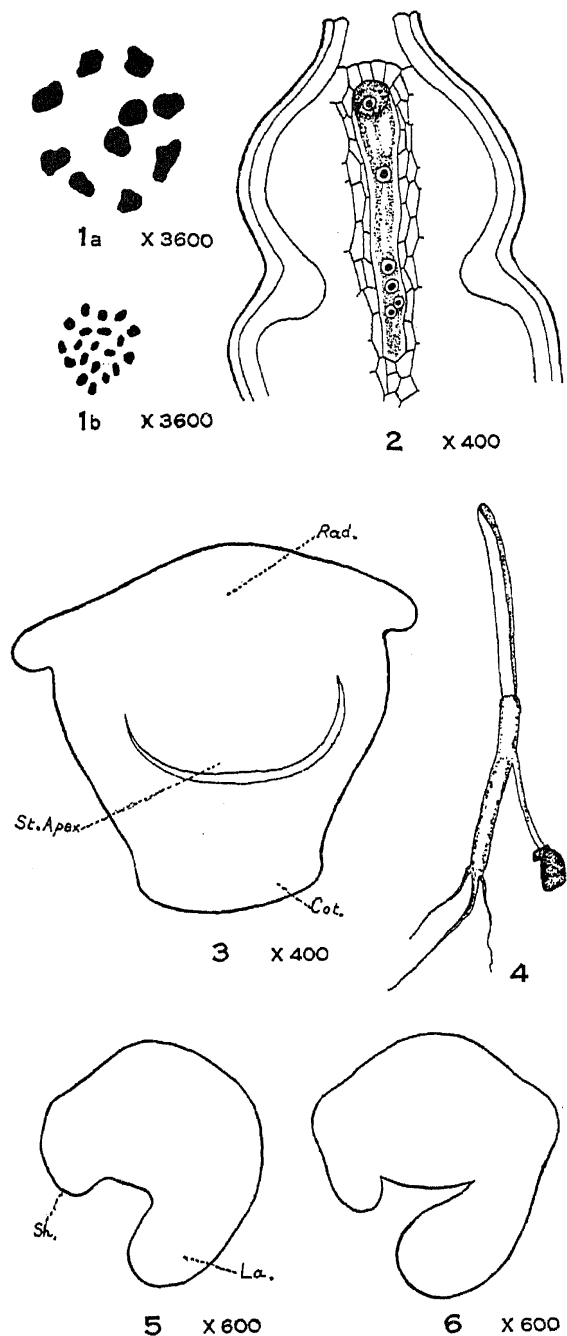


benghalensis are not found in the periplasmodium of the plants studied by the writer. The microspores contain only two nuclei at the shedding stage. The division of the generative nucleus, which usually becomes sickle-shaped, takes place in the pollen tube.



Double fertilisation has been observed in *Cyanotis cristata*. During syngamy the male nucleus shows spireme condition of its chromatin, while the egg nucleus remains in the resting stage.

The embryo of *Cyanotis cristata* is at first merely a spherical mass of cells, thus conforming to the Pistia-type. The sheath of the cotyledon is formed early as a circular outgrowth from the peripheral zone of the apical portion of the developing embryo; the lamina of the cotyledon subsequently

arises as a lateral outgrowth on the sheath (Fig. 5). The stem apex then takes its origin in the central depression of the apical or terminal portion, which alone thus forms both the cotyledon and the stem apex (Fig. 6). The growth of the cotyledonar lamina gradually extends by its lateral margins, which merge with its sheath. In the mature embryo, the cotyledon forms a complete covering over the vegetative point. The radicle is differentiated from the central portion of the broad proximal end (Fig. 3). During germination the cotyledon remains in the seed as a spherical structure, and develops a long thread-like stalk, connecting the seedling with the seed (Fig. 4).

The development of the embryo of *Cyanotis cristata* briefly described here is in accordance with the view adopted by Worsdell† for the embryo situation in the *Commelinaceae* and the *Dioscoreaceae*. On the other hand, Solms-Laubach‡ stated that the cotyledon is lateral in origin in the above-mentioned families.

I am indebted to Dr. M. A. Sampathkumaran under whose direction this work has been done.

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Contribution to the Morphology of *Ottelia alismoides* (Pers.).

PLANTS of the family *Hydrocharitaceae* have received considerable attention since the time of Fischer¹ (1880), who has worked out the development of embryo-sac in *Eloдея canadensis*. Particularly interesting and exhaustive among them is the work on *Vallisneria spiralis*, which is the classic example to illustrate water pollination. Recently, Rangasami² has worked out the complete life-history of this plant. Palm²

† Worsdell, W. C., "The Morphology of the Monocotyledonous Embryo and that of the Grass in particular." *Ann. Bot.*, 1916, **30**, 509-524.

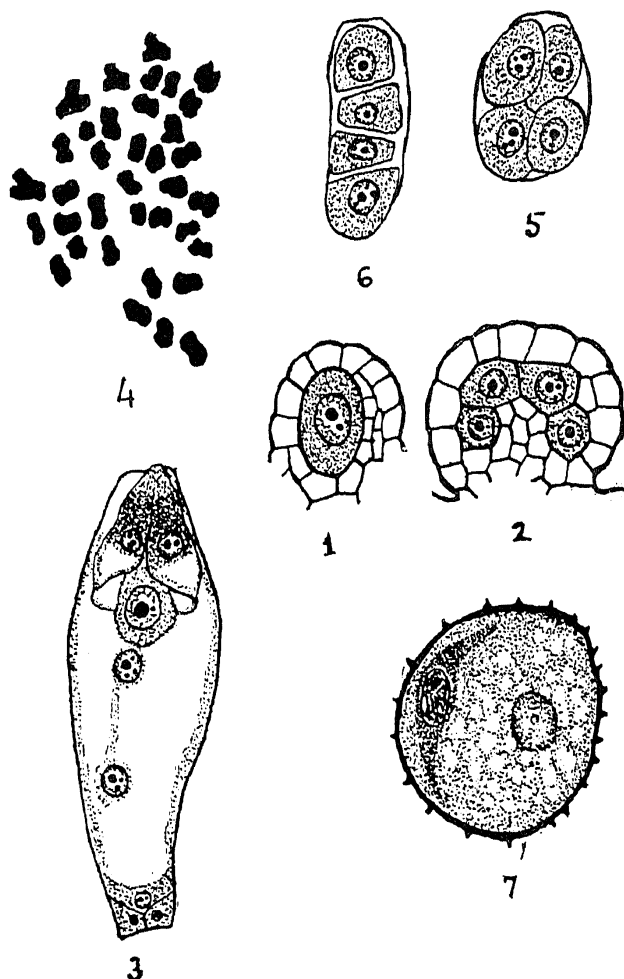
‡ Solms-Laubach, H. Grafzu, "Über monocotyle Embryonen mit scheitelbürtigen Vegetationsspunkt." *Bot. Zeit.*, **36**, 1878. (Abstracted by Schnarf, K., *Embryologie der Angiospermen*, Berlin, 1929).

¹⁻² Extract from Schurhoff's *Die Zytologie der Blüten Pflanzen*. 1926.

³ Contribution to the Life-history of *Vallisneria spiralis*, *Journ. Ind. Bot. Soc.*, 1934.

has reported the development of embryo-sac in *Oitelia lancifolia* to be of the usual Helobiae type. Some of the observations made below show interesting variations from the species studied by him.

Megasporogenesis:—Usually, there is a single hypodermal archesporial cell (Fig. 1); but occasionally it may be multi-cellular



(Fig. 2). In any case, only one develops and directly becomes the megaspore mother cell. After the usual heterotypic divisions, a linear tetrad is formed of which the chalazal megaspore develops to form a typical 8-nucleate embryo-sac (Fig. 3). The synergids are very conspicuous; each, being pyriform in shape, consists of a hyaline beak and a large vacuole at the base (Fig. 3). The egg is suspended between these two synergids. The antipodals are organised into cells (Fig. 3). The two polar nuclei are half-fused by the time the pollen tube enters.

Microsporogenesis:—The earlier development of the anther is normal. The tapetum ultimately forms a periplasmodium with isolated cells. A similar case is reported by me in *Limnophyton obtusifolium* (Miq.)⁴.

⁴ Life-history of *Limnophyton obtusifolium*, *Curr. Sci.*, 1933, 2, 53.

The endothecium is ill-developed. The chromosome number is 36 (haploid) (Fig. 4). The tetrads of microspores are usually isobilateral (Fig. 5), but frequently they are arranged in a linear series which is rather peculiar (Fig. 6). Another interesting feature is the structure of the pollen grain (Fig. 7). While all the members of the *Hydrocharitaceae* so far investigated show three nuclei in the pollen grain at the time of shedding, in the case of *Oitelia alismoides* a tube nucleus and a generative cell are found.

Grateful acknowledgment is due to Dr. M. A. Sampathkumaran for helpful criticism and guidance.

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Specificity of Parasiticism by *Eublemma amabilis*.

IMMS AND CHATTERJEE¹ were the first to realise that "no appreciable improvement is likely to result in lac cultivation until experiments have been conducted with reference to the elimination of insect enemies." There are at once two ways open in following such an enquiry, one of eradicating the enemies, the other of making the lac insect more resistant. The former appeals to an infectionist who would argue, just as a tiger is all-powerful in comparison with a buffalo so that the latter's health cannot be given the least thought in considering its having fallen a prey to a tiger; likewise no parasite would spare a host if it is unprotected and within easy reach. He would also grant as a corollary it is not only one species but several insects which can be attacked by the same parasite if the hosts are equally weak and helpless. The other line of research would be taken up by a predispositionist who would emphasise the somatic condition of the parasitised insect as compared with an immune host. To give a concrete example Sreenivasaya² showed that a deficiency of Calcium in the food of the lac insect resulted in an increased death rate from parasiticism. Apart from physiological factors of predisposition

¹ Imms and Chatterjee, "Structure and Biology of *T. lacca*," *Ind. For. Mem.*, 1915, 3, Pt. 1.

² M. Sreenivasaya, "The Fundamentals of intensive Lac Production," *J. Sc. Assoc., Maharaja's Col., Vizianagaram*, 1924, 1, 436.