cushion or oval-shaped sub-epidermal later becoming erumpent; *hyphae*: 3–4·5 μ in dia. chiefly found in the mesophyll, slender, branched, colourless, septate, tangled sub-epidermal masses of hyphae later on developed into acervuli; *paraphyses*: 2–3·5 μ in dia., numerous, slender, hyaline, non-septate, longer than conidiophores but both intermixed; *conidia*: 2–5 × 12·5–13·75 μ, fusoid, unequal, sided or slightly curved, with cone-shaped apical end cells, 4–5 called. 2–3 middle dark brown, number 2 cell being broadest of all, apical hyaline cell of each conidium provided with a single beak-like appendage, cells slightly constricted at the septa, basal cell of an attached conidia flat or concave without beak-like appendage; *conidiophores*: 2·5–3·5 × 5–7·5 μ, short, hyaline, each bears a single conidium at top.

The pathogen was isolated from the infected spots on Czapek's Dox agar and identified as *Monochaetia karstenii* (Sacc. & Syd.) Sutton (IMI 205320). Pathogenicity of the fungus was successfully proved 7–8 days after inoculation by the method described earlier[3].

A perusal of the literature[1,2,4-7] shows that the present report forms a new host range and hence this is the first record from Shillong.

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WILT DISEASE OF *CALENDULA OFFICINALIS*—A NEW RECORD FROM INDIA

DURING February–March 1978 the authors have observed wilt disease of *Calendula officinalis* in the P.G. Botanical Garden at Bhagalpur. *Fusarium solani* (Mart) Sacc. was identified as the causal organism. This disease of *Calendula officinalis* is the first record from India.

Symptoms are generally manifested when the plants are in flowering stage. The infected plant exhibits yellowing of foliage which later drop down with the advancement of the severity and wilt. The pathogenicity test was found positive.

The identity of the pathogen was confirmed at C.M.I., Kew, England, and the culture is deposited under accession No. IMI 226619.

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IN VITRO DEVELOPMENT OF CALLUS FROM ANTHERS IN *LUFFA CYLINDRICA*

INVESTIGATIONS on anther culture for androgenic plants are completely lacking in the family Cucurbitaceae. This prompted us to take up anther culture studies in this important vegetable yielding Cucurbitaceous plant, *i.e*, *Luffa cylindrica* L.

Mature floral buds (1·0 cm to 1·4 cm in length) containing uninucleate pollen grains were selected for experimental studies. Standard technique for surface sterilization was followed. Anthers from surface sterilized buds were excised aseptically and planted singly or in pairs on the surface of the medium. The MS medium[1] was used as basal medium (BM). BM was also supplemented with various concentrations of adenine (Ad, 0·5–40·0 ppm), Zeatin (Ze, 0·05–1·0 ppm), kinetin (KN, 0·05–20·0 ppm), casein hydrolysate (CH, 100·0–500·0 ppm), yeast extract (YE, 100·0–1000·0 ppm), coconut milk (CM, 10–20%), 2, 4-dichlorophenoxyacetic acid (2, 4-D, 0·1–10·0 ppm), indole-3-butyric acid (IBA, 0·1–10·0 ppm), indole-3-acetic acid (IAA, 0·1–10·0 ppm), and 1-naphthylacetic acid (NAA, 0·1–10·0 ppm), either singly or in various combinations.

The anthers showed slight swelling followed by spreading of its sinuous lobes (Fig. 1 A) on BM alone or supplemented with CM or auxins or cytokinins,

The swelling is caused by initiation of cell division inside the massive connective tissue. On BM + 2, 4-D (2·5 ppm) + CM (15% v/v), the connective tissue of cultured anthers showed initiation of light green friable callus after 10 to 12 days of inoculation in 80% of cultures (Fig. 1 B). After 15 to 20 days, the pollen sac became swollen and ruptured along its upper margin lengthwise exhibiting a mass of pale green pollen callus (Fig. 1 C, D). Cytological studies of pollen of such anthers revealed that the sporophytic development was triggered in a small population of microspores (Fig. 1 E, F) bypassing the normal gametophytic programme (Sinha *et al.*[2]). The pollen callus was slow growing as compared to connective callus (Fig. 1 C). Most of the dividing grains were crushed between the rapidly proliferating lobes of connective tissue. Addition of KN (5·0 ppm) to the above mentioned medium enhanced the rate of callus formation in 100% cultures showing the formation of compact, bright green callus after one week of inoculation.

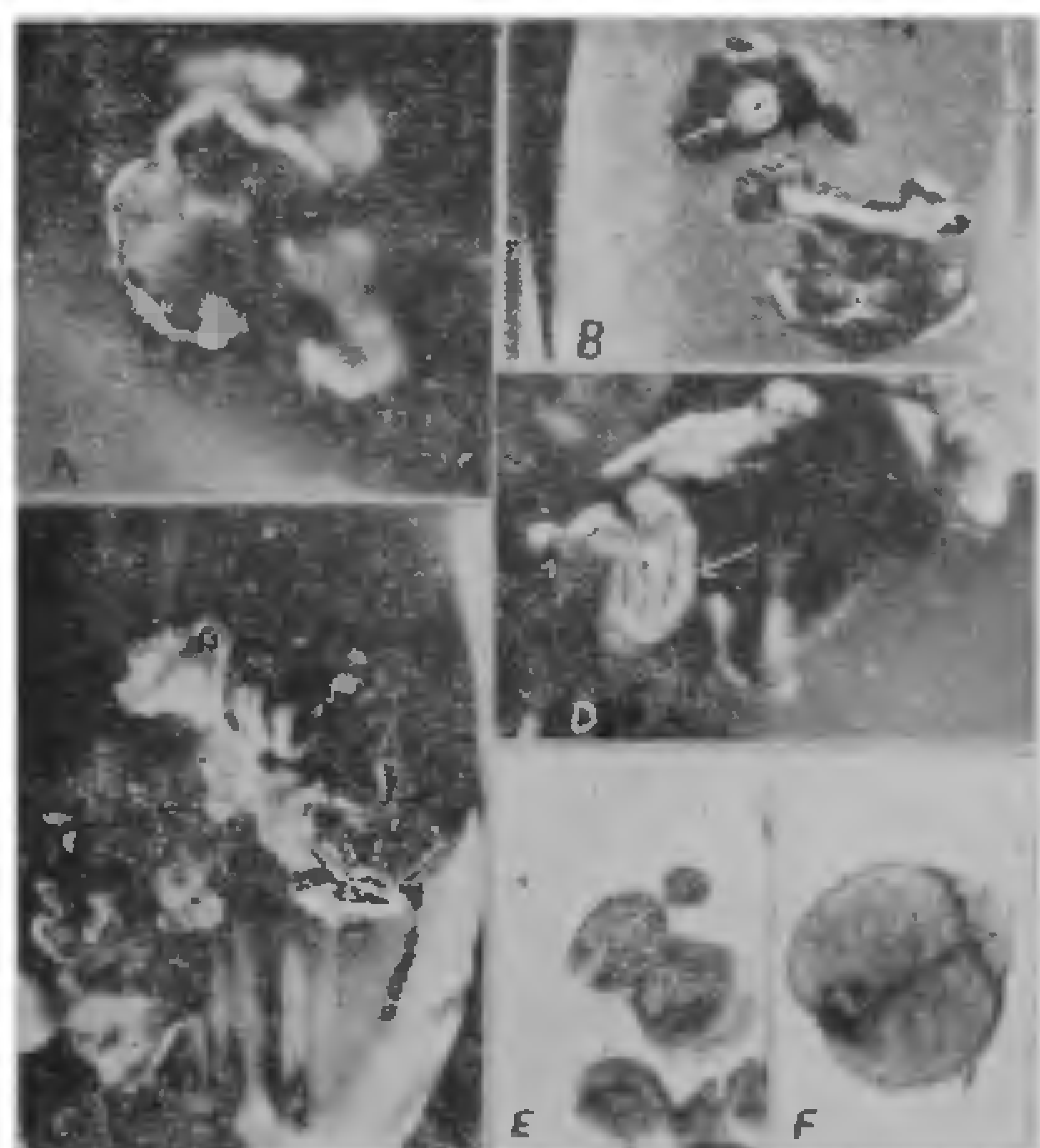

FIG. 1. A–F. Anther culture in *Luffa cylindrica*. (A) Three weeks old culture on BM + CM, showing spreading of lobes of anther, ×3·8. (B) Two weeks old culture, on BM + 2, 4-D + CM showing callus proliferation at connective, × 3·0. (C) Same, after another two weeks; note dehiscence of pollen sac (arrow mark), × 3·2. (D) Three weeks old culture on BM + 2, 4–D + CM showing proliferation of pollen callus through the dehisced pollen sac, × 4·0. (E) Pollen showing symmetrical divisions, × 252. (F) Microtome section of pollen showing division in vegetative cell, × 478.

Experiments were also conducted to induce organogenesis in the anther callus by subculturing it on different media. Although further proliferation of callus took place on the 2, 4-D and CM containing medium, but differentiation of embryoids was not achieved. Incorporation of KN (0·5 to 5·0 ppm) alone or along with YE (1000 ppm) in BM + 2, 4-D + CM proved beneficial showing continuous growth of compact and green callus.

Differentiation of tracheary elements having wall lignification was noticed in the central tissue of all the compact calli, irrespective of the media on which it was growing.

It is concluded that interaction of 2, 4-D and CM is essential for the sporophytic development of pollen and initiation of callus in anther culture of *L. cylindrica*.

The failure of pollen to develop into actively dividing callus and embryoids in *L. cylindrica* may probably be due to copious proliferation of massive connective tissue, which dominates and overshadows the further growth of multicellular pollen grains. Presence of crushed pollen mass between the actively dividing lobes of the connective tissue of anther relates to the same process.

Further experimental manipulations are continuing to achieve quicker growth of pollen callus and organogenesis from pollen grains.

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HANSFORDIA PULVINATA—A MYCOPARASITE ON *ISARIOPSIS INDICA* VAR ZIZYPHI

DURING February–March, 1977, a mycoparasite was observed on *Isariopsis indica* var. *zizyphi* parasiting the leaves of *Zizyphus mauritiana* Lamk.[1] at Horticultural Orchard of Haryana Agricultural University, Hissar. The black sooty tuft-like growth of *I. indica* var. *zizyphi* Gupta and Madaan, covering the whole undersurface, had a whitish-grey, fluffy mycelium in scattered patches (Fig. A), from which a mycoparasitic fungus was isolated by dilution plate method. Leaves of *Zizyphus mauritiana* infected with *I. indica* var. *zizyphi*, but free from the mycoparasite kept under moisture for a few hours, were inoculated with conidia of the mycoparasite from a 10-day old culture and incubated at 25° C. Control blanks were kept for comparison. A whitish-grey growth of the mycoparasite appeared within 3 days. The mycoparasite reisolated was similar to the natural ones. The