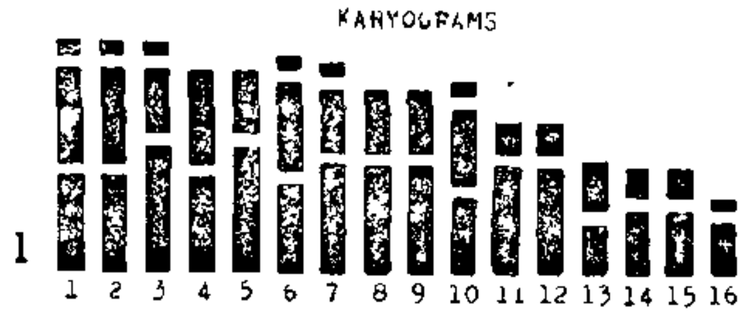
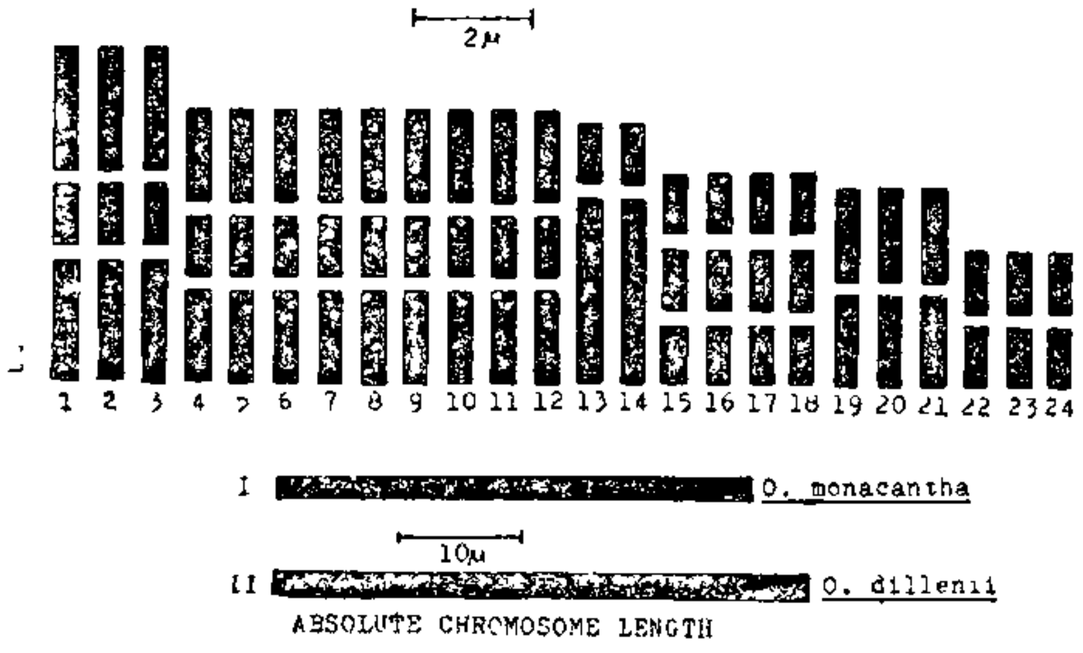
after a wash with distilled water, fixed in 1 : 3 acetic alcohol for 24 hours. Following either modified aceto-orcein method[1] or iron alum haematoxylin schedule[2], the root tip squashes were made.





FIGS. 1–2; I and II. Fig. 1. Haploid karyogram of *O. monacantha*. Fig. 2. Haploid karyogram of *O. dillenii*. Figs. I and II. Absolute chromosome lengths of *O. monacantha* and *O. dillenii*.

The chromosome numbers reported here are at variance with the earlier records[3]. These in the case of *O. monacantha*[4] are $2n = 33$ and in *O. dillenii* $2n = 22$ as well as $2n = 66$[5,6]. The chromosome number determined here for *O. monacantha* is $2n = 32$ while in *O. dillenii* it is $2n = 48$. In the latter species, besides the normal complement of chromosomes, variant nuclei with $2n = 12$, 22, 26, 36, 44, 50, 55 and 66 chromosomes were also observed in the somatic cells. This variation in number, although less frequent, suggests the presence of polysomaty in this taxon. The chromosomes range in length from 1·0 to 3·0 microns in *O. monacantha* (with an average chromosome length of 2·44 microns) and from 1·0 to 2·5 microns (with an average chromosome length of 1·79 microns) in *O. dillenii*. Patent karyomorphological differences occur in the two taxa (Figs. 1, 2), as evident from the karyograms and the absolute chromosome lengths (*i.e.*, 39·1 μm in *O. monacantha* and 43·0 μm in *O. dillenii*; Figs. I, II). In view of the graded karyotype, both the taxa possess a symmetrical character. Structural alterations, accompanied by an augmentation in chromosome number, seem to have contributed to specific differentiation in *Opuntia*. The increase in chromosome number appears to be associated with a general reduction in the average chromosome length in *O. dillenii*.

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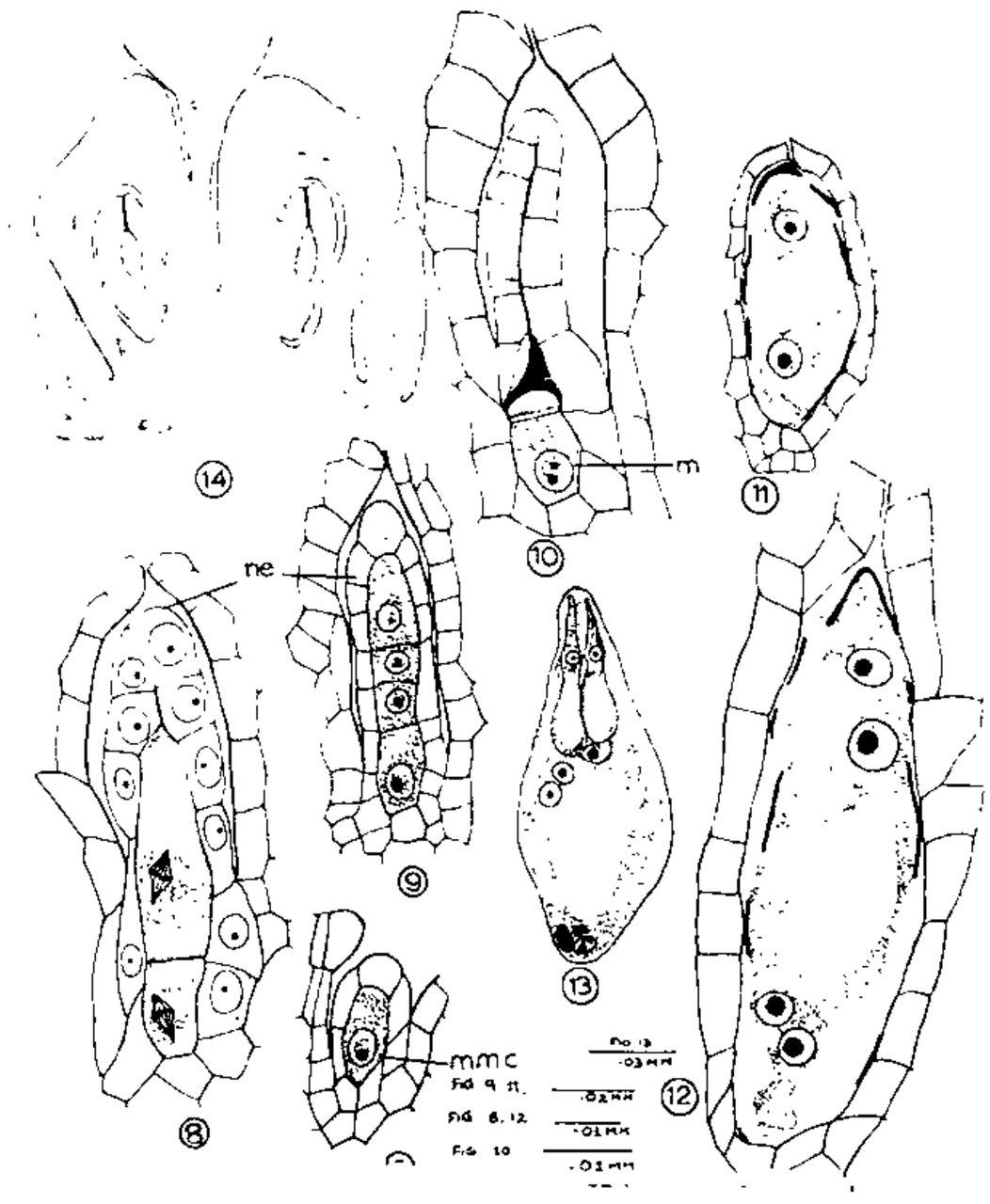
DEVELOPMENT OF GAMETOPHYTES IN *RAUWOLFIA BEDDOMEI* HOOK.

Rauwolfia beddomei Hook. (Apocynaceae), a rare specimen, was collected from the Western Ghats in Kanyakumari District (Tamil Nadu) and its embryology was studied. The present investigation is first of a series undertaken on wild medicinal species of this family which are yet to be studied embryologically. Davis[1] revised the embryological work on this family, followed by Maheswari Devi[2,3] who described the embryology of *R. tetraphylla* and *R. serpentina* with little information on the embryogeny of *R. serpentina*.

The development of microsporangium in *R. beddomei* is initiated by a group of hypodermal archesporial cells (Fig. 1) which cut off outer primary parietal layer and inner sporogenous layer. By further periclinal divisions, the primary parietal layer produces an outer fibrous endothecial layer, one or two middle layers and an inner layer of uninucleate secretory tapetum (Figs. 2–4). The primary sporogenous tissue undergoes one or two divisions and forms pollen mother cells. The pollen mother cells divide in a simultaneous manner resulting in tetrahedral tetrads (Fig. 4). The cytokinesis is by furrowing and the pollen grain is shed at three celled condition. Thus the development of microsporangium follows Dicotyledonous type (Davis[1]). The triporate pollen grains in several cases have been found to grow *in situ* (Fig. 5). This may be attributed to the environmental influence. Thus the development of microspores conforms to the earlier observation made on *R. tetraphylla* and *R. serpentina* excepting the tendency to grow *in situ* (Maheswari Devi[2,3]).

The ovary is bicarpellary, bilocular, apocarpous with unitegmic, tenuinucellate and two anatropous ovules per carpel (Fig. 14). A prominent hypodermal archesporial cell surrounded by a thin nucellar epidermis directly functions as megaspore mother cell (Fig. 7). The nucellar epidermal cells are fully stretched and

are free from the tissues of the integument, as megaspore mother cell embarks on meiotic division forming a linear tetrad (Figs. 8, 9). Similar condition was reported in *R. tetraphylla* and *R. serpentina* even though nucellar epidermal cells were reported merging with the tissues of the integument in *R. canescens* (Meyer[4]). The chalazal megaspore of the tetrad undergoes its first mitotic division during the first phase of enlargement of the megaspore (Fig. 11). The two daughter nuclei migrate to the poles of the cell and undergo further mitotic divisions to form four nuclei in all. By this time, the embryosac is fully elongated and the nucellar epidermis gets disintegrated, the remnants of which are seen as dark lines at the peripheral region of the embryosac (Fig. 12). The pair of nuclei at the poles undergoes one more mitotic division to form eight nucleate embryosac of the Polygonum type (Fig. 13). The synergids are hooked as in *R. tetraphylla* and the polar nuclei fuse before fertilization. There are three uninucleate antipodals which remain healthy until fertilization is over. Again this is in conformity with the findings in other species of *Rauwolfia* (Maheswari Devi[3]) However, there is not even a single case of double embryosac met with in *R. beddomei* though it was reported in other species of *Rauwolfia* (Maheswari Devi[2,3]).



FIGS. 7–14. Figs. 7–13. Developmental stages of embryosac from megaspore mother cell. Fig. 14. L.S. of ovary region. (ar, archesporial cell; ep, epidermis; ta, tapetum; mi, middle layers; end, endothecium; mmc, megaspore mother cell; m, functional megaspore; ne, nucellar epidermis.

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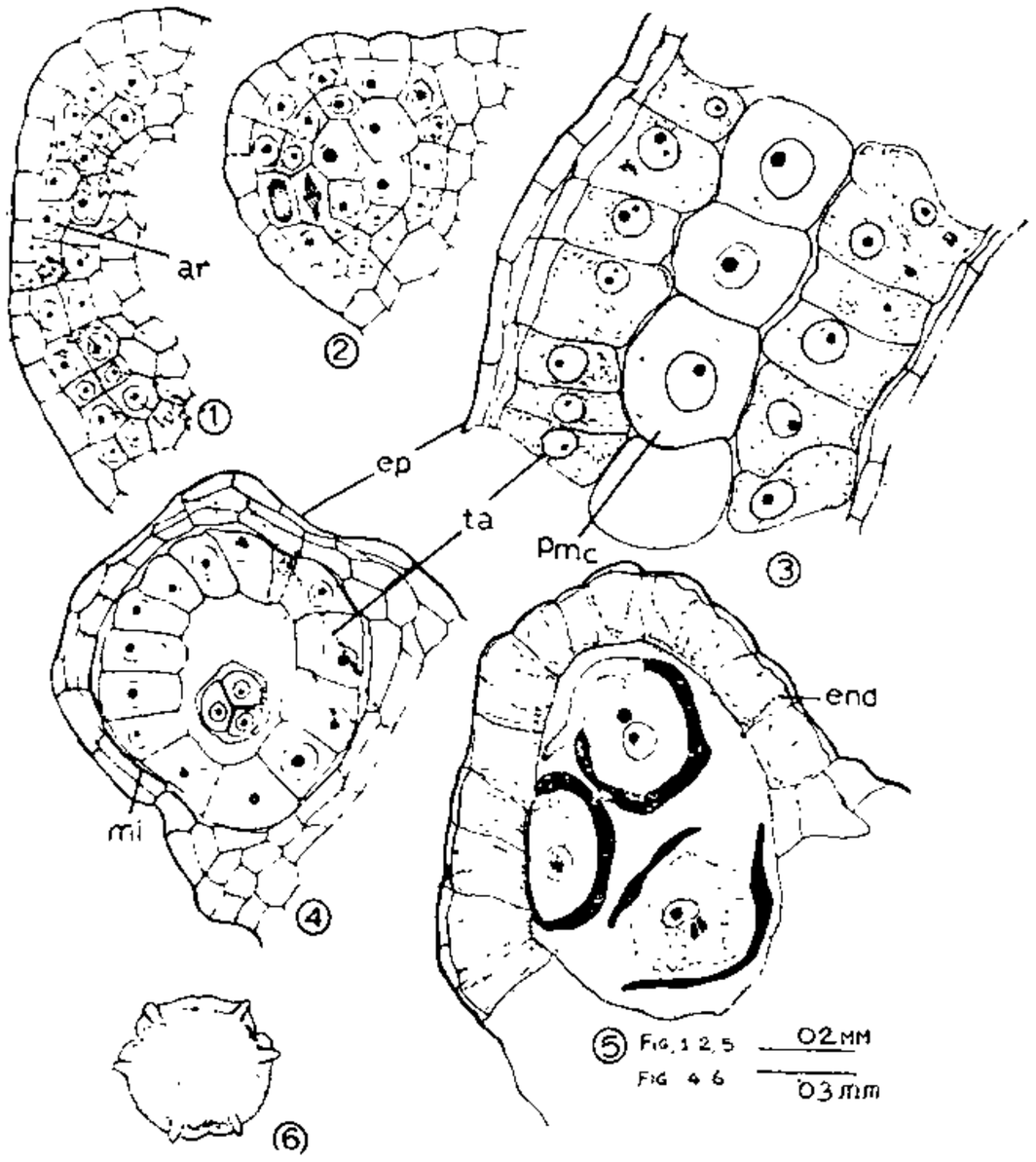

FIGS. 1–6. Figs. 1–2. L.S. and C.S. of young anther lobe. Fig. 3. L.S. of a portion of young anther showing wall layers and microspore mother cells. Fig. 4. C.S. of a portion of anther with a spore tetrad. Fig. 5. C.S. of a portion of mature anther showing endothecium and pollen grains in germination. Fig. 6. Single pollen grain enlarged.

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