

Taxonomic Study on Soil-borne Ascomycetes from Iraq

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Abstract *Ascotricha bosei*, *Lasiobolidium orbiculoides* and *Myxotrichum stipitatum*, isolated from soil in the date palm plantations near Basrah, Iraq, are described as new records. *A. bosei* is characterized by small ascomata, genicular terminal hairs and small discoid ascospores. *L. orbiculoides* is characterized by ascomata with wavy or irregularly coiled hairs, cylindrical asci and globose to subglobose ascospores. *M. stipitatum* is characterized by ascomata with rigid appendages, long stipitate asci and fusiform ascospores.

Key words: *Ascotricha bosei*, *Lasiobolidium orbiculoides*, *Myxotrichum stipitatum*, Ascomycetes, soil-borne fungi, Iraq, taxonomy.

During the course of a mycological survey on Iraqi soil in 1982-1986 (Maebayashi et al., 1984; Udagawa et al., 1985; Horie et al., 1990), three noteworthy fungi were isolated from soil of the date palm plantations near Basrah. These three which could not be referred to any of the previously recorded Ascomycetes from Iraq are described in this paper. Cultures and dried specimens of the species described below have been preserved at the Herbarium, Natural History Museum and Institute, Chiba (CBM).

Ascotricha bosei D. Hawksworth (Figs. 1, 4, 5)

Ascotricha bosei D. Hawksworth, CMI Mycol. Pap. (126): 12 (1971).

Anamorph. *Dicyna* sp.

Colonies on oatmeal agar growing rapidly at 37 °C, more or less floccose, consisting of a thin basal felt, raised up to 2 mm high at the center, brownish gray; ascomata abundantly produced, overgrown with conidial structures; reverse light orange.

Ascomata superficial, scattered on the mycelial felt, often intermixed with conidiophores, ostiolate, dark brown to black, pyriform, base globose, 75-95 µm diam; neck short cylindrical, 12-30 x 25-32 µm; terminal hairs more or less erect, rigid, geniculate, septate, dark brown to black, simple or branched a few times, 100-160 x 2-4 µm near the base, smooth and thick-walled, gradually tapering to bluntly rounded or slender

tip; short sterile hyaline branches clavate, 5-10 x 2.5-4 µm; lateral hairs similar, scattered; peridium dark olivaceous brown to dark brown, thin, textura epidermoidea. Asci 8-spored, cylindrical, 42-52 x 8-9 µm, rounded above, without apical structure, short-stipitate, evanescent at maturity; paraphyses hyaline, filiform, septate, unbranched, ca 3 µm diam, evanescent. Ascospores obliquely uniseriate, pale olivaceous brown to dark brown, discoid, ovoid in face view, 6.5-8 x 5-7 x 4-4.5 µm, with an equatorial germ slit.

Mycelium composed of hyaline to dark olivaceous brown, septate, branched, smooth to roughened, 1-4 µm diam hyphae; often forming a bundle. Conidiophores simple or sparsely branched, septate, erect from aerial hyphae as a lateral branch, straight and often pale brown to dark brown below, but hyaline to pale brown apically, proliferating to geniculate or wavy conidiogenous portion, smooth-walled, 18-40 x 2-2.5 µm. Conidiogenous cells polyblastic, integrated, terminal or discrete, short cylindrical. Conidia dry, acropleurogenous, simple, hyaline to pale fuscous, subglobose to pyriform, 4-6 x 3.5-5.5 µm, with walls smooth or very finely roughened.

Colonies on potato-carrot agar at 37 °C growing rapidly, thin, slightly floccose, brownish gray, zonate; ascomata and conidia produced abundantly; reverse uncolored.

Colonies on cellulose agar growing rather restrictedly, similar to those on potato-carrot agar.

At 25 °C, growth is slow, and ascomata and

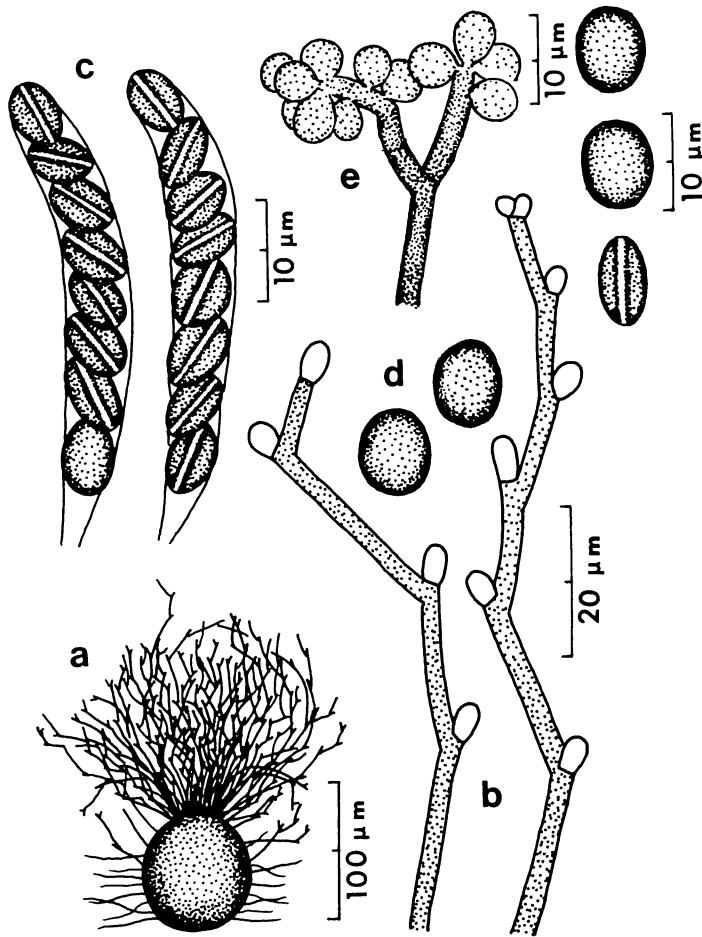


Fig. 1. *Ascotricha bosei*. a, ascoma. b, terminal hairs. c, asci. d, ascospores. e, conidial structures.

conidia are developed late.

Isolation. In culture from cultivated soil at the date palm plantation, near Basrah, Iraq, July 1983, isolated by Y. Horie, CBM-FA-0025.

Remarks. The small ascomata, geniculate terminal hairs, small discoid ascospores and almost smooth conidia are diagnostic for this species. It is similar to *A. chartarum* Berk. and *A. lusitanica* R. Kenneth in some morphological characteristics (Hawksworth, 1971), but the latter two differ from this species in producing larger ascospores and conidia (viz. ascospores of *A. chartarum* are 7-9 x 7-8 µm; *A. lusitanica*, 8-9.5 x 3.5-6 µm).

***Lasiobolidium orbiculoides* Malloch et Benny**
(Figs, 2, 6, 7)

Lasiobolidium orbiculoides Malloch et Benny, Mycologia 65 : 655 (1973).

Colonies on oatmeal agar at 25 °C spreading

broadly, floccose, consisting of a thin basal felt, yellowish brown; ascomata produced abundantly; reverse brownish gray.

Ascomata superficial, light brown, subglobose or somewhat irregular-shaped, non-ostiolate, 300-530 µm diam, roughened due to the projecting peridial elements, with long hairs; ascoma hairs arising from the outer layer of peridial cells, flexuous to wavy or irregularly coiled, up to 2 mm or more long, 5.5-8 µm wide, hyaline to light yellow or light yellowish brown, remotely septate, smooth and thick-walled, unbranched, broadly rounded at the tip; peridium composed of an irregular tuberculate tissue in surface view; peridial cells globose to angular, 6-16 x 6-12 µm, pale yellowish brown. Asci 8-spored, borne directly from the ascogenous hyphae, without croziers, cylindrical, often curved or contorted, 70-92 x 10-14 µm, without apical structure, short- or non-

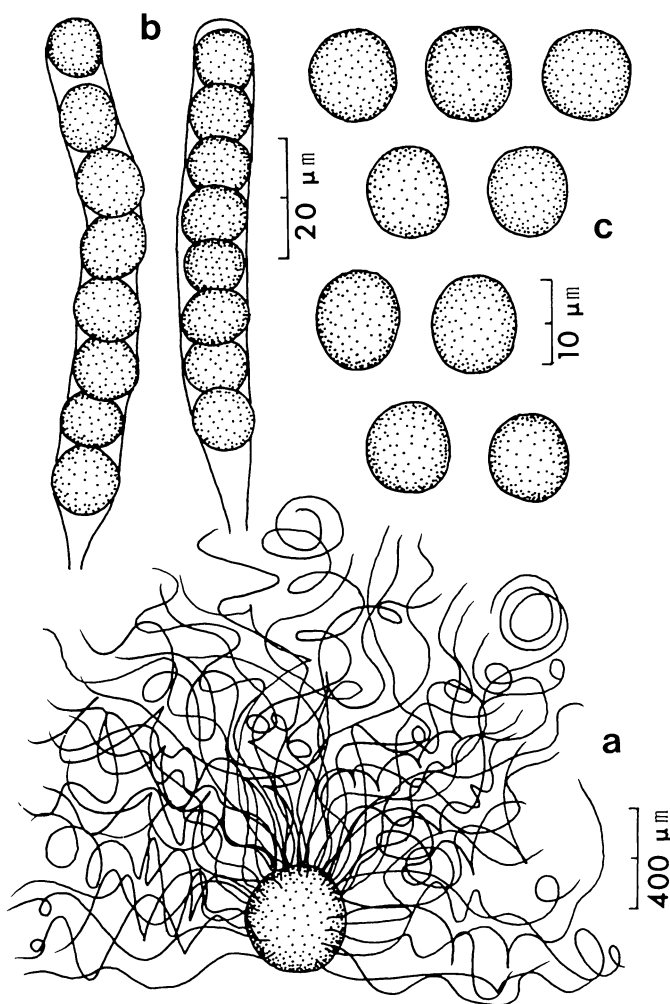


Fig. 2. *Lasiobolidium orbiculoides*. a, ascoma. b, asci. c, ascospores.

stipitate, evanescent at maturity; paraphyses filiform, often branched, 3-5 μm diam, hyaline, septate. Ascospores uniseriate, hyaline, oblate, globose to subglobose in face view, (9-)10-13 x (8-)9-11 μm , with a thin gelatinous sheath, smooth and thick-walled.

Mycelium composed of hyaline to straw-colored, branched, remotely septate, smooth or finely roughened, thin-walled but thick-walled in age, 2-8 μm wide hyphae. Anamorph lacking.

Colonies on potato-carrot agar spreading broadly, floccose, with an arachnoid margin; ascomata produced abundantly as brownish black masses; reverse almost uncolored.

At 37 $^{\circ}\text{C}$, growth is nil.

Isolation. In culture from cultivated soil at the date palm plantation, near Basrah, Iraq, July 1983,

isolated by Y. Horie, CBM-FA-0271.

Remarks. The combination of wavy or irregularly coiled ascoma hairs, cylindrical asci and uniseriate, globose to subglobose ascospores clearly separates *L. orbiculoides* from all other described species of *Lasiobolidium* (Malloch and Cain, 1971; Malloch and Benny, 1973; Locquin-Linard, 1983). Among members of the genus, this is the first record as a component organism of the soil mycoflora.

***Myxotrichum stipitatum* (Lindfors)**

Orr et Kuehn

(Figs. 3, 8, 9)

Myxotrichum stipitatum (Lindfors) Orr et Kuehn, Can. J. Bot. 41 : 1471 (1963).

Gymnoascus stipitatus Lingfors, Sv. Bot. Tidskr.

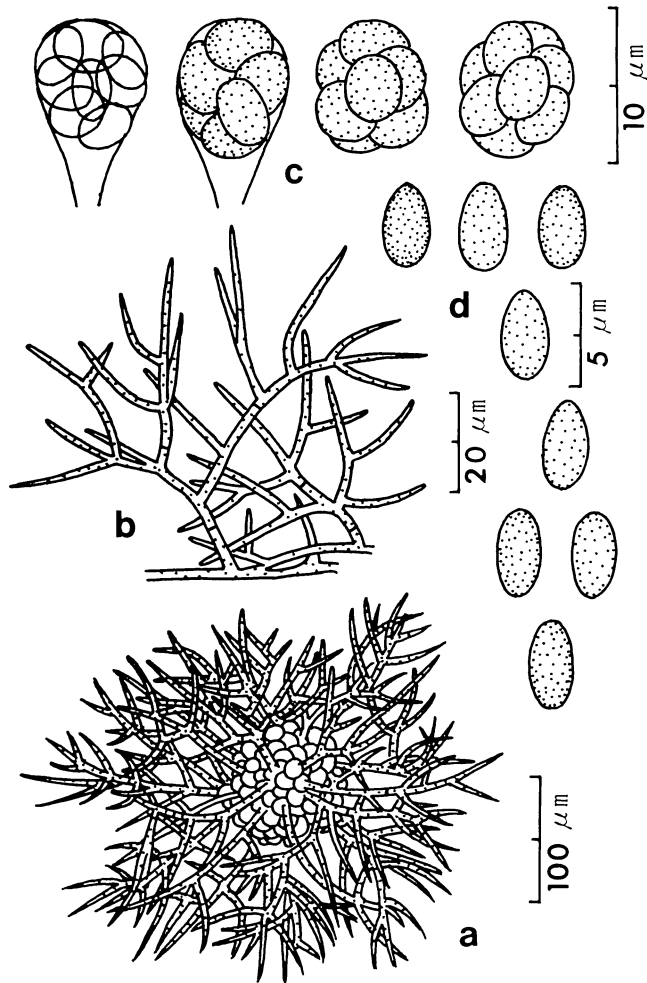


Fig. 3. *Myxotrichum stipitatum*. a, ascoma. b, appendages. c, asci. d, ascospores.

14 : 270 (1920).

Colonies on potato-carrot agar at 25 °C growing restrictedly, plane, consisting of a thin basal felt, floccose, olivaceous gray; ascomata produced abundantly, covered with aerial hyphae; reverse grayish yellow.

Asomata superficial, scattered, grayish black, non-ostiolate, globose to subglobose, 65–150 µm diam, excluding appendages; peridial hyphae pale brown to dark brown, smooth, thick-walled, septate, 2–3 µm diam, branching frequently at wide angles, with appendages extending radially; appendages rigid, dark brown to brownish black, straight or bent, 60–120 µm long, septate, smooth, becoming paler in color toward the apex, branched only on lower portion with short, truncate or stubby, less than 35 µm long, deflexed laterals,

often terminating in a cluster of hyaline knobs or short branchlets; apices fragile, hyaline and acuminate. Asci 8-spored, hyaline, globose to subglobose, stipitate, 6–8 µm diam, up to 20 µm long including stipes, evanescent. Ascospores hyaline to pale yellow, fusiform, 4–5 x 2–3 µm, with faint longitudinal striae (under SEM).

Mycelium composed of hyaline, branched, septate, thin and smooth-walled, 1–3 µm wide hyphae; forming a bundle. Anamorph absent.

Colonies on oatmeal agar at 25 °C growing more rapidly than potato-carrot agar, floccose, zonate, olivaceous brown to grayish yellow; ascomata produced abundantly; exudate prominent, pale yellow; reverse and surrounding agar grayish orange.

Colonies on cellulose agar at 25 °C growing

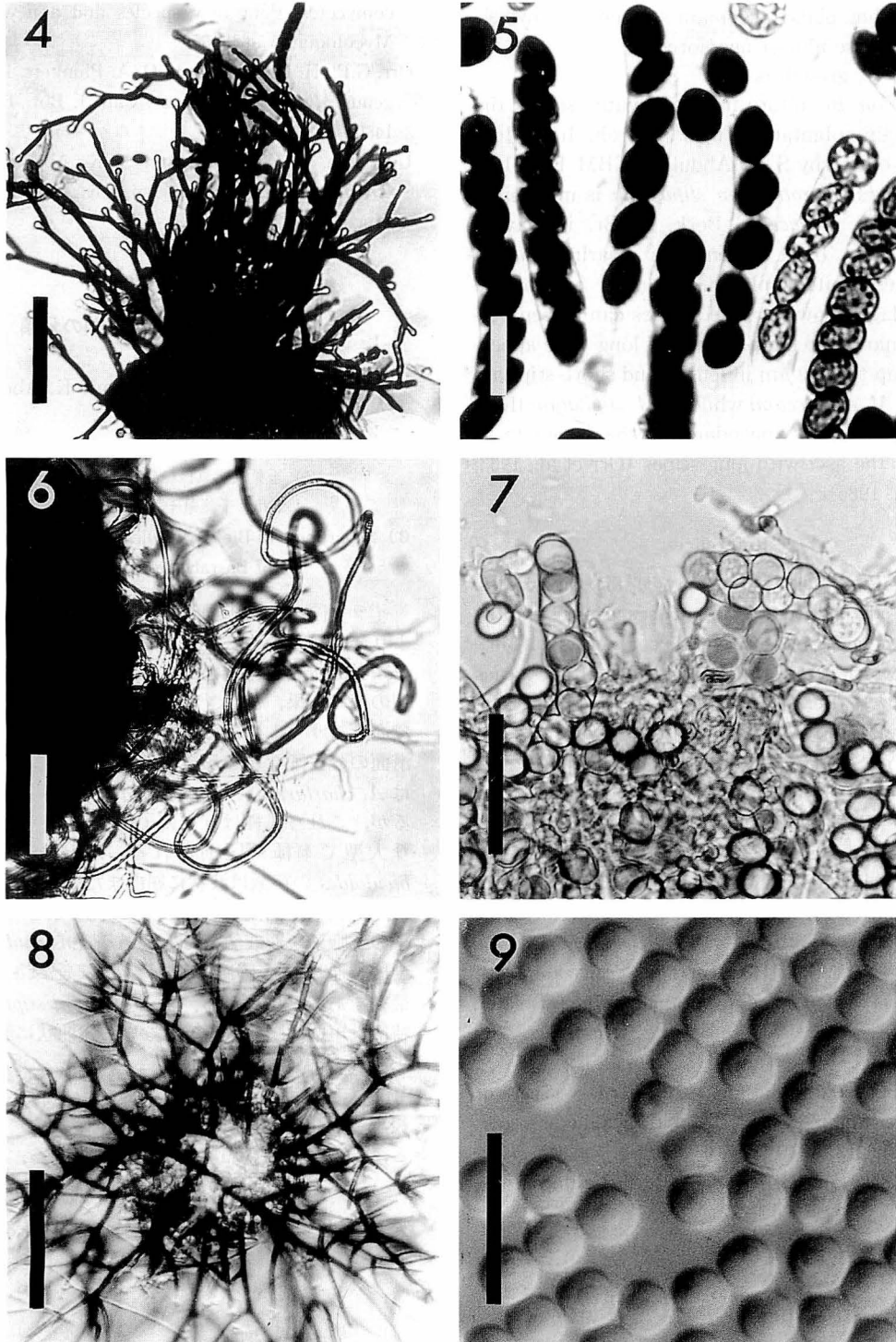


Fig. 4. *Ascotricha bosei*, terminal hairs (scale 50 μm). **Fig. 5.** *Ascotricha bosei*, asci and ascospores (scale 10 μm). **Fig. 6.** *Lasiobolidium orbiculoides*, ascoma (scale 100 μm). **Fig. 7.** *Lasiobolidium orbiculoides*, asci and ascospores (scale 40 μm). **Fig. 8.** *Myxotrichum stipitatum*, ascoma (scale 50 μm). **Fig. 9.** *Myxotrichum stipitatum*, ascospores (scale 10 μm).

slowly, thin, plane, ascomata scattered, brownish gray; reverse almost uncolored.

At 37°C, growth is nil.

Isolation. In culture from cultivated soil at the date palm plantation, near Basrah, Iraq, July 1983, isolated by S. K. Abdullah, CBM-FA-0195.

Remarks. *Myxotrichum stipitatum* is most similar to *M. ochraceum* Berk. et Br. in having straight or bent appendages bearing lateral branches limited only in the lower half of the appendage. However, the species can be separated primarily by the presence of long-type appendages up to 1650 μm in length and short-stipitate asci in *M. ochraceum*, while in *M. stipitatum* there are always short appendages in the ascomata as well as the asci with long stipes (Orr *et al.*, 1963; Currah, 1985).

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イラク産土壌子の菌類の分類

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イラク国バスラ市周辺にあるナツメヤシ畑の土壌より分離例の極めて少ない子の菌類3種を分離し分類学的研究を行った。*Ascotricha bosei*の特徴は小型の子のう果、じぐざぐ型に屈曲した頂毛、円盤状で発芽スリットのある小型の子のう胞子、ほとんど滑面の分生子などを形成することである。類似菌には *A. chartarum*, *A. lusitanica* などが報告されているが、これら二種はともに子のう胞子、分生子がより大型で本種と区別される。*Lasiobolidium orbiculooides*の特徴は波状に屈曲または不規則なコイル状の付属毛、円筒形の子のうと単列で比較的大型の子のう胞子を形成することである。*Lasiobolidium*の全種を通じて、土壌のフロラとして記録されたのは最初であると思われる。*Myxotrichum stipitatum*の特徴は短い付属毛が直線状ないし屈曲状に形成され、子のうの柄はきわめて長いことである。近縁の種としては、*M. ochraceum*が知られているが、付属毛が長短2種類あり、長い付属毛は1650 μm に達すること、子のうの柄が短い点で本種と異なる。