PATELLARIA TETRASPORA MASSEE & MORGAN, A NEW RECORD FOR INDIA

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DURING the extensive fungal forays of 1981, a bitunicate loculoascomycetes *Patellaria tetraspora* was collected from the eastern Himalayas. The species is being reported here for the first time from India.

Observations: Ascocarps gregarious, sessile, shallow cupulate to plane, smooth, black, carbonaceous with a purple tinge, up to 1.5 mm diam. Asci 4-spored, J-, 137–166 × 12–16 μm, clavate-cylindric, apex round, thickened, up to 3 μm thick, base stem-like. Ascospores hyaline, 43–51 × 11–12.5 μm, clavate, up to 9-septate (7-septate ascospores common), guttulate, uniseriate. Pseudoparaphyses filiform, branched, septate, forming bluish epithecium, projecting up to 28 μm beyond the tips of asci. Excipulum differentiated into two zones: ectal excipulum textura angularis, cells black, up to 25 × 15 μm; medullary excipulum textura ar gularis, cells hyaline, shining, up to 10 × 8 μm (figures 1–3). Collection examined: 24002 (FAN), on dead and decaying angiosperm log, Shergaon (alt. 5500 ft.), West Kameng, Arunachal Pradesh, September 5, 1981. Leg. Raghunandan Sharma.

Remarks: This collection differs from the species described by Butler[1] in having smaller and wider, asci and ascospores.

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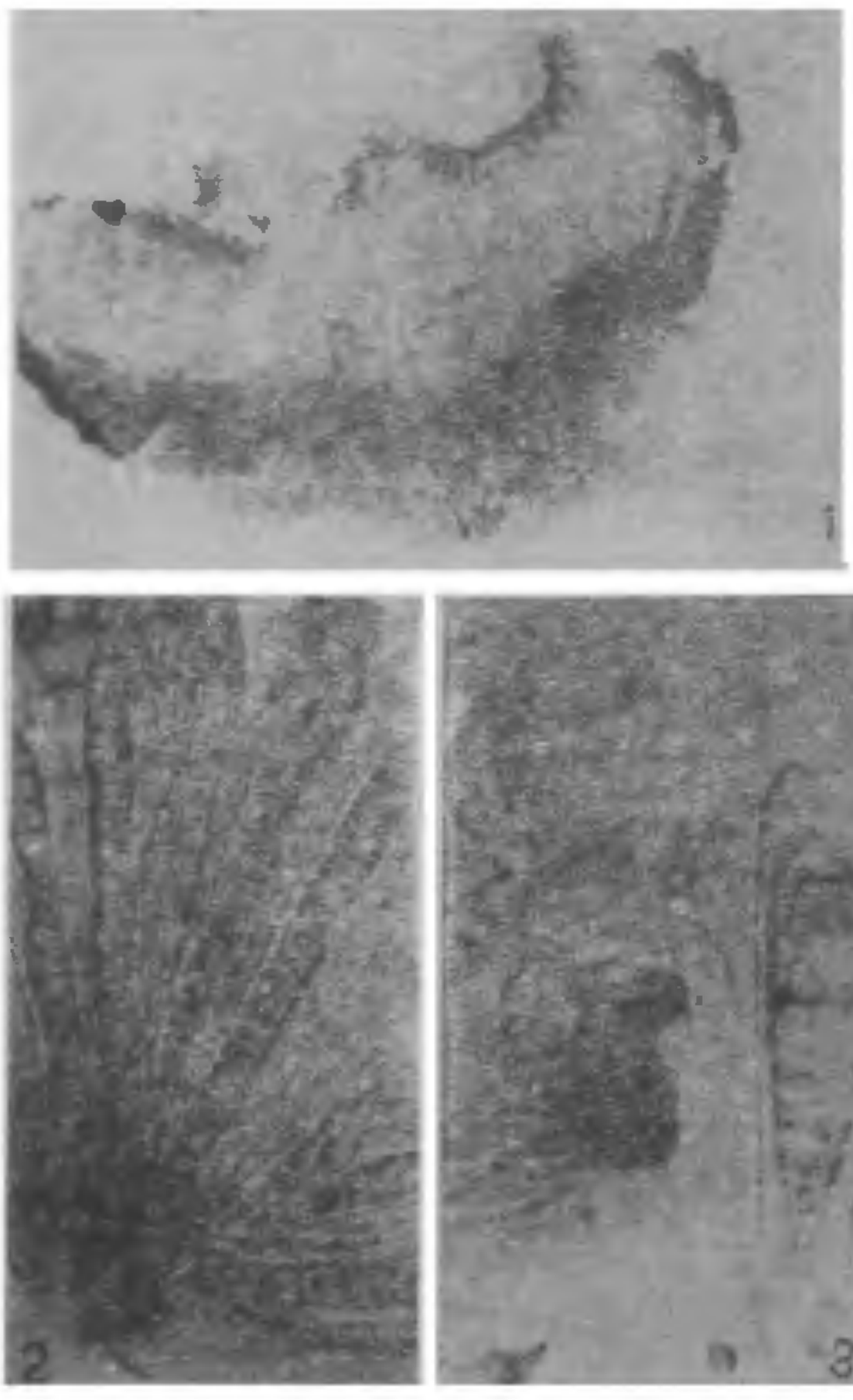
1. Butler, E. T., *Mycologia*, 1940, **B32**, 791.



Figures 1–3. **1.** Vertical section of the ascocarp × 110. **2.** Asci, pseudoparaphyses and epithecium × 480. **3.** Ascus tip, ascospore and epithecium × 1120.

RAPHIDE CRYSTALS IN THE EMBRYOS OF *SCILLA INDICA* BAKER (LILIACEAE)

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RAPHIDE idioblasts occur in many plants including most organs and tissues. Their occurrence, however in the embryos has not been so far reported in the literature[1–3]. In the course of cytological and embryological studies on different populations of *Scilla*, the presence of raphide bundles was noticed in the embryos of *Scilla indica*, collected from Yadavani in Tumkur District of Karnataka State.

Repeated examinations of the permanent slides and also whole mounts of the material from the same population, revealed the constancy of raphide crystals (figures 1–7). Their occurrence as idioblasts in the embryos warranted a detailed study.

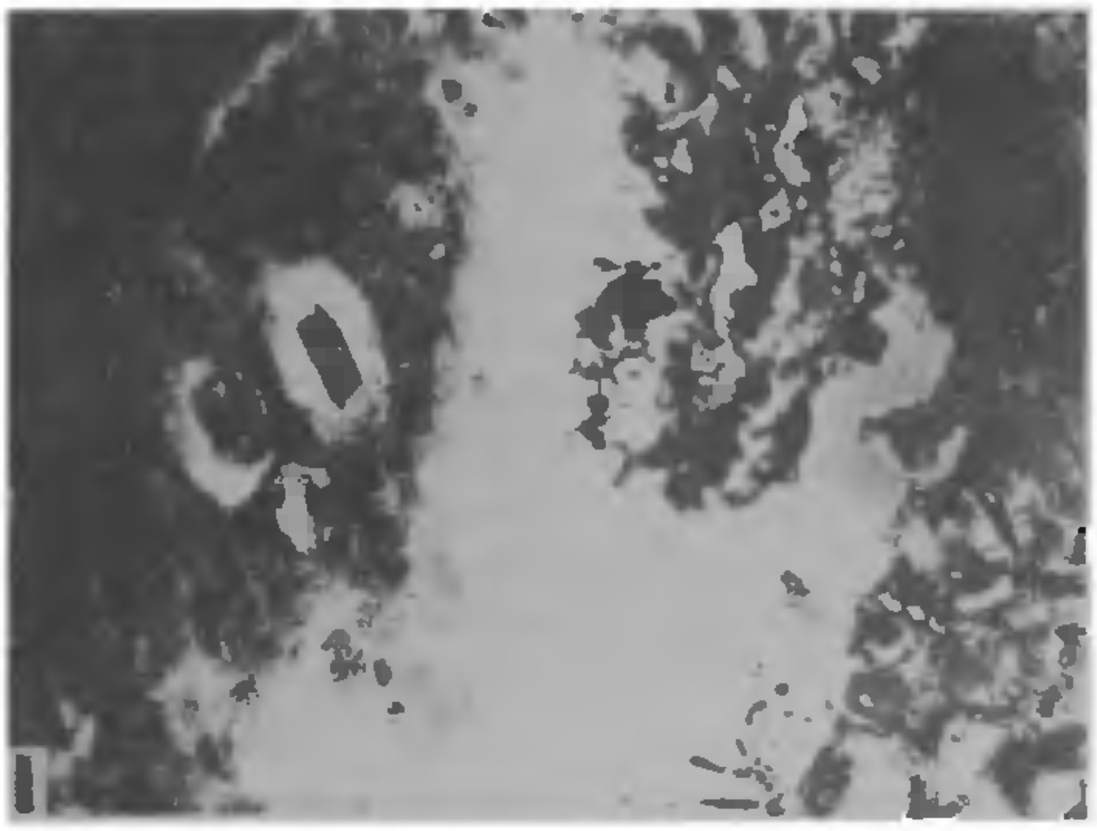
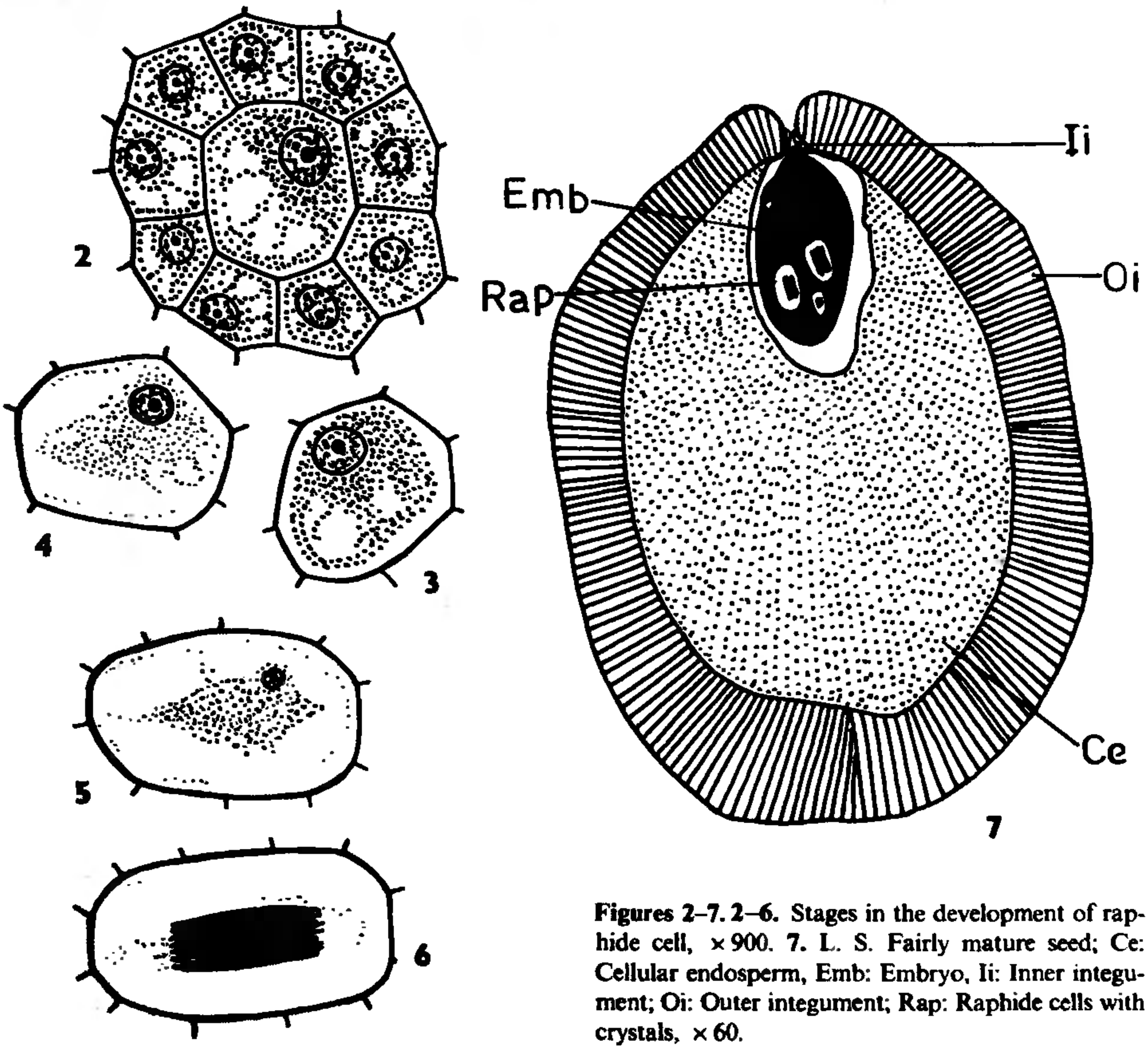


Figure 1. L. S. Fairly mature seed, showing young embryo and raphide crystals × 50.

In young embryos raphide cells were recognised by their characteristic size, shape and peripheral position. Besides, they show an enlarged nucleus, dense mucilagenous-cytoplasmic material and invariably they are longer and broader than the adjacent parenchyma cells (figures 2–6). Further development is rather rapid with the result that the raphide cell matures early, before the embryo is fully formed. The raphide cells were subjected to prolonged hydration for more than an hour to expel the crystals. Thus, the separated crystals were insoluble in acetic acid but soluble in iron alum. Further, the disappearance of raphides under the treatment of HCl, H_2SO_4 and HNO_3 proved that they are calcium oxalate crystals.

The occurrence of raphides in young embryos is



Figures 2–7. 2–6. Stages in the development of raphide cell, × 900. **7.** L. S. Fairly mature seed; Ce: Cellular endosperm, Emb: Embryo, Ii: Inner integument; Oi: Outer integument; Rap: Raphide cells with crystals, × 60.

intriguing and that too in a population confined to a single locality. In this connection, further correlation studies between raphide idioblasts formation and early growth and differentiation of embryo is suggestive of a possible clue for their precocious or belated formation in the plant organs and tissues.

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6 June 1983

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3. Metcalfe, C. R. and Chalk, L., *Anatomy of dicotyledons* Vol. I and II (Oxford Clarendon Press), 1957.

THE GENESIS OF EMBRYO IN *UTRICULARIA BIFIDA* LINN.— A REINVESTIGATION

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THE genesis of embryo is exceptionally diversified in species of *Utricularia* L. However, basing on the early proembryonal stages, three principal types—the Onagrad, the Solanad and the Chenopodiad—are hitherto known in the genus[1–7]. Further, infrequent occurrence of other specific types may also occur in the same species[5,6]. Recently in *Utricularia bifida*[7], collected from Purulea (Bihar), both Chenopodiad and the Onagrad types of embryogeny have been described. To check this, the same species collected from Vazeedu, Cumbum Taluq, Andhra Pradesh, the present study was undertaken and the results are rewarding.

As in other species of the genus[1–7] the zygote elongates into a long tube with the nucleus positioned in the bulbous apex of the zygote (figures A–C). The first division, which is transverse, is initiated in the zygote only after the *ab initio* cellular endosperm has become 10-celled (figures D, E), thus evidencing a delayed division of the zygotic nucleus. Consequently a two-celled proembryo with the apical cell *ca* and a long tubular basal cell *cb* is formed (figure F). These cells soon divide to form a proembryo with four superposed cells *l*, *l'*, *m* and *ci* (figure G). This is the end of the second cell generation. The proembryonal tetrad belongs to the C_2 category of Soueges[8]. However, in a few preparations the segmentation of the cells of the two-celled proembryo occurs successively rather than simultaneously (figures H, I). At the third cell generation the tiers *l*, *l'* and *m* segment longitudinally and the cell *ci* transversely forming two superposed cells *n* and *n'* (figures J, E). Soon the quadrants are organised in *l*, *l'* and *m* whereas *n* divides once along longitudinal plane resulting in two juxtaposed cells and *n'* along transverse plane organising two superposed cells *o* and *p* (figures L, M). However, in a few preparations the tier *n* segments transversely, instead longitudinally, resulting in linearly aligned cells *h* and *k* (figure N). This represents the end of fourth cell generation and the proembryo becomes 16-celled and the cells disposed in either six tiers (figure M) or seven tiers (figure N). Further divisions in the tiers *l*, *l'*, *m* and *n* are very erratic and consequently an undifferentiated pear-shaped embryo is developed (figures O–W) and the major part of the embryo (figure W) comprises large polygonal cells abundantly rich in starch grains. The only discernible differentiation in the embryo is the occurrence of a region of small meristematic cells at the region shown in figure W, and it is supposed that this region organises the plumule in future. The outer walls of the epidermal cells, which lie free from the seed coat of the ripe seed, of the embryo become cutinized (figure W). The suspensor, which is distinctly differentiated during early ontogeny (fourth cell generation) of the embryo (figures M, N), becomes gradually inconspicuous and withers away by about the time a mature embryo is formed (figure W) and finally the remnants even are lost.

Thus, the derivatives of *ca*, *m* and *n* are involved in the formation of the embryo proper, whereas the daughter cells of *n'* form the uniseriate three-celled ephemeral suspensor (figures K–W). Thus, the embryogenesis corresponds to the period I Megarchetype III in the Series C_2 of the embryonic classification of Soueges[8] or to the Chenopodiad pattern keying to the Chenopodiad variation of Johansen[4] as there has been no differentiation of epiphyseal initial in the tier *l* and this can be re-