Japan are not suitable for pearl culture in *P. fucata* of the Gulf of Kutch. Further work is in progress.

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1. Algarswami, K., *Proc. Symp. Mollusca III*, Mar. Biol. Ass. India, 1970, p. 975.
2. — and Quasim, S. Z., *Indian J. Fish.*, 1970, 20, 553.
3. — and —, *Sea Food Expt. J.*, 1970, 6, 1.

MICROSPOROGENESIS IN *GILIA CAPITATA* SIMS

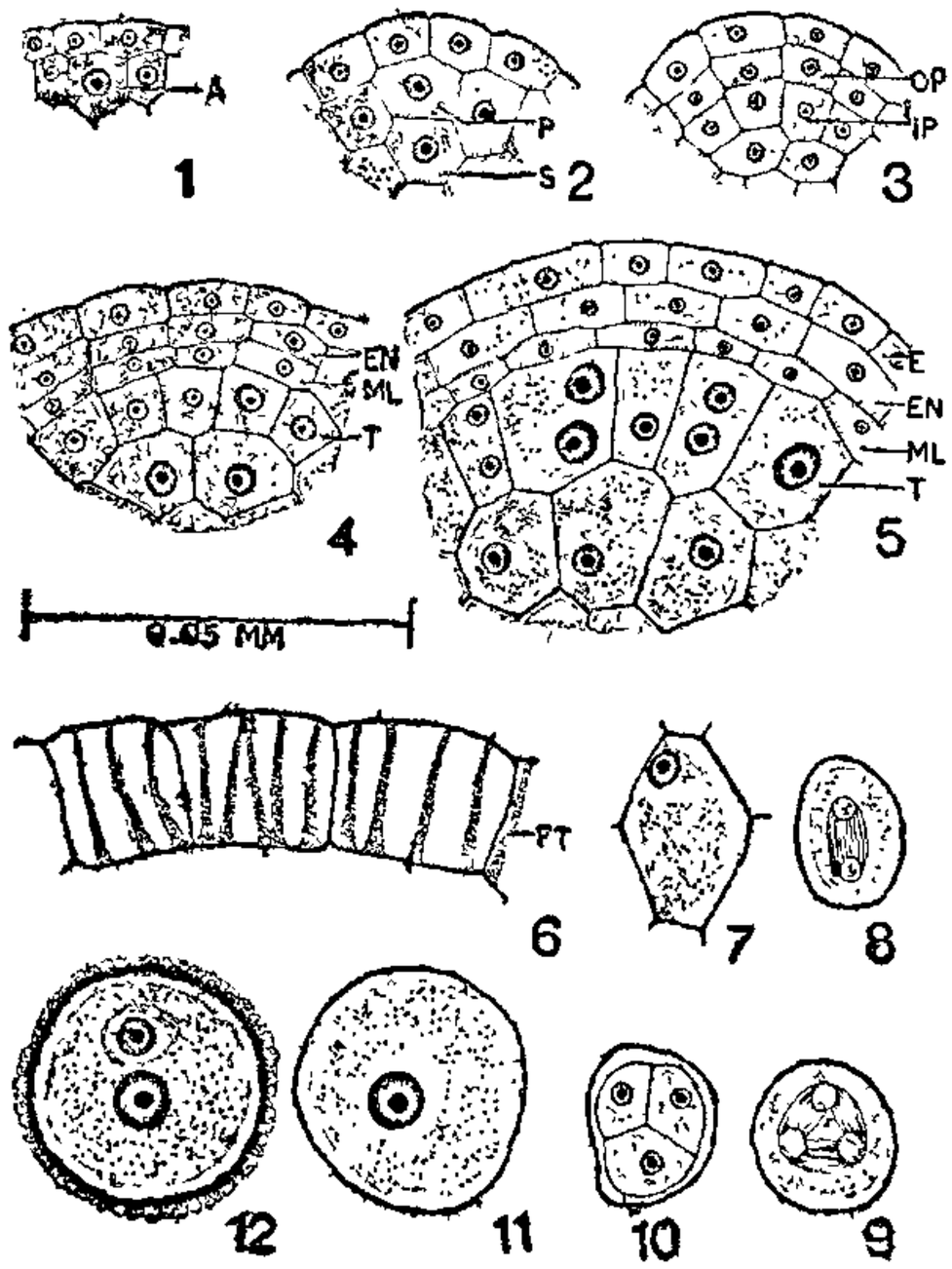
THE embryology of Polemoniaceae has received very little attention from earlier workers[1]. Souèges[2-4] described the embryogeny in *Polemonium caeruleum*, while Sundar Rao[5] worked out the development of its male and female gametophytes. This note reports on the microsporogenesis in *Gilia capitata*.

A mature anther consists of an outer layer of epidermis, single layer each of endothecium and middle layer and an innermost tapetum (Fig. 5). The cells of the epidermis are cuticularized while those of the endothecium develops characteristic fibrous thickenings (Fig. 6). The cells of the middle layer are rectangular and are ephemeral and the tapetal cells are two-nucleate which finally become one-nucleate by the fusion of nuclei.

A young anther is a homogeneous mass of parenchymatous tissue. During further development, it becomes four lobed and in each lobe a single hypodermal archesporial cell is differentiated. This is distinguishable from other cells by larger size, dense cytoplasm and conspicuous nucleus (Fig. 1). The first periclinal division of the archesporium results into an outer primary parietal cell and an inner primary sporogenzous cell (Fig. 2). The outer primary parietal cell divides periclinally to form a secondary outer and a secondary inner parietal layer (Fig. 3). The outer secondary parietal layer gives rise to two layers by a periclinal division, the outer forms the endothecium and the inner the single middle layer (Fig. 4). The inner secondary parietal layer develops directly into the tapetum. The development of the anther wall conforms to the dicotyledonous type[1].

The sporogenous cell divides to form a few cells and the last division forms the microspore mother cells. Each microspore mother cell undergoes the usual reduction division simultaneously to form a tetrahedral tetrad (Figs. 7-10).

The microspores are nearly triangular at the time of separation from the tetrad and at maturity become almost round (Fig. 11). A young microspore is rich in cytoplasmic contents and has a large nucleus. Soon it enlarges considerably and the exine develops ornamentations (Fig. 12). Its nucleus divides to give rise to a vegetative and a generative nucleus. The pollen grains are shed at bicelled stage (Fig. 12).



FIGS. 1-12. Microsporogenesis in *Gilia capitata*. Figs. 1-5. Development of anther wall layers and stages in microsporogenesis. Fig. 6. Cells of the endothecium showing fibrous thickenings. Figs. 7-10. Stages in the development of the microspore. Fig. 11. A microspore. Fig. 12. Two celled pollen grain. (A—Archesporial cell; E—Epidermis; EN—Endothecium; FT—Fibrous thickenings; IP—Inner secondary parietal layer; ML—Middle layer; OP—Outer secondary parietal layer; P—Primary parietal layer; S—Primary sporogenous layer; T—Tapetum.)

During maturation of the anther, the epidermal cells shrivel and the cells of the middle layer disintegrate. The anther wall at the time of dehiscence comprises of a degenerated epidermis and an endothecial layer. The dehiscence is by a longitudinal slit.

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1. Davis, G. L., *Systematic Embryology of Angiosperms*, John Wiley and Sons, Inc., New York, 1966.
2. Souèges, R., *C.R. Acad. Sci. Paris*, 1939, 208, 1338.
3. —, *Bull. Soc. Bot. France*, 1942, 86, 289.
4. —, *C.R. Acad. Sci. Paris*, 1945, 220, 837.
5. Sundar Rao, Y., *Proc. Natl. Inst. Sci. India*, 1940, 6, 695.

A NEW RECORD OF *ALTERNARIA* CAUSING LEAF SPOT OF SUNFLOWER

A SEVERE form of leaf spot due to *Alternaria* was observed during kharif 1973 on sunflower (*Helianthus annus* L.) crop grown around Srikalahasti in Chittoor district of Andhra Pradesh. The disease develops initially as small, chlorotic spots with brown centre on young leaves (Fig. 1 *a*). These spots turn dark brown and are somewhat circular with yellow halos measuring about 3–5 mm in diameter after 10 days (Fig. 1 *b*).

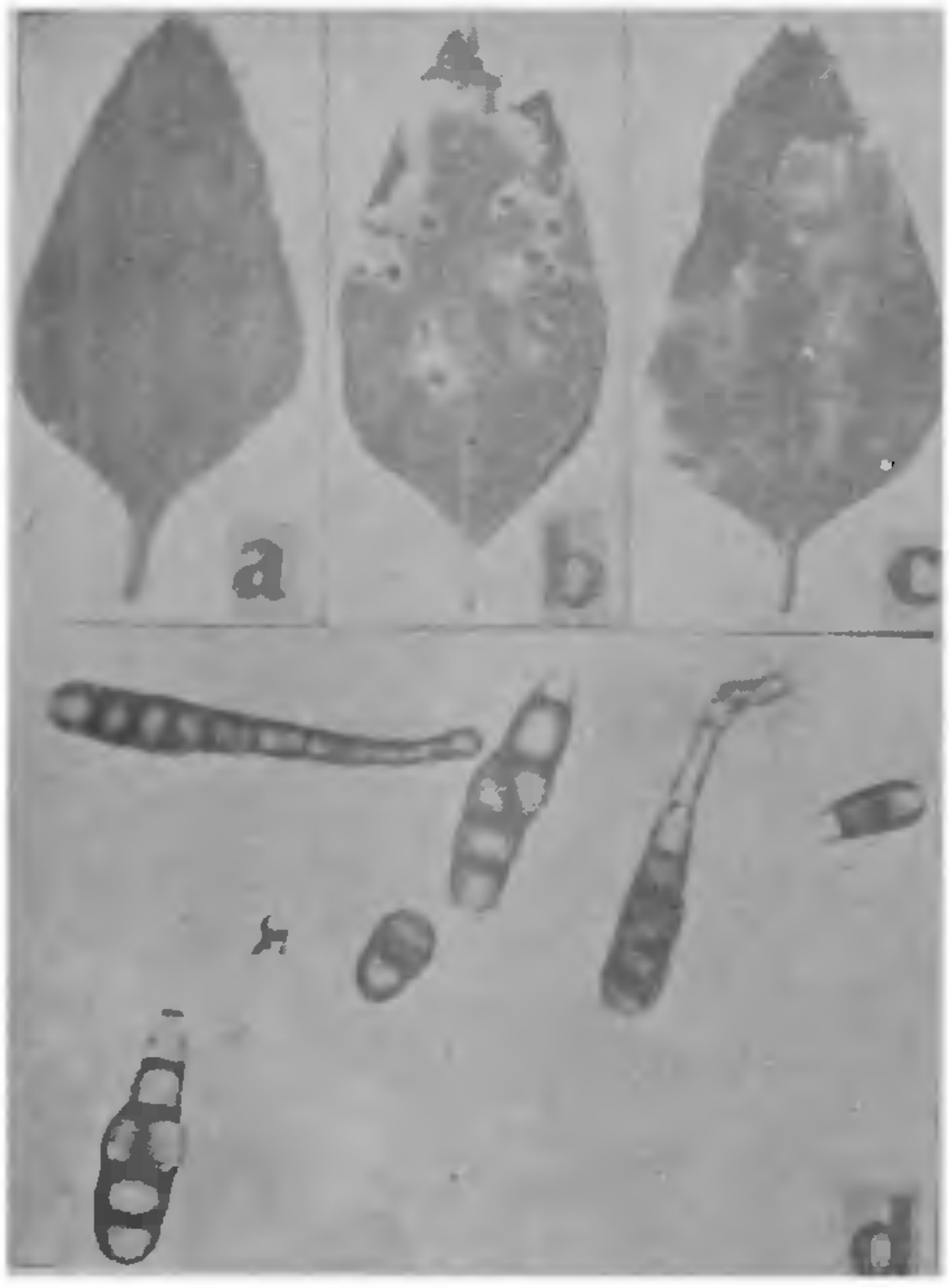

FIG. 1. *a*, *b* and *c*: Progression of symptoms on the leaves of sunflower due to *Alternaria helianthicola* (Rao and Raj). causing leaf spot; *d*: Conidia of *A. helianthicola* showing tapered apex, beak and longitudinal septa in some.

They later coalesce forming irregular dark patches ultimately leading to severe blighting, drying up of leaves and defoliation by 20 days (Fig. 1 *c*).

The pathogen was purified by single spore isolation and the pathogenicity of the organism was proved with positive results in sunflower var. E.C. 68414, E.C. 68415 and Bulgarian. The organism failed to infect ten known hosts of *Alternaria*, viz., *Cyamopsis tetragonoloba* (L.) Taub., *Raphanus sativus* L., *Glycine max* (L.) Merrill, *Arachis hypogaea* L., *Solanum melongena* L., *Lycopersicon esculentum* Mill., *Chrysanthemum maximum* L., *Zinnia elegans* Jacq., *Cucumis sativus* L. and *Brassica juncea* Coss. and appeared to be host specific.

Mycelial colonies on potato dextrose agar were dark, profusely branched and frequently septate with abundant sporulation in 7–10 days. The conidiophores were cylindrical, often branched, septate and difficult to be ditinguished from the mycelium. Conidia were golden yellow or dark brown, ellipsoidal, each having tapered apex and distinct beak, 2–10 septate, slightly constricted at septation. The conidia inclusive of beak measured 66·5 (29·0–91·5) × 15·6 (7·25–21·75) μ, beak alone measuring 45·5 (29·0–72·5) μ in length. Longitudinal septae were present in some conidia (Fig. 1 *d*). Characters of conidia produced in culture were similar to those observed in nature.

From the perusal of literature, it is seen that *A. tenuis*[1], *A. zinniae*[2] and *A. helianthi*[3,4] infect sunflower and cause different leaf spots. However, the foliar symptoms, host range, sporulation as well as conidial measurements of the present isolate differ wholly or partly from the above species of *Alternaria* reported on sunflower. The isolate has since been examined and found quite distinct from *A. tenuis*, *A. zinniae* and *A. helianthi* and hence named as *Alternaria helianthicola* sp. (Rao and Raj.) now. as suggested by Dr. Ellis of Commonwealth Mycological Institute, Kew, Surrey, England. The type culture has been deposited at C.M.I., Kew, Surrey, England, as IMI–191573.

A Latin description of the new species is given below: "Mycelium (in cultura) fuscum, ramosissimum et saepe septatum, sporulatione copiosa; conidiophora cylindrica, saepe ramosa, septata, a mycelio difficile distinguibilia; conidia aurea vel atrobrunnea, ellipsoidea, unamquidque apice contracta et rostro distincto, 2–10 septatum, ad septam leviter constrictum; conidia (rostro incluso) 66·5 (29·0–91·5) × 15·6 (7·25–21·75) μ; rostrum tantum 45·5 (29·0–72·5) μ longum; septa longitudinalia conidiis nonnullis praesentia".

Our grateful thanks are due to Dr. Ellis and Mr. Anthony Johnston, Director, C.M.I., England, for examining the culture and suggesting the new name. Thanks are also due to Rev. Father K. M. Matthew, S.J., Director, The Rapinat Herbarium, St. Josephs'