lower values as compared to their control parental lines were peduncle length, extrusion length, and number of grains panicle. Panicle length also decreased in both mutants but the reduction was marginal. For flag leaf width and 1000-grain weight, both mutants recorded higher values as compared to their control parental lines. The direction of macromutational effects on the other characters in both the mutants was not consistent. Although the panicle length was only marginally affected, a detailed study of the panicle components, *viz.*, the number and the length of primary and secondary branches along the panicle axis, revealed that these changes were quite pronounced and that the mutants differed in degree rather than in kind (Rai *et al.*[6]). Kawai and Narahari[4] also found in one progeny of the M_2 generation in rice, six short and non-lodging plants which behaved as simple recessives. A detailed study showed that the shortness was due to reduction in the internode length. The other changes associated with dwarfism were reflected in decreased number of tillers; reduction in panicle and grain size, leaf length, spikelet density, and finer grains.

The multiple chages in various morpho-physiological characters associated with dwarfism may be due to pleiotropic effects of major dwarfing genes. And the differential pattern in some characters may be either due to involvement of different dwarfing genes in both mutants, or due to the differential behaviour of the same dwarfing gene in differing genetic background of the parental varieties. Cryptic structural changes involving minute deletions may also lead to multiple changes. Minute deficiencies, when low moisture seeds were exposed to ionizing radiations, were found by Brock to be the frequent events in tomato analyses (see Wallace[12]). And yet, there is the possibility of background mutations which do occur concurrently with the major gene mutations (Gregory[3]).

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January 17, 1979.

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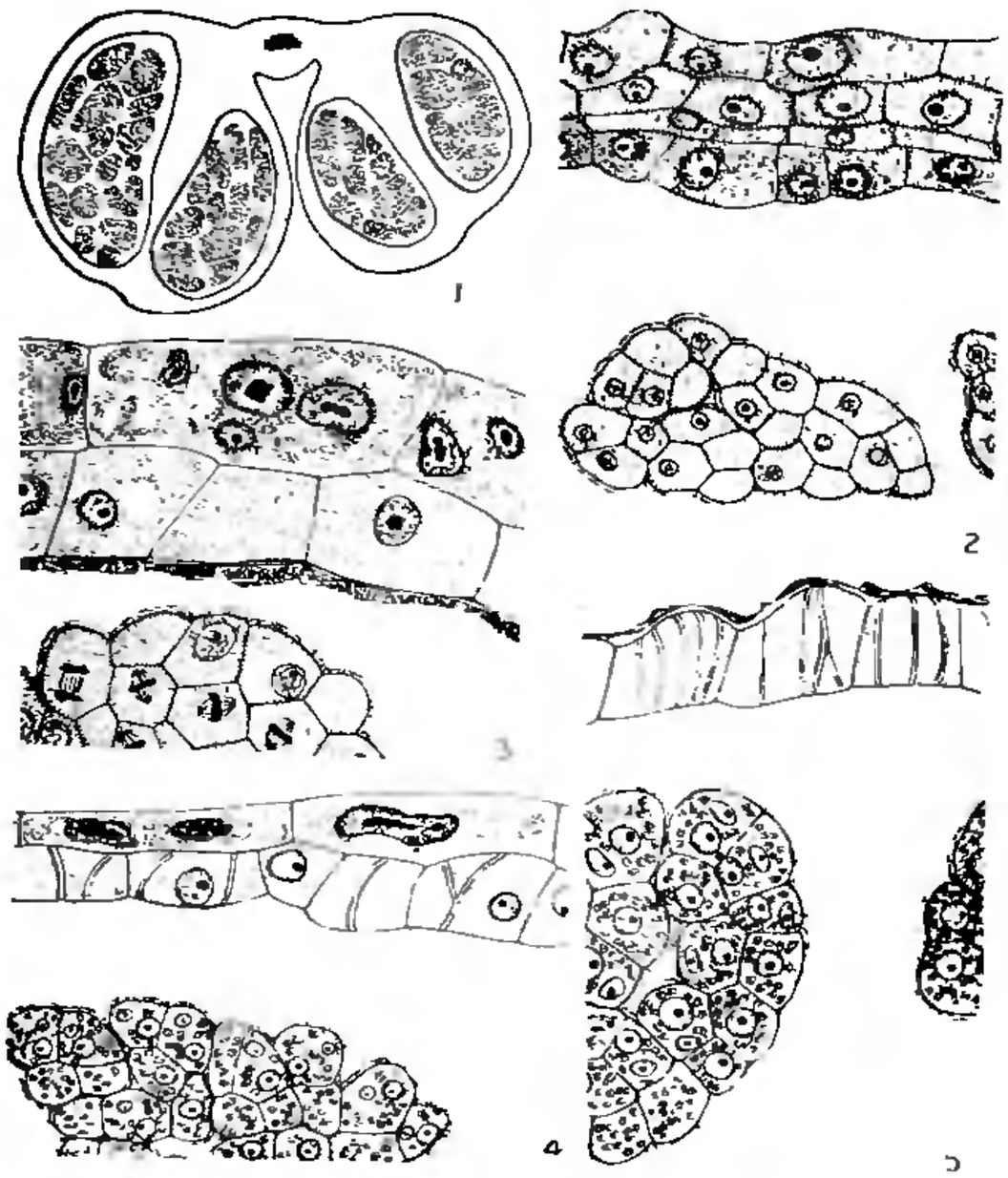
TAPETUM-LIKE ANTHER EPIDERMIS IN *ZEUXINE LONGILABRIS* (LINDL.) BENTH ex HK., ORCHIDACEAE

While studying the anther development in *Zeuxine longilabris* (Lindl.) Benth ex HK., a terrestial semi-saprophytic taxon which produces pollen massulae, we noted an unusual behaviour of the anther epidermis, so far not recorded in any of the angiosperm studied.

A transverse section of a fairly young anther reveals 4 microsporangia (Fig. 1). The anther wall is made up of an epidermis, an endothecium, a middle layer and the tapetum (Fig. 2). At the time of meiosis and quadripartition of microspore mother cells, the uninucleate glandular tapetal cells become conspicuous. But by the time the microspore nuclei begin to divide, the tapetum and the middle layer breakdown and degenerate. The endothecial cells enlarge in size radially. The epidermal cell, stretch tangentially and acquire dense protoplasm and some of them even become multinucleate when the microspore divides (Fig. 3). The nuclei of the epidermal cells frequently fuse to form large irregular polyploid nuclei. During subsequent development, when the pollen grains become two-celled in the massulae and accumulate starch, the endothecial layer develops band-like thickening on the inner surface of tangential walls, while the conspicuous epidermal cells show signs of degeneration (Fig. 4). At the time of shedding of pollen massulae the epidermal cells break down completely and form a thin membrane outside the fibrous endothecium (Fig. 5).

The above account on the behaviour of the epidermis of the anther wall clearly indicates that histologically, *i.e.*, in the enlargement of cells, in the acquisition of dense cytoplasm containing more number of nuclei, presence of nuclear fusion within the cell, and final degeneration, the layer appears more like a tapetum,

Such a behaviour of cells is invariably associated with a nutritional function, especially of anther tapetum, integumentary tapetum, and endosperm and suspensor haustoria. In view of the above, we tend to assign a nutritive role to the epidermis although this layer plays the role of protection at the early stages of anther development.



FIGS. 1–5. Fig. 1. Transverse section of an young anther, × 65. Fig. 2. A portion of microsporangium enlarged showing wall layers, × 660. Fig. 3. Same, at a later stage; note enlarged and multinucleate epidermal cells, × 660. Fig. 4. Same, showing degenerating nuclei in epidermal cells; note band-like thickening in endothecium, × 660. Fig. 5. Pollen shedding stage : Completely degenerated epidermis on the fibrous endothecium, × 660.

A nutritional role to the microsporangial epidermis is not recorded even among gymnosperms and pteridophytes, although reports of its development into an exothecium in gymnosperms[1,2] and the Zingiberaceae and the Orobanchaceae are available[3]. Cutinization and lignification of anther epidermis in some members of angiosperms is also on record[4]. There are, however, instances of subepidermal layers in *Najas flexilis*[5] and the outer middle layer in *Ranunculus*[6] functioning as tapetum. The present finding seems to extend this behaviour to the epidermis also.

The authors are grateful to Prof. B. G. L. Swamy, Bangalore, for constructive suggestions,

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OCCURRENCE OF *THANATEPHORUS CUCUMERIS* AS A WEED FUNGUS ON MUSHROOM BEDS

THE paddy straw mushroom *Volvariella volvacea* (Bull. ex. Fr.) Sing. is cultivated in many parts of Kerala. At the College of Agriculture, Vellayani, Kerala, during September–October 1978, the mushroom yield was suddenly reduced considerably. It was observed that the paddy straw in the beds was almost completely covered by a whitish coating of a fungus growth within five days of laying the beds which overgrew the mycelium of *V. volvacea* (Fig. 1). On examination, the white growth was found to be the basidial state of a fungus. Ten days after the appearance of the white growth, abundant dark brown sclerotia were observed on the growth (Fig. 2).

FIG. 1. Whitish mycelial growth of the fungus on straw.

The organism was isolated on PDA. The hyphae are initially creamy white and turned to light brown