Streamborne fungi from Karrantza (Basque Country) and surroundings

Enric DESCALS

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As part of the ongoing project "Flora Micológica Ibérica", a three-day survey in October of 1998 covering eleven mountain streams from the valley of Karrantza (Biscay, Basque Country) and from nearby ones in Eastern Cantabria and northern Burgos (Castilla y León) has yielded records of a number of streamborne fungi (derived from foam samples), as well as a set of ca. 90 pure cultures, for which a separate report is being prepared. A total of 80 taxa of Ingoldian fungi (i.e. streamborne Ascomycetes, Basidiomycetes and Hyphomycetes with species-identifiable conidia) were detected, plus a few species among the Aero-aquatic Hyphomycetes, Coelomycetes, Entomophthorales and Zoopagales. A further 84 spore forms of doubtful or unknown identity (but presumed to be mostly incompletely known or undescribed Ingoldian fungi) were also seen. Three tables record formal names, taxa distribution and approximate spore frequency. The more interesting taxa and undetermined spore forms are discussed, and illustrated as 264 line drawings on 17 plates.
Keywords: *Streamborne fungi, Ingoldian fungi, Aero-aquatic Hyphomycetes, Coelomycetes, Entomophthorales, Iberian Peninsula, chorology.*

FONGS HIDROCÒRICS DE KARRANTZA (PAÍS BASC) I DELS SEUS VOLTANTS. Com part del projecte vigent Flora Micològica Ibèrica, una prospecció de tres dies durant el mes d'octubre de 1998 d'onze rius de muntanya de la Vall de Karrantza (Bizcaia, País Basc) i d'altres a prop dins la Cantàbria Oriental i nord de Burgos (Castella i Lleó) ha permès el registre d'una sèrie de fongs hidrocòrics a partir de mostres d'escumes, al mateix temps que una col.lecció d'uns 90 cultius purs, dels que s'informarà per separat. S'han detectat un total de 80 tàxons de fongs ingoldians (és a dir d'Ascomicets, Basidiomicets i Hifomicets amb conidis identificables a nivell d'espècie) a més d'unes poques espècies d'Hifomicets aero-acuàtics, Coelomicets, Entomophthorales i Zoopagales. A més a més s'han registrat 84 altres formes espòriques d'identitat dubtosa o desconeguda (però que es pensa que són majoritàriament fongs ingoldians poc estudiats o encara no descrits). Tres taules registren la nomenclatura formal, la distribució dels tàxons i la freqüència aproximada de les espores. Els tàxons i les espores més interessants són comentades, i aquestes il.lustrades amb 264 dibuixos sobre 17 làmines.
Paraules clau: *fongs hidrocòrics, fongs ingoldians, Hyphomycetes aero-acuàtics, Coelomycetes, Entomophthorales, Península Ibèrica, corologia.*

Enric DESCALS, Institut Mediterrani d'Estudis Avançats (CSIC-UIB), Univ. Illes Balears, 07071, Palma de Mallorca, Spain.

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Introduction

The national project "Flora Micológica Ibérica III" (Tellería & Melo, 1995) is a continuation of a long-term study and cataloguing of the fungi of the Ibero-Balearic region. In the 1998 yearly foray a hilly region covering the valley of Karrantza in the southwest of Biscay (Basque Country), as well as other sites in neighbouring eastern Cantabria and northern Burgos (Castilla y León), were surveyed on 13 to 15 October. The subproject on Ingoldian fungi covered a number of streams throughout this area and this is a first report on the findings.

Materials and methods

Collecting and preserving techniques are detailed in Descals (1997a). Foam subsamples were air-dried on microscope slides, stained with lactofuchsin and scanned at 320x with an Olympus BX50 compound microscope equipped with phase contrast and differential interference contrast optics. Spores were drawn under 20x and 40x dry objectives with a drawing tube. Foam specimens are preserved as numbered microscope slides in Herb. Descals.

Localities

L200. Río del Cuadro, upstream from Lanzas Agudas, Karrantza, Biscay. Small stream flowing through deciduous *Quercus* woodland and *Pinus* plantation. Banks lined with *Alnus*, ca. 300 m alt. 13 Oct. 1998.

L201. Río de las Escaleras, upstream from Pando, Karrantza, Biscay. Small stream flowing through *Pinus* plantation. Banks lined with *Castanea, Alnus, Fagus, Quercus,* ca. 400 m alt. 13 Oct. 1998.

L202. Río Calera, upstream from La Calera del Prado, Karrantza, Biscay. Small stream flowing through mixed *Fagus* wood and meadows. Banks lined with *Alnus, Corylus, Salix*, ca. 500 m alt. 13 Oct. 1998.

L203. Unnamed northern tributary of the Ordunte Reservoir, Montes de Ordunte, Burgos, flowing through mixed deciduous woodland. Banks lined with *Alnus, Castanea, Corylus, Quercus*. 13 Oct. 1998.

L204. Río Cadaguas, upstream from Cadaguas, Montes de la Peña, Mena Valley, Burgos. River, ca. 7 m wide, flowing through evergreen *Quercus ilex* woods and meadows on calcareous rock. Banks lined with *Alnus*. 14 Oct. 1998.

L205. Unnamed stream at Alto de los Tornos, on road N-629 from Burgos to Laredo (Cantabria). Flowing through meadows on peat soils. Banks lined also by scattered *Pinus* and *Ulex*, ca. 900 m alt. 14 Oct. 1998.

L206. Small tributary of unnamed stream at Alto de los Tornos, a few m from L205. Flowing through similar land, ca. 1 Km downstream from a *Pinus* plantation, ca. 900 m alt. 14 Oct. 1998.

L207. Río Asón, at its springs, Cantabria. Flowing through meadows and deciduous woodland on calcareous soils. Banks lined with *Fagus*. 14 Oct. 1998.

L208. Small stream above Hazas, Valley of the R. Gándara, nr. Ramales de la Victoria, Cantabria. Flowing through meadows and mixed deciduous woodland. Banks lined with *Alnus*. 15 Oct. 1998.

L209. Small stream above Veguilla, Valley of the R. Gándara, Ramales de la Victoria, Cantabria, flowing through mixed deciduous woodland. Banks lined with *Quercus, Populus, Castanea, Corylus, Salix,* etc. 15 Oct. 1998.

L210. Small stream above Rehoyos, Valley of the R. Gándara, Ramales de la Victoria, Cantabria, flowing through deciduous *Quercus* woodland. Banks lined with *Alnus, Corylus.* 15 Oct. 1998.

Results and discussion

Some of the areas surveyed in Cantabria and Burgos were calcareous, and foams were, as expected, scarce and species-poor. The richest sample (L205), on the other hand, was from a stream flowing through an open grassland on peat, with scattered pine plantations. The remaining localities were tree-lined mountain streams above human habitation but subject to intensive cattle husbandry. This is usually associated with a reduction in fungal biodiversity in streams, as opposed to ungrazed woodland. The collecting dates are considered somewhat early, as leaves from deciduous vegetation had only recently started to fall.

Records of the fungi encountered in individual samples have been compiled in Tables 1 and 2, with an approximation of spore abundance per sample. The right hand column "n" registers the frequency of taxa, i.e. the number of samples in which at least one conidium of a particular taxon appears. Taxa with identifiable conidia are listed in Table 1. Ingoldian fungi are grouped as anamorphs of Ascomycetes and Basidiomycetes and as Hyphomycetes. Basidiomycetes and Ascomycetes seem to be on the whole more widely distributed than Hyphomycetes, except for *Tumularia aquatica*. It is suggested that this could be due to the presence in the former of more than one type of disseminules and /or dispersal media, i.e.: waterborne conidia and spermatia vs. airborne meiospores). Among the Basidiomycetes, *Taeniospora descalsii* was only seen a couple of times, in the same locality. *T. descalsii* is only known as an anamorph with binucleate cells. Although it seems to be a widespread fungus, its conidia are never abundant, and the teleomorph, if extant, may be sparse and difficult to locate, at least in the autumn.

Also listed is a lichenicolous coelomycete *(Cornutispora lichenicola)* with presumably species-identifiable stauroconidia. Less differentiated pestalotioid conidia were quite frequent, as in most stream foams, but they were not recorded. Two species of Entomophthorales were present (see Descals & Webster 1984): *Erynia conica,* a well-known parasite of mammal blood-sucking Simuliidae (Diptera) and *E. rhizospora,* which can cause epizootics among detritivorous Trichoptera and thus affect the dynamics of leaf decomposition in streams. The latter fungus was seen as primary conidia, without the characteristic verticillate appendages formed when those are submerged. Finally there is one record of the invertebrate parasite *Acaulopage tetraceros,* a soilborne member of the Zoopagales sometimes seen as conidia in stream foams.

Part A in Table 2 compiles names of all those forms which clearly belong to the Ingoldian fungi plus a few other species, but which are of doubtful identity at the species or even generic level, 1- because they do not exactly fit the type (e.g. *Actinosporella* sp.), 2- because they are not well known to the author (e.g. *Titaea, Atichia,* etc.), 3- because character states overlap two or more species (e.g. *Goniopila*), 4- because conidia are aborted, (e.g. *Tricladiopsis foliosa*), or 5- because they are well-known, most probably undescribed entities tentatively assigned to extant genera (e.g. *Ypsilina* sp., *Triscelophorus* sp.). Non-ingoldian forms are grouped as "other anamorphs" (probably classified in common genera such as Cercospora and the *Cylindrocarpon-like* complex, but without species-identifiable conidia), helicosporous Hyphomycetes, ascospores of probably Ingoldian species, e.g. ?*Massarina*) and an unidentifiable globose conidium of the Entomophthorales. The second part of Table 2 groups "unknown forms" which the author cannot safely delimit at the species level or

Table 1. Approximate conidial abundance (m= many; f= few; += present; -= not seen) and taxa distribution (n= n° of L samples / taxon) in samples L200 to L210.
Taula 1. Abundància aproximada de conidis (m= molts; f= pocs; += presents; -= cap) i distribució dels tàxons (n= núm. de mostres L (tàxon) en les mostres de la L200 a la L210.

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
INGOLDIAN ASCOMYCETE ANAMORPHS												
Articulospora tetracladia Ingold, figs. 3A, C, G, H	+	m	m	m	-	m	f	l	+	+	+	10
Heliscus lugdunensis Sacc. & Thérry, fig. 11 M	m	m	m	+	l	+	-	f	+	f	f	10
Anguillospora crassa Ingold	+	+	+	+	-	+	-	f	+	+	+	9
A. rosea Webster & Descals, fig. 15 I	+	f	f	+	-	+	-	f	+	+	+	9
Tricladium splendens Ingold	+	+	+	f	-	+	-	-	+	f	+	8
Anguillospora furtiva Webster & Descals, figs. 15A, ?B	+	f	+	f	-	+	-	-	+	-	+	7
A. longissima (Sacc. & Syd.) Ingold, figs. 15G, H	-	l	-	f	f	-	f	+	f	f	7	
Clavariopsis aquatica De Wild.	f	-	f	-	f	f	-	-	f	+	f	7
Tumularia tuberculata (Gönczöl) Descals & Marvanová, figs. 11J	-	-	f	-	-	-	-	-	-	-	f	2
INGOLDIAN BASIDIOMYCETE ANAMORPHS												
Naiadella fluitans Marvanová & Bandoni, fig. 12 Q	f	-	f	-	-	f	l	-	f	-	f	6
Taeniospora gracilis var. gracilis Marvanová & Stalpers	f	f	f	f	-	f	-	-	-	-	-	5
Taeniospora descalsii Marvanová & Stalpers, figs. 12 N, ?O	-	-	-	-	-	f	-	-	-	-	-	1
INGOLDIAN HYPHOMYCETES												
Alatospora acuminata Ingold (s.s.), figs. 9 H, I	m	m	m	m	+	m	f	+	m	+	m	11
A. acuminata Ingold (s.l.), figs. 10 G, H	m	m	m	m	+	m	-	+	+	+	m	10
Tetracladium marchalianum De Wild. figs. 14?P, S	f	l	l	f	+	f	-	f	f	f	+	10
T. setigerum (Grove) Ingold, figs. 14 Q, R	f	f	f	l	f	f	?	l	f	+	f	10
Flagellospora curvula Ingold	+	+	+	f	-	+	-	f	f	f	+	9
Alastospora pulchella Marvanová, fig. 10 O	f	+	-	f	l	f	l	-	f	l	-	8
Heliscella stellata (Ingold & Cox) Marvanová & S. Nilsson	m	m	m	+	-	m	-	-	f	+	+	8
Lateriramulosa uniinflata Matsushima	f	f	l	l	l	f	-	-	f	-	l	8
Lunulospora curvula Ingold, fig. 15 L	f	f	f	-	-	f	-	l	f	l	f	8
Flabellospora acuminata Descals	f	f	f	-	-	f	-	-	f	l	f	7
Isthmotricladia britannica Descals, figs. 8 B, C, D	l	l	l	l	l	f	-	-	-	l	-	7
Margaritispora aquatica Ingold	+	f	-	+	-	?	-	f	f	f	f	7
Tricellula aquatica Webster, figs. 13 K, L	f	-	l	l	l	l	-	l	l	-	-	7
Alatospora flagellata (Gönczöl) Marvanová, fig. 10 L	+	-	m	+	-	-	-	f	-	f	m	6
Diplocladiella scalaroides Arnaud ex M.B. Ellis	f	-	f	-	l	-	-	l	f	-	f	6
Stenocladiella neglecta (Marv. & Descals) Marvanová & Descals	-	f	-	-	+	-	-	f	f	+	+	6
Tetracladium breve Roldán	-	-	l	-	f	f	-	-	f	f	l	6
T. maxilliforme (Rostrup) Ingold	f	f	l	-	-	f	-	-	l	-	l	6
Tricladium curvisporum Descals, figs. 13 C, G	-	l	l	-	-	f	-	-	+	l	f	6
T. patulum Marvanová & Marvan, fig. 6 D	l	f	+	f	-	+	-	-	-	-	f	6
Culicidospora gravida R.H. Petersen, figs. 12 A, ?B	f	l	f	-	-	-	-	-	f	-	f	5
Dendrospora erecta Ingold	f	f	-	l	-	f	-	-	-	-	f	5
Triscelophorus monosporus Ingold	-	-	-	f	-	f	-	-	f	f	f	5
Varicosporium elodeae Kegel	f	f	f	-	-	+	-	-	-	-	f	5
Anguillospora filiformis Greathead	+	f	f	-	-	l	-	-	-	-	-	4
Pachycladina mutabilis Marvanová, figs. 2 B, C, D	-	-	f	-	-	f	-	f	-	-	f	4
Tetracladium furcatum Descals	-	-	l	-	-	f	-	-	f	-	f	4
Tricladium attenuatum Iqbal, figs. 11A, B, C	-	f	f	l	-	f	-	-	-	-	-	4
Triscelophorus acuminatus Nawawi	l	f	-	l	-	f	-	-	?	?	-	4
Ypsilina graminea (Ingold *et al.*) Marvavanová & Descals	f	-	-	-	-	f	-	-	l	l	-	4
Gyoerffyella rotula (Höhnel) Marvanová	-	f	l	-	-	f	-	-	-	-	-	3

(Table 1. Cont.)

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
INGOLDIAN HYPHOMYCETES												
Heliscina campanulata Marvanová, figs. 11 G	1	-	-	+	-	f	-	-	-	-	-	3
Tetracladium palmatum Roldán	1	1	-	-	-	f	-	-	-	-	-	3
Tricladium angulatum Ingold, fig. 4 L	-	-	f	-	-	-	-	-	m	-	f	3
Volucrispora ornithomorpha (Trotter) Haskins	-	-	-	-	1	f	1	-	-	-	-	3
Articulospora atra Descals, fig. 3 E	1	-	-	-	-	+	-	-	-	-	-	2
Camposporium pellucidum (Grove) S.J. Hughes	-	-	-	-	-	1	-	-	f	-	-	2
Clavatospora longibrachiata (Ingold) Marvanová & S. Nilsson	-	?	-	-	-	f	-	f	-	-	-	2
Dwayaangam cornuta Descals, fig. 5 F	1	-	-	-	-	f	-	-	-	-	-	2
Lateriramulosa biinflata Matsushima, fig. 14 H	-	-	-	-	-	1	-	-	1	-	-	2
Lemonniera cornuta Ranzoni, fig. 7 C	-	-	-	-	-	-	-	-	f	-	f	2
L. terrestris Tubaki	-	-	-	-	-	-	-	-	f	-	f	2
Mycofalcella calcarata Marvanová	-	1	-	-	-	1	-	-	-	-	-	2
Tricladium biappendiculatum (Arnold) Marvanová & Descals	-	-	-	1	-	1	-	-	-	-	-	2
T. castaneicola B. Sutton	1	-	-	-	-	f	-	-	-	-	-	2
Tripospermum camelopardus Ingold *et al.*, fig. 13 E	-	-	-	-	-	f	-	-	-	-	1	2
T. myrti (Lind) S.J. Hughes, fig. 13 F	f	-	-	-	-	-	-	-	1	-	-	2
Tumularia tuberculata (Gönczöl) Descals & Marvanová, figs. 11 I	-	-	-	f	-	-	-	-	-	-	f	2
Culicidospora aquatica R.H. Petersen	-	-	-	1	-	-	-	-	-	-	-	1
Enantioptera tetraalata Descals	-	-	-	-	-	-	1	-	-	-	-	1
Fontanospora eccentrica (R.H. Petersen) Dyko, fig. 2 G	-	-	-	-	-	1	-	-	-	-	-	1
F. fusiramosa Marvanová *et al.*, fig. 2 H	-	-	-	1	-	-	-	-	-	-	-	1
Geniculospora inflata (Ingold) Marvanová & S. Nilsson	-	-	-	-	-	1	-	-	-	-	-	1
Gyoerffyella gemellipara Marvanová	1	-	-	-	-	-	-	-	-	-	-	1
Gyoerffyella tricapillata (Ingold) Marvanová, fig. 12J	-	-	-	-	-	-	-	-	-	-	1	1
Heliscina antennata Marvanová	-	-	-	-	-	f	-	-	-	-	-	1
Isthmolongispora minima Matsushima	-	-	-	f	-	-	-	-	-	-	-	1
Lemonniera aquatica De Wild.	-	-	-	-	-	f	-	-	?	-	-	1
L. filiformis R.H. Petersen, figs. 7D, ?F	-	-	-	-	-	f	-	-	-	?	-	1
Mycocentrospora acerina (Hartig) Deighton	-	-	-	-	-	f	-	-	-	-	-	1
M. clavata S.H. Iqbal, fig. 17 N	-	-	1	-	-	-	-	-	-	-	-	1
Pleuropedium tricladioides Marvanová & S.H. Iqbal, fig. 5 B	-	-	-	-	-	1	-	-	-	-	-	1
Sympodiocladium frondosum Descals, fig. 5 E	-	-	-	-	-	1	-	-	-	-	-	1
Tetrachaetum elegans Ingold	-	-	-	-	-	-	-	-	1	-	-	1
Tricellula curvata Haskins, fig. 13 M	-	-	1	-	-	-	-	-	-	-	-	1
Tricladium chaetocladium Ingold	-	-	-	-	-	f	-	-	?	-	-	1
Varicosporium delicatum S.H. Iqbal	-	-	-	-	-	+	-	-	-	-	-	1
Variocladium giganteum (S.H. Iqbal) Descals & Marvanová	-	-	-	-	-	f		-	-	-	-	1
AERO-AQUATIC HYPHOMYCETES												
Candelabrum spinulosum v. Bev.	1	-	-	-	-	-	-	-	-	-	-	1

(Table 1. Cont.)

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
STAUROSPOROUS COELOMYCETES												
Cornutispora lichenicola Hawksw. & B. Sutton, fig. 13T	1	-	-	+	-	f	-	-	-	-	-	3
ZYGOMYCETES												
ENTOMOPHTHORALES												
Eryna conica (Nowakowski) Humber	1	-	-	-	-	f	-	-	-	-	-	2
E. rhizospora (Thaxter) Humber	-	-	-	-	-	-	-	-	-	-	f	1
ZOOPAGALES												
Acaulopage tetraceros Drechsler	-	-	-	-	-	-	-	-	f	-	-	1

even presume to be in known genera, but suspects them to be mostly undescribed Ingoldian taxa.

Table 3 summarizes the distribution and spore abundance of the major taxa encountered. The right hand column "N" adds up the number of taxa in each group, with a total of 81 known Ingoldian taxa (nearly a third of the world mycota) and an approximate total of 164 distinct forms for the eleven streams surveyed. Some 34 taxa belong in part A of table 2, and approximately 50 forms, or nearly a third of the total, come under its part B. This reflects our limited knowledge of the composition of the streamborne mycota in this geographical area.

Parallel single-spore isolations were carried out from the same foam samples, and the results will be discussed in a separate publication. It should be emphasized that roughly 40% of the records are based on single spores, and many others on very few more. Therefore the number of species one is likely to encounter on thinly spread foam on the isolation plates will necessarily be much reduced. Hoerver, further visits to the area should be carried out.

With regard to the Ingoldian fungi, sample L205, with over 90 different forms, was by far the richest. It was also the richest for all the other fungal categories as well as in spore numbers. L206, which was collected a few m away at the mouth of a tributary stream, was extremely poor in variety and spore numbers, with only eight recognizable forms. As the land drained in both cases was similar in vegetation, the difference may be partly due to the age of the foam sample.

Some of the doubtful or unknown forms encountered are discussed below.

The *Dendrospora* conidia in figs. 1A and 1C were seen only once. Fig. 1A could be *D. nana*, described in the UK, but it has never been seen on the Iberian peninsula, as is the case with fig. 1C. This resembles conidia of *D. torulosa*, although the cells of the latter are clearly inflated.

The spore in fig. 1B resembles conidia of *Flabellospora crassa* Alasoadura, a poorly known fungus described from tropical Africa with a maximum of five conidial arms, while the present one bears eight. A similar spore was illustrated in Descals & Moya (1996).

Fig. 1D is most probably of an *Actinosporella*. Here again, a maximum of five conidial arms were seen in pure cultures of *A. megalospora*, while ours has eight. Such conidia were also present in British streams from which the latter was isolated and later associated with its teleomorph *Miladina*

Table 2. Approximate spore abundance and distribution of: A: partially identified taxa; B: unknown forms. (See explanation of symbols in Table 1).
Taula 2. Abundància d'espores i distribució aproximada de: A: tàxons parcialment identificats; B: formes desconegudes (veure l'explicació dels símbols a la Taula 1).

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
Articulospora tetracladia f. ined., figs. 3 D, K	f	+	+	f	-	+	-	-	f	l	f	8
?Arbusculina sp., figs. 13 A	f	l	l	l	-	f	-	-	f	-	f	7
Pleuropedium sp., figs. 5 A, C, D	l	f	l	l	-	f	-	-	-	-	l	6
Articulospora sp. 1, figs. 3 I-M, ?N	f	-	f	f	-	-	-	-	f	-	-	4
Dactylaria spp., figs. 17 P, Q R	l	-	l	-	-	-	-	-	f	-	f	4
Tricellula sp. 1, figs. 13 N, ?O	l	-	l	-	-	l	-	-	-	-	l	4
?Triscelophorus sp., figs. 14 B	l	-	-	-	-	-	-	-	f	f	f	4
?Atichia sp., fig. 14 J	-	-	-	l	-	l	-	-	-	-	l	3
?Isthmotricladia spp., figs. 8 E-I	f	l	-	-	-	-	-	-	f	-	-	3
Tricladium spp., figs. 4 A-K, M-Q	l	-	l	-	-	-	-	-	f	-	-	3
Tripospermum sp. 1, figs. 13 D, H	l	-	l	l	-	-	-	-	-	-	-	3
?Varicosporium giganteum Crane	-	f	f	-	-	f	-	-	-	-	-	3
Lateriramulosa ?ainflata Matsushima, figs. 14 G	-	f	-	-	-	-	-	-	l	-	-	2
Lemonniera sp., figs. 7 E	-	-	-	-	-	-	-	l	l	-	-	2
Tetracladium spp., figs. 14 D, E, K-N, O	-	-	f	-	-	l	-	-	-	-	-	2
Actinosporella sp., fig. 1 D	-	-	-	-	-	-	-	-	-	l	-	1
Campylospora sp, figs. 13 I, J	-	-	f	-	-	-	-	-	-	-	-	1
Dendrospora sp. 1, fig. 1A	-	-	-	-	-	l	-	-	-	-	-	1
Dendrospora sp. 2, fig. 1C	-	-	-	-	-	l	-	-	-	-	-	1
Flabellospora sp., fig. 1 B	-	-	-	-	-	-	-	-	f	-	-	1
Gyoerffyella ?myrmecophagiformis Mel'nik & Dudka, fig. 12 K	-	-	-	-	-	l	-	-	-	-	-	1
Titaea sp., figs. 14 C	f	-	-	-	-	-	-	-	-	-	-	1
Tricellula sp. 2, fig. 13 P	-	-	-	-	-	l	-	-	-	-	-	1
?Tricladiopsis foliosa Descals	-	-	-	-	-	-	-	-	l	-	-	1
Ypsilina sp., figs. 13Q	-	-	-	-	-	f	-	-	-	-	-	1
Goniopila monticola (Dyko) Marvanová & Descals	-	?	-		-	?	-	-	-	?	-	0
OTHER ANAMORPHS												
?Cylindrocarpon spp., curved conidia	f	f	+	l	-	l	-	l	-	-	f	7
"*Rhynchosporium* sp."	f	f	-	f	-	f	f	-	-	-	f	6
Cercospora-like conidia	-	-	-	-	-	-	-	-	f	-	-	1
HELICOSPOROUS HYPHOMYCETES												
Helicosporium spp.	-	-	f	l	l	f	-	-	f	-	f	6
Helicodendron spp.	-	-	l	-	-	-	-	-	-	-	-	1
?Helicomyces roseus, fib. 15 F	-	-	-	f	-	-	-	-	-	-	-	1
ASCOMYCETES												
Leptosphaeria-like ascospore (pigmented)	-	-	-	l	-	-	-	-	-	-	-	1
Massarina-like ascospore, fig. 17 H	-	-	-	l	-	-	-	-	-	-	-	1
ZYGOMYCETES ENTOMOPHTHORALES												
globose aerial conidium	-	-	-	l	-	-	-	-	-	-	-	1

(Table 2. Cont.)

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
B: UNKNOWN FORMS												
figs. 17 B	+	+	-	+	-	+	+	-	-	-	+	6
fig. 17 F	+	-	+	+	-	+	-	-	+	-	+	6
figs. 17 A	-	f	f	f	-	f	-	-	-	-	-	4
figs. 6 A, B, C	-	1	1	-	-	1	-	-	-	-	-	3
figs. 16 A-F	f	-	f	-	-	-	-	-	-	-	1	3
fig. 16 J	-	-	1	-	-	1	-	-	-	-	1	3
figs. 7 A, B	-	-	-	-	-	1	-	-	1	-	-	2
figs. 11 E	-	-	f	f	-	-	-	-	-	-	-	2
figs. 11 F	-	-	-	-	-	-	-	f	f	-	-	2
figs. 11 G	-	-	f	f	-	-	-	-	-	-	-	2
figs. 11 L	-	-	-	1	-	1	-	-	-	-	-	2
figs. 12 D, H, I	f	-	1	-	-	-	-	-	-	-	-	2
fig. 14 A	1	-	-	-	-	1	-	-	-	-	-	2
figs. 14 D, E, F, M	-	-	-	-	f	f	-	-	-	-	-	2
figs. 16 L, M	1	-	1	-	-	-	-	-	-	-	-	2
figs. 17 D	-	-	-	-	-	-	-	-	+	+	-	2
fig. 2 A	-	-	-	-	-	-	-	-	1	-	-	1
fig. 2 E	-	-	-	-	1	-	-	-	-	-	-	1
fig. 2 F	-	-	-	1	-	-	-	-	-	-	-	1
fig. 4 A	-	-	-	-	-	-	-	-	1	-	-	1
figs. 4 J, N, O	-	-	f	-	-	-	-	-	-	-	-	1
fig. 4 Q	-	-	-	-	-	-	-	-	-	-	1	1
fig. 5 G, H	-	-	-	-	-	-	-	-	f	-	-	1
fig. 8 A	1	-	-	-	-	-	-	-	-	-	-	1
fig. 8 K	-	-	-	-	-	1	-	-	-	-	-	1
fig. 11 H	-	-	-	-	-	-	-	-	1	-	-	1
fig. 11 K	-	-	-	-	-	f	-	-	-	-	-	1
fig. 11 N	-	-	f	-	-	-	-	-	-	-	-	1
fig. 12 C	-	1	-	-	-	-	-	-	-	-	-	1
fig. 12 E	-	-	1	-	-	-	-	-	-	-	-	1
fig. 12 F	-	1	-	-	-	-	-	-	-	-	-	1
fig. 12 G	-	-	1	-	-	-	-	-	-	-	-	1
fig. 12 L	1	-	-	-	-	-	-	-	-	-	-	1
fig. 12 M	-	-	-	-	-	-	-	-	1	-	-	1
fig. 12 P	-	-	-	-	-	1	-	-	-	-	-	1
fig. 12 R	-	-	1	-	-	-	-	-	-	-	-	1
fig. 13 B	1	-	-	-	-	-	-	-	-	-	-	1
fig. 15 B	-	-	-	-	-	-	-	-	-	-	f	1
fig. 15 C	-	-	-	-	-	-	-	-	1	-	-	1
fig. 15 D	-	-	-	-	1	-	-	-	-	-	-	1
fig. 15 E	-	-	-	-	1	-	-	-	-	-	-	1
fig. 15 J	-	-	-	-	1	-	-	-	-	-	-	1
fig. 15 K	-	-	1	-	-	-	-	-	-	-	-	1
fig. 16 I	-	-	1	-	-	-	-	-	-	-	-	1
fig. 16 K	-	-	-	-	-	1	-	-	-	-	-	1
figs. 17 G, K	-	-	-	-	-	-	-	-	f	-	-	1
fig. 17 J	-	-	-	-	-	1	-	-	-	-	-	1
figs. 17 L, M	f	-	-	-	-	-	-	-	-	-	-	1
figs. 17 O	-	-	-	-	-	f	-	-	-	-	-	1
fig. 17 S	-	-	-	-	-	1	-	-	-	-	-	1

Table 3. Distribution and spore abundance of the major taxa encontered. Columns 200 to 210: number of taxa or unknown forms of each major grouping per L sample (bottom line: approximate total of taxa and unknown forms per sample). Column N: total n° of taxa or unknown forms within each major grouping (bottom cell: approximate grand total of taxa and unknown forms in all samples).
Taula 3. Distribució abundància d'espores dels tàxons trobats. Columnes 200 a 210: nombres de tàxons o formes desconegudes per a cada grup principal a les mostres L (línia inferior: nombre total aproximat de tàxons i formes desconegudes per mostra). Columna N: núm. total de tàxons o formes desconegudes per a cada grup principal (celda inferior: total global aproximat de tàxons i formes desconegudes en totes les mostres).

SAMPLES: L NUMBERS	200	201	202	203	204	205	206	207	208	209	210	n
INGOLDIAN ASCOMYCETE ANAMORPHS	7	6	9	6	3	8	1	5	8	7	9	9
INGOLDIAN BASIDIOMYCETE ANAMORPHS	2	1	2	1	-	3	1	-	1	-	1	3
INGOLDIAN HYPHOMYCETE ANAMORPHS	30	25	27	23	12	49	4	13	28	17	29	68
TOTAL INGOLDIAN TAXA	39	32	38	30	15	60	6	18	37	24	39	80
TOTAL OTHER TAXA	3	-	-	-	-	1	-	-	1	-	1	5
TOTAL KNOWN TAXA	42	32	38	30	15	61	6	18	38	24	40	82
INCOMPLETELY IDENTIFIED INGOLDIAN TAXA (APPROX.)	11	6	11	6	-	11	-	1	11	3	7	25
OTHER INCOMPLETELY IDENTIFIED TAXA (APPROX.)	2	2	3	7	1	3	1	1	2	-	3	9
TOTAL INCOMPLETELY IDENTIFIED TAXA (APPROX.)	13	8	14	13	1	14	1	2	13	3	10	29
TOTAL UNKNOWN FORMS (APPROX.)	10	5	16	7	5	16	1	1	11	1	6	50
TOTALS (APPROX.)	65	45	68	50	21	91	8	21	62	28	56	164

lechithina, a member of the Pezizales. We may thus be dealing with a single species, but this needs confirmation from further pure cultures. Within the Iberian peninsula, *A. megalospora* has only been recorded by the author from the Montseny mountain range in Catalonia (unpubl.). The fungus is also known from the French slopes of the nearby Pyrenees (Descals & Chauvet 1992).

Fig. 3 brings together conidia of *Articulospora*-like conidia. Figs. I-J,L,M represent a form which was previously found in central Spain (Descals *et al.* 1995b) and in the French Pyrenees (Descals & Chauvet, 1992). Some larger forms (fig. F) look like *A. tetracladia*, but two branches are atypically retrorse. Such conidia have been frequently seen elsewhere.

Tricladium angulatum is characteristic of calcareous streams. Similar, though somewhat small conidia were seen in L208 (fig. 4H). But those in figs. 4 B,D-I,K-M are significantly shorter than in the neotype (Descals & Webster 1982), which records an axis at least 60 µm long. They merge with the forms in figs. 4 J,N-P. These also resemble *T. angulatum* by the distal arm, which is narrower than the lower one; but the detachment scar is much thinner. Figs. 4 A,C and Q probably belong to different fungi, fig. C being somewhat reminiscent of *Arbusculina*, while fig. Q looks like a small version of *T. splendens*.

The conidia in figs. 5 A,C,D seem to bear two orders of branching, and could then fall in *Pleuropedium*. The same forms were drawn in Descals & Chauvet (1992) from French material, and by Descals & Moya (1996) from Catalan samples, both originating in Pyrenean streams.

The conidia in figs. 6 A-C, with swollen ends superficially resemble those of *Varicosporium giganteum* Crane, where the axis measures (140-) 260 (-270) µm. However, they show distinctly constricted branch insertions, whereas in *V. giganteum* these are apparently always broad. This North-American species is also little known, and needs a more precise description.

Fig. 7C shows the characteristic branch curvature unique for *Lemonniera cornuta*, but in microscope preparations the arms often flatten out on the glass and appear straight. Fig. 7E could be an example of this, or it could belong to *L. alabamensis* or *L. pseudofloscula*, again two species which need redescribing. Fig. 7F shows three branches inserted at the base of an axis, a character state typical of *L. filiformis* (fig. 7 D). However, the shape is more like that in *L. alabamensis*. Forms like those in E and F were seen only once, and may not be typical.

Figs. 9 and 10 group conidia superficially resembling those in *Alatospora acuminata* in its two forms, cited provisionally by Marvanová & Descals (1985) as *sensu stricto* and *sensu lato* respectively. However, in some samples (especially in L200), forms matching the *sensu stricto* concept (i.e. with broad branch insertions) but with extra arms appearing in odd positions were unusually common, and deserve further study in pure culture. Fig. 9 M is also close to the conidia of the basidiomycete anamorph *Crucella subtilis* Marvanová & Suberkropp but it lacks the long basal extension or, in its absence, the truncate scar.

In fig. 10 one can see a continuum from forms typical of *Alatospora pulchella* (fig. O) to *A. acuminata* s.l. (fig. E) to *A. constricta* (fig. H) and to *A. flagellata* (fig. L), with an intermediate case (fig. C), widespread in Europe, and which cannot be safely adscribed to the latter. There are forms such as that in fig. I which may be aberrant *A. acuminata* or even of an undescribed taxon.

Due to this continuum in shapes and sizes, species were only recorded when conidia were true to type. This phenomenon occurs among and between other genera of Ingoldian fungi, and it would obviously interfere with quantitative studies, though not so when merely recording conidial presence and approximate abundance.

Figs. 4 E depicts five conidia which are quite similar. The second from the left shows a detachment scar, and it approaches *Heliscella stellata*. The other four conidia, however, show no scars, and their identity is even less clear.

The turbinate conidia in figs. 11 F are similar in outline to those of *Tumularia tuberculata* (Fig. 11 I) but half in size and lacking the central septum. Those in fig. 11 G, under 10 µm long, look different from those in 11 F, and seem closer to *Heliscina campanulata*, but here the axis is described as 9 to 25 µm long, far longer than in our case. The conidia in fig. 11 K show a median constriction which is not present in the otherwise similar *Heliscus lugdunensis* (Fig. 11 M). The form seen in fig. 11 L is often seen in foam samples. It resembles the latter species, but two of the knobs are themselves forked.

Figs. 12 D, H show thick-walled conidia, while in K it is thin-walled. All three are similar to those of *Trifurcospora* Matsushima, but they could also belong to *Trinacrium*, a terrestrial genus but with conidia often encountered in stream foam.

Fig. 12 K, a form only seen once, matches secondary conidia of *Gyoerffyella myrmecophagiformis*, and, if correct, this would be a first record for the Iberian peninsula, as well as for stream foam, as it was described on *Melasmia lonicerae*, a coelomycetous anamorph of the leaf parasitic Rhytismataceae.

The form depicted in fig. 12 N belongs to the basidiomycetous anamorph *Taeniospora descalsii*, where the conidial axis may range from (17-) 38 (-55) µm. It would appear that fig. O is simply a clampless form of the same species, but pure culture has so far shown that clamped *T. descalsii* conidia will only produce clamped conidia, while similar

clampless forms do not produce clamped ones (Marvanová & Bärlocher, 1988). (Cultures from clampless conidia have not yet been paired in an attempt to obtain the clamped ones). One could therefore suspect that it is an altogether different species without basidiomycetous connections. Both figs. 12 O and P could just be incompletely branched conidia of *Enantioptera tetraalata* Descals, except that its conidial length is recorded as above 30 µm.

Figs. 13 A are somewhat like those of *Arbusculina fragmentans*, but these have a shallow frill around the scar, branch insertions are subconstricted and secondary branching is not mentioned nor illustrated in the protologue. In our case conidial branches are sometimes decurrent and branching order and arrangement is not clear.

The conidia in figs. 13 D-F and H seem to belong to *Tripospermum camelopardus*, but this was described with just two branches arising laterally from the reflexed axis, while our conidia bear three, which is typical of *T. myrti* (Fig. 13 F), here shown with only two laterals, though otherwise fitting the type. Conidia of the similar genus *Campylospora* (with laterals also arranged singly on a reflexed axis) are shown in figs. 13 I and J. They could belong to Matsushima's (1980) *Campylospora* species, recorded by the latter as *C. filicladia* but believed to be different. On the basis of published dimensions, the allantoid part of the main body is 14 to 18 µm long in Matsushima's fungus, and 9-13 µm in *C. filicladia*. Our conidia have intermediate values (ca. 14 µm), and identification is thus risky.

Figs. 13 Q show two conidia which are similar to those of *Ypsilina graminea* (Figs. 13 R, S), but the axis is strongly arched, a feature seen in conidia from Gredos (Descals *et al.* 1995b).

Fig. 13 T is of a conidium of the coelomycete *Cornutispora lichenicola*, which, as the name implies, fruits on lichens. Its conidia are now and then seen in stream foam.

Figs. 14 C are undoubtedly of a *Titaea* Sacc. This genus is characteristically of terrestrial origin (Sutton 1984). The conidia in figs. 14 D-F, ?I, M, N have a retrorse secondary branch although they bear a resemblance with *Tetracladium* (especially fig. N) and are most probably undescribed. The conidia in figs. 14 K,L,O are more like the latter genus. In fig. 14 K one sees branching from three levels on the axis, which is characteristic of *T. palmatum*, but this has digitiform rather than acuminate elements. In figs. L and O conidia branch only from two levels, and do not seem to belong to described species. Fig. 14 P could be of a misshapen *T. marchalianum* (Fig. 14 S), which conidia are notoriously polymorphic. Figs. 14 Q and R are unquestionably those of *T. setigerum*, but with the uppermost lateral intruding between the axis and the lower digitiform branch instead of on the opposite side of the axis. This form is not unusual in foam.

The conidium in fig. 15 B exceeds 350 µm in length, but it is still within the limits of *Anguillospora furtiva*, which may sometimes span out to 590 µm. Such long conidia should however be isolated for confirmation. Fig. 15 F is similarly long but close-septate and nearer to *Helicomyces roseus* (a terrestrial hyphomycete where conidia uncoil on water), although the characteristic end swellings are missing.

Figs. 16 A-G represent conidia often seen in Spanish streams (e.g. Descals *et al.* 1995b, from Gredos), but which remain unnamed. They are similar in outline to those of *Anguillospora longissima*, but broader and never with the frill-like remains of a separating cell endosing the insertion of the percurrent basal extension.

The two conidia in figs. 17 B were earlier reported from the Catalan Pyrenees by Descals (1997b) and studied in pure culture. They probably belong to an undescribed *Mycocentrospora*. Those in fig. 17 O were also seen in the Gredos mountain range by Descals et al. (1995b).

Finally, criteria based solely on dimensions have been followed for distinguishing conidia of two pairs of similar species: of the *Goniopila / Margaritispora* complex, those which were well below 16 µm in diam. were assigned to the former; and, of the *Tetracladium setigerum / T. breve* pair, conidia with an axis length clearly below 21 µm (excluding the basal extension, which is highly variable in length) were put in the latter. In both pairs, some intermediate cases were present, and thus ignored.

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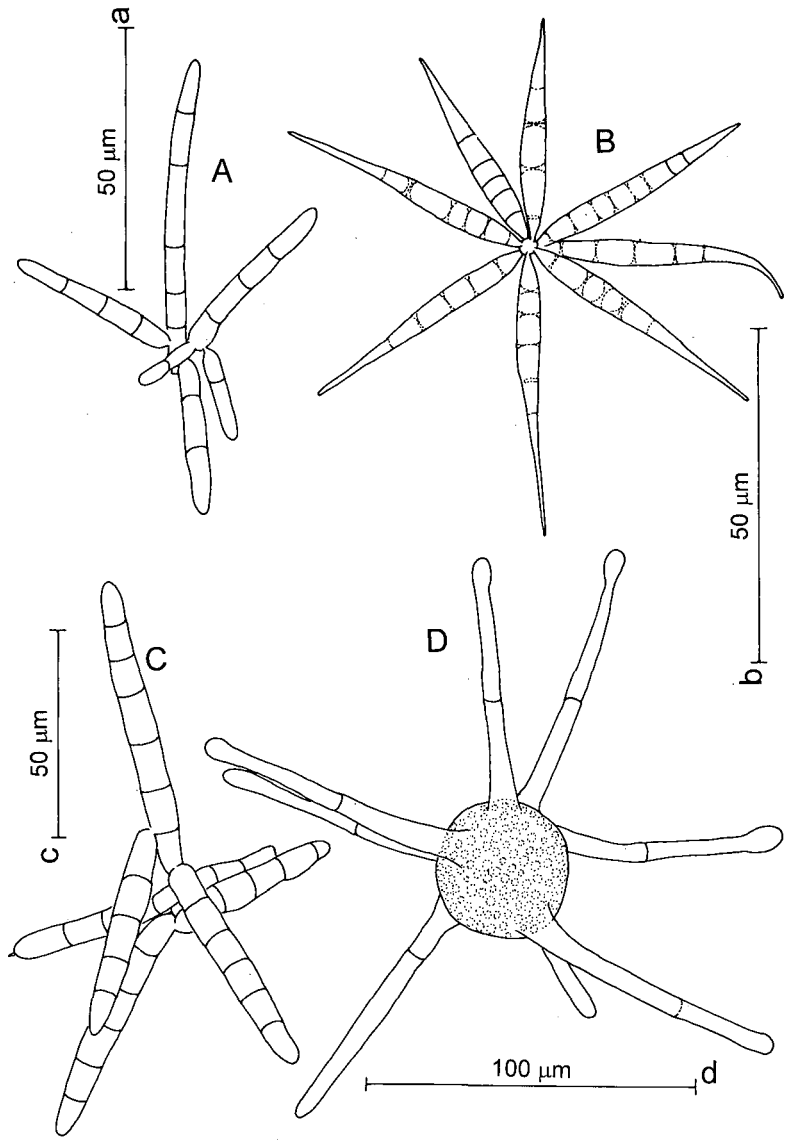

Fig. 1. A: *Dendrospora* sp. 1 (L205). B: *Flabellospora* sp. (L208). C: *Dendrospora* sp. 2 (L205). D: *Actinosporella* sp., germinating (L209). Scales: a, b c: 50 µm, d: 100 µm.
Fig. 1. A: Dendrospora *sp. 1 (L205). B:* Flabellospora *sp. (L208). C:* Dendrospora *sp. 2 (L205). D:* Actinosporella *sp., germinant (L209). Escales: a, b, c: 50 µm, d: 100 µm.*

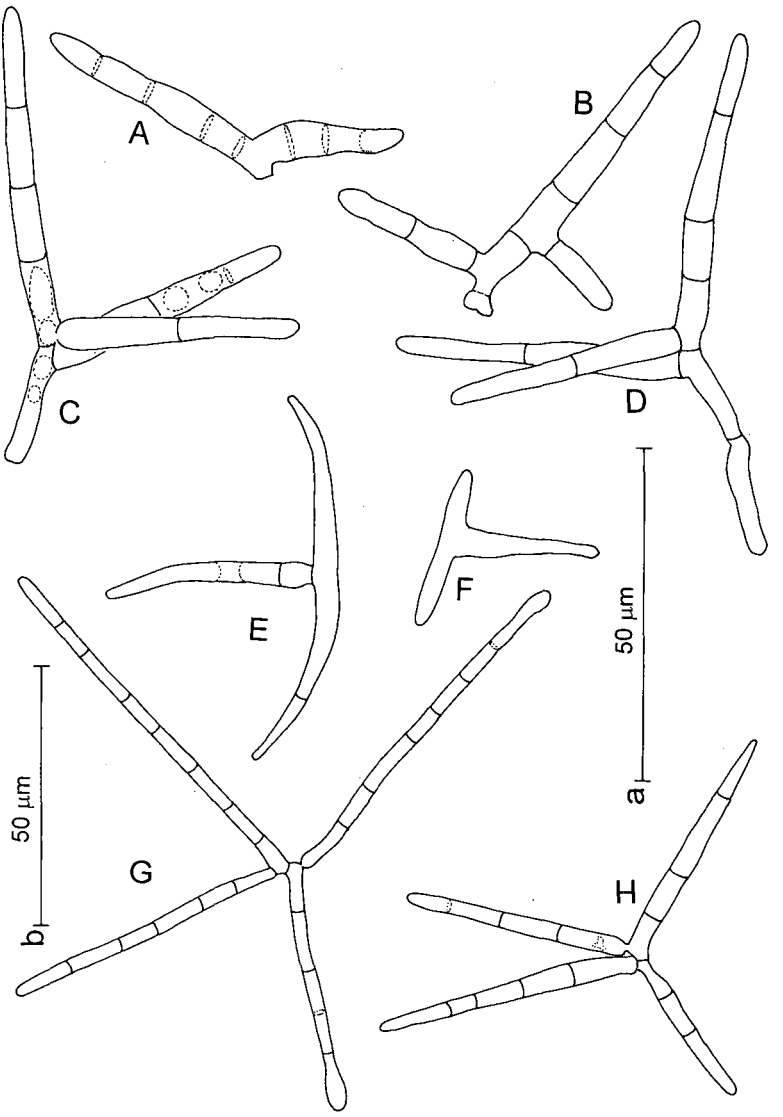

Fig. 2. B, C, D: *Pachycladina mutabilis* (L202); G: *Fontanospora eccentrica*, germinating (L205); H: *Fontanospora fusiramosa* (L203); remaining: unknown (A: L208, E: L204, F: L203). Scale: 50 µm. G to scale b, the remaining to scale a.

Fig. 2. B, C, D: Pachycladina mutabilis *(L202); G:* Fontanospora eccentrica, *germinant (L205); H:* Fontanospora fusiramosa *(L203); la resta: desconegut (A: L208, E: L204, F: L203). Escales: 50 µm. G a escala b, la resta a escala a.*

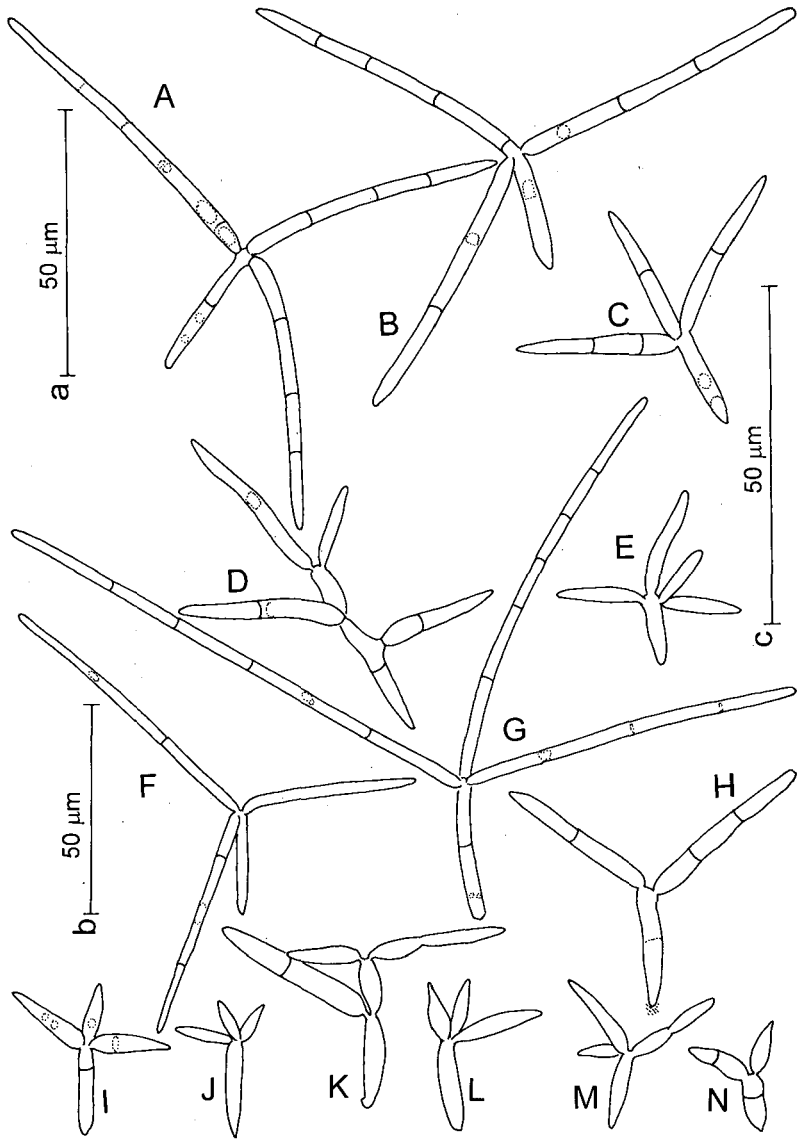

Fig. 3. *Articulospora* spp. A, B, C, G, H: *A. tetracladia* (A, C, G: L202, B: L210, F: L200, H: L209). D,K: *A. tetracladia* f. ined. (D: L200, K: L205). E: *Articulospora atra* (L205). I, J, L, M, ?N: *Articulospora* sp. 1 (I: L208, J, M: L200, L: L203; N: L202). Scales: 50 µm. A, C, G to scale a, F to scale b, remaining to scale c. (Broken lines in H: mucilage).

Fig. 3. Articulospora *spp. A, B, C, G, H:* A. tetracladia *(A, C, G: L202, B: L210, F: L200, H: L209). D,K:* A. tetracladia *f. ined. (D: L200, K: L205). E:* Articulospora atra *(L205). I, J, L, M, ?N:* Articulospora *sp. 1 (I: L208, J, M: L200, L: L203; N: L202). Escales: 50 µm. A,C,G a escala a, F a escala b, la resta a escala c. (Línies a traces a H: mucílag).*

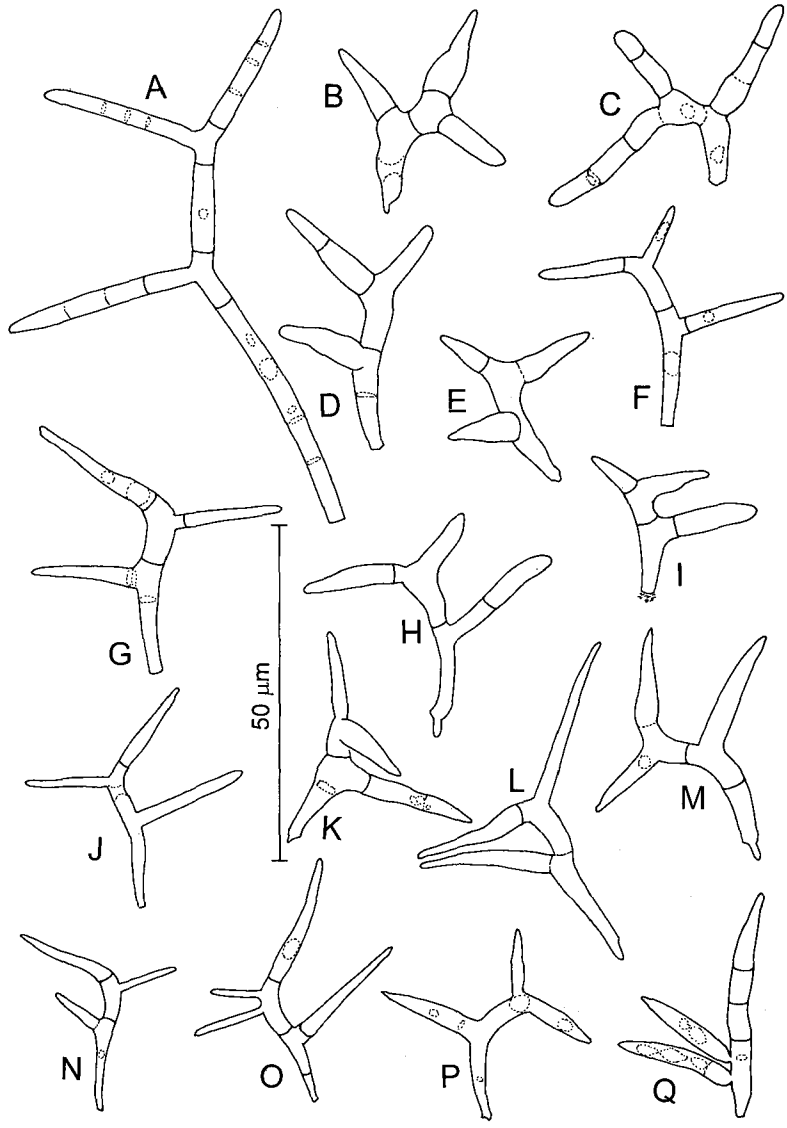

Fig. 4. L: *Tricladium angulatum* (L210). B-K, M-Q: ?*Tricladium* spp. (A, B, E, H, I, K, M, P: L208; C: L200; D, F, G, J, N, O: L202; Q: L210). Scale: 50 µm.
Fig. 4. L: Tricladium angulatum *(L210). B-K, M-Q:* ?Tricladium *spp. (A, B, E, H, I, K, M, P: L208; C: L200; D, F, G, J, N, O: L202; Q: L210). Escala: 50 µm.*

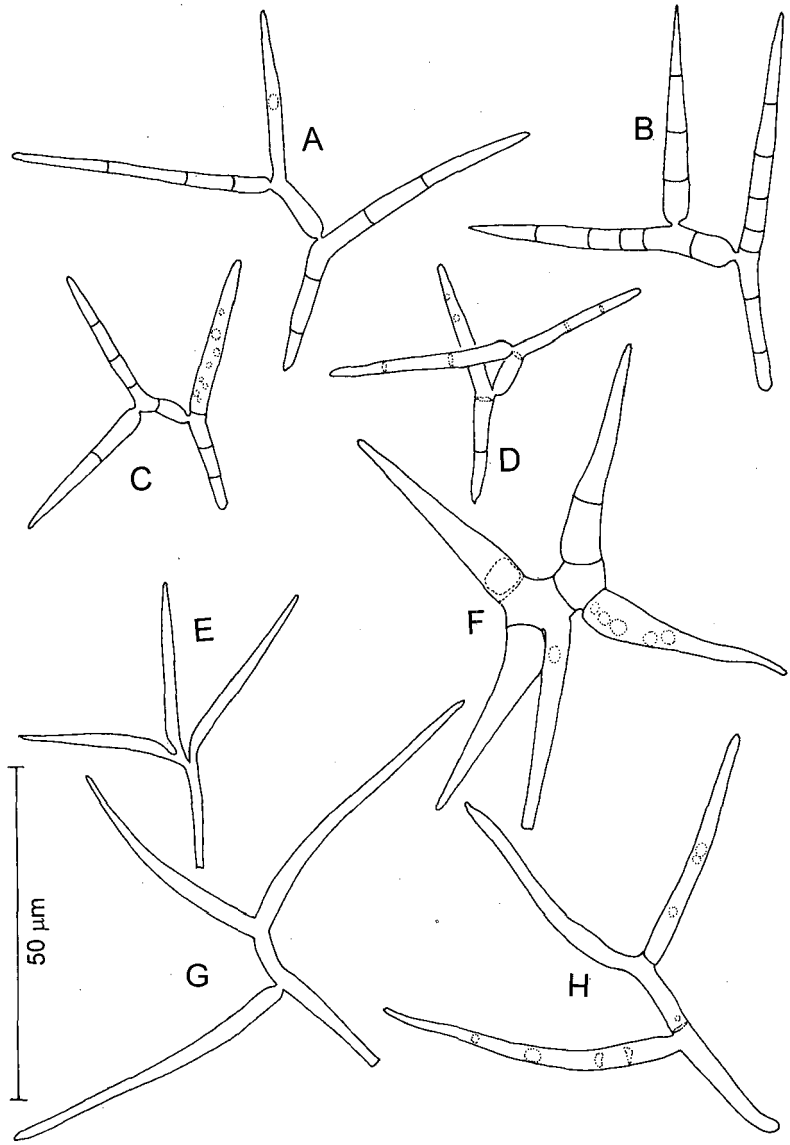

Fig. 5. A, C, D: *Pleuropedium* sp. (A: L201, C: L200, D: L205). B: *Pleuropedium tricladioides* (L205). E: *Sympodiocladium frondosum* (L205). F: *Dwayaangam cornuta* (L200). G, H: unknown (L208). Scale: 50 µm.

Fig. 5. A, C, D: Pleuropedium *sp. (A: L201, C: L200, D: L205). B:* Pleuropedium tricladioides *(L205). E:* Sympodiocladium frondosum *(L205). F:* Dwayaangam cornuta *(L200). G, H: desconegut (L208). Escala: 50 µm.*

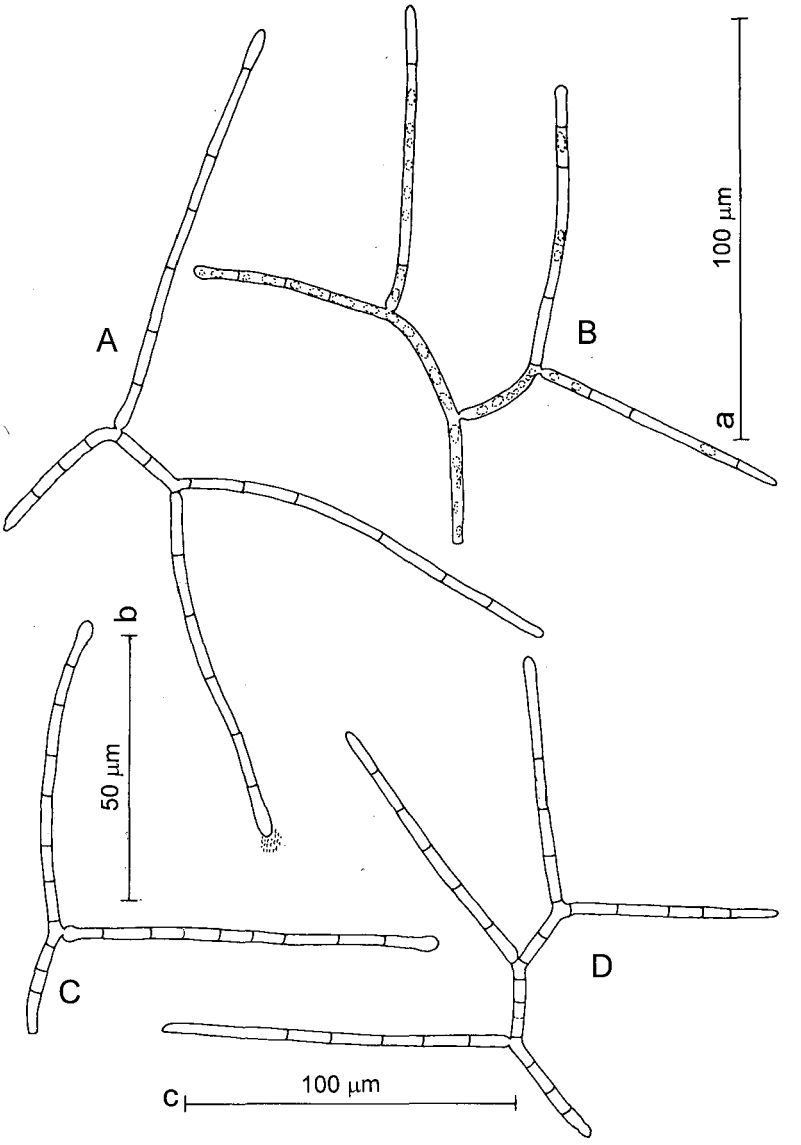

Fig. 6. A, B, C: unknown (A: L202, B: L205, C: L201). D: *Tricladium patulum* (L202). Scales a, c: 100 µm, b: 50 µm. Figs. A, B to scale a, C to scale b, D to scale c. (Broken lines in A: mucilage).
Fig. 6. A, B, C: desconegut (A: L202, B: L205, C: L201). D: Tricladium patulum *(L202). Escales a, c: 100 µm, b: 50 µm. Figs. A, B a escala a, C a escala b, D a escala c. (Línies a traces a A: mucílag).*

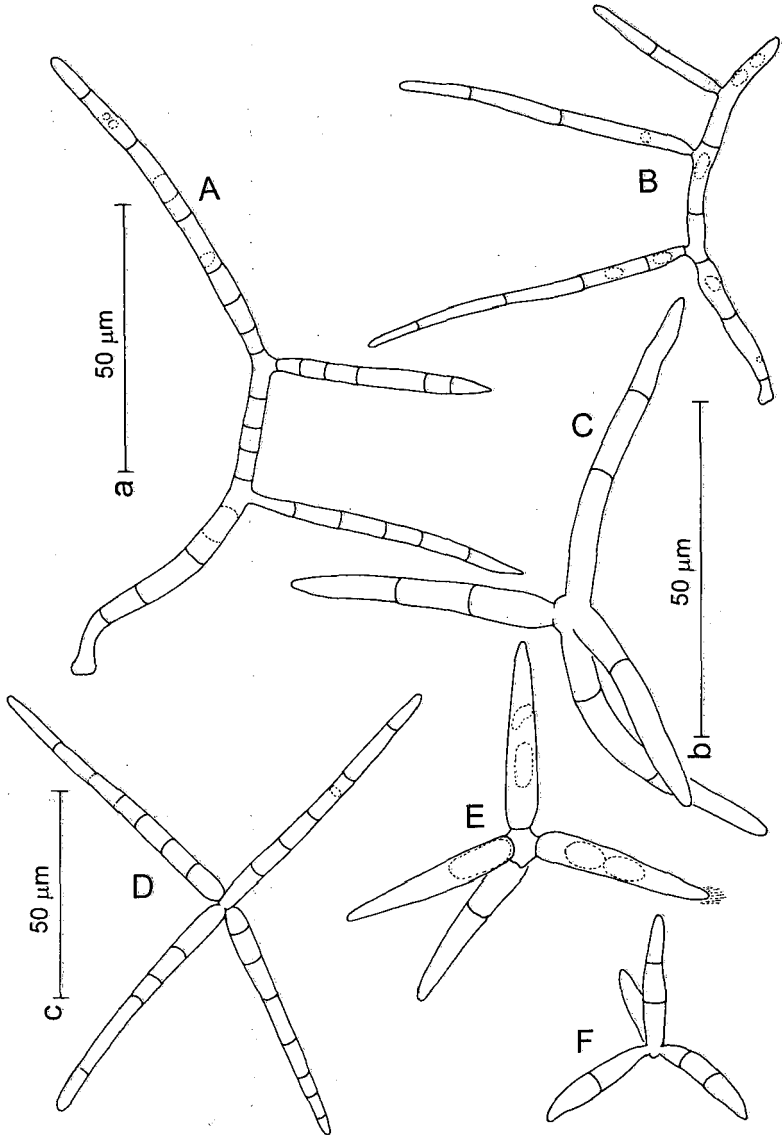

Fig. 7. A, B: unknown (A: L205, B. L208). C. *Lemonniera cornuta* (L208). D: *L. filiformis* (L205). E, F: *Lemonniera* spp. (E: L207, F: L208). Scales: 50 µm. A,B to scale a; C, E, F to scale b; D to scale c. (Broken lines in E: mucilage).

Fig. 7. A, B: desconegut (A: L205, B. L208). C. Lemonniera cornuta *(L208). D:* L. filiformis *(L205). E, F:* Lemonniera *spp. (E: L207, F: L208). Escales: 50 µm. A,B a escala a; C, E, F a escala b; D a escala c. (Línies a traces a E: mucilag).*

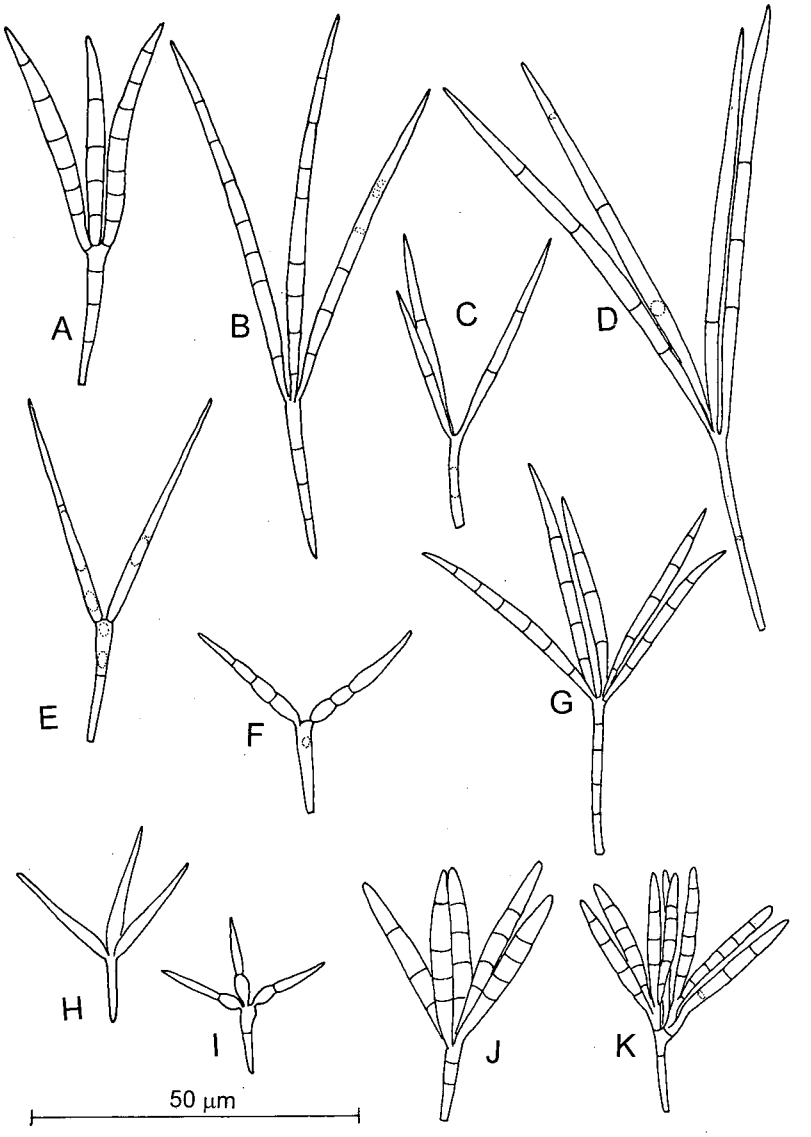

Fig. 8. B, C, D: *Isthmotricladia britannica* (B: L200, C: L204, D: L209); E-I: ?*Isthmotricladia* spp. (E,F: L208, G: L200, H: L201, I: L200; remaining: unknown (A: L200, J: L200, K: L205). Scale: 50 µm. *Fig. 8. B, C, D:* Isthmotricladia britannica *(B: L200, C: L204, D: L209); E-I:* ?Isthmotricladia *spp. (E,F: L208, G: L200, H: L201, I: L200; la resta: desconegut (A: L200, J: L200, K: L205). Escala: 50 µm.*

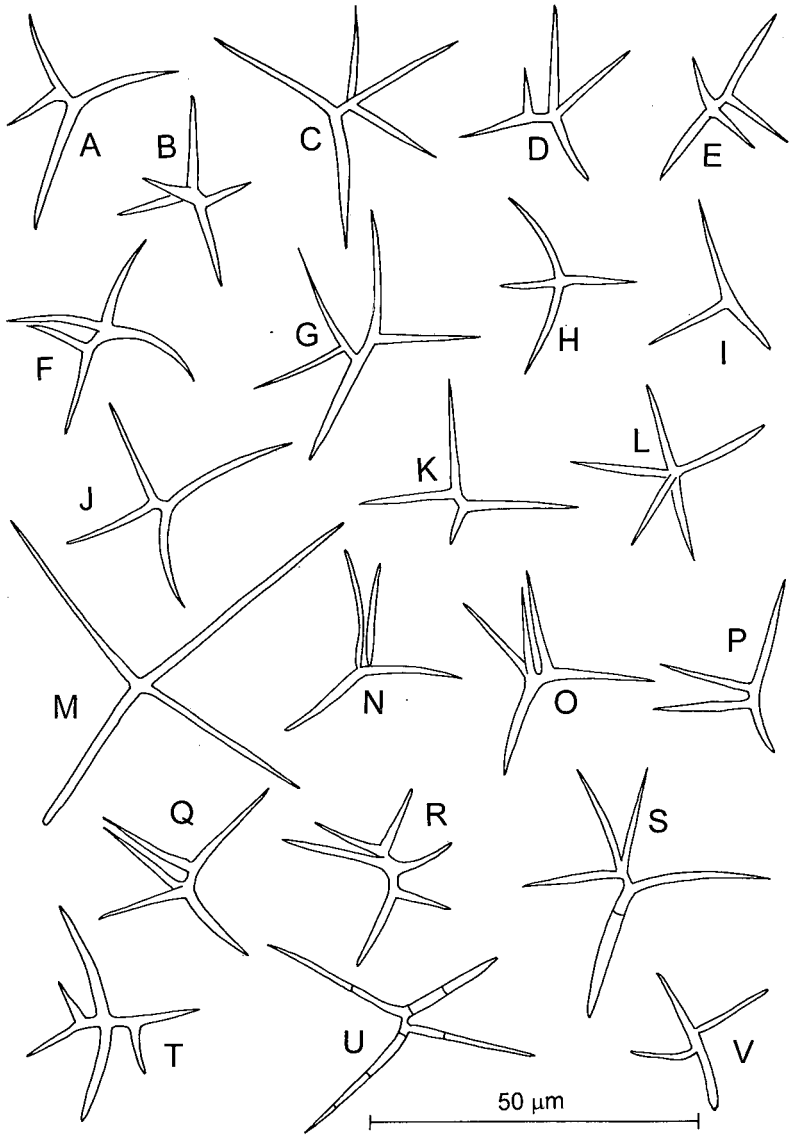

Fig. 9. H, I: *Alatospora acuminata* s.s.: with broad branch insertion (L200). N, V: unknown , both with branches constricted at their insertion (N: L200, V: L205); remaining: possibly aberrant *Alatospora acuminata* s.s. (A, B, C, D, F, G, J, K, L, M, O, P: L200; E, Q, R, T: L201, S,U: L202). Scale: 50 µm. *Fig. 9. H, I:* Alatospora acuminata *s.s.: amb inserció de les branques ampla (L200). N, V: desconegut, ambdues amb la inserció de les branques estreta (N: L200, V: L205); la resta: possiblement una forma aberrant d'*Alatospora acuminata *s.s. (A, B, C, D, F, G, J, K, L, M, O, P: L200; E, Q, R, T: L201, S,U: L202). Escala: 50 µm.*

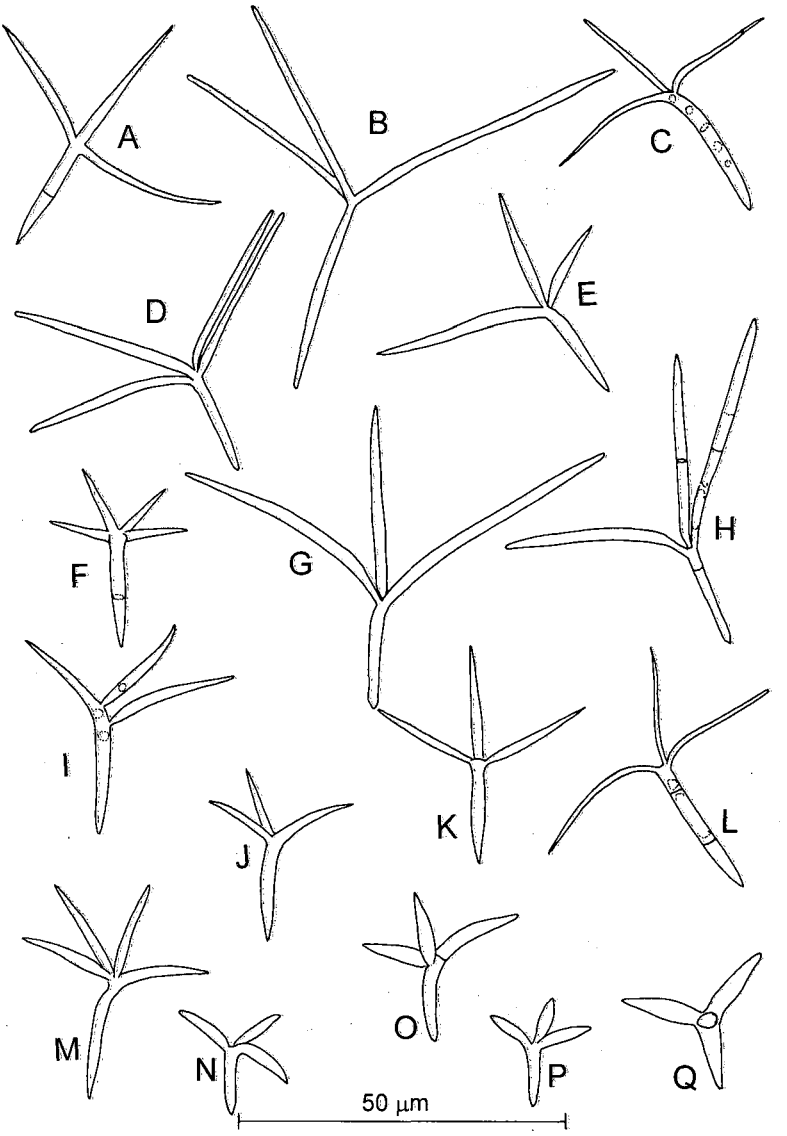

Fig. 10. A-P: *Alatospora* spp. L: *A. flagellata* (L200); C. *Alatospora acuminata* s.l. or *Alatospora flagellata* (L200); O, ?E, ?M, ?N, ?P: *A. pulchella* (E, N, O: L200, M: L201, P: L203); G,H: *A. acuminata* s.l. or *A. constricta* (L200). Q: unknown (L206). Scale: 50 µm.

Fig. 10. A-P: Alatospora *spp. L:* A. flagellata *(L200); C.* Alatospora acuminata *s.l. o* Alatospora flagellata *(L200); O, ?E, ?M, ?N, ?P:* A. pulchella *(E, N, O: L200, M: L201, P: L203); G,H:* A. acuminata *s.l. or* A. constricta *(L200). Q: desconegut (L206). Escala: 50 µm.*

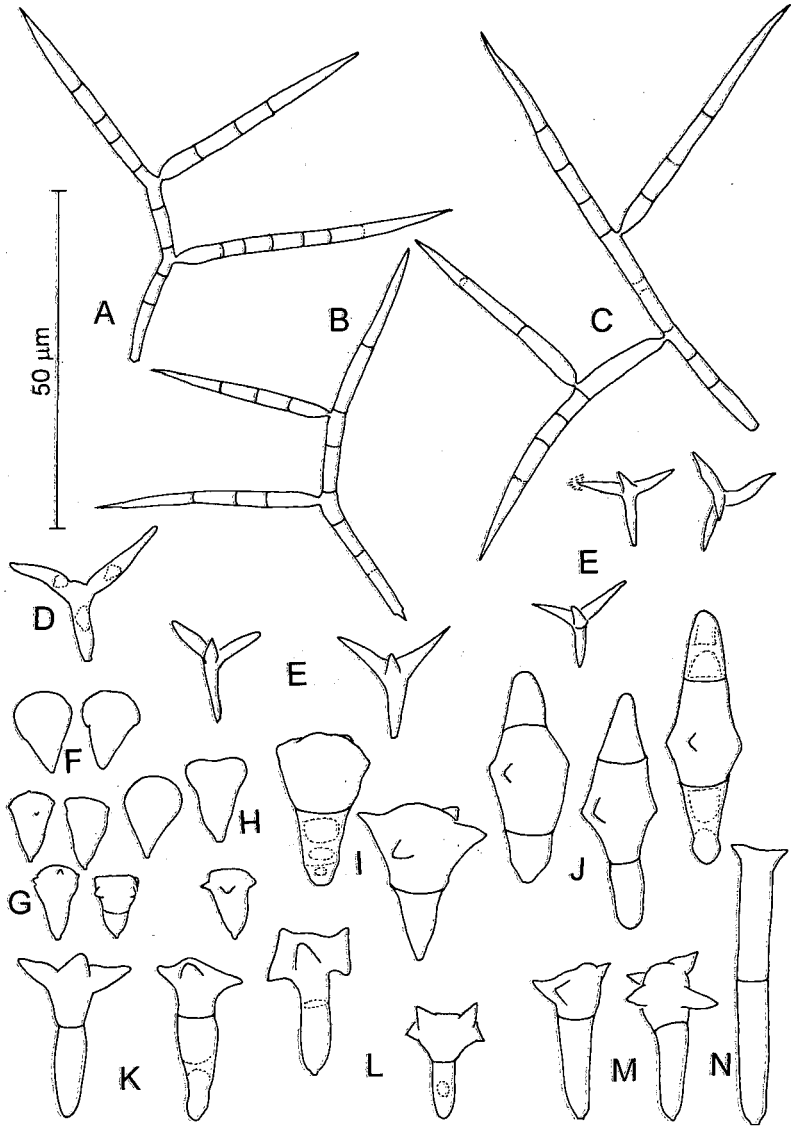

Fig. 11. A-C: *Tricladium attenuatum* (A: L203, B: L200, C: L205); I: *Tumularia tuberculata*: two conidia (L203); J: *Tumularia aquatica*: three conidia (central conidium: L210, remaining: L202); M: *Heliscus lugdunensis*: two conidia (L202); remaining: unknown (D: L206; E: L202, L203 (five conidia); F: L207 (three conidia), L208; G: L202, L210 (five conidia); H: L208; K: L205 (two conidia); L: L203, L205 (two conidia); N: L202). Scale: 50 µm. (Broken lines in E: mucilage).

Fig. 11. A-C: Tricladium attenuatum *(A: L203, B: L200, C: L205); I:* Tumularia tuberculata*: dos conidis (L203); J:* Tumularia aquatica*: tres conidis (conidi central: L210, la resta: L202); M:* Heliscus lugdunensis*: dos conidis (L202); la resta: desconegut (D: L206; E: L202, L203 (cinc conidis); F: L207 (tres conidis), L208; G: L202, L210 (cinc conidis); H: L208; K: L205 (dos conidis); L: L203, L205 (dos conidis); N: L202). Escala: 50 µm. (Línies a traces a E: mucílag).*

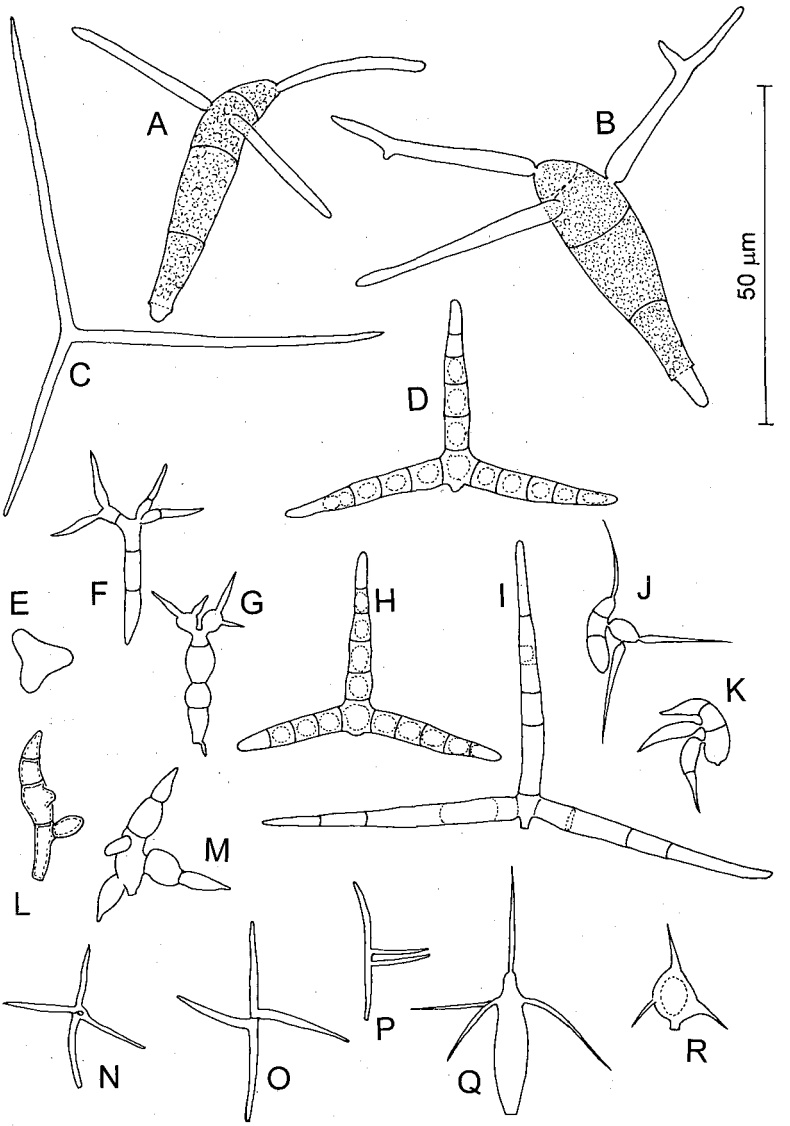

Fig. 12. A, ?B: *Culicidospora gravida* (A: L202, B: L200); J: *Gyoerffyella tricapillata* (L210); K: *Gyoerffyella ?myrmecophagiformis* (L205); N, ?O: *Taeniospora descalsii* (N: L205, O: L206); Q: *Naiadella fluitans* (L202); remaining: unknown (C, F: L201; D, I, L: L200; E, G, H, R: L202; M: L208; N,P: L205). Scale: 50 µm.

Fig. 12. A, ?B: Culicidospora gravida *(A: L202, B: L200); J:* Gyoerffyella tricapillata *(L210); K:* Gyoerffyella ?myrmecophagiformis *(L205); N, ?O:* Taeniospora descalsii *(N: L205, O: L206); Q: Naiadella fluitans (L202); la resta: desconegut (C, F: L201; D, I, L: L200; E, G, H, R: L202; M: L208; N,P: L205). Escala: 50 µm.*

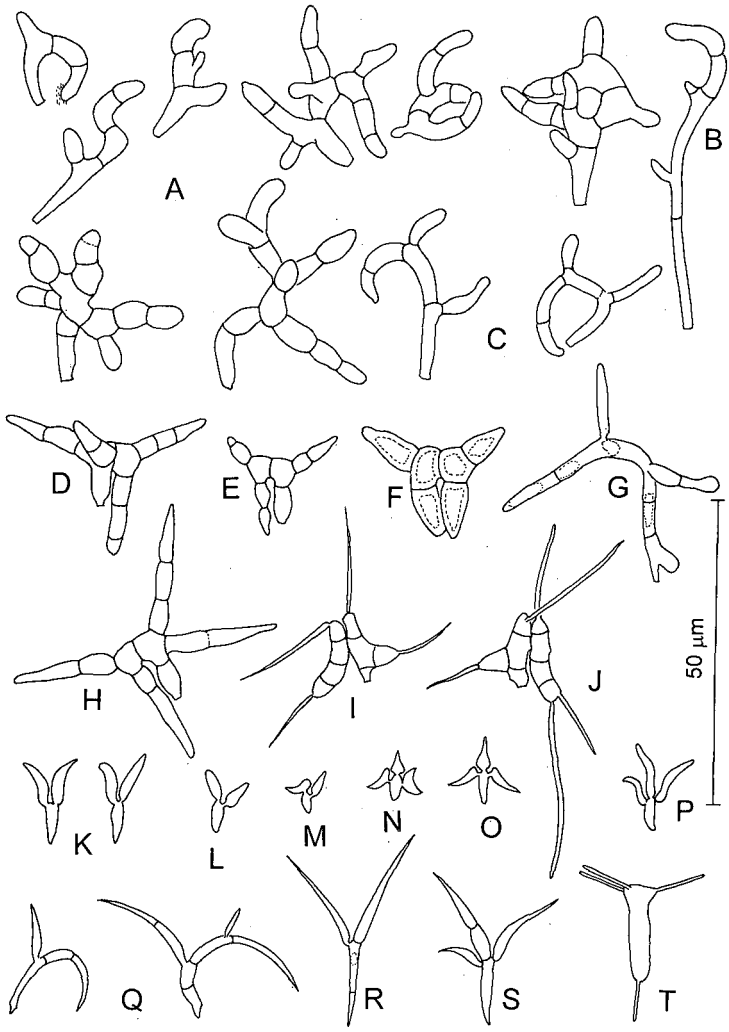

Fig. 13. A, ?B: *?Arbusculina* sp.: nine conidia (L200, L203, L205); C (two conidia), G?: *Tricladium curvisporum* (C: L201, L202; G: L205); D, H: *Tripospermum* sp. 1 (D: L202; H: L200); E: *Tripospermum camelopardus* (L205); F: *Tripospermum* sp. 2 (L200); I, J: *Campylospora* sp. , in J germinating (L202); K (two conidia), L: *Tricellula aquatica* (K: L205, L207; L: L203); M: *Tricellula curvata* (L202); N, ?O: *Tricellula* sp. 1 (N: L200; O: L202); P: *Tricellula* sp. 2 (L205); Q: *Ypsilina* sp.: two conidia (L205); R,S: *Ypsilina graminea*: two conidia (L205); T: *Cornutispora lichenicola* (L200). Scale: 50 µm. (Broken lines in A: mucilage).

Fig. 13. A, ?B: ?Arbusculina *sp.: nou conidis (L200, L203, L205); C (dos conidis), G?:* Tricladium curvisporum *(C: L201, L202; G: L205); D, H:* Tripospermum *sp. 1 (D: L202; H: L200); E:* Tripospermum camelopardus *(L205); F:* Tripospermum *sp. 2 (L200); I, J:* Campylospora *sp. , a J germinant (L202); K (dos conidis), L:* Tricellula aquatica *(K: L205, L207; L: L203); M:* Tricellula curvata *(L202); N, ?O:* Tricellula *sp. 1 (N: L200; O: L202); P:* Tricellula *sp. 2 (L205); Q:* Ypsilina *sp.: dos conidis (L205); R,S:* Ypsilina graminea*: dos conidis (L205); T:* Cornutispora lichenicola *(L200). Escala: 50 µm. (Línies a traces a A: mucilag).*

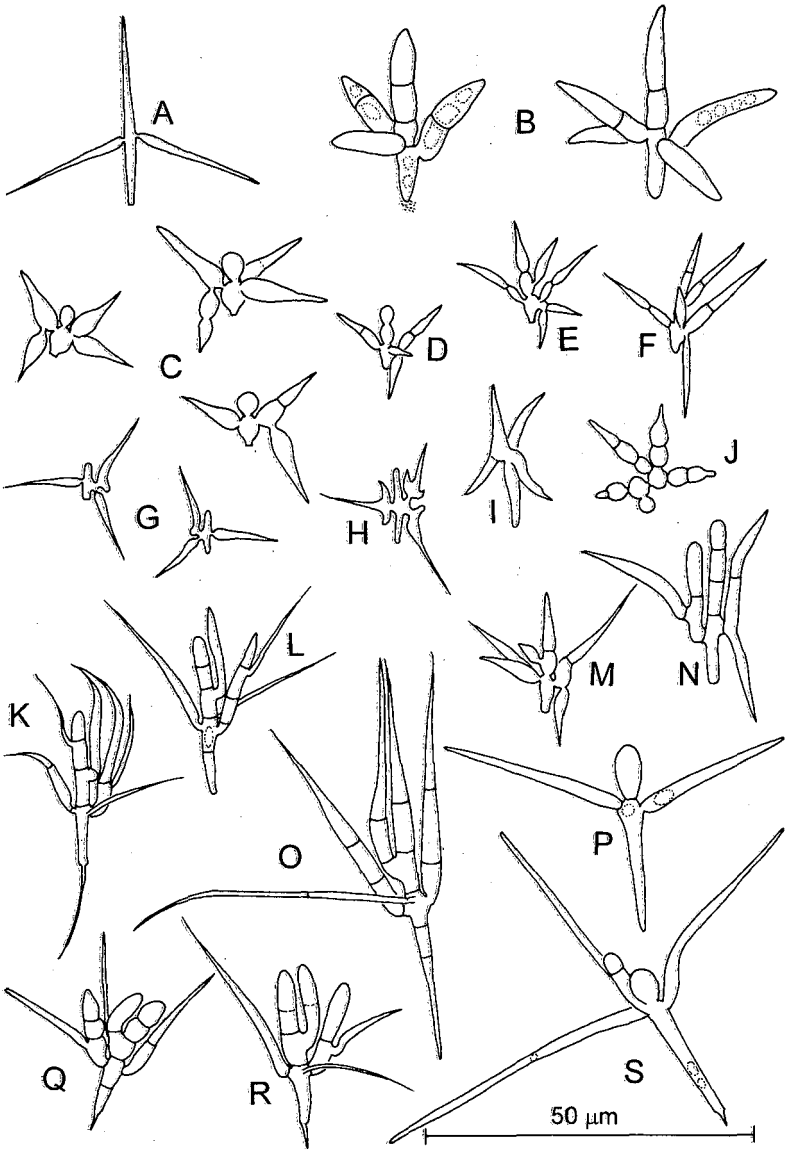

Fig. 14. B: *Triscelophorus* sp.: two conidia (L208); C: *Titaea* sp.: three conidia (L200); G: *Lateriramulosa ?ainflata*: two conidia (L201); H: *Lateriramulosa biinflata* (L200); K, L, O: *Tetracladium* spp. (K, O: L205; L: L202); S, ?P: *Tetracladium marchalianum* (P: L208; S: L204); Q, R: *Tetracladium setigerum* (Q: L204; R: L200); remaining: unknown (A, E, F, M,O: L205; D, I: L204; J: L203, N: L202). Scale 50 µm.

Fig. 14. B: Triscelophorus *sp.: dos conidis (L208); C:* Titaea *sp.: tres conidis (L200); G:* Lateriramulosa ?ainflata: *dos conidis (L201); H:* Lateriramulosa biinflata *(L200); K, L, O:* Tetracladium *spp. (K, O: L205; L: L202); S, ?P:* Tetracladium marchalianum *(P: L208; S: L204); Q, R:* Tetracladium setigerum *(Q: L204; R: L200); la resta: desconegut (A, E, F, M, O: L205; D,I: L204; J: L203, N: L202). Escala 50 µm.*

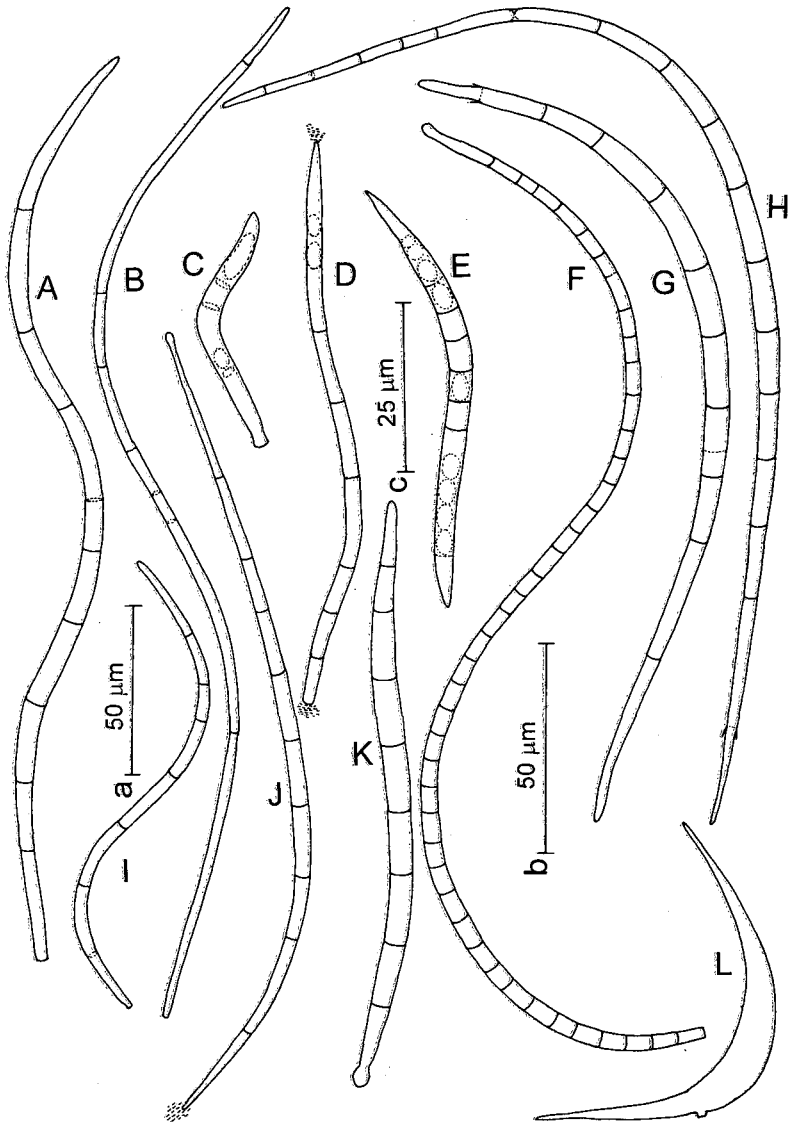

Fig. 15. A: *Anguillospora furtiva* (L210); F: *?Helicomyces roseus* (L203); G, H: *Anguillospora longissima* (G: L205; H: L204); I: *Anguillospora rosea* (L210); L: *Lunulospora curvula* (L 201); remaining: unknown (B: L210; C: L208; D, E, J: L204; K: L202). Scales a, b: 50 µm, c: 25 µm. A, B, I, J to scale a; F, G, H to scale b; remaining to scale c. (Broken lines in D, J: mucilage).

Fig. 15. A: Anguillospora furtiva *(L210); F:* ?Helicomyces roseus *(L203); G, H:* Anguillospora longissima *(G: L205; H: L204); I:* Anguillospora rosea *(L210); L:* Lunulospora curvula *(L 201); la resta: desconeguda (B: L210; C: L208; D, E, J: L204; K: L202). Escales a, b: 50 µm, c: 25 µm. A, B, I, J a escala a; F, G, H a escala b; la resta a escala c. (Línies a traces a D, J: mucilag).*

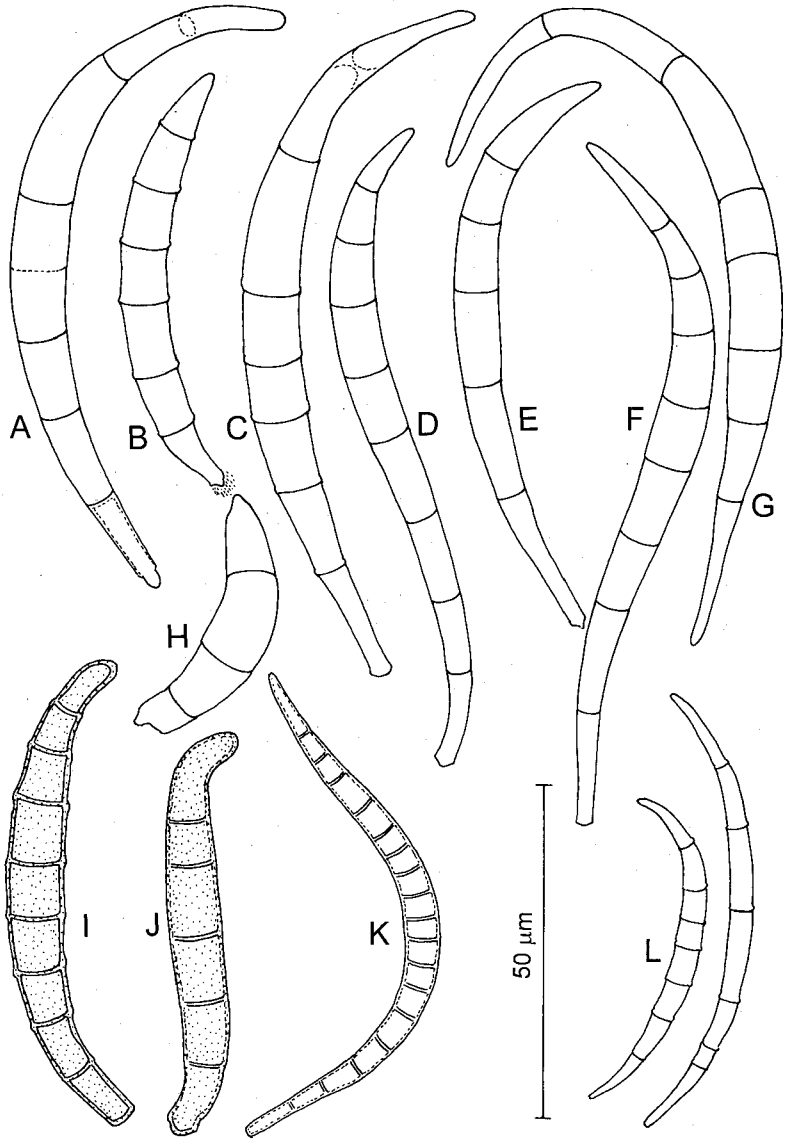

Fig. 16. Unknown forms. A-G similar to *Anguillospora longissima* but without separating cell remains; bottom cell in A collapsed. (A, C, D, I, J, M: L202; B, E, F, L: L200; G: L210; H, K: L205). Scale: 50 µm. (Broken lines in B: mucilage).

Fig. 16. Formes desconegudes. A-G similar a Anguillospora longissima *però sense restes de cèl.lula de separació; cèl.lula inferior a A col.lapsada. (A, C, D, I, J, M: L202; B, E, F, L: L200; G: L210; H, K: L205). Escala: 50 µm. (Línies a traces a B: mucilag).*

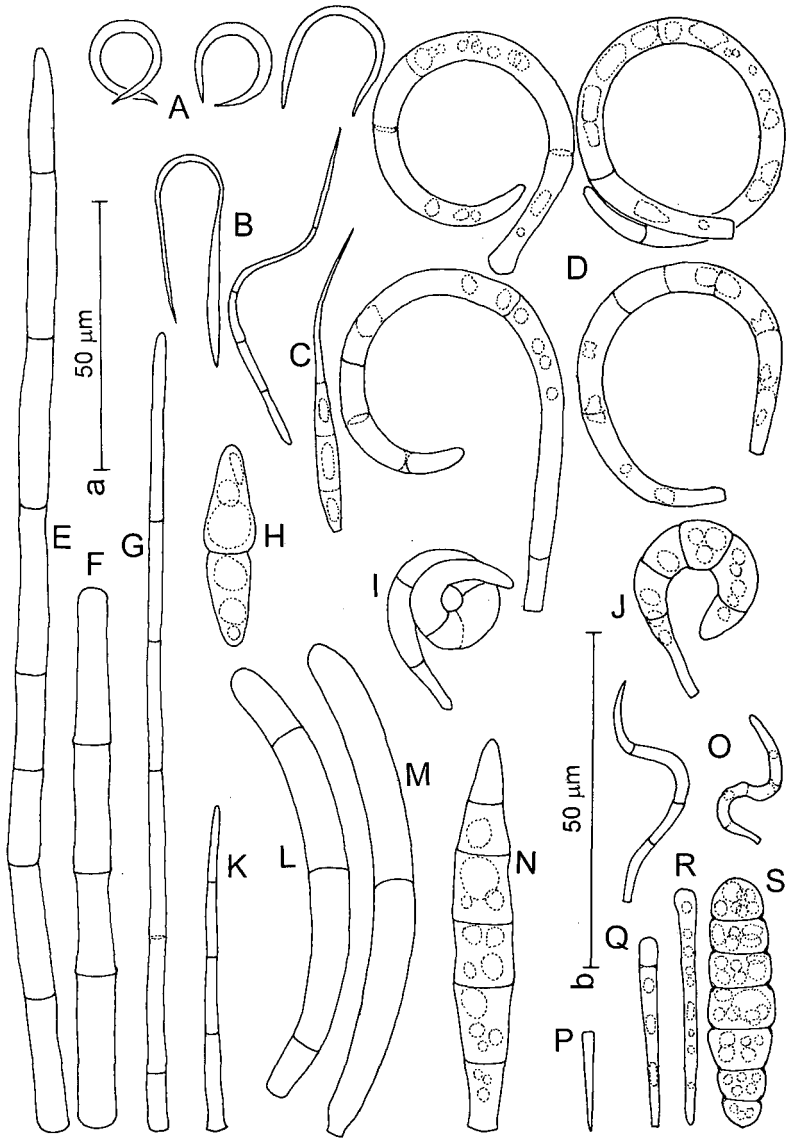

Fig. 17. H: *Massarina*-like ascospore (L203); N: *Mycocentrospora clavata* (L202); P, Q, R: *Dactylaria* sp. (P: L208; Q: L200; R: L210); remaining: unknown (A (three conidia): L201, L203; B (two conidia), L, M: L200; C, J, O (two conidia), S: L205; D (four conidia), G, K: L208; E: L201; F: L200; I: source lost). Scales: 50 µm. E to scale a, remaining to scale b.

Fig. 17. H: ascòspora del tipus Massarina *(L203); N:* Mycocentrospora clavata *(L202); P, Q, R:* Dactylaria *sp. (P: L208; Q: L200; R: L210); la resta: desconeguda (A (tres conidis): L201, L203; B (dos conidis), L, M: L200; C, J, O (dos conidis), S: L205; D (quatre conidis), G, K: L208; E: L201; F: L200; I: procedència desconeguda). Escales: 50 µm. E a escala a, la resta a escala b.*