosts 12

8. Acanthophyses very scarce or absent 9
8. Acanthophyses clearly present 10

9. Dendrohyphidia rare to abundant, often strongly branched, known only from *Cedrus* in the Mediterranean area ..... **A. atlanticus**
9. Acanthophyses sparingly present among few dendrohyphidia, basidiospores 14-17 µm long, known only from *Thuja* in western North America ..... **A. occidentalis**

10. Basidiocarp corticioid, effused and thinning out at the margin, acanthophyses with protuberances more or less restricted to the apical part, basal hyphae with clamps only 11
10. Basidiocarps orbicular to discoid, protuberances covering up to half of the acanthophyses, basal hyphae with both simple septa and clamps, known only from *Abies* in Japan ..... **A. subglobosporus**

11. Basidiospores 13-17 µm wide, acanthophyses with long and often branched protuberances, widespread in North America and east Asia ..... **A. penicillatus**
11. Basidiospores 10-13 µm wide, acanthophyses with only wart-like protuberances, known only from *Taxus* in the Himalayas ..... **A. taxicola**

12. Dendrohyphidia narrow with small and tiny branches, the apex of which are slightly amyloid, African species ..... **A. gabonicus**
12. Dendrohyphidia narrow to clavate with few distinctly amyloid branches, known only from Cuba ..... **A. tenuis**

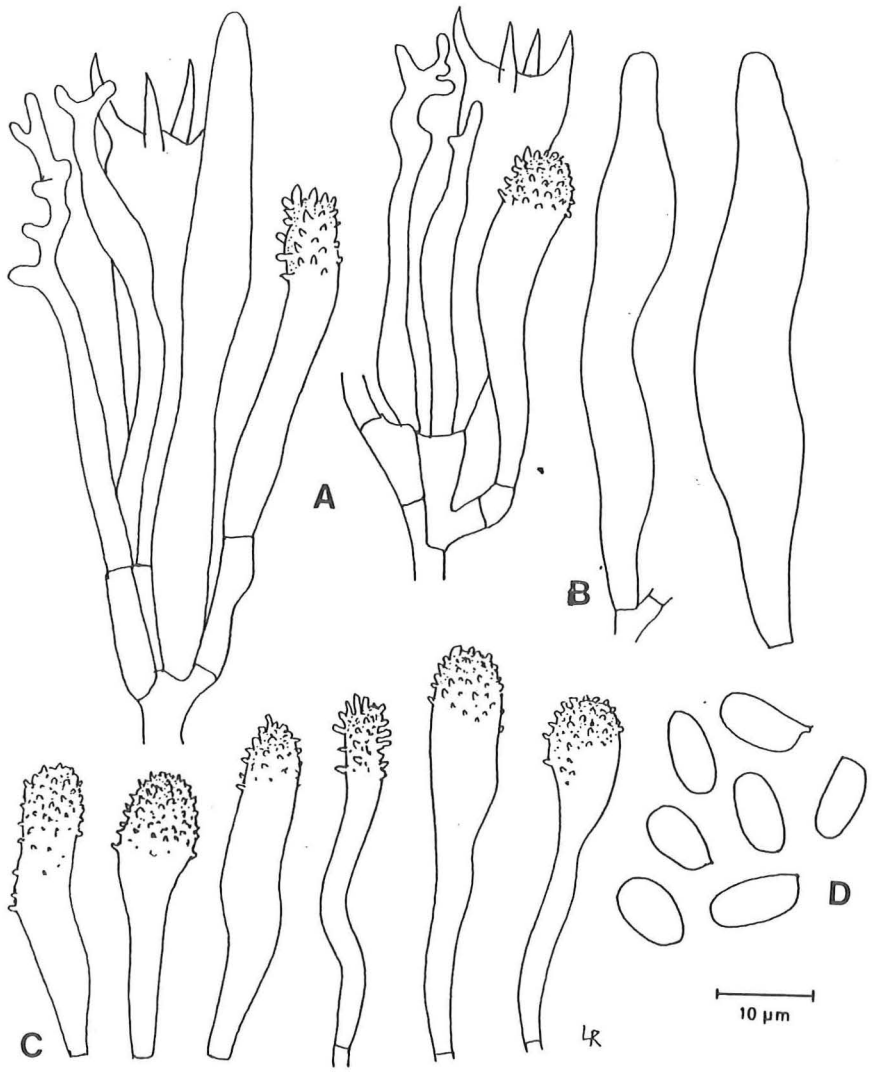


Fig. 2. *Aleurodiscus aberrans*, New Zealand, Wellington, Kumanuawa Range Jan. 1956. leg. G.H. Cunningham, Lectotype (PDD). A) part of the hymenium, B) gloeocystidia, C) acanthophyses, D) basidiospores.

10. Description of species

Note: since all described species have amyloid basidiospores, this information is not repeated in the descriptions. Cultural characteristics and sexuality are only known for a few species. Therefore, if not mentioned in the descriptions, they are unknown.

Aleurodiscus aberrans G. Cunn. Fig. 2
Trans. Roy. Soc. New Zeal. 84: 257, 1956.
Basidiocarp stereoid, at first appearing as small linear patches 2-5 x 1-2 cm, later more effused, ceraceous-cretaceous; margin white, fibrillose, hymenophore white becoming cream to sulphur-yellow with age, usually distinctly rimose.
Hyphal system monomitic, generative hyphae simple-septate.
Acanthophyses mostly clavate or fusiform, to 8 µm diam., apically with blunt processes 2-3 µm long.
Gloeocystidia fusiform or flexuous-cylindrical usually mammillate, content grainy and pale yellowish when mature, 45-80 x 8-10 µm.
Basidia subclavate, 16-25 x 5-6 µm, with 4 sterigmata up to 6 µm long.
Dendrohyphidia subclavate, simple or forked, occasionally more branched, 12-28 x 4-5 µm.
Basidiospores elliptic-oblong to subcylindrical, 7-9 x 4-5 µm, smooth.
Substrata. On different deciduous trees, once also recorded on *Pinus*.
Distribution. Known only from New Zealand.
Remarks. Separated from other species with simple septate hyphae by the small, smooth, elliptic-oblong basidiospores.

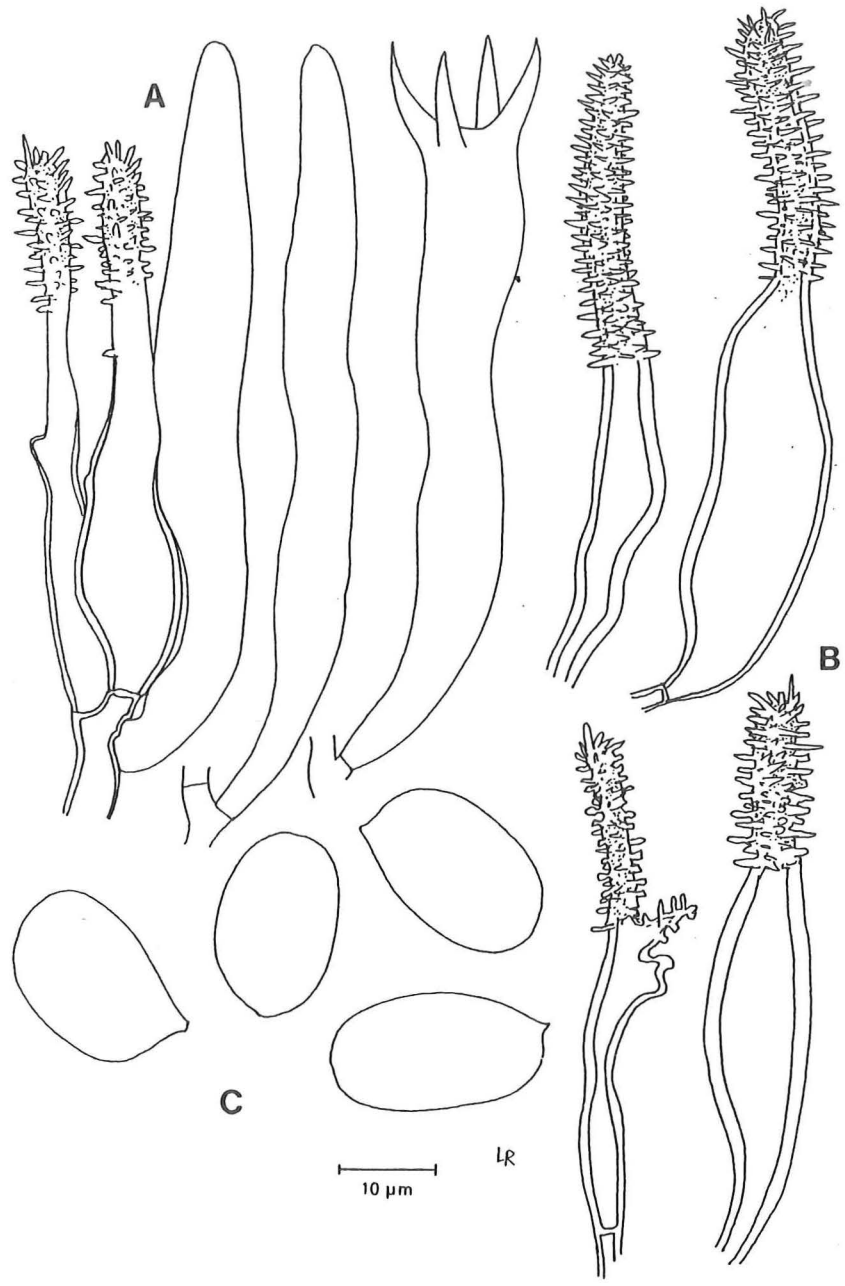


Fig. 3. *Aleurodiscus abietis*, Canada, Quebec, St. Catharine, 25. 8. 1938, H. Jackson, Holotype (DAOM). A) part of the hymenium, B) acanthophyses, C) basidiospores.

Aleurodiscus abietis H.S. Jacks. & P.A. Lemke Fig. 3
Can. J. Bot. 42: 225, 1964.
Basidiocarp pulvinate to stereoid, resupinate, up to 1 cm in diam., 0.5 mm thick in cross section, margin first indeterminate, white and cobwebby, later determinate and distinct, adnate or slightly lifted, hymenophore smooth, light cream or orange-buff, becoming paler on drying.
Hyphal system monomitic, generative hyphae with simple septa, up to 5 µm diam., with partially thickened walls.
Acanthophyses hyphoid to bottle-shaped with a swollen, smooth, thick-walled base, protuberances in upper part, 4-7 µm diam. in upper part, 4-12 µm in lower smooth part, hyaline to slightly yellowish in KOH, faintly amyloid in Melzer's reagent.
Gloeocystidia mostly embedded, subcylindric to mammillate with an apical bulb, 35-85(100) x (8)13-20 µm.
Basidia clavate, 85-100 x 20-24 µm, bearing 4 arcuate sterigmata and with a basal simple septum.
Basidiospores smooth, subglobose, (16)18-20 x (14)16-18 µm.
Substrata. On the underside of small, dead branches of living *Abies* spp. and *Tsuga mertensiana.*
Distribution. Southern Canada and northern parts of USA.
Remarks. The species is related to *A. farlowii* Burt, sharing cylindrical, thick-walled acanthophyses as well as smooth basidiospores, and found on coniferous trees.

Aleurodiscus ahmadii Boidin et al. Fig. 4
Bull. Soc. Mycol. Fr. 84:68, 1968. - *Stereum ahmadii* Boidin, Biologia Lahore 2:217, 1956. - *Xylobolus ahmadii* (Boidin) Boidin, Rev. mycol. 23:341, 1958.
Basidiocarp orbicular to cupulate with raised rounded margin, separable, perennial, woody, up to 1.5 mm thick, stratified in sections with dark lines, hymenophore undulating, smooth, entire, grey in the dry holotype, subiculum ochraceous and thin.
Hyphal system dimitic, generative hyphae with clamps, difficult to observe in dried material, 3-6 µm wide and thin-walled in the subhymenium, more thick-walled and up to 8 µm in the subiculum, skeletal hyphae present in subiculum and intersectional layers, straight, hyaline, very thick-walled, 6-12 µm wide.
Skeletocystidia smooth, thick-walled bending into the hymenium from the subiculum with rounded apices, 6-12 µm wide.
Gloeocystidia clavate, often ventricose, yellow and with a grainy content, up to 85 µm long, transitional with the skeletocystidia.
Dendrohyphidia absent.
Acanthophyses abundant, simple or forked, slightly thick-walled, 25 to 80 µm long, 4-10 µm wide, some with septa where clamps were probably present originally, upper part densely covered with small spiny protuberances.
Basidia clavate with 4 sterigmata, 20-35 µm long.
Basidiospores subcylindrical to oblong ellipsoid, smooth, thin-walled, 5-6 x 2.5-3 µm.

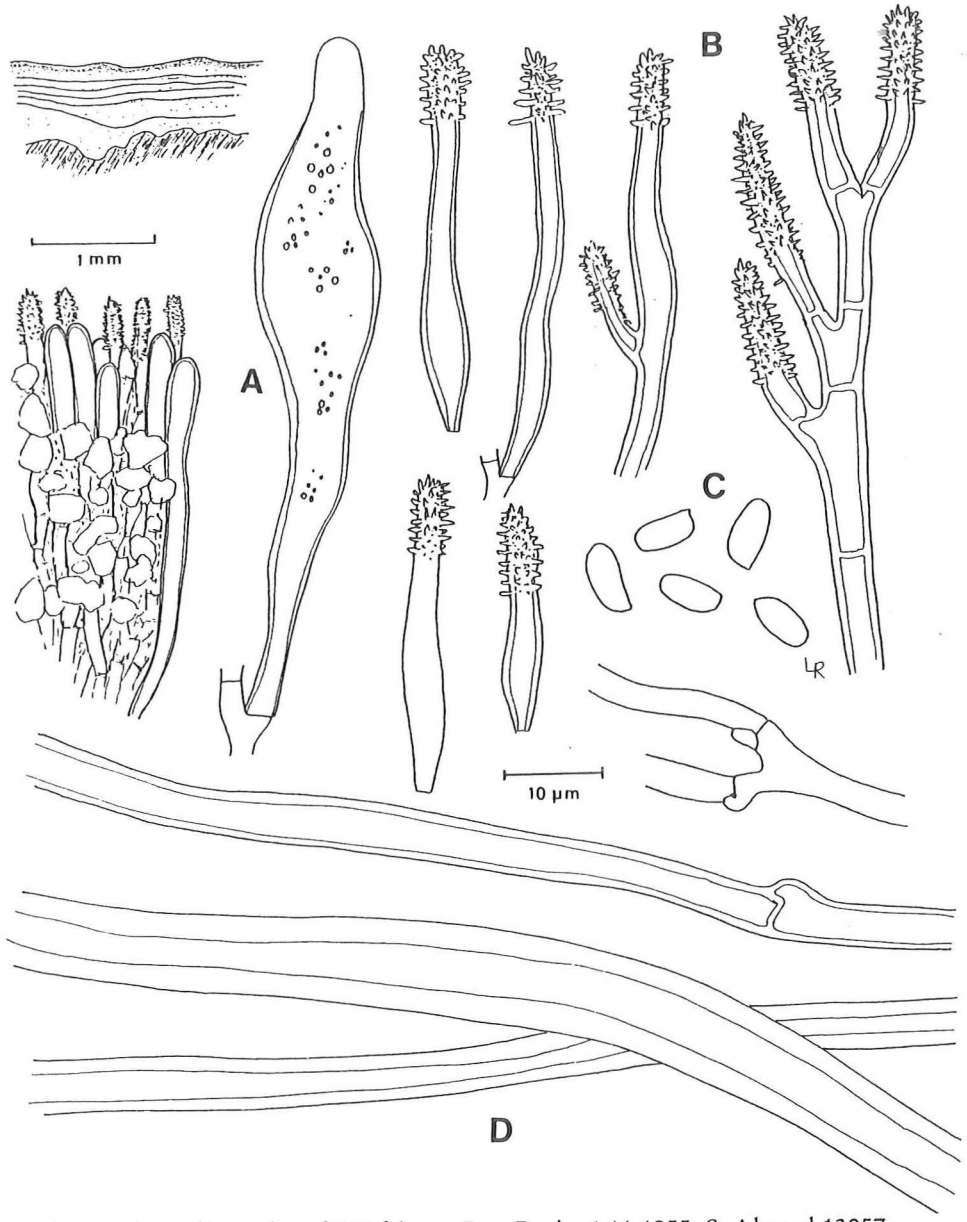


Fig. 4. *Aleurodiscus ahmadii*, Pakistan, Lun Bagia, 4.11.1955, S. Ahmad 13057, Isotype (LY). A) Part of the hymenium and cystidium, B) acanthophyses, C) basidiospores, D) generative and skeletal hyphae in the subiculum.

Aleurodiscus ahmadii (Boidin) Boidin, Terra & Lanq.

Substrata. Dead hardwood of unknown identity.
Distribution. Known only from the type locality in Lun-Bagia, Pakistan.
Remarks. Superficially the species reminds one of a *Stereum* with its orbicular basidiocarp with rounded, partly lifted margin and a dense, undulating smooth surface. Microscopically the structure is also *Stereum*-like with many skeletocystidia penetrating the hymenium. However, the monomitic structure of the subhymenium and the clamped generative hyphae exclude *Stereum*.

Aleurodiscus amorphus (Pers.:Fr.) J. Schröt. Fig. 5
Krypt.-Fl. Schles. 3: 429, 1888. - *Thelephora amorpha* Pers.: Fr., Elench. fung. 1:183, 1828. - *Peziza amorpha* Pers., Syn. meth. fung. 1:183, 1801.
Basidiocarp discomycete-like then more confluent, 0.5-1 mm thick, 1-5 cm wide, margin narrow and distinctly determinate, hymenophore ochraceous, pinkish grey to orange-red, consistency of mature basidiocarps firm, subcoriaceous.
Hyphal system monomitic with simple-septate hyphae, 2-4 µm wide, in an open texture of distinct hyphae.
Acanthophyses absent.
Cystidia tubelike and usually distinctly moniliform with slightly thickened walls, 110-160 x 5-10 µm.
Paraphyses few and scattered, occasionally branched and becoming similar to dendrohyphidia, up to 140 µm long.
Basidia very large, about 100 x 25 µm or even larger, with 4 sterigmata, 15-25 µm long.
Basidiospores subglobose to broadly ellipsoid, 24-28 x 18-22 µm, densely covered with fine, cylindrical to slightly conical and blunt spines.
Cultural characteristics. See Boidin et al. (1968:54) and Nakasone (1990).
Substrata. Most common on dead, attached branches of *Abies*, but also rather common on *Picea abies*. Usually it grows on nearly or recently dead, but still-attached lower branches. The basidiocarps are annual, developing during humid periods, and fertile specimens can even be found throughout the winter.
Distribution. Throughout the northern boreal zone, common in areas with *Abies*, more scattered in other coniferous areas.
Remarks. The discomycete-like basidiocarp and the large, echinulate basidiospores make *A. amorphus* easily recognized. The small parasites *Tremella mycetophiloides* Kobayasi and *T. simplex* H.S. Jacks. & G.W. Martin are very often found parasitizing whole basidiocarps, occurring as gelatinous folded outgrowths (Bandoni & Ginns 1993).

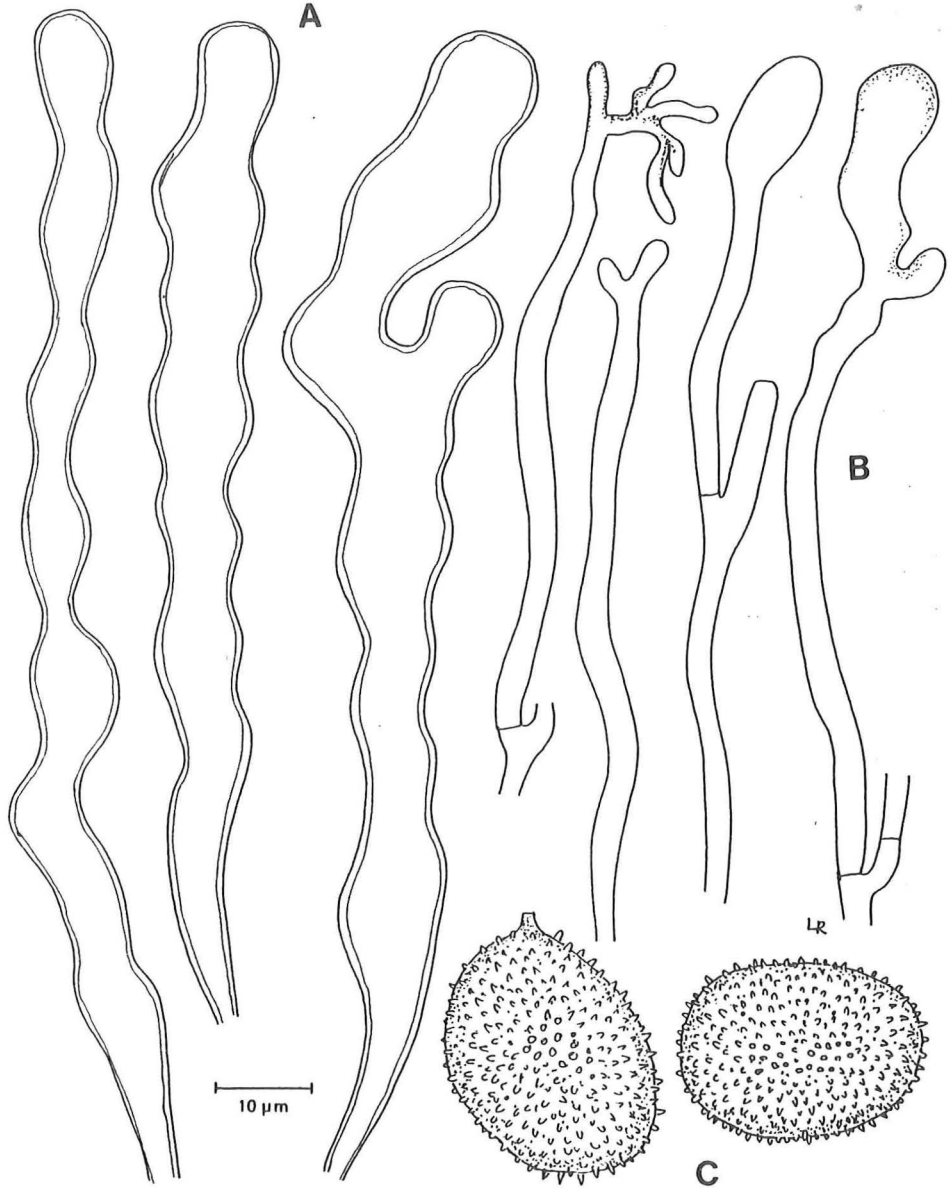


Fig. 5. *Aleurodiscus amorphus*, Norway, Akershus, Tømte, 27.9.1989, L. Ryvarden 27145 (O). A) cystidia, B) paraphyses, C) basidiospores.

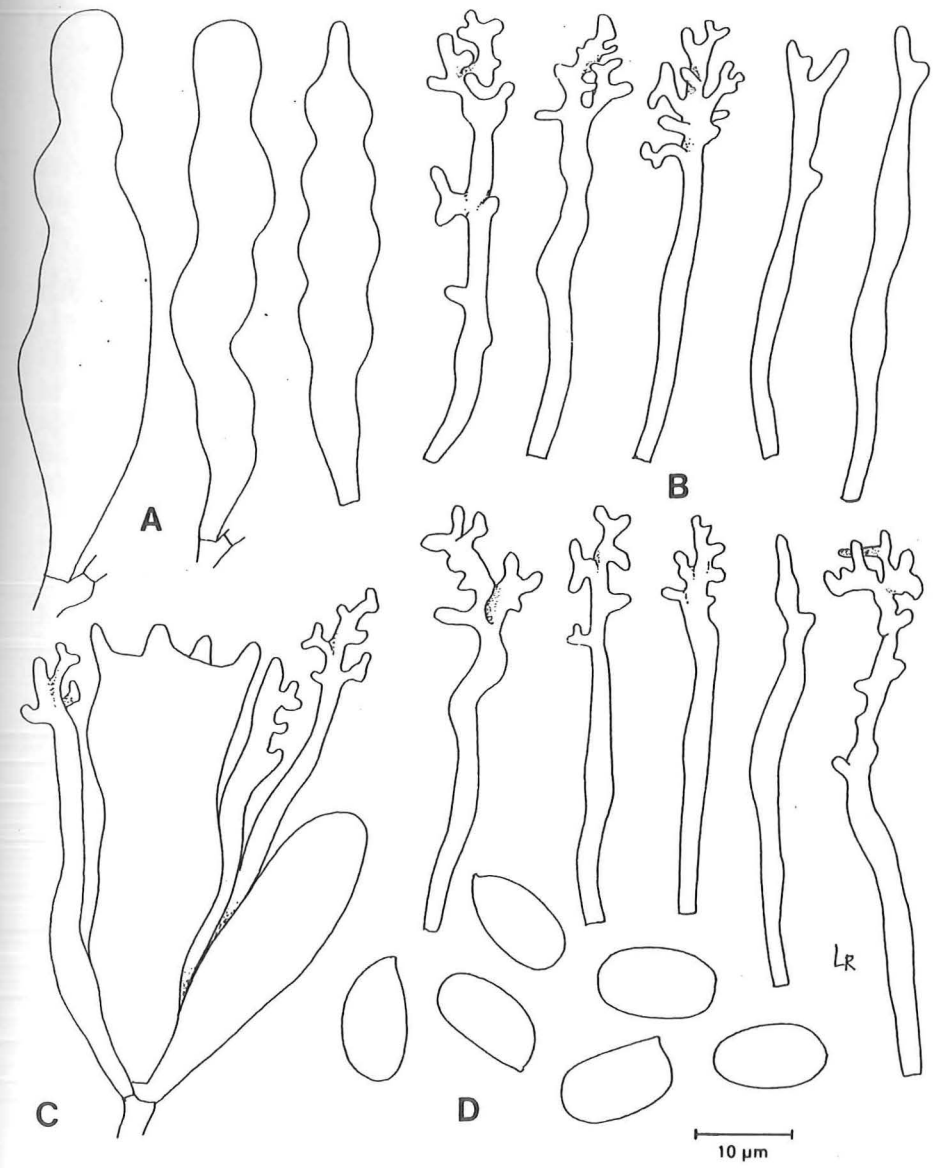


Fig. 6. *Aleurodiscus andinus*, Colombia, Cundinamarcha, Tenjo, 2600 m a. s. l., 4 June 1978, Ryvarden 15472, Holotype (O). A) gloeocystidia, B) dendrohyphidia, C) part of the hymenium, D) basidiospores.

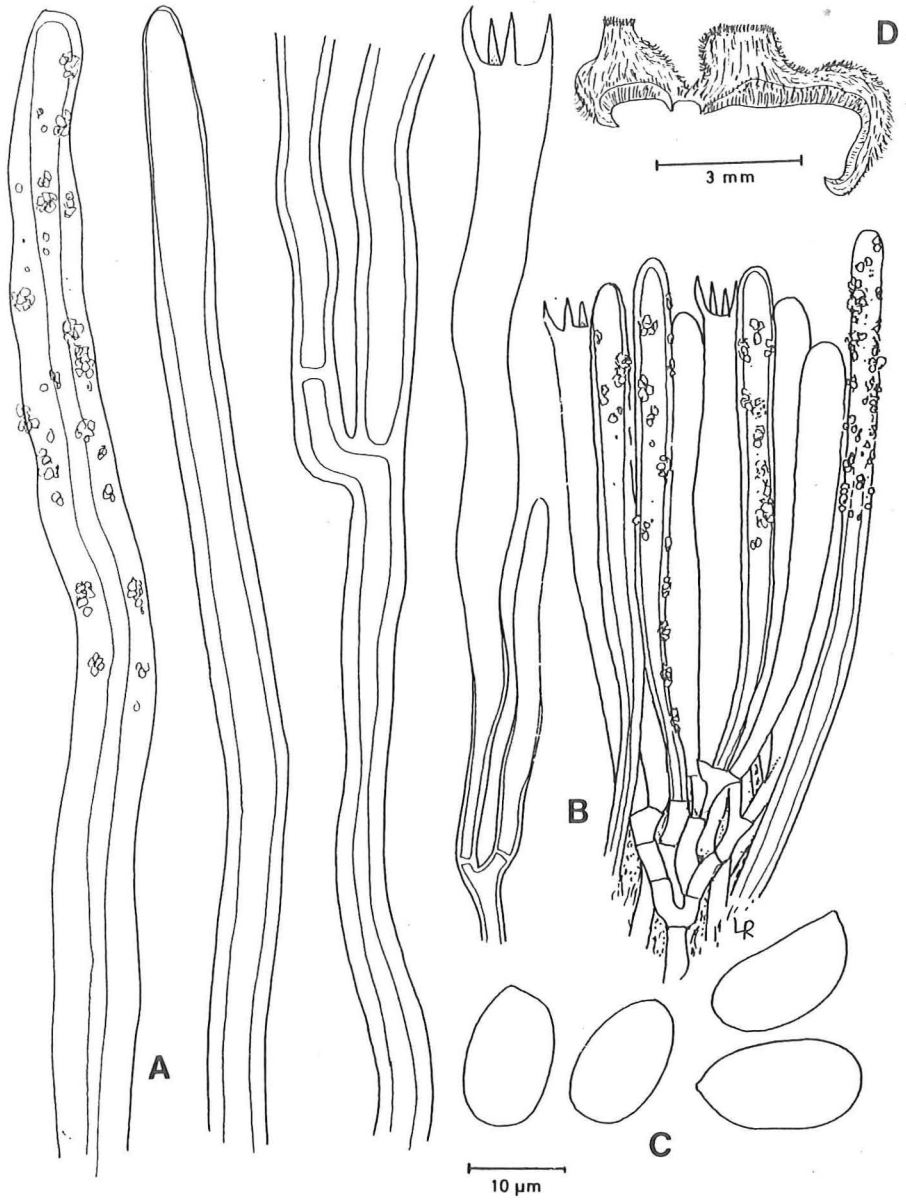


Fig. 7. *Aleurodiscus antarcticus*, Argentina, Tierra del Fuego, Monte Olivia, 23. Februar 1982, L. Ryvarden 19500 (O). A) skeletocystidia, B) part of the hymenium, C) basidiospores, D) basidiocarp.

Aleurodiscus andinus Núñez & Ryvarden sp. nov. Fig. 6

Fructificatio resupinata, arcte adnata, tenuis, hymenio cremicolori, contextus monomiticus, hyphae tenuitunicatis sine fibulis, gloeocystidia abundantia, 40-90 x 6-16 µm, dendrohyphidia abundantia, acanthophyses nulla, basidiosporae ellipsoidibus, leves, 12-14 x 7-8 µm.

Holotype: Colombia, Dep. Cundinamarcha, Tenjo, 2600 m a. s. l., 4 June 1978, Ryvarden 15472. Herb. O, isotypes in K and GB.

Basidiocarp adnate, effused, annual, thin and corticioid, smooth, pale yellow, up to 1.5 x 4 mm, 100 µm thick.

Hyphal system monomitic, generative hyphae with simple septa, thin-walled to slightly thick-walled in the subiculum, 3-8 µm wide, septation rather difficult to observe.

Acanthophyses absent.

Gloeocystidia clavate, often slightly moniliform, hyaline to yellow with grainy content, 40-90 x 6-16 µm.

Dendrohyphidia abundantly present among the basidia, up to 60 µm long, hyphoid with few outgrowths to more richly branched with rounded distinct apices.

Basidia clavate 45-65 x 6-10 µm with 4 sterigmata.

Basidiospores oblong ellipsoid, smooth, thin-walled, 12-14 x 7-8 µm.

Substrata. Known only from *Bambusa chusquia* (Poaceae).

Distribution. Known only from the type locality, but is probably widespread along the Andean mountains where the host is common.

Remarks. The species is recognized by its pale warm yellow colour, the total lack of acanthophyses, the numerous dendrohyphidia, and the host.

Aleurodiscus antarcticus (Speg.) Ryvarden comb. nov. Fig. 7

Basionym: *Corticium antarcticum* Speg., Bol. Acad. Nac. Cienc. Cordoba 11: 170, 1887. - *Stereum antarcticum* (Speg.) Rajchenb., Sydowia 40:248, 1987. - *Stereum magellanicum* Hjortstam & Ryvarden, Trans. Br. Mycol. Soc. 89: 114, 1987.

Basidiocarp biannual to perennial, stereoid to cupulate, dorsally attached, up to 2 x 1.5 cm , and 1.2 cm thick at point of attachment, margin curved inward when dry, abhymenial surface covered with appressed brown hairs under which there is a thin cuticle, hymenophore pale yellow to beige, smooth, finely cracked when old, up to 300 µm deep in undifferentiated zones, context up to 800 µm thick, pale brown and with an upper thin, black cuticle.

Hyphal system dimitic (?), generative hyphae with simple septa, 3 -8 µm diam., thin- to very thick-walled, first hyaline, pale brown in cuticle and on the abhymenial surface, skeletal hyphae abundant in the context and pale brown in the abhymenial hairs, 4-8 µm wide, bending into the hymenium as skeletocystidia (see below).

Cystidia present as skeletocystidia, smooth to finely encrusted with small

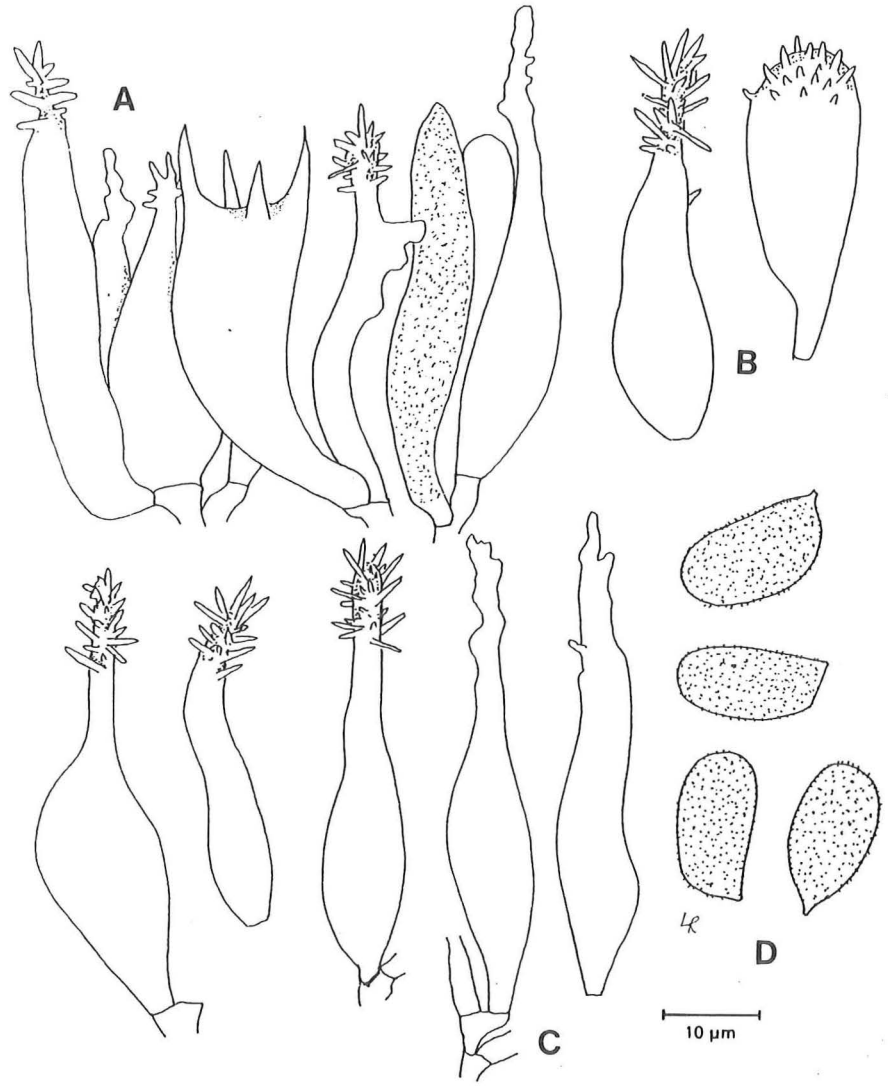


Fig. 8. *Aleurodiscus apricans*, France, Aveyron, 3. July 1909, Galzin 4153, Holotype (PC). A) part of the hymenium, B) two types of acanthophyses, C) paraphyses, D) basidiospores.

brown grains, 4-8 µm at the base, swelling to 12 µm near the apex, thick-walled except for the rounded apex .
Basidia clavate, up to 150 µm long, with 4 sterigmata.
Basidiospores ellipsoid, smooth, thin-walled, 14-17 x 8-10 µm.
Substrata. Known only from dead *Nothofagus.*
Distribution. Known only from Tierra del Fuego in Argentina, but may have a wider distribution in the *Nothofagus* zone in South America.
Remarks. The species has the same shape as many *Aleurodiscus* species and the large basidiospores also remind one of this genus. However, as seen from its synonyms, it also has characters placing it very close to *Stereum* where the same hyphal system and skeletocystidia are known. We have therefore been in doubt as to where to place it, but have chosen *Aleurodiscus* which already contains a great variety of species, rather than *Stereum* which is a rather homogeneous genus without the present cupulate species.

Aleurodiscus apricans Bourdot Fig. 8
Rev. Sci. Bourbon. 27: 5, 1910.
Basidiocarp corticioid, effused, forming small, irregular colonies 3-30 mm long, margin arachnoid, adherent, concolorous with the white to cream hymenophore.
Hyphal system monomitic, with simple septate hyphae, 2.5-4 µm diam.
Acanthophyses ovate, obovate or fusiform, 16-24 x 8-12 µm, upper part covered with numerous protuberances up to 4 µm long. A very few bulbuous cystidia with scattered short protuberances are also present.
Gleocystidia yellow with a grainy content, 30-60 x 8-12 µm.
Basidia cylindrical with slightly inflated bases, or subclavate, 20-24 x 8-10 µm, bearing 2-4 sterigmata.
Paraphyses subclavate or oval, 16-40 x 6-8 µm, some looking almost like cystidia.
Basidiospores pip-shaped, oval, obovate or elliptical, some flattened adaxially, with oblique or central apiculi, 12-15 x 7-10 µm, smooth to finely verruculose according to the original description. In our examination of the type we found all basidiospores finely asperulate. See below for remarks.
Substrata. *Rubus*, *Rosa*, *Viburnum*, *Calluna*, *Pteridium*, dead sheaths on living stems of *Arundinaria macrosperma* (Poaceae), and unidentified dead hardwood.
Distribution. A rare species known only from a few localities in France, British Isles (Channel Islands), Spain (Manjon et al. 1990) and New Zealand.
Remarks. Bourdot (1910) stated that both smooth and asperulate basidiospores were present and this was confirmed by Boidin et al. (1968: 3). As far as we know, it is the only species in the genus with both smooth and ornamented basidiospores. As stated above, we found all basidiospores to be asperulate in the type while Boidin et al. (1985) and Telleria & Melo (1995) report the basidiospores to be smooth in collections from France and Spain respectively.

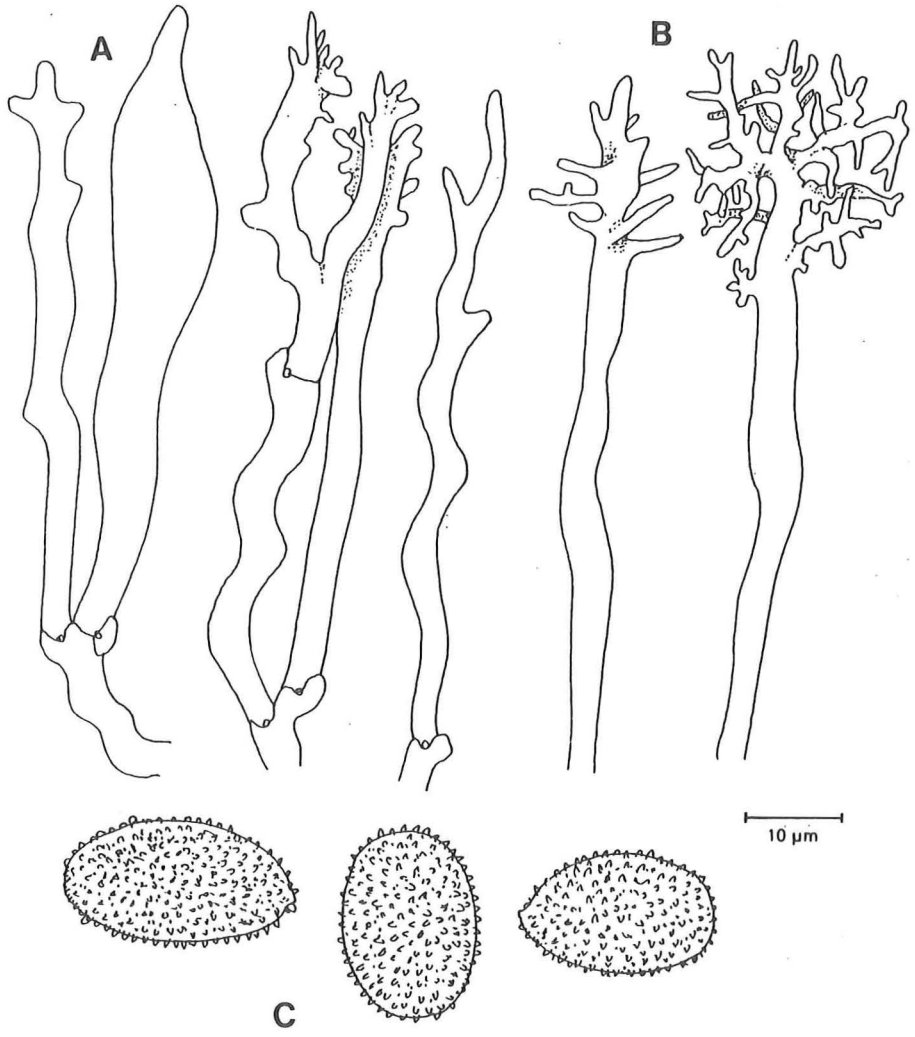


Fig. 9. *Aleurodiscus atlanticus*, Morocco, Termit el Had., 14. November 1918, Maire 6100, Holotype (PC). A) part of the hymenium with gloeocystidium and paraphyses, B) dendrohyphidia, C) basidiospores.

Aleurodiscus atlanticus Maire Fig. 9

Bull. Soc. Hist. Nat. Afr. Nord. 8:157, 1917.

Basidiocarp pulvinate, margin abrupt and adnate, 2-6 mm diam., rarely more confluent, hymenophore pink to white, smooth when fresh, finely cracked when dry.

Hyphal system monomitic, generative hyphae with clamps, in the subiculum 3-5 µm wide and thick-walled, in the subhymenium vertical, 2-3 µm wide, in parts agglutinated and densely mixed with crystals of calcium oxalate.

Acanthophyses absent.

Gloeocystidia very few, pointed, 35-65 µm long, hyaline.

Dendrohyphidia and **paraphyses** rare to abundant, hyaline, simple, forked to strongly branched in the upper part, thick-walled and 3-7 µm wide in the main stem, and 25 to 85 µm long from the clamps from which they arise. There are even transitions from the simple hyphae to the forked dendrohyphidia.

Basidia smooth, 80-110 x 12-16 µm, with 4 large sterigmata.

Basidiospores amygdaliform to ellipsoid, finely warted, individual warts up to 1.5 µm long, 18-20 x 12-14 µm.

Cultural characteristics. See Boidin et al. (1968).

Sexuality. Tetrapolar. See Boidin et al. (1968).

Substrata. Known only from branches of living *Cedrus libanotis* var. *atlanticus* in Morocco and the main variety in Turkey.

Distribution. Central mountains of Morocco and Anatolia in Turkey (herb. GB , leg. N. Hallenberg). It will probably be found in other Mediterranean countries where *Cedrus* is native.

Remarks. The species is easily recognized by the host, the distribution, and microscopically by the lack of acanthophyses and the variably branched dendrohyphidia.

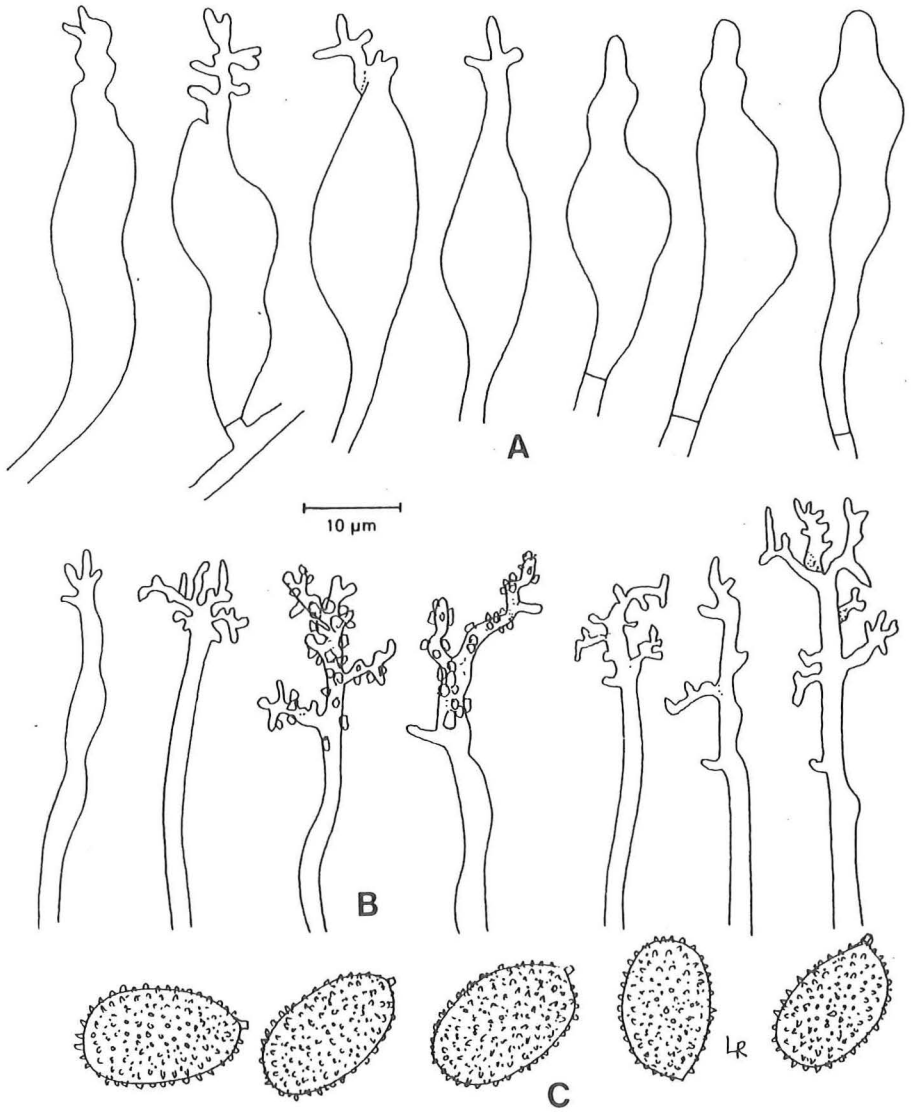


Fig. 10. *Aleurodiscus aurantius*, England, Guernesey, 27. September 1948, Ellis 355 (K). A) gloeocystidia, B) dendrohyphidia, C) basidiospores.

Aleurodiscus aurantius (Pers.: Fr.) J. Schröt. Fig. 10
Krypt. F-Fl. Schles. 3: 429, 1888. - *Thelephora aurantia* Pers.: Fr., Syst. Mycol. 1: 445, 1821. - *Thelephora aurantia* Pers., Ann. Bot. (Usteri) 11: 80, 1794.
Basidiocarp effused, corticioid, usually smooth, without a distinctly developed margin, closely adnate, 0.1-0.3 mm thick, pale with orange tinges, consistency subcoriaceous.
Hyphal system monomitic with simple septate, thin-walled hyphae, 2.5-4 µm diam.
Acanthophyses absent.
Gloeocystidia variable in shape, cylindrical to ventricose and usually mammillate. The protoplasm is yellowish (darkens in sulphovanillin) which makes it easy to separate the cystidia from the basidia.
Dendrohyphidia numerous, richly branched and covered with crystals - in some cases so abundantly that they are more or less hidden behind the crystal-layer.
Basidia about 60 x 15 µm with 4 sterigmata approximately 15 µm long.
Basidiospores ellipsoid to subglobose, 18-21 x 12-14 µm, finely echinulate.
Cultural characteristics. See Boidin et al. (1968).
Substrata. Usually on species of the Rosaceae, but also known from *Taxus, Alnus, Cornus, Arctostaphylos*, and other dead hardwoods.
Distribution. A rare species recorded throughout Europe, common in southern England, widespread in the USA and Japan.
Remarks. The specimens from *Taxus* are somewhat different, being slightly thinner, with smaller, more numerous cystidia and less branched dendrohyphidia. These specimens may perhaps be regarded as a variety.

Aleurodiscus australiensis Wakef. Fig. 11
Kew Bull. Misc. Inf. p. 208, 1918.
Basidiocarp membranous, adherent, appearing first as numerous disciform colonies 2-5 mm across, then forming irregular areas up to 8 x 2 cm, up to 0.5 mm thick, margin free, lacerate, concolorous, hymenophore cream to tan, velutinate, context isabelline.
Hyphal system monomitic, generative hyphae 4-5 µm diam. with clamps at the septa, embedded crystals present.
Acanthophyses 1) subclavate, 28-32 x 6-8 µm, 2) clavate, 50-60 x 14-16 µm, 3) cylindrical, 4-6 µm diam., with protuberances in the upper part.
Gloeocystidia crowded in the hymenial layer and in irregular rows through the context, pyriform, fusiform, flexuous-cylindrical, or clavate, 35-86 x 6-22 µm, sometimes bearing a few spines in the apical region.
Basidia cylindrical, 55-70 x 12-16 µm with 4 arcuate, stout sterigmata, up to 10 µm long, often with scattered protuberances in the basal part.
Basidiospores obovate, elliptical, some compressed adaxially, strongly apiculate, 20-26 x 14-18 µm, coarsely aculeate.
Substrata. On bark of *Eucalyptus* sp and *Phillipa* sp.
Distribution. Australia and Réunion in the Indian Ocean (Boidin & Gilles

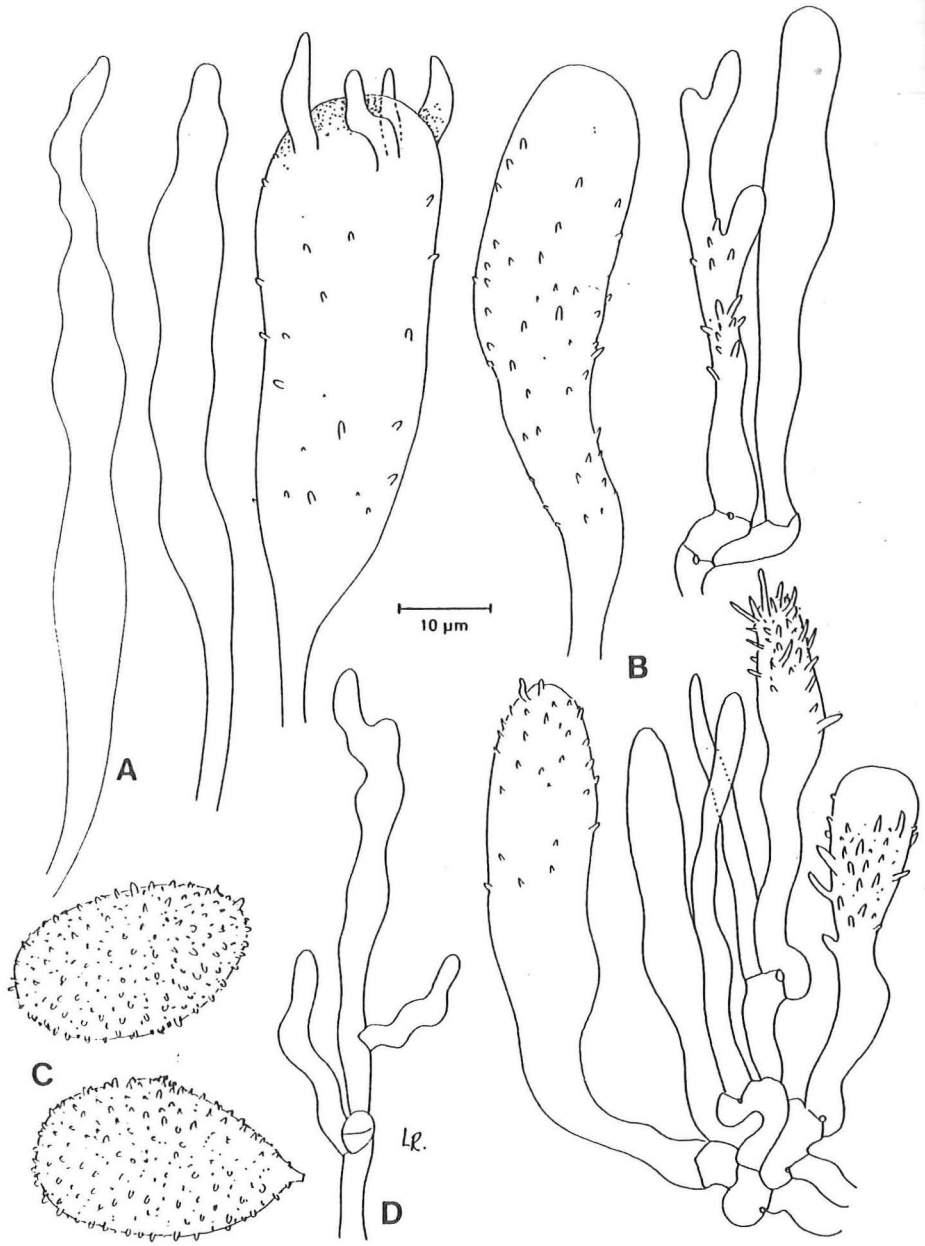


Fig. 11. *Aleurodiscus australiensis*, Australia, Queensland, Buderim, 1912, C.T. White (K). A) cylindrical gloeocystidia, B) ornamented basidia, gloeocystidia, and acanthophyses, C) Basidiospores, D) paraphyses.

1986).

Remarks. The species is easily recognized by the acanthophyses and cystidia of various shapes, together occupying the greater part of the context and hymenium, and in addition the large, aculeate basidiospores.

Aleurodiscus berggreni (Cooke) G. Cunn. Fig. 12

Proc. Linn. Soc. New South Wales 77: 277, 1953. - *Hypocrea berggreni* Cooke, Grevillea 8: 65. 1879.

Basidiocarp pulvinate, orbicular, attached by a broad base, 0.5 mm diam., up to 1 mm thick, becoming confluent, and then strongly reminding one of *Xylobolus frustulatus*, finally deeply rimose and divided into irregular segments, hymenophore at first convex, pruinose, cream or ochre, discoloured dingy brown when cracked.

Hyphal system monomitic, generative hyphae thick-walled and with simple septa, in the context up to 10 µm diam., gelatinized, with strongly thickened walls and a capillary lumen.

Acanthophyses subclavate to hyphoid, 4-6 µm diam., with blunt protuberances, mostly restricted to the apex or occasionally also further down.

Gloeocystidia abundant, variable in shape, in the subhymenium fusiform-clavate or flexuous-cylindrical, thin-walled in fertile hymenium, very thick-walled in old parts of the basidiocarp, 80-160 x 14-18 µm, in the context 30-56 µm diam. with walls 4-8 µm thick.

Basidia subclavate, some cylindrical, 20-30 x 5-6 µm, bearing 2-4 sterigmata up to 5 µm long.

Basidiospores cylindrical to oblong-ellipsoid, 9-12 x 4-4.5 µm, smooth.

Substrata. On bark of dead branches of *Nothofagus* sp.

Distribution. Known only from New Zealand.

Remarks. This is a highly characteristic species due to the small pulvinate basidiocarps, usually occurring in large numbers, often crowded and then reminding one strongly of *Xylobolus frustulatus*. According to Cunningham (1956) it is a biennial species. The thick-walled cystidia and smooth, cylindric basidiospores separate this species from other species belonging to the group with clavate acanthophyses.

Aleurodiscus bisporus (Boidin & Lanq.) Núñez & Ryvarden comb. nov. Fig. 13

Basionym: *Acanthophysium bisporum* Boidin & Lanq., Bull. Soc. mycol. Fr. 101: 362, 1985.

Basidiocarp corticioid, annual, first as small patches, later more effused, thin, smooth, buff to whitish grey, up to 120 µm thick.

Hyphal system monomitic, generative hyphae with simple septa, 2-3 µm wide, thin-walled and mixed with crystals especially in the subiculum.

Acanthophyses hyphoid to ventricose and with only a few (3-12) protuberances in the apical part, 16-20 x 6-7.5 µm.

Gloeocystidia ventricose to moniliform, thick-walled from the base towards a

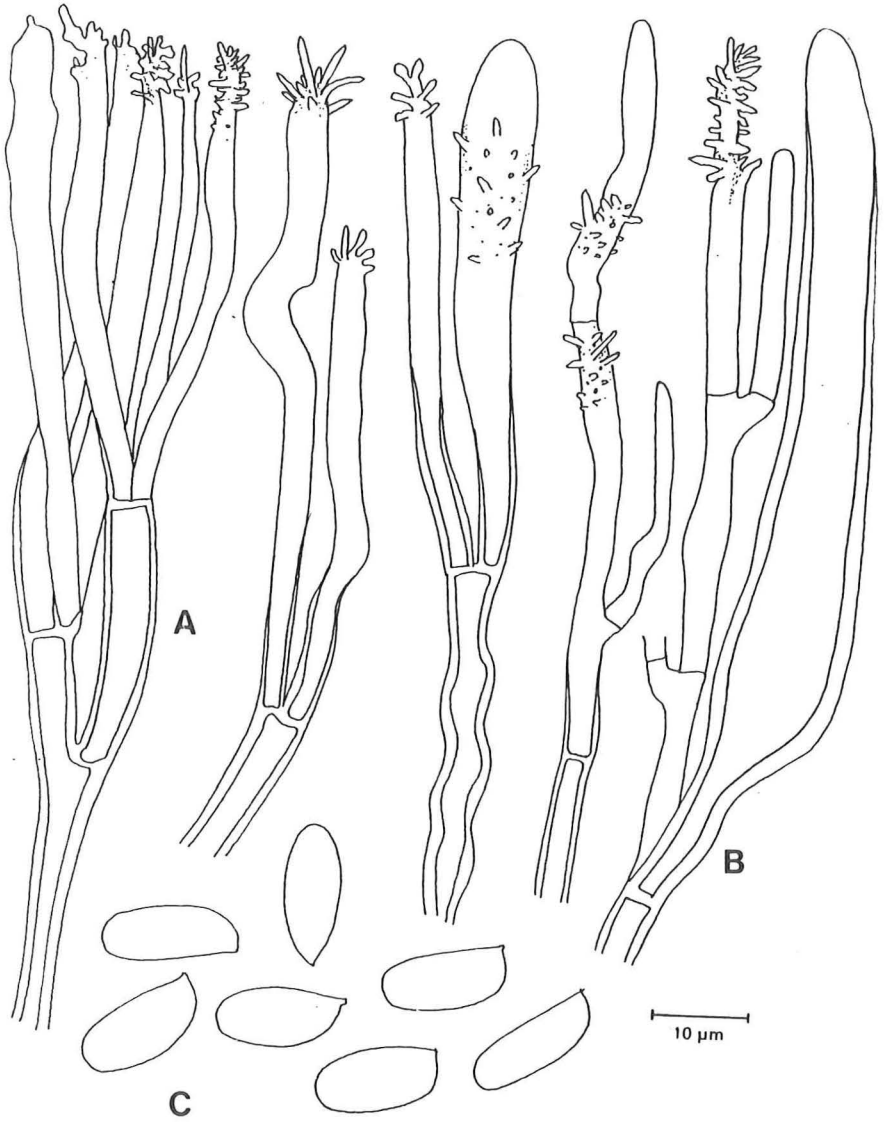


Fig. 12. *Aleurodiscus berggreni*, New Zealand, Otago, Lake Wakahupui, 21 March 1964, Davidson NSDA 23148 (PDD) A) part of the hymenium B) gloeocystidium, C) basidiospores.

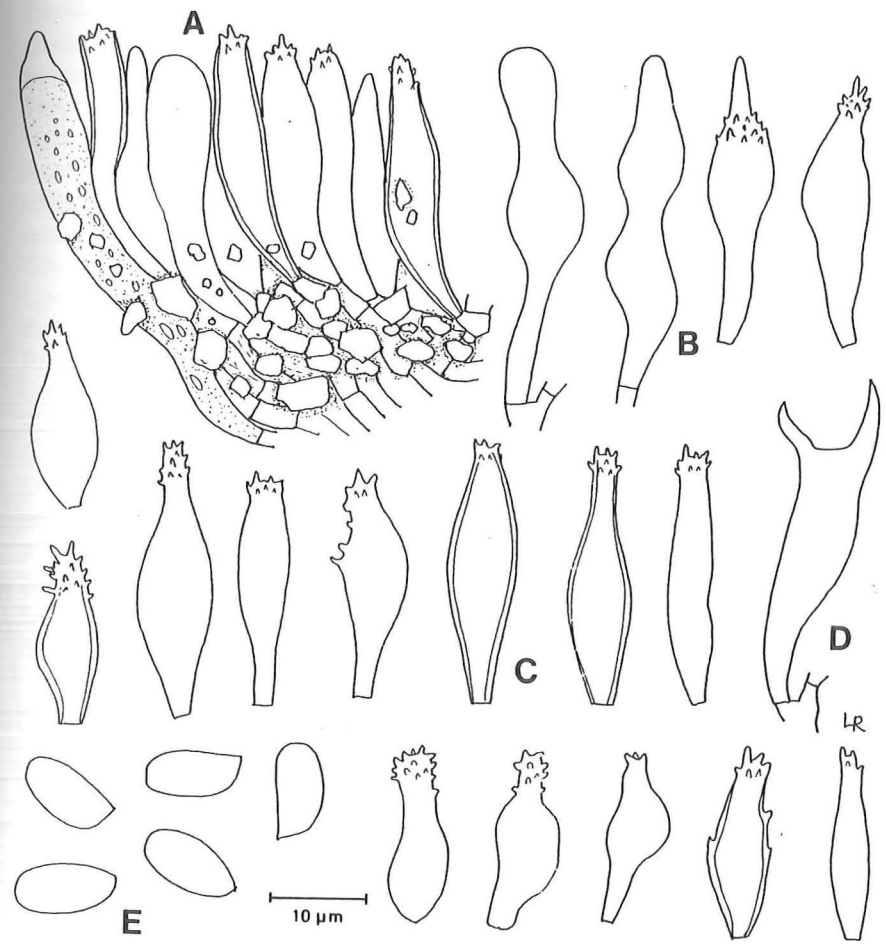


Fig. 13. *Aleurodiscus bisporus*, Guadaloupe, Cascade de Carbet, 6 August 1975, J. Boidin, 7664 (LY). A) part of the hymenium, B) gloeocystidia and ventricose acanthophyses, C) acanthophyses, D) basidium, E) basidiospores.

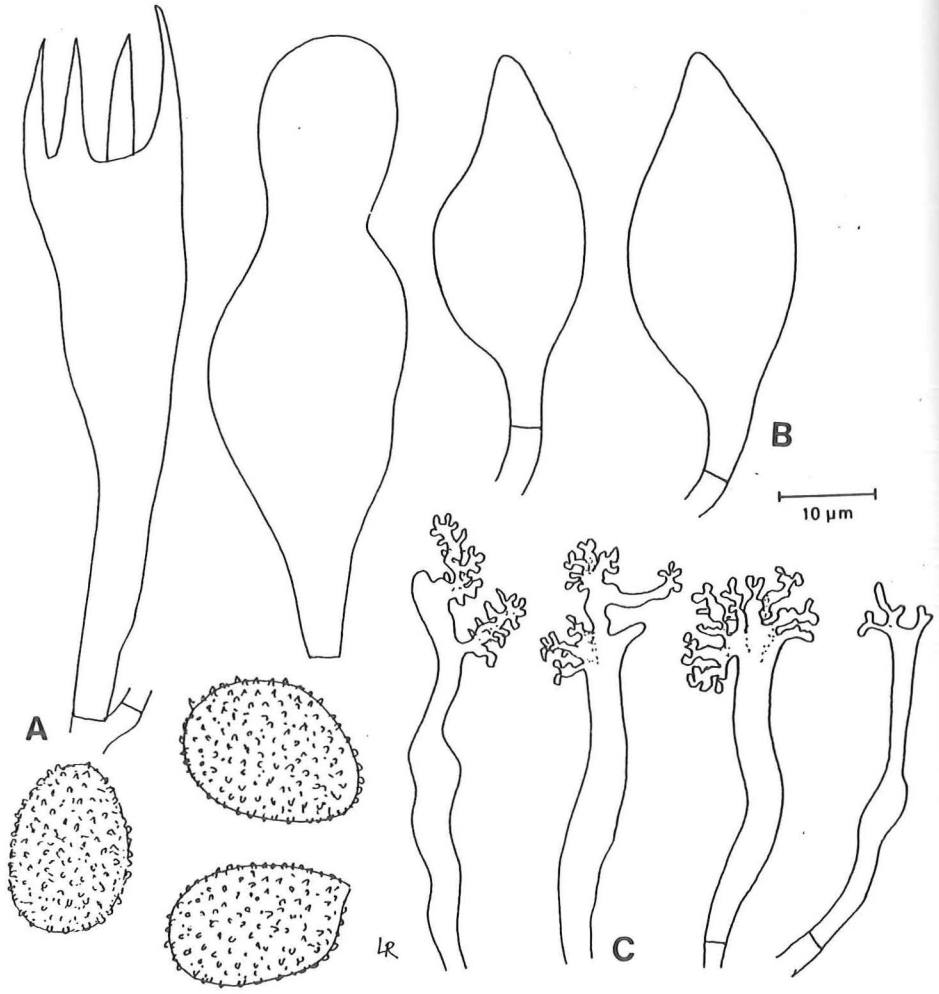


Fig. 14. *Aleurodiscus botryosus*, Spain, Canary Islands, Tenerife, Monte Las Mercedes, 19 Januar 1974, Ryvarden 12617 (O). A) basidium and basidiospores, B) gloeocystidia, C) botryophyses.

thin apex, yellowish to hyaline, 30-65 x 7-10 µm.
Basidia clavate, 35-45 x 5-6 µm, with 2 sterigmata.
Basidiospores ellipsoid, smooth, 6-10 x 4.5-5.5 µm.
Substrata. On branches of hardwood trees.
Distribution. Known only from the type locality in Guadeloupe (West Indies).
Remarks. The species is undoubtedly related to *A. cerrusatus* but is separated by the small and sparingly asperulate acanthophyses, the lack of clamps, and the bisterigmate basidia.

Aleurodiscus botryosus Burt Fig. 14
Ann. Mo. Bot. Gard. 5: 198, 1918.
Basidiocarp corticioid, first as separate patches 2-4 mm in diam., about 1 mm thick, later effused, margin determinate, adnate, pruinose-pulverulent, hymenophore white to pale buff-coloured, smooth to rimose when old.
Hyphal system monomitic, thin-walled hyphae with simple septa, more thick-walled in the subiculum.
Acanthophyses (botryophyses) cylindrical to clavate with numerous, small, strongly amyloid, cluster-like branches in the apex, a few sparingly branched and reminiscent of dendrohyphidia.
Gloeocystidia variable, cylindric, clavate to ventricose or fusiform with a tapering, simple to bifurcate apex, 38-90 x (7)12-19 µm, yellowish in KOH.
Basidia short-clavate to subclavate, 35-55 x 12-15 µm, with 4 sterigmata.
Basidiospores ovoid to subglobose, 12-15 (18) x (7)8-11 µm, echinulate.
Cultural characteristics. See Boidin et al. (1968).
Substrata. Hardwoods, recorded from a wide host range such as *Juniperus, Acer, Lonicera, Myrica, Ostrya, Quercus, Symphiocarpus, Syringia, Thuja, Vitis, Rosa.*
Distribution. Widespread in warm temperate to subtropical areas in the northern hemisphere, the northernmost locality in Europe seems to be the Czech Republic. Known from Zimbabwe and Zaire, and probably widespread in Africa. Also recorded from New Zealand.
Remarks. The amyloid botryophyses are diagnostic for this species. The species is the type of *Aleurobotrys* Boidin

Aleurodiscus buxicola (Boidin & Lanq.) Núñez & Ryvarden comb. nov. Fig. 15
Basionym: *Acanthophysium buxicola* Boidin & Lanq., Bull. Soc. mycol. Fr. 101: 359, 1985.
Basidiocarp annual, resupinate, strongly adnate, smooth, white with a faint pink tint to pale cream.
Hyphal system monomitic, generative hyphae with clamps, 2-3 µm wide.
Acanthophyses absent.
Gloeocystidia clavate to cylindrical, often mammillate, violet black in sulphoaldehyde, 40-65 x 4-10 µm.
Dendrohyphidia numerous, hyaline, mostly dichotomously branched, smooth or covered with fine crystals, up to 60 µm long from the basal clamp to the apex.

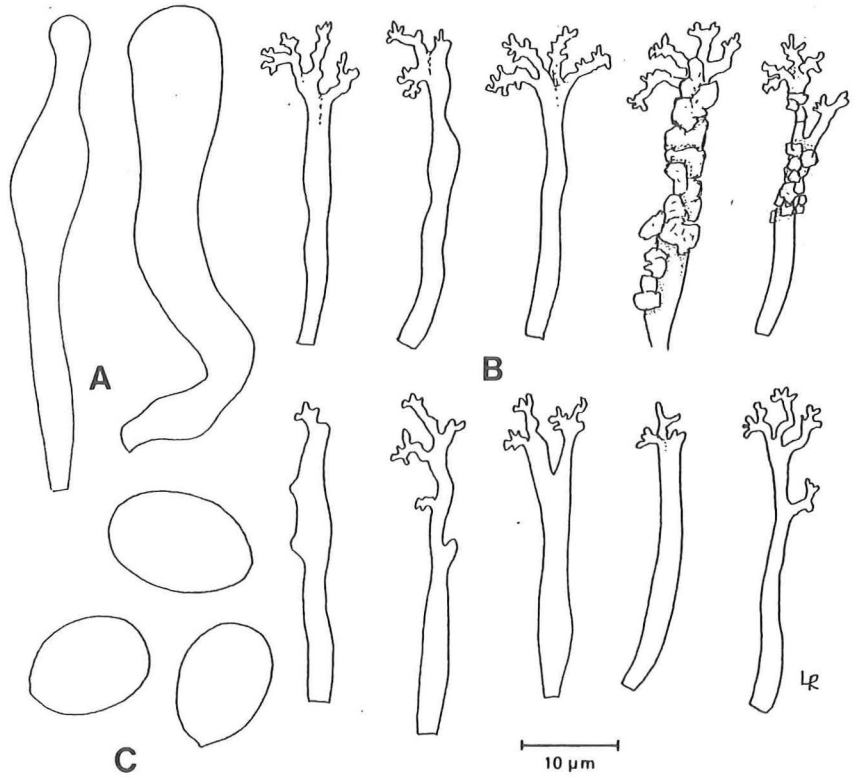


Fig. 15. *Aleurodiscus buxicola*, France, Vauclaz, Malauceine et Bedouin, 72 May 1977, J. Boidin (LY). A) gloeocystidia, B) dendrohyphidia, C) basidiospores.

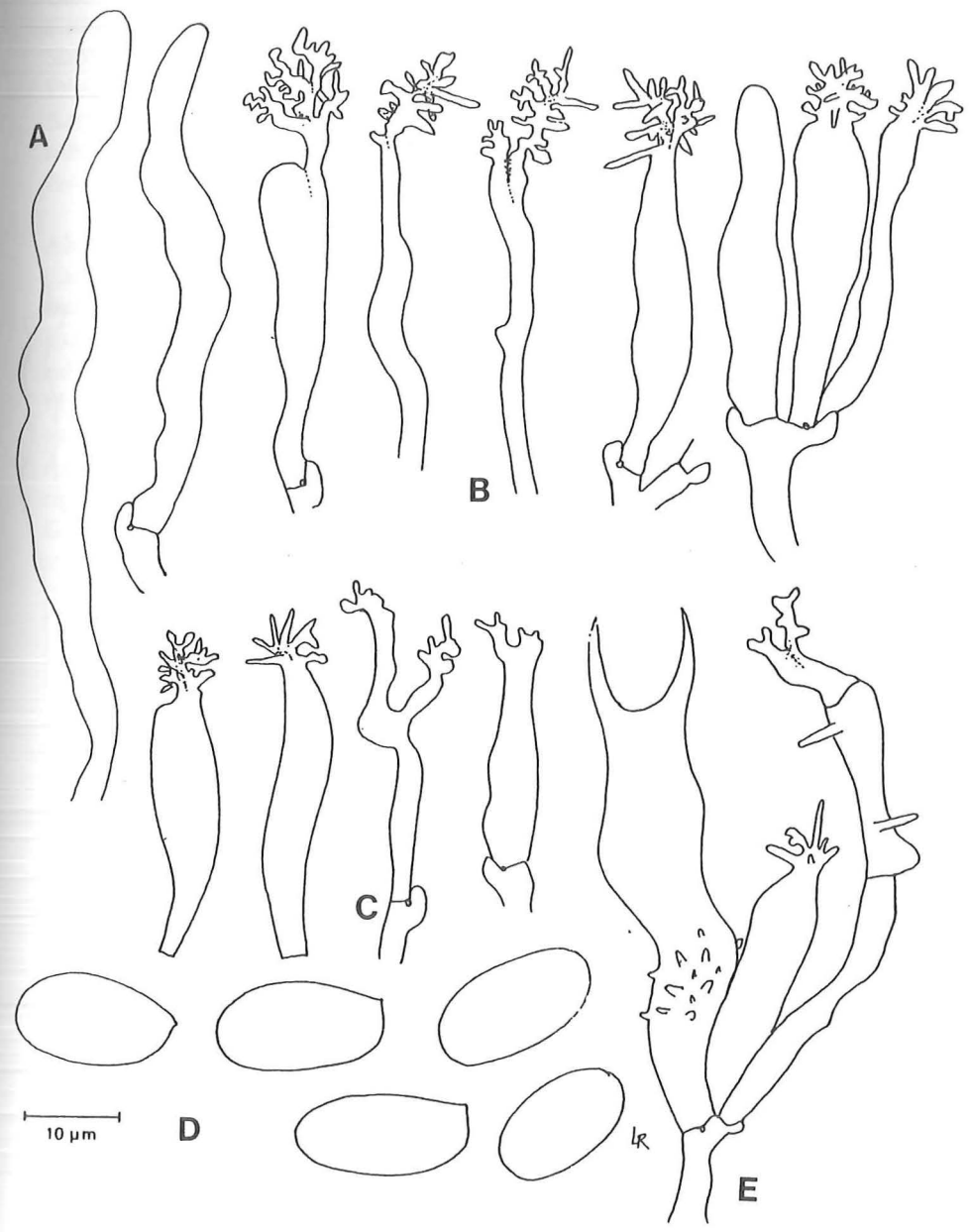


Fig. 16. *Aleurodiscus canadensis*, Canada, Quebec, Burnet, 25 August 1938, G. Drayton, TRTC 18662, Holotype (TRTC). A) gloeocystidia, B) acanthophyses, C) acanthophyses transitional to dendrohyphidia, D) basidiospores, E) part of the hymenium with an ornamented basidium.

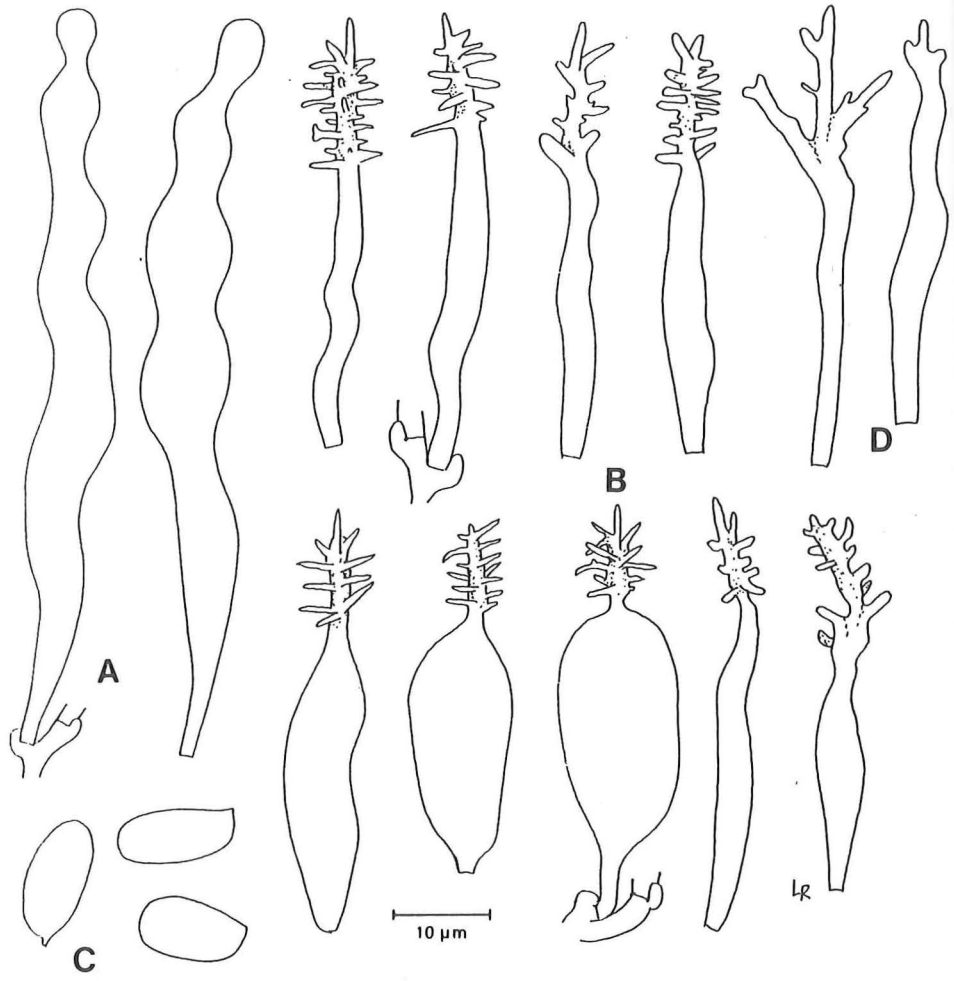


Fig. 17. *Aleurodiscus cerussatus*, Italia, Trento, 1890, J. Bresadola, Holotype (PC). A) gloeocystidia, B) cylindrical and ventricose acanthophyses, C) basidiospores, D) dendrohyphidia.

Basidia clavate, 60-100 x 5-10 µm with 4 sterigmata.
Basidiospores ovate to almost subglobose, smooth, 9.5-14 x 8-13 µm.
Cultural characteristics. See Boidin et al (1985).
Substrata. Collected only on *Buxus sempervirens*.
Distribution. Known only from the type locality in France.
Remarks. The species is recognized by the lack of acanthophyses, the subglobose asperulate basidiospores and the host. Concentrated collecting on *Buxus* will probably reveal a wider distribution in central Europe.

Aleurodiscus canadensis Skolko Fig. 16
Can. J. Res. Ser. C, 22: 258, 1944.
Basidiocarp corticioid, irregular, usually less than 1 cm long, up to 1 mm thick, later more effused, margin determinate at maturity, dense-pruinose to subceraceous, hymenophore smooth, white, drying cream to ochraceous-buff.
Hyphal system monomitic with clamped hyphae, those in the subiculum partially thick-walled.
Acanthophyses 20-40 µm long, hyphoid to clavate and with protuberances restricted to the apical part, i.e. up to about 10 µm from the apex.
Gloeocystidia moniliform, cylindric to subclavate, 40-100 x 6-10 µm, yellowish in KOH.
Basidia clavate, 45-60 x 10-13 µm and with protuberances in the mid section, in Canadian specimens with only two sterigmata, in the eastern part of Russia a single collection with 4-sterigmate basidia has been examined.
Basidiospores narrowly ellipsoid, (10)12-18 x (7)9-13 µm, smooth, delicately thin-walled and usually collapsed in dried specimens.
Cultural characteristics. See Nakasone (1990) and Skolko (1944).
Sexuality. Tetrapolar, see Nakasone (1990).
Substrata. We have seen specimens on the bark of small branches of *Picea canadensis* and *P. microsperma* and it was described from *Picea glauca*. It is also reported from *Abies, Betula, Prunus, Quercus, Thuja,* and *Tsuga*.
Distribution. Canada, USA and Sakhalin Island in eastern Russia.
Remarks. Microscopically, this species is recognized by the large subcylindric, thin-walled and smooth basidiospores, the clamped hyphae and the host genus.

Aleurodiscus cerussatus (Bres.) Höhn. & Litsch. Fig. 17
K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 116: 807, 1907. - *Corticium cerussatum* Bres., Fung. Trid. II: 37, 1892. - *Acanthophysium minor* (Pilát) Telleria, Nova Hedw. 53: 231, 1991.
Basidiocarp corticioid, smooth, 0.05 - 0.2 mm thick, without distinct margin, whitish when young, darkening with age from yellowish to greyish, more or less ochraceous when dry, consistency subcoriaceous to crustose.
Hyphal system monomitic with clamped, thin-walled hyphae, 2-4 µm in diam. Nakasone (1978: 18) reports that the species is dimitic in culture with skeletal hyphae.
Acanthophyses numerous, mostly subclavate, 30-40 x (4)5-7 µm, and with

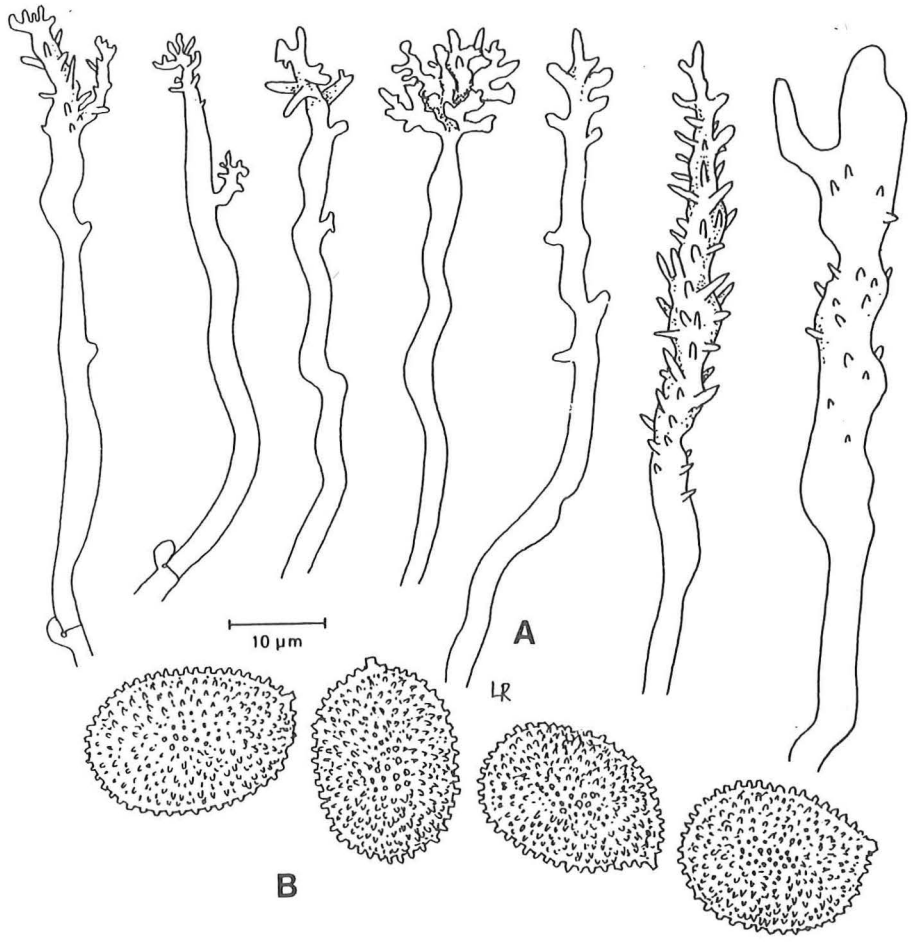


Fig. 18. *Aleurodiscus coralloides*, New Zealand, Wellington, Mount Tongariro, G.H. Cunningham, PDD 4971 (PDD). A) coralloid and cylindrical acanthophyses, B) basidiospores.

numerous protuberances at the apex.
Gloeocystidia numerous, more or less of the same size as the basidia, variable in form, but usually moniliform, hyaline or slightly yellowish and finely granulate.
Dendrohyphidia filiform to branched and with transitional stages to acanthophyses, 3-8 µm diam.
Basidia 40-50 x 7-8 µm, with 4 sterigmata.
Basidiospores 10-12 x 6-7 µm, ellipsoid to subcylindrical, smooth.
Cultural characteristics. See Boidin et al. (1968), Stalpers (1978), and Nakasone (1990).
Sexuality. Bipolar, see Boidin et al. (1968).
Substrata. Known from numerous hosts, both hardwoods and gymnosperms, such as *Abies, Juniperus, Thuja, Pseudotsuga, Salix, Quercus, Populus, Ulmus, Fraxinus, Amelanchier, Prunus, Buxus, Lavandula,* and *Lonicera*; see Ginns (1993) for further hosts.
Distribution. Circumpolar in the northern hemisphere from central Europe through Russia and Asia to North America.
Remarks. *A. cerussatus* is a variable species and several species have been described separated by rather small differences. *A. lapponicus* is primarily distinguished by less prominent acanthophyses.

Aleurodiscus coralloides G. Cunn. Fig. 18
Trans. Roy. Soc. New Zeal. 84: 259, 1956.
Basidiocarp adherent, at first disciform 1-2 mm diam., up to 0.5 mm thick, soon coalescing to form effused areas up to 15 x 3 cm, margin thinning out, indicated in colonies by deep crevices, texture cretaceous, hymenophore chalk-white, cream or pallid pink, deeply rimose, even or finely tuberculate.
Hyphal system monomitic, hyphae 3-6 µm diam., with clamps, lumen almost capillary, embedded crystals present.
Acanthophyses coralloid, branched, freely spinose with numerous protuberances, projecting, lumen capillary.
Gloeoecystidia absent.
Dendrohyphidia subclavate, scanty, buried in the context, 40-110 x 8-12 µm.
Basidia subclavate, often distorted, soon collapsing, 60-115 x 15-16 µm, bearing 4 sterigmata up to 20 µm long.
Basidiospores oval to subglobose, 18-25 x 16-22 µm, irregularly aculeate, spines up to 3 µm long.
Substrata. On dead branches of *Nothofagus* spp.
Distribution. New Zealand.
Remarks. The lack of cystidia separates this species from other species with coralloid acanthophyses.

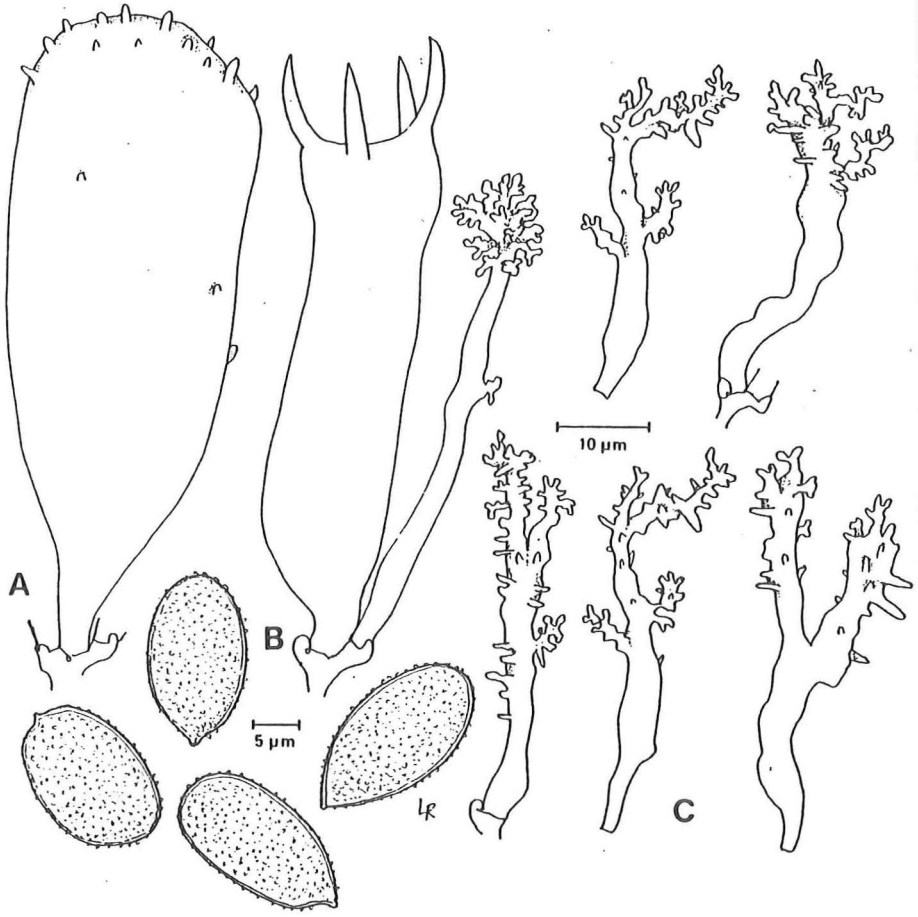


Fig. 19. *Aleurodiscus coronatus*, New Zealand, Auckland, Hunua, Range, March 1953, leg. J. Dingley, PDD 12585, Holotype (PDD). A) ornamented gloeocystidium, B) basidium and basidiospores, C) coralloid acanthophyses.

Aleurodiscus coronatus G. Cunn. Fig. 19
Trans. Roy. Soc. N. Z. 84: 262. 1956.
Basidiocarp effused, forming linear areas up to 10 x 1 cm, margin thinning out, white, fibrillose, texture coriaceous, hymenophore white to pallid cream, finally rimose.
Hyphal system monomitic, with clamped generative hyphae up to 4 µm in diam., embedded crystals present.
Acanthophyses coralloid, apically branched and covered with fine spines.
Gloeocystidia narrowly ovate, clavate or broadly fusiform, 50-80 x 20-28 µm, apically crowned with irregular spinous processes.
Basidia cylindrical, 50-65 x 12-14 µm, 4-sterigmate.
Basidiospores elliptical or obovate, strongly apiculate, 16-22(25) x 10-12 µm, finely ornamented.
Substrata. On bark of dead branches of *Cyathodes fasciculata* (Epacridaceae).
Distribution. New Zealand.
Remarks. The spinose-crowned cystidia are diagnostic.

Aleurodiscus cremicolor Hjortstam & Ryvarden Fig. 20
Nord. J. Bot. 2: 273, 1982.
Basidiocarp corticioid, thin, composed of irregular, confluent patches, hymenophore cream-coloured, at first pulverulent, when fully developed more or less ceraceous, margin indeterminable.
Hyphal system monomitic, hyphae thin- to moderately thick-walled, sparsely branched, 2.5-3 µm diam. Basal hyphae more or less horizontal, closely packed into a thin and inconspicuous subiculum, all hyphae without clamps.
Acanthophyses absent.
Gloeocystidia abundant, variable in shape, usually mammillate and with a granular content, apparently not darkening in sulphovanillin, about 40-60 x 7-10 µm.
Dendrohyphidia projecting between the basidia, simple septate, scarcely branched, 2.5-3 µm diam.
Basidia more or less clavate, about 30-40 x 6-7 µm, usually with 4 sterigmata.
Basidiospores ellipsoid, verruculose to echinulate, 12-14 x 6-8 µm.
Substrata. On hardwoods and ferns.
Distribution. Known from the type locality in Thailand and also from Nepal.
Remarks. The distinguishing characteristics are the simple septate hyphae, numerous gloeocystidia and the verruculose basidiospores. It resembles *A. aurantius*, but this species has larger basidiospores.

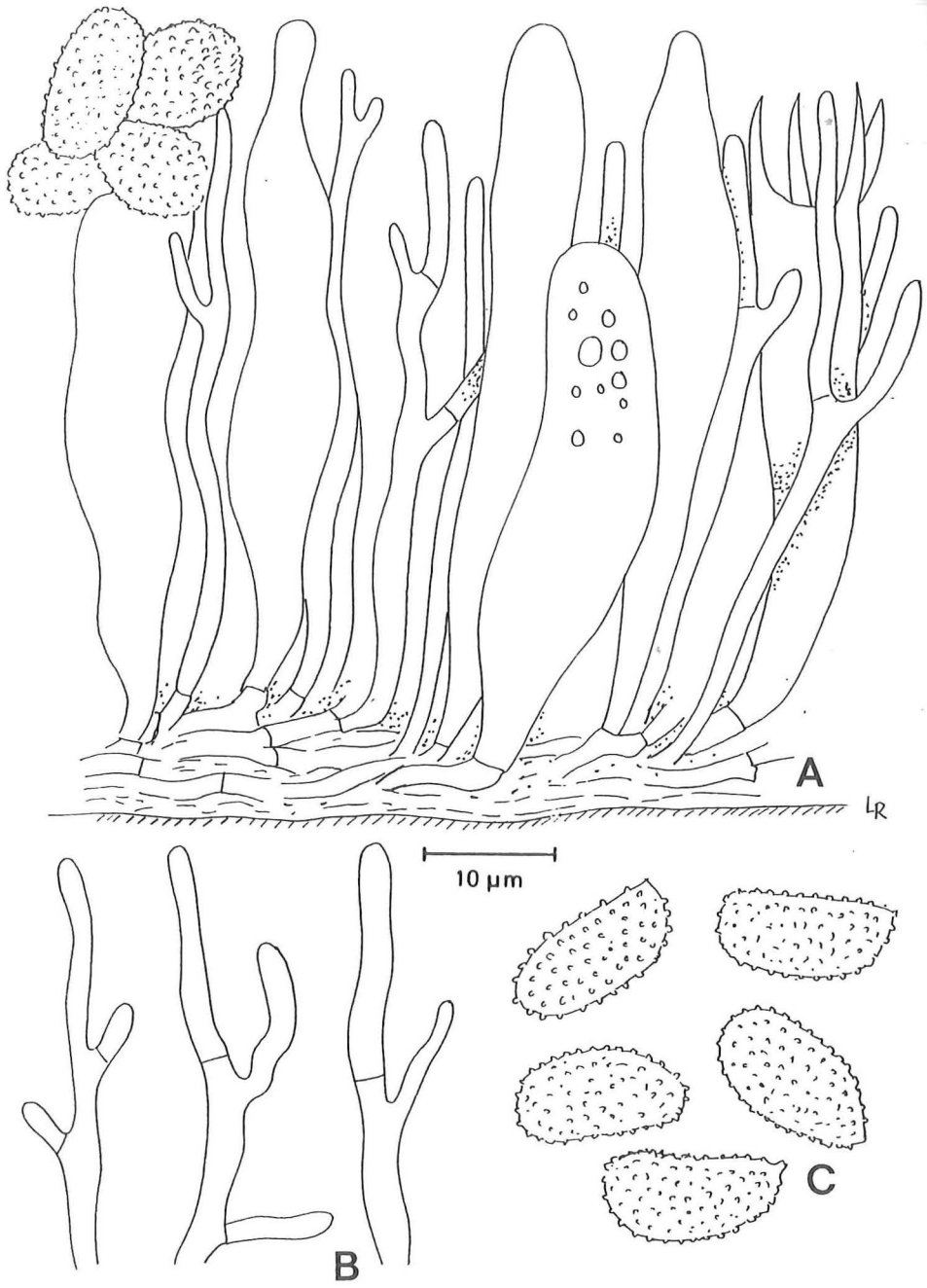


Fig. 20. *Aleurodiscus cremicolor*, Thailand, Cangwat Chiang-mai, Doi Suthep, 18 February 1979, Ryvarden 17749, Holotype (O). A) part of the hymenium, B) dendrohyphidia, C) basidiospores.

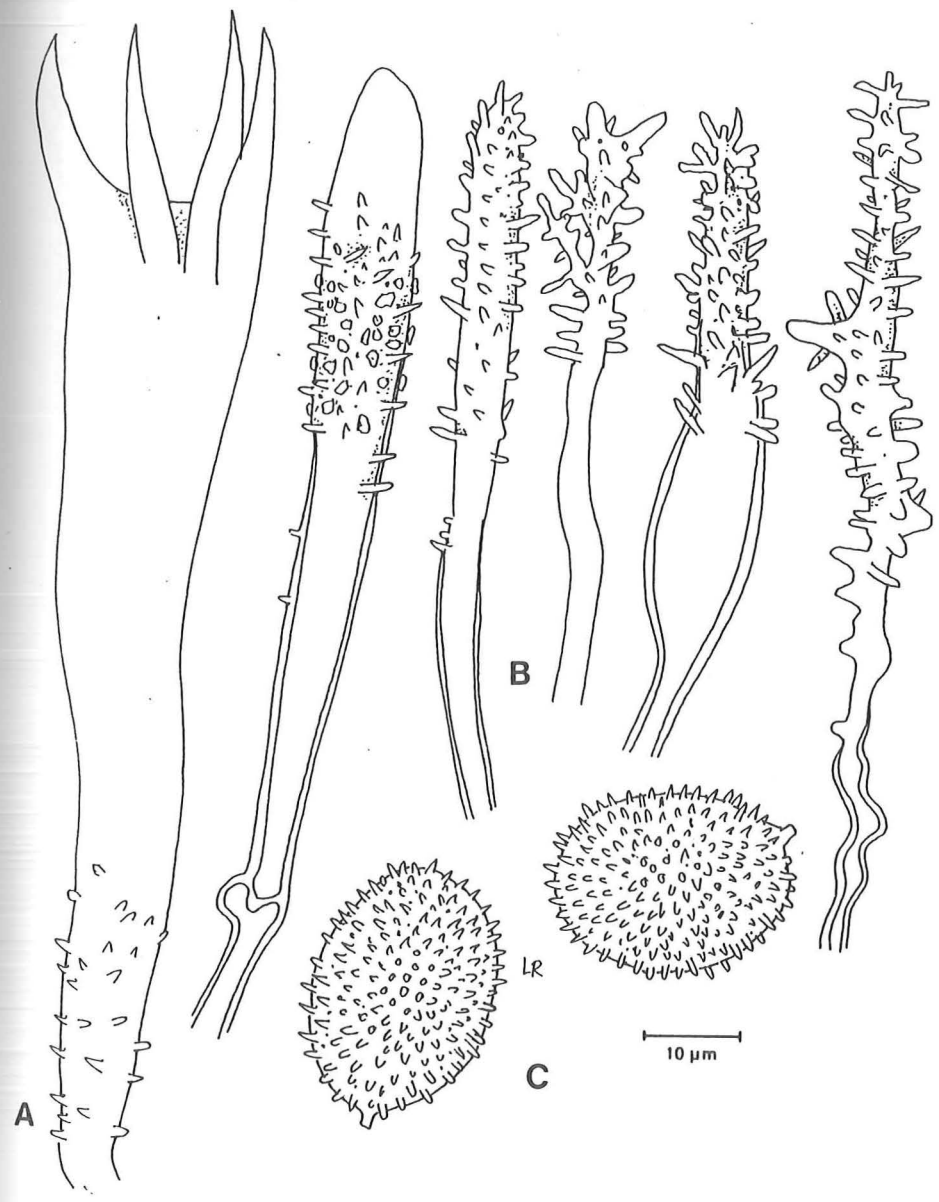


Fig. 21. *Aleurodiscus croceus*, Ecuador, February 1892, leg. Lagerberg (FH). A) ornamented basidium, B) acanthophyses, C) basidiospores.

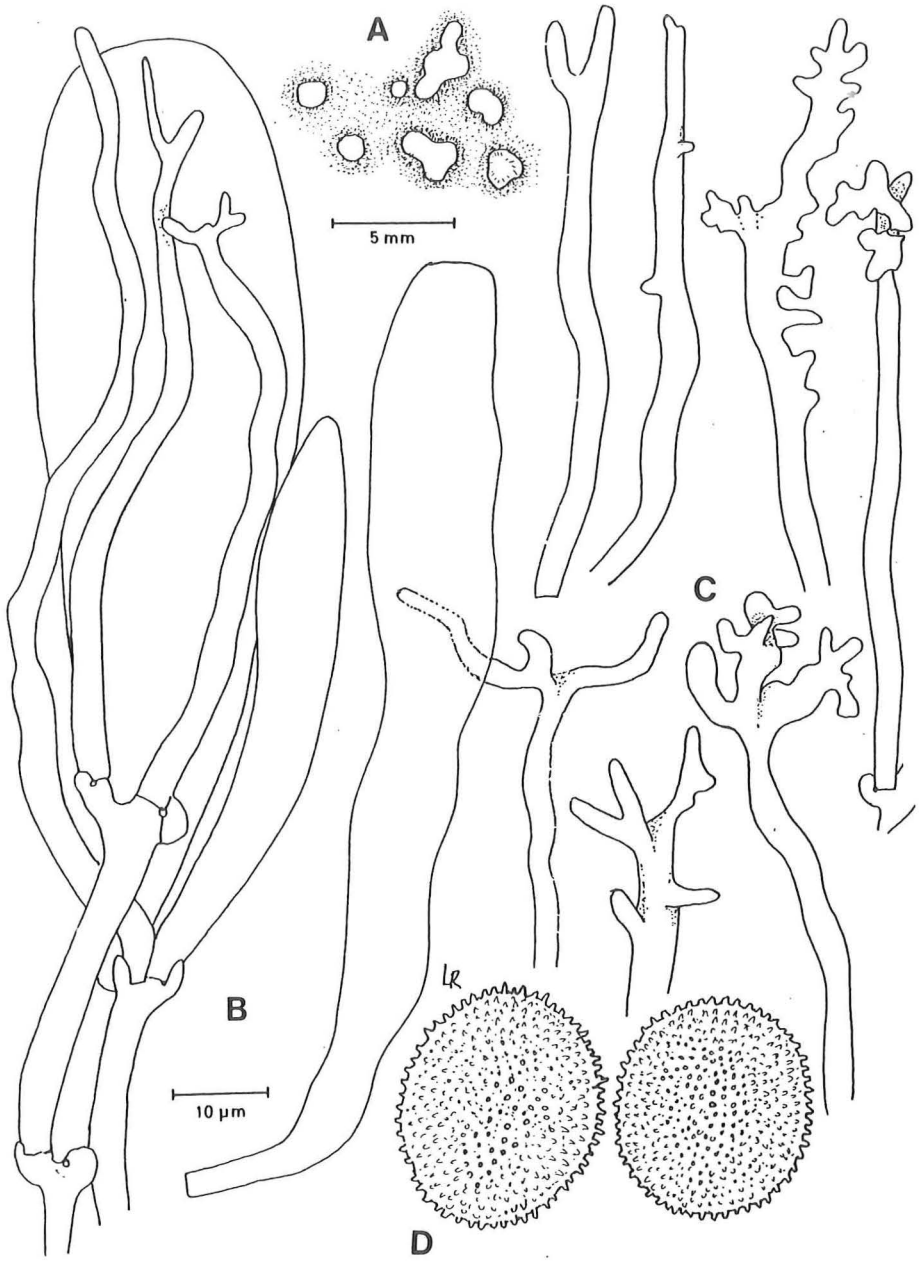


Fig. 22. *Aleurodiscus cupulatus*, USA, Idowa, Priest river, 10 March 1970, R. Petersen 4657, Holotype (TENN). A) basidiocarps, B) part of the hymenium with paraphyses and gloeocystidia, C) dendrohyphydia, D) basidiospores.

Aleurodiscus croceus Pat. Fig. 21
Bull. Soc. mycol. Fr. 9: 133, 1893.
Basidiocarp disciform to cupulate, separable, 1-3 mm in diam., to confluent patches, up to 0.6 mm thick, margin slightly reflexed, brittle and farinose, hymenophore white to pale ochraceous with some grey tints, abhymenial surface whitish, tomentose.
Hyphal system monomitic, generative hyphae with clamps, 2-4 µm wide, those of the subhymenium and subiculum smooth, those of the abhymenial surface club-like and with numerous small protuberances.
Acanthophyses numerous, cylindrical, thick-walled, 6-12 µm diam., in the upper part with numerous protuberances, partly dissolving in KOH.
Gloeocystidia embedded, flexuous-cylindric, often slightly pointed and widened in the apical part, yellow in KOH, 60-160 x 7-10 µm.
Basidia 100-180 x 12-20 µm, with 4 sterigmata up to 25 µm long and some scattered protuberances at the base.
Basidiospores subglobose to globose, 20-25 x 17-22 µm, slightly thick-walled, variably asperulate.
Substrata. The type came from *Melastoma puctularia*; later collected on numerous unidentified deciduous trees.
Distribution. Known from Ecuador, Costa Rica, Argentina and Colombia, but is probably widespread in South America; also recorded from USA (Arizona) (Ginns 1993).
Remarks. This species is related to *A. mirabilis*, which however has larger, navicular basidiospores and decidedly more hydnoid acanthophyses. *A. ochraceo-flavus* differs in possessing smaller and distinctly ellipsoid basidiospores.

Aleurodiscus cupulatus Núñez & Ryvarden sp. nov. Fig. 22
Fructificatio cupulatae, hymenio cremicolori, contextus dimiticus cum hyphae skeletales, hyphae generatoriae fibulatae vel afibulatae, dendrohyphidia et hyphae paraphysiodeae praesentes, basidia clavatae, 80-120 x 12-22 µm, sporae ellipsoidibus, verrucosae, amyloidibus, 22-26 x 17-20 µm.
Holotypus: USA, Idaho, Priest River, Coolin Dump, 3 Oct.1970, on *Pseudotsuga menziesii*, leg. R.H. Petersen 4657, Herb. TENN 34696, isotype in Herb. O.
Basidiocarps cupulate and pendant, round, 1-3 mm diam., in dry condition with a curled margin, abhymenial surface tomentose, pale sand-coloured, probably more or less white when fresh, marginal hairs present, hymenophore smooth, pale sand-coloured.
Hyphal system pseudodimitic, generative hyphae both with clamps and simple septa, in the context thick-walled, up to 8 µm wide and with simple septa ending in long unbranched sections which are interpreted as skeletal hyphae, in the subhymenium thin-walled and both with clamps and simple septa, 2-6 µm wide.
Acanthophyses absent.
Gloeocystidia clavate with a round to pointed apex, 65-90 x 10-18 µm, in some cases difficult to separate from immature basidia.

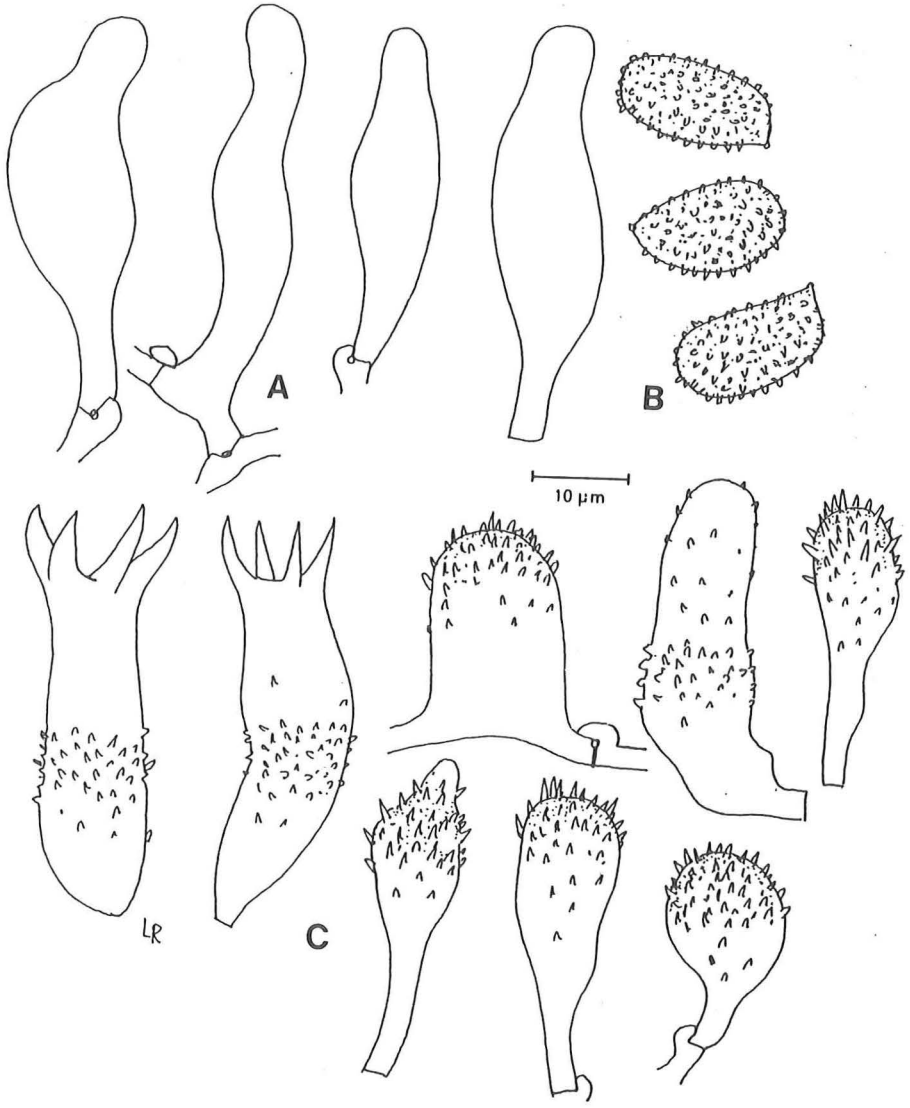


Fig. 23. *Aleurodiscus delicatus*, England, Norfolk, Wheaften Broad, K. Ellis, 1. February 1948, Holotype (K). A) gloeocystidia, B) basidiospores, C) ornamented basidia and acanthophyses.

Dendrohyphidia present as sparsely branched hyphae in the hymenium, may also be interpreted as branched paraphyses, 60-120 µm long, both with clamps and simple septa at their bases.
Basidia with clamps at their bases, 100-120 x 12-22 µm, clavate with 4 sterigmata.
Basidiospores ellipsoid to subglobose, warted, 22-26 x 17-20 µm.
Substrata. Known only from *Pseudotsuga*.
Distribution. Known only from the type locality.
Remarks. This is a remarkable species with small, pendant, hairy, cupulate basidiocarps, very thick-walled hyphae, and two types of septation in the generative hyphae. It seems to occupy an isolated position in the genus.

Aleurodiscus delicatus Wakef. Fig. 23
Trans. Br. Mycol. Soc. 35: 44, 1952.
Basidiocarp corticioid in small oval patches with no distinct margin, very thin and delicate, texture pulverulent, hymenophore whitish or pale peach-pink.
Hyphal system not distinctly seen, obscured by dense, rhomboidal crystals, but clamps are present.
Acanthophyses rounded or pear-shaped, apically brush-like, resembling the cheilocystidia of some species of *Mycena*.
Gloeocystidia possibly present, flexuous, difficult to separate from immature basidia.
Basidia subcylindrical to urniform or ampulliform, 25-30 x 10-11 µm, somewhat constricted and with protuberances in the middle, bearing 4 subulate sterigmata 8-9 µm long.
Basidiospores elliptical, 13-15 x 7-8 µm, depressed on the inner side, with a small, oblique apiculus, minutely and closely echinulate.
Substrata. On dead leaves of *Cladium mariscus*.
Distribution. Known from England (Norfolk) and Germany.
Remarks. The species seems to be related to *A. phragmitis* which also grows on dead herbs, but is separated by larger basidiospores and lack of acanthophyses.

Aleurodiscus dendroideus Ginns Fig. 24
Can. Field Nat. 96: 131, 1982.
Basidiocarp cupulate, up to 1.5 mm diam., sessile, attached by a central, white radiating base up to 0.5 mm diam., margin white, determinate, of fine granulose-appearing hairs that extend slightly over the edges of the hymenophore, the latter pale yellow to yellow, finely granulose, slightly convex, context pure white.
Hyphal system monomitic, hyphae rather frequently branched, thin- to thick-walled with clamps, 4-5 µm wide.
Acanthophyses numerous, cylindrical, thin-walled, 4-5 µm diam., with a dendroid head up to 60 x 12 µm, faintly amyloid in Melzer's reagent.

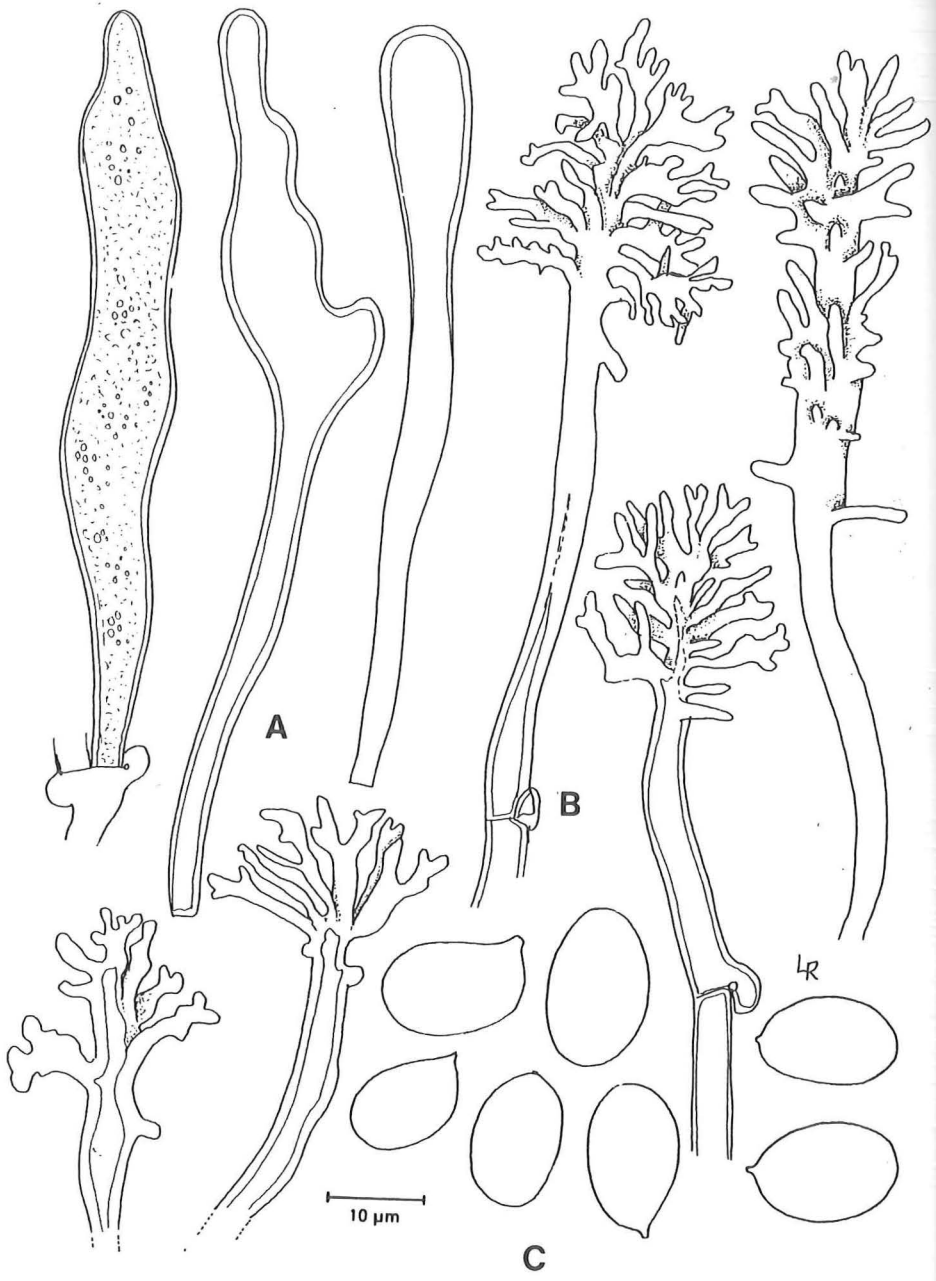


Fig. 24. *Aleurodiscus dendroideus*, Canada, Alberta, High Level, E. Gautreau, 3 September 1964, CFB 6329, Holotype (ALTA). A) gloeocystidia, B) acanthophyses, C) basidiospores.

Gloeocystidia narrowly clavate, occasionally cylindrical to mammillate, up to 8.5 µm diam., slightly thick-walled, up to 120 µm long.
Basidia narrowly clavate, 140-150 x 12-13 µm, tapering to an essentially cylindrical base 4 µm wide, with 4 sterigmata up to 11 µm long.
Basidiospores ovoid to broadly ellipsoid, sometimes slightly flattened adaxially, (15)16-18 x 9.5-11 µm, smooth,with a broad, blunt apiculus.
Substrata. Known only from *Picea glauca*.
Distribution. Only known from the type locality in Canada (Alberta and British Colombia) (Herb GB, Eriksson 7216).
Remarks. The almost antler-shaped acanthophyses make this a very distinct species.

Aleurodiscus dextrinoideocerussatus Moreno, Blanco & Manjón Fig. 25
Mycotaxon 39: 351, 1990.
Basidiocarps corticioid, effused as elongated patches, margin indistinct, hymenophore smooth, white to cream, slightly rimose when dry.
Hyphal system monomitic, generative hyphae with clamps, hyaline, thin-walled, 2-4 µm wide.
Acanthophyses apically richly branched with dextrinoid apices.
Gloeocystidia smooth, moniliform, 70-100 x 6-10 µm.
Basidia clavate, up to 50 x 8 µm, with 4 sterigmata.
Basidiospores subcylindrical to ellipsoid, smooth, thin-walled, 7-10 x 4-7 µm.
Substrata. On dead hardwoods and conifers; type collected on *Alnus glutinosa*; also collected on *Juniperus, Rhododendron, Quercus,* and *Salix*, up to 4000 m in Nepal.
Distribution. Known from Spain and Italy.
Remarks. The species is microscopically identical to *A. cerrusatus* but is separated by the dextrinoid apices of the acanthophyses. Cultural studies will eventually confirm if this is a phenotypic variation or genetically fixed. This species is problematic as it makes the distinction between *Aleurodiscus* and *Vararia* rather vague, since the latter genus is characterized by dextrinoid dichohyphidia (see Parmasto 1970) and contains many species with amyloid basidiospores. It is only the shape of the acanthophyses which excludes this species from *Vararia,* where the dichohyphida are normally more strongly branched than the acanthophyses of *A. dextrinoideocerussatus* (see Hallenberg 1985). Personally we are not convinced that the species will be retained in *Aleurodiscus* when cultural and molecular examinations are made.

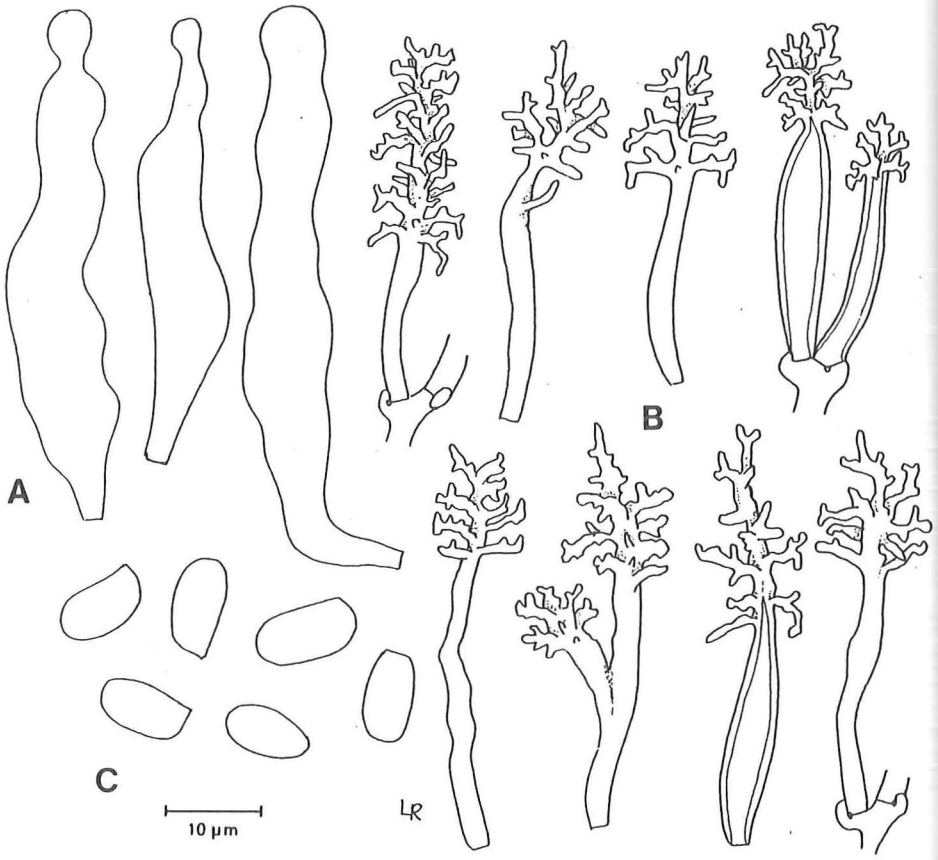


Fig. 25. *Aleurodiscus dextrinoideocerussatus*, Italia, Circeo Nat. Park, Hjortstam 15147C (GB). A) gloeocystidia, B) acanthophyses, C) basidiospores.

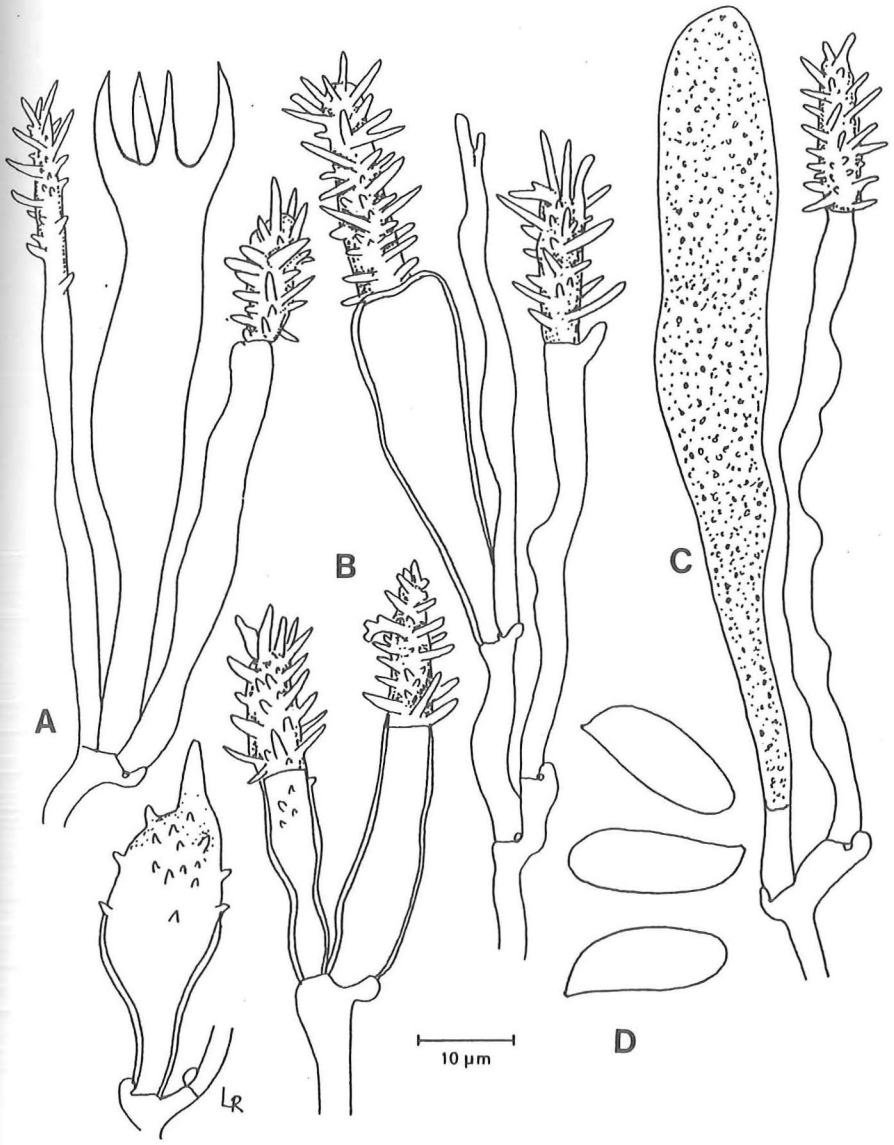


Fig. 26. *Aleurodiscus diffisus*, USA, Arizona, Cochirse County, Coronado Nat. Forest, 14 May 1971, E. Canfield (ARIZ). A) part of the hymenium, B) acanthophyses, C) gloeocystidia, D) basidiospores.

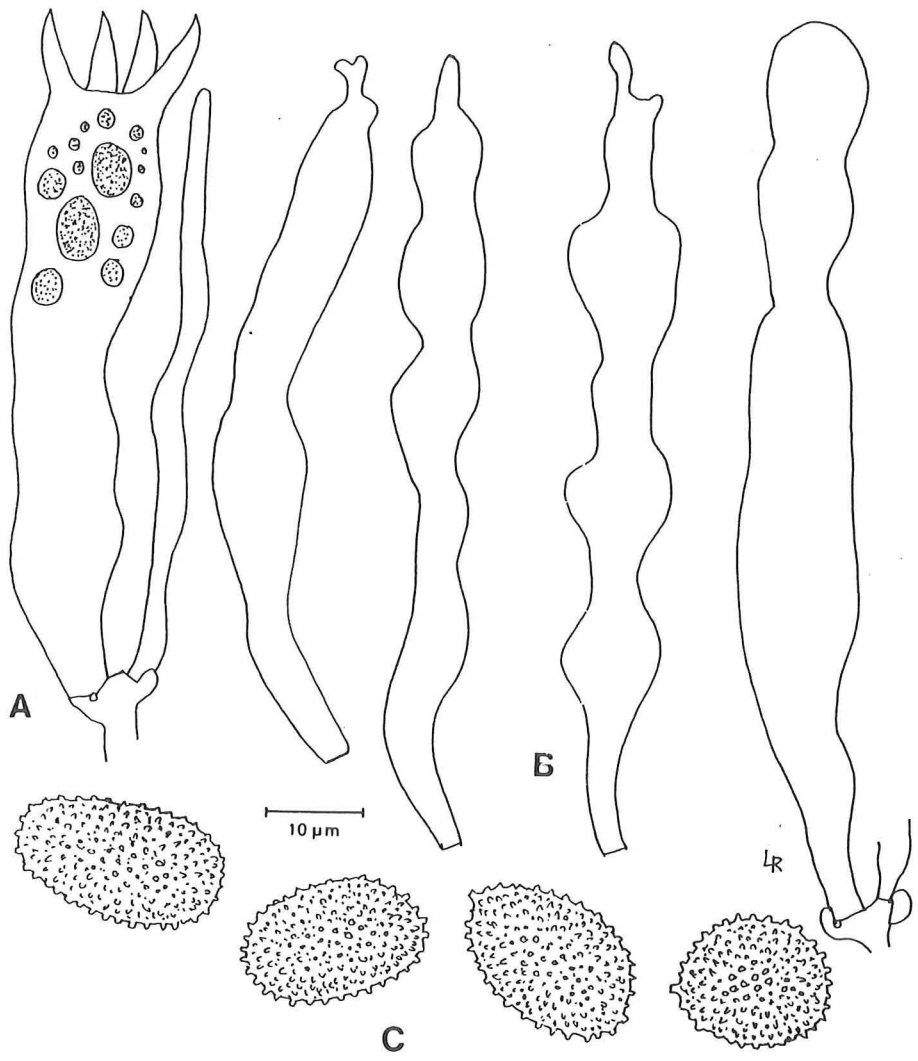


Fig. 27. *Aleurodiscus disciformis*, Norway, Telemark, Drangedalen, Skultrevannsåsen, 10 October 1986, L. Ryvarden 24104 (O). A) basidium, B) gloeocystidia, C) basidiospores.

Aleurodiscus diffisus (Sacc.) Burt Fig. 26

Ann. Mo. Bot. Gard. 18: 485, 1931. - *Peniophora diffisa* Sacc., Bull. Roy. Soc. Bot. Bel. 28: 79, 1889.

Basidiocarp at first pulvinate in orbicular patches 1-3 mm diam., readily forming irregular, effused patches, up to 0.7 mm thick, margin determinate, thick, often slightly reflexed, texture compact-farinose to subcoriaceous, hymenophore cream to fuscous-grey, drying deeply rimose to areolate, subiculum darker.

Hyphal system monomitic, with scattered clamped hyphae, 4-4.5 µm diam., those in the subiculum with partially thickened walls.

Acanthophyses abundant, filiform to subclavate, 45-80 x 3-8.5 µm, upper part with numerous pointed protuberances, basal part often thick-walled and separated from upper part by an adventitious septum, yellowish to pale brown in KOH.

Gloeocystidia scattered, flexuous-cylindric to subclavate, 80-100 x 7-9(11) µm, mostly embedded, with partially thickened walls, frequently apically moniliform, yellowish in KOH.

Basidia flexuous-cylindric to subclavate, 80-100 x 7-9 µm, with 4 sterigmata.

Basidiospores cylindrical to suballantoid, (10)12-18 x 5-7 µm, flattened adaxially, smooth.

Substrata. On dead branches of Ericaceae species, also *Juglans, Juniperus, Quercus* and *Lycium*.

Distribution. Eastern part of North America, Siberia and Manchuria in China.

Remarks. This species is distinguished from *A. cerussatus* by having larger basidiobasidiospores and longer, pointed protuberances. *A. macrocystidiatus* is closely related and found on the same substrata, but possesses conspicuous, clavate to ampulliform cystidia, and differs in the spore details.

Aleurodiscus disciformis (DC.: Fr.) Pat. Fig. 27

Bull. Soc. mycol. Fr. 10: 80, 1894. - *Thelephora disciforme* DC.: Fr., Syst. mycol. 1: 443, 1821. - *Thelephora disciforme* DC., in Lamarck & Poiret, Encylop. Meth. Bot. p. 31, 1815.

Basidiocarp discoid to stereoid, with the margin slightly loosened from the substrate, usually a few cm in diam., more rarely coalesced into larger basidiocarps 1-1.5 cm thick, hymenophore more or less finely tuberculate, when dry often rimose, whitish to light grey, sometimes with yellow tinges, consistency dense and hard.

Hyphal system monomitic with clamped, thin- to thick-walled hyphae, 2.5-3.5 µm in diam., in the subiculum with thickened walls and clamps which can be difficult to demonstrate; these hyphae may superficially be called skeletal hyphae; below the subhymenium the hyphae are usually covered with angular crystals.

Acanthophyses absent.

Gloeocystidia cylindrical to more commonly moniliform, 60-120 x 5-10 µm, smooth or usually abundantly covered with crystals.

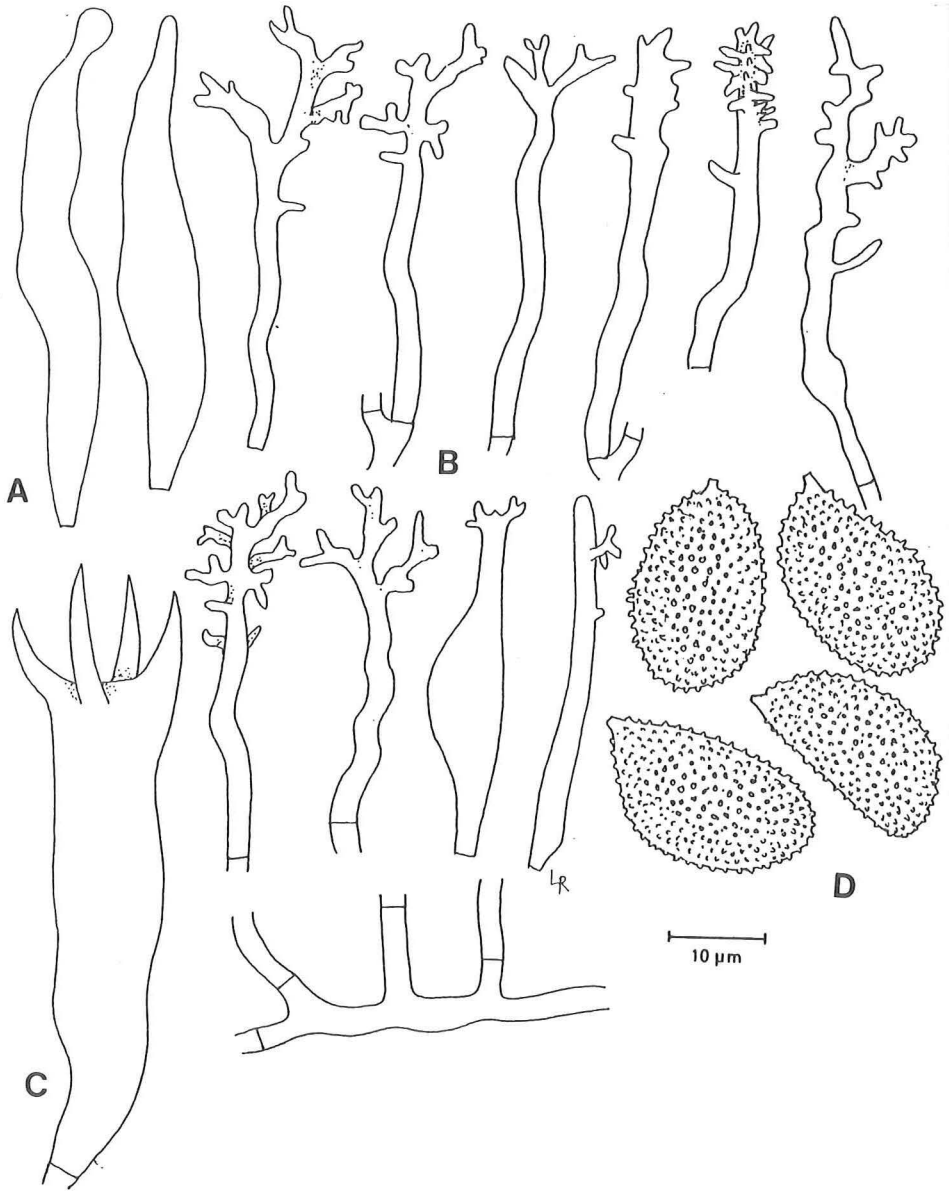


Fig. 28. *Aleurodiscus exasperatus*, Brazil, Ihla de Cardoso, Hjortstam 16107 (O). A) gloeocystidia, B) dendrohyphidia, C) basidium, D) basidiospores.

Basidia about 65-75 x 8-10 µm, smooth, with 4 sterigmata.
Basidiospores 15-17 x 10-12 µm (in KOH to 20 x 13 µm) µm, subglobose to ellipsoid, covered with rounded irregular warts.
Cultural characteristics. See Boidin et al. (1968).
Sexuality. Tetrapolar, see Boidin et al. (1968).
Substrata. Usually on the bark of old *Quercus* trees, often 1-5 m above the ground, but also recorded from hosts like *Acer, Tilia* and *Cinnamomeum*.
Distribution. Temperate species which seems to follow the genus *Quercus* (though absent from the British Isles). From southern part of Fennoscandia to the Mediterranean area, through Russia and Japan, to eastern part of North America.
Remarks. The species is easy to recognize by its thick pulvinate to stereoid basidiocarps with a pale cream to greyish colour.

Aleurodiscus exasperatus Hjortstam & Ryvarden Fig. 28
Mycotaxon 47: 83, 1993.
Basidiocarp corticioid, adnate, approximately 0.1-0.2 mm thick, more or less coriaceous, confluent, hymenophore smooth or slightly pulverulent, cream-coloured or with a greyish tint, with age pale brown, margin indeterminate.
Hyphal system monomitic, hyphae thin-walled, moderately branched, (2.5-)3-3.5 µm wide, forming a rather dense subiculum, all hyphae without clamp-connections.
Acanthophyses very few and with transitions to moderately branched dendrohyphidia, amyloid in the apical part.
Gloeocystidia generally numerous, thin-walled and with granular content, 50-80 x 8-12 µm, blackish in sulphoaldehyde, basally often with several protuberances.
Dendrohyphidia numerous, projecting slightly above the basidia, richly branched, smooth to slightly encrusted, slightly amyloid in the upper part, but the reaction is weak.
Basidia clavate, large, 70-100 µm long or sometimes longer, with a width of 12-15 µm just below the 4 stout sterigmata, without a basal clamp.
Basidiospores ellipsoid to somewhat fusoid, thin-walled or with slight wall thickening, 20-23 x 8-10 µm, appearing smooth in KOH but slightly rugose to strongly ornamented in Melzer's reagent.
Substrata. Known only from dead hardwood of unknown identity.
Distribution. Known from southern Brazil and northern Argentina.
Remarks. *A. exasperatus* is similar to *A. aurantius*. It differs primarily in its spore-shape and gloeocystidia. In the latter species the basidiospores are ellipsoid, never fusoid, and are distinctly echinulate to verrucose. In addition, the gloeocystidia are moniliform at the apex. Macroscopically it is also reminiscent of species of *Vuilleminia*, but otherwise it is clearly defined by the amyloid basidiospores and sulpho-positive gloeocystidia.

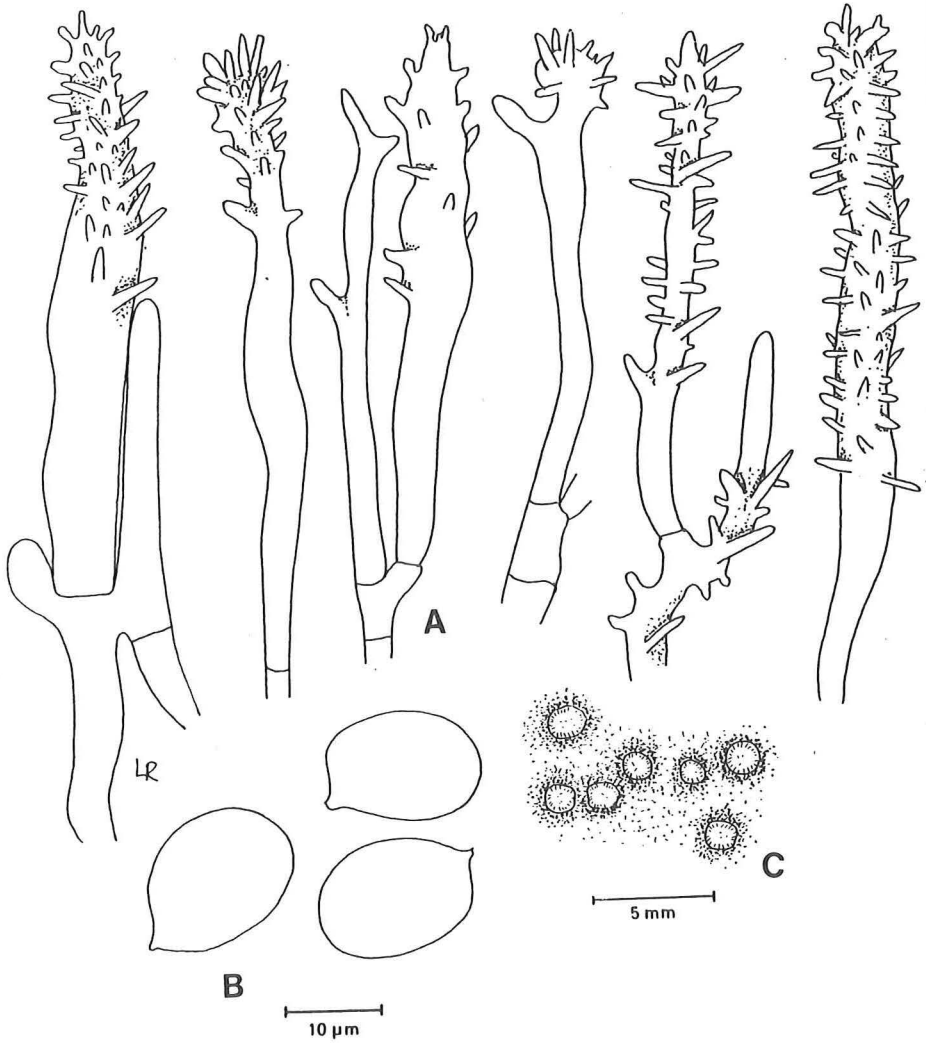


Fig. 29. *Aleurodiscus farlowii*, Canada, Ontario, Aurora, H. Jackson, 23 June 1937, TRTC 12678, Holotype (FH). A) acanthophyses, B) basidiospores, C) basidiocarps.

Aleurodiscus farlowii Burt Fig. 29

Ann. Mo. Bot. Gard. 5: 182, 1918. - *Aleurodiscus piceinus* Lyon & P.A. Lemke, Can. J. Bot. 42: 264, 1964.

Basidiocarp disciform, 0.5-1.5 mm diam., up to 0.6 mm thick, or confluent, margin determinate, raised, rounded as a slightly swollen ring, distinctly paler than the fertile hymenophore, farinose-pulverulent to subcoriaceous, hymenophore continuous, convex, whitish cream, drying light-buff.

Hyphal system monomitic, generative hyphae simple-septate, thin- to thick-walled in the subiculum.

Acanthophyses numerous, cylindrical to subclavate, hyaline to pale yellow, with numerous etereter protuberances in the upper part, upper part often slightly thick-walled, 4.5-8 µm diam., often slightly amyloid.

Gloeocystidia (or immature basidia) scattered to inconspicuous, flexuous-cylindric, without moniliform constrictions, 100-220 x 10-15 µm.

Basidia subclavate, 75-90 x 14-20 µm, occasionally with a few protuberances, 4-sterigmate.

Basidiospores ovoid, 15-19 x 11-14 µm, smooth, slightly flattened adaxially.

Substrata. On recently dead twigs of living *Abies*, *Tsuga* and *Pseudotsuga*.

Distribution. Canada and USA.

Remarks. This species is very closely related to *A. fennicus*, which is separated by having smaller basidiospores.

Aleurodiscus fennicus Laurila Fig. 30

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

Basidiocarp discoid to effused, usually small, rarely more than 1 cm diam. and up to 0.5 mm thick, margin sharp and somewhat reflexed, narrow, white and finely tomentose, hymenophore smooth, pale grey to pale pink brown or isabelline, soft when young, firmer with age.

Hyphal system monomitic with intertangled, thin-walled and simple septate hyphae, 2-3.5 µm diam., in an open texture.

Acanthophyses very abundant and very variable in shape and size, clavate to hyphoid, apically with numerous protuberances, in some cases with protuberances in the middle part while the apex is smooth, some more irregular and almost like dendrohyphidia.

Gloeocystidia scattered, clavate and mostly with a slightly tapering apex or almost hyphoid in shape, faintly yellowish in KOH.

Dendrohyphidia few and there are transitions to slender acanthophyses.

Basidia 60-70 x 10-12 µm with 4 large sterigmata, protoplasm distinctly refractive in phase-contrast (as are the basidiospores).

Basidiospores ovoid, smooth, 15 -17 x 8-10 µm.

Substrata. On dry, quite thin (2-10 mm) branches of *Picea* sp.

Distribution. Circumpolar in the boreal coniferous zone, but evidently very rare. In Europe only known from Sweden and Finland, recorded from Siberia,

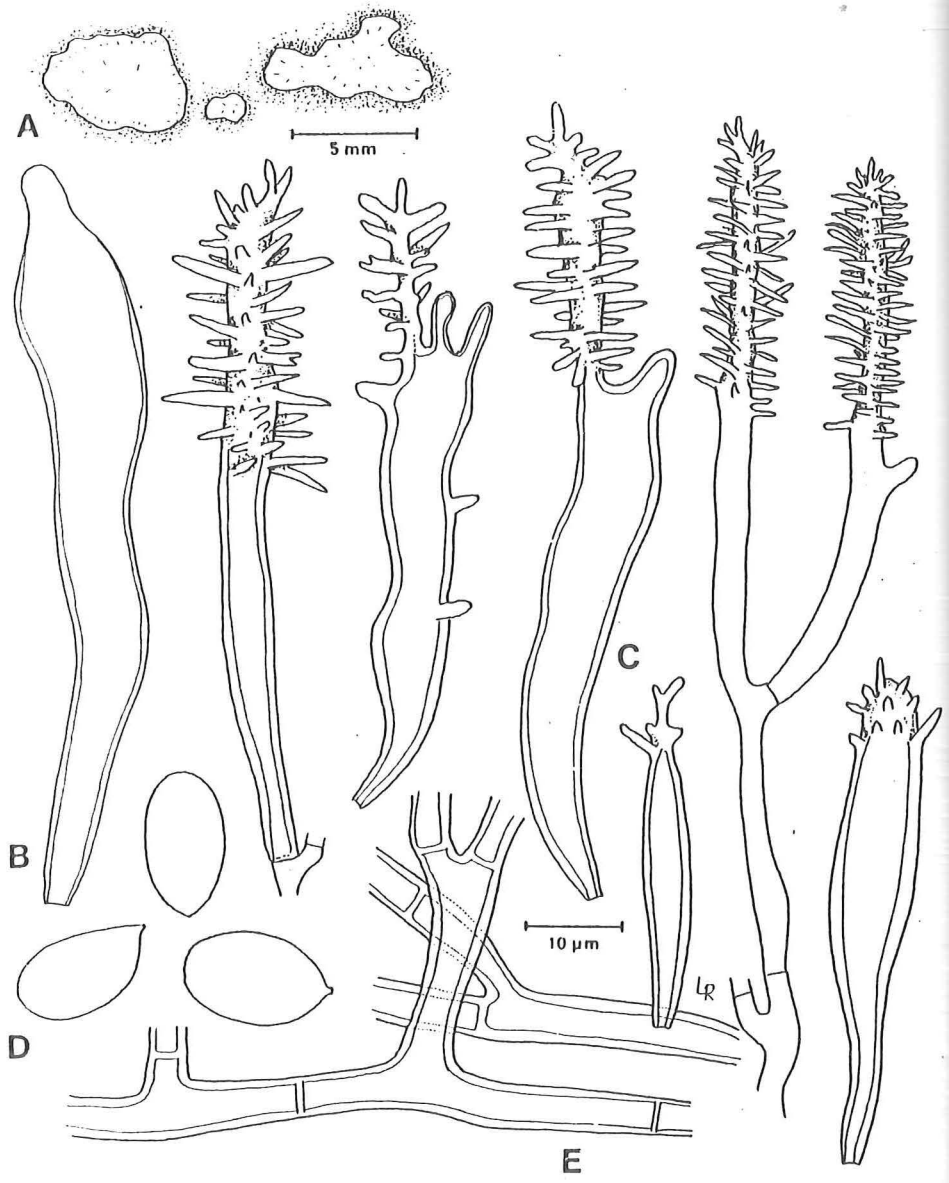


Fig. 30. *Aleurodiscus fennicus*, Finland, Satakunta, Kankaanpää, 14 June 1935, Laurila, Holotype (H). A) basidiocarps, B) gloeocystidium, C) acanthophyses, D) basidiospores, E) hyphae in the subiculum.

USA and Canada.
Remarks. The species is recognized by its host, the large smooth basidiospores and the simple-septate hyphae.

Aleurodiscus fruticetorum W.B Cooke Fig. 31
Mycologia 35: 281, 1943.
Basidiocarp substereoid, effuse-reflexed, up to 1 mm thick, without a cuticle layer, margin reflexed up to 1 cm, deflexed on drying, texture subceraceous, hymenophore drying orange-buff, abhymenial surface pale greyish, conspicuously tomentose to cottony continuing into similar margin.
Hyphal system dimitic, with simple-septate and partially thick-walled generative hyphae, 2.5-3.5 µm diam., skeletal hyphae only found in the subiculum, semi-solid, aseptate, unbranched, about 4 µm diam., agglutinate on the abhymenial surface forming a trichoderm.
Acanthophyses clavate to subfusiform, 35-55 x 4-8 µm, thin-walled with tiny to small protuberances in the apical part.
Gloeocystidia embedded-cylindrical to emergent-clavate, with a yellow grainy content, 70-80(120) x 7-10 µm, apices often mammillate.
Basidia clavate, 60-70 x 7-9(11) µm, bearing 4 sterigmata and small protuberances in the middle part.
Basidiospores ellipsoid, 10-13 x 5.5-7 µm, smooth.
Substrata. Collected on *Arctostaphylos, Artemisia* and *Ceanothus* at 2000 m elevation.
Distribution. USA (California).
Remarks. This species, together with *A. utahensis, A. ahmadii, A. cupulatus,* and *A. oakesii,* exhibits a tendency toward dimiticism and a stereoid habit.

Aleurodiscus fuegianus Núñez & Ryvarden sp. nov. Fig. 32
Fructificatio resupinata, tenuis, hymenio pallide brunneus, hyphae generatoriae sine fibulis, acanthophyses et dendrohyphidia nulla, skeletocystidia praesentes, sporae ellipsoidibus, hyalinae, leves, amyloideae, 12-15 x 6-8 µm.
Holotype: Argentina, Tierra del Fuego, Monte Olivia, 23 February 1982, on dead *Nothofagus*, Ryvarden 19494. Herb. O, isotypes in K and GB.

Basidiocarp stereoid, effused, undulating, separable, up to 7 cm long, margin lifted and distinct, fragile and slightly radially cracked with age, hymenophore pale brown, smooth to slightly tuberculate, subiculum white and cottony, distinctly contrasting with the hymenium in section.
Hyphal system monomitic, generative hyphae with simple septa, thin-walled, 3-5 µm wide and difficult to observe in the subhymenium, thick-walled in the subiculum, 4-10 µm, angular crystals present obscuring the basal structure.
Acanthophyses and **dendrohyphidia** absent.
Gloeocystidia absent.
Skeletocystidia present as long hyphal ends originating in the subhymenium, thick-walled, slightly torulose or sinuous, up to 10 µm wide and 180 µm long.

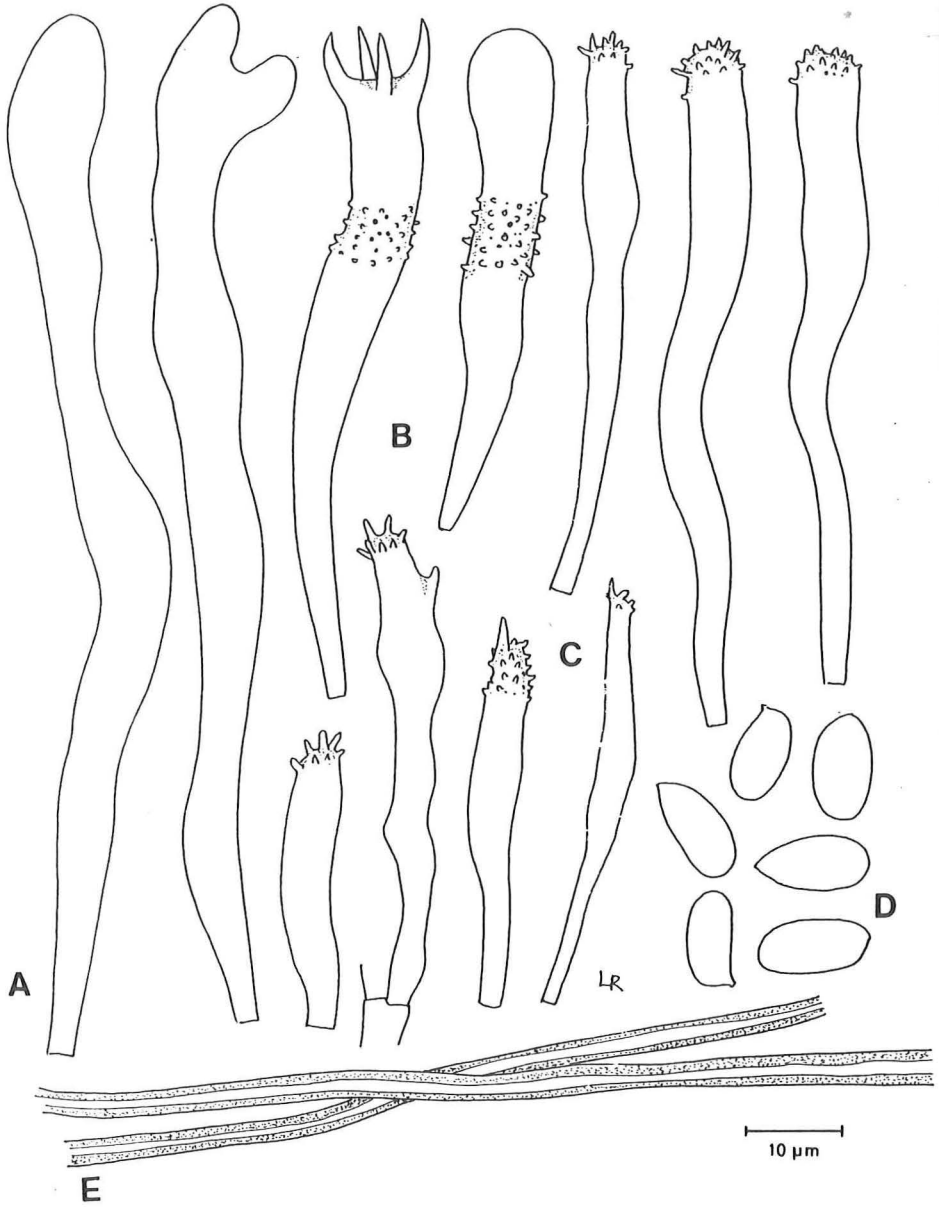


Fig. 31. *Aleurodiscus fruticetorum*, USA, California, Mount Shasta, 18 August 1941 (FH). A) gloeocystidia, B) ornamented basidium and basidiol, C) acanthophyses, D) basidiospores, E) hyphae in the subiculum.

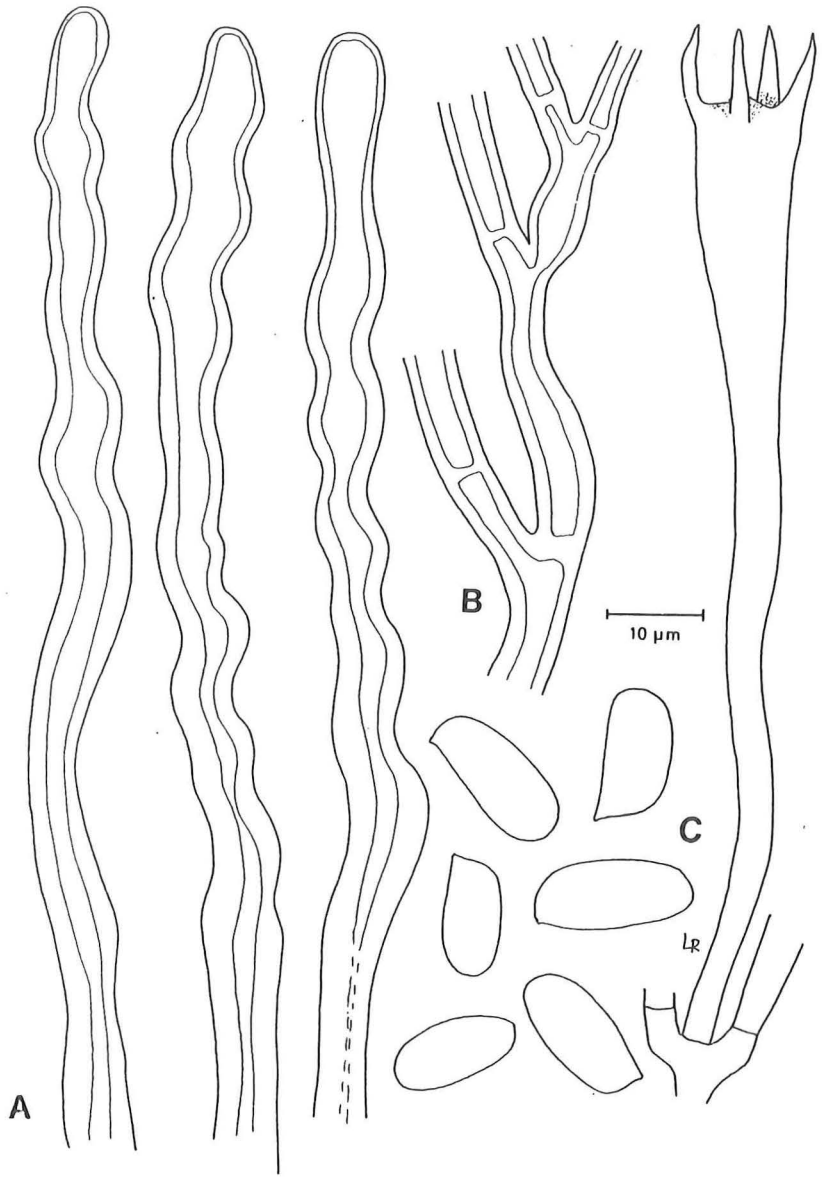


Fig. 32. *Aleurodiscus fuegianus*, Argentina, Tierra del Fuego, Monte Olivia, 23 February 1982, on dead *Nothofagus*, Ryvarden 19494, Holotype (O). A) skeletocystidia, B) hyphae in the subiculum, C) basidium and basidiospores.

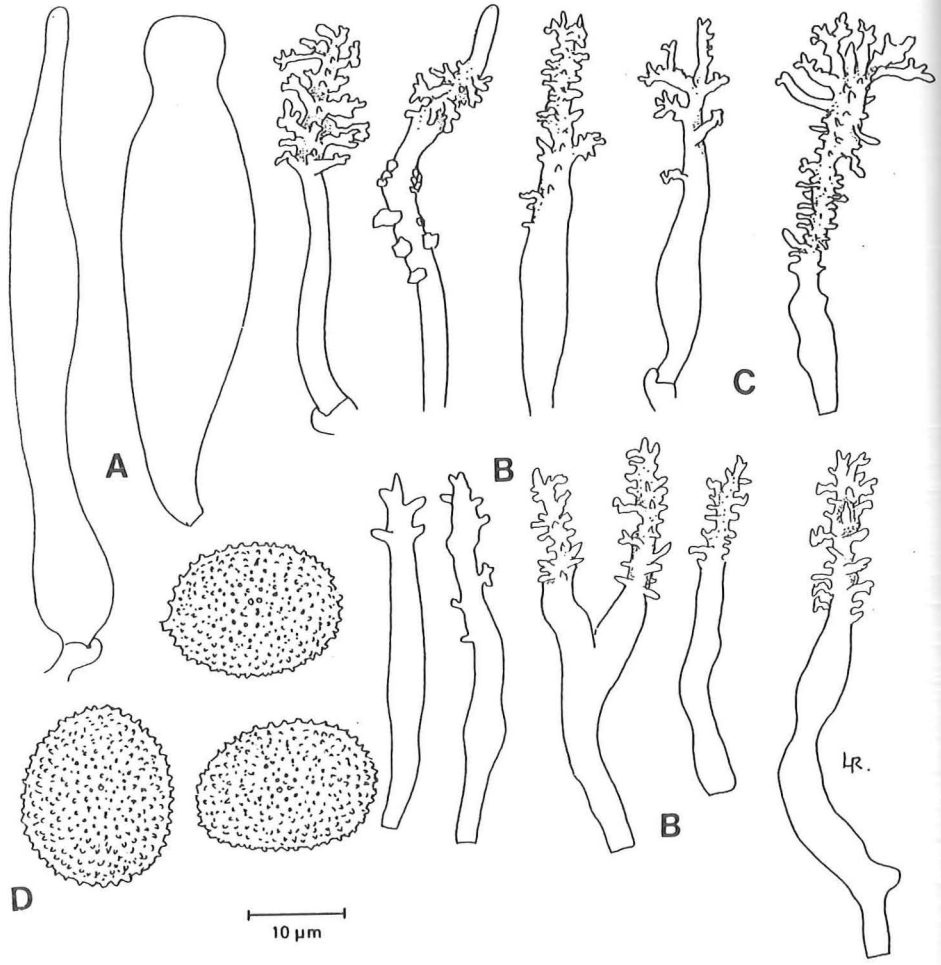


Fig. 33. *Aleurodiscus gabonicus*, Gabon, Mundah Km. 16, 27 January 1979, G. Gilles 1416, Holotyope (LY). A) gloeocystidia, B) transition between acanthophyses and dendrohyphidia, C) two dendroid acanthophyses, D) basidiospores.

Basidia clavate 80-120 x 6 -14 µm with 4 sterigmata.
Basidiospores oblong ellipsoid to subcylindrical, smooth, thin-walled, 12-15(17) x 6-8 µm.
Substrata. Known only from *Nothofagus.*
Distribution. Known only from Monte Olivia, Tierra del Fuego, Argentina, but is probably widespread in the *Nothofagus* zone in South America.
Remarks. The species is undoubtedly close to *A. parmuliformis* from New Zealand, but is separated by the narrower basidiospores (8-12 µm wide in *A. parmuliformis*) and the sinuous, thick-walled skeletocystidia.

Aleurodiscus gabonicus Boidin, Lanq. & Gilles Fig. 33
Bull. Soc. mycol. Fr. 101: 352, 1985.
Basidiocarp annual, corticioid, occurring as small patches, finally more confluent, white to pale yellow.
Hyphal system monomitic, generative hyphae with clamps, those in the subiculum up to 20 µm diam., those in the subhymenium 2-4 µm wide.
Gloeocystidia with a yellowish grainy content and slightly thickened basal walls, 60-90 x 8-15 µm, cylindric to clavate usually with a tapering apex with some slight constrictions, thus reminding one of moniliform cystidia.
Acanthophyses numerous and irregular, in parts reminding one of finely branched dendrohyphidia, but also as hyphal ends with protuberances below a smooth apex which is slightly amyloid.
Dendrohyphidia present as slightly branched hyphal ends, probably representing young acanthophyses.
Basidia clavate, 55-75 x 14-18 µm, with 4 large sterigmata.
Basidiospores ovoid, warted, 14-18 x 11-14 µm.
Substrata. On dead hardwood.
Distribution. Known only from the type locality in Gabon.
Remarks. The species reminds one of *A. tenuis* Burt from Cuba which however lacks the gloeocystidia so prominent in *A. gabonicus*.

Aleurodiscus gigasporus Ginns & Bandoni Fig. 34
Mycologia 83: 548, 1991
Basidiocarp annual, cupulate, more irregular in outline with age, when dry with somewhat curled and lifted margins, up to 13 mm long, hymenophore smooth, ochraceous and dull, subiculum very thin and white.
Hyphal system monomitic, generative hyphae with clamps, arranged in parallel in the subiculum, 2-5 µm diam.
Gloeocystidia rare, cylindrical often mammillate, up to 6 µm diam., up to 45 µm long.
Dendrohyphidia scattered with slight branching, mixed with simple hyphal ends, up to 10 µm wide at the base and with transitions to the acanthophyses.
Acanthophyses abundant in the hymenium (lacking in the rest of the basidiocarp) with numerous protuberances in the upper part, 5-7 µm wide, non amyloid and non-dextrinoid.

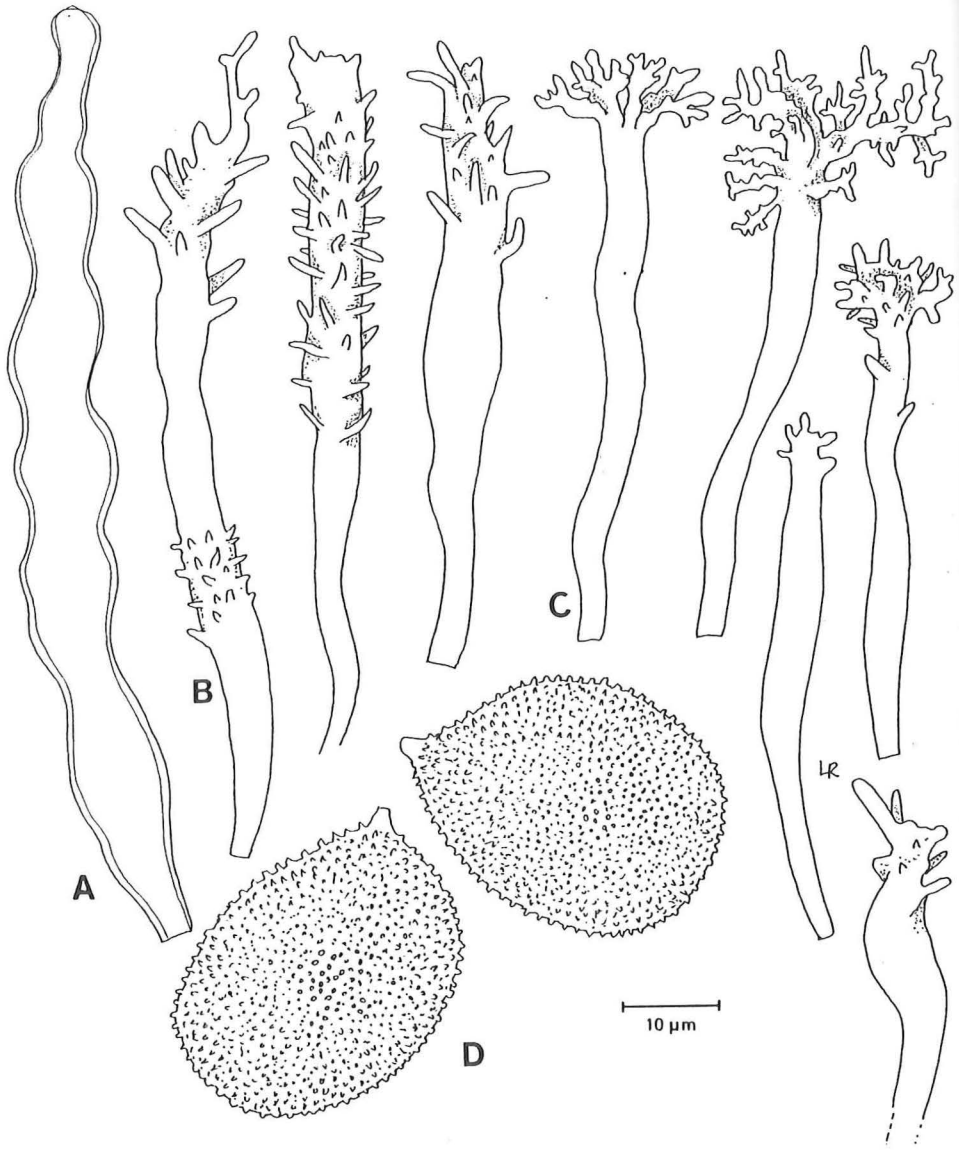


Fig. 34. *Aleurodiscus gigasporus*, China, Kunning, Golden Temple, 18 September 1986, Bandoni 7659, Holotype (DAOM). A) gloeocystidium, B) acanthophyses, C) dendrohyphidia, D) basidiospores.

Basidia clavate, 170 x 35 µm with 4 sterigmata and a basal clamp.
Basidiospores broadly ellipsoid, strongly warted or spiny, 29-34(39) x 22-28 µm.
Substrata. Known only from the type collection collected on *Keteleeria davidiana.*
Distribution. Known only from the type locality in China (Kunming province).
Remarks. The species should be easy to recognize by its gigantic basidiospores and the presence of acanthophyses. The latter character will immediately rule out species like *A. grantii* and *A. amorphus* which both have very large basidiospores.
A. wakefieldiae is similar, but has smaller basidiospores and there are a mix of simple septa and clamps on the basal hyphae.

Aleurodiscus grantii Lloyd Fig. 35
Mycol. Writ. 6: 927, 1920.
Basidiocarp cupulate, 1-4 mm diam., up to 1 mm thick, scattered to gregarious, sometimes confluent, margin determinate, ringed with white, shiny fascicles of hairs up to 0.2 mm long, hymenial surface finely granulose, pale orange-pink to pink, sometimes faded, abhymenial surface white, grey or pale brown, finely hirsute or matted.
Hyphal system monomitic, generative hyphae with clamps, thin- to thick-walled, in the context gelatinized, brownish yellow, to 7 µm wide in the abhymenial surface, hyphal hairs rarely branched, simple-septate, embedded crystals present.
Acanthophyses absent.
Gloeocystidia (or paraphyses) thin- to thick-walled, 4-6 µm diam., unbranched or with up to four short branches, cylindrical or with a moniliform apex.
Basidia clavate, about 230 x 25-28 µm diam., tapering to a 4 µm wide base, bearing 4 sterigmata up to 21 µm long.
Basidiospores broadly ellipsoid to subglobose, 22-32(39) x 18-24(28) µm, thick-walled, with spines up to 4 µm long and a broad (-3 µm), blunt apiculus.
Substrata. On the lower surface of small dead branches of living or dead *Abies, Picea, Pinus, Pseudotsuga, Thuja* and *Tsuga.*
Distribution. Western North America, Japan.
Remarks. *A. grantii* was considered a synonym of *A. amorphus* since they share the same discoid basidiocarps with large, spiny basidiospores and presence of cylindric paraphysoid hyphae. The latter species, however, lacks clamps and has slightly smaller basidiospores which is obvious when measuring the largest ones in both species. In addition, the moniliform paraphysoid hyphae of *A. grantii* never reach the size of the cystidia in *A. amorphus*. The gelatinous parasite, *Tremella mycetophiloides*, occurs on both species (Bandoni & Ginns 1993).

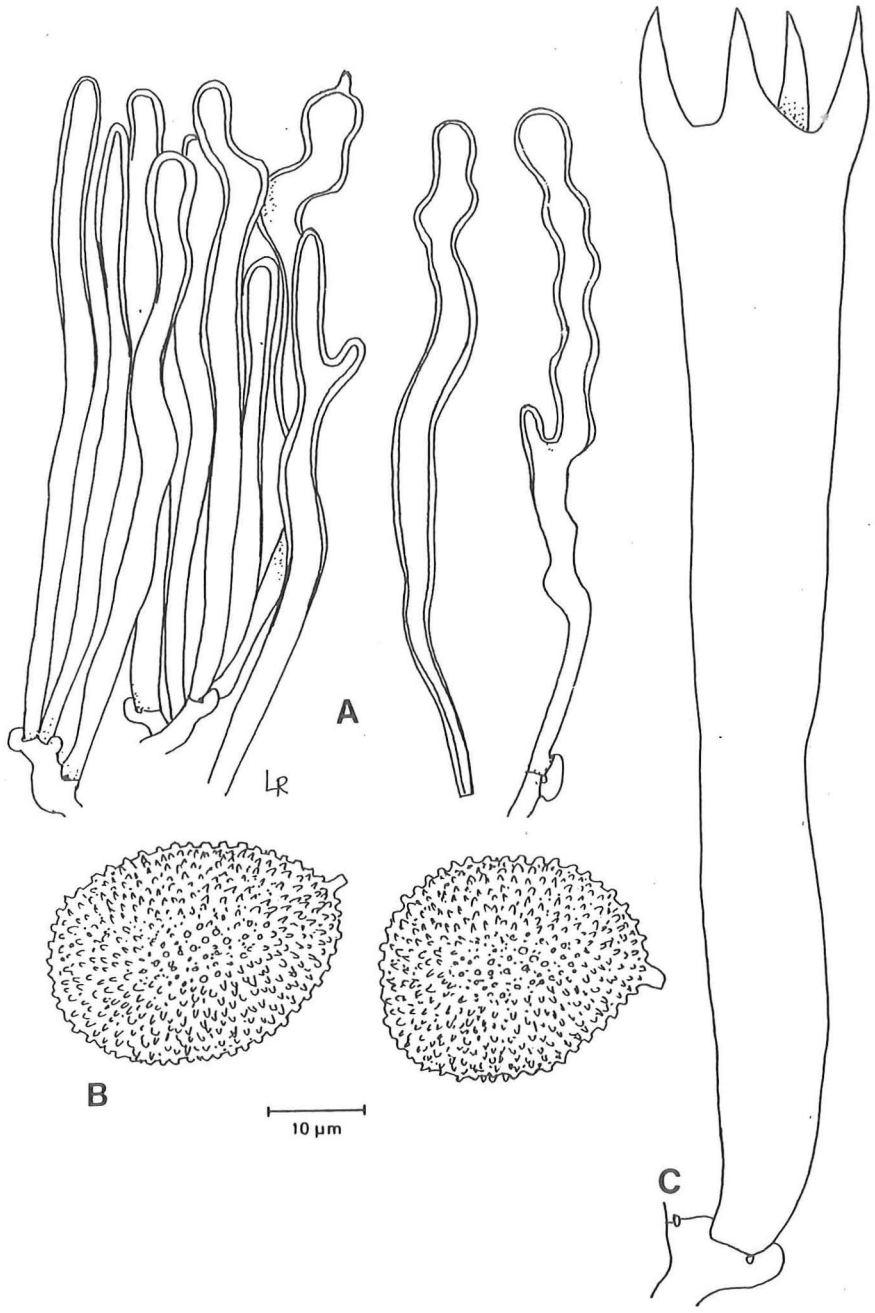


Fig. 35. *Aleurodiscus grantii*, Canada, British Colombia, Vancouver Island, Kowichan, 6 July 1972, S. Hughes, DAOM 139104, Holotype (DAOM). A) paraphyses or gloeocystidia, B) basidiospores, C) basidium.

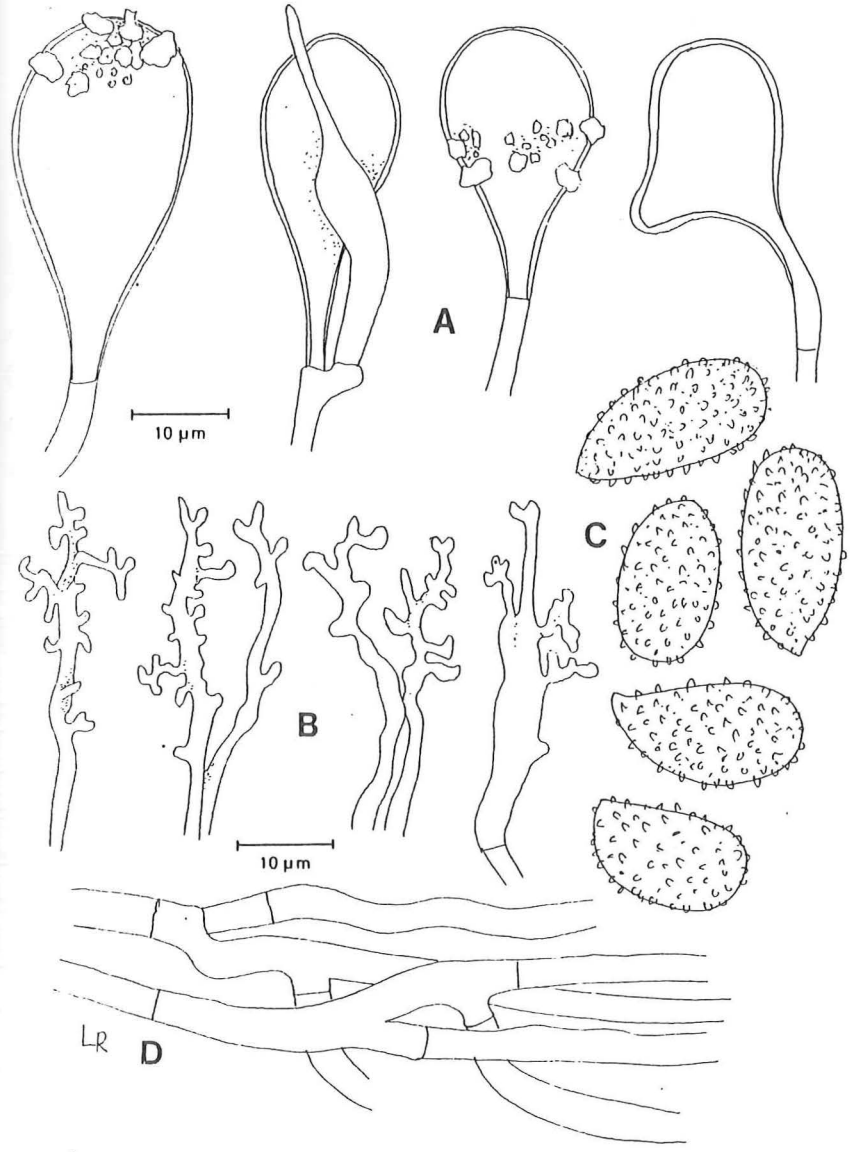


Fig. 36. *Aleurodiscus ilexicola*, Italia, Sardinia, Bades Alighes, 13 October 1983, A. Bernicchia 1939, Holotype (O). A) gloeocystidia, B) dendrohyphidia, C) basidiospores, D) hyphae in the subhymenium.

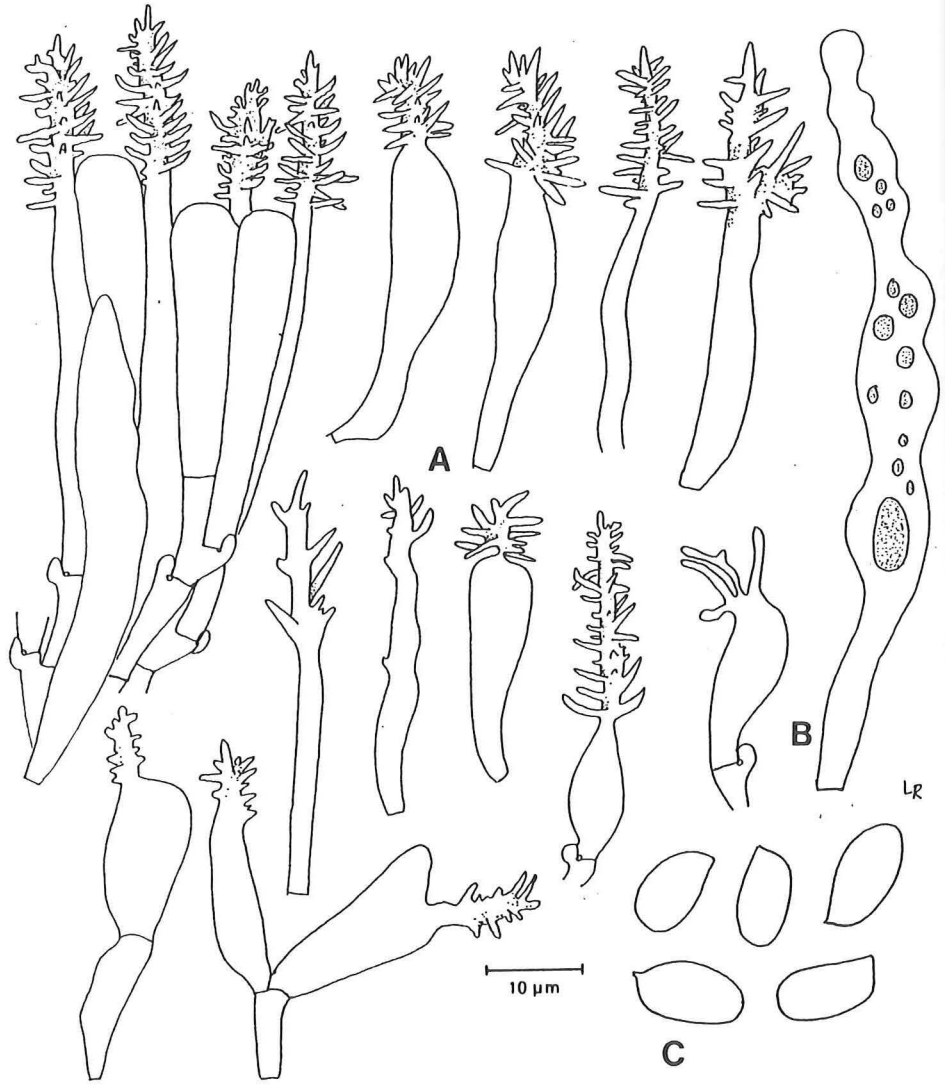


Fig. 37. *Aleurodiscus lapponicus*, Norway, Hedmark, Ringsaker, Hoghulen 551-79 (O). A) acanthophyses, B) gloeocystidium, C) basidiospores.

Aleurodiscus ilexicola Bernicchia & Ryvarden Fig. 36
Mycol. Helv. 3: 85, 1988.
Basidiocarps corticioid, adnate and small, reaching 2.5 cm diam. at maturity, hymenophore white and thin.
Hyphal system monomitic, generative hyphae with simple septa.
Acanthophyses absent.
Gloeocystidia globose, hyaline, slightly thick-walled, smooth or with scattered crystals, non-amyloid, 25-45 x 10-17 µm.
Dendrohyphidia abundant and richly branched at the apex.
Basidia clavate, 35-40 x 10-15 µm, 4-sterigmate, with a simple septum at the base.
Basidiospores ellipsoid to lacrymoid, verrucose, 16-20 x 10-11 µm.
Substrata. On *Ilex aquifolium.*
Distribution. Only known from the type locality in Sardinia (Italy).
Remarks. This species is undoubtedly related to *A. aurantius*, differing in the cystidia being pointed with papillae in the latter species, which also has smaller basidiospores.

Aleurodiscus lapponicus Litsch. Fig. 37
Ann. Mycol. 42: 11, 1944.
Basidiocarp corticioid, variable but usually as longitudinally extended patches on the wood, often not more than about 1 cm long and 2-4 mm wide, more rarely coalesced into larger basidiocarps, hymenophore smooth to finely verrucose, greyish to ochraceous buff, when dry usually finely cracked or rimose, consistency subcoriaceous to crustose.
Hyphal system monomitic with thin-walled, hyaline and narrow generative hyphae, 2-4 µm, with clamps, usually in a dense structure.
Acanthophyses abundant, basally smooth, apically with numerous protuberances.
Gloeocystidia usually numerous, embedded, up to 80 µm long, frequently moniliform at the apex, thin-walled, smooth, content granular, paraphysoid hyphae often present.
Basidia clavate, about 60 x 10 µm, with 4 sterigmata.
Basidiospores ellipsoid, thin-walled, hyaline, smooth, 10-12 x 6-7 µm.
Substrata. Usually on dry, hard, naked wood, preferably on *Salix* spp., but also noted from *Betula, Juniperus* and rotten herbs like *Aconitum, Lactuca,* and others.
Distribution. Probably circumpolar, scattered and rare in the northern part of the Scandinavian peninsula.
Remarks. *A. lapponicus* is closely related to *A. cerussatus* and the only character separating the two species seems to be the acanthophyses, which are slightly larger and more prominently spiny in *A. cerussatus*. *A. cerussatus* is not known from Fennoscandia and *A. lapponicus* may perhaps be interpreted as a boreal subalpine ecotype.

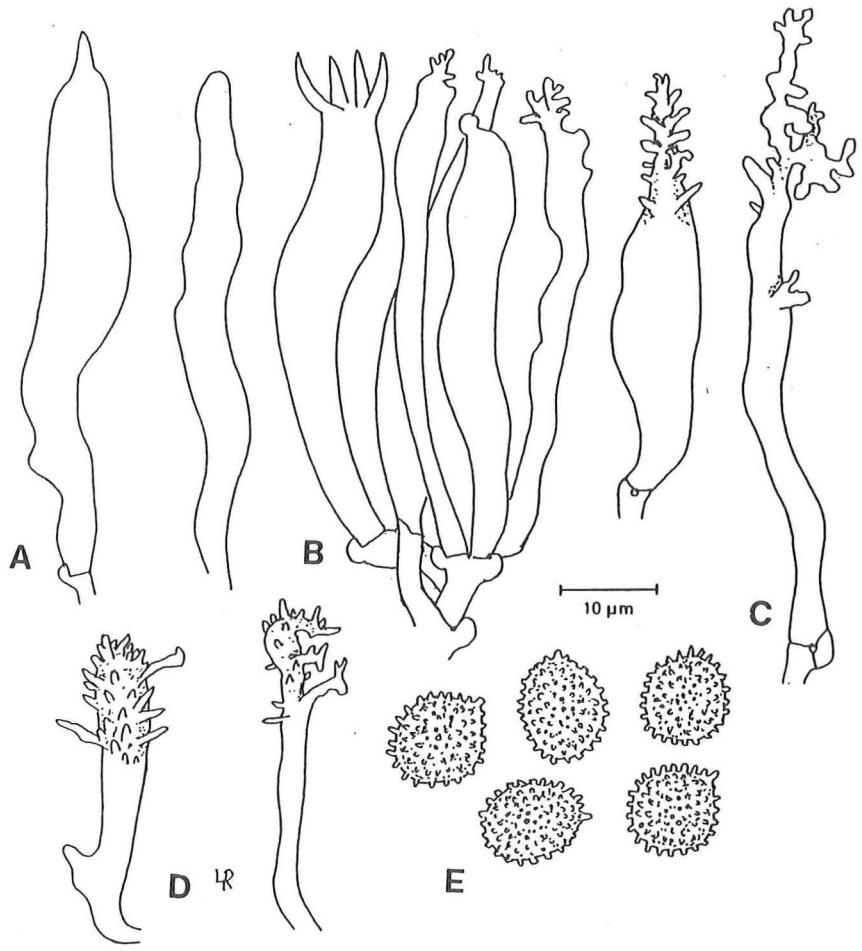


Fig. 38. *Aleurodiscus laurentianus*, Canada, Quebec, Sanct Dorothea, 26 August 1941, Jackson, Holotype (DAOM). A) gloeocystidia, B) part of the hymenium, C) dendrohyphidium, D) acanthophyses, E) basidiospores.

Aleurodiscus laurentianus H.S. Jacks. & P.A. Lemke Fig. 38
Can. J. Bot. 42: 251, 1964.
Basidiocarp corticioid, separate to confluent, up to 0.3 mm thick, margin adnate, finally determinate, texture pruinose-pulverulent, hymenophore white when fresh, drying cream to tawny or cartridge-buff, rimose on drying.
Hyphal system monomitic, with thin- to thick-walled, clamped generative hyphae.
Acanthophyses variable, cylindrical to subclavate, thin-walled, (20)25-35 x (3)5-7 µm with irregular protuberances.
Gloeocystidia flexuous-cylindric to narrowly subclavate with an apical bulb, 30-80(100) x 5-7(10), yellowish in KOH.
Dendrohyphidia simple to rarely branched, 2-2.5 µm diam.
Basidia flexuous-subclavate, 55-70 x 8-10 µm, bearing 4 sterigmata.
Basidiospores globose to subglobose, 8-10 x 7.5-9 µm, densely asperulate.
Substrata. On dead twigs of standing conifers such as *Abies* and *Picea*.
Distribution. Canada (Quebec) and USA (New York).
Remarks. Closely related to *A. weirii* and *A. spiniger*, the three species possessing globose, roughened basidiospores, clamps, cystidia and thin-walled acanthophyses.

Aleurodiscus limonisporus D.A. Reid Fig. 39
Kew Bull. 10: 631, 1955.
Basidiocarp corticioid to merulioid, annual, adnate, orbicular to effuse, up to 7 cm diam., waxy when fresh, hard when dry, margin white, pubescent to hirsute and slightly radiating, slightly curled when dry, hymenophore typically reticulate or merulioid when fresh, smoother when dry, pale ochraceous to yellow.
Hyphal system monomitic, generative hyphae with simple septa, 2-5 µm wide.
Acanthophyses and **dendrohyphidia** absent.
Paraphyses unbranched or with a few lateral swellings at the apex, 3-7 µm wide and may remind one of slender cystidia.
Gloeocystidia absent.
Basidia large, 80-130 x 10-15 µm with 4 curved sterigmata and a simple septum at the base.
Basidiospores hyaline, smooth, ellipsoid to citriform, 16-21 x 9-10 µm.
Substrata. On dead *Nothofagus cunninghamii* and *N. cliffordiae*, with a white rot.
Distribution. Known from the type locality at Cumberland Falls, Victoria, Australia and a number of localities in New Zealand.
Remarks. The species is characterized by its merulioid basidiocarps when fresh, microscopically by the large, smooth, citriform basidiospores and the lack of sterile organs. There is a beautiful colour picture of the basidiocarps in Fuhrer & Robinson (1992: 73).

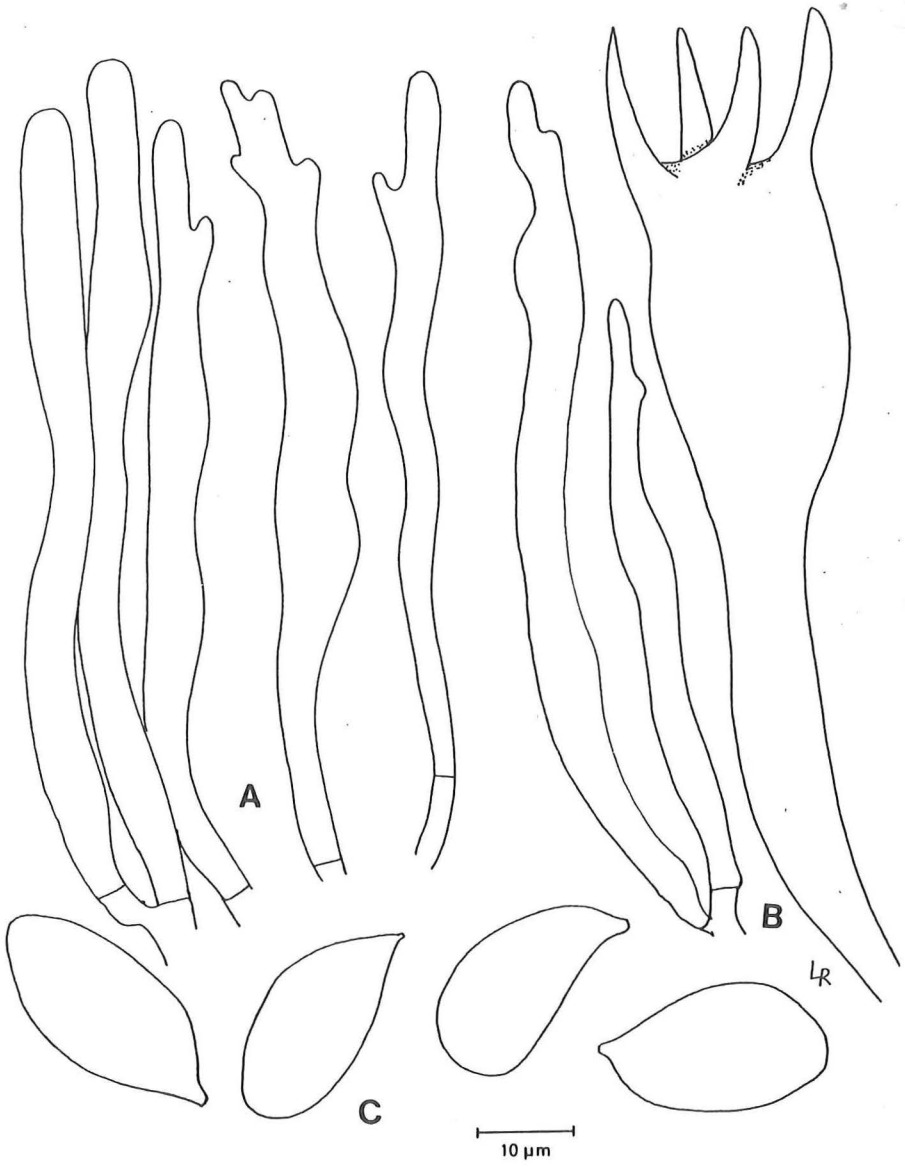


Fig. 39. *Aleurodiscus limonisporus*, New Zealand, Wellington, Mount Ruapetui, January 1951, G. H. Cunningham, Holotype (K). A) paraphyses, B) basidium, C) basidiospores.

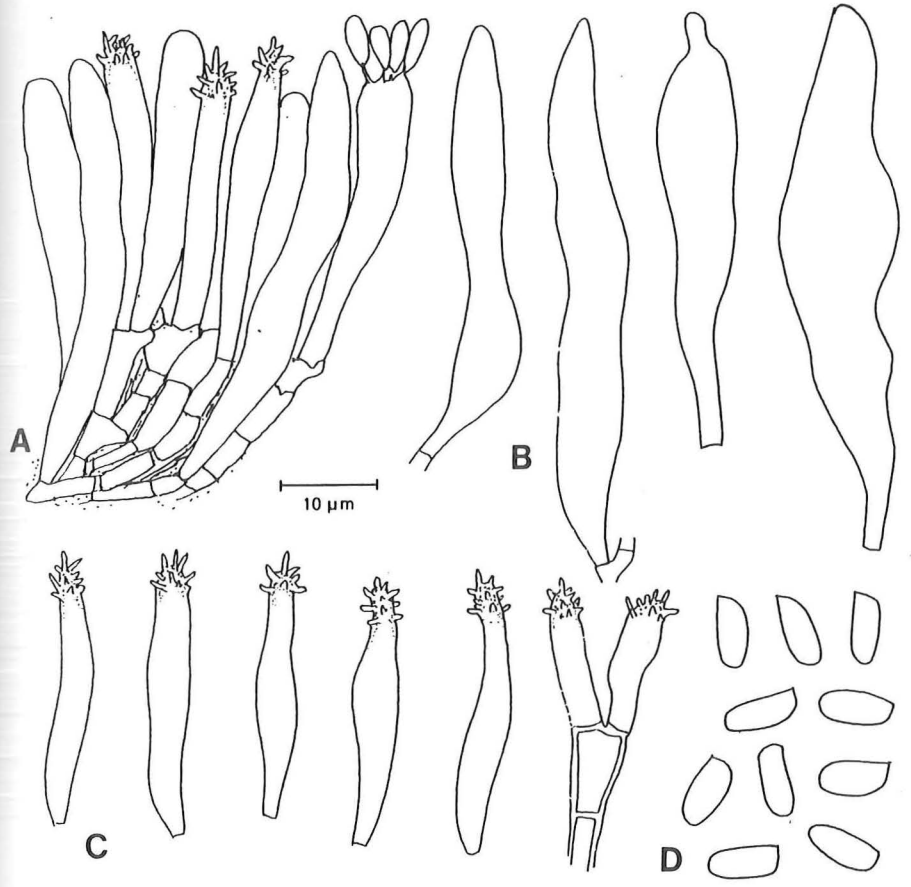


Fig. 40. *Aleurodiscus lividocoeruleus*, Norway, Finmark, Porsanger, Stabbursdalen, August 1976, L. Ryvarden 6421 (O). A) part of the hymenium, B) gloeocystidia, C) acanthophyses, D) basidiospores.

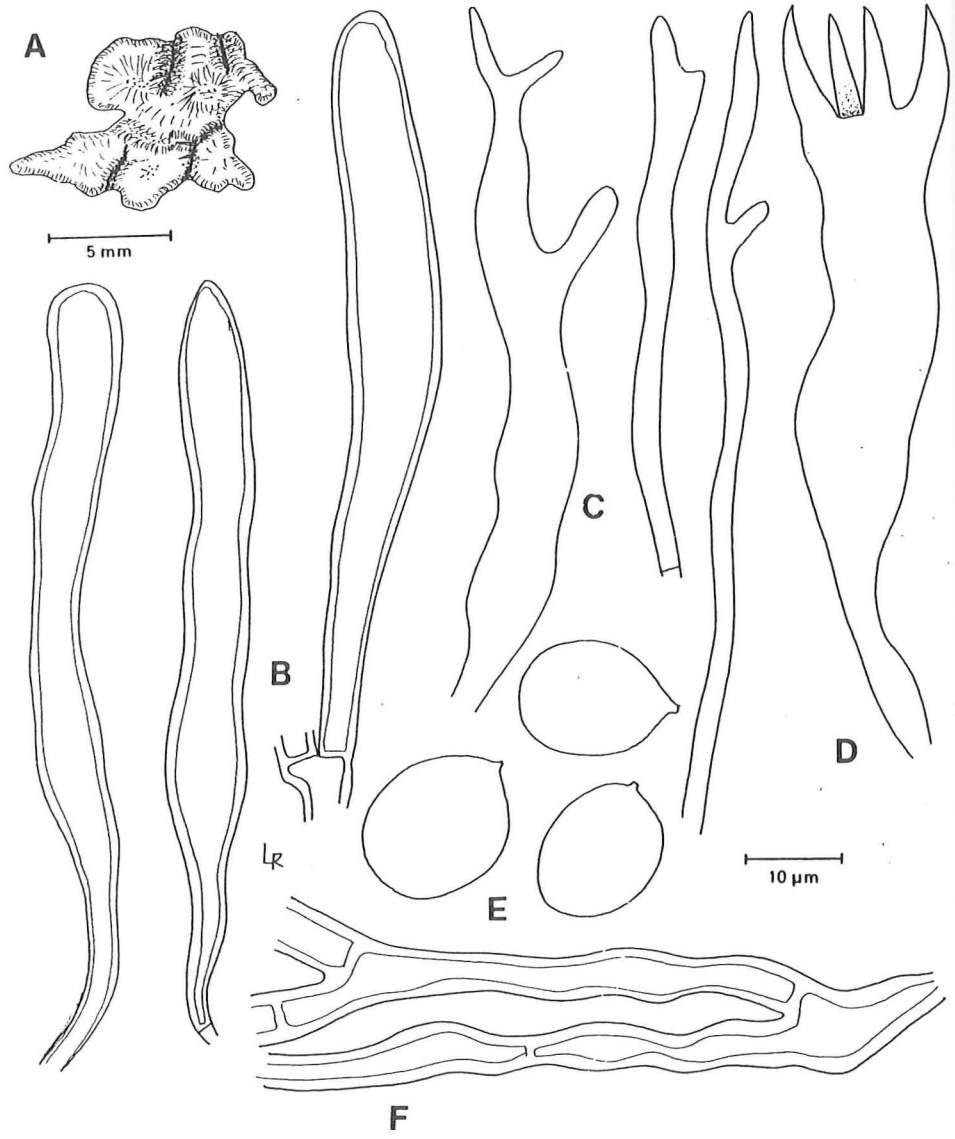


Fig. 41. *Aleurodiscus ljubarskii*, Russia, Siberia, Lazo, G. Garnez, 5 September 1961, E. Parmasto 15428, Holotype (TAA). A) basidiocarp, B) gloeocystidia, C) paraphyses, D) basidium, E) basidiospores, F) hyphae in the subiculum.

Aleurodiscus lividocoeruleus (P. Karst.) P.A. Lemke Fig. 40
Can. J. Bot. 42: 252, 1964. - *Corticium lividocoeruleum* P. Karst., Not. Soc. Fauna Fl. Fenn. Förh. 5: 370, 1868.
Basidiocarp corticioid, effused and without differentiated edge, adnate, when older somewhat loosened from the substrate, hymenophore smooth, dark blue to greyish blue, rarely almost black, often paler when dry or even yellowish with a bluish tinge or a few scattered bluish patches, young specimens are often weakly pigmented, consistency dense and firm.
Hyphal system monomitic with thin-walled, clamped hyphae, usually densely interwoven and fused to an almost pseudo-parenchymatic structure in which distinct hyphae may be difficult to demonstrate. Between the hyphae there are irregular grains of a dark blue pigment and Calcium oxalate crystals in varying degree.
Acanthophyses numerous, 15-25 x 4-5 µm with short apical protuberances.
Cystidia (pseudocystidia) numerous, often mammillate, 40-80 x 8-12, protoplasm granular.
Basidia subclavate, 20-25 x 5 µm with 4 sterigmata.
Basidiospores subcylindrical, 7-8 x 3-4 µm, smooth.
Cultural characteristics. See Boidin et al. (1968) and Nakasone (1990).
Sexuality. Bipolar, see Boidin et al. (1968).
Substrata. On coniferous wood (fallen trees, fencing, etc.), rarely on deciduous wood such as *Salix* spp., usually in open, sunny, dry localities.
Distribution. Throughout the boreal conifer-zone and locally common.
Remarks. The species is easy to recognize because of the strong blue to greyish colour. The parasite *Tremella subencephala* Bandoni & Ginns is specific to *A. lividocoeruleus*, producing small, pustular to discoid, gelatinous outgrowths (Bandoni & Ginns 1993).

Aleurodiscus ljubarskii Parm. Fig. 41
Eesti NSV Tead Akad. Toim. Biol. 16: 378, 1967.
Basidiocarp resupinate, pulvinate with a steep margin, adherent, 0.5-2 mm diam. and 4 mm thick, later confluent, margin at first pubescent, white, evanescent, then distinctly dark coloured, hard and brittle, hymenophore smooth, cream to pale ochraceous, rimose with age.
Hyphal system monomitic, hyphae thin-walled, simple-septate, 2-5 µm diam., in older parts distinctly thick-walled and up to 10 µm wide, but very difficult to separate as the layers below the subhymenium are filled with crystals.
Acanthophyses absent.
Gloeocystidia scarce, clavate, slightly thick-walled with age, obtuse or more rarely pointed with a yellowish content, 40-140 x 15-20 µm.
Paraphyses few, simple to forked, 2-5 µm wide.
Basidia clavate, utriform, 65-100 x 16-22 µm, bearing 4 arcuate sterigmata up to 15 µm long.
Basidiospores broadly ellipsoid, sometimes arcuate close to the apiculus,

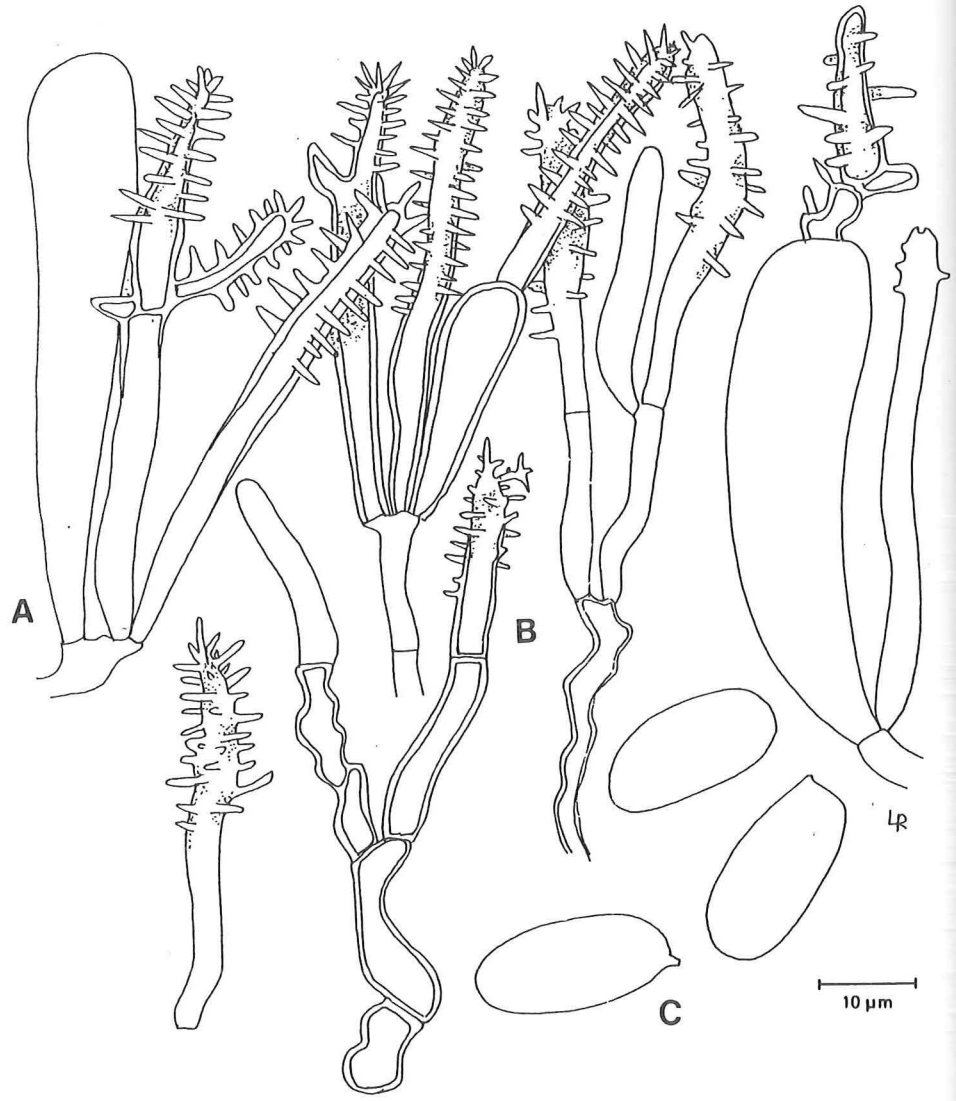


Fig. 42. *Aleurodiscus macrocystidiatus*, Canada, British Columbia, Vancouver Island, lake Cowechan, 2 June 1948, H. Jackson 35012, Isotype (S). A) part of the hymenium with gloeocystidium, B) acanthophyses, C) basidiospores.

smooth, 18-22 x 14-17 µm, with prominent apiculus.
Substrata. Known from dead branches of *Quercus mongolica* and *Quercus* spp.
Distribution. The far east of Russia, also Japan.
Remarks. The species is easy to recognize because of the prominent but small, thick, pulvinate basidiocarps and the host. Microscopically the slightly thick-walled cystidia and lack of other sterile hymenial elements are characteristic.

Aleurodiscus macrocystidiatus P.A. Lemke Fig. 42
Can. J. Bot. 42: 255, 1964.
Basidiocarp corticioid, forming linear patches 0.5-3 cm long and 1-3(5) mm wide, margin determinate, adnate, hymenophore drying cream to ochraceous-buff.
Hyphal system monomitic, with thin- to thick-walled, simple-septate generative hyphae, up to 4.5 µm diam.
Acanthophyses variable, basal portion cylindrical to clavate, walls thin to slightly thickened, aculeate portion borne laterally or at the apex, thick-walled to semisolid, 20-30 x 7.5-8 µm, occasionally branched.
Gloeocystidia clavate to mammillate, 40-60(70) x (9)15-18(23) µm.
Basidia 50-60 x 8-10 µm, with 4 sterigmata.
Basidiospores ellipsoid to cylindric, 14-16 x 7-9 µm, rounded at both ends, smooth.
Substrata. On recently dead branches of *Arbutus menziensii* and *Arctostaphylos* sp.
Distribution. Canada (British Columbia) and USA (California).
Remarks. This species is closely related to *A. diffisus*, also found on Ericaceae, but has wider basidiospores and distinctly different pseudocystidia. The protuberances on the acanthophyses in the latter species are longer and more acicular.

Aleurodiscus mesaverdensis Lindsey Fig. 43
Mycotaxon 30: 433, 1987.
Basidiocarp perennial, pulvinate to stereoid, 1-8 mm diam., up to 0.7 mm thick, sometimes appearing in effused patches up to 25 mm, margin determinate, concolorous, often raised, hymenophore whitish becoming golden-buff, smooth to rimose.
Hyphal system monomitic, thin- to slightly thick-walled, clamped, 2.5-5 µm wide.
Acanthophyses abundant, up to 100 µm long, thick-walled, aculeate portion up to 70 µm long, golden in KOH, individual protuberances 1 x 3 µm.
Gloeocystidia absent.
Basidia clavate, up to 70 x 17 µm with 4 sterigmata.
Basidiospores ovoid-ellipsoid, strongly but bluntly apiculate, 19-28 x 12-17 µm, smooth, becoming thick-walled.
Substrata. On bark on underside of living branches and trunks of *Pinus edulis*

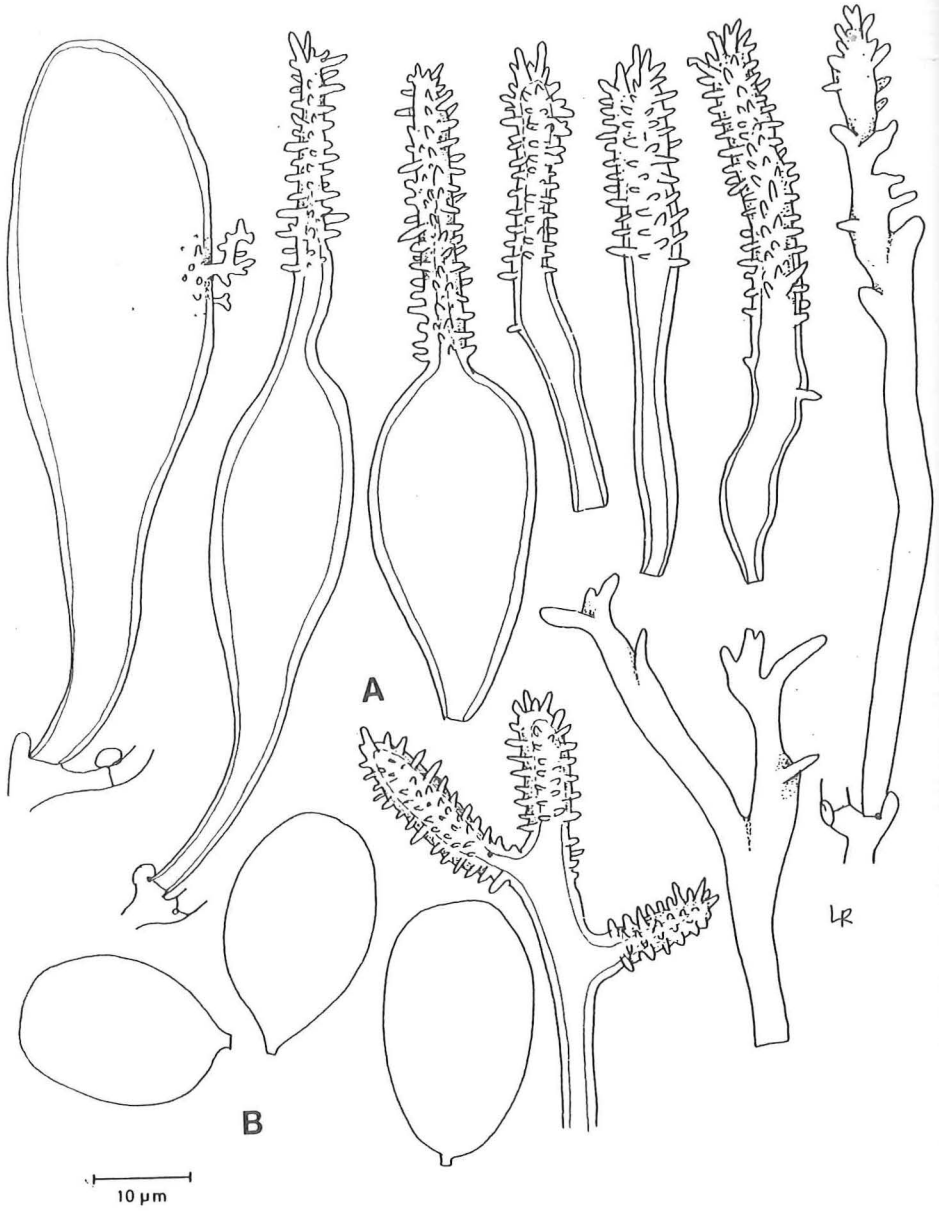


Fig. 43. *Aleurodiscus mesaverdensis*, USA, Colorado, Mesa Verde, Far View Rim, 20 November 1986, P. Lindsay 1815, Holotype (ARIZ). A) basidiocarps, B) acanthophyses, C) basidiospores.

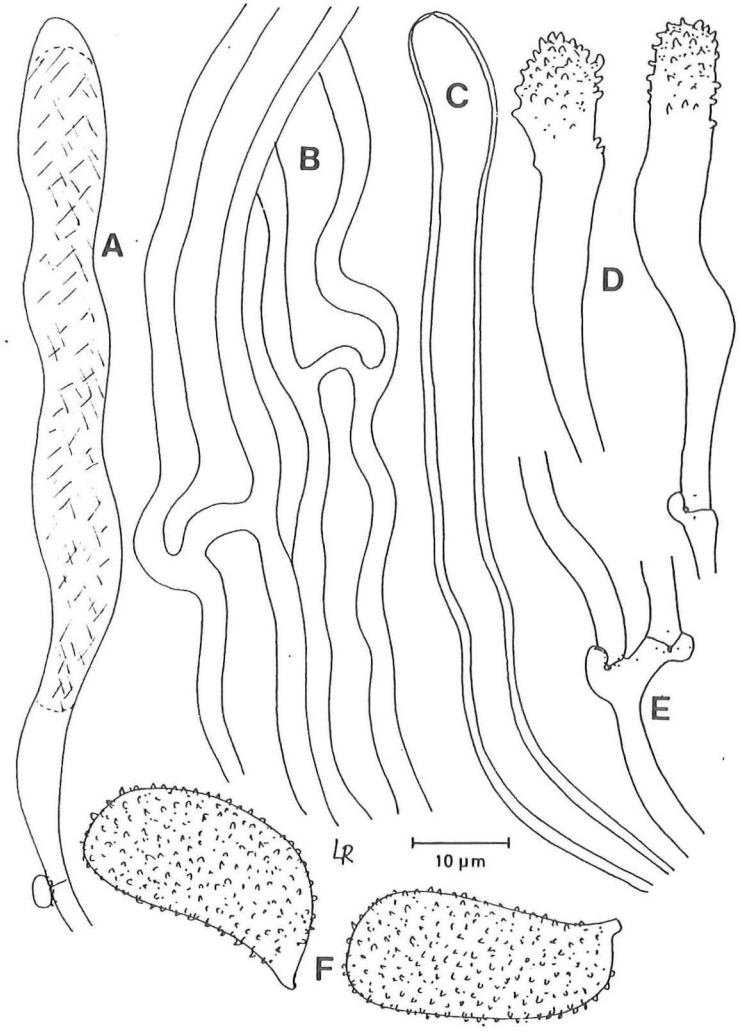


Fig. 44. *Aleurodiscus microcarpus*, China, Yun-Nay, Leg. Delaway no 53, Holotype (NY). A) gloeocystidium, B) hyphae in the subiculum, C) paraphyses, D) acanthophyses, E) hyphae in the subhymenium, F) basidiospores.

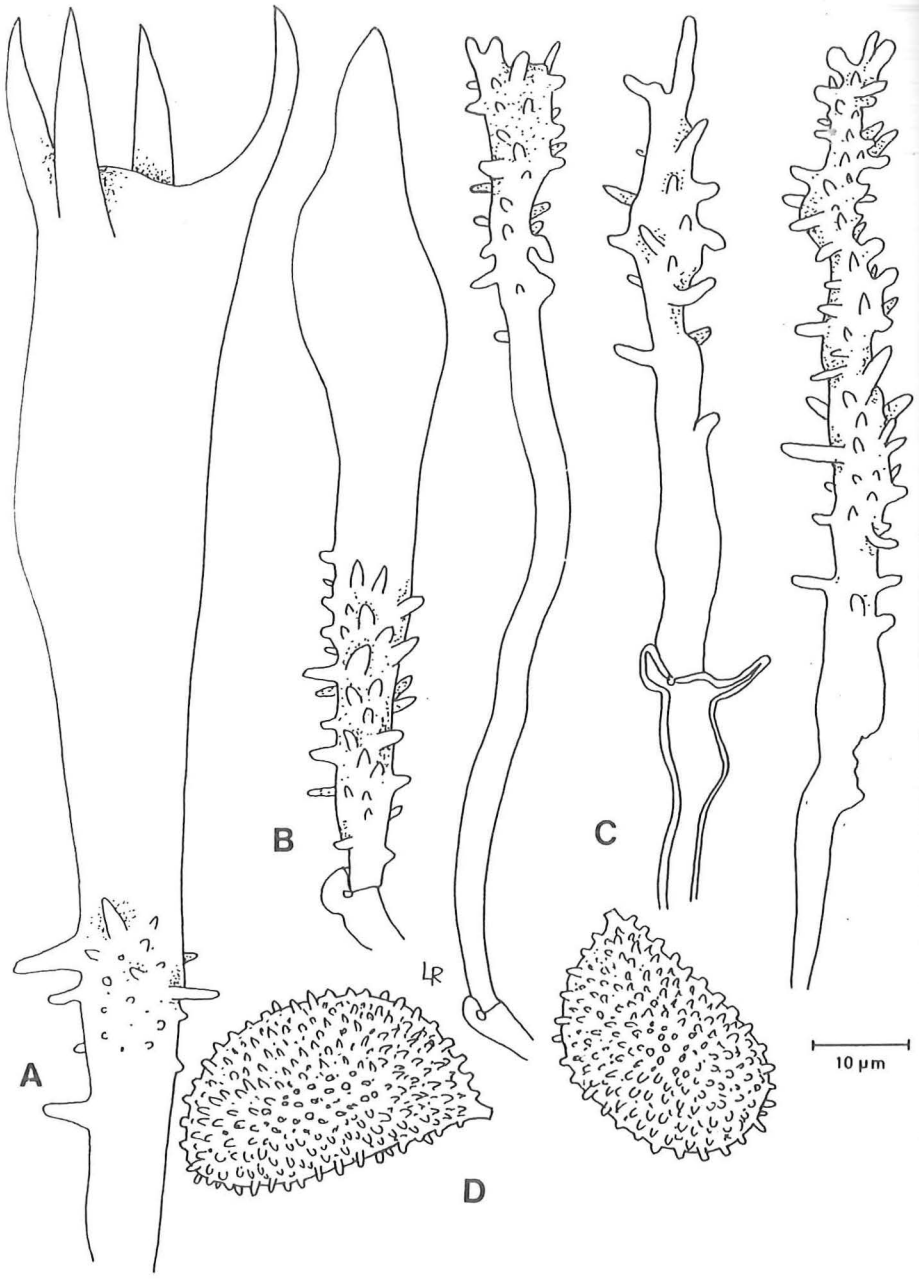
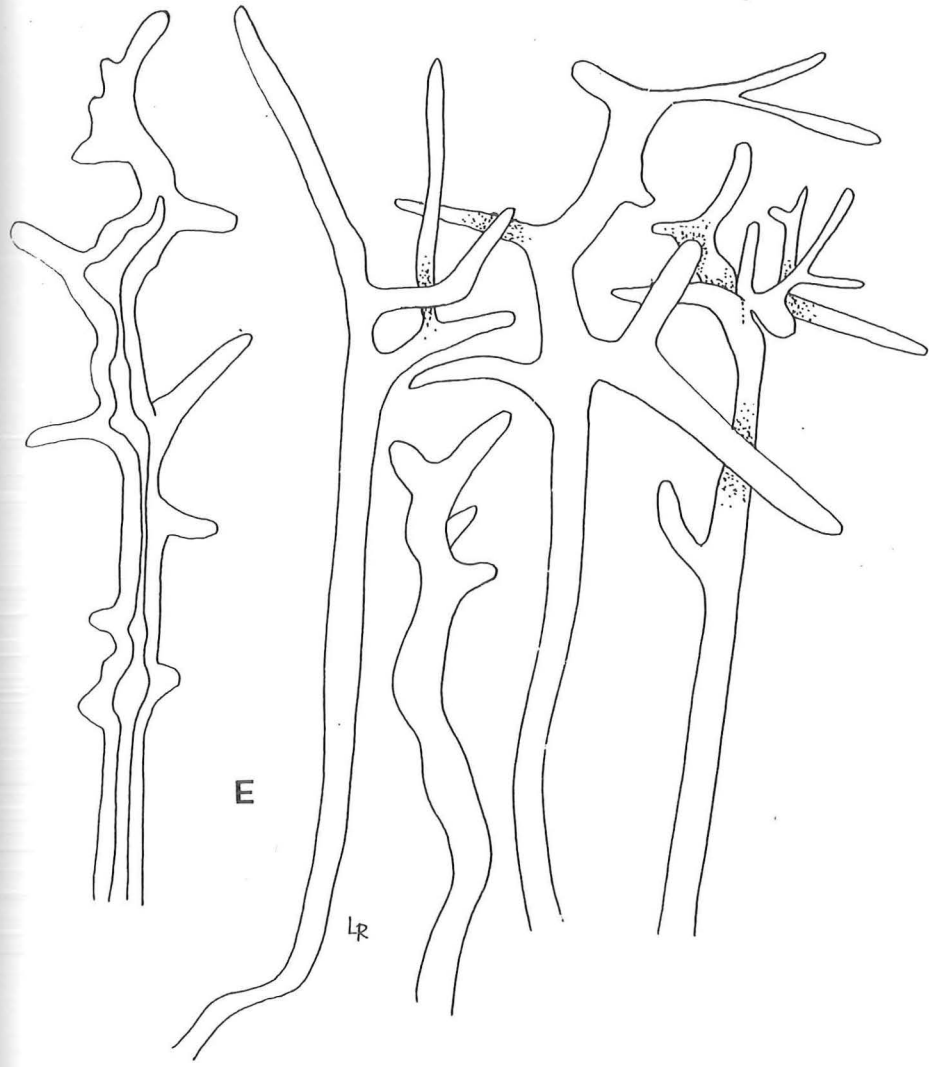


Fig. 45. *Aleurodiscus mirabilis*, Zimbabwe, Eastern Province, Stapleford, 12 Januar 1990, L. Ryvarden 27420. A) ornamented basidium, B) ornamented gloeocystidium, C) acanthophyses, D) basidiospores, E) acanthophyses with forked protuberances.



and *Pinus ponderosa*.
Distribution. USA (Arizona and Colorado).
Remarks. This species resembles *A. canadensis* in having almost identical basidiospores, but have only apically spiny acanthophyses with even transitions to dendrohyphidia. American specimens of *A. canadensis* have only 4 sterigmata, thus on this continent this character may also be used to separate the two species.

Aleurodiscus microcarpus Núñez & Ryvarden sp. nov. Fig. 44
Fructificatio resupinate, arcte adnata, tenuis, 2-4 mm in diametro, hymenium cremicolori, contextus monomiticus, hyphae distinctis, tenuitunicatis vel crassiculis, fibulatae, 3-14 µm in diam.eteretro, gloeocystidia et acanthophyses presentiae, in hymenio hyphae paraphysoideae praesentes, 3-8 µm in diam.eteretro, basidia clavatae, 70-85 x 8-15 µm, plerumque 4 sterigmatibus, sporae cylindricibus, verruculosis, amyloidibus, 25-30 x 12-14 µm.
Holotype: China, Yun-Nay, Leg. Delaway no 53 (NY).

Basidiocarp resupinate, adnate, pulvinate, 2-4 mm diam., less than 1 mm thick, hard and brittle, hymenophore smooth, cream, margin indistinct.
Hyphal system monomitic, generative hyphae with clamps, in the subiculum densely agglutinated, very thick-walled, 3-14 µm diam. with large thick-walled clamps, in the subhymenium more thin-walled and moderately branched 3- 8 µm wide.
Gloeocystidia tubular, rounded to pointed, with a yellowish content in KOH, 6-10 x 60-90 µm.
Acanthophyses rare, clavate with small apical protuberances, IKI-, 30-50 x 8-12 µm.
Dendrohyphidia not seen.
Paraphyses present among basidia and gloeocystidia, smooth, slightly thick-walled, up to 70 µm long, 3-8 µm diam.
Basidia clavate, smooth, thin-walled, 70-85 x -15 µm with 4 large curved sterigmata, up to 12 µm long.
Basidiospores cylindrical to slightly allantoid, thin-walled, finely verruculose, 25-30 x 12-14 µm.
Substrata. Known only from a small decorticated branch of a hardwood host.
Distribution. Known only from the type locality in China (Yun-Nay).
Remarks. This is a remarkable species because of the very thick-walled, wide contextual hyphae, the scarce acanthophyses and the large cylindrical, verruculose basidiospores. It seems to be rather isolated in the genus.

Aleurodiscus mirabilis (Berk. & M.A. Curtis) Höhn. Fig. 45
K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzungsb 118: 818, 1909. - *Psilopeziza mirabilis* Berk. & M.A. Curtis, J. Linn. Soc. Bot. 10: 364, 1868. - *Corticium peradeniae* Berk. & Broome, 1873. - *Aleurodiscus usambarensis* Henn., Bot. Jahrb. 38: 43, 1905. - *Aleurodiscus javanicus* Henn., Monsunia 1: 139, 1905. - *Aleurodiscus spinulosus* Henn., Bot. Jahrb. 38: 107, 1905. - *Aleurodiscus apiculatus* Burt, Ann. Mo. Bot. Gard. 5: 186, 1918. - *Aleurodiscus japonicus* Yasuda, Tokyo Bot. Mag. 33: 33, 1919. - *Aleurodiscus alboroseus* Bres., Ann. Mycol. 18: 46, 1920. - *Aleurodiscus peteloti* Pat., Bull. Soc. mycol. Fr. 40: 31, 1924. - *Aleurodiscus salmoneus* Pat., Mem. Acad. Malgache 6: 11, 1927. - *Aleurodiscus sinensis* Teng. & Ling, Contr. Biol. Lab. Sci. Soc. China 8: 273, 1933. - *Aleurodiscus pallideroseus* Litsch., Symb. Sinica 2, part 41, 1937.
Basidiocarp initially disciform to cupulate, 1-3 mm diam., up to 0.7 mm thick, readily confluent, forming irregularly effused areas, margin determinate, reflexed and white on the abhymenial surface, hymenophore smooth, salmon or pink when fresh, becoming cream to ochraceous with age, smooth to reticulate-ridged in more compact specimens.
Hyphal system monomitic, generative hyphae thin- to thick-walled, 3-5 µm diam., with clamps, in the abhymenial surface partly unbranched, simulating skeletal hyphae and mixed with variably branching hyphae with transitions to strongly spiny acanthophyses.
Acanthophyses thick-walled, mostly cylindrical to 8 µm diam., protuberances partly in the upper parts, partly covering the whole length, up to 120 µm long, sometimes with forked protuberances, scattered in the abhymenial surface with transitions to binding hyphae.
Gloeocystidia embedded, scattered to abundant, flexuous-cylindric, 70-150 x 8-12 µm.
Basidia clavate, 80-160 x 16-24 µm, often with warts and protuberances on the basal part.
Basidiospores ellipsoid-citriform to semilunate, biapiculate, 24-28 x 14-17 µm, thick-walled, asperulate.
Cultural characteristics. See Nakasone (1990).
Sexuality. Homothallic, see Boidin et al.(1968) and Nakasone (1990).
Substrata. Dead branches of hardwood hosts, such as *Rhododendron*, *Betula*, *Larix*, *Cinnamomeum* and numerous tropical trees of unknown identity.
Distribution. Pantropical to subtropical, north to USA and Japan, not known from Europe.
Remarks. This species is usually easy to recognize in the field by its stereoid pinkish basidiocarp. Microscopically it is closely related to *A. ochraceoflavus*, sharing the same cylindric, spinulate acanthophyses and the same spore ornamentation, though the spores are elliptical-shaped in the latter species. *A. zealandicus* shares the same type of basidiocarps with the last two species, but the acanthophyses are only apically brush-like. *A. mirabilis* has been investigated for antibiotics, and the chemical compound aleurodiscal has been isolated from it (Lauer et al. 1989).

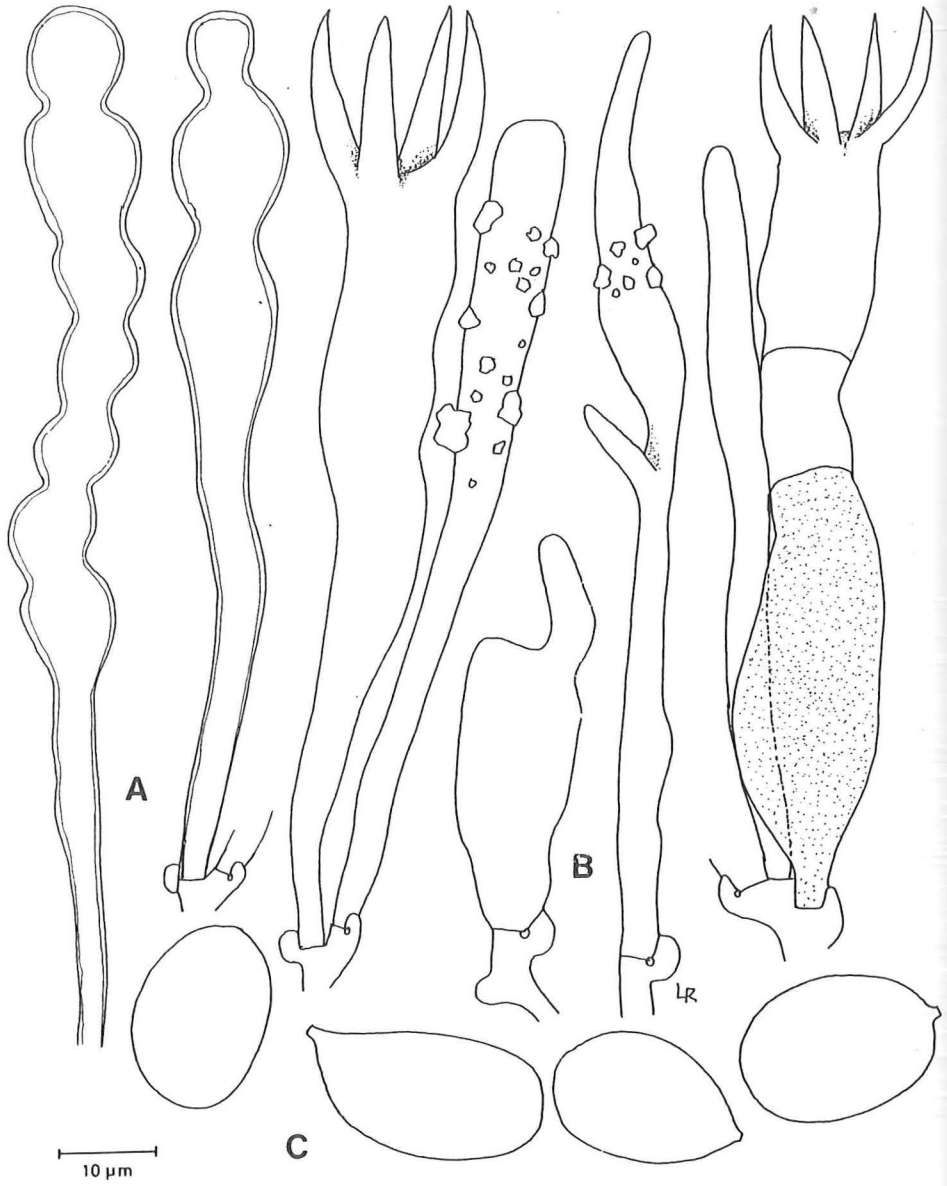


Fig. 46. *Aleurodiscus monilifer*, Morocco, Atlas, Daiet, Achlef, 13 May 1961, G. Malencon LY3940, Holotype (LY). A) gloeocystidia, B) paraphyses and basidia, C) basidiospores.

Aleurodiscus monilifer Malençon Fig. 46
Bull. Soc. mycol. Fr. 70:130, 1954.
Basidiocarp thin, adnate, disciform, rarely confluent, up to 10 mm diam., margin somewhat lifted when dry, hymenophore smooth, white and entire when dry, margin soft and abrupt towards the substrate.
Hyphal system monomitic, generative hyphae with clamps, in the subiculum delicately thin-walled, 3-5 µm wide, subiculum up to 500 µm thick consisting of vertical hyphae with moderate branching, 2-4 µm wide and covered by angular crystals.
Gloeocystidia smooth, thin- to thick-walled and distinctly moniliform, 7-11 µm wide and up to 120 µm long.
Acanthophyses absent.
Paraphyses few, scarcely branched, scattered among the basidia.
Basidia clavate, 70-80 x 10-12 µm with 4 sterigmata,
Basidiospores ellipsoid, hyaline, thin-walled, smooth and pale violet in Melzer's reagent, 22-26 x 14-17 µm.
Cultural characteristics. See Boidin et al. (1968).
Substrata. On bark of *Cedrus atlanticus.*
Distribution. Known only from higher altitudes in Morocco (Azrou).
Remarks. Superficially the species may remind one of *Aleurocystidiellum subcruentatum* with its discoid basidiocarp, but the microstructure is completely different.

Aleurodiscus norvegicus J. Erikss. & Ryvarden Fig. 47
Norw. J. Bot. 20: 10, 1973.
Basidiocarp corticioid, adnate, somewhat elongated, up to 3 cm long, 2-4 mm wide and about 50 µm thick, hymenophore smooth, white to pale cream, consistency rather soft.
Hyphal system monomitic with a thin layer of thin-walled intertangled hyphae next to the substratum, 2-4 µm diam., with clamps at all septa.
Acanthophyses scattered and sparse, clavate, 15-20 x 5-8 µm, with a few apical protuberances.
Gloeocystidia numerous, variable in shape and size, 30-50 µm long, often mammillate, the content more or less granular or resinous, yellowish to light brown in Melzer's solution, in KOH only pale yellowish.
Basidia 30-40 x 8-10 µm with 2 sterigmata, a very few with lateral protuberances which indicates that acanthophyses and basidia are homologue elements and that some acanthophyses may develop into basidia.
Basidiospores ellipsoid to oblong subcylindrical, finely warted, 10-15 x 5-7 µm.
Substrata. On dead branches of *Calluna vulgaris*, *Erica, Rubus, Ledum,* and also on pine needles.
Distribution. Known from France, Portugal, Norway, Denmark, Spain, Germany, and the British Isles.
Remarks. The species is recognized by its bi-sterigmate basidia, the small warted

basidiospores, and the acanthophyses with small apical protuberances. Almost all basidia seen by us have been without protuberances and even Telleria & Melo (1995: 23) have drawn the basidia smooth whilst still placing the species in *Acanthobasidium*.

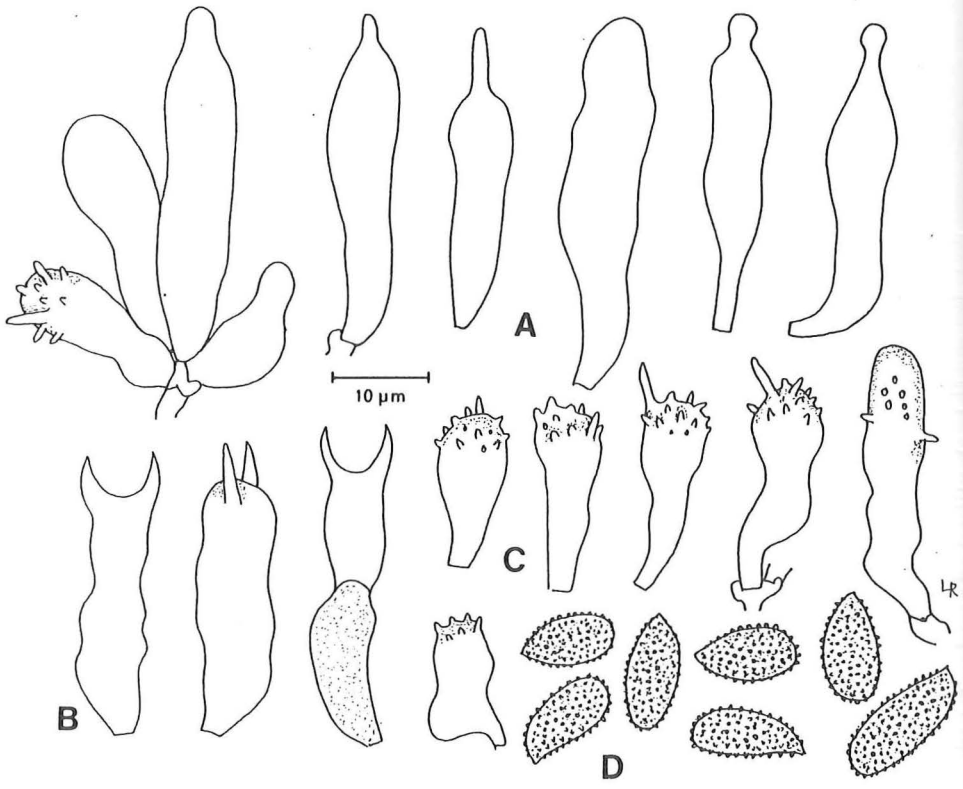


Fig. 47. *Aleurodiscus norvegicus*, Norway, Hordaland, Fana, Kvituren, 2. Nov. 1978, Hjortstam 10179 (O). A) gloeocystidia, B) basidia, C) acanthophyses, D) basidiospores.

Aleurodiscus oakesii (Berk. & M.A. Curtis) Pat. Fig. 48
Rev. Mycol. 12: 133, 1890. - *Corticium oakesii* Berk. & M.A. Curtis, Grevillea 1: 166, 1873. - *Aleurodiscus oakesii* (Berk. & M.A. Curtis) Cooke, Grevillea 3: 172, 1875, invalid name as the generic name was not yet published.

Basidiocarp first cupulate, 1.5-5.5 mm diam., up to 0.6 mm thick, later more effused and stereoid, margin reflexed to deflexed on drying, farinose to subcoriaceous, hymenophore smooth, pale cream, drying avellaneous to ochraceous, sometimes with pale grey tints, abhymenial surface floccose, white when fresh, drying pale ochraceous.

Hyphal system monomitic, generative hyphae simple-septate, in the hymenium and subhymenium thin-walled to slightly thick-walled with many septa, richly branched, 3-5 µm wide, in the subiculum and on the abhymenial surface sparingly dichotomously branched, smooth with few clamps only at the branching, 3-7 µm wide. These hyphae have sometimes been cited (Lemke) as skeletal hyphae.

Acanthophyses numerous, filiform to subclavate, slightly thick-walled, 40-80 x 4-6 µm, usually with apical antler-like protuberances, some also with lateral protuberances.

Gloeocystidia moniliform-cylindric to mammillate, smooth, up to 80 µm long and 10 µm diam., embedded, yellowish in KOH, sometimes a few protuberances can be observed close to the apex.

Basidia flexuous-subclavate, 75-120 x 12-15.5(20) µm, with 4 sterigmata.

Basidiospores ovoid-ellipsoid, 18-27 x 12-14(17) µm, thick-walled at maturity, finely warted.

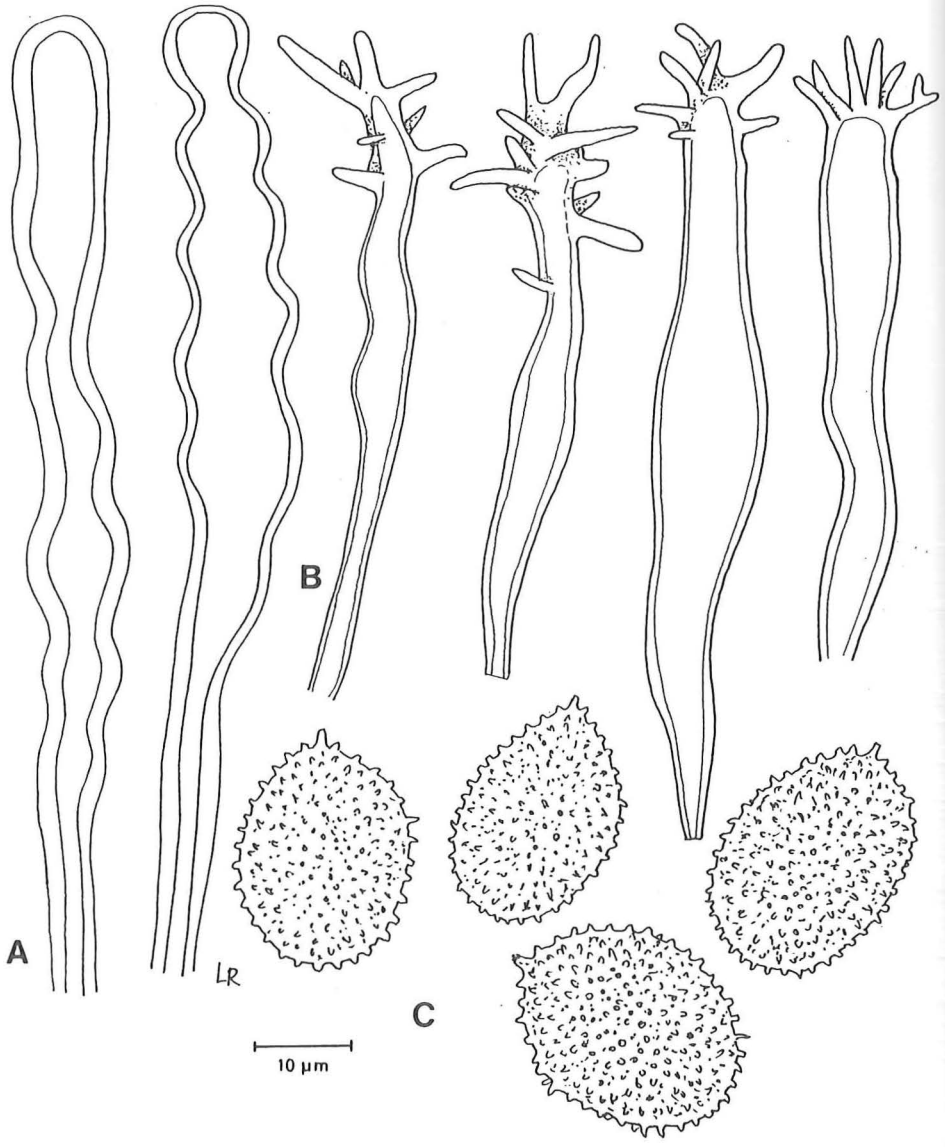
Cultural characteristics. See Boidin et al. (1968), Nakasone (1990).

Sexuality. Homothallic, see Boidin et al. (1968).

Substrata. Normally on dead wood and bark of living deciduous trees.

Distribution. Known from North America, eastern Asia, and the Pyrenees in Europe.

Remarks. The species comes close to *A. wakefieldiae* from Europe which is mainly separated by clamped hyphae.



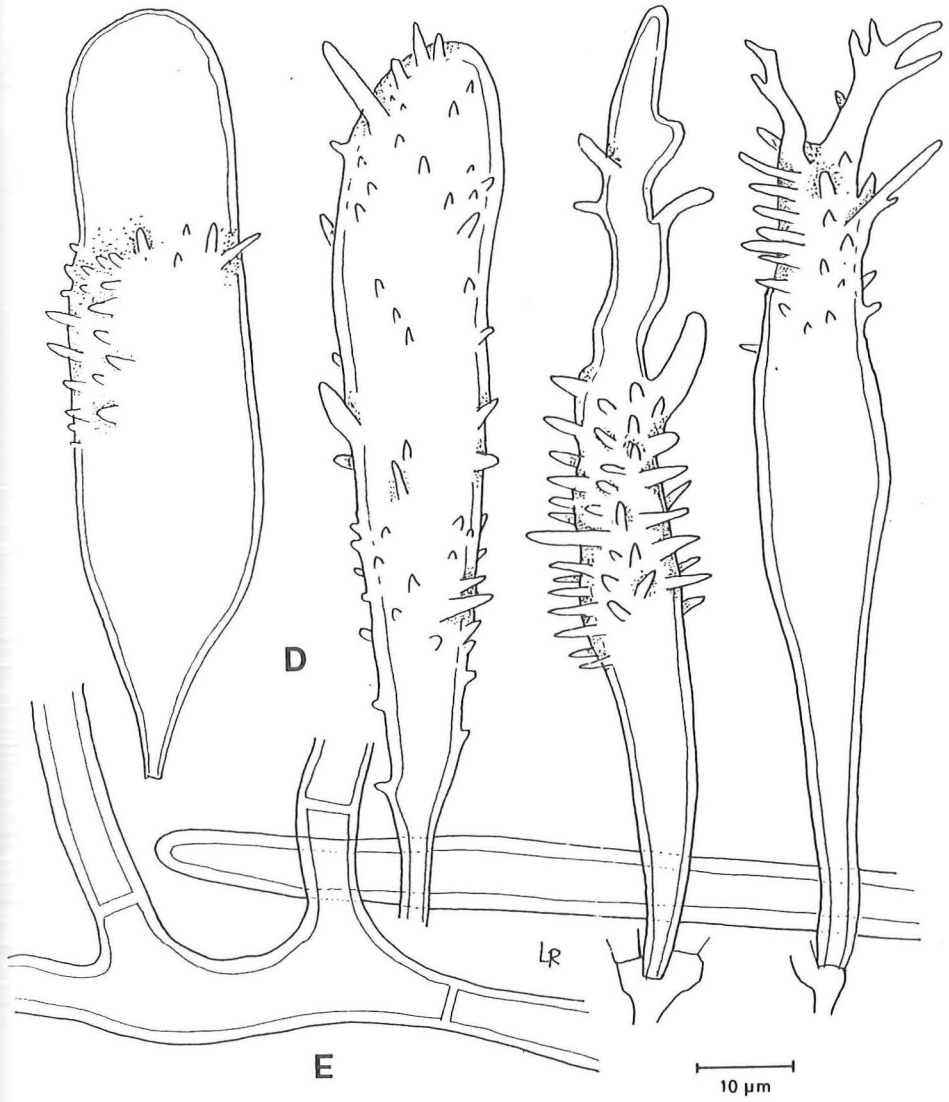


Fig.48. *Aleurodiscus oakesii*, USA, New York, Essex, Saramac, 11 September 1965, C. Rogerson (NY). A) monoliform cystidia, B) acanthophyses, C) basidiospores, D) ornamented gloeocystidia, E) hyphae of the subiculum.

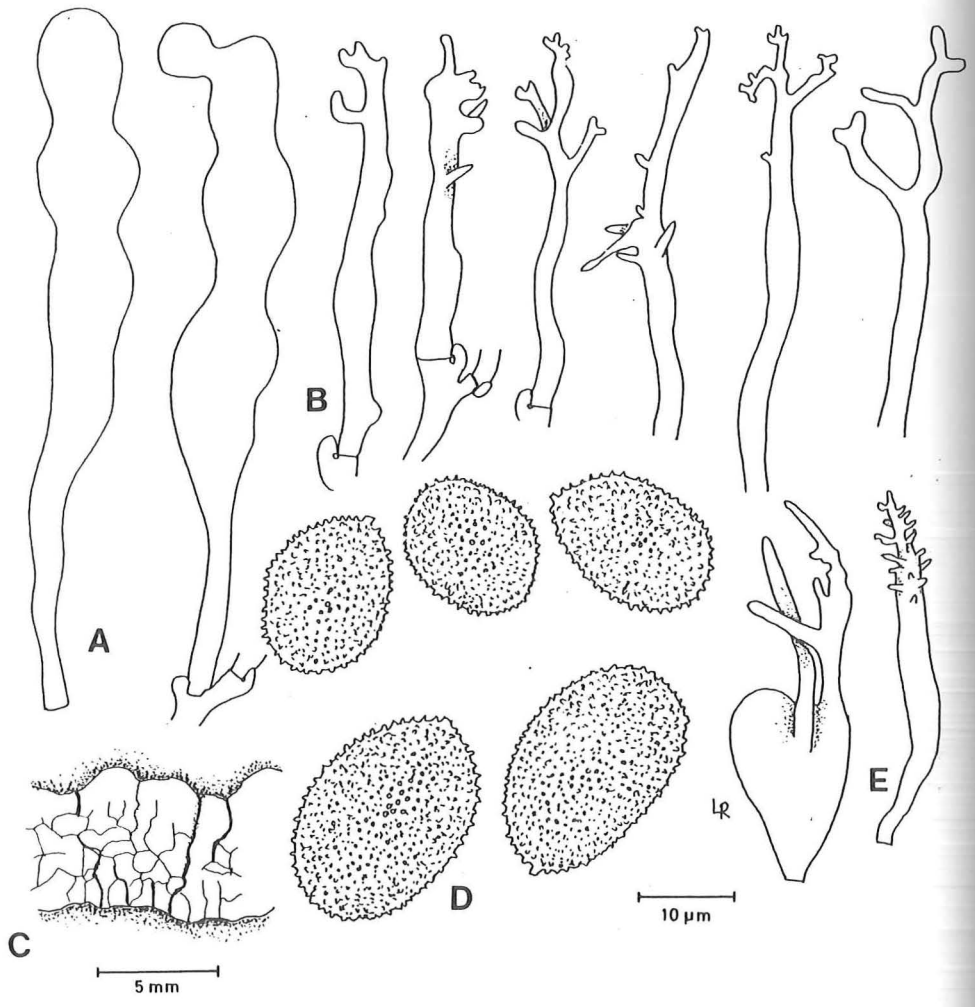


Fig. 49. *Aleurodiscus occidentalis*, Canada, British Columbia, Vancouver Island, Mount Newton, 9 June 1938, E. Mounce & J. Bosher, DAOM 8942, Holotype (DAOM). A) gloeocystidia, B) dendrohyphidia, C) basidiocarp, D) basidiospores, E) acanthophyses.

Aleurodiscus occidentalis Ginns Fig. 49

Mycologia 82: 753, 1990.

Basidiocarp disciform to steroid, cream to pale grey, crustose, smooth or very finely rimose, small, up to 10 mm diam., margin white and abrupt, subiculum white, very thin.

Hyphal system monomitic, generative hyphae with clamps, freely branched and tortuous, 2-4 µm wide and difficult to observe properly due to abundant crystalline matter.

Acanthophyses scattered and very rare, cylindrical to clavate with a few protuberances, up to 5 µm wide and thin-walled.

Gloeocystidia usually moniliform to mammillate, 40-55 x 10-12 µm and with a basal clamp.

Dendrohyphidia scattered in the hymenium, slightly branched, 2-4 µm diam.

Basidia clavate with basal clamp, 60-90 x 12-16 µm with 4 large sterigmata, 10-15 µm long.

Basidiospores subglobose to ovoid, often adiaxially flattened, distinctly warted, 14-17 x 11-14 µm.

Substrata. Known only from *Thuja plicata.*

Distribution. Known from Canada (British Columbia) and north-west USA.

Remarks. This species comes close to *A. spiniger* and *A. penicillatus* but has smaller basidiospores.

Aleurodiscus ochraceoflavus Lloyd Fig. 50

Mycol. Writ.7: 1228, 1923.

Basidiocarp cupulate, often laterally confluent and then up to 2-5 cm long, up to 0.5 mm thick, margin raised and free, acute, entire or lobed, texture coriaceous, hymenophore initially pale pink, pale ochraceous when dry, pruinose, even or slightly rugulose, abhymenial surface white, tomentose.

Hyphal system monomitic, generative hyphae with clamps, the tomentum consisting partly of acanthophyses and flexuous hyphae with scattered spines or protuberances.

Acanthophyses cylindrical to subclavate, 40-90 x 5-8 µm, in the upper part covered with blunt protuberances.

Gloeocystidia flexuous-cylindrical, 60-250 x 7-12 µm, a few with some scattered protuberances in the lower part.

Dendrohyphidia subclavate, 65-100 x 8-10 µm, simple or with a few short side branches or blunt protuberances.

Basidia clavate, 110-160 x 16-22 µm, bearing 4 sterigmata up to 16 µm long.

Basidiospores obovate, elliptical, flattened adaxially or slightly D-shaped, 18-20 (23 µm in KOH) x 12-15 µm, finely verruculose.

Substrata. Known only from branches of dead *Leptospermum* sp.

Distribution. Known only from New Zealand.

Remarks. The species is related to *A. mirabilis* and *A. zealandicus* through having the same type of basidiocarp, but has distinctly smaller basidiospores.

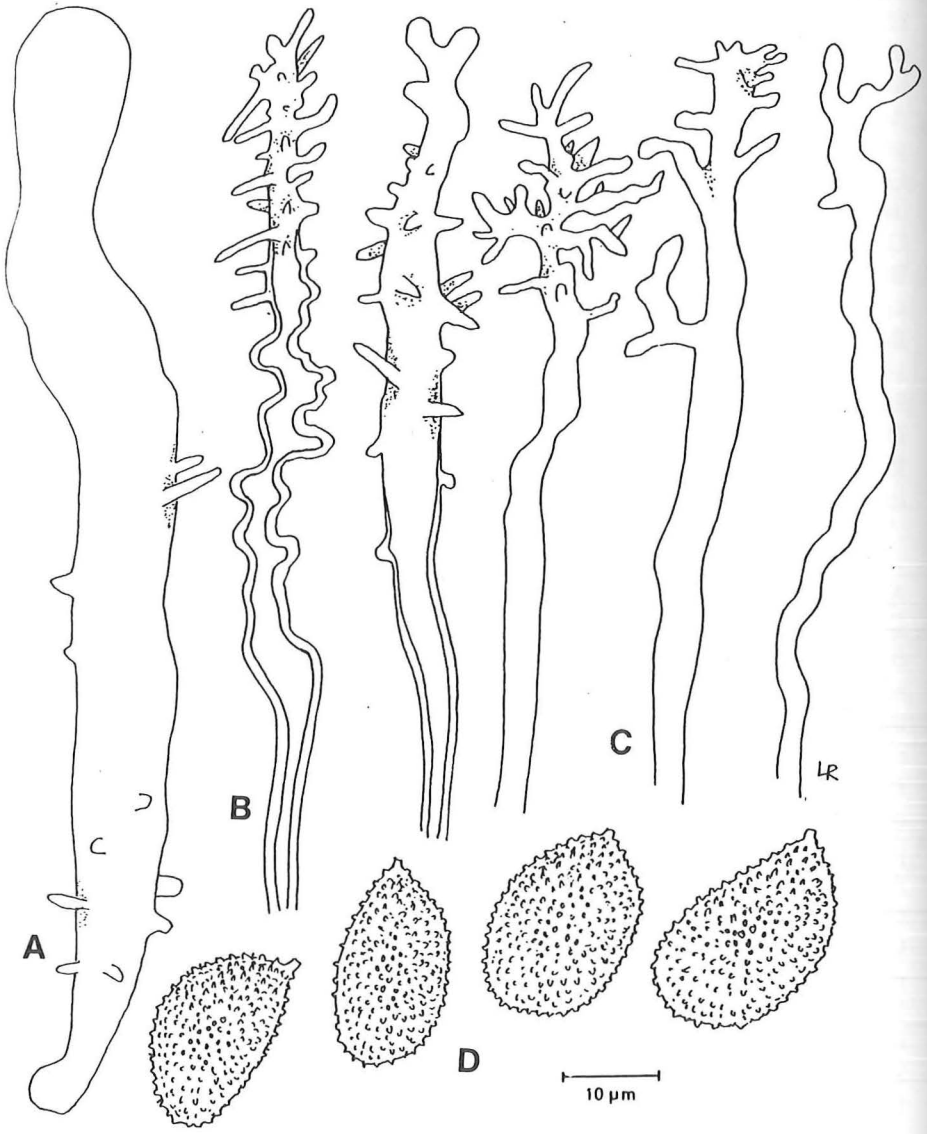


Fig. 50. *Aleurodiscus ochraceoflavus*, New Zealand, Auckland, Cacamatus stream, 23 August 1963, J.M. Dingley, (PDD). A) ornamented gloeocystidium, B) acanthophyses, C) dendrohyphidia, D) basidiospores.

The spore ornamentation is also much finer. The strongly branched acanthophyses in *A. mirabilis*, and to a lesser degree *A. zealandicus*, are not found in *A. ochraceoflavus*.

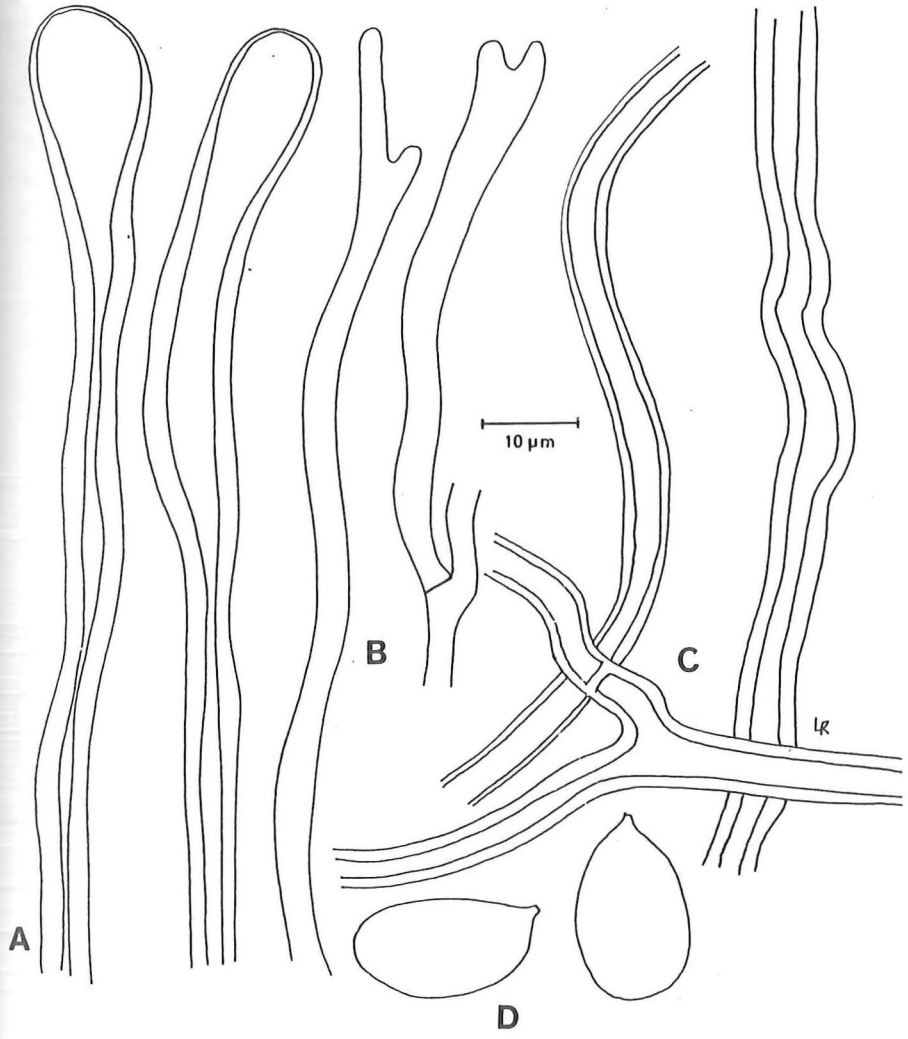


Fig. 51. *Aleurodiscus parmuliformis*, New Zealand, Wellington, Tararua Range, Gable End Rich, November 1932, G. Chamberlain 3837, Isotype (K). A) skeletocystidia, B) paraphyses, C) hyphae in the subiculum, D) basidiospores.

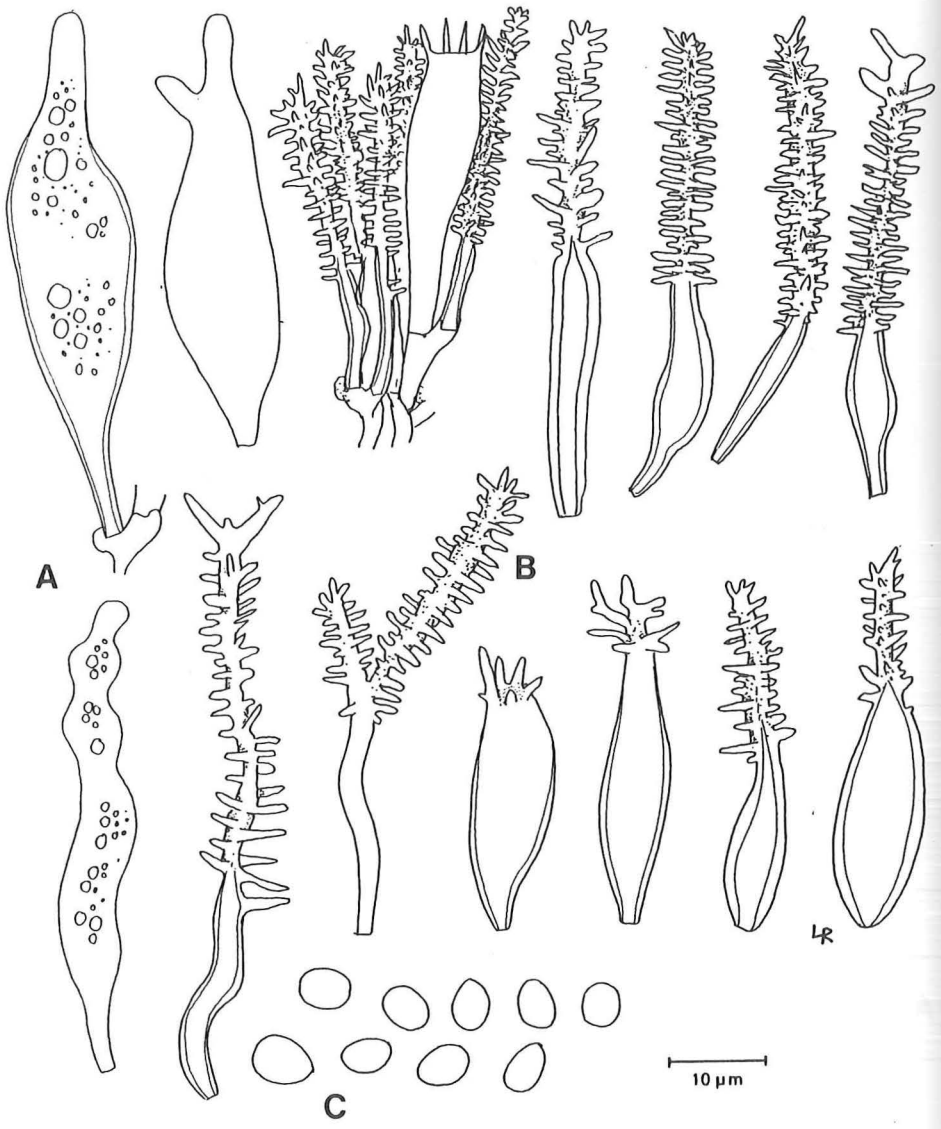


Fig. 52. *Aleurodiscus parvisporus*, Japan, Niigata pref., Irihirose, 26 Oct. 1991., L. Ryvarden 30163, (O). A) gloeocystidia, B) acanthophyses, C) basidiospores.

Aleurodiscus parmuliformis G. Cunn. Fig. 51
Trans. Roy. Soc. New Zeal. 84: 244, 1956. - *Aleurodiscus pateriformis* G. Cunn., Trans. Roy. Soc. New Zeal. 84: 243. 1956.
Basidiocarp corticioid, consisting of numerous confluent disciform colonies, 2-10 mm diam., up to 6 cm long, deeply rimose with age, margins of young specimens slightly lifted, finely floccose, becoming plane, definite, fragile; hymenophore pale cream, ochraceous, with reddish or pale olivaceous tints when old.
Hyphal system monomitic, generative hyphae with simple septa, thin-walled and difficult to observe in the subhymenium, thick-walled in the subiculum, often obscured by masses of crystals, basal hyphae may easily be taken as skeletal hyphae because of the scattered septa.
Acanthophyses absent.
Gloeocystidia scanty to abundant, flexuous-cylindrical, 80-160 x 6-16 µm, often difficult to separate from young basidia.
Skeletocystidia thick-walled, arising from a simple septum, up to 150 µm long.
Paraphyses cylindrical, slightly projecting, simple or occasionally forked, 5-7 µm diam.
Basidia subclavate, 65-100 x 12-16 µm with 4 sterigmata.
Basidiospores ellipsoid or oval, 14-16 x 8-12 µm, obliquely apiculate, smooth.
Substrata. On bark of dead branches of different hardwood hosts such as *Weinmannia*.
Distribution. Known only from New Zealand.
Remarks. The species is characterized by its simple septate hyphae, the lack of acanthophyses, and the large, smooth, ellipsoid basidiospores.

Aleurodiscus parvisporus Núñez & Ryvarden sp. nov. Fig. 52
Fructificatio resupinata, adnata, hymenio pallide luteus, hyphae generatoriae fibulatae, acanthophyses praesentes, gloeocystidia abundantia, sporae leves, amyloidibus, 5-6 x 4-5 µm.
Holotype: Japan, Niigata pref. Irihirose, 26 Oct. 1991., L. Ryvarden 30163, herb. O, isotype in K.

Basidiocarp annual, effused, adnate, corticioid, thin, up to 300 µm thick, hymenophore smooth, pale yellow to ochraceous, context very thin and difficult to separate from hymenial layer.
Hyphal system monomitic, generative hyphae with clamps 2-4 µm diam., in the subiculum up to 8 µm wide, thin-walled, hyaline.
Gloeocystidia present, clavate to ventricose with a tapering round apex, simple, rarely with lateral side branches, slightly thick-walled, hyaline or filled with oily pale yellow content, 40-70 µm long.
Dendrohyphidia absent.
Acanthophyses abundant, narrow and hyphoid with numerous thin spiny protuberances, covered in lengths to 40 µm, intergrading with some which are

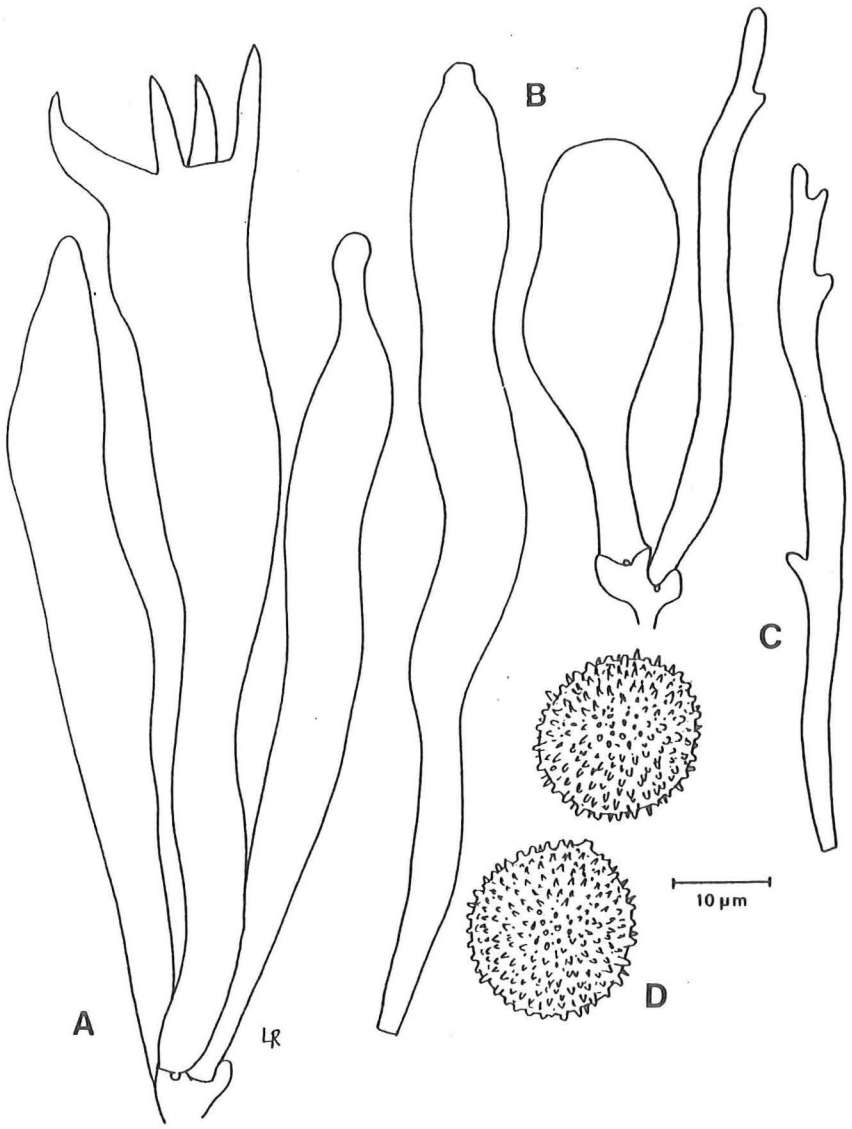


Fig. 53. *Aleurodiscus patellaeformis*, New Zealand, Canterbury Arthur Pass, 17. January 1956, J. Dingley, Isotype (K). A) basidium, B) gloeocystidia, C) dendrohyphidia, D) basidiospores.

more ventricose, up to 10 µm wide in the middle, thick-walled at least in the basal parts.
Basidia clavate, 25-40 x 5-8 µm with 4 sterigmata.
Basidiospores subglobose, smooth, thin-walled, 5-6 x 4-5 µm.
Substrata. Dead hardwood branches.
Distribution. Known only from the type locality in Japan (Niigata).
Remarks. The remarkable characters are the small, smooth basidiospores combined with the numerous and densely spiny acanthophyses. Superficially it looks like any adnate, thin, corticioid species.

Aleurodiscus patellaeformis G. Cunn. Fig. 53
Trans. Roy. Soc. New Zeal. 84: 243, 1956.
Basidiocarp cupulate and usually attached by a small base, membranous, brittle when dry, 2-10 mm diam., up to 0.3 mm thick, margin free and deflexed, abhymenial surface floccose to slightly villose, white to pale tan, hymenophore smooth, cream or pale ochre, subiculum white.
Hyphal system monomitic, generative hyphae with clamps, delicately thin-walled in the subhymenium, 3-5 µm wide, distinctly thick-walled and wide in the subiculum, 3-8 µm with large and conspicuous clamps at the branching.
Acanthophyses absent.
Gloeocystidia abundant, cylindric to mammillate, rarely moniliform and then often sinuous, 110-160 x 10-16 µm.
Dendrohyphidia present, difficult to find in dry specimens, 3-5 µm wide, simple or with one or a few lateral outgrowths near the apex.
Basidia subclavate, 64-80 x 10-14 µm with 4 sterigmata.
Basidiospores almost globose, 14-17 x 15-18 µm, coarsely echinulate.
Substrata. On bark of dead hardwoods.
Distribution. Known only from New Zealand.
Remarks. The globose, echinulate basidiospores and the presence of clamps separate this species from *A. parmuliformis* and *A. limonisporus*, which share the initially cupulate basidiocarp.

Aleurodiscus penicillatus Burt Fig. 54
Ann. Mo. Bot. Gard. 5: 201, 1918.
Basidiocarp corticioid, first in small, separate patches 2-3 mm diam., up to 0.4 mm thick, later more confluent, forming irregularly effused areas, margin determinate, adnate, hymenophore pruinose to pulverulent, first smooth, later finely rimose, white to cream.
Hyphal system monomitic, hyphae with clamps, 3-6 µm wide, thin-walled.
Acanthophyses hyphoid to broadly clavate, 20-100 x 5-20 µm, thick-walled, protuberances restricted to rounded apical part in the clavate acanthophyses, in the hyphoid ones also laterally in a length of up to 20 µm; transitions between the two types occur.

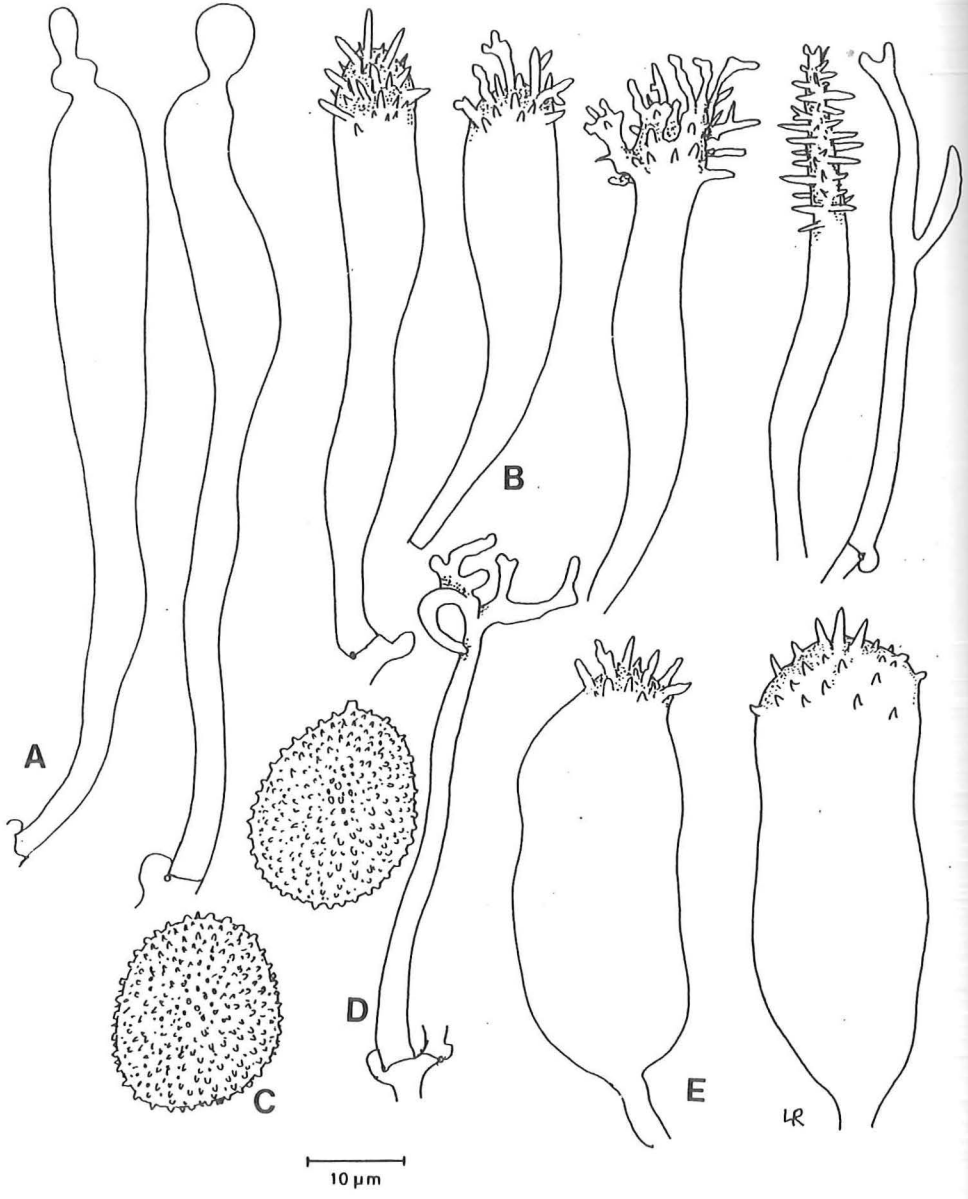


Fig. 54. *Aleurodiscus penicillatus*, USA, Oregon, Eugene Lane County, 7 October 1909, G. Humphrey 6085, Holotype (NY). A) moniliform cystidia, B) acanthophyses, C) basidiospores, D) dendrohyphidium, E) ornamented gloeocystidia.

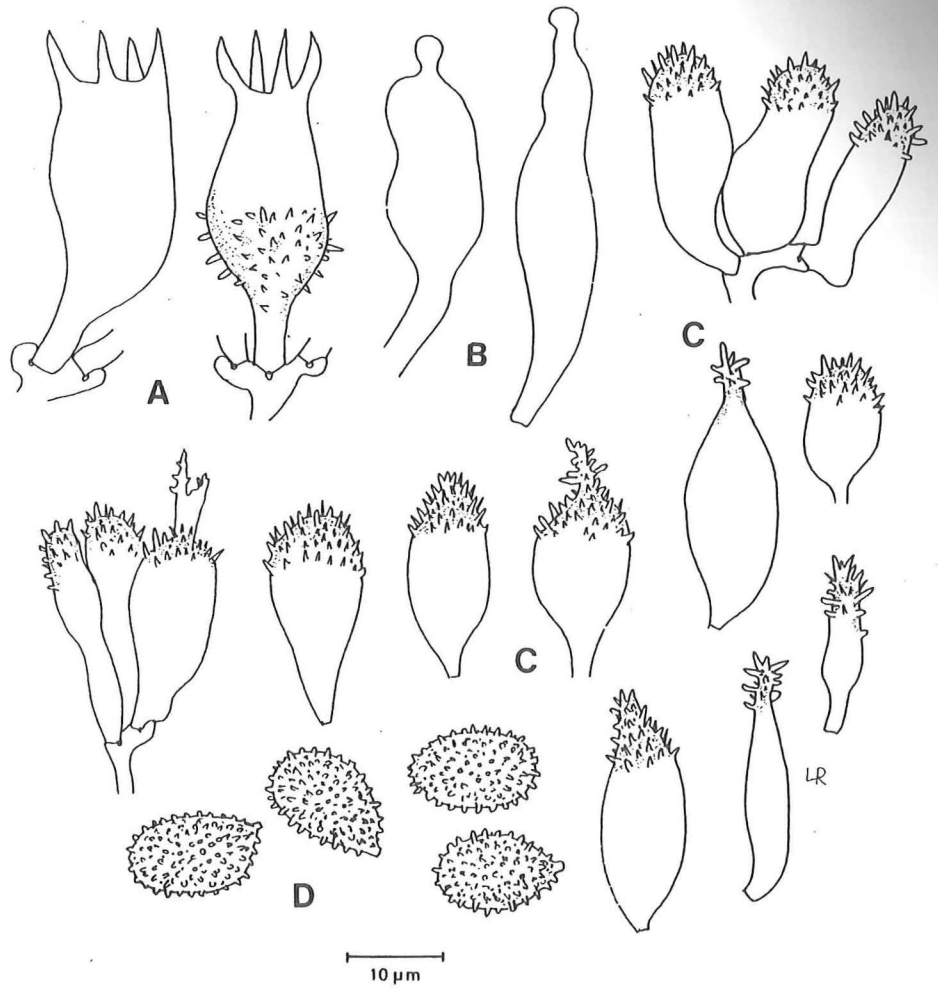


Fig. 55. *Aleurodiscus phragmitis*, Argentina, Misiones El Soberlio, 28 April 1966, Gomez, DAFC 24546 (DAFC). A) basidia, B) gloeocystidia, C) acanthophyses, D) basidiospores.

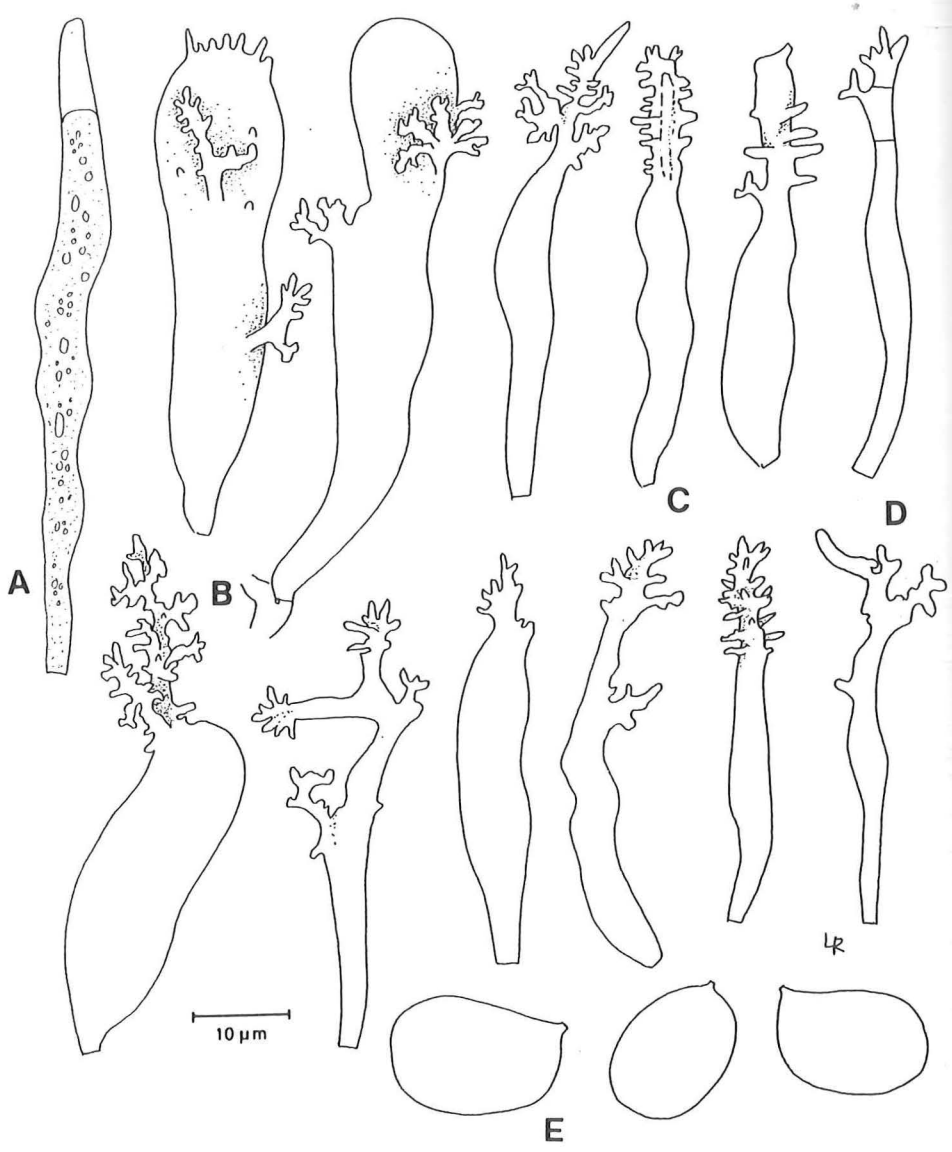


Fig. 56. *Aleurodiscus propinquus*, Isle Reunion, Petit Line, 9 May 1985, Boidin 11725, Holotype (LY). A) gloeocystidium, B) clavate acanthophyses with dendroid appendixes, C) cylindrical acanthophyses, D) dendrohyphidia, E) basidiospores.

Gloeocystidia cylindric to clavate or moniliform, (35)50-75 x 9-12 µm, often mammillate.
Basidia clavate, 55-90(110) x 16-24 µm, difficult to observe properly in dry specimens, reported to have scattered lateral protuberances, with 4 sterigmata.
Basidiospores ovoid-ellipsoid, 15-20 (25) x 13-17 µm, thick-walled at maturity, densely warted.
Cultural characteristics. See Boidin et al. (1968).
Substrata. On dead branches of conifers such as *Abies, Picea, Pinus, Pseudotsuga, Thuja,* and *Tsuga*.
Distribution. Southern Canada, USA, eastern Russia, Japan, and Taiwan.
Remarks. The species seems to be related to *A. spiniger* sharing the same microstructure except for the basidiospores which are larger.

Aleurodiscus phragmitis (Boidin et al.) Núñez & Ryvarden comb. nov. Fig. 55
Basionym: *Acanthobasidium phragmitis* Boidin et al. Bull. Soc. Mycol. Fr. 101:345, 1985.
Basidiocarp corticioid, very thin and delicate, white to pale buff.
Hyphal system monomitic, generative hyphae with clamps, 2-3.5 µm wide, irregular in outline.
Gloeocystidia hyaline or with few drops of oily yellow content, cylindrical to moniliform, often mammillate, 20-50 x 5.5-14 µm.
Acanthophyses numerous, clavate to ventricose or widened in the apex, 18-30 x 7-8 µm, the upper part densely covered with distinct protuberances, up to 2.5 µm long, later developing into basidia.
Basidia developing from the acanthophyses and thus with numerous protuberances in the middle part and close to the base, 35-40 x 9-11 µm with 4 sterigmata, up to 12 µm long.
Basidiospores ellipsoid, strongly warted, 11-14 x 5.5-7 µm.
Substrata. Known from *Phragmitis, Bambusa*, and *Sasa japonica*.
Distribution. Known from Spain, France, England, and Argentina but probably overlooked in places where *Phragmitis* is growing because corticiologists mostly collect on dead wood.
Remarks. The species is recognized by the monocotyledon substrate, the fairly small asperulate basidiospores, and the acanthobasidia.

Aleurodiscus propinquus (Boidin & Gilles) Fig. 56
Núñez & Ryvarden comb. nov.
Basionym: *Acanthophysium propinquum* Boidin & Gilles, Bull. Soc. mycol. Fr. 102: 295, 1985.
Basidiocarp corticioid, adnate, occurring as small round patches, hymenophore pale yellow to pale orange contrasting with the margin which is prominently floccose and white, up to 200 µm thick.
Hyphal system monomitic, generative hyphae with clamps, 2-7 µm wide.

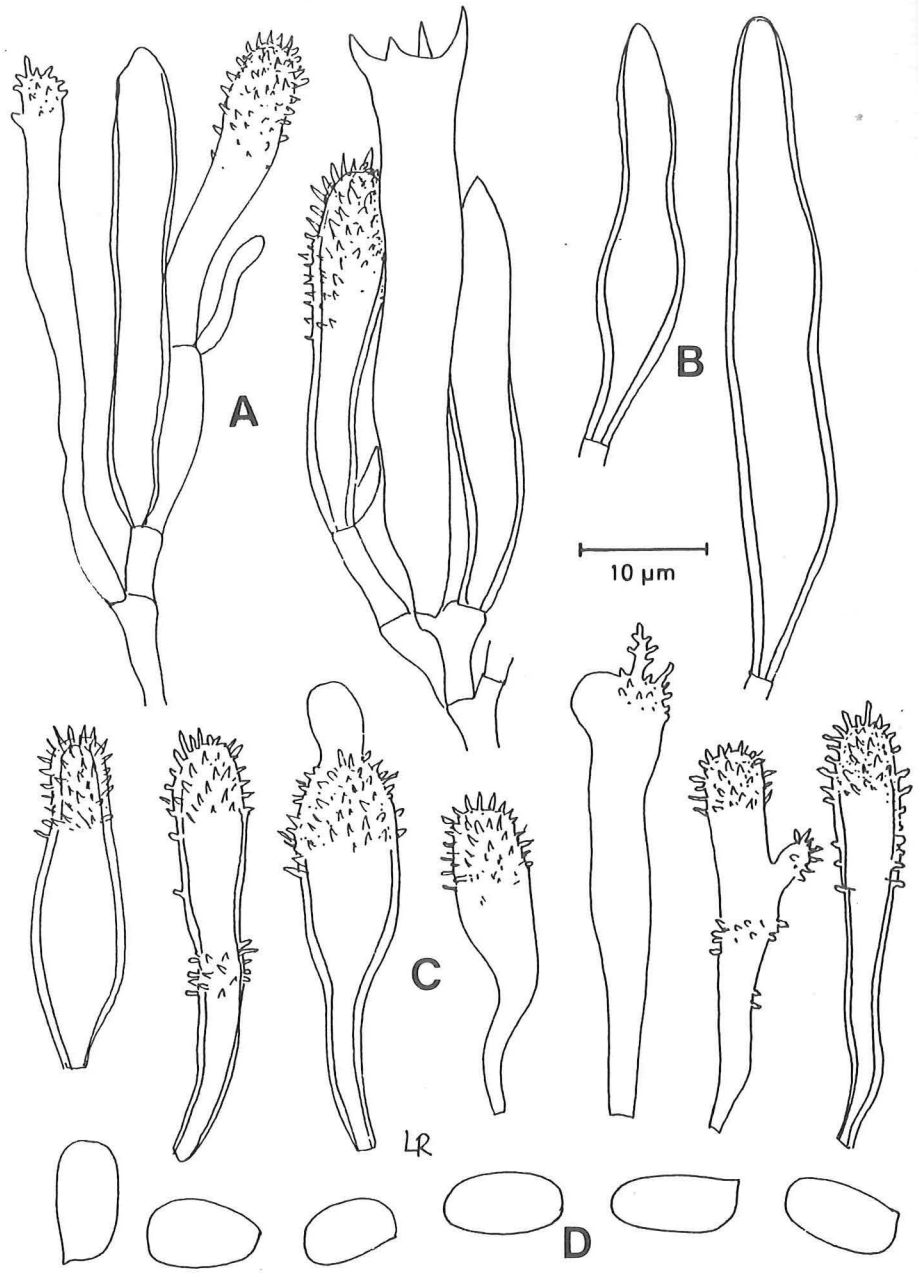


Fig. 57. *Aleurodiscus rimulosus*, USA, Puerto Rico, Vieques Islands, Campo Cielo to Ensenada Honda., 27 February 1914, J.A. Shafer 3048, Isotype (O). A) part of the hymenium, B) gloeocystidia, C) acanthophyses, D) basidiospores.

Gloeocystidia hyaline, clavate and slightly moniliform towards the apex, positive in sulphoaldehyde, 60-100 x 6-12 µm.
Acanthophyses numerous, clavate to hyphoid and with numerous protuberances with transitions to dendrohyphidia.
Dendrohyphidia simple or sparingly branched, up to 60 µm long.
Basidia clavate, 45-55 x 12-17 µm, with 4 sterigmata, a few observed with lateral acanthophysoid branches.
Basidiospores ellipsoid, smooth, thin-walled, 13-15 x 10-11.5 µm.
Substrata. On *Phillipa* sp.
Distribution. Known only from Réunion in the Indian Ocean.
Remarks. The species is related to *A. cerrusatus* but separated by much larger basidiospores and the floccose white margin with a pale yellow to orange hymenial surface.

Aleurodiscus rimulosus Núñez & Ryvarden sp. nov. Fig. 57

Fructificatio resupinate, arcte adnata, hymenio cremicolori, rimuloso, contextus monomiticus, hyphae tenuitunicatis vel crassiusculis, 2-4 µm latis, sine fibulis, cystidia clavata autem variabilia, 25-60 x 4-8 µm, acanthophyses praesentes, amyloideae, dendrohyphidia et hyphae paraphysoideae nulla, basidia clavata 30-40 x 5-7, plerumque 4 sterigmatibus, sporae ellipsoidibus, laeves, amyloidibus, 8-10 x 5-6 µm.
Holotype: USA, Puerto Rico, Vieques Islands, Campo Cielo to Ensenada Honda., 27 February 1914, J.A. Shafer 3048, on decorticated hardwood (NY, isotype O).
Etymology: 'rimulosus' - minutely cracked, referring to the very finely cracked basidiocarps.

Basidiocarps resupinate, strongly adnate, slightly stereoid with a raised margin, initially disciform, later more confluent, up to 3 cm long and 1 cm wide, up to 0.5 mm thick, hymenophore smooth in small basidiocarps, undulating and reflecting the substrate in larger ones, pale cream, minutely and irregularly rimose in the type.
Hyphal system monomitic, generative hyphae with simple septa, thin-walled in the subhymenium, 2-3 µm, thick-walled in the subiculum and to 5 µm wide, hyphae strongly agglutinated and mixed with numerous angular crystals often in dense clusters.
Acanthophyses numerous, cylindrical, clavate to ventricose, densely covered with protuberances in the upper half, often also in the basal parts, thin- to thick-walled, especially in the upper part, 25-40 x 4-10 µm, hyaline in KOH, pale brown in Melzer's reagent with distinct, amyloid, apical protuberances.
Gloeocystidia scattered, cylindrical to clavate, smooth, slightly thick-walled, hyaline, 25-60 x 4-9 µm.
Dendrohyphidia and **paraphyses** not seen.
Basidia clavate, smooth, thin-walled, 25-40 x 4-8 µm, with 4 sterigmata.

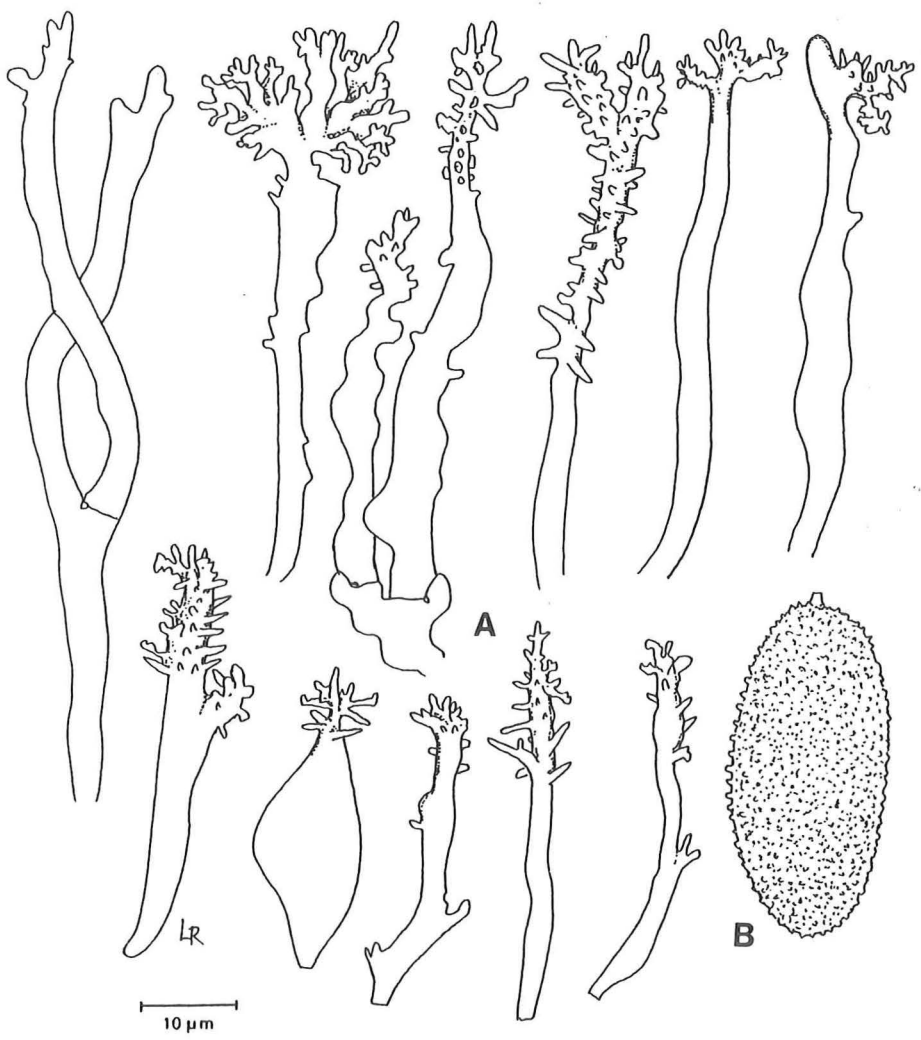


Fig. 58. *Aleurodiscus sparsus*, Australia, Vangarata, Victoria, without collector, Holotype (K). A) different types of acanthophyses, from cylindrical to clavate and coralloid, B) basidiospores.

Basidiospores cylindrical to oblong ellipsoid, smooth, thin-walled, 8-10 x 5-6 µm.
Substrata. Only known from decorticated wood of a hardwood host.
Distribution. Known only from the type locality in Puerto Rico in the Caribbean.
Remarks. This species undoubtedly comes close to *A. bisporus* which was described from Guadeloupe. However, *A. bisporus* is a thin species without cracking, additionally having numerous paraphysoid hyphae and non-amyloid acanthophyses with only a few apical protuberances. The basidiospores of the two species are almost identical, although slightly larger in this new species. The basidia in *A. bisporus* have only two sterigmata and distinct mature basidia are unfortunately difficult to find in *A. rimulosus*. Only one was observed properly and this had four sterigmata, which again indicates that *A. rimulosus* is different from *A. bisporus.*

Aleurodiscus sparsus (Berk.) Höhn. & Litsch. Fig. 58
Sitzber. Math.-Nat. Kl. Akad. Wiss. Wien 116: 809. 1907. - *Stereum sparsum* Berk, J. Linn. Soc. 13: 169. 1873.
Basidiocarp corticioid, at first orbicular, soon confluent in effused areas 11-14 x 1-2 cm, margin fibrillose to definite and abrupt, texture cretaceous, hymenophore chalk white, finally deeply rimose.
Hyphal system monomitic, hyphae predominantly with simple septa, 2-4 µm wide, in the subiculum with scattered clamps.
Acanthophyses in a dense palisade, coralloid, branched, spinulose throughout, fragile and easily broken, difficult to observe in unbroken state.
Gloeocystidia commonly fusiform, oval to obpyriform, 32-72 x 18-50 µm, contents orange when fresh, pale grey to yellow in dry specimens.
Basidia cylindrical or slightly clavate, 65-110 x 20-25 µm, with 4 sterigmata up to 32 µm long.
Basidiospores elliptical, 25-36 x 16-20 µm, finely asperulate to aculeate.
Substrata. On bark or decorticated wood of *Eucalyptus* sp.
Distribution. Australia, New Zealand.
Remarks. Separated from other species in Australia and New Zealand by the large, oblong-ellipsoid basidiospores.

Aleurodiscus spiniger D.P. Rogers & P.A. Lemke Fig. 59 & 60
Can. J. Bot. 42: 265, 1964.
Basidiocarp stereoid, first as small separate patches 0.5-1.5 mm diam., up to 1 mm thick, later confluent with distinct white and finely floccose margin, hymenophore pruinose to farinose, first smooth or finely tuberculate, rimose with age and drying, white when fresh, drying cream.
Hyphal system monomitic, generative hyphae with clamps, thin- to thick-walled, up to 6 µm wide in the subiculum.
Acanthophyses numerous and variable, hyphoid to clavate or ventricose, yellow

and apparently thick-walled, 25-65 x 7-17 µm, protuberances mostly confined to the apical part, but also lateral in the hyphoid types; also seen are small crystal-like bodies with a few protuberances, yellow, and probably young acanthophyses.

Gloeocystidia flexuous-cylindric to subclavate, 50-85 x 4-7 µm, often mammillate, hyaline or yellowish in KOH, often difficult to find in dry specimens.

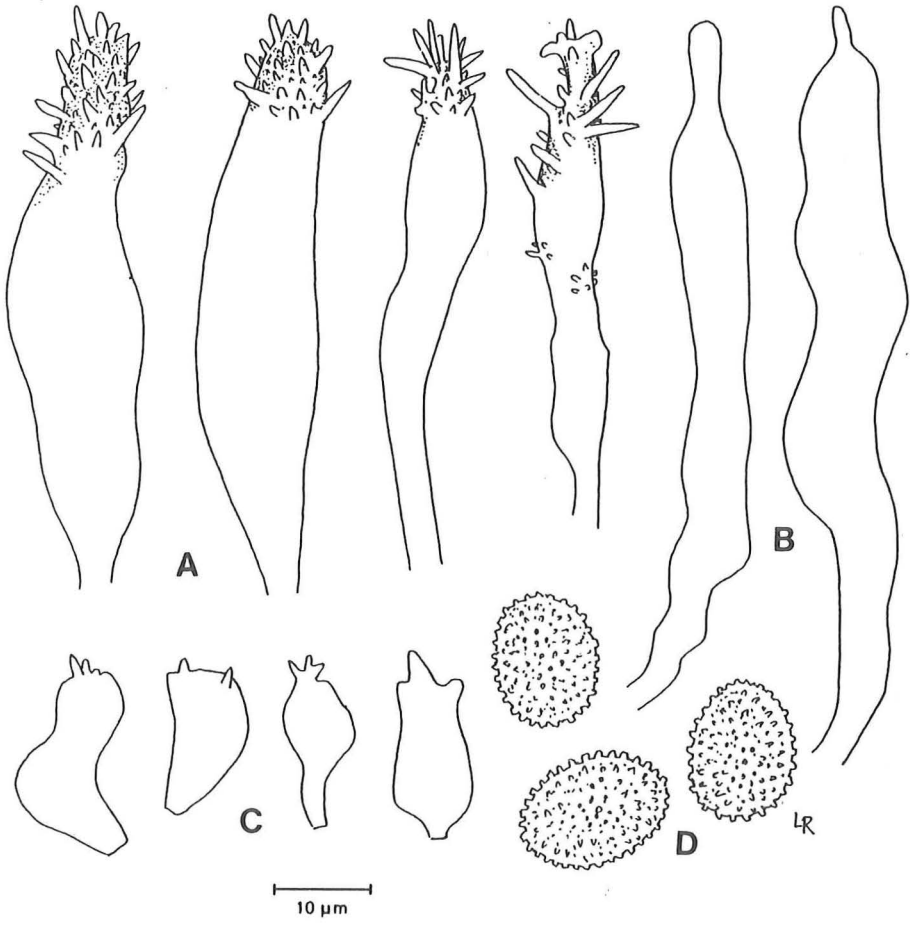


Fig. 59. *Aleurodiscus spiniger*, USA, Oregon, Marris Peak, 16 December 1938, D.P. Rogers 810, Holotype (NY). A) clavate acanthophyses, B) gloeocystidia, C) young acanthophyses?, D) basidiospores.

Basidia cylindric to subclavate, 60-90 x 10-13 µm, 4-sterigmate.

Basidiospores ovoid to ellipsoid, 12-15 x 9-12 µm, echinulate, .

Substrata. On bark of conifers, see Ginns et Lefebvre (1993) for details.

Distribution. Northwestern North America.

Remarks. The species is related to *A. weirii* and *A. laurentianus*. The three species differ in spore details and shape of acanthophyses.

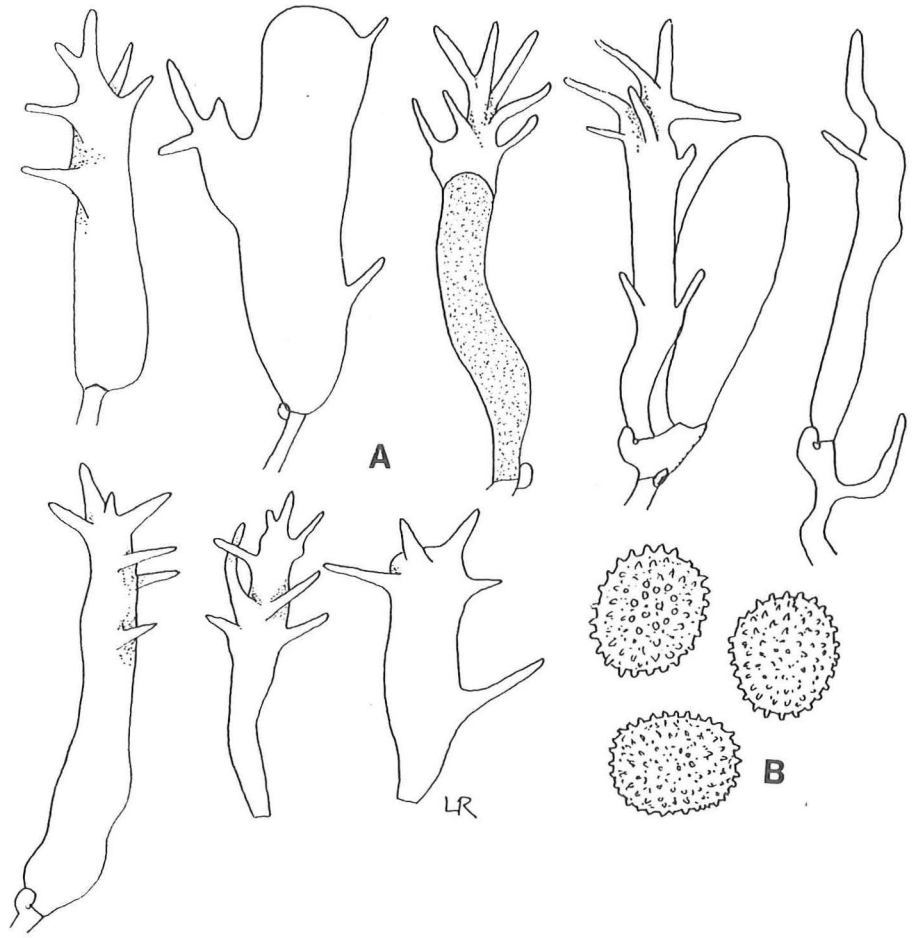


Fig. 60. *Aleurodiscus spiniger*, Canada, British Columbia, Vancouver Island, J. Eriksson 77217, August 1961 (GB). A) hyphoid acanthophyses, B) basidiospores.

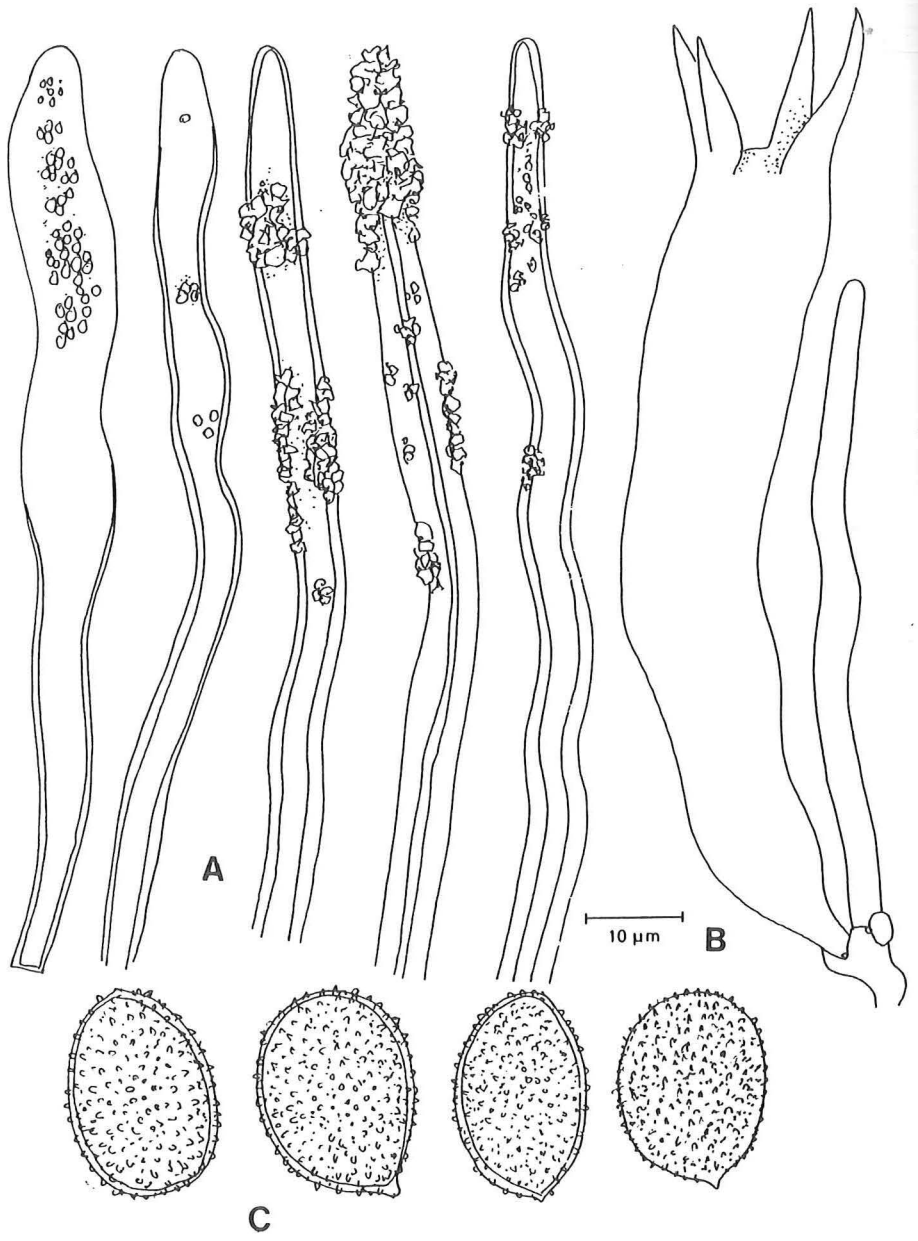


Fig. 61. *Aleurocystidiellum subcruentatum*, Japan, Wright 106, Holotype (K). A) skeletocystidia, B) basidium, C) basidiospores.

Aleurocystidiellum subcruentatum (Berk. & M.A. Curtis) Burt Fig. 61
Ann. Mo. Bot. Gard. 7: 237, 1920. - *Stereum subcruentatum* Berk. & M.A. Curtis, Proc. Am. Acad. Arts. Sci. 4: 123, 1858. - *Aleurodiscus scutellatus* Litsch., Österr. Bot. Zeitschr. 75:48, 1926.

Basidiocarp perennial, discoid to subpileate on vertical substrata, attached by a central point, up 10 mm wide, up to 1.5 mm thick, coriaceous when fresh, stiff and hard when dry, margin narrow, curved inwards in dry specimens, hymenophore smooth, cream to isabelline or slightly grey, abhymenial surface or partly reflexed upper margin smooth, greyish brown, often concentrically sulcate.

Hyphal system dimitic, generative hyphae with clamps, scattered and often difficult to find, skeletal hyphae abundant, hyaline to slightly yellowish, thick-walled, 3-6 µm wide.

Acanthophyses absent.

Skeletocystidia abundant, arising deep in the subhymenium and filling up the hymenium, thick-walled to solid, first smooth, but soon irregularly encrusted in the upper part with small grainy crystals, 5-10 µm wide, up to 200 µm long from the clamps from which they arise.

Gloeocystidia few, smooth, tubular, 5-10 µm wide, up to 120 µm long, often collapsed in dry specimens and difficult to find.

Basidia clavate, 55-100 x 8-12 µm, with 4 sterigmata.

Basidiospores ellipsoid to subglobose, thick-walled, appearing smooth in KOH, finely verruculose in Melzer's reagent, 15-20(22) x 10-15 µm.

Cultural characteristics. See Boidin et al. (1968).

Sexuality. Tetrapolar, See Boidin et al. (1968).

Substrata. On conifers like *Abies, Picea*, and *Pinus.*

Distribution. In Europe restricted to the central European mountains from France eastwards. Circumpolar to North America and Asia.

Remarks. The species is easy to recognize by its discoid basidiocarps on the bark of living coniferous trees and the numerous encrusted skeletocystidia.
See introduction for the genus concept (p. 15).

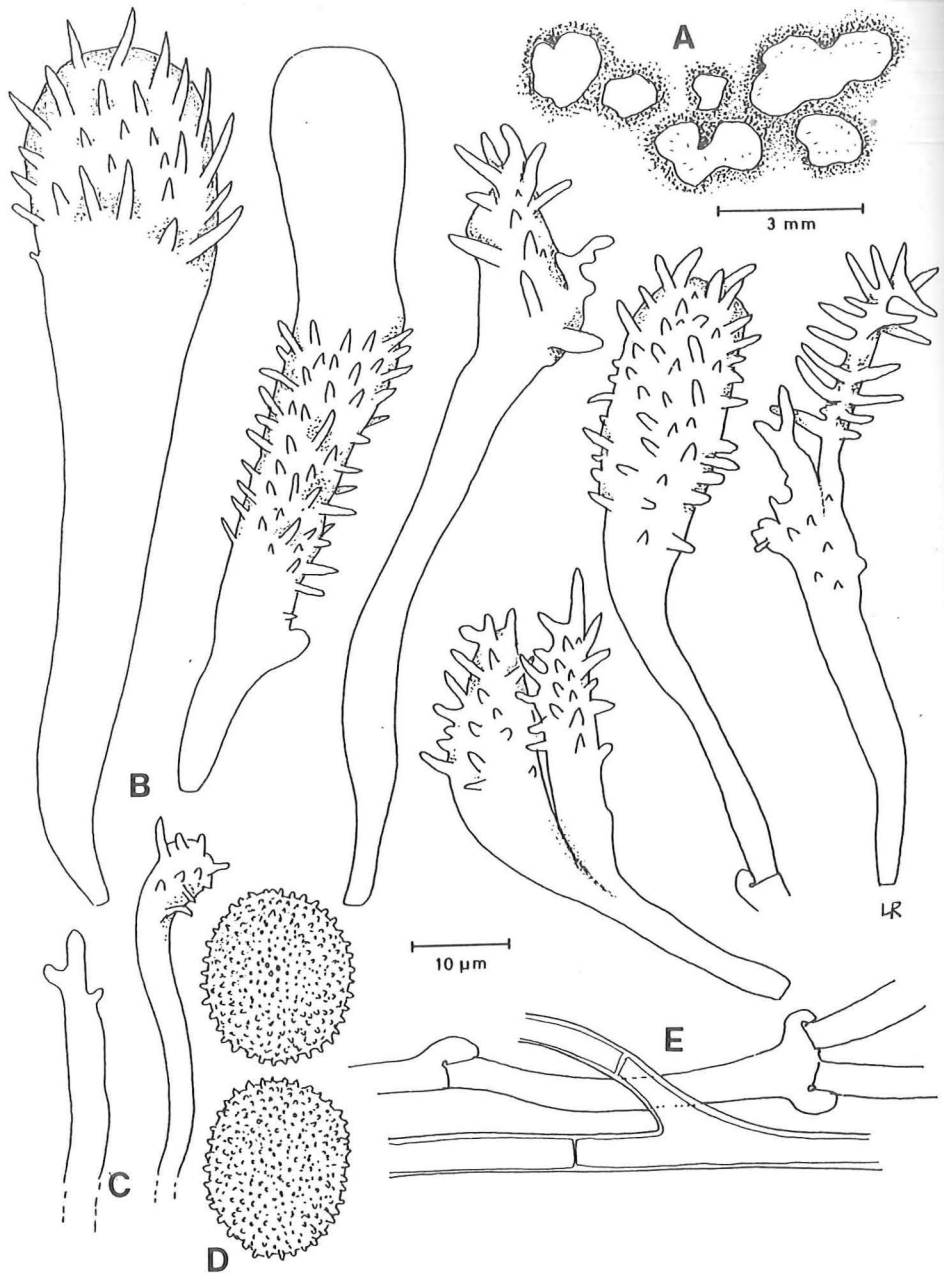


Fig. 62. *Aleurodiscus subglobosporus*, Japan, Gumma Prefecture, Konsaitoge, 26 May 1986, R. Bandoni 7543, Holotype (DAOM). A) basidiocarps, B) ornamented gloeocystidia with transitions to acanthophyses, C) dendrohyphidia, D) basidiospores, E) hyphae in the subiculum.

Aleurodiscus subglobosporus Ginns & Bandoni Fig. 62
Mycologia 83: 550, 1991.
Basidiocarp annual, cupulate, up to 10 mm long and about 0.5 mm thick, later more irregular, margin white, lifted in dry condition, hymenophore smooth, dull, cream to pale greyish white, subiculum white and very thin.
Hyphal system monomitic, generative hyphae mostly with clamps but basal hyphae also with simple septa, 3-7 µm diam.
Acanthophyses abundant, variable in shape from cylindrical to fusoid or clavate with a widened top, protuberances scattered, mostly confined to the upper part.
Gloeocystidia not common, about 100 x 12 µm, cylindrical, often mammillate, no reaction in sulphobenzaldehyde, occasionally with protuberances in the middle part.
Dendrohyphidia inconspicuous, a few hyphal ends present in the hymenium.
Basidia clavate, 80-100 x 15-22 µm, usually with a few scattered protuberances in the middle part, with 4 sterigmata and a basal clamp.
Basidiospores (sub)globose, warted to slightly spiny, 19-20(23) x 15-20 µm.
Substrata. Known only from *Abies veichii.*
Distribution. Known only from the type locality in Japan (Gunma Prefecture).
Remarks. The species is easy to recognize by the globose basidiospores and the host.

Aleurodiscus succineus Bres. Fig. 63
Mycologia 17: 71, 1925.
Basidiocarp orbicular, stereoid and rimose when dry, 0.5 mm diam., up to 0.5 mm thick, margin determinate, thick, abrupt to slightly raised, texture compact-subceraceous, hymenophore smooth, pale grey.
Hyphal system monomitic, hyphae with partially thickened walls and with clamps which however may often be difficult to observe.
Acanthophyses abundant, cylindric-subclavate, 30-80 x 3-7 µm, uniformly thin-walled, some with faintly amyloid protuberances close to the apex.
Gloeocystidia thin-walled, flexuous-cylindric to subclavate, (50)70-100 x 6.5-13.5 µm, rarely mammillate, contents granular-guttulate, yellowish in KOH.
Basidia subclavate, 55-70 x 7-9 µm, 4-sterigmate.
Basidiospores ellipsoid to subcylindric, (10)12-14 x 5-7 µm, thin-walled and smooth.
Substrata. On decorticated wood of *Arbutus menziesii.*
Distribution. USA (California, Oregon).
Remarks. This species is closely related to *A. cerussatus*, but separated by the thick, rimose and orbicular basidiocarps, looking like small, rimose cushions. Microscopically the two species are identical.

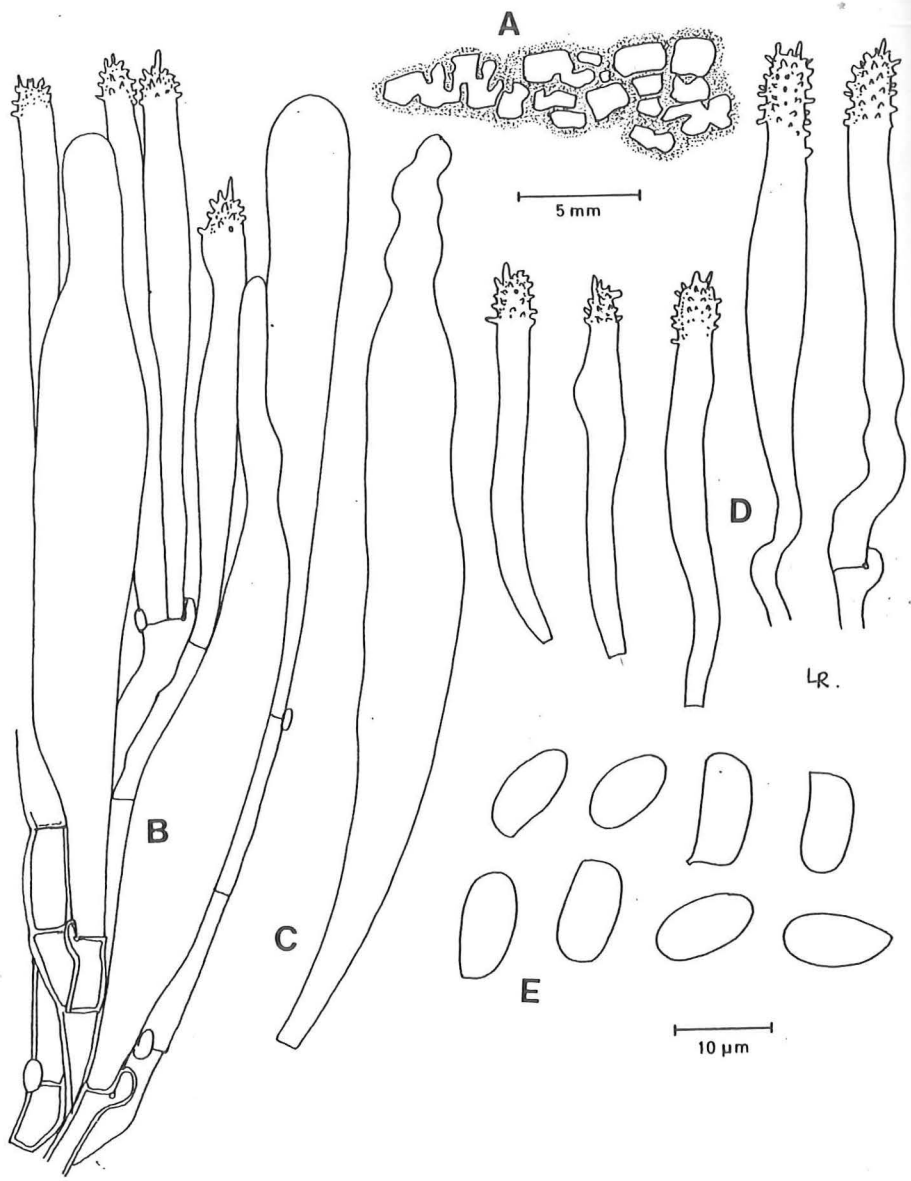


Fig. 63. *Aleurodiscus succineus*, USA, California, Berkeley University Campus, Moore 55, Holotype (NY). A) basidiocarps, B) part of the hymenium, C) mammillate cystidium, D) acanthophyses, E) basidiospores.

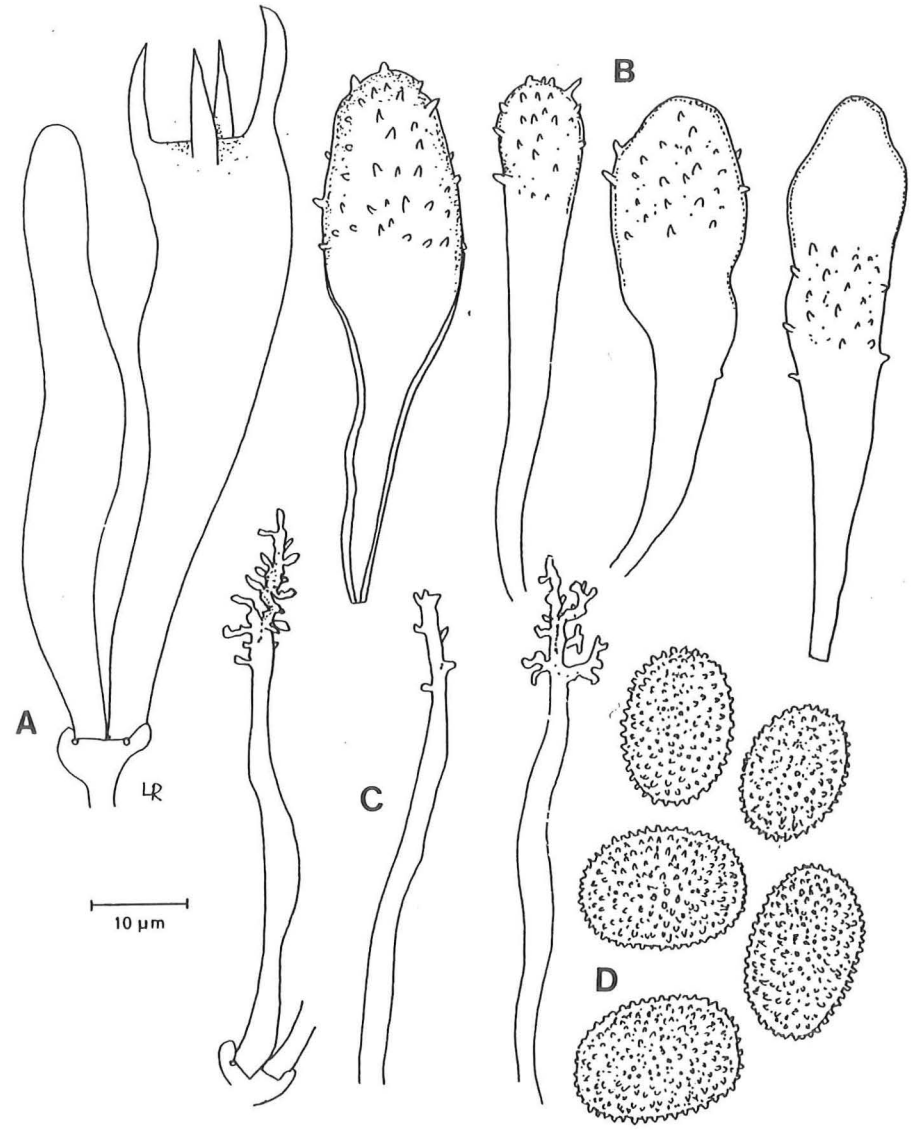


Fig. 64. *Aleurodiscus taxicola*, India, Bagi Mahasu, 13 October 1967, S. Rattan 5352, Holotype (LY). A) basidium, B) clavate acanthophyses, C) dendrohyphidia, D) basidiospores.

Aleurodiscus taxicola Thind & Rattan Fig. 64
Mycologia 65: 1255, 1973.
Basidiocarp stereoid, adnate, often arising as small pin-head colonies which may become effused or confluent, up to 2.5 x 1.5 cm, to 0.5 mm thick, margin thin to more or less abrupt, adnate, concolorous, texture farinose, hymenial surface white to cream, rarely rimose in thicker parts.
Hyphal system monomitic, hyphae 2-3.5 wide, thin-walled, clamped, usually collapsed in mature basidiocarps, or obscured by crystalline matter.
Acanthophyses up to 8 µm broad, clavate, thin-walled, dextrinoid according to Thind & Rattan, no reaction observed by us, protuberances up to 4 µm long confined to the apical part, older acanthophyses often collapse and are difficult to observe due to a covering of coarse crystals.
Gloeocystidia of variable length, 8-15 broad, fusiform, with granular contents, immersed or just reaching the hymenial surface, some with basal aculeate protuberances.
Dendrohyphidia finely branched in the upper part, up to 60 µm long.
Basidia clavate, 65-85 x 12-18 µm, with a long, tapering base, 2-4-spored, sterigmata up to 15 µm long, retraction septa common.
Basidiospores 15-18 x 10-13 µm, broadly ellipsoid to ovoid, finely but coarsely echinulate, with prominent apiculus.
Substrata. On bark of *Taxus baccata.*
Distribution. Only known from the type locality in the north western Himalayas.
Remarks. The species is close to *A. penicillatus*, sharing the coniferous host, clamped hyphae, ornamented basidiospores, and clavate acanthophyses. However, the basidiospores of the latter species are wider than in *A. taxicola* and this species lacks moniliform cystidia.

Aleurodiscus tenuis Burt Fig. 65
Ann. Mo. Bot. Gard. 5: 200, 1918.
Basidiocarp corticioid, adnate, thin with an indefinite margin, pruinose to pulverulent, hymenophore whitish to pale ochraceous.
Hyphal system monomitic, generative hyphae thin- to thick-walled with clamps at the septa, difficult to tease apart and mixed with numerous angular crystals, 3-6 µm wide.
Acanthophyses numerous, but difficult to separate, simple or sparingly branched, hyphoid to clavate with numerous protuberances which fall off very easily in microscopic preparations, 3.2-5.5 µm diam., seemingly rather short, up to about 40 µm.
Gloeocystidia scattered, partly thick-walled yellow bodies present in the type, cylindric to occasionally contracted and pointed, some with faintly amyloid walls, up to 20 µm diam. and 80 µm long, cystidia or unripe basidia?
Dendrohyphidia subclavate to clavate, 50-65 x 8-10 µm, with a few terminal short protuberances.

Basidia broadly clavate, 45-60 x 12-20 µm, with a slight median constriction, a clamp at the base and with 4 long sterigmata, only two seen in the type.
Basidiospores ovoid-ellipsoid, 16-20 x 12.5-15 µm, finely warted.
Substrata. Known only from dead twigs of an unknown host.
Distribution. Known only from an unknown type locality in Cuba.
Remarks. Lemke reported the generative hyphae to be simple septate, which is not the case. Clamps are present, but difficult to observe unless a phase-contrast microscope is used. The interpretation of this species is slightly dubious as is apparent from the description above. The acanthophyses are very difficult to separate and bodies assumed to be cystidia may be immature basidia. The type is thin and small and more collections are desirable to ascertain its microstructure. We have only seen the type which is apparently the only collection, and it is possible that the species may be a form of *A. penicillatus*

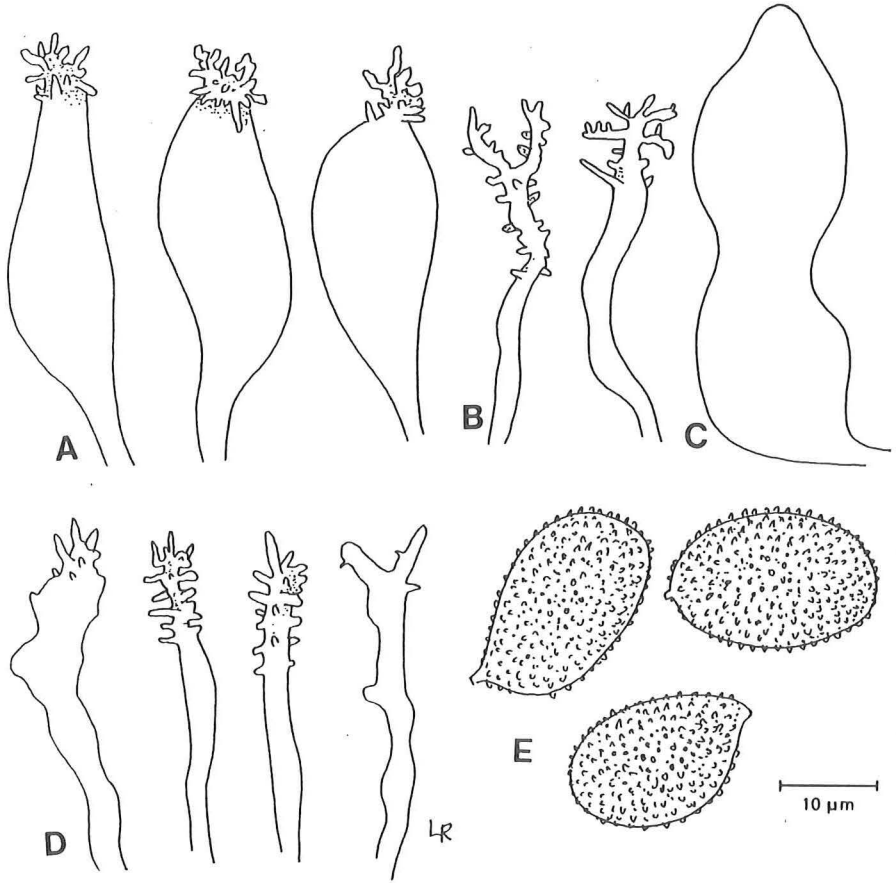


Fig. 65. *Aleurodiscus tenuis*, Cuba, March 1915, Lloyd 522, Holotype (FH). A) clavate acanthophyses, B) dendrohyphidia, C) gloeocystidium, D) cylindrical acanthophyses transitional to dendrohyphidia, E) basidiospores.

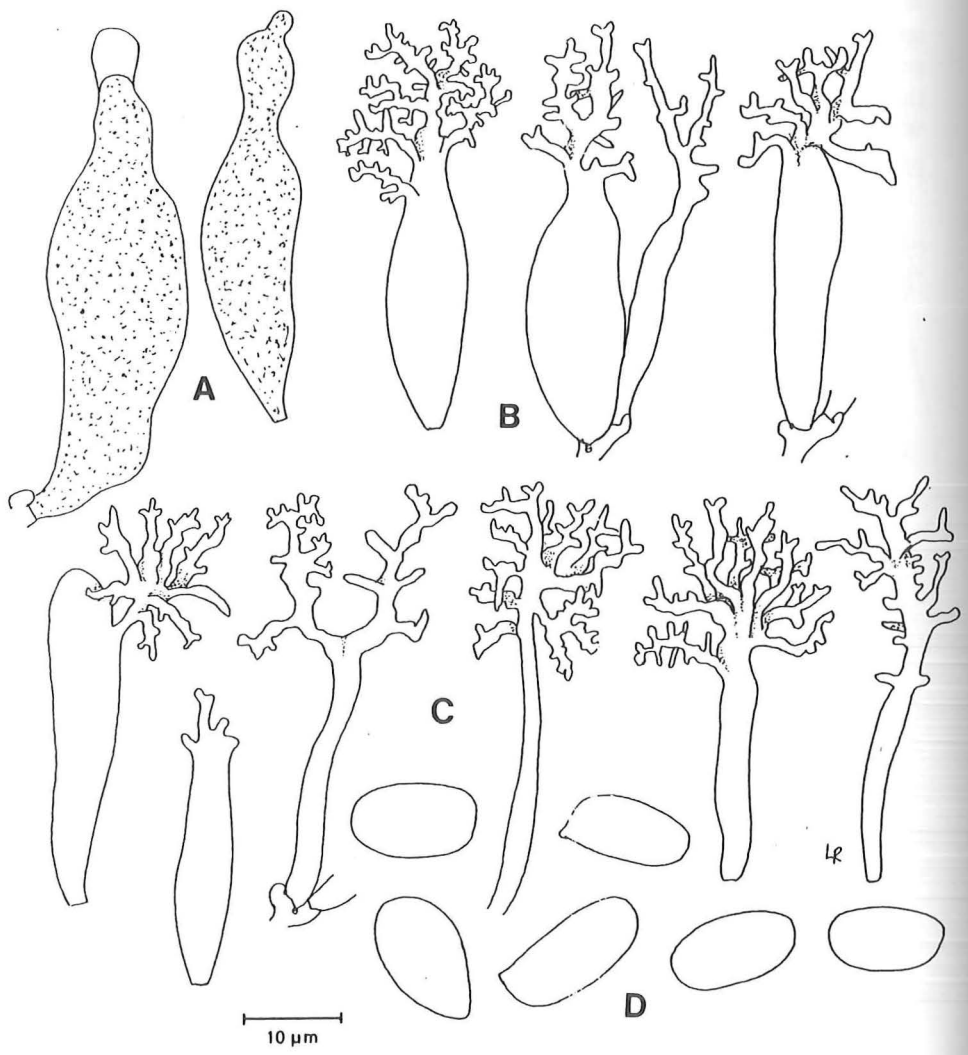


Fig. 66. *Aleurodiscus thoenii*, Zaire, Shaba Province, Kipopo, 19 June 1972, D. Thoen 5518, holotype (LY). A) gloeocystidia, B) acanthophyses, C) dendrohyphidia, D) basidiospores.

Aleurodiscus thoenii (Boidin et al.) Núñez & Ryvarden comb. nov. Fig. 66
Basionym: *Acanthophysium thoenii* Boidin et al., Bull. Soc. mycol. Fr. 101: 356, 1985.
Basidiocarp annual, resupinate, adnate, dull to finely pruinose, slightly tuberculate (lens), white to pale grey or beige.
Hyphal system monomitic, generative hyphae with clamps, 2-4 µm wide.
Acanthophyses numerous, clavate to ventricose with long, partly branched protuberances in the upper part and with transistions to true dendrohyphidia.
Gloeocystidia yellowish, slightly thick-walled, clavate to ventricose and usually mammillate, smooth, 35-50 x 7-20 µm.
Dendrohyphidia with transitions to acanthophyses, up to 60 µm long.
Basidia clavate, 30-65 x 7-10 µm with 4 sterigmata and a basal clamp.
Basidiospores oblong ellipsoid to subcylindrical, smooth, 8-11 x 5-6 µm.
Cultural chracteristics. See Boidin et al (1985).
Substrata. Dead *Cassia grainea* and *Bambusa*.
Distribution. Known only from two localities in Zaire.
Remarks. The species is close to *A. cerussatus* but separated by strongly branched acanthophyses and possibly by the hosts. All experiments in crossing *A. thoenii* with *A. cerussatus* from Europe failed.

Aleurodiscus thujae Ginns 67
Mycologia 82: 754, 1990.
Basidiocarp annual, resupinate, adnate, crustose with delimited margin, up to 6 cm long, hymenophore smooth or finely rimose, pale cream to cream, margin white and narrow, chalky, subiculum white to cream, very thin.
Hyphal system monomitic, generative hyphae with simple septa, rather short-celled, freely branched, 2-4 µm diam., mixed with large crystals especially in the subiculum.
Acanthophyses absent.
Gloeocystidia ventricose to cylindrical or moniliform with a few constrictions, 45-65 x 10-13 µm, content negative in sulphoaldehyde.
Dendrohyphidia few and indistinct, slightly branched and may also be categorized as hyphal endings, 2-3 µm diam.
Basidia clavate-cylindrical, 55-70 x 15-17 µm, with 4 sterigmata and a simple septum at the base.
Basidiospores broadly ellipsoid to subglobose, slightly adaxially flattened, finely asperulate, 16-20 x 13-16 µm.
Substrata. Known only from *Thuja occidentalis.*
Distribution. Eastern Canada and USA (Michigan), but will probably be found elsewhere within the area of the host.
Remarks. This species comes close to *A. occidentalis* but is easily separated by the simple-septate hyphae. The gelatinous parasite, *Tremella simplex*, occurs on *A. thujae* as well as *A. amorphus* (Bandoni & Ginns 1993).

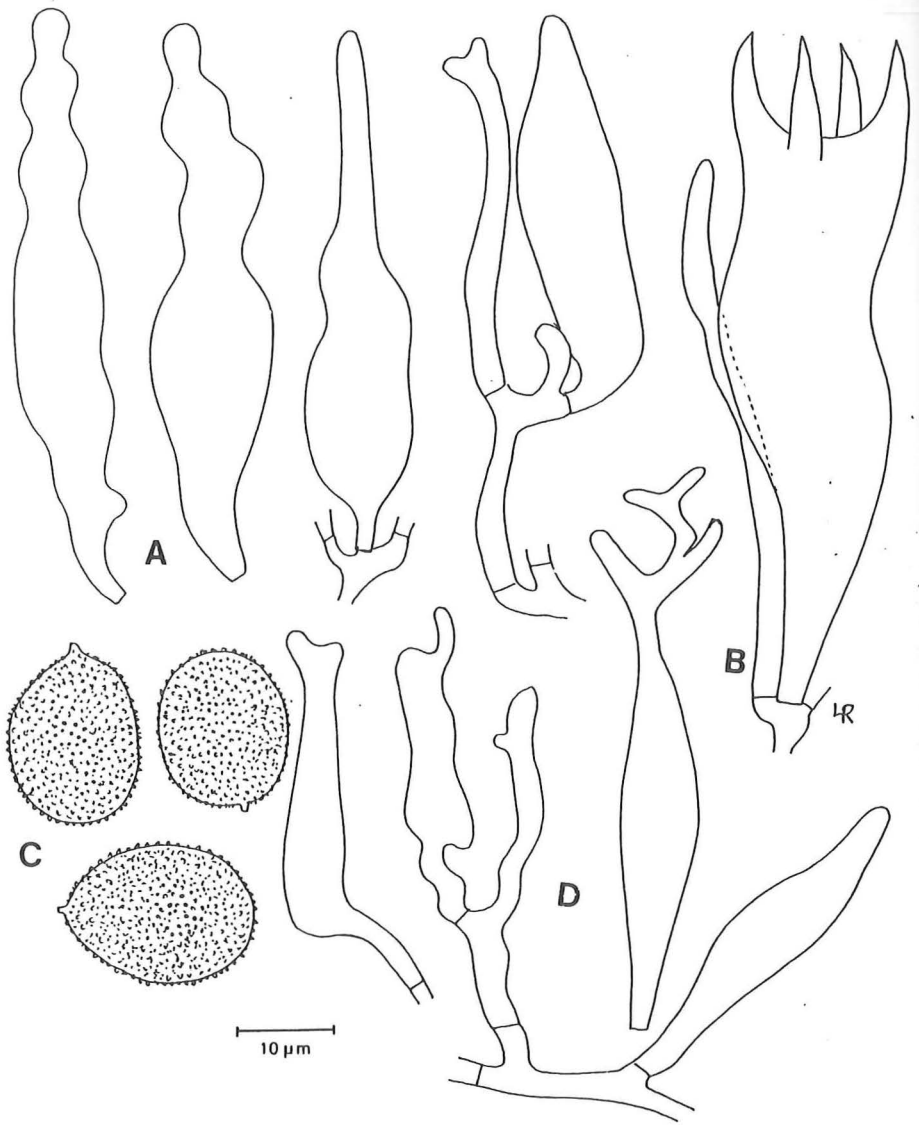


Fig. 67. *Aleurodiscus thujae*, Canada, Ontario, Haliburton District, University Forest, 14 September 1961, R.F. Cain 37974, Holotype (DAOM). A) gloeocystidia, B) basidium, C) basidiospores, D) dendrohyphidia.

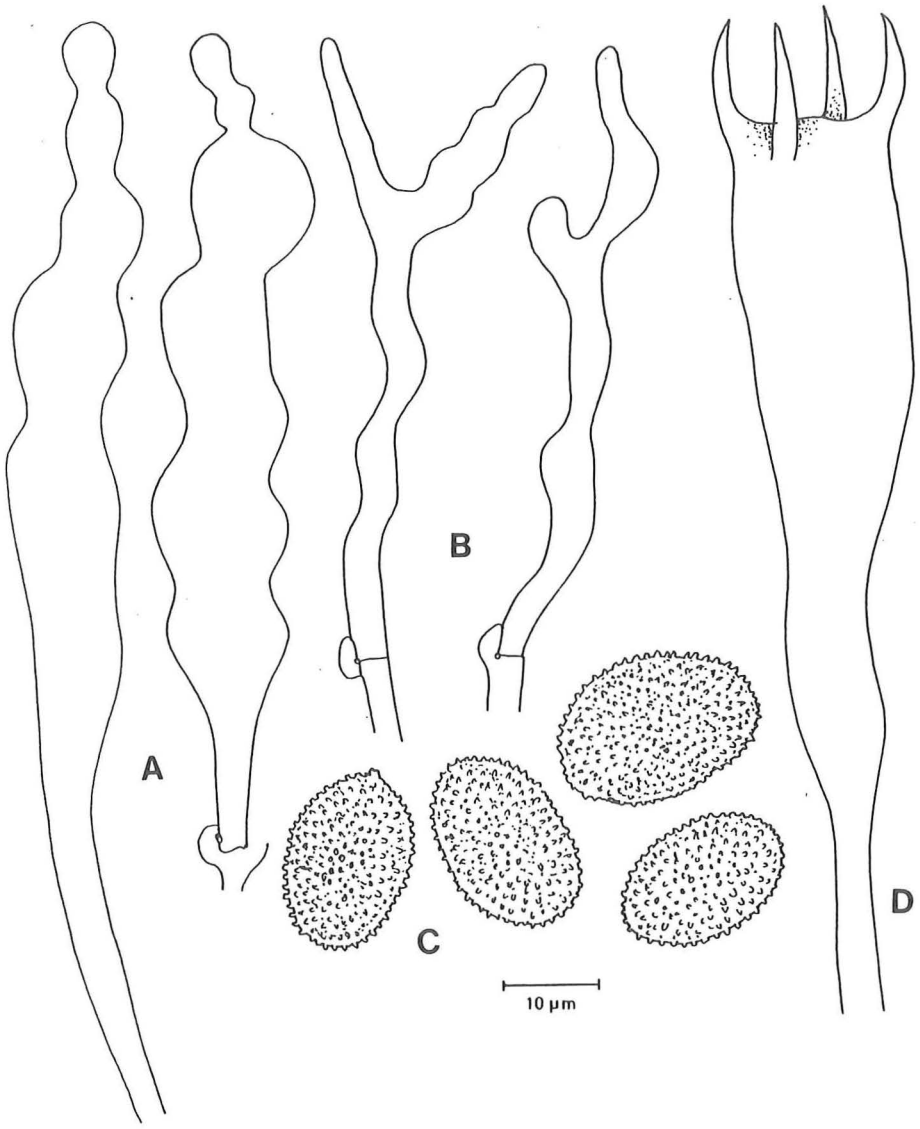


Fig. 68. *Aleurodiscus tsugae*, Russia, Kuril Islands, Iturup, 16 August 1976, A. Rossman, TAA 96619 (TAA). A) gloeocystidia, B) dendrohyphidia, C) basidiospores, D) basidium.

Aleurodiscus tsugae Yasuda in Lloyd Fig. 68
Mycol. Writ. 6: 1066 (May), 1921. Tokyo Bot. Mag. 35: 145 (June), 1921.
Basidiocarp corticioid with a lifted margin, first in small patches, later more confluent, but rarely over 1 cm diam., margin determinate, white and floccose and loosening from the substrate when dry, rather brittle when dry and pruinose to granulose-pulverulent, hymenophore smooth, slightly rimose when dry, first white, but soon yellowish-cream or pale tan to buff.
Hyphal system monomitic, generative hyphae thin-walled and with large conspicuous clamps, 3-10 µm wide, sparingly branched.
Acanthophyses absent.
Gloeocystidia mostly clavate to distinctly moniliform, 50-120 x 6-20 µm, with a yellowish content.
Dendrohyphidia simple to sparsely branched at the apex, up to 8 µm diam.
Basidia subclavate to flexuous-suburniform, 55-120 x 12-18 µm, 4-sterigmate.
Basidiospores oblong-ellipsoid, asperulate, 15-20 x 10-14 µm, flattened adaxially, slightly thick-walled when mature.
Substrata. On bark of conifers such as *Pinus pumila* and *P. thunbergii*.
Distribution. Japan and eastern Russia.

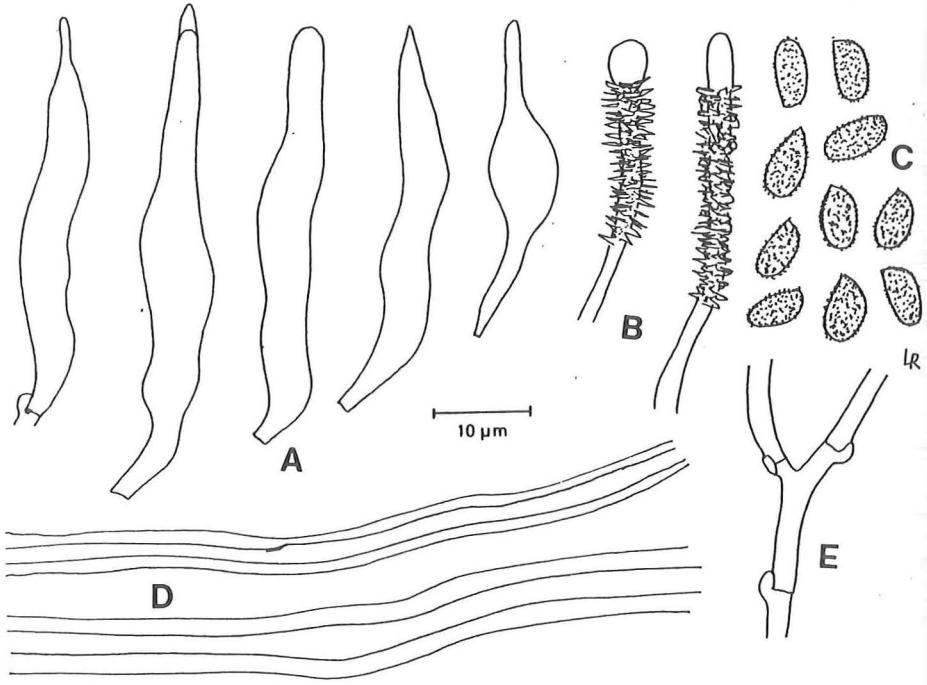


Fig. 69. *Aleurodiscus utahensis*, USA, Utah, Iron County, 18 August 1973, Gilbertson 11090, Holotype (BPI). A) gloeocystidia, B) acanthophyses, C) basidiospores, D) skeletal hyphae in the subiculum, E) generative hyphae.

Remarks. The stereoid basidiocarp with the lifted floccose margin and the coniferous host are good field characteristics. Microscopically the numerous gloeocystidia and the lack of other sterile hymenial elements together with asperulate ellipsoid basidiospores characterize the species. *A. aurantius* seems to be related, but this is a species with simple septa and a much more adnate basidiocarp and has as yet only been recorded from *Taxus* and hardwoods. The heterobasidiomycete *Tremella simplex* is a parasite on *A. tsugae* (Martin 1940), as well as *A. amorphus*.

Aleurodiscus utahensis Lindsey & Gilb. Fig. 69
Mycotaxon 18: 544, 1983.
Basidiocarps corticioid, rhizomorphic, margin diffuse, indistinct, texture slightly farinaceous, hymenophore cream to light ochre, rimose upon drying.
Hyphal system dimitic, generative hyphae with clamps, some with refractive contents, 1.5-2 µm wide, skeletal hyphae present in the subiculum, thick-walled, 2.5-3 µm wide.
Acanthophyses densely tangled, thick-walled, apically spiny with small sharp protuberances, often breaking loose and floating free in preparations.
Gloeocystidia imbedded or projecting, 30-40 x 5-7 µm, pointed to often mammillate, with refractive contents.
Basidia clavate, 22-25 x 3.5-5 µm, 4-sterigmate, with a basal clamp.
Basidiospores short-cylindric to broadly ellipsoid, 4-5.5 x 2-3 µm, finely echinulate.
Substrata. On bark of *Pinus longaeva*.
Distribution. Only known from the type locality in USA (Utah).
Remarks. This species has very small basidiospores for an *Aleurodiscus* species and is similar to *A. weirii*, but has skeletal hyphae, basidiobasidiospores which are smaller, and gloeocystidia which are more frequently mammillate.

Aleurodiscus vitellinus (Lév.) Pat. Fig. 70
Essai. Tax. Hymen. p. 54, 1900. - *Exidia vitellina* Lév., Ann. Sci. Nat. Bot. III, 2: 219, 1844.
Basidiocarp cyphelloid, pendant and strongly lobed or folded, attached by a contracted base, separable, 2.5 cm diam., up to 2 mm thick, margin determinate, widely reflexed, deflexed on drying, texture gelatinous when fresh, drying cartilaginous, hymenophore concave, continuous, chrome to yellow when fresh, drying ochraceous to tan-buff, abhymenial surface veined to reticulate, concolorous, trama distinctly duplex with a lower dense layer and a subiculum of looser consistency.
Hyphal system monomitic, hyphae with clamps, in the subhymenium 3-6 µm wide, in the subiculum contorted, irregularly widened and very thick-walled, i.e. walls up to 4 µm wide and total width up to 22 µm, walls strongly agglutinated and difficult to tease apart.
Acanthophyses numerous, cylindric to clavate, 4-15 µm diam., up to 180 µm

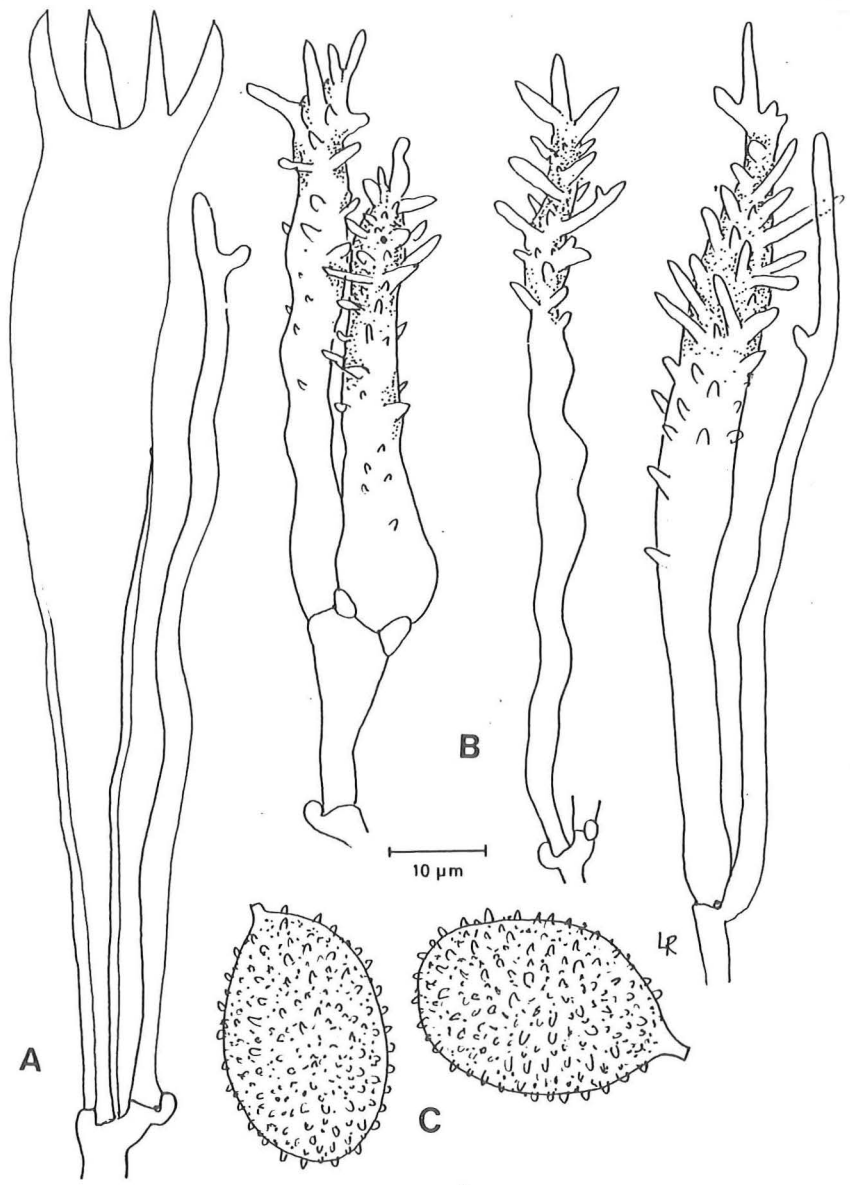


Fig. 70. *Aleurodiscus vitellinus*, Argentina, Tierra del Fuego, Lago Escondido, L. Ryvarden 19334 (O). A) basidium, B) acanthophyses, C) basidiospores.

long and apically densely covered with protuberances up to 8 µm long.
Dendrohyphidia generally cylindric to slightly swollen, smooth, unbranched or with a few apical stout side branches, 2-8 µm diam.
Basidia subclavate to clavate, 150-200 x 22-30 µm, bearing (2)4 large sterigmata up to 15 µm long.
Basidiospores ovoid, 20-30 x 18-24 µm, slightly flattened adaxially, asperulate.
Substrata. Known only from dead stems of *Nothofagus* spp.
Distribution. Southern Chile and Argentina where it follows the genus *Nothofagus.*
Remarks. The species is recognized in the field by its large, yellowish, pendant basidiocarp with gelatinous texture and a contracted central area of attachment, and additionally by the host.

Aleurodiscus wakefieldiae Boidin & Beller Fig. 71
Bull. Soc. mycol. Fr. 82: 561, 1966.
Basidiocarp cupulate, later confluent, with slightly lifted margin, up to 8 mm thick, hymenophore smooth, bright pink when fresh, becomin cream to pale ochraceous when dry.
Hyphal system monomitic, generative hyphae with clamps, 2-5 µm wide, thin-walled and richly branched.
Acanthophyses numerous, hyphoid to distinctly clavate, arising from a clamp, 30-80 x 4-12 µm, upper part covered with numerous to few protuberances.
Gloeocystidia rare, hyaline, smooth, slightly thick-walled and slightly moniliform with a few constrictions, negative in sulphoaldehyde solution, 90-180 x 5-12 µm.
Dendrohyphidia absent.
Basidia large, clavate, 80-180 x 10-20 µm, with 4 sterigmata and a basal clamp, when immature filled with numerous yellow oily bodies or small grains, smooth or with scattered basal protuberances.
Basidiospores ellipsoid, with a distinct apiculus, ornamented, 20-28 x 14 -20 µm.
Cultural characteristics. See Boidin et al. (1968).
Substrata. On dead hardwoods like *Castanea, Corylus, Fagus,* and *Quercus*, also on *Rubus fruticosus.*
Distribution. British Isles and south west France.
Remarks. The species is related to *A. oakesii* which is an American and East-Asian species with simple-septate generative hyphae.

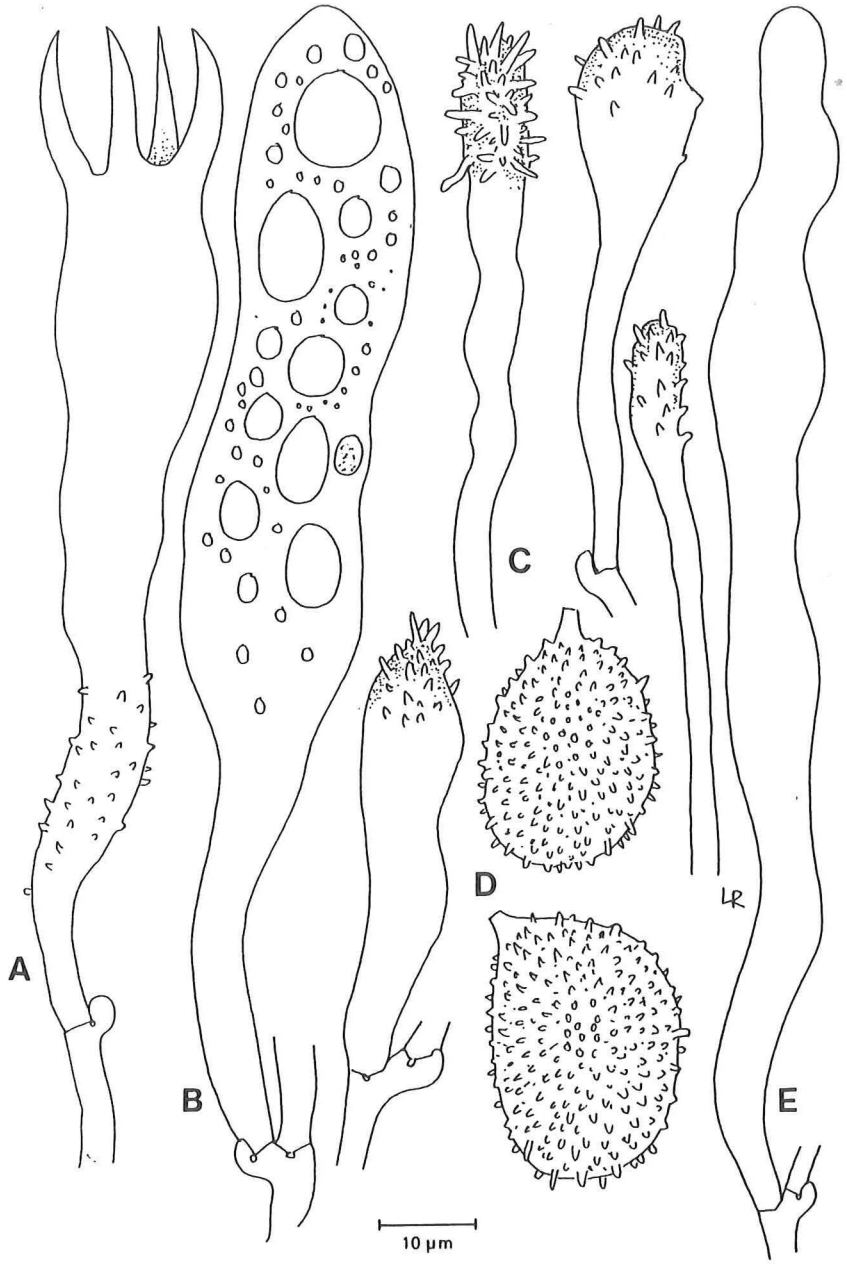


Fig. 71. *Aleurodiscus wakefieldiae*, France, Avignon, 1 February 1981, Candusseau (O). A) ornamented basidium, B) gloeocystidium, C) acanthophyses, D) basidiospores, E) moniliform cystidium.

Aleurodiscus weirii Burt Fig. 72

Ann. Mo. Bot. Gard. 5: 203, 1918.

Basidiocarp corticioid, effused, up to 1 mm thick, margin distinct, rounded and abrupt, fragile and farinose, hymenophore first smooth, soon deeply rimose to cracked, white when fresh, becoming pale cream.

Hyphal system monomitic, generative hyphae with clamps, often difficult to observe because of masses of crystals, thin-walled, 2-5 µm wide.

Acanthophyses cylindrical to clavate, first hyaline and thin-walled, easy to observe, 3-8 µm wide, apparently becoming thick-walled from the apex which falls off easily in microscopic preparations and floats around as yellowish irregular bodies, protuberances easily broken off when solid, 12-35 µm long.

Gloeocystidia flexuous-cylindric to moniliform, 55-80 x 5-8 µm, yellowish in KOH.

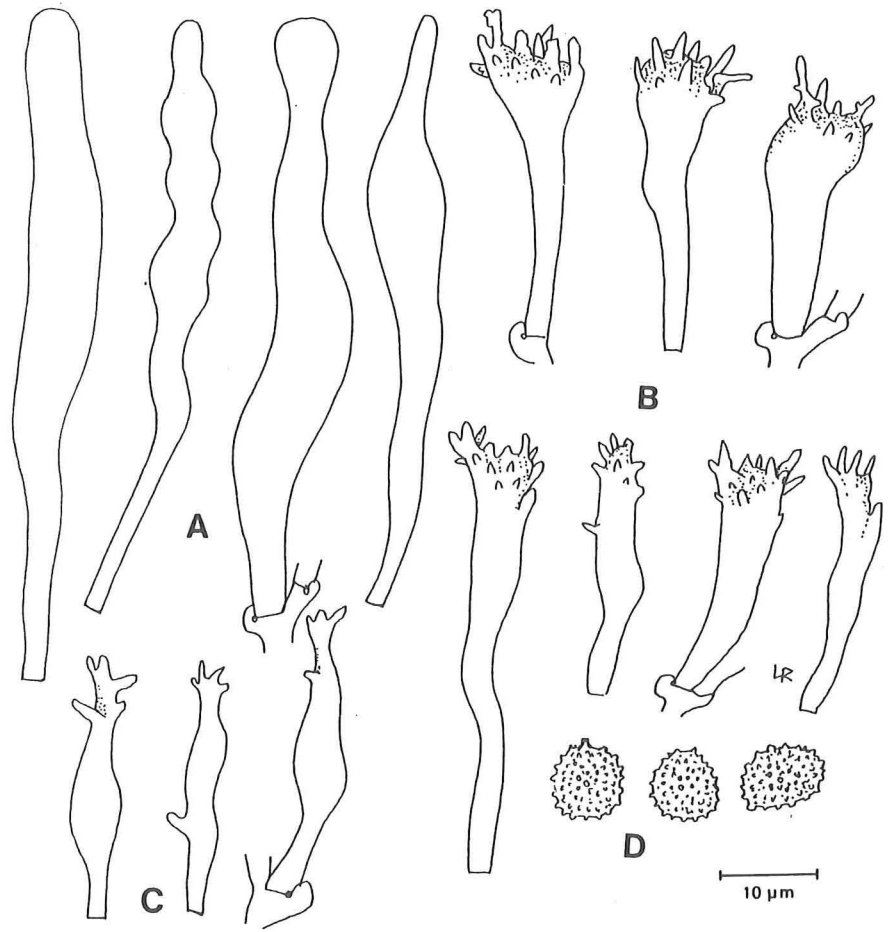


Fig. 72. *Aleurodiscus weirii*, USA, Idaho, Priest River, Weir no 70. Holotype (FH). A) gloeocystidia, B) clavate acanthophyses, C) dendrohyphidia, D) basidiospores.

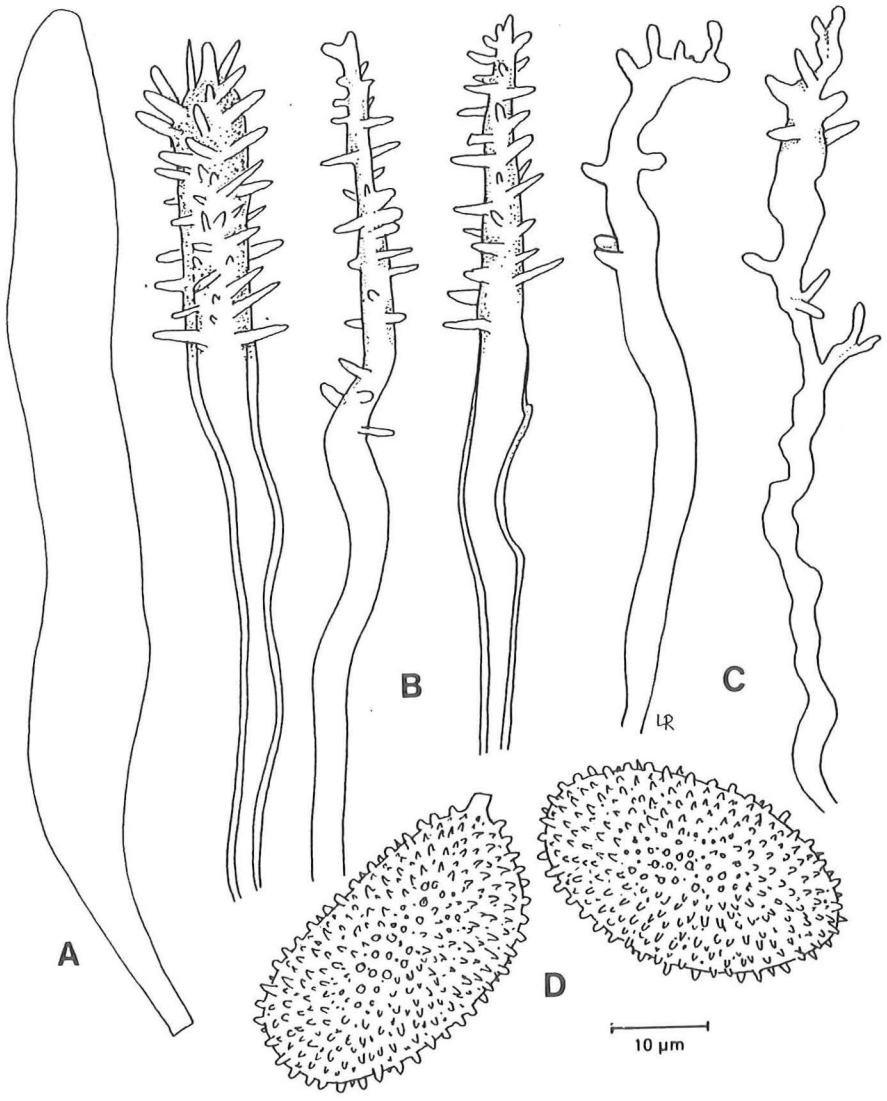


Fig. 73. *Aleurodiscus zealandicus*, New Zealand, Koromandel, Little Barrier Island, 29 August 1958, J.N. Dingley, PDD 56729 (PDD). A) gloeocystidium, B) acanthophyses, C) dendrohyphidia transitional to acanthophyses, D) basidiospores.

Dendrohyphidia scattered and difficult to observe, simple to slightly branched, 3-4 µm diam.
Basidia cylindric to subclavate, 30-45 x 5-7 µm, with 4 sterigmata.
Basidiospores subglobose, 5-7 µm diam., sometimes slightly adaxially flattened, strongly warted.
Cultural characteristics. Nakasone (1990).
Substrata. On bark of coniferous trees, especially *Larix occidentalis*, but also recorded on *Abies, Picea, Pseudotsuga, Thuja* and *Tsuga.*
Distribution. Northwestern North America.
Remarks. *A. weirii* is recognized by the small basidiospores and the small club-like acanthophyses. Except for the acanthophyses, it reminds one strongly of a *Gloeocystidiellum* species.

Aleurodiscus zealandicus (Cooke & W. Phillips) G. Cunn. Fig. 72
Proc. Linn. Soc. N. S. Wales 77: 298, 1953. - *Cyphella zealandica* Cooke & W. Phillips, Grevillea 8: 57, 1879.
Basidiocarp cupulate, pendant with exposed upper surface, 2-7 mm diam., up to 0.5 mm thick, sometimes connate in small groups, texture ceraceous, margin free and bent down, acute, entire, hymenophore pink or salmon when fresh, pale ochraceous when dry, farinose, wrinkled or slightly rugulose, abhymenial surface at first white, then tan or isabelline, tomentose, later smooth except for the margins.
Hyphal system monomitic, hyphae thin- to thick-walled, with clamps.
Acanthophyses not projecting, cylindrical, up to 8 µm wide with numerous protuberances in the upper part, occasionally branched near the apices.
Dendrohyphidia present in variable degree, clavate, 40-80 x 5-8 µm, straight or with a few blunt side branches and with transitions to acanthophyses.
Gloeocystidia abundant, flexuous-cylindrical, 60-200 x 10-14 µm.
Basidia subclavate, 60-150 x 20-26 µm, with 4 sterigmata up to 20 µm long.
Basidiospores obovate, citriform or D-shaped, 24-30 x 15-20 µm, coarsely asperulate.
Substrata. On bark of different deciduous trees, see Cunningham (1953) for list of hosts.
Distribution. Known only from New Zealand.
Remarks. The basidiocarps are similar to those of *A. ochraceo-flavus*, which, however, has much shorter basidiospores. The closest species is undoubtedly *A. mirabilis* sharing the same type of basidiospores. The acanthophyses of the latter however are in parts much more branched and the basidiocarps are more adnate with only a slightly raised margin. In *A. zealandicus* the basidiocarps are cupulate, attached usually by a narrow central point.

11. Nomenclator

aberrans, A. G. Cunn., Trans. Roy. Soc. New. Zeal. 84:257, 1956.
Accepted, see p. 55.
abietis, A. H. S. Jacks. & P. A. Lemke, Can. J. Bot. 42:225, 1964.
Accepted, see p. 37.
acerinus, A. (Pers.:Fr.) Hoehn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 116:804, 1907.
= *Dendrothele acerinus* (Pers.:Fr.) P. A. Lemke
ahmadii, A. (Boidin) Boidin, Terra & Lanq., Bull. Soc. Mycol. Fr. 84:68, 1968.
Accepted, see page 37.
albidus, A. Mass.& Cooke, Grevillea 17:55,1889.
= *Dendrothele lepra* (Berk. et Br.) P. A. Lemke
albo-roseus, A. Bres., Ann. Mycol. 18:46, 1920.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
albus, A. (Burt) D. P. Rog. & H. S. Jacks., Farlowia 1:306, 1943.
= *Litschauerella clematitis* (Bourdot & Galz.) Erikss. & Ryvarden, teste P. A. Lemke 1964:756.
alliaceus, A. (Quel.) Boidin, Bull. Soc. Hist. Nat. Toulouse 92:28, 1957.
= *Dendrothele alliacea* (Quel.) P. A. Lemke
amorphus, A. (Pers.:Fr.) J. Schröt., Krypt.-Fl. Schles. 3:429, 1888.
Accepted, see p. 39.
amylaceus, A. (Bourdot & Galz.) Rog. & Jacks., Farlowia 1:291, 1943.
= *Amyloathelia amylacea* (Bourdot & Galz.) Hjortst. & Ryvarden
andinus, A. Nunez & Ryvarden, nov. sp., see page 43.
antarcticus, A. (Speg.) Ryvarden
Accepted, see page 43.
apiculatus, A. Burt, Ann. Mo. Bot. Gard. 5:186, 1918.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
apricans, A. Bourdot, Rev. Sci. Bourbon. 27:5, 1910.
Accepted, see p. 45.
atlanticus, A. Maire, Bull. Soc. Hist. Nat. Afr. Nord. 8:157, 1917.
Accepted, see p. 47.
aurantius, A. (Pers.:Fr.) J. Schröt. in Cohn, Kript. F.-Fl. Schles. 3:429, 1888.
Accepted, see p. 49.

australiensis, A. Wakef., Kew Bull. Misc. Inf.:208, l918.
Accepted, see p. 49.
berggreni, A. (Cooke) G. Cunn., Proc. Linn. Soc. New S. Wales 77:277, 1953.
Accepted, see p. 51.
bicolor, A. Rick, Iheringia Bot. 4:113, 1958.
Identity unknown, type lost?
bisporus, A. (Boidin & Lanq.) Nunez & Ryvarden
Syn.: *Ac. bisporum* Boidin & Lanq., Bull. Soc. Mycol. Fr. 101:362, 1985.
Accepted, see p. 51.
botryosus, A. Burt, Ann. Mo. Bot. Gard. 5:198, 1918.
Accepted, see p. 55.
burtii, A. Lloyd (as «McGinty»), Mycol. Writ. 7:1288, 1924.
= *A. cerussatus* (Bres.) Höhn. & Litsch.
buxicola, A. (Boidin & Laq.) Nunez & Ryvarden
Syn: *Ac. buxicola* Boidin & Lanq., Bull. Soc. Mycol. Fr. 101:359, 1985.
Accepted, see p. 55.
canadensis, A. Skolko, Can. J. Res. sect. C, 22:258, l944.
Accepted, see p. 59.
candidus, A. (Schw.) Burt, Ann. Mo. Bot. Gard. 5:188, l9l8.
= *Dendrothele candida* (Schw.) P. A. Lemke
capensis, A. Lloyd, Myc. Writ. 6:930, 1920.
= *Aleurocystis. hakgallae* (Berk. & Br.) G. Cunn., teste P. A. Lemke1964:758.
cerussatus, A. (Bres.) Höhn.& Litsch., K. Akad. Wiss. Wien Math-Nat. Kl. Sitzb. 111:807,1907.
Accepted, see p. 59.
cinnamomeus, A. Rick, Iheringia Bot. 4:115, 1958.
= invalidly published, no type indicated.
coralloides, A. G. Cunn., Trans. Roy. Soc. New Zeal. 84:259, 1956.
Accepted, see p. 61.
corneus, A. Lloyd, Mycol. Writ. 6:930, 1920.
= *Aleurocystis hakgallae* (Berk. & Br.) Donk
coronatus, A. G. Cunn., Trans. Roy. Soc. New Zeal. 84:262, 1956. Accepted, see p. 63.
crassus, A. Lloyd, Mycol. Writ. 6:928, l920.
= *Dendrothele candida* (Schw.) P. A. Lemke
cremeus, A. Pat., Bull. Soc. Mycol. Fr. 31:73, l9l5.
= *Dendrothele lepra* (Berk. & Br.) P. A. Lemke
cremeus, A. Burt, Ann. Mo. Bot. Gard. 5:199, 1918.
Illegitimate name, not *A. cremeus* Pat. 1915.
cremicolor, A. Hjortstam & Ryvarden, Nord. J. Bot. 2:273, 1982.
Accepted, see p. 63.
croceus, A. Pat., Bull. Soc. Mycol. Fr. 9:133, 1985.
Accepted, see p. 67.

cupulatus, A. Nunez & Ryvarden, nov. sp., see p. 67.
delicatus, A. Wakef., Trans. Br. mycol. Soc. 35:44, 1952.
Accepted, see p. 69.
dendroideus, A. Ginns, Can. Field Nat. 96:131, l982.
Accepted, see p. 69.
dextrinoideocerussatus, A. Moreno, Blanco & Manjon, Mycotaxon 39:351, 1990.
Accepted, see p. 71.
diffissus, A. (Sacc.) Burt, Ann. Mo. Bot. Gard. 18:485, 1931.
Accepted, see p. 75.
digitalis, A. (Alb.& Schw.:Fr.) Donk, Reinwardtia l:210, 1951.
= *Cyphella digitalis* (Alb. & Schw.) Fr., teste P. A. Lemke 1964:757.
disciformis, A. (DC:Fr.) Pat., Bull. Soc. Mycol. Fr. 10:80, 1894.
Accepted, see p. 75.
dryinus, A. (Pers.) Bourdot, Rev. Sci. Bourbon.:18, 1922.
= *Dendrothele dryina* (Pers.) P. A. Lemke
exasperatus, A. Hjortstam & Ryvarden, Mycotaxon 47:83, 1993.
=Accepted, see p. 77.
farlowii, A. Burt, Ann. Mo. Bot. Gard. 5:182, 1918.
Accepted, see p. 79.
fasciculatum, Acn. G. Cunn., New Zeal. Dep. Sci. Ind. Res. Bull.145:330, 1963.
= Dendrothele fasciculata (G. Cunn.) P. A. Lemke
fennicus, A. Laurila, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo 10(4):11, 1939.
Accepted, see p. 79.
fruticetorum, A. W. B. Cooke, Mycologia 35:281, 1943.
Accepted, see p. 81.
fuegianus, A. Nunez & Ryvarden, nova sp., see p. 81.
gabonicus, A. Boidin, Lanq. & Gilles, Bull. Soc. Mycol. Fr. 101:352, 1985.
Accepted see p. 85.
gigasporus A. Ginns & Bandoni, Mycologia 83:548, 1991.
Accepted, see p. 85.
grantii, A. Lloyd, Mycol. Writ. 6:927, 1920.
Accepted, see p. 87.
griseo-canus, A. (Bres.) Höhn. & Litsch., Wiesner Festschrift:76, 1908.
= *Dendrothele griseo-cana* (Bres.) Bourdot & Galz.
guttulatus, A. Rick, Broteria Cienc. Nat. 3:165, 1934.
= *Bourdotia cinerea* (Bres.) Bourdot & Galz., teste P. A. Lemke 1964:758.
hakgallae, A. (Berk. & Br.) Donk, Persoonia 1:68, 1959.
= *Aleurocystis hakgallae* (Berk. & Br.) G. Cunn.,
teste P. A. Lemke 1964:758.
helveolus, A. Bres., Mycologia 17:71, 1925.
= *Clavariadelphus fistulosus* (Fr.) Corner var. *contortus* Corner, Ann. Bot. Mem. No.1:273, 1950.
hiemalis, A. (Laur.) Erikss. in Sprague, Res. Stud. St. Coll.Wash. 23:215, 1955.
= *Globulicium hiemale* (Laur.) Hjortst.

ilexicola, A. Bernicchia & Ryvarden, Mycol. Helv. 3:85, 1988.
Accepted, see p. 91.
jacksonii, A. Ahmad, Biologia Lahore 8:124, 1962.
= *Dendrothele candida* (Schw.) P. A. Lemke
japonicus, A. Yasuda, Tokyo Bot. Mag. 33:33, 1919.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
javanicus, A. Henn. in Warburg, Monsunia 1:139, 1905.
= *A. mirabilis* (Berk.) Höhn., teste P. A. Lemke 1964:256.
jonides, A. (Bres.) Bourdot & Galz., Bull. Soc. Mycol. Fr. 28:353, 1913.
= Laeticorticium jonides (Bres.) Donk.
lapponicus, A. Litsch., Ann. Mycol. 42:11, 1944.
= Accepted, see p. 91.
laurentianus, A. H.S. Jacks. & P. A. Lemke, Can. J. Bot. 42:251, 1964.
Accepted, see p. 93.
lepra, A. (Berk. & Br.) Höhn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 117:1098, 1908.
= *Dendrothele lepra* (Berk. & Br.) P. A. Lemke
limonisporus, A. D. A. Reid, Kew Bull. 10:631, 1955.
Accepted, see p. 93.
lividocoeruleus, A. (P. Karst.) P. A. Lemke, Can. J. Bot. 42:252, 1964.
Accepted, see p. 97.
ljubarskii, A. Parmasto, Eesti NSV Tead. Akad. Toim. Biol. 16:378, 1967.
Accepted, see p. 97.
macrocystidiatus, A. P. A. Lemke, Can. J. Bot. 42:255, 1964.
Accepted, see p. 99.
macrodens, A. Coker, J. Elisha Mitchell Soc. 36:146, 1921.
= *Dendrothele macrodens* (Coker) P. A. Lemke
macrosporum, A. Bres. apud Bourdot & Galz., Bull. Soc. Mycol. Fr. 28:353, 1913.
= *Dendrothele macrospora* (Bres.) P. A. Lemke
magnisporus, A. (Burt) Donk, Persoonia 1:68, 1959.
= *Aleurocystis magnispora* (Burt) P. A. Lemke, teste P. A. Lemke 1964:760.
mancinianus, A. (Sacc. & Cub.) Pat., Bull. Soc. Mycol. Fr. 16:180, 1901.
= *Dendrothele strumosa* (Fr.) P. A. Lemke
manni, A. Baker, J. Agric. Res. 25:253, 1925.
Exluded name and misprint for *Aleurodicus manni* Baker, a blackfly from Honduras. The name *Aleurodiscus manni* occurs on many lists of species described in genus. When the misprint or misunderstanding first occurred is unknown.
megalosporus, A. (Bres.) Bres., Bull. Soc. Mycol. Fr. 28:353, 1913.
= *Laeticorticium megalospora* (Bres.) Erikss. & Ryvarden
mesaverdensis, A. Lindsey, Mycotaxon 30:433, 1987.
Accepted, see p. 99.

microcarpus, A. Nunez & Ryvarden, nov. sp., see p. 104.
minnsiae, A. H. S. Jacks., Can. J. Res. Sect. C, 28:67, 1950.
= *Laeticorticium minnsiae* (Jacks.) Donk
minor, A. (Pilat) Telleria, Nova Hedw. 53:231, 1991.
= *A. cerussatus* (Bres.) Höhn. & Litsch.
mirabilis, A. (Berk. & M. A. Curtis) Höhn., K. Akad. Wiss. Wien Math-Nat. Kl. Sitz. ll8:818, 1909.
Accepted, see p. 105.
monilifer, A. Malencon, Bull. Soc. Mycol. Fr. 70:130, 1954.
Accepted, see p. 107.
moquiniarum, A. Vieg., Rev. Agr. Piracicaba 14:313, 1939.
= *Dendrothele moquiniara* (Vieg.) P. A. Lemke
nivosus, A. (Berk. & M. A. Curt.) Höhn. & Litsch., K. Akad. Wiss. Wien Math-Nat. Kl. Sitzb. 116:808, 1907.
= *Dendrothele nivosa* (Berk. & M. A. Curt.) P. A. Lemke
norvegicus, A. J. Erikss. & Ryvarden in Ryvarden, Norw. J. Bot. 20:10, 1973.
Accepted, see p. 107.
oakesii, A. (Berk. & M. A. Curtis) Pat., Rev. Mycol 12:133, 1890.
Accepted, see p. 109.
occidentalis, A. Ginns, Mycologia 82:753, 1990.
Accepted, see p. 113.
ochraceoflavus, A. Lloyd, Mycol. Writ. 7:1228, 1923.
Accepted, see p. 113.
orientalis, A. Lloyd, Mycol. Writ. 6:927, 1920.
= *Licrostroma subgiganteum* (Berk.) P. A. Lemke, teste P. A. Lemke 1964:763.
pallide-roseus, A. Litsch. apud Lohwag, Symbolae Sinica 2:41, 1937.
= A. mirabilis (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
paraphysatus, A. (Burt) Rog. & Jacks., Farlowia 1:297, 1943.
= *Corticium paraphysatum* teste P. A. Lemke 1964:761. The type is in bad condition, identity unknown.
parmuliformis, A. G. Cunn., Trans. Roy. Soc. New Zeal. 84:244, 1956.
Accepted, see p. 117.
parvisporus, A. Nunez & Ryvarden, nova sp., see p. 117.
patellaeformis, A. G. Cunn., Trans. Roy. Soc. New Zeal. 84:243, 1956.
Accepted, see p. 119.
pateriformis, A. G. Cunn., Trans. Roy. Soc. New Zeal. 84:243, 1956.
= *A. parmuliformis* G. Cunn.
penicillatus, A. Burt, Ann. Mo. Bot. Gard. 5:201, 1918.
Accepted, see p. 119.
peradeniae, A. (Berk. & Br.) Henn., Monsunia 1:139, 1900.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
peteloti, A. Pat., Bull. Soc. Mycol. Fr. 40:31, 1924.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964: 256.

peziculoides, A. Wakef., Kew Bull. Misc. Inf. 4:201, 1931.
= *A. berggreni* (Cooke) G. Cunn.
phragmitis, A. (Boidin et al.) Nunez & Ryvarden
Syn.: *Acanthobasidium phragmitis* Boidin et al., Bull. Soc. Mycol. Fr. 101:345, 1985.
Accepted, see p. 123.
piceinus, A. Lyon & P. A. Lemke, Can. J. Bot. 42:264, 1964.
= *A. farlowii* Burt
pini, A. H. S. Jacks., Can. J. Res. Sect. C, 28:74, 1950.
= *Laeticorticium pini* (H. S. Jacks.) Donk
polygonioides, A. (Karst.) Ann. Mycol. 24:221, 1926.
= *Laeticorticium polygonioides* (Karst.) Donk
polygonius, A. (Pers.:Fr.) Höhn. & Litsch., Österr. Bot. Zeit. 58:475, 1908.
= *Peniophora polygonia* (Pers.:Fr.) Bourdot & Galz.
propinquus, A (Boidin & Gilles) Nunez & Ryvarden
Syn.: *Ac. propinquum* Boidin & Gill., Bull. Soc. Mycol. Fr. 102:295, 1985.
Accepted, see p. 123.
reflexus, A. Yasuda, Tokyo Bot. Mag. 35:269, 1921.
= *Licrostroma subgiganteum* (Berk.) P. A. Lemke, teste P. A. Lemke 1964:763.
rimulosus, A. Nunez & Ryvarden, nov. sp., see p. 125.
roseus, A. (Pers.:Fr.) Höhn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 115:1568, 1906.
= *Laeticorticium roseum* (Pers.:Fr.) Donk
roseo-flavus, A. Rick, Broteria Cienc. Nat. 30:165, 1934.
= Invalid name, no type indicated. An authentic specimen in FH represents an unknown Fungi imperfecti.
sajanensis, A. (Murash.) Pilat, Hedwigia 71:328, 1932.
= *A.diffissus* (Sacc.) Burt, teste P. A. Lemke 1964:242.
salmoneus, A. Pat., Mem. Acad. Malgache 6:11, 1927.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.
scandens, A. Petch, Ann. Roy. Bot. Gard. Peradeniya 9: 281, 1925.
= *Vararia* sp. with dextrinoid dichohyphidia, small smooth cystidia, spores smooth, amyloid, about 6 um in diameter, only observed in agglutinated groups of four and probably immature.
scopulatus, A. Lloyd, Mycol. Writ. 6:1067, 1921.
= *A. croceus* Pat., teste P. A. Lemke 1964:241.
scutellatus, A. Litsch., Österr. Bot. Zeitschr. 75:48, 1926.
= *A. subcruentatum* (Berk. & M. A. Curt.) P. A. Lemke
sendaiensis, A. Yasuda in Lloyd, Mycol. Writ. 7:1162, 1922.
= *Cylindrobasidium evolvens* ((Fr.) Jülich, teste P. A. Lemke 1964:762.
seriatus, A. (Berk. & M. A. Curt.) Burt, Ann. Mo. Bot. Gard. 5:192, 1918.
= *Dendrothele seriata* (Berk. & M. A. Curt.) P. A. Lemke
sinensis, A. Teng & Ling, Contr. Biol. Lab. Sci. Soc. China Bot. Ser. 8: 273, 1933.

= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.

sordido-albus, A. Rick, Broteria Cienc. Bat. 3:166. 1934.
= *Sebacina sordido-albus* (Rick) Rick, see Rick in Iheringia 2:37,1958.

sparsus, A. (Berk.) Höhn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb. 116: 809, 1907.
Accepted, see p. 127.

spiniger, A. D. P. Rogers & P. A. Lemke, Can. J. Bot. 42:265, 1964.
Accepted, see p. 127.

spinulosus, A. Henn., Bot. Jahrb. Syst. 38:107, 1905.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.

stereoides, A. Yasuda, Tokyo Bot. Mag. 35:161, 1921.
= *A. subcruentatum* (Berk. & Curt) Burt

strumosoides, A. Rick, Iheringia Bot. 4:113, 1959.
= Invalidly published, no type indicated.

strumosus, A. (Fr.) Burt, Ann. Mo. Bot. Gard. 5:190, 1918.
= *Dendrothele strumosa* (Fr.) P. A. Lemke

subacerinus, A. Höhn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzb.116:807, 1907.
= *Dendrothele alliacea* (Quel.) P. A. Lemke

subcruentatum, A. (Berk. & M. A. Curtis) Burt, Ann. Mo. Bot. Gard. 7:237, 1920.
= *Aleurocystidiellum subcruentatum* (Berk. & M. A. Curt.) Burt, see p. 131.

subgiganteus, A. (Berk.) Höhn. & Litsch., K. Akad. Wiss. ' Wien Math.-Nat. Kl. Sitzb.121:342, 1912.
= *Licrostroma subgiganteum* (Berk.) P. A. Lemke, teste P. A. Lemke 1964:763.

subglobosporus, A. Ginns & Bandoni, Mycologia 83:550, 1991.
Accepted, see page 133.

succineus, A. Bres., Mycologia 17:71, 1925.
Accepted, see p. 133.

tabacinus, A. Cooke, Grevillea 14:11, 1885.
= *Veluticeps tabacina* (Cooke) Burt

taxicola, A. Thind & Rattan, Mycologia 65:1225, 1973.
Accepted, see p. 136.

tenuis, A. Burt, Ann. Mo. Bot. Gard. 5:200, 1918.
Accepted, see p. 136.

thoenii, A (Boidin et al.) Nunez & Ryvarden
Syn.: *Ac. thoenii* Boidin et al., Bull. Soc. Mycol. Fr. 101:356, 1985.
Accepted, see p. 139.

thujae, A. Ginns, Mycologia 82:754, 1990.
Accepted, see p. 139.

tsugae, A. Yasuda in Lloyd, Mycol. Writ. 6:1066, May 1921, in Tokyo Bot. Mag. 35:145, June 1921,
Accepted, see p. 142.

usambarensis, A. Henn., Bot. Jahrb. 38:107, 1905.
= *A. mirabilis* (Berk. & M. A. Curt.) Höhn., teste P. A. Lemke 1964:256.

utahensis, A. Lindsey & Gilb., Mycotaxon 18:544, 1983.
Accepted, see p. 143.

vitellinus, A. (Lév.) Pat., Essai. Tax. Hymen.:54, 1900.
Accepted, see p. 143.

vleugelii, A. Litsch., Ann. Mycol. 42: 18, 1944.
= *A. fennicus* Laur., teste P. A. Lemke 1964:246.

wakefieldiae, A. Boidin & Beller, Bull. Soc. Mycol. Fr. 82:561, 1967.
Accepted, see p. 145.

weirii, A. Burt, Ann. Mo. Bot. Gard. 5:203, 1918.
Accepted, see p. 146.

zealandicus, A. (Cooke & W. Phillips) G. Cunn., Proc. Linn. Soc. New S. Wales 77:298, 1953.
Accepted, see p. 149.

zelleri, A. Burt, Ann. Mo. Bot. Gard. 13:309, 1926.
= *Peniophora aurantica* (Bres.) Höhn. & Litsch., teste P. A. Lemke 1964:764.

12. Acknowledgements

Many friends and colleagues have been most helpful by sending specimens for examination. Our most sincere thanks go to J. Boidin, Lyon, France, J. Ginns, Biosystematics Research Institute, Ottawa, Canada, Dr. R. L. Gilbertson, Arizona University, USA, N.Hallenberg, University of Gotheburg, Sweden, Eric Macenzie, Landcare, Auckland, New Zealand, D. Pegler, Kew, London, England, R. Petersen, University of Tennessee, USA, T. Hattori, Forest Research Institute, Tsukuba, Japan, M. Rajchenberg, Centro Forestal, Esquel, Argentine, N. Maekawa, Tottori Mycological Institute, Japan and R. Halling, New York Botanical Garden, NY, USA, who all have sent us types and specimens of *Aleurodiscus* for examination.
Kurt Hjortstam of Alingsås and Karl Henrik Larsen of Gotheburg have both given advice during our work and checked lists and keys.
Dr. J. Stalpers of Centralbureau voor Schimmelcultures in Baarn and Dr. E. Parmasto of the Botany Department of Tartu University in Estonia have both kindly sent us lists of names published in *Aleurodiscus* which have been most useful in compiling the Nomenclator section.
Last, but not least, Peter Roberts of the Kew Herbarium has kindly read the manuscript and corrected our English besides suggested many other improvements in the text. We deeply acknowledge his generous help.

13. References

Andersson, L. 1976: Beobachtungen an *Aleurodiscus amorphus* und seinen parasitierenden *Tremella-arten*. Gøteborg Svampkl. Årsskr. 1975-76:47-55.
Bandoni, J.R. & Ginns, J. 1993: On some species of *Tremella* associated with Corticiaceae. Trans. Mycol. Soc. Japan 34:21-36.
Boidin, J. 1956: *Stereum ahmadii* nov. sp. Biologia (Lahore) 2:217-220.
Boidin, J. & Gilles, G. 1985: Basidiomycètes aphyllophorales de l'ile de La Rèunion: I à VI. Bull. Soc. Mycol. Fr. 102:273-319.
Boidin, J. & Gilles, G. 1990: Corticies s.l. interessants ou noveaux pour la France (Basidiomycotina). Bull. Soc. Mycol. Fr. 106:135-167.
Boidin, J., Lanquetin, P., Gilles, G., Candoussau, F. & Hugueney, R. 1985: Contribution a la connaissance des Aleurodiscoideae a spores amyloides (Basidiomycotina, Corticiaceae). Bull. Soc. Mycol. Fr. 101:333-367.
Boidin, J.., Terra, P. & Lanquetin, P. 1968: Contribution a la connaissance des characteres myceliens et sexuelles des genres *Aleurodiscus, Dendrothele, Laeticorticium* et *Vuilleminia.* Bull. Soc. Mycol. Fr. 84:53-84.
Bourdot, H. 1910: Corticiés nouveaux de la flore mycologique de France III. Rev. Sci. Bourb. et Centre Fr. 23:1-15.
Bourdot, H. & Galzin, A. 1928: Hymenomycetes de France. Bibl. Mycol. 23:1-255. New York. Reprint from 1969.
Cunningham, G. H. 1953: Thelephoraceae of New Zealand. Part. II. The genus *Pellicularia*. Trans. Roy. Soc. N.Z. 81:321-328.
Cunningham, G. H. 1956: Thelephoraceae of New Zealand. Part. XI. The genus *Aleurodiscus*. Trans. Roy. Soc. N.Z. 84:237-268.
Eriksson, J. et al. 1976-88: The Corticiaceae of North Europe. Vol. 1-8. Fungiflora, Oslo.
Fuhrer, B. & Robinson, R. 1992: Rainforest fungi of Tasmania and Southern Australia. CISRO Australia.
Gilbertson, R L. 1974: Fungi that decay Ponderosa pine. Univ. Arizona Press.
Ginns, J. 1982: The wood-inhabiting fungus *Aleurodiscus dendroideus*, and the distinction between *A. grantii* and *A. amorphus*. Can. Field Natur. 96:131-138.
Ginns, J. 1990: *Aleurodicus occidentalis* sp. nov., *A. thujae* sp. nov. and the *A. tsugae* complex in North America. Mycologia 82:753-758.
Ginns, J. & Bandoni, R.J. 1991: *Aleurodiscus gigasporus* sp. nov. from China and *A. subglobosporus* from Japan. Mycologia 83:548-552.
Ginns, J. & Lefevre, 1993: Lignicolous Corticioid Fungi (Basidiomycota) of North America. Systematics, Distribution, and Ecology. Mycol. Mem. 19:1-247.
Hallenberg, N. 1985: Compatibility between species of Corticiaceae s.l. (Basidiomycetes) from Europe and Canada. II. Mycotaxon 24:437-443.

Ito, T. 1929: Symbolae ad mycologicum Japonicam 1. *Aleurodiscus*. Bot. Mag. (Tokyo) 43:460-66.
Langer, E. 1994: Die Gattung *Hyphodontia* John Eriksson. Bibl. Mycol. 154: 1-298. J. Cramer.
Langer, E., et al. 1997: Generic concepts in Aphyllophorales. Memorial workshop in honour of John Eriksson 1921-1995. Mycologia 88: in press.
Larsson, K.H. 1994: The genus Trechispora (Corticiaceae, basidiomycetes). Phd. dissertation, Univ. Gotheburg, Sweden.
Lauer, U., Anke, T., Sheldrick, W., Scherer, A., & Steglich, W. 1989: Antibiotics from Basidiomycetes. 31. Aleurodiscal: An antifungal sesterterpenoid from *Aleurodiscus mirabilis* (Berk. & Curt.) Höhn. J. Antibiotics 42:875-882.
Lemke, P. A. 1964a: The genus *Aleurodiscus* (sensu stricto) in North America. Can. J. Bot. 42:213-281.
Lemke, P. A. 1964b; The genus *Aleurodiscus* (sensu lato) in North America. Can. J. Bot. 42:723-768.
Maekawa, N. 1993: Taxonomic studies of Japanes Corticiaceae I. Rep. Tottori Mycol. Inst. 31:1-149.
Maekawa, N. 1994: Taxonomic studies of Japanes Corticiaceae II. Rep. Tottori Mycol. Inst. 32:1-123
Manjon, J.L., Blanco, M.N. & Moreno, G. 1990: Estudios micologicos en el parque nartural de Monfragüe (Extremadura, Espanna) II. Aphyllophorales. Crypt. Mycol. 11:145-152.
Martin, G.W. 1940: Some heterobasidiomycetes from Eastern Canada. Mycologia 32:
Michelitsch, S. 1986: *Aleurocystidiellum subcruentatum* (Berk. & Curt.) Lemke (Aleurodiscaceae, Basidiomycetes) - eine Sippe niederschlagsreicher Gebiete. Minn. naturwiss. Ver. Steiermark 116:191-203.
Nakasone, K. 1990: Cultural studies and identification of wood-inhabiting Corticiaceae and selected Hymenomycetes from North America. Mycologia Mem. 15:1-412. J. Cramer.
Oberwinkler, F. 1966: Primitive Basidiomyceten. Sydowia Ser. 2, vol. 19:1-72.
Parmasto, E. 1968: Conspectus systematis Corticiacearum. Inst. Zool. Bot. Acad. Sci. Eston. 261 pp.
Parmasto, E. 1970: The Lachnocladiaceae of the Soviet Union. Acad. Sci. Estonian SSR. Scripta Mycol. 2:1-168.
Pilat, A. 1926: Monographie der mitteleuropeischen Aleurodisineen. Ann. mycol. 24:203- 230.
Rajchenberg, M- & Wright, J. 1987: Type studies of Corticiacerae and Polyporaceae (Aphyllophorales) described by Spegazzini. Mycologia 79:246-264.
Rattan, S. S. 1977: The resupinate Aphyllophorales of the North West Himalayas. Bibl. Mycol. 60:1-427.
Ryvarden, L. 1991: Genera of Polypores. Nomenclature and taxonomy. Fungiflora, Oslo. 363 pp.

Schroeter, J. 1888: Die Pilze Schlesiens: (165. Gatt. *Aleurodiscus* Rabenhorst 1874). Krypt. Fl. v. Schesien 3:429.
Stalpers, J. 1978: Identification of wood-inhabiting Aphyllophorales in pure culture. Stud. Mycol. 16:1-248. Baarn.
Telleria, M.T. & Melo, I. 1995: Flora mycologica Iberica 1:1-223.
Skolko, A.J. 1944: A cultural and cytological investigation of a two-spores basidiomycete *Aleurodiscus canadensis* n. sp. Can. J. Res. C. 22:251-271.
Wu, Sheng-Hua, 1995: Two new genera of corticoid basidiomycetes with gloeocystidia and amyloid basidiospores. Mycologia 87:886-890.

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