After a continuous trial and error method, a solution has been developed in this laboratory which gives nearly 100% germination in petridishes and soil alike and the whole process does not take more than 8 days. The seeds have to be soaked in the solution given below for 12–18 hours and washed thoroughly with distilled water before germination.

The aqueous solution used for germination contains the hormone gibberellic acid 1000 ppm and the following amino acids 0·5 ppm each: (1) Glutamic acid, (2) Histidine, (3) Leucine, (4) Lysine, (5) Methionine, (6) Nicotinic acid, (7) Proline, (8) Thiamine HCl, (9) Tryptophane and (10) Valine.

The effect of gibberellic acid on germination is accompanied by stimulation of synthesis of protein and of mRNA in the embryo. It is known that in most of the seeds other than cereals, gibberellic acid is acting through mechanisms which do not directly involve carbohydrate metabolism. Thus it appears that in these seeds gibberellic acid may be directly concerned with the germination of embryo. The studies[1,2], on the effects of gibberellic acid, suggest that it acts at the level of endoplasmic reticulum and may be involved in polysome formation.

An actual metabolism of amino acids in the process of germination is not still clear. General rise in the amino acid content of lettuce seeds during germination was observed[3]. The changes in the free amino acid composition in the seed may be indicative of developmental changes. It is also observed[4] that both the ratio of amino acids and the absolute amounts change during after-ripening of tree peony seeds.

The effect of each amino acid on the germination percentage of *Solanum viarum* is to be studied through elimination process.

The solution is found useful in the germination of *Solanum xanthocarpum* seeds and may be useful in at least other *Solanum* species in which germination is considered as one of the main problems.

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THREE NEW DEUTEROMYCETES ASSOCIATED WITH LEAF DRYING OF COCONUT PALMS

DURING the draught years of 1975 to 1977 the coconut palms in plantations at Hassan, Chitradurga, Tumkur and Mysore districts of Karnataka State developed severe leaf blight. The disease was present in palms growing on all soil types. The blight started at the base of the midrib of the leaflets in the leaves of lower whorls and gradually spread over to all the leaflets. Partial or complete blighting of most of the leaves in the lower whorls was common. Blighted leaves dried off fast under dry climate. The flowers, buttons and immature nuts dropped off. Yield from affected palms was reduced enormously and palms remained barren in severe cases.

The blighted leaves were examined. The Koch's postulates were proved by inoculating the pure cultures isolated on potato dextrose agar medium on healthy coconut seedlings. The pure cultures of the fungi were found to be weakly pathogenic to the senescent leaflets of the lower whorls. The deuteromycetes hitherto not reported on coconut are described below.

Cladosporium cladosporoides (Fresen) de Vr.

Colonies on potato dextrose agar olive green, effuse or olivaceous brown finally dark, velvety, reverse on the medium greenish black. Dark hyphae measure 4–11 μm in width. Conidiophores macronematous and micronematous, measure 30–420 × 2·5–5·4 μm, pale to mid-olivaceous brown, smooth or verrucose; conidia are smooth pale brown, 1–3 celled and measure 2·5–12 × 2·5–4 μm.

Botryosphaeria rhodina (Berk & Curt) v' Arx.

Colonies on PDA white and turn dark with age, pycnidia black, osteolate, erumpent single or in groups, sub-epidermal or deeper in the tissue and measure 240 × 245 μm. Conidiophores simple and measure 80–90 μm long, conidia hyaline, oval, single celled when young, and measure 30 × 13 μm. Mature conidia are dark grey, elliptical or oval, two celled and measure 45 × 18 μm. Both types of conidia are found in the same pycnidium. Two celled mature conidia predominate in older pycnidia. Conidia are released in mucus in the form of cirrhus. Spore mass hardens into coiled thread of creamy white colour over the osteole.

Seimatosporium falcatum (Sutton) Shoemaker

Colonies on PDA white to subhyaline, effuse, turn greyish with age. Lesions amphigenous, circular to irregular, ashy grey in colour. Acervuli more abundant on the upper surface, sparse, irregular in distribution, dark to dark brown, circular, separate with sparse stroma development, and 200 μm in diameter. Mycelium subhyaline to pale brown, spore mass black, erumpent emerging through irregular or linear opening, not

spreading at maturity. Conidiophores erect, hyaline, simple, aseptate, cylindrical, without terminal proliferation, 5–10 μm × 1–2 μm. Conidia produced singly, long, fusiform fulcate, 3 septate, tapering at each end, gently constricted at the septum, smooth walled, measure 28–37·5 (31) μm long, 4–5 (4·5) μm wide. Two medium cells 15·5–20 (17) μm long are pale brown to olivaceous and separated from the hyaline end cells by the transverse septum. Apical cell is long, conical, truncated by a short stout apical appendage measuring 6·7 (6·5) μm barely distinguishable from the apical cell. The basal cell is long truncate with distinct marginal frill. The basal appendage is exogenous, stout, hyaline, unbranched and 6·5–10 (7·5) μm in length.

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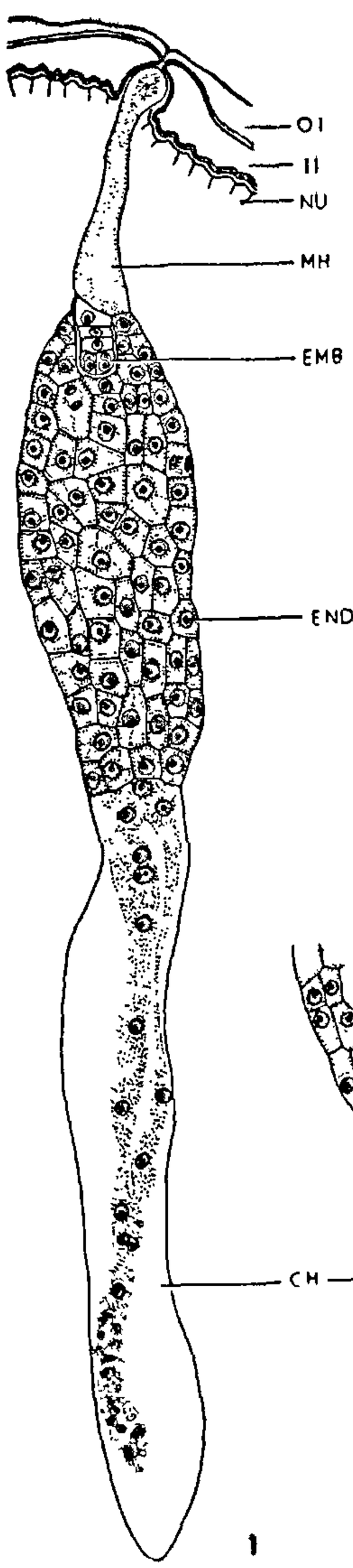
ENDOSPERM OF *SCLERIA FOLIOSA* HOCHSTETTER Ex A. RICHARD

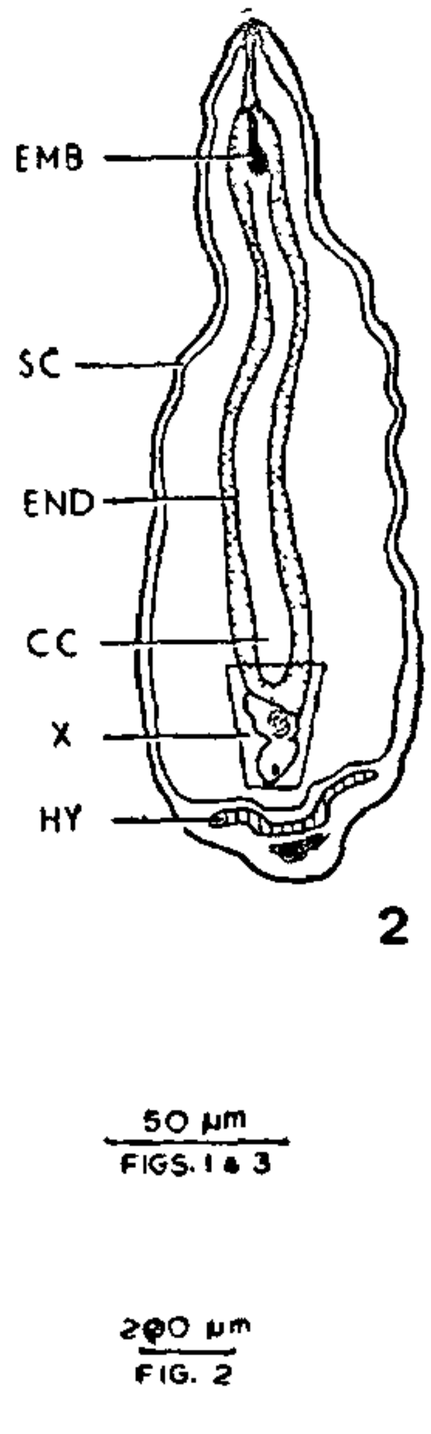
The endosperm in the Cyperaceae has been remarkably uniform in being nonhaustorial and in following the nuclear ontogeny. However, our investigations on *Scleria foliosa* revealed some strikingly unusual features which have not been previously described in any other taxa of the family, and these are presented here.

The endosperm development is of the nuclear type. The primary endosperm nucleus, by repeated free nuclear divisions, gives rise to several nuclei which become distributed in a thin peripheral layer of cytoplasm. The central part of the endosperm is occupied by a large vacuole. At the binucleate stage of the endosperm, a tubular extension is formed at the micropylar end of the embryo sac. This outgrowth reaches the micropyle and functions as the micropylar haustorium. It remains enucleate with a relatively scanty cytoplasm (Fig. 1).

The centripetal wall formation begins around the proembryo and is restricted only to upper one-third of the endosperm forming the endosperm proper (Fig. 1). The chalazal part which remains coenocytic elongates right up to the base of the nucellus. It has dense cytoplasm and often shows "nodule-like" nuclear aggregations and serves as the chalazal haustorium (Figs. 2 and 3). The latter destroys the nucellar cells adjacent to it and remains active up to the late globular stage of the proembryo. As the growth of the cellular endosperm increases, the chalazal haustorium folds up and eventually degene-



1



2

50 µm
FIGS. 1 & 3

200 µm
FIG. 2

3

Figs. 1-3. Endosperm of *Scleria foliosa*. Fig. 1. Cellular endosperm with micropylar and chalazal haustoria. Fig. 2. L.S. of seed showing a central cavity in the endosperm. Fig. 3. Portion marked 'X' in Fig. 2 is enlarged to show nuclear aggregations in the chalazal haustorium.