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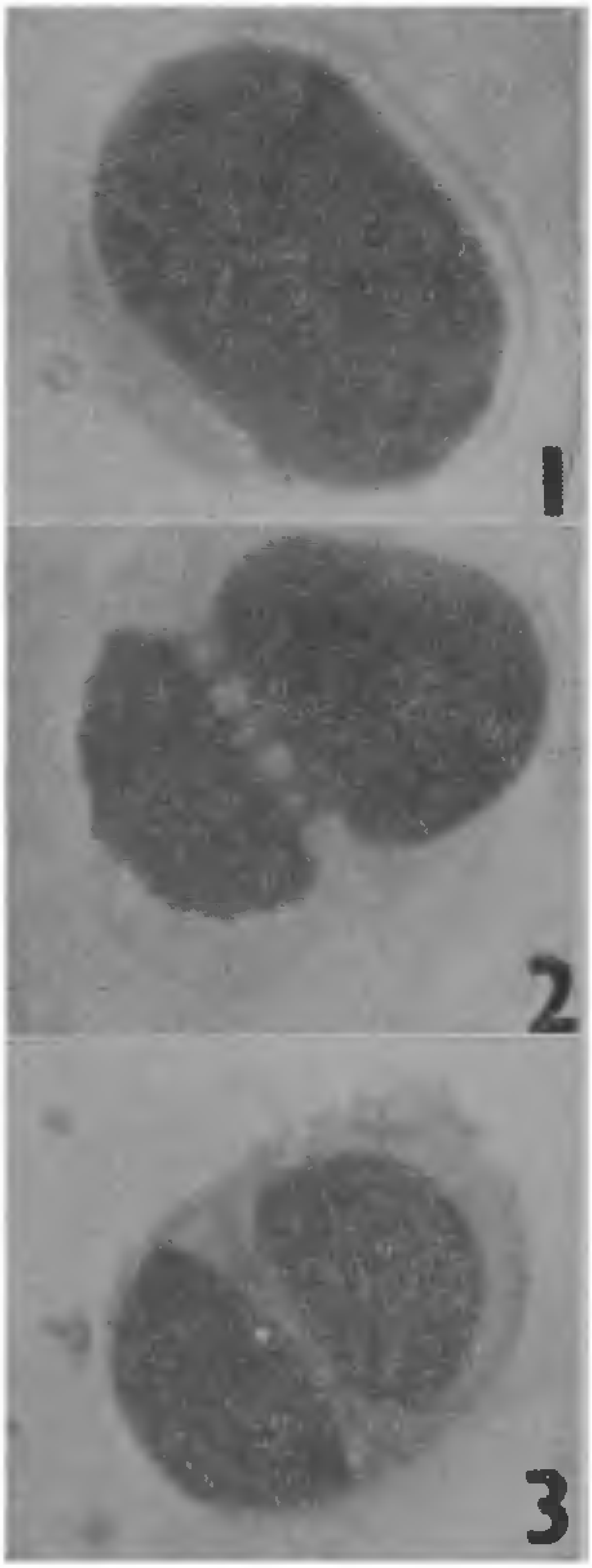
CYTOKINESIS AND MICROSPORE FORMATION IN *PLANTAGO LANCEOLATA* L.

DEPENDING upon whether cytokinesis in the microspore mother cells takes place in one or in two steps, two types have been recognized—successive and simultaneous.[1] In Plantaginaceæ the cytokinesis is of the simultaneous type,[2] except for a solitary report of successive division in *Plantago major*.[3] This note brings to record an anomaly in the mode of wall formation in a few naturally occurring plants of *Plantago lanceolata*, collected from Srinagar.

Meiosis of the microspore mother cell nucleus proceeds normally resulting in two haploid nuclei which occupy opposite poles of the cell (Fig. 1). Hereafter, development proceeds along two lines. In 137 of the 225 microspore mother cells studied, this nuclear division is followed by the vacuolation of cytoplasm along the equatorial plate of metaphase spindle (Fig. 2). Immediately afterwards furrows develop on the two sides. These invaginate till they meet in the centre and divide the cell into a dyad (Fig. 3). Nuclear division in the dyad cells is immediately followed by the development of furrows along the equatorial plates of the spindles. These, on invagination, divide the dyad into microspore tetrad of the isobilateral or tetrahedral type.

Division such as that described above is successive because it occurs in two steps. It is, however, simultaneous with regard to the mode of division. Similar type of division occurs in *Uvaria kirkii*[4] and *Annona squamosa*.[5] In order to accommodate these intermediate types, a third type of cytokinesis has been proposed which is designated as "Successive constriction"[6] or Modified simultaneous".[7]



FIGS. 1-3. Fig. 1. A microspore mother cell at Telophase I. × 600. Fig. 2. A microspore mother cell vacuolated along the metaphase spindle, × 600. Fig. 3. A dyad, × 600.

In 39% microspore mother cells cytoplasmic division is of the simultaneous type and takes place through the development of centripetally advancing furrows at the end of both the nuclear divisions. The microspore mother cells therefore develop into tetrads in just one step.

The present observation is interesting in two ways. First, majority of the microspore mother cells exhibit a modified simultaneous type of division not reported for any member of the family so far. Secondly, microspore mother cells of the same anther display a variation in the method of division.

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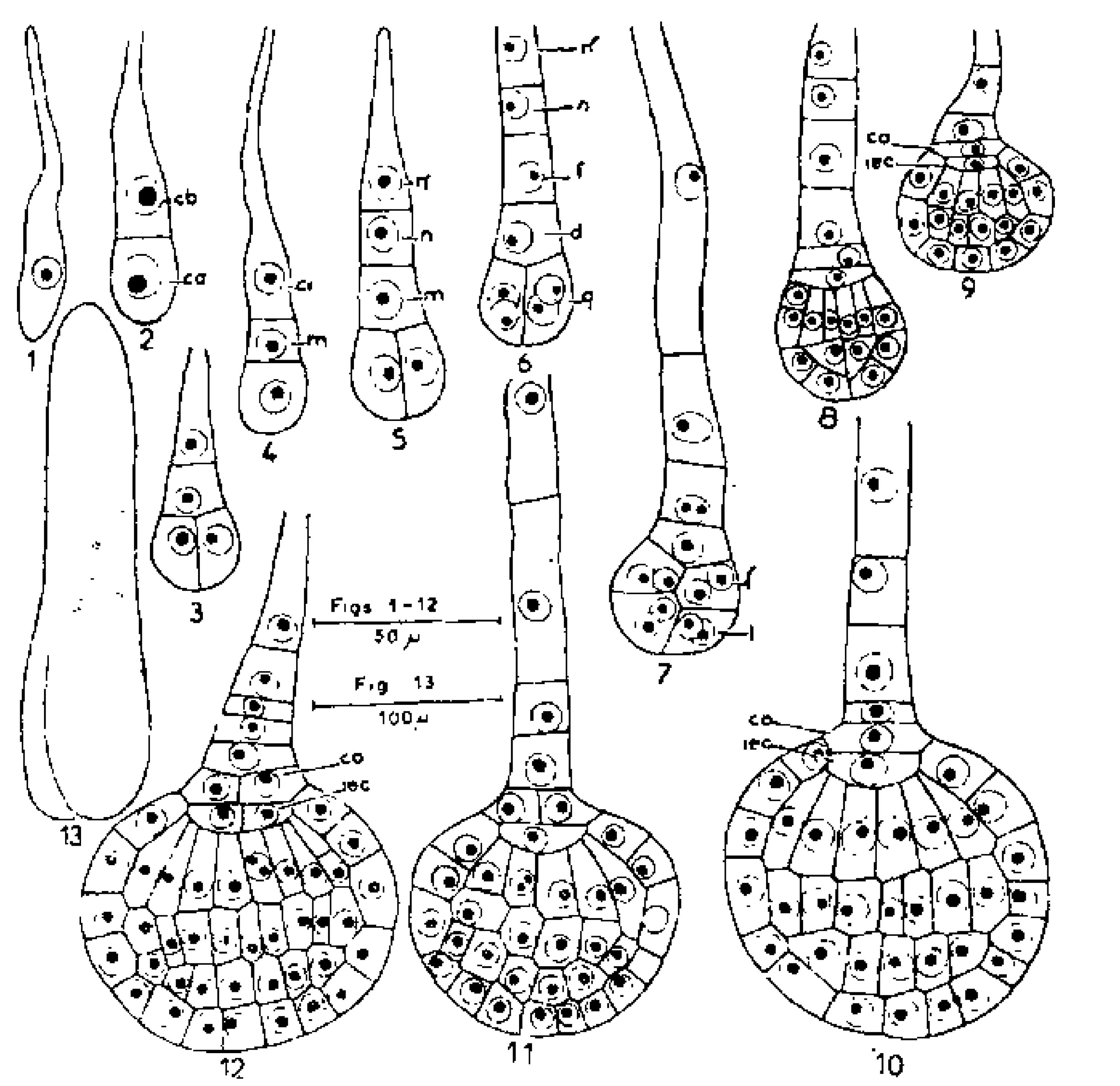
EMBRYOGENY IN *NEMESIA STRUMOSA* BENTH.

SINGH AND TANEJA[1] investigated various aspects of embryology in *Nemesia strumosa* but they did not describe the embryogeny in this plant. The present communication, therefore, deals with this aspect.

The zygote elongates considerably (Fig. 1) and undergoes a transverse division resulting



FIGS. 1-13

in two cells, *ca* and *cb* (Fig. 2). The cell *cb* divides transversely forming two cells, *ci* and *m* (Figs. 3, 4) while the cell *ca* undergoes a vertical division (Figs. 3, 5). Another vertical division at right angles to the first results in a quadrant (Fig. 6). The cells *ci* and *m* undergo transverse division resulting in cells *n*, *n'*, *d* and *f* (Figs. 5, 6). A transverse wall is laid down in each cell of the quadrant forming two tiers, *l* and *l'*, each having four cells (Fig. 7). The suspensor formed by the cells *f*, *n* and *n'* and their derivatives becomes very long in later stages of the embryogeny. A single-layered dermatogen is separated owing to periclinal divisions in the cells of the octant (Fig. 8). After the formation of the dermatogen the divisions in the inner cells of the tier *l* and *l'* lead to the fomation of a large globular proembryo (Figs. 9-12). The cell *d* functions as the hypophysis. It first divides transversely to form two cells (Fig. 9) each of which divides further to produce two groups of cells, *iec* and *co* (Figs. 10-12). The former forms the initials of root cortex and the latter of the root cap. The cotyledonary primordia arise laterally at the apical region of the globular proembryo. The embryogeny in this plant thus conforms to the Onagrad type. The mature embryo is white, fleshy and more or less straight. The radicle is longer than the cotyledons (Fig. 13).

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COMPARATIVE EFFECTS OF GIBBERELLIN, GROWTH RETARDANTS AND MORPHACTINS ON EXPANSION OF COTYLEDONS OF *IPOMEA PENTAPHYLLA**

RECENTLY, we observed that morphactins[1] (derivatives of fluorene-9-carboxylic acid), which show an apparent similarity of action to growth retardants in their overall growth-retarding property, somewhat increased the expansion of cotyledons.[2] It is also known that gibberellin and growth retardants have varied effects on leaf expansion.[3-6] Since physiologically, cotyledons are known to be different from 'true leaves',[7] and partly since the factors governing expansion of *Ipomea* cotyledons are as yet undefined, the following experiments were designed to evaluate the role of GA, growth retardants and morphactins, alone and in combination, on cotyledon expansion. These results are presented in this report.

Seeds of *I. pentaphylla* were germinated in 10 cm. petri dishes in light for 40 hr. and the cotyledons excised from these seedlings were used for the experiments. Six cotyledons were floated in each petri dish lined with a single layer of filter-paper moistened with 5 ml. of