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FOVEOSTROMA SALVADORAE SP. NOV., FROM PAKISTAN

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Abstract

A new species *Foveostroma salvadorae* on *Salvadora oleoides* is described, illustrated and compared with related taxa.

Introduction

In a continuing revision of Coelomycetes from Pakistan and Karachi in particular (Abbas & Sutton, 1988a, 1988b; Abbas, Sutton & Ghaffar, 1998, 1999a, 1999b, 2000a, 2000b, 2000c; Muthumary, Abbas & Sutton, 1986; Sutton & Abbas, 1986; Sutton, Ghaffar & Abbas, 1972), a specimen of *Salvadora oleoides* having a species with falcate conidia, tentatively placed in *Cryptosporium* Künze in IMI herbarium posed interesting taxonomic problems. These mainly concerned the interpretation of conidiomatal structure and possible relationships with a teleomorphic state. The fungus is recognizable under the dissecting microscope by the hyaline to pale yellow appearance of the conidial masses. These are formed on comparatively large dark brown to black eustromatic structures which are semi-immersed in the host substratum. Vertical median sections show the stromata to consist of a basal region of thick-walled brown textura prismatica to textura angularis which is composed of somewhat smaller darker cells at the periphery than in the centre. In the upper part of the stroma several locules of variable size are produced. These may be discrete or partially divided and multilocular and most appear empty with remnants of spore bearing and/or sterile elements. Others seem to be immature but with a specialized ostiolar structure developing. The *Cryptosporium* - like conidial masses are formed, 1-2 to each stroma and are located amongst the empty locules. The possibility that this is a mycoparasite occurring on an effete Loculoascomycete or Coelomycete, does not seem tenable, for the conidiomatal tissue is of the same structure as the stroma, there being no distinction between the two. The alternative interpretation which is favoured here is that the fungus is the anamorphic state of an ascomycete. The identity of the ascomycete cannot be determined because of its poor condition.

***Foveostroma salvadorae* sp. nov., Abbas, Sutton & Ghaffar**
Fig. 1, 2 and 3

Mycelium immersed, ramosum, septatum, laeve, brunneum *Conidiomata* eustromatica, 165-264 µm diam x 50-132 µm (longit.), in fructificationibus effetis nigris eustromaticis unilocularibus et multilocularibus formata ad basim globosa vel subglobsa vel cupulata ex cellulis parvis, ad marginem, crassa, nigra ex taxtura prismatica composita, usque ad 2-7 cellulis crassa et 6-19 µm lata. *Ostiola* absentia, dehescentia irregularia apertura lata. *Conidiophora* hyalina, laevia, ad basim et apicem septata,

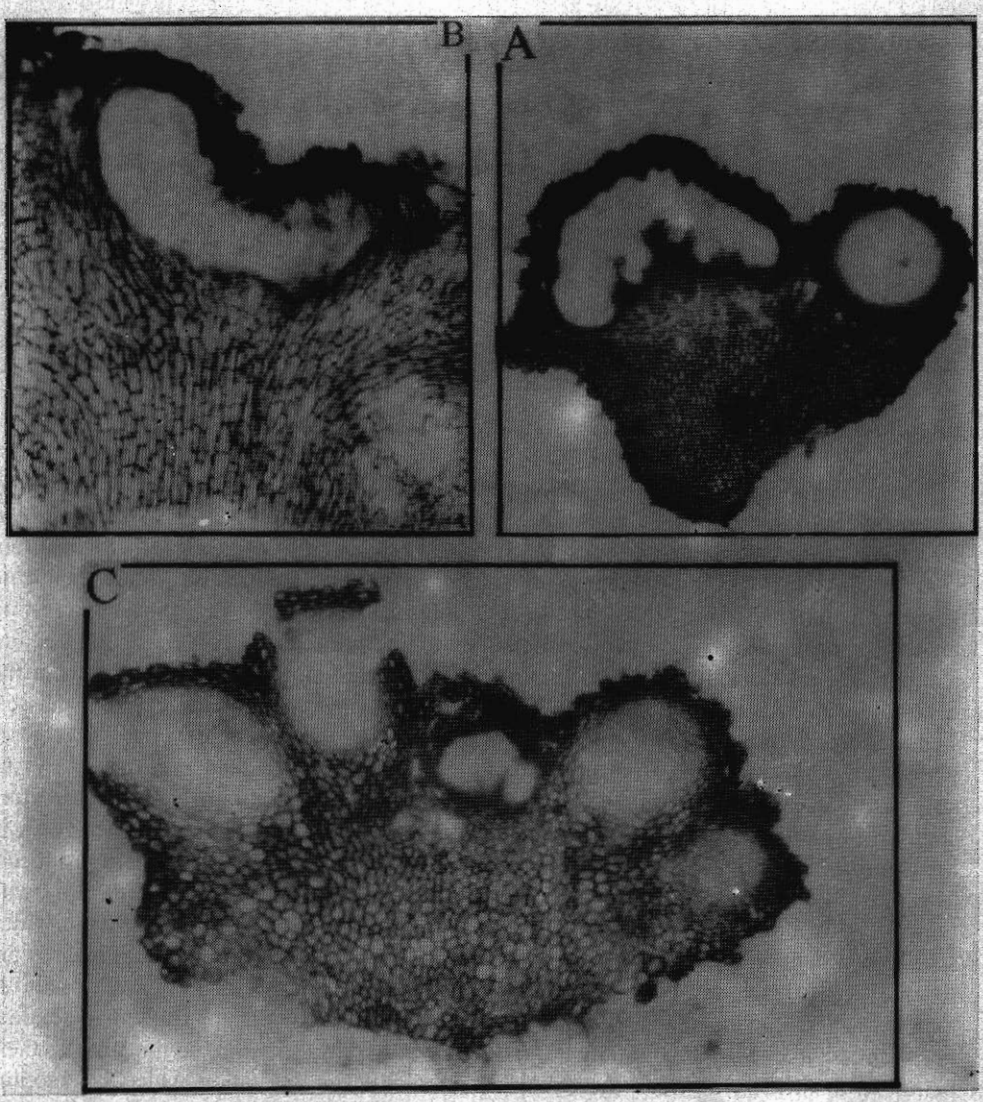

Fig. 1. *Foveostroma salvadorae*. V.S. of telomorphic fruiting bodies on which anamorphic conidiomata developed (A) 60X; (B) 250X; (C) 60X.

generatim ramosa, cylindrica, erecta vel undulata, 24-40 µm longit. x 2.5-6.5 µm lata, evoluta ad peripheram et basim. *Cellulae conidiogenae* enterogenicis et stationaracis, hyalinae, laeves, cylindricae vel lageniformes, erectae vel undulatae, 12-18.5 µm longit. x 2.5-4.0 µm latit. gradatim contractae versus apicem 2 µm latae. *Conidia* primova formanali hologenitica cero enterogenitica, hyalina, laevia, mediano 1-euseptata, falcata, fusiformia, 22.5-36.0 x 2.5-4.0 µm, apicem gradatim contracta ad obtusa, basim truncatum cum appendice breve laterali.

In ramis emortuis *Salvadorae oleoides*, Kasur, Pakistan, 20 Nov. 1966, S. Ahmad 1946 (IMI 253748), holotypus.

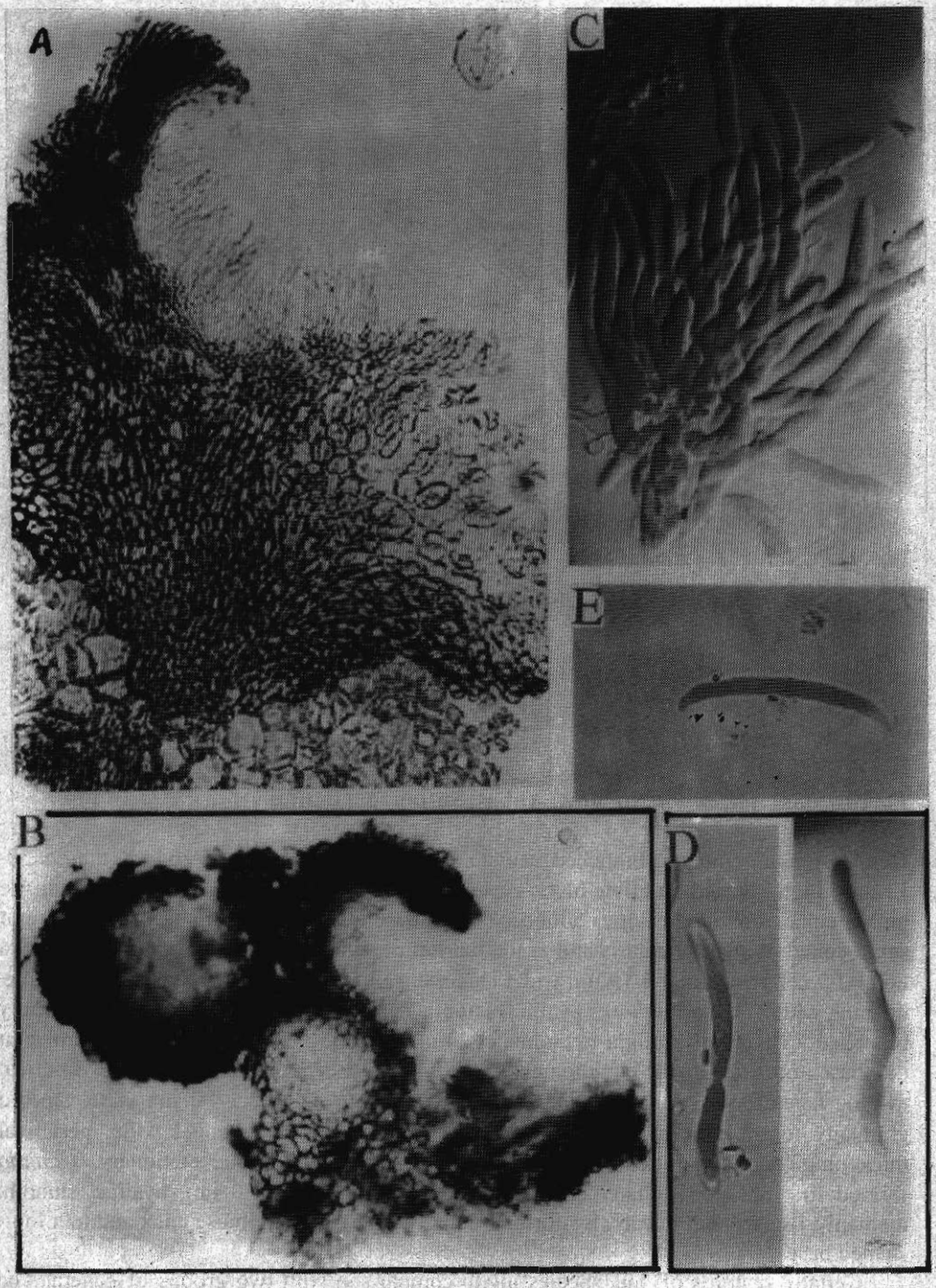

Fig. 2. *Foveostroma salvadorae*, V.S. conidioma (A) 100X; (B) 40X; (C) 2 conidia and conidiogenous cells 1800X; (D) Conidia with conidiogenous cells 1800X; (E) Conidia, 1800X

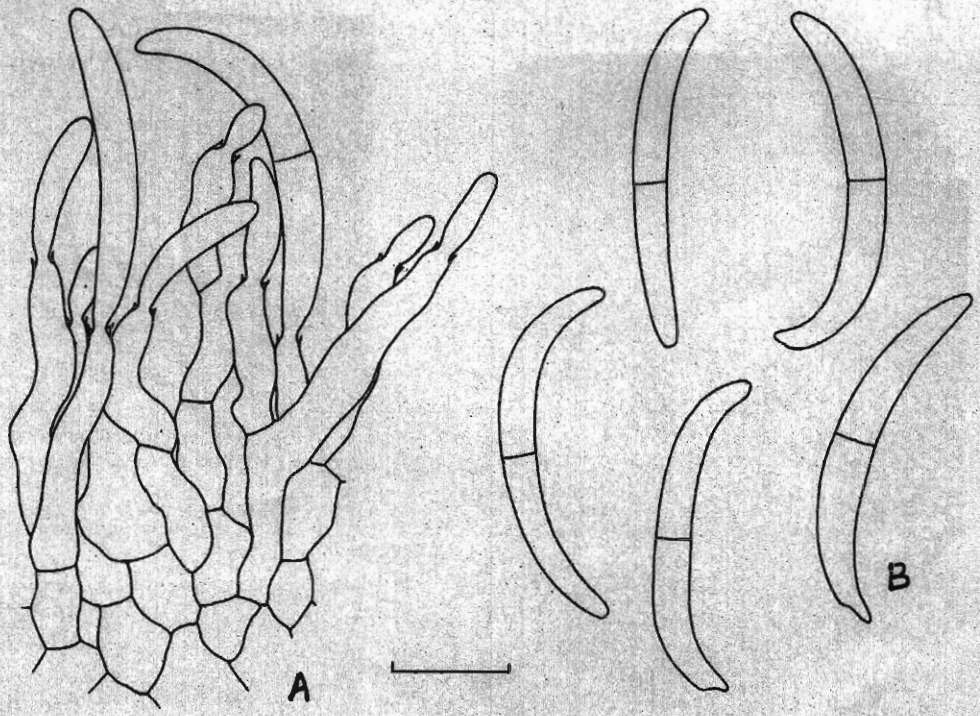

Fig. 3. *Foveostroma salvadorae*. A. Conidiogenous cells with developing conidia (B) Conida.

***Foveostroma salvadorae* sp. nov., Abbas, Sutton & Ghaffar**

Mycelium immersed, branched, septate, brown. *Conidiomata* 165-264 µm diam x 50-132 µm high, formed on effete black eustromatic fruit bodies amongst peripheral, uni- to multilocular or divided cavities, globose, subglobose to cupulate, composed at the base of small-celled textura angularis and at the margin of somewhat darker textura prismatica up to 2-7 cells thick and 6-19 µm wide. Dehiscence irregular, with no specialized ostiole, opening widely. *Conidiophores* hyaline, smooth, septate at the base and above, frequently branched, cylindrical, straight to undulate, 24-40 µm long x 2.5 - 6.5 µm wide, formed at the base and sides of the conidiomata. *Conidiogenous cells* hyaline, smooth, cylindrical to long lageniform, straight or undulate, 12- 18.5 µm long x 2.5-4.0 µm wide, tapered gradually to the apices which are 2 µm wide; cytoplasmic channel wide, periclinal thickening and collarette minute, proliferating enterogenous and stationary. *Conidia* formed first hologenous later enterogenous, 22.5-36.0 x 2.5-4.0 µm, hyaline, smooth, medianly 1-euseptate, falcate, fusiform, gradually tapered to an obtuse apex and to a foot-shaped base.

Certain features of this species invite comparison with two groups of genera. The conidiomatal structure, conidiogenesis and conidial morphology place it in the *Gelatinosporium- Cornicuariella- Foveostroma* complex which represent the anamorphs of some genera of Helotiales. The conidia, some of which show foot-shaped bases, link

the species with those Hyphomycetes and Coelomycetes tabulated by Sutton (1986) with similar conidia. In a revision of fungi placed in *Cornicularíella* Karst., and *Cornicularia* Sacc., Di Cosmo (1978) introduced the generic name *Foveostroma* to replace *Micropera* Lév., a later homonym of *Micropera* Lindley (Orchidaceae). Seven species of *Cornicularíella* were accepted, some of which represented anamorphs of *Dermea* Fr., and *Durandiella* Seaver. Two species of *Foveostroma* were treated, both with *Dermea* teleomorphs. *Gelatinosporium* Peck with a single species but no known teleomorph was also covered. This work derived from the pioneering studies of Groves (1946, 1954), later followed by Funk (1976) where *Micropera* was generally used for the anamorphic states of these related Helotiaceous genera. Sutton (1980) accepted the separation of anamorphic genera advanced by Di Cosmo (1978), the distinction between *Cornicularíella* and *Foveostroma* mainly being attributable to features of the conidiomata which are unilocular and cylindrical in *Cornicularíella* and irregularly multilocular and more or less pulvinate in *Foveostroma*. There are no significant differences in conidiophores and conidiogenous cell morphology, conidiogenesis or conidial morphology so the maintenance of this separation, bearing in mind the similarity in teleomorphs, seems increasingly doubtful.

The tissue structure of textura angularis and prismatica in conidiomata of the *Salvadora* fungus precludes its inclusion in *Gelatinosporium* and places it in *Cornicularíella* or *Foveostroma*. The structure and morphology of conidiomata is consistent with *Foveostroma* rather than *Cornicularíella*. The species is quite distinct from *F. drupacearum* (Lév.) Di Cosmo, the type species, and *F. abietinum* (Peck) Di Cosmo in conidial morphology. Of the species included by Funk (1976) in *Micropera* it shows most similarity with *M. boycei* (Dearn.) Groves, the anamorph of *Dermea pseudotsugae* Funk and *M. fosteri* Funk in having falcate conidia, but differs in being consistently medianly 1 septate rather than multiseptate. A further similarity with *M. fosteri* is the presence of foot-shaped base to the conidia. Although this feature was not mentioned by Funk (1976) it is clearly shown in his figure 4. Sutton (1986) listed 21 genera of Deuteromycetes with foot-shaped bases or foot cells in the conidia and of these *Phloeosporella* Höhn., and *Vermisporium* Swart & Williamson have acervular conidiomata and *Fusarium* Link, *Vermiculariopsiella* Bender and *Seimatosporium* Corda have acervular-sporodochial conidiomata. However, none possess the combination of features shown by the *Salvadora* fungus and can be excluded from consideration as generic placements for the species. Neither *Cornicularíella* nor *Foveostroma* were originally included in the genera treated by Sutton (1986) but in any future contribution *Foveostroma* should be listed.

Although *Fovestroma salvadorae* is confidently described in this genus on the basis of its morphology, development and similarity with known species, there is the anomaly that it is associated with or is the anamorph of a fungus which clearly does not belong in the Helotiales. Ascomata in *Dermea* are apothecial, separate or caespitose, circular to undulate, sessile or narrowed below to substipitate (Groves, 1946). *Foveostroma salvadorae* is associated with an eustromatic fungus in which several separate divided or undivided locules are formed in the upper part. The structure is not apothecial, but if it is ascomycetous as seems likely, the affinities are more with the Loculoascomycetes. The implication from Sutton's (1986) compilation is that the *Fusarium* type of conidium with a basal foot cell or foot-shaped base is polyphyletic in origin. In such a context it should not be surprising to find similar anamorphs associated with possible dissimilar teleomorphs.

Specimen examined:

***Foveostroma salvadorae* sp. nov.,**

On dead twigs of *Salvadora oleoides*, Kasur, Pakistan, 20 Nov. 1966, S. Ahmad 1946 (IMI 253748), holotype.

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