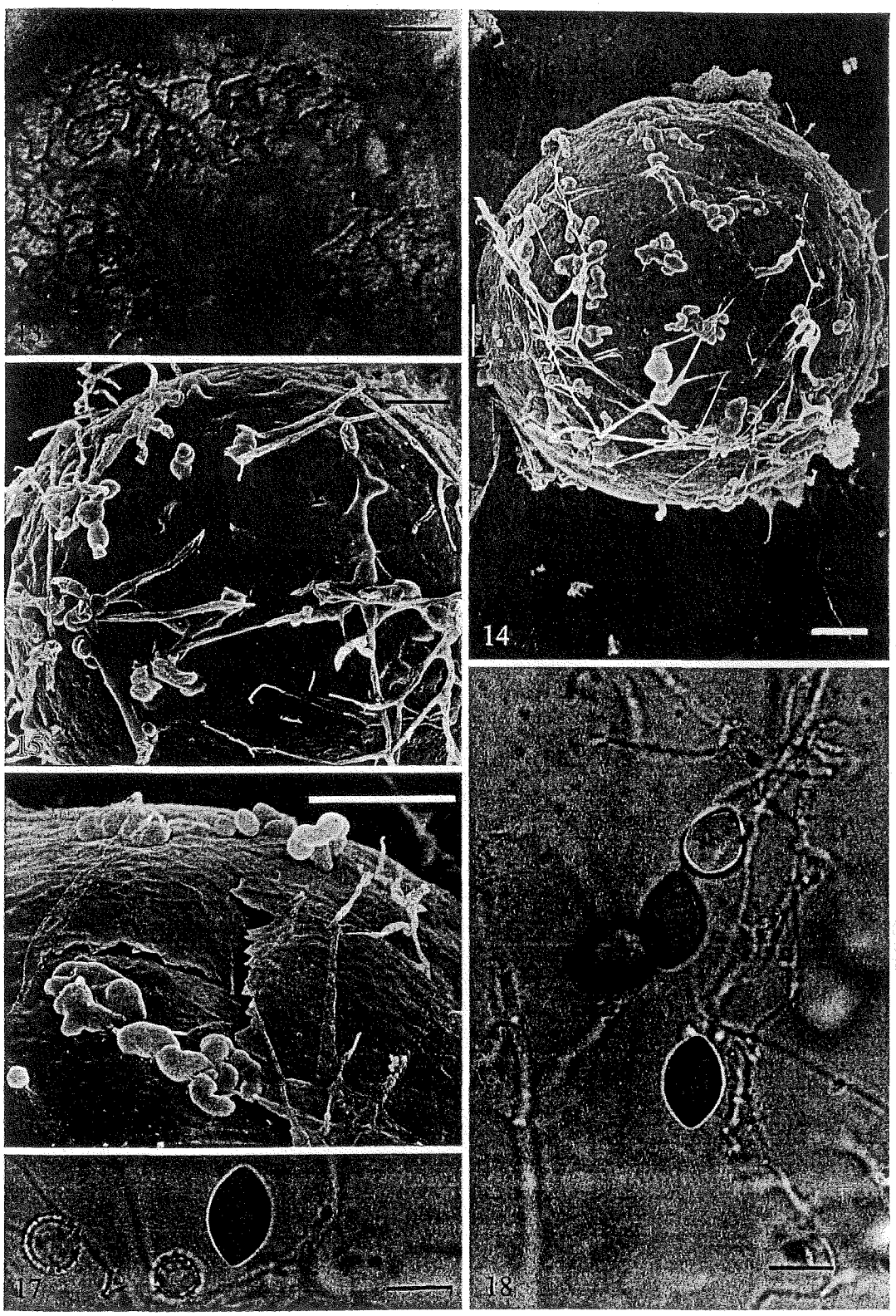
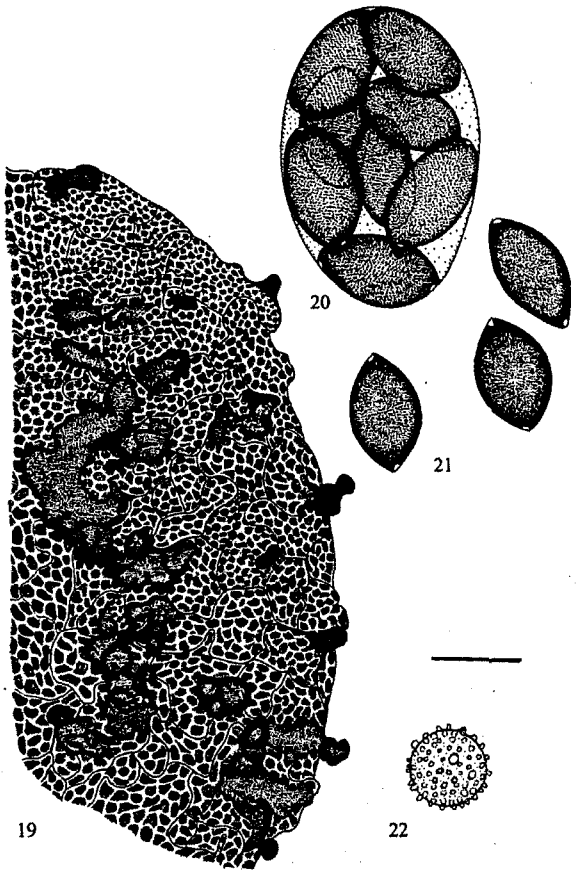


Figs 13–18. *Corynascus verrucosus* FMR 5904. **Fig. 13.** Peridial wall detail. **Fig. 14.** Ascoma, SEM. **Figs 15–16.** Peridium detail, showing the *textura epidermoidea* and their verruciform projections, SEM. **Figs 17–18.** Ascospores showing oblique to sub-terminal germ pores, and *Myceliophtohora* anamorph conidia. Bars = 10 µm.



Figs 19–22. *Corynascus verrucosus* FMR 5904. **Fig. 19.** Peridium detail, showing the textura epidermoidea and their verruciform projections. **Fig. 20.** Ascus and ascospores. **Fig. 21.** Ascospores. **Fig. 22.** *Myceliophtohora* anamorph conidia. Bar = 10 µm.

Corynascus similis differs from the other species of the genus in the navicular ascospores with two lateral to subterminal germ pores. The ascospore size, although slightly narrower, is similar to that of *C. sepedonium* (12–19 × 8–11 µm). In the latter species, however, the ascospores have terminal germ pores. The anamorphs of both species are very similar.

Corynascus verrucosus Stchigel, Cano & Guarro, sp. nov. (Figs 13–22)

Anamorph: *Myceliophthora* sp.

Ascomata globosa, non ostiolata, brunnea pallescens vel atrobrunnea, glabra, 50–140 µm diam. Peridium *ex textura epidermoidea* composidum cum processis verrucaeformibus. Asci 25–37 × 21–32 µm, sub-globosi vel ellipsoidei, octospori. Ascosporae 11–18 × 6·5–9 µm, ellipsoideae cum apibibus acutiformibus, brunneae, cum duobus germinalibus obliquis vel sub-apicalibus. Conidia globosa vel piriformia, sub-hyalina vel palide aurantiaca, verrucosa, 7–10 µm diam.

Typus: **Argentina**: Buenos Aires, Quilmes, Bernal, ex solo, 2 Nov. 1995, *A. M. Stchigel* (IMI 378522-holotypus; FMR 5904-isotypus).

Mycelium composed of hyaline to pale yellow, branched, anastomosing, septate, smooth hyphae, 1–3 µm broad. Colonies on PCA attaining 59–63 mm diam in 14 d on PCA at 22–25°, orange grey to greyish orange (M 5B2 to 5B3), olive brown (M 4E7 to 4F8) in the central area, flat, floccose to powdery by conidia and ascomata production, zonate; reverse orange grey (M 5B2); exudate yellow. *Ascomata* superficial, globose, non-ostiolate, dark brown to very dark brown, 40–70 µm diam; peridium with *textura epidermoidea*, composed of a layer of irregular, reticulate, golden brown cells, with dark brown, verruciform projections. *Paraphyses* absent. Asci 25–38 × 21–32 µm, subglobose to broadly ellipsoidal, short-stipitate, thin-walled, evanescent, 8-spored. *Ascospores* 11–18 × 6·5–9 µm, ellipsoidal with acute ends, hyaline when young and brown when mature, one-celled, smooth-walled, with a distinct oblique to subterminal germ pore at each end.

Anamorph: *Conidiophores* short, not sharply differentiated from the vegetative hyphae. *Conidia* blastic, terminal or lateral, sessile or on short protrusions, globose to pyriform, subhyaline to pale golden, thick-walled, verrucose, 7–10 µm diam.

Colonies on PDA attaining 43–47 mm diam in 14 d at 22–25°, yellowish orange (M 4A6 to 4B7), cottony, zonate, with yellow exudate; reverse yellowish orange to olive yellow (M 4A7 to 3C6). Ascomata absent and conidia profused produced.

Key to* Corynascus *species

This key is updated from that of Arx *et al.* (1988).

1 Conidia clavate to obovate or absent; heterothallic 2
Conidia more or less spherical, always present; homothallic 3

2(1) Ascospores mostly with one germ pore, 8–13 × 5–7 µm . . . . . **heterothallicus**
Ascospores all with two germ pores, 22–32 × 17–23 µm . . . . . **thermophilus**

3(1) Ascomata setose or with a verrucose peridium 4
Ascomata glabrous 5

4(3) Ascomata with brown setae; ascospores with a germ pore at each end, 17–23 × 11–13 µm . . . . . **setosus**
Ascomata covered with verruciform projections; ascospores with two oblique to subterminal germ pores, 11–18 × 6·5 9 µm . . . . . **verrucosus**

5(3) Ascospores with two lateral to subterminal germ pores; ascospores navicular in lateral view, 11–20 × 6·5–9 µm . . . . . **similis**
Ascospores with two terminal germ pores 6

6(5) Anamorph absent; ascospores limoniform, 9–14 × 8–10 µm . . . . . **sexualis**
Anamorph present 7

7(6) Conidia finely echinulate to tuberculate; ascospores 12–19 × 8–11 µm . . . . . **sepedonium**
Conidia smooth; ascospores 18–24 × 8–10 µm . . . . . **novoguineensis**

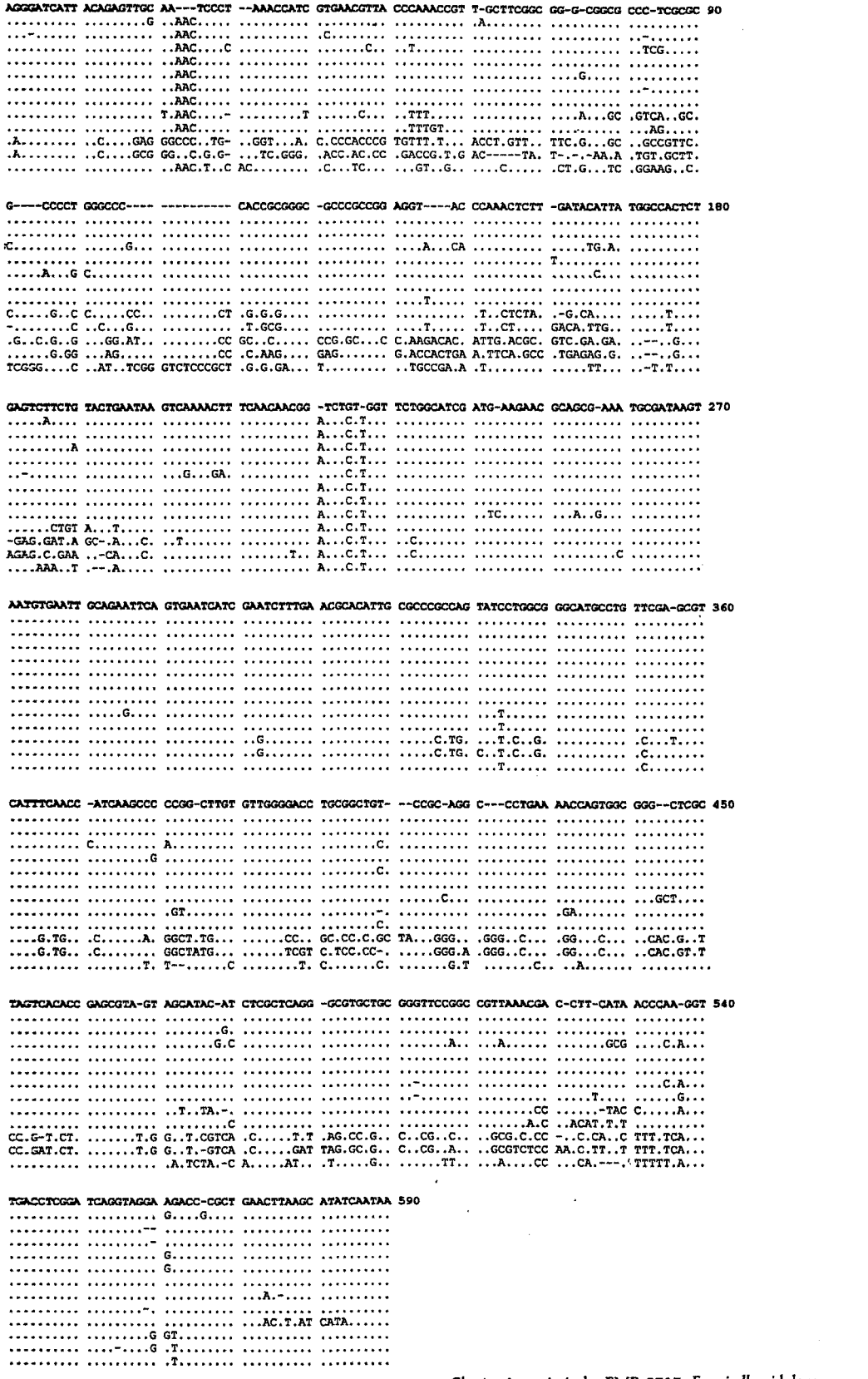


Fig. 23. Differences in ITS1 and ITS2 and rRNA 5.8S gene sequences among *Chaetomium nigricolor* FMR 5737, *Emericella nidulans* CBS 121·35, *Corynascus heterothallicus* IEIA 486, *C. novoguinensis* IFO 9556, *C. sepedonium* FMR 5593, *C. setosus* IFO 9557, *C. sexualis* FMR 5691, *C. similis* FMR 5693, *C. thermophilus* IMI 145136, *C. verrucosus* FMR 5904, *Gelasinospora bonaerensis* FMR 5962, *Melanospora pascuensis* FMR 6367 and *Thielavia terrestris* CBS 492.74. Dot, base identical with among; dash, indel.

Colonies on PA attaining 65–75 mm diam in 14 d at 22–25°, white to pale yellow (M 3A3), flat, floccose to powdery, zonate, with golden yellow exudate; reverse light yellow (M 3A5). *Ascomata* and conidia present.

Colonies on MEA attaining 24–26 mm diam in 14 d at 22–25°, light yellow to yellow (M 3A4 to 3A7), cottony; zonate, with yellow exudate; reverse light yellow (M 3A5). Ascomata absent and conidia profusely produced.

Thermotolerant, growing rapidly at 42°; ascomata and conidia profusely produced in all tested media.

The sequence of the ITS1–2 and 5.8S rDNA regions is shown in Fig. 23. The main features are: 560 bp; 132 A; 161 C; 146 G and 121 T. Location ITS1 nt 29–191; gene 5.8S rRNA nt 192–348; ITS2 nt 349–560. EMBL accession no. AJ224203.

The ascospore size of *Corynascus verrucosus* is very similar to that of *C. similis*, but the species differ in their spore morphology (irregularly limoniform in *C. similis*; ellipsoidal with acute ends in *C. verrucosus*), and because a peridium with verruciform projections is present in *C. verrucosus*. The anamorph of *C. verrucosus* is very similar to those of *C. sepedonium* and *C. similis*.

DISCUSSION

The alignment of the ITS-region sequences of all known *Corynascus* species and of several species of morphologically similar genera are shown in Fig. 23. Fig. 24 shows the phylogram obtained when these sequences were analysed with the neighbour-joining method (Saiton & Nei 1987). The sordariaceous *Chaetomium nigricolor*, *Corynascus* spp., *Gelasinospora bonaerensis* and *Thielavia terrestris* group together in a clearly defined clade, supported by a bootstrap value of 100%. The *Corynascus* species form a subclade supported by a bootstrap of 99%. The sequences of the species of *Corynascus* studied were very similar and the greatest difference was between *C. heterothallicus* and *C. sepedonium* (34 nucleotide substitutions). The three new species, *Corynascus sexualis*, *C. similis* and *C. verrucosus*, although clearly having specific morphological features, differ only in 16, 10 and 16 bp from *C. sepedonium*, respectively (Fig. 23). *C. sexualis* differs in 16 bp from *C. similis* and in 12 bp from *C. verrucosus*, and *C. similis* differs from *C. verrucosus* in 6 bp. The differences in the sequences of the *Corynascus* species are not discriminatory alone. This was already noticed in a previous study of sordariaceous fungi (Stchigel, Cano & Guarro 1998). The only exception is the heterothallic *C. heterothallicus*, which is considered to be a hypothetical ancestor of the others. This is in agreement with Yun *et al.* (1998), who studied the organisation of the *MAT* gene in homothallic and heterothallic species of *Cochliobolus* (*Pleosporaceae*), and suggested that the heterothallic condition probably came first. In the phylogenetic tree, *Melanospora pascuensis* (*Ceratostomataceae*) and *Emericella nidulans* (*Trichocomaceae*) are clearly distant from the sordariaceous fungi. These findings demonstrate that *Corynascus* is closer to *Chaetomiaceae* than to *Ceratostomataceae*.

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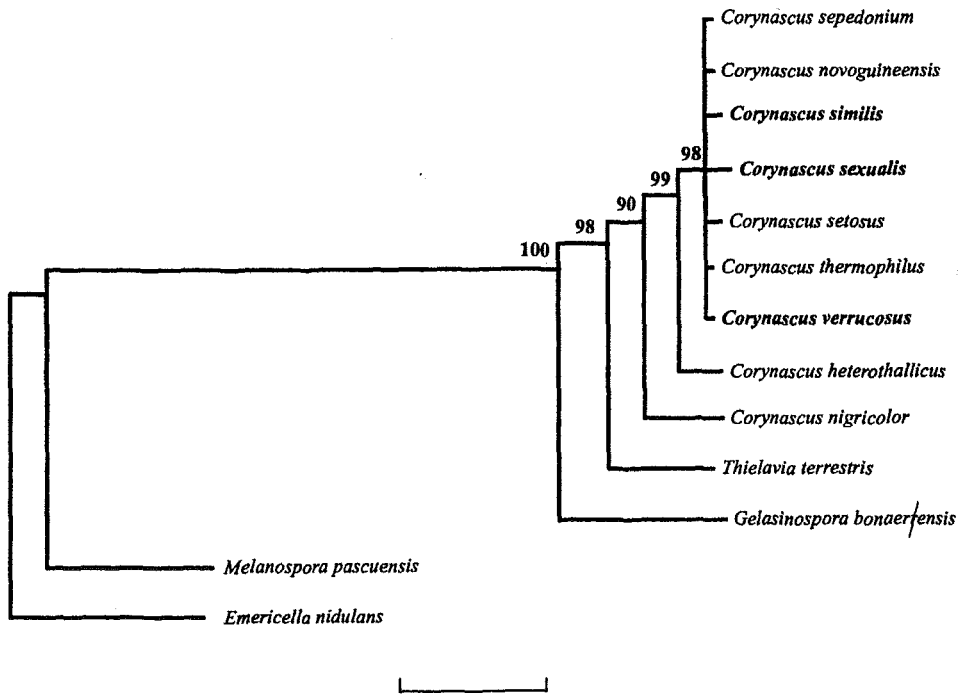

Fig. 24. Neighbour-joining phylogenetic tree of the aligned sequences of the strains studied. Confidence limits of branches (indicated in % along the branches) were created in a bootstrap analysis using 500 trials. The scale bar represents 0·1% sequence divergence.

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1.8. Ascomicetos del suelo de España. XII. *Ascotricha canariensis* sp. nov.

1.8.1. A. M. Stchigel, J. Guarro, D. García & B. Acosta. Soil ascomycetes from Spain. XII. *Ascotricha canariensis* sp. nov. *Mycologia* (en prensa)

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Short tittle: New *Ascotricha* species

Soil ascomycetes from Spain. XII. *Ascotricha canariensis* sp. nov.

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Abstract: *Ascotricha canariensis* sp. nov. (Xylariaceae, Ascomycetes) isolated from soil of the Canary Islands is described and illustrated. It belongs to the group of *Ascotricha* species with cylindrical asci and is differentiated from the other species by bearing ascomata with short, single or once-branched setae and by the presumed absence of an anamorph.

Key Words: Ascomycota, soil fungi, Xylariales

During the course of a study of soil ascomycetes from Spain, an interesting species of *Ascotricha* Berk. was isolated from Gran Canaria, Canary Islands. Gran Canaria is an island located near the African continent, in the Atlantic Ocean. Its origin is volcanic and it has a surface area of 100.55 km^2. The terrain is basically basaltic, and the vegetation is mainly composed of *Phoenix* spp., some Cactaceae, and numerous members of the Poaceae. The area is dominated by a Mediterranean climate, with a hot summer. The average temperature is 22 C, with a minimum of 17C and a maximum of 25 C. The main annual precipitation is 150-200 mm. The morphological characteristics differentiate this taxon from all previously described species in the genus (Hawksworth 1971, Udagawa et al 1994 a, b, Stchigel and Guarro 1998, Udagawa and Uchiyama 1999) and is thus described here as new.

Materials and methods

Soil was mainly collected from the A_o horizon with sterilized polyethylene bags. These were sealed with a rubber band and labelled. On returning to the laboratory soil was stored at 4--7 C until used. Approx 1 g of the sample was treated with 60% (v/v) ethyl alcohol during 10 min (after Warcup and Baker 1963). The supernatant was discarded and the solid phase was suspended in 10 ml of distilled water. The suspensions were cultured on potato carrot agar (PCA) with chloramphenicol (50 mg/L) at room temperature (22--25 C) under 12 h of darkness alternating with 12 h of cool white fluorescent light. The morphological characteristics of the colonies were studied on malt extract agar (MEA; Difco), oat meal agar (OMA; Difco), PCA, and potato dextrose agar (PDA, Difco) at 10, 15, room temperature (22--25), 37 and 42 C, under 12 h of darkness alternating with 12 h of cool white fluorescent light. Color notations in parentheses are from Kornerup and Wanscher (1984). The

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measurements of the fungal structures were taken in water or lactophenol. Photomicrographs were obtained with a Leitz Dialux 20 EB microscope. Scanning electron microscopy techinques were described previously by Figueras and Guarro (1988).

Ascotricha canariensis Stchigel, D. García et Guarro, sp. nov. Figs. 1-9

Mycelium ex hyphis subhyalinis vel brunneis, ramosis, septatis, levibus vel tuberculatis, 1--6 μm diam composito. *Coloniae* in agaro cum decocto tuberorum et carotarum "PCA" restrictae, planae, tenues, ex mycelio vegetativo submerso, subhyalinae vel brunneae; reversum olivaceo-brunneo vel nigrum. *Ascomata* superficialia vel immersa, ostiolata, translucida, olivaceo-brunnea vel atro-brunnea, subglobosa vel globosa, 160--180 x 140--160 μm, apex cum collo brevi, 12--25 μm alta, 25--40 μm lata, pilosa. *Pili* rigidiusculi, non ramosi vel 1-ramosi, verrucosi, septati, atrobrunnei, 15--45 μm longi, 3--5 μm diam ad basim, cum vesicula hyalina et globosa vel piriformia, laevia, 3--6 μm diam, ad apicem formanti. *Peridium* parum olivaceo-brunneum vel brunneum, tenue, ex textura epidermoidea vel intricata, 4--6 stratiorum compositum, 10--15 μm crassitunicatum. *Asci* 47--54 x 5--7 μm, linear-cylindrici, stipitati, cum muris tenuibus, deliquescenti, octospori. *Paraphyses* nullae. *Ascosporae* 6--8 x 4.5--6 x 2--4 μm, ovoideae vel ellipsoideae, oblatae, atro-brunneae, laeves, fissura germinali aequatoriale paratae, uniseriatae. *Status conidialis* nullis.

Mycelial hyphae subhyaline to brown, branched, septate, smooth to tuberculate, 0.5--6 μm diam. *Colonies* on PCA growing slowly, attaining 17-20 mm

diam in 14 d at room temperature, olive brown (M. 4F5) to blackish, flat, thin, powdery to granulose, consisting of submerged mycelium and sparse aerial hyphae, producing abundant ascomata; reverse olive brown (M. 4F5) to blackish; ascomal initials coiled. *Ascomata* superficial to immersed, scattered to grouped, ostiolate, subglobose to globose, translucent, olive-brown to dark brown, 160--180 x 140--160 μm, sometimes with a short beak 12--25 x 25--40 μm. *Setae* stiff, simple or bifurcate at the middle, 2--3 septate, verrucose and dark brown at the base, becoming smooth and hyaline at the apex, 15--45 μm long, 3--5 μm diam at the base, thin-walled, terminated by a hyaline, globose to pyriform, smooth-walled vesicle, 2.4--4 μm diameter. *Peridium* 4--6 layered, 10--15 μm thick, pale olivaceous-brown to brown, *textura epidermoidea* to *intricata* in surface view. *Asci* 47--54 x 5--7μm, spore-bearing part 35--48 μm long, cylindrical, short stipitate, thin-walled, evanescent, fasciculate, 8-spored, without apical structures. *Paraphyses* not observed. *Ascospores* 6--8 x 4.5--6 x 2--4 μm, ovoid to ellipsoidal in front view, oblate, dark brown, smooth-walled, with an equatorial germ slit on the narrow side, uniseriate. *Anamorph* not observed.

On OMA at room temperature, colonies attaining 20--22 mm diam in 14 d, similar to those on PCA but strongly zonate.

On MEA at room temperature, colonies attaining 15-16 mm diam in 14 d, raised, cottony, white; exudate absent; soluble pigment orange; reverse orange (4B6). Ascomata not formed.

On PDA at room temperature, colonies attaining 19-21 mm diam in 14 d, similar to those on MEA but without a soluble pigment and reverse whitish. Ascomata not formed.

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On PCA, OMA, MEA and PDA at 15 and 37 C, growing very slowly, attaining 3-4 mm diam in 14 d, raised, hairy, white. Ascomata not produced. No growth was observed at 10 and 42 C.

Specimens examined: SPAIN. GRAN CANARIA: La Laguna (15º 25' GM, 28º 9' N), from soil, 22-VIII-1998, col. *B. Acosta*, isol. *A. M. Stchigel* (IMI 381334-HOLOTYPE, FMR 6738:ISOTYPE). Living cultures ex type: CBS 102197, FMR 6738, IMI 381334.

Discussion

The genus *Ascotricha* encompasses 13 species (Ames 1951, Hawksworth 1971, Kulshreshtha et al 1977, Stchigel and Guarro 1998, Udagawa et al 1994 a, b, Udagawa and Uchiyama 1999), characterized by ostiolate or nonostiolate setose ascomata with translucent peridial wall, 8-spored asci, brown ellipsoidal ascospores with an equatorial germ slit, and anamorphs belonging to *Dicyma* Boulanger or to the *Geniculosporium-Nodulisporium* complex. *Ascotricha* spp. are generally found on cellulosic substrates (Ames 1951, Hawksworth 1971, Calviello 1978), dung (Hawksworth 1971, Kahn and Cain 1977) and soil (Hawksworth 1971, Horie et al 1993; Stchigel and Guarro 1998, Udagawa et al 1994 a, b). The genus *Ascotricha*, morphologically very close to *Chaetomium* Kuntze, was erected by Berkeley (1838) for *A. chartarum* Berk. Hawksworth (1971), in an extensive review of the genus, considered it included in the Chaetomiaceae of the order Sphaeriales although some similarities with members of the Coniochaetaceae were later noticed (Hawksworth and Wells 1973). Khan and Cain (1977) considered *Ascotricha* as phylogenetically distant from *Chaetomium* and related genera, and placed it in the Xylariaceae. Laessøe (1994) considered *Ascotricha* and the closely placed *Ascotrichella*

Valldosera & Guarro (Valldosera and Guarro 1988) as genera *incertae sedis* due mainly to the nonstromatic nature of their ascomata, which differentiated them from the other genera of the Xylariaceae. *Ascotricha* was recently included in the Xylariaceae (Hawksworth et al 1995, Eriksson and Hawksworth 1998), and this view has been substantiated by Lee and Hanlin (1999) on the basis of 18S rDNA sequence analyses. *Ascotricha canariensis* belongs to the group of species with cylindrical asci which includes *A. amesii* Hawksworth, *A. amphitricha* (Corda) S. J. Hughes, *A. bosei* Hawksworth, *A. chartarum* Berk., *A. delhiana* Kulshreshtha, Raychardhuri & Khan, *A. erinacea* Zambett., *A. guamensis* Ames, *A. hispanica* Stchigel & Guarro, *A. lusitanica* Kenn. and *A. xylina* Ames. It can be easily differentiated from all previously described species (with the exception of *A. hispanica*) mainly by the setal morphology and by the presumed absence of an anamorph. *Ascotricha hispanica* also has short and simple ascomal setae and lacks an anamorph, but differs from *A. canariensis* by its longer (30--100 x 3--5 μm) setae with a more elaborate branching pattern (sub-dichotomous and once- to twice-branched) and by its smaller ascospores (4.5--7 x 3--4 x 3-4- μm).

Acknowledgements

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Figs. 1-6. *Ascotricha canariensis*. 1. Ascoma. 2. Detail of the peridium. 3. Simple and branched setae. 4. Asci and ascospores. 5. Asci and ascospores, ascospore showing the germ slit (arrow). 6. Ascospores (SEM). Scale bars: 1 = 50 μm; 2-6 = 10 μm.

Figs. 7-9. *Ascotricha canariensis*. 7. Ascoma. 8. Ascus with ascospores. 9. Ascospores. Scale bars: 7 = 25 μm; 8 - 9 = 10 μm.

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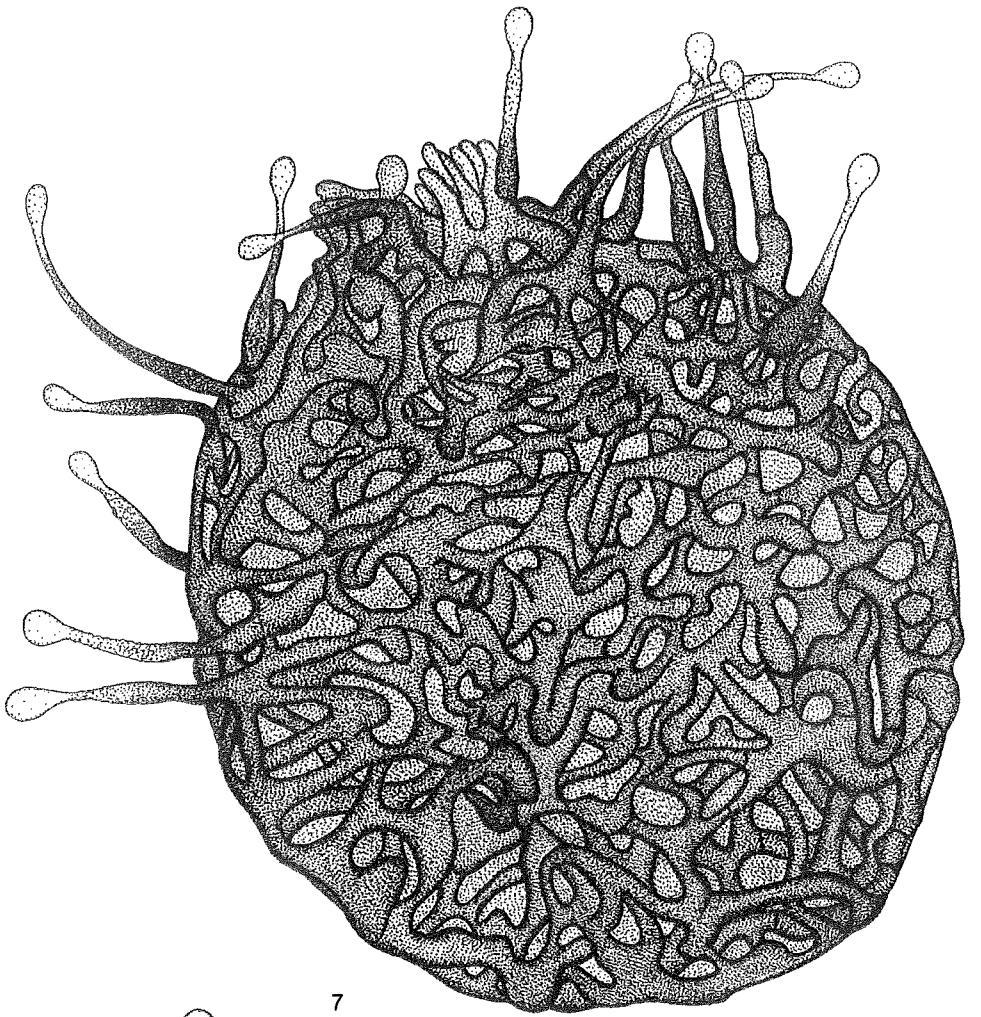

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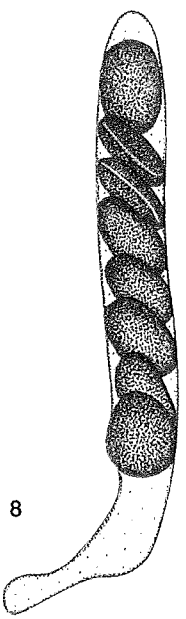

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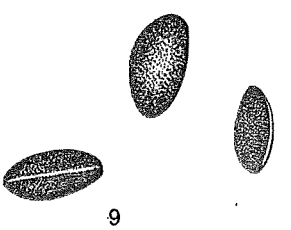

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1.9. Una nueva *Apiosordaria* de Nigeria, con una clave dicotómica de las especies del suelo

1.9.1. A. M. Stchigel, J. Cano, J. Guarro & C. Gugnani. A new *Apiosordaria* from Nigeria, with a key of the soil-borne species. *Mycologia* (en prensa)

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Short tittle: *Apiosordaria nigeriensis* sp. nov.

A new *Apiosordaria* from Nigeria, with a key to the soil-borne species

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Abstract: A new species, *Apiosordaria nigeriensis*, isolated from soil of Nigeria is described and illustrated. This fungus is characterised by its two-celled ascospores with spinulose walls and an apical germ pore surrounded by a dark area. Reexamination of *Apiosordaria angulispora* resulted in a new combination, *Cercophora angulispora* based in the presence of cephalothecoid peridium, cylindrical asci with thickened apical ring and curved to sigmoid ascospores with long apical and caudal appendages. A key to the soil-borne species of *Apiosordaria* is provided.

Key Words: Africa, Ascomycota, soil fungi, Lasiosphaeriaceae, Sordariales

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During an expedition to the rainforests in southeast Nigeria in May-Jun 1997, numerous litter and soil samples were collected in Anambra and Cross River states. An ascomycete isolated from a soil sample of Nsukka was sufficiently different from all described Sordariales to warrant the proposal of a new species of the genus *Apiosordaria* Arx & Gams. In the present report the species is fully described and illustrated.

The soil samples were collected on the campus of the Nsukka University, Anambra state, Nigeria. The altitude is below 300 m. The soil is of the lateritic type and the vegetation is mostly composed of lowland forest trees, consisting of *Piptadeniastrum africanum* (Hok.) Brenan, *Uapaca* spp., *Pycanthus* sp., *Lophira alata* Baks & Gaertn. and *Khaya ivorensis* A. Chev. The area is dominated by a tropical interland climate with an average temperature of greater than 27 C. The total annual precipitation is 2000-3000 mm. The methods used for sampling, soil activation, culture and measurement of the structures were described previously (Stchigel et al 1998). Color notations in parentheses are from Kornerup and Wanscher (1984).

Apiosordaria nigeriensis Stchigel et Guarro, sp. nov. Figs. 1-9

Mycelio ex hyphis hyalinis vel dilute brunneis, septatis, ramosis, anastomosans, levibus vel tuberculatis, 1--6 µm diametro composito. *Coloniae* in PCA expansae, planae, tenues, sub-granulosae, ex mycelio vegetativo submerso et aereo, olivaceo-brunnea; reversum olivaceo-brunneum. *Ascomata* immersa vel superficialia, non-ostiolata, translucida, sub-hyalina vel pallide brunnea, globosa vel subglobosa, 300--600 µm diam compositae, pilosae. *Peridium* pallide brunneum, ex textura angularis compositum, 3-6 stratiorum compositum. *Asci* 8-spori, clavati, cum

muris tenuibus, 160--180 x 29--36 μm, longistipitati, 60--90 μm. *Paraphysibus* hyalinis, filiformibus, septatis, 3--4 μm diam. *Ascosporae* biseriatae, primum unicellulares, clavatae, hyalinae, deinde transverse septatae ad bicellularis; cellula superiore ovoidea cum apice acuminato, brunnea, crassitunicata, 24--32 x 20--23 μm, spinis ad 1--7 μm longis, cum foramine germinali singulari, apicali praedita, 1.5--2 μm diam; cellula inferiore subhyalinae vel brunnea, cylindrico-conica vel conica, cum spinis formantes, 7--10 x 4--5 μm, sine foramine germinali. *Ascosporae* sine appendicibus gelatinosis et sine strato mucosa. *Status conidialis* nullis.

Mycelium composed of hyaline to pale brown hyphae, septate, branched, smooth to tuberculate, 1--6 μm diam. *Colonies* on PCA growing rapidly, attaining 45--47 mm diam in 7 d at room temperature (approx 25 C), flat, thin, consisting of submerged mycelium and sparse aerial hyphae, olive brown (M. 4D8-4E8), producing abundant ascomata; reverse olive brown; ascomatal initials originating as coiled hyphae of vegetative mycelium soon interwoven by neighbouring hyphae. *Ascomata* immersed to superficial, scattered, non-ostiolate, globose, translucent, appearing dark brown to black due to mass of ascospores, 300--600 μm diam, covered by hyaline to subhyaline hyphae. *Peridium* 3-6 layered, 7--15 μm thick, translucent, subhyaline to pale ochraceous brown, *textura angularis*, cells 6--25 μm diam. *Asci* 8-spored, fasciculate, clavate, thick-walled when young, 160--180 x 29--36 μm, broadly rounded at the apex, stipe 60--90 μm long, without conspicuous apical structures, evanescent. *Paraphyses* hyaline, filiform, septate, 3-4 μm diam *Ascospores* biseriate, clavate, hyaline and one-celled when young, becoming two-celled by the formation of a transverse septum; upper cell ovoid, truncated at the base and with an acuminate

apex, brown, thick-walled, 24--32 x 20--23 μm, uniformly ornamented with numerous spines (1--7 μm long), darker coloured around the germ pore; germ pore single, apical, conspicuous, 1.5--2 μm diam; lower cell subhyaline to medium brown, cylindric-conical to conical, spinulose, 7--10 x 4--5 μm. *Anamorph* unknown. At 37 C growing more rapidly than at room temperature, but ascomata are not produced. No growth 42 C.

SPECIMENS EXAMINED: NIGERIA. Enugu, Nsukka University campus, from garden soil, 26-V-1997, col. *M. Calduch, A. M. Stchigel* and *J. Guarro*, isol. *A. M. Stchigel* (HOLOTYPE:IMI 378909, ISOTYPE:FMR 6363). Living cultures: CBS 100895, FMR 6363, IMI 378910, UAMH 9419.

The genus *Apiosordaria* Arx & Gams (Lasiosphaeriaceae) is characterised by dark ascomata, non-amyloid asci with no distinct apical structures, and two-celled ascospores, composed of a dark and ornamented upper cell and a lower hyaline cell (Arx and Gams 1967). In the most recent revision of the genus 16 species and 2 varieties were accepted, with *Echinopodospora* Robinson and *Lacunospora* Cailleux considered as synonyms (Krug et al 1983). Subsequently, five more species and a new variety have been reported (Guarro and Cano 1988, Mukerji et al 1995, Udagawa 1990), four of them were transferred from *Triangularia* Boedijn (Guarro and Cano 1988).

Apiosordaria nigeriensis together with *A. jamaicencis* (Robinson) Krug, Udagawa & Jeng, *A. sacchari* (Robinson) Krug, Udagawa & Jeng and *A. spinosa* (Cailleux) Krug, Udagawa & Jeng share spherical, translucent and non-ostiolate ascomata with spinulose to spiny ascospores which in part correspond to the main

features of *Echinopodospora* B. M. Robinson. *Apiosordaria nigeriensis* can be easily differentiated from the other mentioned species by the characteristic darker surface region around the germ pore and the spinulose lower cell of the ascospore. Other species with spinulose upper cell of the ascospores are *A. effusa* (Morinaga et al) Krug, Udagawa & Jeng, *A. microcarpa* Udagawa & Muroi, *A. terrestris* Jong & Davis, *A. vermicularis* (Morinaga et al) Krug, Udagawa & Jeng, *A. tuberculata* Krug, Udagawa & Jeng and *A. verruculosa* (Jensen) Arx & Gams. *Apiosordaria nigeriensis* can be distinguished from these taxa by the presence of non-ostiolate ascomata (ostiolate in *A. microcarpa* and *A. verruculosa*), clavate asci (cylindrical in *A. effusa*, *A. microcarpa*, *A. vermicularis* and *A. verruculosa*), ascospores with a relatively large upper cell (24--32 x 20--23 μm in *A. nigeriensis* and 18--22 x 11--17 μm in *A. effusa*, 15--19 x 10--12.5 μm in *A. microcarpa* and 16--22 x 12--15 μm in *A. vermicularis*), which are ornamented with long aculeate spines (up to 7 μm long in *A. nigeriensis* and 3--5 μm in the other species), and with a spinulose lower cell (smooth or near so in the other species).

Cercophora angulispora (Cain & Farrow) Stchigel et Guarro, comb. nov.

≡ *Triangularia angulispora* Cain & Farrow, *Can J Bot* 34, 690 (1956).

Apiosordaria angulispora (Cain & Farrow) Guarro formerly considered a species of *Triangularia* Boedijn, was placed in *Apiosordaria* by Guarro and Cano (1988) on the basis of the verruculose cell wall of the upper cell of the ascospore. However, after a careful reexamination of the strain ATCC 32380 (=CBS 265.77) we noticed that some of its features such as the cephalothecoid peridium, cylindrical asci with a distinct, thickened apical ring, curved to sigmoid ascopores with both long apical and caudal appendages, long lower cell of the ascospore and subapical to

lateral pore are very rare or absent in *Apiosordaria* spp. By contrast all these characteristics are typical of *Cercophora* Fuckel (Lundqvist, 1972). Therefore, the new combination is proposed.

Considering the new taxon proposed here and the exclusion of *A. angulispora*, there are currently 16 soil-borne species of *Apiosordaria*. For their identification, the following key is proposed:

1.- Upper cell of the ascospore polygonal, five-angled in side view, ornamented with longitudinal ribs, measuring 10--12 x 8--9 μm.....*A. striatospora*
Upper cell of the ascospore more or less ellipsoidal.....2

2.- Asci 4-spored.....3
Asci 8-spored.....6

3.- Ascomata globose, non-ostiolate; upper cell of the ascospore verrucose, measuring 18--22 x 14--17 μm; lower cell of the ascospore measuring 4--6 x 5--6 μm.....*A. effusa*
Ascomata pyriform, ostiolate.....4

4.- Upper cell of the ascospore spinulose or warty, measuring 16--21 x 13--15 μm; lower cell of the ascospore measuring 6--10 x 9--19 μm.....*A. verruculosa*
Upper cell of the ascospore pitted.....5

5. Lower cell of the ascospore measuring 10--14 x 7.5--9 μm.....*A. longicaudata*
Lower cell of the ascospore measuring 4--7.5 (10) x 6--8 (11) μm.....*A. tetraspora*

6. Upper cell of the ascospore longer than 25 μm.....7

   Upper cell of the ascospore measuring 25 μm or less.....11

7. Upper cell of the ascospore measuring 33.2--40.5 x 24.8--31.3 μm, spinulose.....*A. sacchari*

   Upper cell of the ascospore smaller.....8

8. Ascomata ostiolate, pyriform; upper cell of the ascospore pitted, measuring 27--34 x 18--23 μm.....*A. backusii*

   Ascomata non-ostiolate, globose; upper cell of the ascospore more or less spinulose.....9

9. Upper cell of ascospore ornamented with fat-topped ridges, forming an incomplete reticulum.....*A. terrestris*

   Upper cell of the ascospore ornamented with spines.....10

10. Upper cell 24--32 x 20--23 μm, with a dark area surrounding the germ pore and ornamented with spines up to 7 μm long; lower cell 7--10 μm long.....*A. nigeriensis*

    Upper cell 24--30 x 17--26 μm and ornamented with spines up to 3 μm long; lower cell 11--18 μm long.....*A. jamaicensis*

11. Ascomata non-ostiolate, globose; upper cell of ascospore spinulose, measuring 16--20 (22) x 12--15 μm; lower cell 12--20 x 8--9 (16) μm.....*A. vermicularis*

    Ascomata pyriform, ostiolate.....12

12. Upper cell of the ascospore more or less spinulose.....13
Upper cell of the ascospore pitted.....15

13. Upper cell of theascospore measuring 20--24 x 15--18 μm, warty.....*A. otanii*
Upper cell of the ascospore smaller and spinose.....14

14. Upper cell of theascospore measuring 15--19 x 10--18 μm; lower cell measuring 5--6.5 x 7.5--9 μm.....*A. microcarpa*
Upper cell of the ascospore measuring 10--12.5 x 6--8 μm; lower cell measuring 4--6 x 4.5--6.5 μm.....A. *yaeyamensis*

15. Upper cell of the ascospore measuring 20--25 x 12--15 μm, regularly pitted; lower cell measuring 4--5 x 3--4 μm.....*A. vestita*
Upper cell of the ascospore measuring 14--18 x 10--12 μm, ornamented with numerous longitudinal ridges and pitted; lower cell measuring 2.5--5 x 3--4 μm.....*A. rugosa*

ACKNOWLEDGMENTS

This work was supported by grant PM95-0160 from CICYT (Ministerio de Educación y Ciencia, Spain) and the Fundació Ciència i Salut, Reus, Spain. The senior author is grateful for the fellowship grant from Instituto de Cooperación Iberoamericana (I.C.I.), Spain.

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Figs. 1-6. *Apiosordaria nigeriensis.* 1. Ascoma. 2. Ascus and ascospores. 3. Ascospores showing the spines. 4. Dark colored ascospore wall around the germ pore. 5. Ascospore (SEM). 6. Ascospore (SEM). Scale bars: 1 = 100 μm, 2 = 30 μm, 3, 4 = 10 μm, 5, 6 = 5 μm.

Figs. 7-9. *Apiosordaria nigeriensis.* 7. Peridium detail. 8. Ascus. 9. Ascospores. Scale bars: 7-9 = 25 μm.

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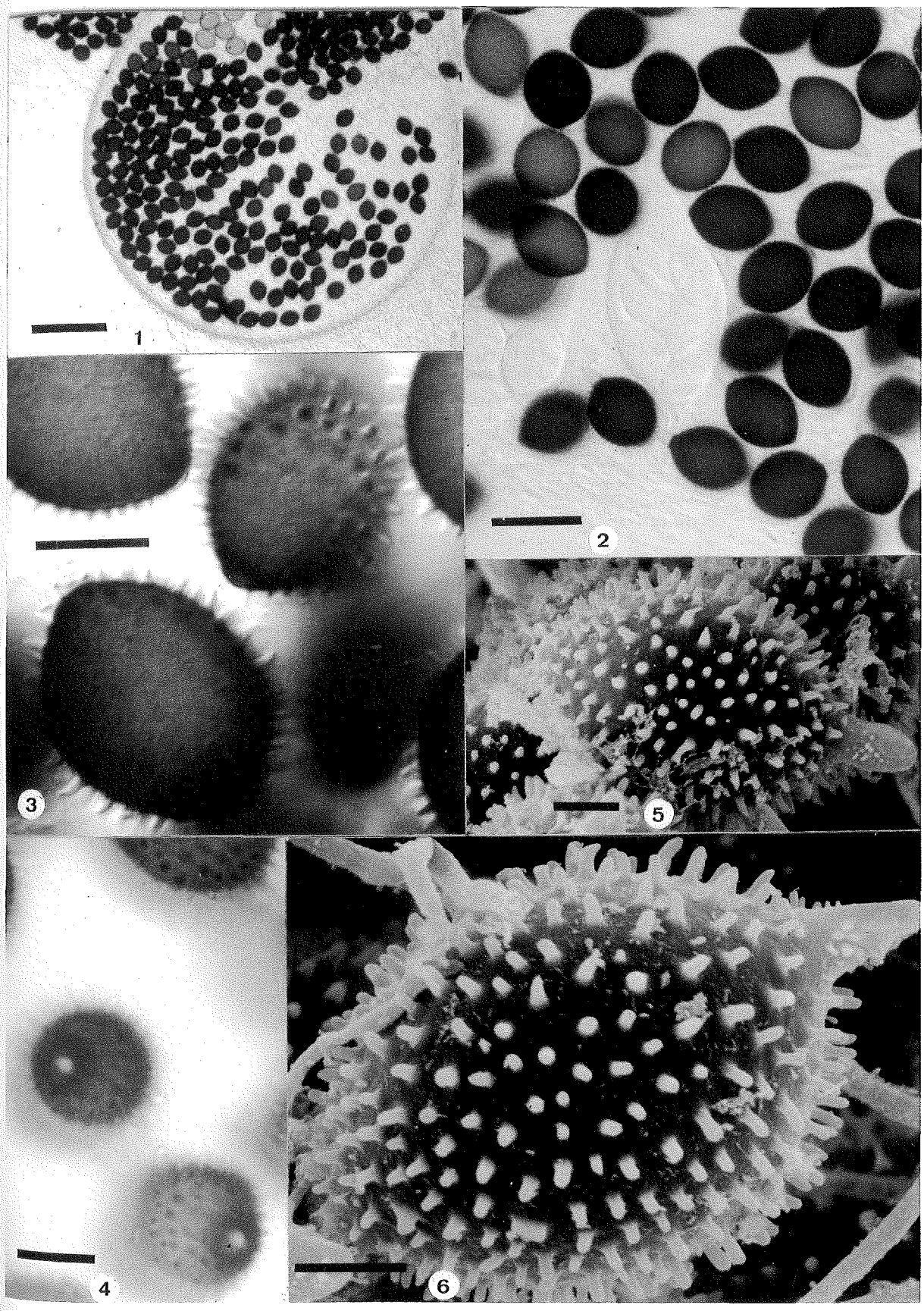

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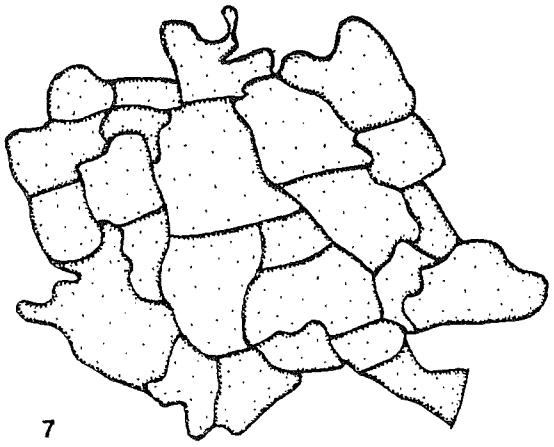

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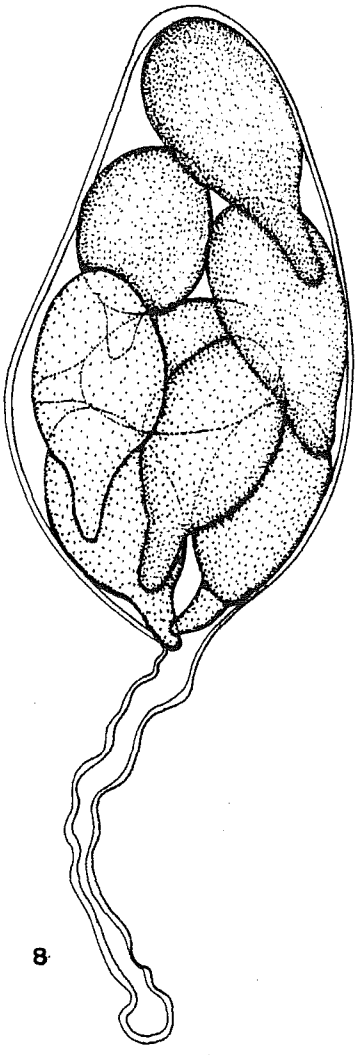

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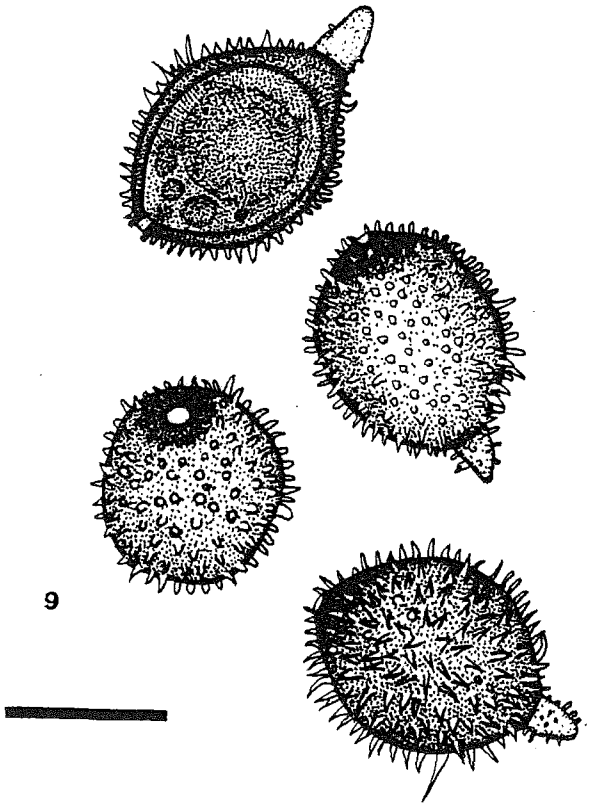

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1.10. *Antarctomyces psychrotrophicus* gen. et sp. nov., un nuevo ascomiceto de la Antártida

1.10.1. A. M. Stchigel, J. Cano, W. Mac Cormack & J. Guarro. *Antarctomyces psychrotrophicus* gen. et sp. nov., a new ascomycete from Antarctica. *Mycological Research* (aceptado)

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Antarctomyces psychrotrophicus gen. et sp. nov., a new ascomycete from Antarctica.

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We describe and illustrate a new ascomycete, *Antarctomyces psychrotrophicus* gen. et sp. nov., characterised by naked asci, hyaline, thick-walled, ellipsoidal to fusiform, echinulate ascospores, and blastoconidia, isolated from Antarctican soil samples. Analysis of the nuclear rDNA ITS region sequences showed that this taxon is related with members of Thelebolaceae.

Antarctic region, Ascomycota, *Calyptrozyma arxii*, *Monascella botryosa*, South Shetland Islands

During the summer expedition of the "Instituto Antártico Argentino" to the Antarctica, one of our party (W. M. C.) collected a number of soil samples from near the "Jubany" Argentinian base (King George Island, South Shetland Islands). Two strains of an undescribed ascomycete were also isolated in axenic culture. These were characterised by rudimentary ascomata, composed of a cluster of a small number of asci without peridium, and hyaline, ellipsoidal to fusiform, spinulose ascospores. It was difficult to determine its taxonomic placement from morphological characteristics alone, so we compared the sequence of its ITS region with those of other morphologically similar fungi of uncertain taxonomic position and others belonging to Eurotiales, Onygenales, Pezizales and Sordariales.

MATERIAL AND METHODS

Fungal isolation

Soil samples were collected near the "Jubany" Argentinian base (62° 14´S, 58° 40´W) is located on King George Island, South Shetland Islands, Antarctica. The terrain is basically basaltic and meteorised rocks and penguin dung is very common. The vegetation is mainly algae as *Prasiola crispa*, lichens as *Acarospora molybdina*, *Lecidea auriculata*, *Placodium spp.*, mosses (*Andreaea depressinervis*, *A. regularis*, *Brachytecium antarcticum*, *Bryum dichotomum*, *Grimnia antartici*, *Hypnum sarmentosum*, *Pogonatum alpinum*, *Tortula excelsa*, etc.), *Colobanthus quitensis*, *Deschampsia antarctica* and *Poa pratensis* (Cabrera, 1994; Lindsay, 1971; Möller and Dreyfuss, 1996). The area is dominated by a cold climate. The following data were reported for 1995: average temperature was -1.5 °C, with a minimum of -19.9 °C and a maximum of 10.4 °C; total annual precipitation was 273 mm and total annual snow was 1257 cm;

minimum, average and maximum atmospheric pressure were 946 mb, 989.9 mb and 1025 mb, respectively; average humidity was 88 %. Material was collected mainly from the A horizon, placed into sterilised polyethylene bags closed by rubber band, and stored in a refrigerator at -20 ºC.

Fungal isolation was done using the soil plate method described by Warcup (1950) in which suspensions were cultured on potato carrot agar with 30 mg/l chloramphenicol (PCA; potatoes, 20 g; carrot, 20 g; agar, 20 g; tap water, 1,000 ml; prepared by ourselves). We also performed a modification of Furuya and Naito's method (1979). Approx. 1 g of soil was suspended in 5 ml of 5 % v/v acetic acid, shaken vigorously for 5 min and left for a further 5 min. The layer of acetic acid was removed by decantation, the residual soil was resuspended with 9 ml of sterilised water, and the suspensions were plated in a Petri dish. PCA with chloramphenicol was placed on top of the soil suspension and mixed. All cultures were incubated at 11-12 ºC under 12 h of darkness, alternating with 12 h of cool white fluorescent light.

The strains were grown on oatmeal agar (OA; Difco), PCA, potato dextrose agar (PDA; Difco) and malt extract agar (MEA; Difco) at room temperature (22-25 ºC), at 11-12 ºC and at 4-6 ºC under 12 h of darkness, alternating with 12 h of cool white fluorescent light. Colour notations in parentheses are from Kornerup and Wanscher (1984). The structures were measured in lactophenol.

Molecular study

Table 1 lists the strains used in the study. The sequences obtained from Momol & Kimbrough (1994) are not available in any DNA sequences database checked. *Monascus purpureus*, *Neurospora cassa* and *Talaromyces flavus* var. *macrosporus* were obtained from EMBL. New sequences were obtained from *Amauroascus niger*,

Amauroascus volatilis-patellus, *Antarctomyces psychrotrophicus*, *Aphanoascus keratinophylus*, *Calyptrozyma arxii* and *Monascella botryosa*. The DNA was isolated as described by Estruch et al. (1989) with some modifications (Guillamón et al., 1996). The strains were grown at 20 ºC in Sabouraud broth in ehrlenmeyer flasks and shaken at 200 rpm. The mycelium was collected by filtration through nytal mesh (42 µm pore size), washed with distilled water, blotted with paper towels, frozen with liquid nitrogen and ground to a fine powder with a mortar and pestle. The powder was incubated for 1 h at 65 ºC in 2 ml of extraction buffer 80.2 M TrisHCl pH 8.0, 0.25 M NaCl, 25 mM EDTA, 0.5 % SDS). The lysate was extracted with phenol-chloroform-isoamyl alcohol solution (25:24:1) and DNA was recovered by isopropanol precipitation. The pellet was washed with 70 % v/v ethanol, dried under vacuum and resuspended in TE buffer (10 mM TrisHCl pH 8.0, EDTA 1mM).

The rDNA ITS region containing ITS1 and ITS 2 and the intervening 5.8 S rRNA gene were amplified as described by Gené et al. (1996), using a Perkin Elmer 2400 thermal cycler (Perking Elmer Cetus corporation, Emervyville, CA). Primers ITS5 (5'-GGAAGTAAAAGTCGTAACAAGG-3') and ITS4 (5'-TCCTCCGCTTATTGATATGC-3') (White et al., 1990) were used. The amplification program consisted of pre-denaturalisation at 94-6 ºC for 5 min, 30 cycles at 95 ºC for 30 sec, 50 ºC for 1 min and 72 ºC for 1 min, and final incubation at 72 ºC for 7 min to complete the final extension. The final products were resolved by electrophoresis in a 2 % agarose MP gel (Boehringer Mannheim), and cleaned following the GENECLEAN II protocol (BIO 101). The molecular weights of amplified DNA were estimated by comparing them with 100 bp DNA leader (Gibco BRL) standard lane.

The protocol "Taq DyeDeoxy Terminator Cycle Sequencing Kit" (Applied Biosystems, Gouda, The Netherlands) was used for sequencing. Reactions were performed using the primers ITS5 and ITS4 (White et al., 1990) and run on a 310 DNA sequencer (Applied Biosystems). The new sequences were aligned using the Clustal W, version 1.5, computer program for multiple sequence alignment (Thompson et al., 1994). Cladistic analyses using the neighbor-joining method (Saitou and Nei, 1987) and parsimony were performed with the MEGA 1.0 computer program (Kumar et al., 1993). Confidence values for individual branches were determined by bootstrap analyses (1000 pseudoreplicates). Nucleotide composition, frequencies from pairwise comparisons and alignment gap sequences were performed with the MEGA 1.0 computer program.

RESULTS AND DISCUSSION

Taxonomy

Antarctomyces Stchigel & Guarro, gen. nov

Hyphis septatis, ramosis vel simples, anamostosantes, hyalinis. Ascomata per asci nudi compositum, sine excipulos. Asci ellipsoidei vel subglobosi, unitunicati, non-catenati, octospori. Paraphyses nullae. Ascosporae ellipsoideae vel fusiformis, hyalinae, spinulosae, sine poro germinali, unicellulares. Species typica: *Antarctomyces psychrotrophicus* Stchigel & Guarro.

Mycelium mainly submerged, composed of septate, branched and unbranched, anastomosing, hyaline hyphae. Ascomata composed of naked asci, without excipulum. Asci ellipsoidal to subglobose, unitunicate, non-catenate, 8-spored. Paraphyses absent.

Ascospores ellipsoidal to fusiform, hyaline, spinulose, without germ pores, 1-celled. Type species: *Antarctomyces psychrotrophicus* Stchigel & Guarro.

Antarctomyces psychrotrophicus Stchigel & Guarro, *sp. nov.* (Figs 1-15)

Anamorph: blastoconidia.

Hyphis hyalinis, ramosis vel simples anastomosantes, septatis, (1-)4-7 μm diam composito, tenuitunicati vel crassitunicati. Coloniae in agaro cum decocto tuberorum et carotarum (PCA) planae, tenues, hyalinae. Ascomata e hyphis initialibus duabus involutis formantes. Ascomata per asci nudi compositum, 2-7 in numero, sine excipulos. Asci 15-19 x 12-13 μm, ellipsoidei vel subglobosi, non-estipitati, unitunicati, crassitunicati, non-catenati, octospori. Paraphyses nullis. Ascosporae 7-10 x 4-5.5 μm, ellipsoideae vel fusiformis, hyalinae, spinulosae, sine poro germinali, unicellulares.

Typus: Antarctica, South Shetland Islands, King George Island, ex solo, 10 Nov 1996, leg. W. Mac Cormack, isol. A. M. Stchigel (IMI 378528- holotypus, FMR 6368- isotypus).

Mycelium mainly submerged, composed of hyaline, branched and unbranched, anastomosing, septate hyphae; hyphae (1-)4-7 μm broad, thin to thick-walled. Colonies on PCA attaining a diam of 33-47 mm in 14 d at 22-25 ºC, plane, thin, white, with irregular margins; reverse uncolored. Ascomatal initials begin to develop from the coiling of two side branches, occasionally disposed in tandem. Ascomata composed of naked asci, single or grouped in number of 2-7, arising directly from the fertile hyphae, without excipulum. Asci 15-19 x 12-13 μm, subglobose to ellipsoidal, non-stipitate, unitunicate, thick-walled, non-catenate, 8-spored, developed form croziers. Paraphyses absent.

Ascospores 7-10 x 4-5.5 μm, ellipsoidal to fusiform, hyaline, spinulose, thick-walled, without germinal pores, one-celled; spines approx. 0.5 μm long. Anamorph: Conidiophores 4-7 μm thick, hyaline, with lateral cylindrical protuberances measuring 2-5 x 1-2 μm. Conidiogenous cells enteroblastic, integrated, intercalarly, determinate. Conidia 3-20 x 2-5 μm, subglobose to irregularly cylindrical, hyaline, smooth, thick-walled, aggregated in slimy masses, one-celled. Chlamydospores 10-15 x 5-8 μm, irregular, single or forming long chains, one or two-celled.

Colonies on PCA after 14 d attaining a diam of 32-43 mm at 11-12 °C and 26-28 mm at 4-6 °C, plane, thin, zonate, vegetative mycelium mainly submerged, uncolored; reverse uncolored. Asci and chlamydospores abundant; conidia absent.

Colonies PDA attaining a diam of 65-71 mm in 14 d at 22-25 °C, plane, thin, irregular margins, vegetative mycelium mainly submerged, uncolored; reverse uncolored. Chlamydospores present; in long chains, asci absent; conidia present. At 11-12 °C the colonies attain a diam of 62-68 mm in 14 d and 35-37 mm at 4-6 °C, plane, thin, irregular margins, vegetative mycelium mainly submerged, dull blue (M 23D4), light blue funicles in the central area, composed of sterile hyphae; reverse with the same colour. Asci abundant in the marginal area; chlamydospores in long chains; conidia absent.

Colonies on OMA attaining a diam of 50-55 mm in 14 d at 22-25 °C, plane, thin, margins fimbriate, vegetative mycelium mainly submerged, uncolored; reverse uncolored. Chlamydospores very abundant, in long chains; asci absent; conidia present. At 12 °C the colonies attain a diam of 35-45 mm and at 4-6 °C a diam of 26-29 mm in 14 d, plane, thin, vegetative mycelium mainly submerged, uncolored; reverse uncolored. Asci and chlamydospores abundant; conidia absent.

Colonies on MEA attaining a diam of 54-58 mm in 14 d at 22-25 °C, with the same cultural characteristics as in OMA. Moniliform mycelium present; asci and

chlamydospores absent; conidia absent. At 12 ºC the colonies attaining a diam of 45-49 mm in 14 d and 20-22 mm at 4-6 ºC, plane, thin, with vegetative mycelium mainly submerged, uncolored; reverse uncolored. Moniliform mycelium present; asci and chlamydospores absent; conidia absent.

The main features of the *A. psychrotrophicus* ITS1-2 and 5.8 S rDNA region sequence are: 547 bp; 130 A; 131 C; 130 G and 156 T. The location ITS1 from nucleotide 33 to 192, the gene 5.8S rRNA from nucleotide 193 to 364 and the location ITS2 from nucleotide 365 to 499.

Two other ascomycetes with simple sexual structures consisting of clusters of a few asci with no type of peridium or excipulum and with more or less ellipsoidal and hyaline ascospores are *Calyptrozyma arxii* Boekhout & Spaay and *Monascella botryosa* Guarro & Arx each of which is monotypic. The latter was isolated from Spanish soil (Guarro and Arx, 1986) and accommodated in the Onygenaceae (Hawksworth et al., 1995). No anamorph has been observed in this species. *Calyptrozyma* was isolated from human oesophagus in the U.S.A. (Boekhout et al., 1995) and provisionally placed in Eurotiales, though not in any family (Eriksson and Hawksworth, 1996). The three taxa are distinguished mainly by their anamorphs, which are blastoconidia in *Antarctomyces,* aleurio-, arthro- and blastoconidia in *Calyptrozyma* and absent in *Monascella*; the ascomata initials which are erect ascogonia surrounded by coiled anteridia in *M. botryosa,* aggregations of generative hyphae in *C. arxii* and clustered antheridia and ascogonia in *A. psychrotrophicus*; the asci which are clavate to obovate in *M. botryosa*, cylindrical in *C. arxii*, and spherical to subspherical in *A. psychrotrophicus*; and the ornamentation of the ascospores which are smooth walled in *C. arxii* and in *M.* botryosa,

and spinulose in *A. psychrotrophicus*. Differences in the ITS-rRNA gene sequences of these three species confirned their placement in different genera.

To infer the phylogenetic relationships of these taxa with other morphologically similar ones and to establish a more precise taxonomic position, we have compared their ITS sequences with those of 13 other species, some of which were obtained from the EMBL. We chose representatives of Thelebolaceae (*Thelebolus* sp), Eurotiales (*Monascus ruber* and *Talaromyces flavus*), Onygenales (*Amauroascus niger*, *A. volatilis-patellis* and *Aphanoascus keratinophylum*), Pezizales (*Ascodesmis nigricans*, *A. sphaerospora*, *Eleutherascus lectardii*, *Lamprospora sp.*, *Pyronema domesticum* and *Saccobolus depauperatus*), and Sordariales (*Neurospora crassa*). The phylogenetic tree, based on analyses of the ITS-5.8 rRNA gene sequences of all taxa studied with the neighbor-joining method, demonstrated that *Antarctomyces psychrotrophicus*, *Calyptrozyma arxii* and *Monascella botryosa* were not closely related phylogenetically. These analyses showed the existence of two well-supported clades (Fig. 16). The first clade, supported by a bootstrap value of 56 % encompasses the Onygenales, Eurotiales and a sister subclade composed of *Antarctomyces psychrotrophicus*, *Calyptrozyma arxii* and *Thelebolus sp.* (with a bootstrap value of 100 %). In this case *C. arxii* may be the ancestor of the other two taxa. However, it is very difficult to establish any morphological relationship among these tree taxa. *Thelebolus* and *Antarctomyces* share only thick-walled asci and ellipsoidal to fusiform, thick-walled ascospores, which do not have germ pores. The second clade, supported by a bootstrap value of 100 %, is formed by the pezizalean fungi. *Monascella botryosa* was also included in this group. It did not cluster surprisingly with those species that have simpler ascomatal structures, such as *Ascodesmis* spp., *Eleutherascus lectardii* and *Saccobolus depauperatus*, but with *Lamprospora sp.* and *Pyronema domesticum* (Pyronemataceae) whose ascomata are

more developed. Kimbrough (1989) pointed out a close relationship of some members of Onygenales with simple structures and naked asci such as *Amauroascus* with the Pezizales. He included this genus, together with *Ascodesmis* and *Eleutherascus*, in the family Ascodesmidaceae (Pezizales). Considering the asci structure, we disagreed that there was such a relationship between Pezizales and Onygenales (Guarro et al, 1992). In this study the two species of *Amauroascus* were placed in a different clade from the Pezizales, which confirms our previous opinion.

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Table 1. List of strains, sources and sequences used in the analysis

Species	Strain	Origin	EMBL accesion numbers
Amauroascus niger Schroeter	IFO 32599	soil	AJ 133434
Amauroascus volatilis-patellus (Orr & Kuehn) Currah	UAMH 3406	soil	AJ 133435
Antarctomyces psychrotrophicus gen. et sp. nov	FMR 6368	soil	AJ 133431
Aphanoascus keratinophylus Punsola & Cano	IMI 319010	soil	AJ 133436
Ascodesmis nigricans V. Thieghem*	FLAS 122	soil	-
Ascodesmis sphaerospora Obrist*	FLAS 260	rat dung	-
Calyptrozyma arxii Boekhout *et al.*	CBS 354.92	human oesophagous	AJ 133432
Eleutherascus lectardii (Nicot) Arx*	FLAS 300	salty soil	-
Lamprospora sp.*	FLAS 346	soil	-
Monascella botryosa Guarro & Arx	CBS 233.85	soil	AJ 133433
Monascus purpureus Went.	ATCC 16365	-	U18356
Neurospora cassa Shear & B. O. Dodge	-	-	M13906
Pyronema domesticum (Sowerby ex Gray) Saccardo*	ATCC 14881	steamed soil	-
Saccobolus depauperatus (Berk. & Br.) Kimbrough*	FLAS 106	cow dung	-
Talaromyces flavus var. *macrosporus* Stolk & Samson	FRR 2386	-	U18354
Thelebolus sp.*	IMI 67944	dung	-

*The sequences of these strains were obtained directly from Momol & Kimbrough (1994)
ATCC= American Type Culture Collection; CBS= Centralbureau voor Schimmelcultures; FLAS= Florida Agricultural Experiment Station culture collection; FMR= Facultat de Medicina de Reus culture collection; FRR= CSIRO Food Research Laboratory; IFO= Institute of Fermentation of Osaka; IMI= International Mycological Institute, CABI; UAMH=University of Alberta Microfungus Collection and Herbarium

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Figs 1-10. *Antarctomyces psychrotrophicus*. **Fig. 1**. Ascomata initials. **Fig. 2**. Ascomata initials forming a crozier. **Fig. 3**. Cluster of asci containing the ascospores. **Fig. 4**. Free ascospores. Note the spinulose surface and the thick ascospore wall. **Figs 5-7**. *Sporothrix*-like anamoph. **Fig. 8**. View of a funicle formed at 12 ºC on PDA. **Fig. 9**. Ascus and ascospores. **Fig. 10**. Ascospore showing the spinose outer wall. Figs. 1, 2, 5-8, Bar 20 μm. Figs. 3,4, Bar 12.5 μm. Fig. 9, Bar 10 μm. Fig. 10, Bar 1 μm.

Figs 11-15. *Antarctomyces psychrotrophicus*. **Figs 11-12**. Ascomatal initials forms. **Fig. 13**. Cluster of thick-walled asci, showing young and mature ascospores inside. **Fig. 14**. Anamorph. . **Fig. 15**. Conidia of different size. Figs 11-15, Bar 15 μm.

Fig. 16. Neighbor-joining phylogenetic tree of the aligned sequences of the studied strains. Confidence limits of branches (indicated in % along the branches) were created in a bootstrap analysis using 500 trials. The scale barr represents 0.68 % sequence divergence.

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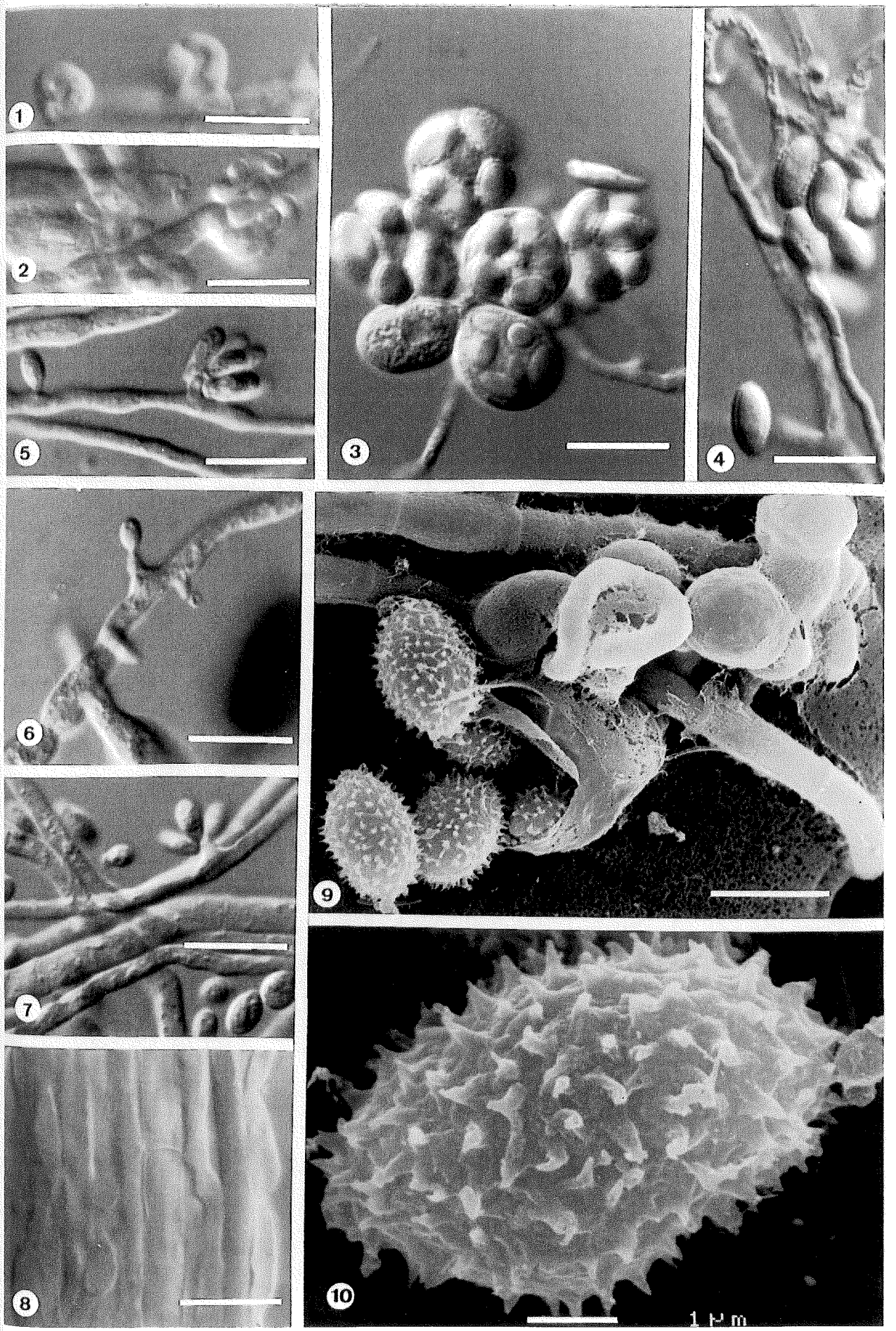

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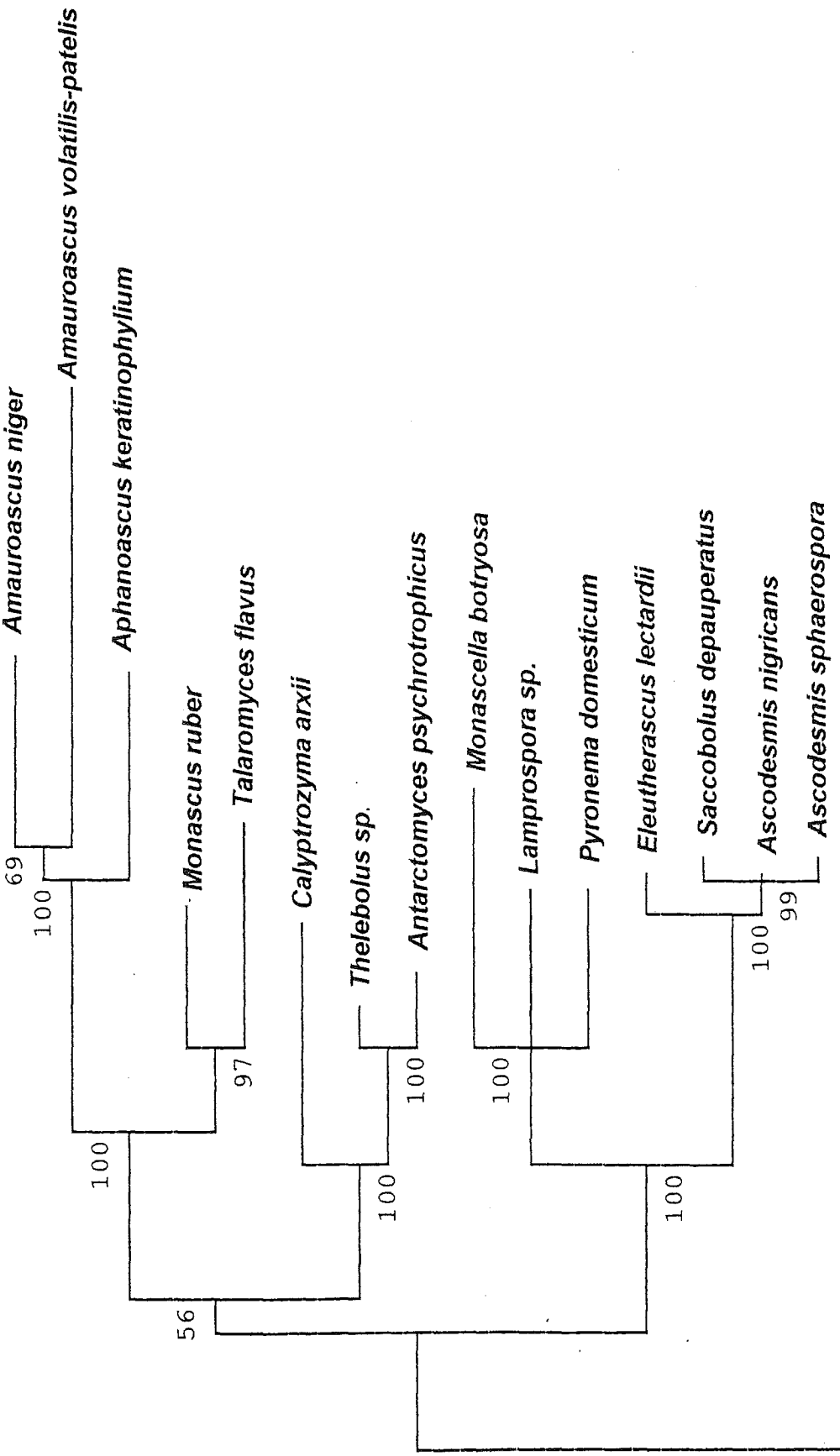

Fig. 16. Scale: each – is approximately equal to the distance of 0.0068

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1.11. Dos nuevas especies termotolerantes de *Thielavia* del suelo, y estudio molecular de la región ITS1-2 de especies representativas del género

1.11.1. A. M. Stchigel, L. Figuera, J. Cano & J. Guarro. Two new soil-borne thermotolerant species of *Thielavia* and a molecular study (ITS region) of representative species of the genus. *Mycologia* (sometido)

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Short tittle: New *Thielavia* species

Two new soil-borne thermotolerant species of *Thielavia* and a molecular study (ITS region) of representative species of the genus

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Abstract: Two new thermotolerant species of *Thielavia* isolated from Easter Island and Indian soils, respectively, are described and illustrated. *Thielavia intermedia* is characterized by large, obovate, dark brown ascospores with a terminal germ pore. *Thielavia rapa-nuiensis* is distinguished by their large, ellipsoidal to fusiform, brown ascospores with a prominent, lateral to medial germ pore. A phylogenetic study of the ITS 1-2 sequences of 18 species of *Thielavia* and *Melanocarpus thermophilus* was performed. This analysis revealed that *T. intermedia* could be the ancestor of the remaining species and that all the species tested are genetically closely related.

Key Words: Ascomycota, Chaetomiaceae, soil fungi, Sordariales, Thielaviaceae