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STUDIES ON THE PEARL OYSTER, *PINCTADA FUCATA* (GOULD) OF THE GULF OF KUTCH

III. Preliminary Investigation on Pearl Culture

INDIAN pearl fishery is restricted to two regions namely the Gulf of Mannar in Southern India and the Gulf of Kutch (Jamnagar district) in Gujarat. The pearl fishery of Gulf of Kutch is comparatively small and is at standstill for the past few years. Unlike the pearl oysters of the Gulf of Mannar, the pearl oyster *Pinctada fucata* (Gould) of the Gulf of Kutch is intertidal in habitat and could easily be picked up. Possibly because of this, the pearl fishery at Jamnagar coast flourished some years back. In spite of the existence of potential grounds of the pearl oysters, so far, no experiments centering around pearl culture have been undertaken. With a view to investigating the potentiality for pearl formation, various indigenously prepared nuclei in comparison with imported Japanese nuclei were employed in the pearl oyster, *P. fucata*.

One hundred and eighty-five live *P. fucata* (3 to 5 years) were collected from Piroton, Ajad, Deeda and Moovada islands of the Gulf of Kutch during October-November 1974. The pearl oysters were maintained in protected marine impoundments at Sikka coast, Jamnagar, Gujarat, by keeping them in Japanese designed rafts (under 3′ of water). No mortality was reported.

During January 1975, the oysters were taken out in groups of 10 to 15 from the rafts and after washing, were exposed to bright sunlight. when the oysters opened the valves within five minutes, a piece of wood (4″ long and 1/2″ wide with tapering) was inserted inside each oyster kept in trays filled with sea water. Nucleus of each type was inserted in the gonadial region of each oyster over which mantlepiece (1 cm square size) was kept. Precautions were taken to see that the soft body parts of the oysters were not injured. Oysters were then carefully transferred back to the raft. Each oyster was kept separately in a petridish (9″ dia.). The types of nuclei (2-3 mm dia.) used in the present study are given in Table I.

TABLE I

Results of pearl culture

Types of the nuclei inserted	% of Rejection	% of Retention	% of Mortality
1. True pearl	40	60	44
2. Pearl from *Placuna placenta*	60	40	30
3. Imported Japanese Nuclei	80	20	36
4. Toothpastefoil	80	20	00
5. 'Mala moti'	20	80	00
6. Partially coated pearls	100	00	20

Long sterilised instruments were used. About 50 pearl oysters of age group 3 to 5 years were used for seeking results for each type of the nuclei as mentioned in Table I. The nuclei of all types inserted were ejected within a week's time after the operations (Table I). After this period none of the pearl oysters ejected the nuclei. This indicated that the operated pearl oysters should be kept under observation for a week (rejection period) after insertion of nuclei.

Algarswamy and Quasim[1–3] maintained the pearl oyster, *P. fucata* of the Gulf of Mannar in standing sea water in the laboratory before, and, after operations and narcotised the pearl oysters before the operations. They also reported that the operated pearl oysters ejected the implanted nuclei (4 hours to 2–3 days after operation).

The pearl oysters implanted with white holed nuclei (Used in Mala) and with particles prepared from foil suffered no mortality (Table I) but rejection of the foil nuclei was 80%; in the case of the former, the rejection was 20% and the retention of the nuclei resulted in beautiful lustrous pearls with bluish tint (80%). Among other types of the nuclei tried, true pearls (pearls of small size) deserve attention. In this case the retention was 60%, rejection 40%, and mortality 44%. Mortality seems to be a factor of serious concern here. Similarly partially coated nuclei were also rejected by the pearl oysters and mortality was 20%. Imported Japanese nuclei caused 36% mortality, and 80% rejection. From these studies it can be stated that imported nuclei from

Japan are not suitable for pearl culture in *P. fucata* of the Gulf of Kutch. Further work is in progress.

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MICROSPOROGENESIS IN *GILIA CAPITATA* SIMS

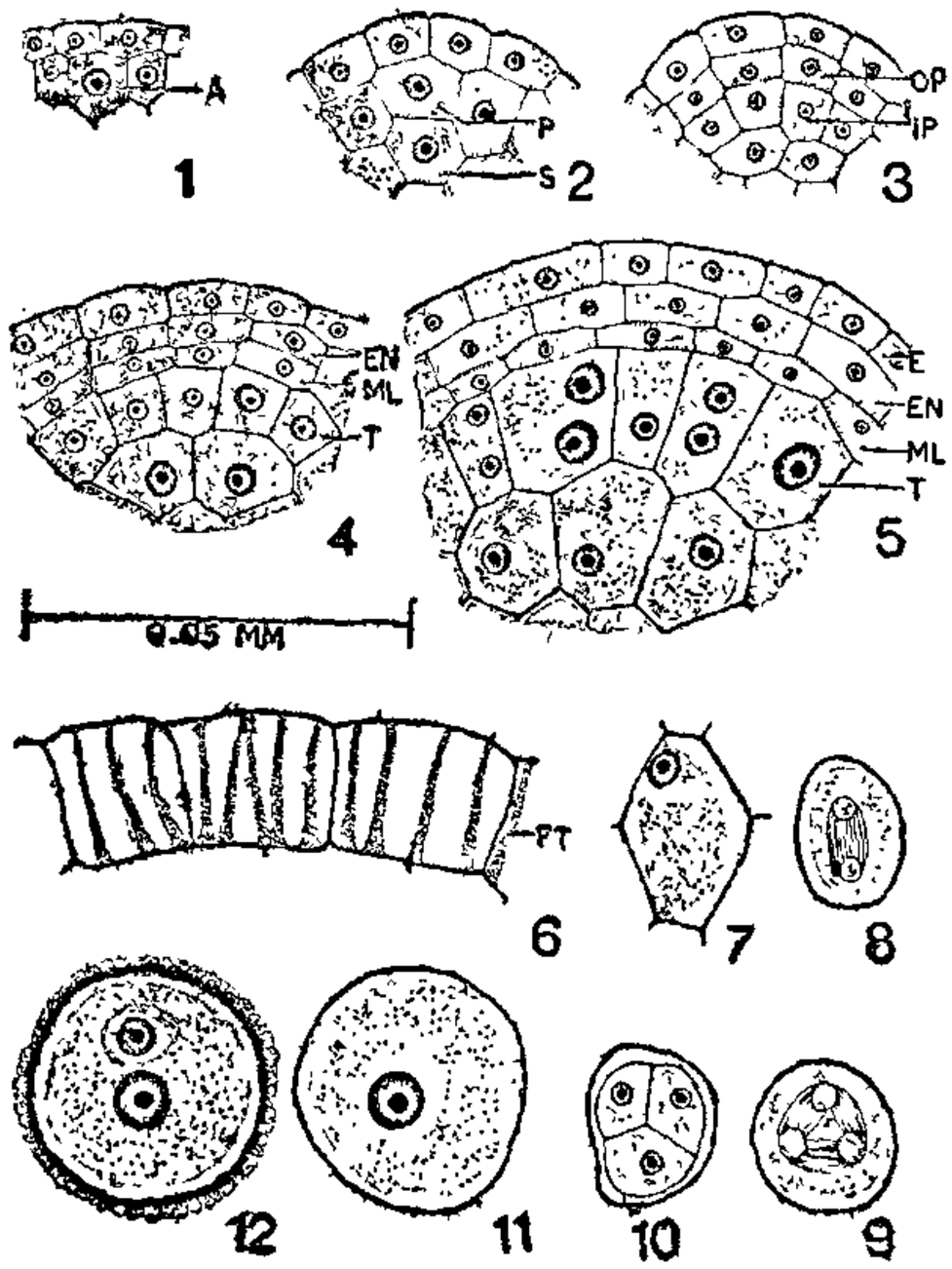
THE embryology of Polemoniaceae has received very little attention from earlier workers[1]. Souèges[2-4] described the embryogeny in *Polemonium caeruleum*, while Sundar Rao[5] worked out the development of its male and female gametophytes. This note reports on the microsporogenesis in *Gilia capitata*.

A mature anther consists of an outer layer of epidermis, single layer each of endothecium and middle layer and an innermost tapetum (Fig. 5). The cells of the epidermis are cuticularized while those of the endothecium develops characteristic fibrous thickenings (Fig. 6). The cells of the middle layer are rectangular and are ephemeral and the tapetal cells are two-nucleate which finally become one-nucleate by the fusion of nuclei.

A young anther is a homogeneous mass of parenchymatous tissue. During further development, it becomes four lobed and in each lobe a single hypodermal archesporial cell is differentiated. This is distinguishable from other cells by larger size, dense cytoplasm and conspicuous nucleus (Fig. 1). The first periclinal division of the archesporium results into an outer primary parietal cell and an inner primary sporogenzous cell (Fig. 2). The outer primary parietal cell divides periclinally to form a secondary outer and a secondary inner parietal layer (Fig. 3). The outer secondary parietal layer gives rise to two layers by a periclinal division, the outer forms the endothecium and the inner the single middle layer (Fig. 4). The inner secondary parietal layer develops directly into the tapetum. The development of the anther wall conforms to the dicotyledonous type[1].

The sporogenous cell divides to form a few cells and the last division forms the microspore mother cells. Each microspore mother cell undergoes the usual reduction division simultaneously to form a tetrahedral tetrad (Figs. 7-10).

The microspores are nearly triangular at the time of separation from the tetrad and at maturity become almost round (Fig. 11). A young microspore is rich in cytoplasmic contents and has a large nucleus. Soon it enlarges considerably and the exine develops ornamentations (Fig. 12). Its nucleus divides to give rise to a vegetative and a generative nucleus. The pollen grains are shed at bicelled stage (Fig. 12).



FIGS. 1-12. Microsporogenesis in *Gilia capitata*. Figs. 1-5. Development of anther wall layers and stages in microsporogenesis. Fig. 6. Cells of the endothecium showing fibrous thickenings. Figs. 7-10. Stages in the development of the microspore. Fig. 11. A microspore. Fig. 12. Two celled pollen grain. (A—Archesporial cell; E—Epidermis; EN—Endothecium; FT—Fibrous thickenings; IP—Inner secondary parietal layer; ML—Middle layer; OP—Outer secondary parietal layer; P—Primary parietal layer; S—Primary sporogenous layer; T—Tapetum.)

During maturation of the anther, the epidermal cells shrivel and the cells of the middle layer disintegrate. The anther wall at the time of dehiscence comprises of a degenerated epidermis and an endothecial layer. The dehiscence is by a longitudinal slit.

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