

cate apex, 8-spored; ascospores obliquely 1-seriate, smooth, continuous, elliptical with a prominent apiculus at each end, usually 3-guttulate, $27-35 \times 11-14 \mu\text{m}$; paraphyses brown, stout and clavate, septate, $7-9 \mu\text{m}$ broad.



Figure 1. *Helvella costifera* 2. *H. lacunosa* and 3. *H. macropus*.

Habit and Habitat: Terricolous, fruiting gregariously in shady places, collected near Botany Department, D. S. B. College, Nainital, N 522, September 17, 1981.

2. *Helvella lacunosa* Afzel.

Pileus irregular, more or less irregularly inflated, irregularly lobed, lobes drooping and attached to the stem, dark grey or blackish grey; margin free; hymenium greyish-black to black; stem creamish white, solid, $2.5-10.5 \times 0.5-1.5 \text{ cm}$, variously ribbed or lacunose, pallid; excipulum composed of densely interwoven hyphae, hyphae septate, running out at the periphery, $10-20 \mu\text{m}$ broad at the tip; hymenium $200-325 \mu\text{m}$ broad; asci cylindrical, 8-spored; ascospores smooth, hyaline, obliquely 1-seriate, broadly ellipsoidal, ends obtuse with a large oil globule, $18-20 \times 10-12 \mu\text{m}$; paraphyses brownish, septate becoming gradually clavate, $6-10 \mu\text{m}$ broad at the tip.

Habit and Habitat: Solitary to gregarious under hardwood forests, Collected from D. S. B. College, Nainital, N 531, September 21, 1981, and Chaubattia Garden Road, Ranikhet, Almora N 537, September 27, 1981.

3. *Helvella macropus* Karst.

Pileus subglobose, margin incurved at first, expanding with age; Hymenium brown, externally greyish to black, minutely rough with small irregular warts formed by the outgrowth of hyphae; stipe clavate, more or less lacunose, imperfectly hollow with age,

greyish, covered with very minute velvety warts, stem in some cases paler towards the base, $3-7 \times 0.2-0.5 \text{ cm}$; excipulum consists of densely interwoven hyphae which become pseudo-parenchymatous in the cortex; hymenium $250-300 \mu\text{m}$ broad; asci 8-spored; ascospores 1-seriate, smooth, hyaline, elliptical, $27-34 \mu\text{m}$; paraphyses brown, clavate and straight, $8-10 \mu\text{m}$ broad at the tip.

Habit and Habitat: Solitary on the ground in shady places, collected near the Canteen, D. S. B. College, Nainital, N 523, September 17, 1981.

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COWPEA TOP NECROSIS - CAUSED BY *FUSARIUM EQUISETI* (CORDA) SACC.

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DURING the course of a survey of cowpea crop for seed-borne virus diseases, certain cowpea plants were observed to be stunted in growth due to necrosis of apical buds. The axillary buds proliferated giving the plants a bushy appearance. Leaves of such plants were shrivelled with petioles drying and drooping. Water-soaked areas on stem developed into brown lesions which were most prominent at the collar region. Roots were also not fully developed. Whenever such plants flowered, no pods were formed (figures 1-3).

A similar disease on cowpea-cowpea top necrosis-causing necrosis of apical buds was described earlier¹; wherein the association of a spherical virus was reported. Therefore, at first the sap from diseased plants was rub inoculated on various hosts used for virus work. Axillary sprouts from infected plants were

grafted on young healthy plants of cowpea. *Aphis craccivora*, *A. gossypii* and *Bemisia tabaci* were also tested for transmission of the disease. The disease was not transmissible either by sap inoculation or by the insect vectors tested. However, on grafted plants, symptoms of the disease appeared after one week. Electron microscopic observations (Phillips 200) using the Brandes dip method² did not reveal the presence of any virus-like particles.



Figures 1-5. 1. A cowpea plant affected with top necrosis disease caused by *Fusarium equiseti* 2. A shoot showing necrosis of apical bud, drying of petioles and proliferation of axillary buds. 3. Water-soaked lesions on stem. 4. and 5. Conidiophore and conidia of *F. equiseti*.

In the following years, the disease was observed to recur in the same fields. A close examination of the symptoms prompted us to make isolations and see if any fungus is involved with the disease. Samples were brought to the laboratory, surface sterilized with chlorax (with 1% available chlorine, 30-40 sec) and ethanol (70%, 20-30 sec) and kept in moist chamber. After 48 hr white mycelial growth was noticed on the explants. The mycelium was transferred to PCA

(potato carrot agar) and later identified to be *Fusarium equiseti* (Corda) Sacc.

Healthy cowpea cv. Pusa phalguni plants were inoculated with the fungus isolated using different methods. The disease did not develop when healthy plants were inoculated by spraying spore suspension with an atomiser (with or without prior injury); or by injecting spore suspension into stem and apical bud region with a hypodermic syringe. The disease was produced by mixing spores with seeds before planting as also by mixing the sporulating culture in sterile soil and then planting the seeds. The symptoms became apparent as the primary leaves emerged. The apical bud became completely necrotic after the development of 2-3 trifoliates. The stem and petioles showed water-soaking and browning with the petioles finally drooping. Samples from such plants were again placed on PCA for isolation of the fungus. The mycelium appeared after 48 hr and showed heavy sporulation after one week. Pure cultures were prepared by single spore isolations and identified as *Fusarium equiseti* (Corda) Sacc³ (figures 4-5). The cultural characters are as follows.

Two types of cultures were obtained. In initial isolations, cultures showed white floccose aerial mycelium tinged with peach but when cultures were prepared from single macroconidia there was a suppression of aerial mycelium accompanied with profuse sporodochial production. Conidia borne on simple lateral phialides, falcate with a well-developed foot cell and an attenuated apical cell which is bent inwards; 4-7 thin distinct septa; conidia measuring 21.6-37.8 μm with an average at 30.5 μm ; chlamydospores intercalary, solitary or in chains, globose 5.4-7.1 μm . The culture has been deposited in the Indian Type Culture Collection as ITCC 2817.

Fusarium equiseti is common in warm, temperate and subtropical areas of the world. In our country it has been found to be pathogenic to cowpea for the first time, although earlier it is known to cause leaf spot of *Eichhornia crassipes*⁴, damping off of *Piper betel*⁵ and safflower⁶ and foot rot of *Celosia*⁷. Association of this fungus with a large number of seeds has also been shown⁸. In our study, seeds collected from infected fields were not found to carry the disease. Hence the fungus is soil-borne and appears to have the ability to cause infection by penetrating the living tissues as also reported earlier by Garofalo⁹.

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OCTOSPORA EUCHORA, A RARE PEZIZALES FROM INDIA

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OCTOSPORA Hedw. ex S. F. Gray was typified¹ by *O. leucoloma* Hedw. ex S. F. Gray, which disposition has been accepted, Fuckel's Fungi Rhen. No. 1219, *Peziza leucoloma* (Hedw.) Raben., in the Farlow Herbarium has been designated² as the neotype specimen of *O. leucoloma* and the relationship within *Octospora* has been discussed³. Accordingly, *O. euchora* (Karst.) Berthet is here placed in *Octospora* subgenus *Octospora*.

O. euchora is recorded for the first time from India. Although the species has a limited global distribution, it is represented well in Western Himalayas, where it was found growing in damp, bare soil under coniferous canopy. Interestingly, some of the collections have been made from burnt soil. The specimens were critically examined for macroscopic and microscopic features using appropriate fungal stains. The species is delimited by the following important features:

Apothecia up to 3 mm in diam., densely gregarious, sessile, discoid; external surface pale orange, attaching hyphae numerous towards base, up to 14 μm wide; margin entire; hymenium orange. Asci 125–180 (–195) \times 9–11 μm , 8-spored, cylindrical, J-. Ascospores 14–18 (–19) \times 7–8.8 μm , ellipsoid, uniseriate, hyaline, smooth, biguttulate. Paraphyses up to 3.5 μm wide below, expanding above up to 7 μm at their clavate tips, slender, septate, straight, simple or branched below. Anatomy; Excipulum textura angularis throughout, up to 390 μm thick, cells up to 50 μm across, becoming somewhat hyphoid towards margin; hypothecium up to 50 μm thick, textura angularis, cells up to 18 (–20) μm across.

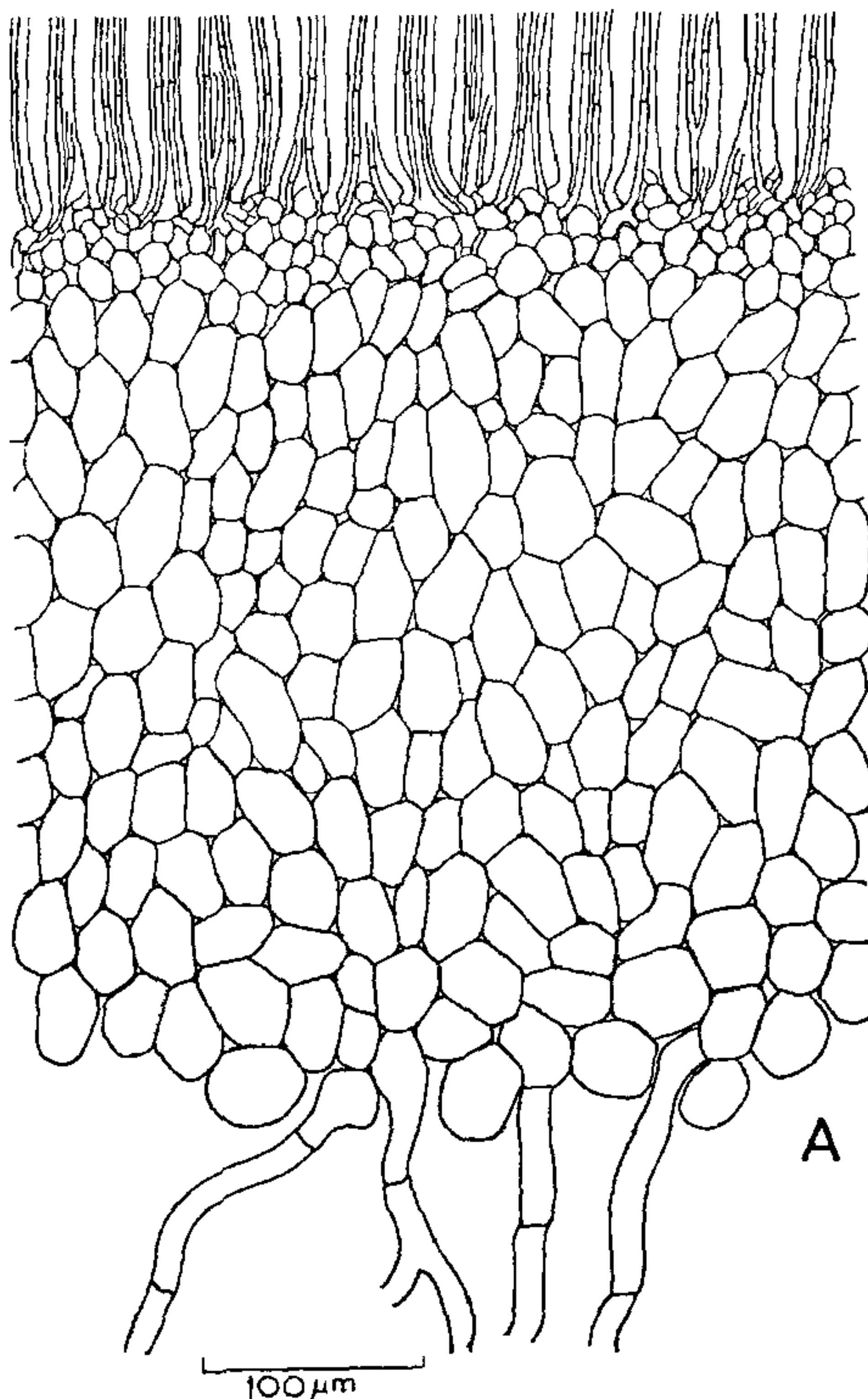


Figure 1. *Octospora euchora*. A. V.S. of the apothecium passing through its middle.

Collections examined: S. Chander 2478, 2479 (PAN, BPI), on soil Gulmarg, J&K, August 28, 1972; S. Chander 2491 (PAN, BPI), on burnt soil, Pahalgam, J&K, August 30, 1972; S. Chander 2533 (PAN, BPI), on burnt soil, Kilbury, Nainital, U.P., August 11, 1973; S. Chander 2575 (PAN, BPI), on burnt wood and nearby soil, Municipal Gardens, Mussoorie, U.P., September 6, 1973.

Distribution: Eurpore, India.

The lack of a raised margin and the excipular anatomy in the Indian collections are typical of *O. euchora*. In its anatomical features *O. euchora* is close to *O. semiimera* (Karst.) Khare and Tewari, but the latter grows partially immersed in soil and has larger ascospores.

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