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HYPOSTASE IN CYPERACEAE

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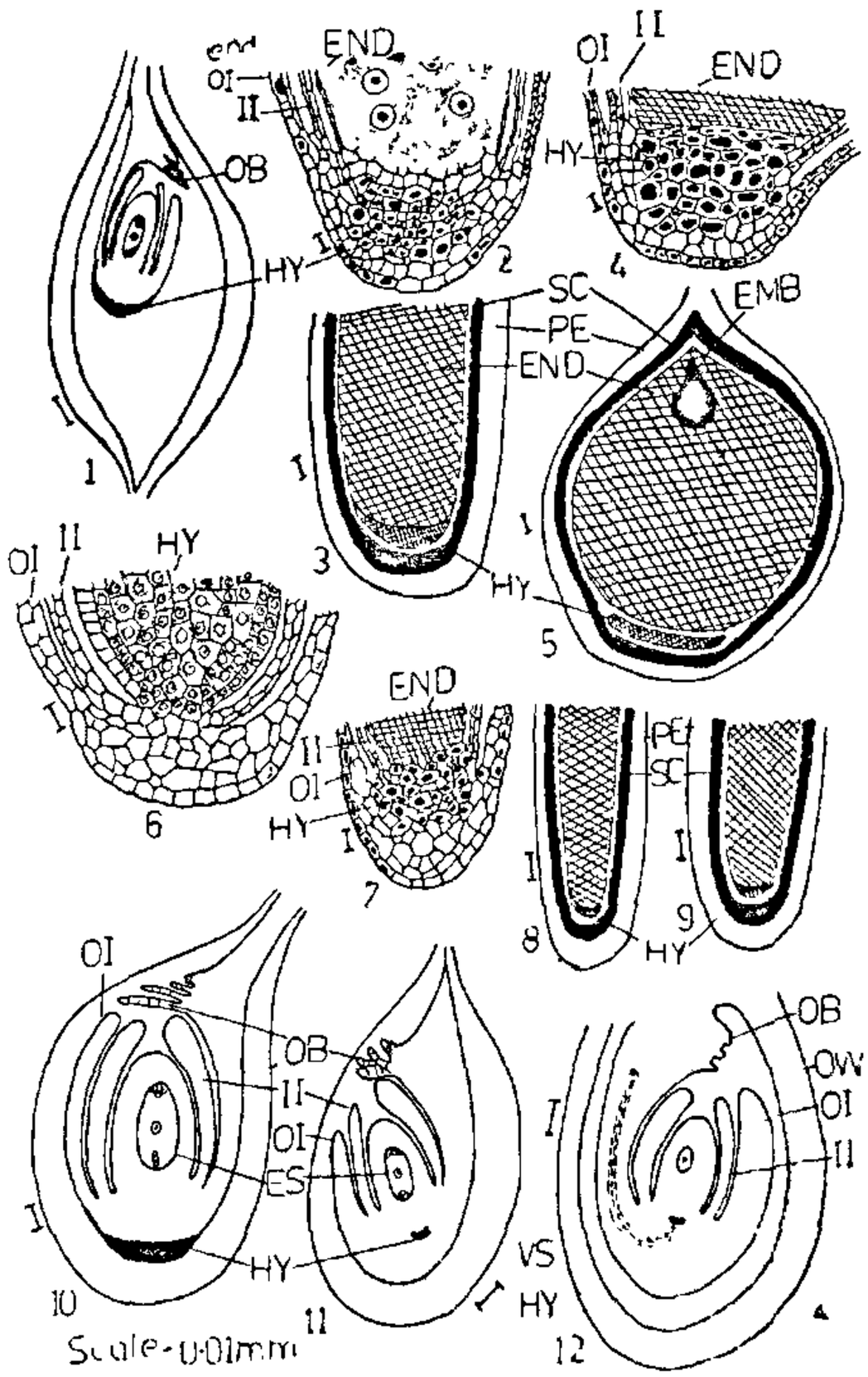
The family Cyperaceae has attracted the attention of botanists due to the unique mode of pollen development and also the embryogeny which conforms to Juncus variation of Onagrad type. While studying the embryological characters in the family, the presence of hypostase is noticed uniformly in the following taxa investigated by the author: *Pycreus pumilus* Nees., *Cyperus alternifolius* Willd., *Mariscus paniceus* Vahl., *Eleocharis atropurpurea* Kunth., *Fimbristylis cymosa* R. Br., *Scirpus supinus* Linn., *Eriophorum comosum* Wall., *Fuirena ciliaris* Linn, *Lipocarpha sphacelata* Kunth., *L. argentea* Br., *Remirea maritima* Abul. and *Scleria lithosperma* Roxb.

A group of nucellar cells at the chalazal end of the ovule became prominent and differed from the adjoining cells, having dense cytoplasm with distinct nucleus (Figs. 2, 4, 6, 7). This tissue was normally located at the chalazal end wherefrom the integuments originated. During seed development the cells in this region get enlarged and became somewhat thickened. After fertilization these cells get filled with tanniniferous granular deposits. Ultimately they were completely packed with tannin (Figs. 1–5, 7–12). In mature seeds, cells of this region were devoid of nucleus and cytoplasm.

The hypostase normally appeared bowl shaped, except in *Eleocharis atropurpurea* where it was saucer-shaped (Fig. 5). It persisted as such in mature seed. This was the only nucellar portion persisting in the mature seed (Figs. 1–12). The vascular supply of the ovule terminated at the base of hypostase (Fig. 12).

The presence of hypostase in the ovule of many angiosperms is well known. This structure has since been recorded in the family by different workers[3,6,7]. Various roles have been attributed to this structure. Van Tieghem[8] considered that these cells are resistant to digestion and possibly prevent the destruction of the nucellus in this area. Johansen[2] stated that the hypostase controls the entry of nutrients into the ovule. According to Goebel[1] it is concerned with water economy of the embryo sac. Netolitzky[5] designated it as 'chalazal corl. tissue' having mechanical function. Khanna[3] stated that it provides mechanical



Figs. 1–12. Hypostase in Cyperaceae. Fig. 1. *Pycreus pumilus* Nees. Fig. 2. *Cyperus alternifolius* Willd. Figs. 3, 4. *Mariscus paniceus* Vahl. Fig. 5. *Eleocharis atropurpurea* Kunth. Fig. 6. *Fimbristylis cymosa* R. Br. Fig. 7. *Scirpus supinus* Linn. Fig. 8. *Eriophorum comosum* Wall. Fig. 9. *Lipocarpha sphacelata* Kunth. Fig. 10. *Fuirena ciliaris* Linn. Fig. 11. *Remirea maritima* Abul. Fig. 12. *Scleria lithosperma* Roxb. Figs. 1, 10, 12. L.S. ovule. Figs. 2, 4, 7. L.S. mature fruit (lower part) showing tannin filled cells of hypostase. Figs. 3, 8, 9. L.S. of mature fruit (lower part) showing well-developed hypostase. Fig 5. L.S. of mature fruit showing saucer-shaped hypostase. Fig. 6. L.S. ovule (lower part) showing developing hypostase. (END = endosperm, ES = Embryo sac, HY = hypostase, II = inner integument, OB = obturator, OI = outer integument, OW = ovary wall, PE = pericarp SC = seed coat, VS = vascular supply).

strength to seed instead of being of any value in the nutrition of the developing seed, but Shah[7] believed that hypostase served as the tannin diffusing centre for the seed coat layers. The present author believes that hypostase in Cyperaceae with tannin packed cells had only a mechanical role. Further histochemical studies would help to explain its significance.

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DEVELOPMENT OF FEMALE GAMETOPHYTE IN *OUGENIA OOJEINENSIS* (ROXB.) HOCHREAT

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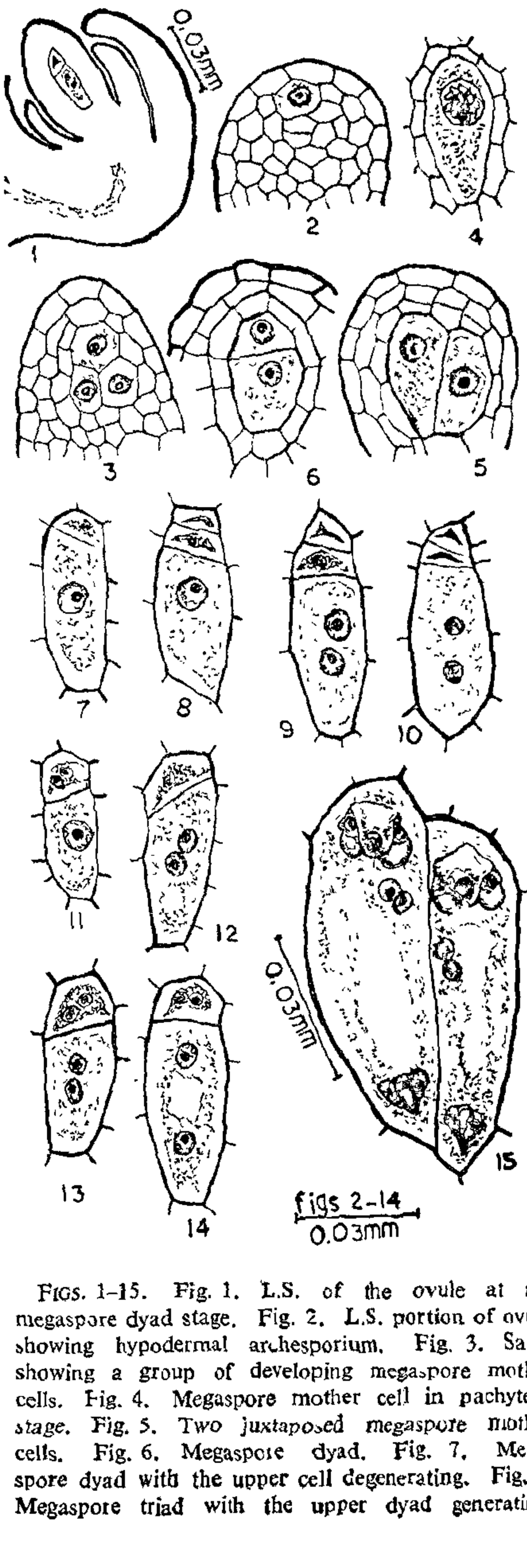
Ougenia oojeinensis is a medium sized tree belonging to the tribe Hedysareae of Papilionoideae and exhibits cauliflory. The ovule is anatropous, crasinucellate and bitegmic with the vascular supply ending near the chalaza (Fig. 1). The archesporium in the ovule is hypodermal, represented by a single cell or a plate of three or four cells (Figs. 2, 3). The archesporium cuts off a parietal cell; the fully developed megaspore mother cell has dense contents and is very conspicuous (Figs. 4, 5). Meiosis I produces a dyad with the upper cell being much smaller than the lower (Fig. 6). The second meiotic division in the dyad cells is variable and results in the development of both bisporic and monosporic types of embryo sac.

Among the ovules showing the Polygonum type of development, the upper dyad cell degenerates without



FIGS. 1–15. Fig. 1. L.S. of the ovule at the megaspore dyad stage. Fig. 2. L.S. portion of ovule showing hypodermal archesporium. Fig. 3. Same showing a group of developing megaspore mother cells. Fig. 4. Megaspore mother cell in pachytene stage. Fig. 5. Two juxtaposed megaspore mother cells. Fig. 6. Megaspore dyad. Fig. 7. Megaspore dyad with the upper cell degenerating. Fig. 8. Megaspore triad with the upper dyad generating.