MYCOTAXON

Volume LXVII, pp. 427-432 April-June 1998

CONTRIBUTION TO THE STUDY OF FIMICOLOUS FUNGI. XXVII. A NEW CHAETOMIDIUM FROM ITALY WITH A CEPHALOTHECOID PERIDIUM

Doveri F.[1], Guarro J.[2], Cacialli G.[3] & Caroti V.[4]

[1]Via Baciocchi 9, 57126 Livorno, Italia. [2]Unitat de Microbiologia, Facultat de Medicina, Universitat Rovira i Virgili, 43201 Reus, España. [3]Via Aloisi 3, 57128 Livorno, Italia. [4]Via Zola 51, 57122 Livorno, Italia.

ABSTRACT

A new species of ***Chaetomidium*** with a cephalothecoid peridium, obtained in culture on bovine dung in Italy, is described and illustrated. A dichotomous key to the ***Chaetomidium*** species with cephalothecoid peridia is provided.

Key words: Chaetomiaceae, ***Chaetomidium***, ***Thielavia***, cephalothecoid peridium; Ascomycota.

INTRODUCTION

At the recent meeting of the A.M.B. (Bresadola Mycological Association) scientific committee, held in Marola-Reggio Emilia (Italy), an interesting fungal specimen was obtained in a moist chamber on bovine dung collected in the late spring of 1997. After its microscopic examination, we realized that it was a typical representative of the **Chaetomiaceae** Winter (v. Arx *et al.*, 1988). The diagnostic characters are the globose, hairy, non-ostiolate ascomata, the ephemeral, pedunculate, very thin-walled asci clustered at the base of the ascoma, and the one-celled and pigmented ascospores devoid of gelatinous appendages. The presence of globose, non-ostiolate ascomata with a cephalothecoid peridium is typical of ***Chaetomidium*** (Zopf) Sacc. This genus was considered by von Arx (1975) as the "non-ostiolate counterpart" of ***Chaetomium*** Kunze, and differing from ***Thielavia*** Zopf in the hairy rather than smooth ascomata and in the pseudoparenchymatous rather than epidermoidal peridial texture (v. Arx *et al.*, 1988). Our species, especially because of the size of its ascospores, is clearly different from the others in ***Chaetomidium*** and consequently is described here as new.

DESCRIPTION AND DISCUSSION

Chaetomidium megasporum Doveri, Guarro, Cacialli et Caroti, *spec. nov.* (Figs. 1-3)
Etym: from the Greek = "with large spores"

Ascomata globosa, 250-300 µm crassa, fusco-brunnea, membranacea, omnino pilosa, ex fissuris discedentia. Peridium cephalothecoideum, hyphis cylindratis atque sinuosis instructum. Pili brunnei, sinuosi, usque ad 500 µm longi et ultra, brunneopallentes, crasse verrucosi. Asci octospori, clavati, longicaudati, 100-150 x 25-30 µm, evanescentes. Ascosporae 19-21.5 x 11-13 µm, ellipsoideae vel ovatae, fusco-ravidae, uniporosae, spisso- atque glabrotunicatae. Anamorphosis ignota.

Holotypus: MUCL 40586 ex fimo vaccino, Reggio Emilia, Italy, leg. F. Doveri, V-1997. Isotypi CLSM 02397, FMR 6230.

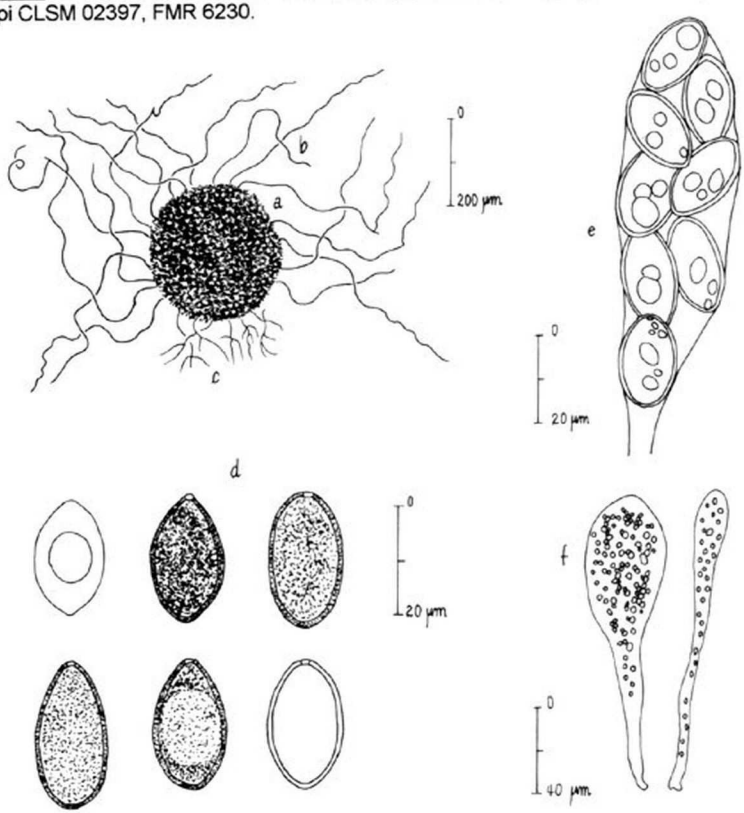


Fig. 1. a) ascoma. b) hairs. c) rhizoids. d) ascospores. e) ascospore arrangement inside the ascus. f) young asci.

Ascomata globose, 250-300 μm in diam, dark brown, membranous, covered with wavy hairs, dehiscent by splitting. Peridium cephalothecoid, two-layered: 1) inner layer with hyaline, 5-10 μm diam, thin-walled polyhedral cells; 2) outer layer of texture epidermoidea, made up of very wavy, thick-walled, dark-brown, 2-3 μm diam hyphae, which in surface view appear radiate inside penta- to hexagonal, 30-50 μm diam plates. From the base of the perithecium arise many dark-brown, 2-4 μm diam, septate, ramified, thick-walled rhizoids. Hairs arising from the outer intercellular spaces, longer than 500 μm, 2-4 μm diam, numerous, wavy, evenly septate, usually unbranched, slightly enlarged at the base, thin-walled (<1μm), light brown, paling distally, warted, rounded at the apex, sometimes

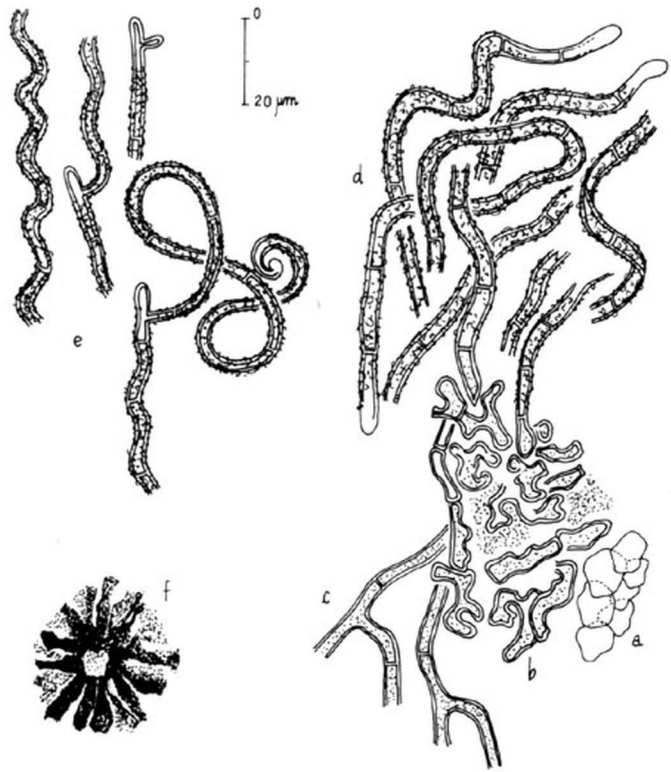


Fig. 2. a) inner layer of peridium. b) outer layer of peridium. c) rhizoids. d) hairs. e) apex of hairs. f) detail of peridium in surface view.

branched at right angles near the apex and the branches occasionally aborting and appearing to be a short diverticulum, or forming a very wavy or even loosely coiled additional end (fig. 2e). Asci 8-spored clavate, 100-150 x 25-30 μm, non-amyloid, unitunicate, long stipitate, evanescent. Paraphyses not observed. Ascospores biseriate, 19-21.5 x 11-13 μm, one-celled, hyaline when young, dark grey when mature, ellipsoidal to broadly fusiform, smooth, thick-walled, with an apical, slightly flattened germ pore ca. 1.5 μm diam. **Anamorph** not observed.

Material examined: MUCL 40586 on bovine dung (*Bos taurus*), Reggio Emilia, Marola 800 m, Italy, F. Doveri, May 1997. ***Chaetomidium khodense***: FMR 3688, cow dung, Wadi Hina, Dhofar Province, Sultanate of Oman, 20 Oct., 1989, A. E. ElShafie. ***Chaetomidium cephalothecoides***: strain ex type IMI 180791, on mouse dung, San Bernardino, California, USA, 2 Jan., 1970, G. L. Benny; FMR 2437, on sheep dung, Carrascoy Hill, Murcia, Spain, 12 March, 1988, M. Valldosera. ***Chaetomidium arxii***: strain ex type, ATCC 38819, on kangaroo-rat dung, San Bernardino, California, USA, 29 July, 1974, G.L. Benny.

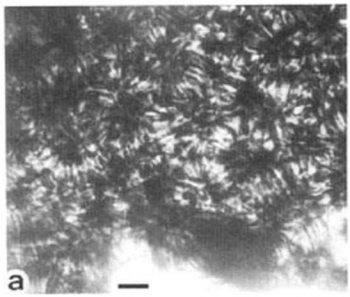
The main features of ***C. megasporum*** are its cephalothecoid ascomatal peridium, the large asci and ascospores, as well as some peculiarities of the hairs, which appear especially wavy and warted and sometimes with wavy or even coiled end branches at right angles. Such a combination of characters have never been observed in other ***Chaetomidium*** spp. and, in our opinion, they are sufficient for proposing a new species. Only three cephalothecoid ***Chaetomidium*** species have been recognized so far, each of them easily distinguishable from ***C. megasporum*** on the basis of the following features: In ***C. cephalothecoides*** (Malloch & Benny) Arx (Malloch & Benny, 1973; Valldosera & Guarro, 1992) and in ***C. khodense*** Cano, Guarro et Elshafie (1993) the ascospores and asci are noticeably smaller. In both these species the hairs (usually very long and flexuous) have a structure similar to that of our species, but differ in the smooth or at most slightly roughened walls and in the absence of branches or diverticula at right angles. Moreover in ***C. khodense*** the ascospores have a subapical germ pore and the outer peridial hyphae are irregularly placed inside the plates rather than arranged in a petaloid or radiate pattern. ***Chaetomidium arxii*** Benny (1980), a species described also by Lorenzo (1993), differs, as well as in the noticeably smaller spores, with the germ pore bounded by a dark ring, and the short, straight and usually smooth hairs.

KEY TO THE SPECIES OF *CHAETOMIDIUM* WITH A CEPHALOTHECOID PERIDIUM

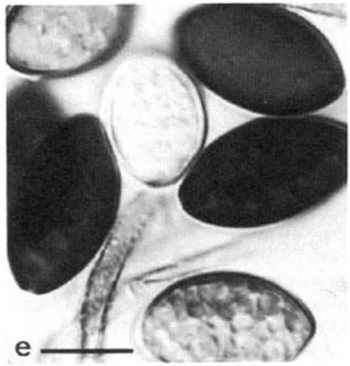
1a.- Hairs straight and less than 400 μm long. Ascospores 13.9-15.2 x 10.7-11.4 μm, with a dark ring around the germ pore ..... ***C. arxii***

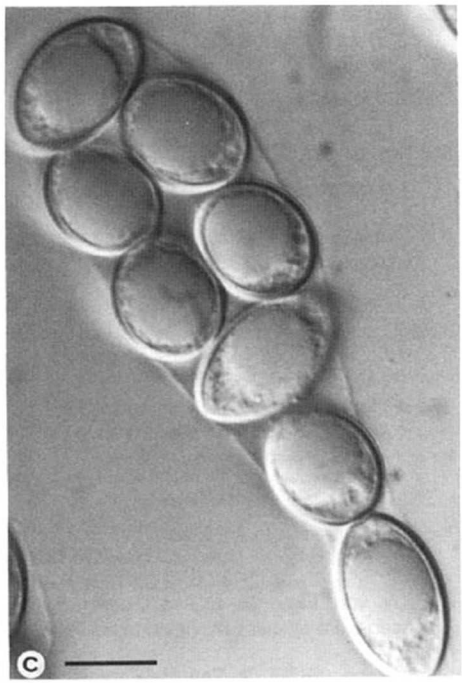
1b.- Hairs flexuous and longer than 500 μm. Ascospores without a dark ring 2

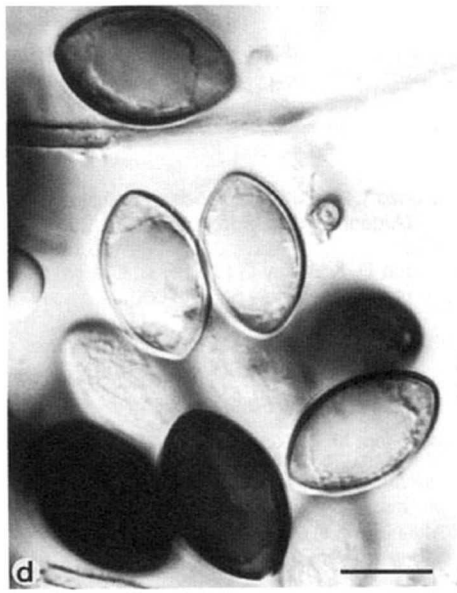
Fig. 3. a) peridium in surface view. b) hairs. c) ascus. d,e) ascospores.


a


b


e


c


d

2a.- Hairs coarsely warted, sometimes with end branches at right angles. Ascospores 19-21.5 x 11-13 µm ..... ***C. megasporum***

2b.- Hairs smooth or slightly roughened, usually unbranched. Ascospores smaller (11-15.5 µm long) 3

3a.- Outer peridial hyphae with a petaloid arrangement. Hairs often circinate at the apex. Ascospores 12-15.5 x 8-10.5 µm ..... ***C. cephalothecoides***

3b.- Outer peridial hyphae irregularly arranged. Hairs non-circinate but sometimes coiled. Ascospores 11-13 x 6.5-7 µm ..... ***C. khodense***

ACKNOWLEDGMENTS

The authors are particularly indebted to Mr. Ugo Papallo for the revision of the English text and to Dr. E. Descals (Inst. Mediterrani d'Estudis Avançats de les Balears C.S.I.C. / U.I.B.) for serving as pre-submission reviewer.

REFERENCES

Arx J.A. von, Figueras, M.J. & Guarro, J. (1988). Sordariaceous Ascomycetes without ascospore ejaculation. Beihefte zur Nova Hedwigia 94: 1-104.

Arx J.A. von, (1975). On ***Thielavia*** and some similar genera of Ascomycetes. Stud. Mycol. 8: 1-29.

Benny G. L., (1980). A second species of ***Chaetomidium*** with cephalothecoid peridium wall. Mycologia 72: 832-836.

Cano, J., Guarro J. & ElShafie A.E., (1993). A new ***Chaetomidium*** from Oman. Mycotaxon 49: 399-403.

Lorenzo L.E., (1993). Especies coprófilas de la familia Chaetomiaceae en la Patagonia (Argentina). Bol. Soc. Argent. Bot. 29 (3-4): 159-172.

Malloch D. & Benny G.L., (1973). California Ascomycetes: four new species and a new record. Mycologia 65: 648-660.

Valldosera M., (1991). Contribución al estudio de los hongos coprófilos - Ascomycotina - en España. Unpublished Ph. D Thesis, Universitat Autonoma de Barcelona, Barcelona, Spain. 695 pp.

Valldosera M. & Guarro J., (1992). Estudios sobre hongos coprófilos aislados en España. XVII. Ascomycotina. Bol. Soc. Micol. Madrid 17: 19-37.