

THREE *HAPLOTRICHUM* SPECIES RECENTLY FOUND IN CATALONIA

M. MUNTAÑOLA-CVETKOVIĆ and A. GÓMEZ-BOLEA

Dept. Biologia Vegetal, Unitat de Botànica, Fac. Biologia, Univ. Barcelona, Av. Diagonal, 645, E-08028 Barcelona

ABSTRACT. Three *Haplotrichum* species recently found in Catalonia. The basidiomycetous anamorphs *Haplotrichum capitatum* (Pers.) Link, *H. elliposporum* (Hol.-Jech.) Hol.-Jech., and *H. rubiginosum* (Fr.) Linder, recently found in Catalonia, are described and commented, and line-drawings of microscopic preparations illustrate their asexual reproductive structures. Sexual states have been not found in these collections.

Key Words: Basidiomycetes, anamorphs, *Haplotrichum*, Catalonia.

RESUM. Tres espècies d'*Haplotrichum* recentment trobades a Catalunya. Els anamorfs dels basidiomicets *Haplotrichum capitatum* (Pers.) Link, *H. elliposporum* (Hol.-Jech.) Hol.-Jech., i *H. rubiginosum* (Fr.) Linder, recentment recol·lectats a Catalunya, són descrits i comentats, i amb dibuixos amb càmera clara s'il·lustren les respectives estructures de reproducció asexual. Els estats sexuals no han estat trobats en aquestes col·leccions.

Paraules clau: Basidiomicets, anamorfs, *Haplotrichum*, Catalunya.

INTRODUCTION

The studies carried out during 1998 under the Programme on Mycological Biodiversity of Catalonia have made possible to know the existence of several interesting fungal species unrecorded until now in this country; among them, some ones belong in *Haplotrichum* Link.

Haplotrichum is the name that some authors (BREITENBACH & KRÄNZLIN, 1986; HOLUBOVÁ-JECHOVÁ, 1980; HJORSTSTAM, 1983; BOIDIN & GILLES, 1990; LANGER, 1994; TELLERÍA & MELO, 1995; FARR *et al.*, 1995) use for the anamorph state of the teleomorph *Botryobasidium* Donk (Telephoraceae), whilst *Acladium* Link is used by others (CARMICHAEL *et al.*, 1980; ELLIS, 1976; HAWKSWORTH *et al.*, 1995). Many *Haplotrichum* taxa were described or included in the today rejected Link's *Oidium* of 1809 (LINDER, 1942; HOLUBOVÁ-JECHOVÁ, 1969; ERIKSSON & RYVARDEN, 1973). *Oidium* Link 1824 being a *nom. cons.* for anamorphic Erysiphaceae, HOLUBOVÁ-JECHOVÁ (1976) made the pertinent nomenclatural changes to *Haplotrichum* and discussed the priority of *Haplotrichum* over the earlier *Acladium* Link: Fr., a name that had been used by HUGHES (1958) for the same group of lignicolous fungi. In Spain, few species have been reported in *Haplotrichum* or *Acladium* (TELLERÍA & MELO, 1994), and two of the species presented here, *H. conspersum* (Link) Linder and *H. elliposporum* (Hol.-Jech.) Hol.-Jech., are new for the mycobiota of Catalonia, whilst *H. rubiginosum* (Fr.) Linder was so far known only from one locality of this country. They are described and illustrated in this paper.

MATERIAL AND METHODS

Collections were made in Catalonia, Spain, during 1996-1997 at the sites indicated in Fig. 1, and are preserved in the BCC Myc. Herbarium. For comparisons, the following material was received in loan: from the MA-Fungi Herbarium: *H. capitatum* (Pers.) Link (1108), *H. conspersum* (Link) Hol.-Jech. (7220), and *H. rubiginosum* (Fr.) Hol.-Jech. (6688); and from the PR Herbarium: *Oidium caribense* Hol.-Jech. (670954, *typus*), and *O. elliposporum* Hol.-Jech. (670955, *typus*). Fresh material was studied by light microscopy (LM) in order to avoid any variation in size or colour of the microscopic structures introduced by drying.

DESCRIPTIONS AND REMARKS

Haplotrichum capitatum (Pers.) Link (Fig. 2).

Basionym: *Acladium capitatum* Link, 1809.

Synonyms: = *Oidium candicans* (Sacc.) Linder, 1942; = *Monilia candicans* Sacc., 1876.

Teleomorph: *Botryobasidium candicans* J. Erikss., 1958.

Colonies in nature effuse, cottony, almost white when fresh, cream-coloured when drying. Conidiophores erect, ascending, often branching and anastomosing in basal parts, hyaline to subhyaline-yellowish, smooth-walled, without clamp-connections, up to 500 μm in length, 7-9 μm in width at the base and 5,5-7 μm at the apex. Conidiogenous cells cylindrical along the distal part of the conidiophores, or distinct, ellipsoidal, vesiculose, in short chains in apical parts, often arising at right angles of the 2-3 ultimate cells of the conidiophores giving them a cross-like appearance, smooth-walled, denticulate, 25-36 \times 9-11 μm , narrower at the base; denticles conspicuous, often 3-5 on a conidiogenous cell, up to 5 μm long and 2-3 μm wide. Conidia blastic, in acropetal chains, ellipsoidal, apiculate at one or both ends, hyaline or subhyaline, 12-17 \times 8-9 μm .

MATERIAL EXAMINED: SPAIN, CATALONIA, Girona, Port de la Selva, Pineda del Molí, alt. 30 m, on a decayed carpophore of *Trichaptum fusco-violaceum* (Ehreb.: Fr.) Ryv., 11 Oct. 1998, leg. X. Llimona (BCC Myc. MC 418). - CASTILLA-LA MANCHA, Albacete, source of the river Mundo, on wood of *Pinus clusiana* Clem., 1 Oct. 1979, leg. M. Tellería (MA-Fungi 1108).

REMARKS: According to TELLERÍA & MELO (1995), *Botryobasidium candicans* J. Erikss., the teleomorph of *H. capitatum*, is widely distributed in the Iberian Peninsula, preferably on gymnosperm wood (*Abies* and *Pinus*), but infrequent. It has not been found in our material from Port de la Selva (BCC Myc. MC 418). This is the first report of *H. capitatum* on a Corioliaceae.

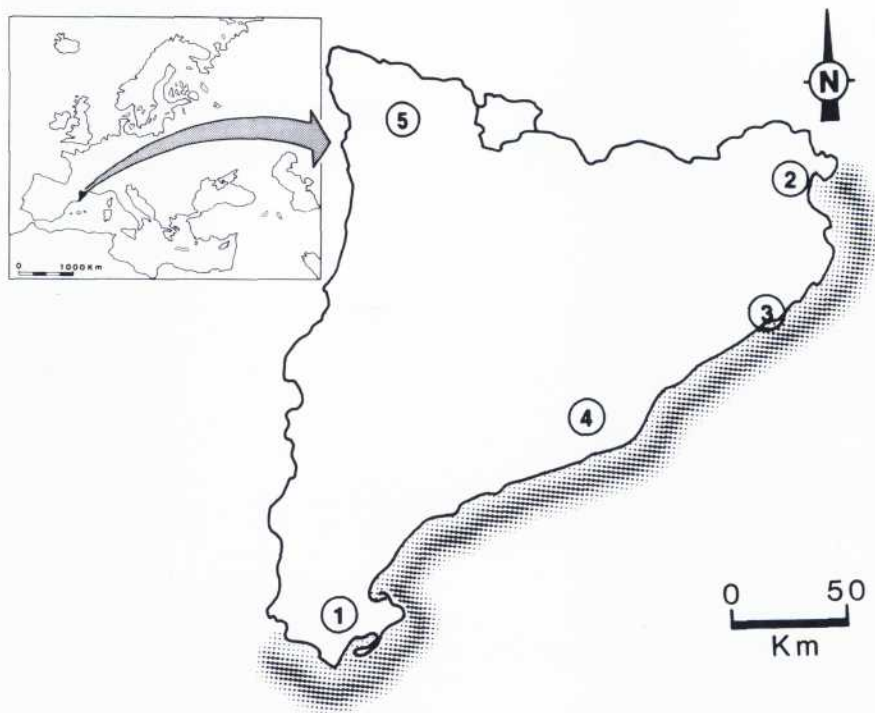


Fig. 1. Catalonia, Spain. Geographical location of the collecting sites mentioned in this paper. - 1. Tarragona, La Galera. 2. Girona, Port de la Selva. - 3. Girona, Tossa de Mar, Cala Bona. - 4. Barcelona, Baix Llobregat, Santa Maria de Cervelló. - 5. Lleida, Espot, National Park of Aigües Tortes i Sant Maurici.

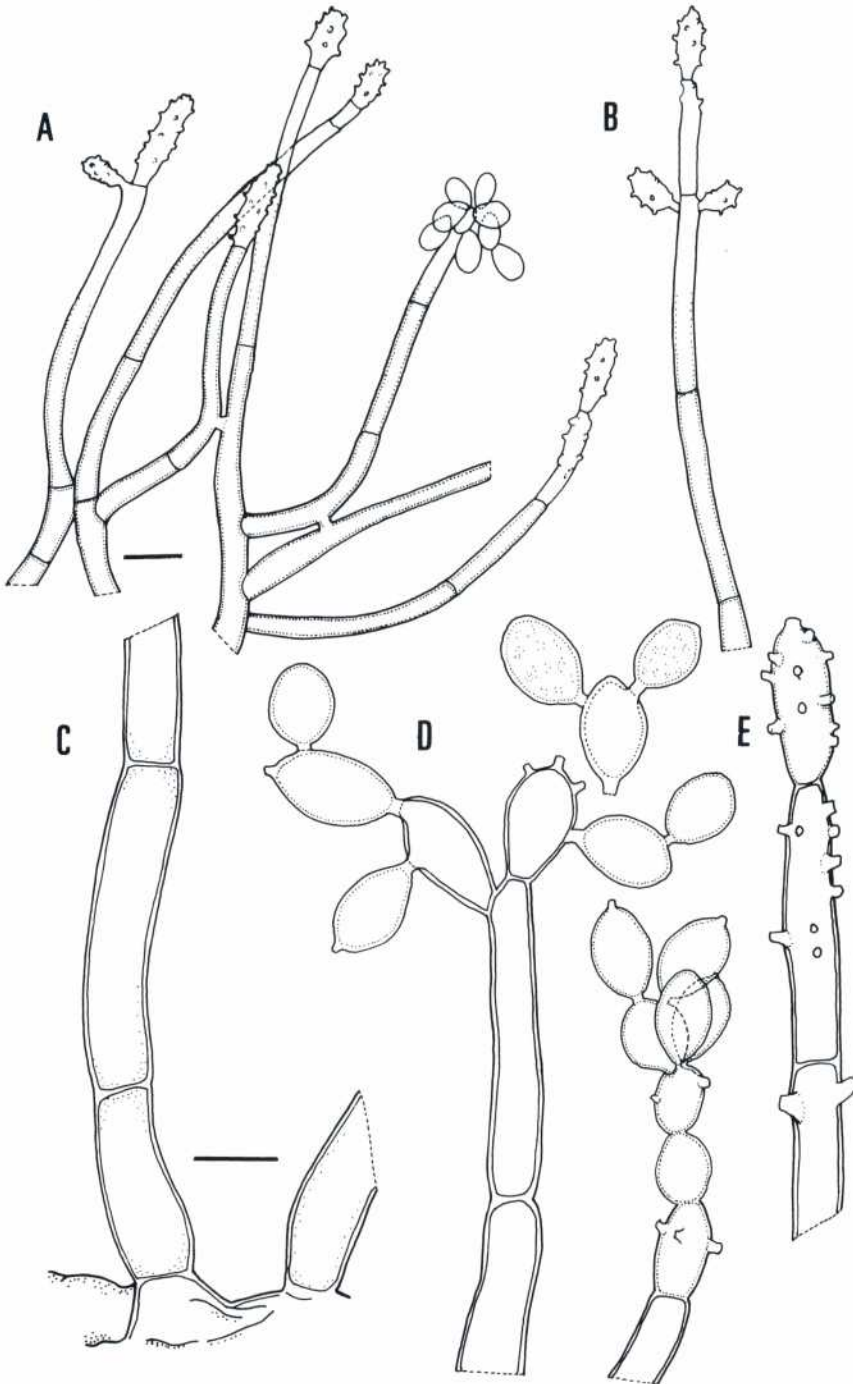


Fig. 2. *Haplotrichum capitatum*. **A**, Sparsely long-branched and anastomosing conidiophores, terminating in elongate-ellipsoidal denticulate conidiogenous cells. **B**, Vesiculous conidiogenous cells arising at the apex or at right angles of a conidiophore. **C**, Basal part of the conidiophores. **D**, conidia catenulate, occasionally bearing lateral denticles. **E**, Conspicuous denticles at the penultimate and antepenultimate cells of the conidiophores. (Bars = 10 μ m).

***Haplotrichum elliposporum* (Hol.-Jech.) Hol.-Jech. (Fig. 3).**Basionym: *Oidium elliposporum* Hol.-Jech., 1969.Teleomorph: *Botryobasidium elliposporum* Hol.-Jech., 1969.

Colonies in nature effuse, irregular, forming loose, yellowish, olivaceous or ochraceous tufts, hyphae hyaline, yellowish or olivaceous with age, branched, 5-9 μm wide, smooth-walled, septate. Conidiophores macronematous, mononematous, erect or suberect, flexuous, cylindrical, yellowish, paler toward the apex, without clamp connections, ca. 240 \times 8 μm , slightly tapering upwards to 4 μm wide, irregularly branched, rarely anastomosed, septate, 40-60 μm between septa. Conidiogenous cells usually long and subcylindrical, bearing numerous denticles mostly at the three distal cells; denticles prominent and stout, up to 6 \times 3 μm , simple or frequently branched, scattered or one close to the other and often forming clusters mainly in the distal cells. Conidia blastic, ellipsoidal or ellipsoidal-clavate, with a truncate papilla at the base, rounded at the apex, hyaline, yellowish with age, showing granular contents, thin and smooth-walled, 0-septate, (19)-22-24-(28) \times (11)-12-13,5 μm .

Material examined. SPAIN, CATALONIA, Lleida, National Parc of Aigües Tortes i St. Maurici, Refugi de pesca, alt. 1700 m (Fig. 1, site 5), on highly decayed and moist fallen dead trunk of *Abies alba* Mill., 13 Sep. 1996, leg. X. Llimona (BCC Myc. MC260). - SLOVAQUIA, Bohemoslovakia, on a dead trunk of *Abies alba*, 26 Sep. 1968, leg. V. Holubová (PR 670955, *typus*).

REMARKS. *H. elliposporum* is similar to *H. conspersum*, from which it differs by some features that HOLUBOVÁ-JECHOVÁ (1980) considered important in *Haplotrichum*: i.e. the conidiogenous cells of *H. elliposporum* are more elongate, denticles more crowded and forming conspicuous branched clusters, conidia are ellipsoidal to ellipsoidal-clavate, mostly 22-24 \times 12-13,5 μm , whilst in *H. conspersum* they are broadly ellipsoidal to subglobose: 15-18 \times 11-13 μm (BREITENBACH & KRÄNZLIN, 1986), 15-18 \times 10-13 μm (BOIDIN & GILLES, 1990), 14,65 \times 10,51 μm (LANGER, 1994), or 13-16 \times 10-12 μm (TELLERÍA & MELO, 1995).

The specimen of our collection BCC Myc. MC260 differs from typical *H. elliposporum* by the numerous, often proliferating and shortly branched conidiogenous denticles, and by the shape of some conidia, slightly constricted at the middle part. In both respects this collection bears some resemblance to *H. caribense*. It differs, however, from this species in the colonies, conidiophores and conidia colours, which are rusty brown, yellow ochraceous to ochraceous rusty in *H. caribense*, and yellowish or olivaceous in *H. elliposporum*. Moreover, both species differ each other in their distribution, *H. caribense* being known from the tropical Cuba, whilst *H. elliposporum* seems to occur mainly in colder regions. This is the first report of *H. elliposporum* for the Iberian Peninsula.

In the BCC Myc. MC260 collection the conidial structures of *H. elliposporum* were mixed with the yellowish, globose, apiculate spores, 7-8,5 μm in diam., ornamented with conspicuous rodlets up to 3,5 μm long, of the corticiaceous teleomorph *Botryobasidium isabellinum* (Fr.) Rogers (*Botryohypochnus isabellinus* (Fr.) J. Erikss.), a common fungus widely distributed throughout the Iberian Peninsula (TELLERÍA & MELO, 1995). The same collection was mixed with *Tomentella bryophila* (Pers.) Larsen.

***Haplotrichum rubiginosum* (Fr.) Hol.-Jech. (Fig. 4).**Teleomorph: *Botryobasidium robustior* Pouzar et Hol.-Jech., 1967.

Colonies in nature effuse, forming a loose, honey or ochre-coloured tomentum. Conidiophores macronematous, mononematous, erect or suberect, flexuous, subhyaline or yellowish, occasionally and irregularly branched, without clamp connections, 6,5-8 μm wide, somewhat attenuated upwards, typically terminating in an inflated conidiogenous cell. Conidiogenous cells terminal or pleurogenous, globose, ovoid, claviform or ellipsoidal, very finely verrucose, 15-40 \times 5-8 μm , bearing a variable number but usually numerous prominent, stout, separate denticles, 3-6,5 \times 2-3 μm , somewhat expanded towards the base. Conidia blastic, catenulate, ovoid, globose or subglobose, straw coloured, initially smooth and thin-walled, later golden-brownish, with somewhat thicker and very finely corrugated walls, 0-septate, (10)-13-15-(18) μm in diam.

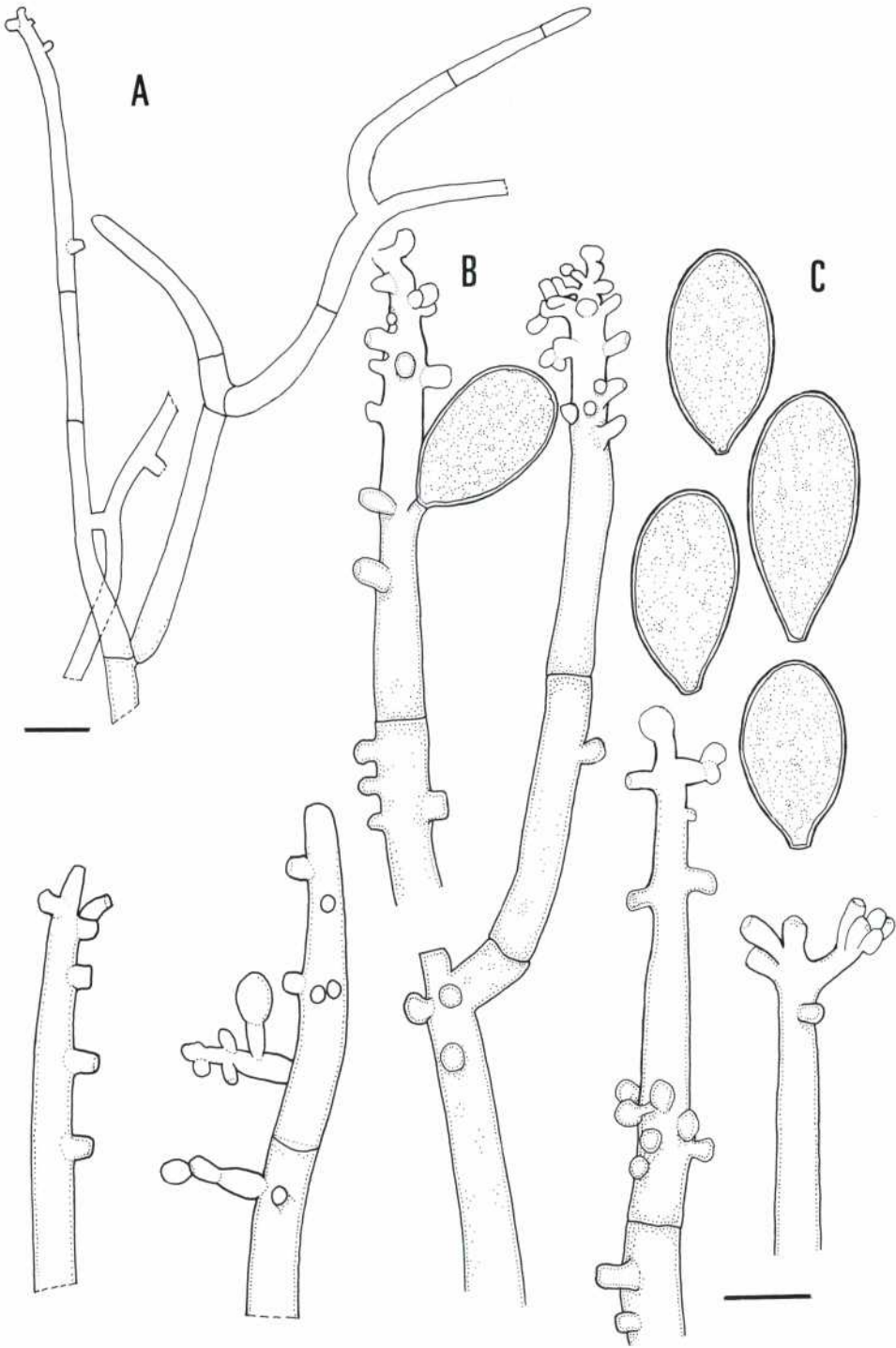


Fig. 3. *Haplotrichum ellipsosporum*. **A.** Conidiophores irregularly branched and anastomosing. **B** and **C.** Conidiophores with subcylindrical conidiogenous cells and prominent denticles disposed singly or frequently in clusters and branched. (Bars = 10 μ m).

Material examined. SPAIN, CATALONIA. Girona, Cala Bona, on a decayed stump of *Quercus suber* L., 15 Oct. 1996, leg. X. Llimona (BCC Myc. MC265). - Tarragona, La Galera, agricultural field near Les Ribes, on decayed bark of *Ceratonia siliqua* L., 21 Jan. 1997, leg. P. Hoyo (BCC Myc. MC348). - Barcelona, Santa Maria de Cervelló, Refugi dels caçadors, alt. 150 m, on bark of *Pinus halepensis* Mill., Mar. 1995, leg. X. Llimona (BCC Myc. MC391/A). - Madrid, Villaviciosa de Odón, the castle gardens, on a non identified branch, 4 Mar. 1979, leg. E. Álvarez (MA-Fungi 6688).

REMARKS. This is the first report of *H. rubiginosum* for Catalonia and the second for the Iberian Peninsula. TELLERÍA & MELO (1995) had previously identified *H. rubiginosum* in Madrid. BOIDIN & GILLES (1990) reported the collection of the teleomorph *Botryobasidium robustior* Pouzar et Jech.-Hol. in France, at Puy-de Dôme, at 850 m altitude. We have not found this teleomorph.

ACKNOWLEDGEMENTS

This work has been done under the Programme "Mycological Biodiversity of Catalonia" (Institut d'Estudis Catalans). The valuable assistance of P. Hoyo, biologist, in the laboratory work and her co-operation in the line-drawing illustrations are gratefully recognised. The curators of the MA and PR Herbaria are thanked for the loan of the specimens mentioned in the text.

REFERENCES

- BOIDIN, J. & GILLES, G. (1990). Corticiés s.l. intéressants ou nouveaux pour la France (Basidiomycotina). *Bull. Soc. Myc. Fr.*, 106: 135-177.
- BREITENBACH, J. & KRÄNZLIN, F. (1986). Champignons de Suisse. 2. Champignons sans lames. Ed. *Mykologia*, Lucerne, 412 pp.
- CARMICHAEL, J.W., KENDRICK, W.B., CONNER, I.L. & SIGLER, L. (1980). Genera of hyphomycetes. *The University of Alberta Press*, Canada, 388 pp.
- ELLIS, M.B. (1976). More Dematiaceous Hyphomycetes. *Commonwealth Mycological Institute*, Kew, 507 pp.
- ERIKSSON, J. & RYVARDEN, L. (1973). The Corticiaceae of North Europe, 2: 58-286. *Universit. tryknings*. Oslo.
- FARR, D.F., BILLS, G.F., CHAMURIS, G.P. & ROSSMAN, A.Y. (1995). Fungi on plants and plant products in the United States. 2nd ed. *The American Phytopathological Society*, St. Paul, Minnesota, 1252 pp.
- HAWKSWORTH, D.L., KIRK, P.M., SUTTON, B.C. & PEGLER, D.N. (1995). Ainsworth & Bisby's Dictionary of the Fungi. 8th ed. CAB Intn., Cambridge, 616 pp.
- HJORSTSTAM, K. (1983). Studies in tropical Corticiaceae (Basidiomycetes). V. *Mycotaxon*, 17: 555-572 (562).
- HOLUBOVÁ-JECHOVÁ, V. (1969). New species of the genus *Oidium* Link ex Fr. emend. Linder. *Ceská Mykol.*, 23: 211-214.
- HOLUBOVÁ-JECHOVÁ, V. (1976). *Haplotrichum* Link instead of *Oidium* Link, a necessary nomenclatural change. *Ceská Mykol.*, 30: 3-4.
- HOLUBOVÁ-JECHOVÁ, V. (1980). Revision and subdivision of *Haplotrichum*-anamorphs of *Botryobasidium*. *Mycotaxon*, 12: 122-130.
- HUGHES, S.J. (1958). Revisions Hyphomycetum aliquot cum appendice de nominibus rejiciendis. *Can. J. Bot.*, 36: 727-836.
- LANGER, G. (1994). Die Gattung *Botryobasidium* Donk (Corticiaceae, Basidiomycetes). *Bibliotheca Mycologica*, 158. J. Cramer, Berlin, Stuttgart, 459 pp.
- LINDER, D.H. (1942). A contribution towards a monograph of the genus *Oidium* (Fungi Imperfecti). *Lloydia*, 5: 165-207.
- TELLERÍA, M.T. & MELO, I. (1995). Aphylophorales resupinate non poroid, I. *Acanthobasidium* - *Cystostereum*. *Flora Mycologica Iberica*. 1. J. Cramer, Madrid, Berlin, Stuttgart, 223 pp.

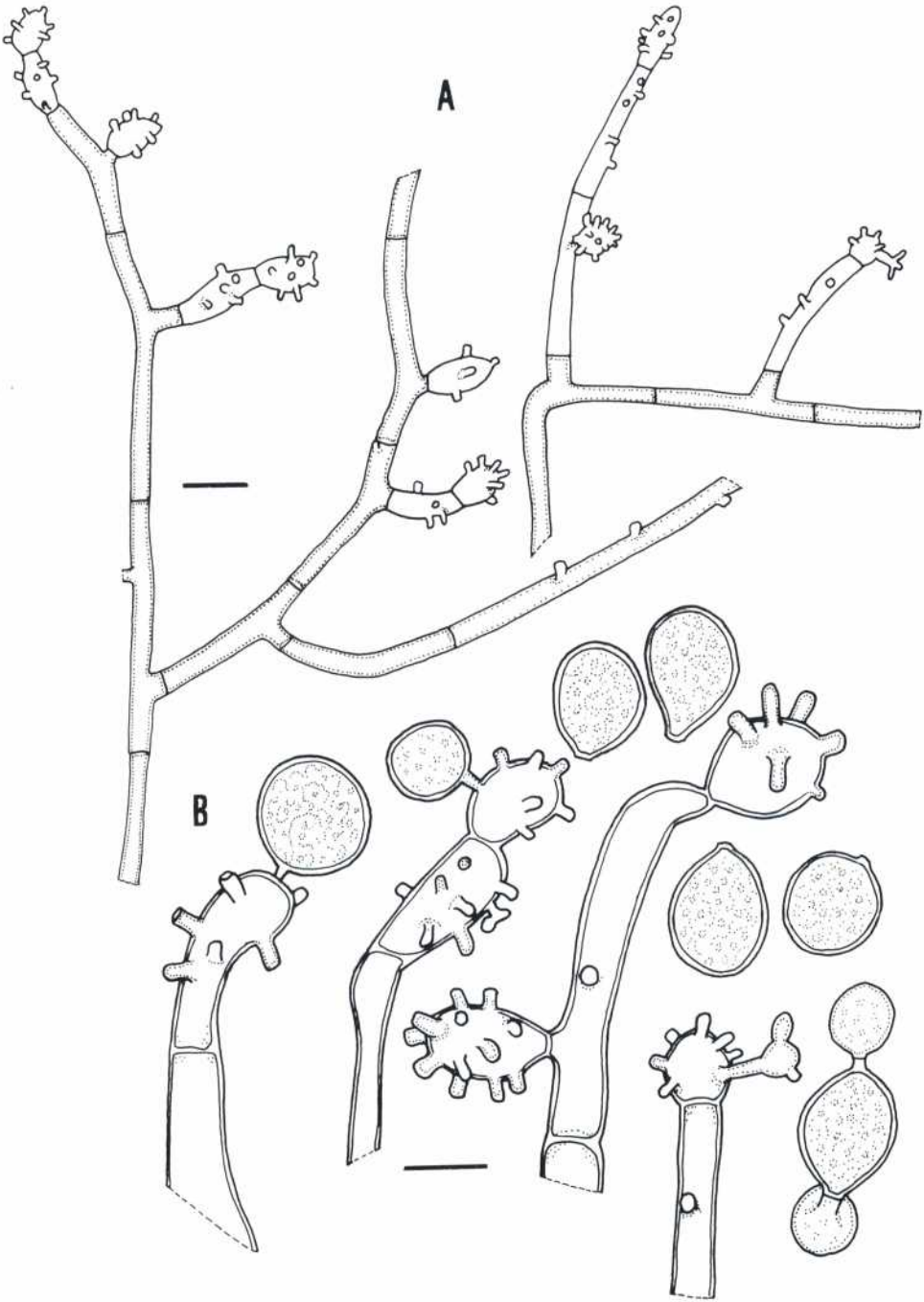


Fig. 4. *Haplotrichum rubiginosum*. A, Conidiophores. B, Conidiogenous cells and conidia. (Bars = 10 μ m).



Fructifications of *Haplotrichum rubiginosum* in nature (BCC Myc. MC265).