

# Post Fertilization Changes in *Mimosa pudica* Linn

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**Abstract:** The Post fertilization changes in *Mimosa pudica* Linn. was studied. It is observed that ovules are anatropous, bitegmic and crassinucellate. Embryosac is polygonum type. Endosperm is abinitio nuclear. Endosperm shows haustoria. Endosperm is mostly used by developing embryo. The first division of the zygote is transverse. The inner integument is completely crushed during maturation of the seed. Outer integument is two layered thick, it is of multiplicative type of integument.

**Keywords:** Embryo, Seed, *Mimosa*.

## I. INTRODUCTION

Seed is an important constituent in the complicated network of food chains. It forms a link between the successive generation. It is a source of food, spice, condiment, fibres, medicinal product and industrial raw material etc. Therefore embryologists have taken interest in the development, nature and function of the seeds.

Considerable embryological investigations are carried out in India. *Mimosa pudica* Linn. embryologically investigated by Narasimhachar [1 & 2]. There was no account of seed formation. The seed development aspect was neglected. Therefore this investigation has been undertaken to study the post fertilization changes i.e. seed development.

## II. MATERIALS AND METHOD

The plants of *Mimosa pudica* Linn. were collected from the Botanical Garden of Maharaja Sayajirao Gaikwad College, Malegaon Camp. The flowers and fruits grow well from August to November. The material was collected at 9 am. in the morning fixed in FAA (Formalin, Acetic Acid, Alcohol) fixative for embryological studies; dehydration was done by using different grades of alcohol. Usual methods of embedding were followed. Paraffin blocks were cut on Rotary microtome. For cutting the sections, the mature seeds were boiled for 5 to 6 hours in wax and then cut on microtome. The sections were stained with Iron - alum -haematoxylin and destained in a saturated solution of Picric Acid. Slides were passed through xylol, and finally mounted in Canada Balsam.

## III. RESULT AND DISCUSSION

The ovule is crassinucellate, bitegmic and anatropous (Fig. I). This character is shared by several taxa of the family Mimosaceae. However, Narasimhachar [2], Davis [3] stated that ovules may be hemianatropous to anatropous. In present study a rudimentary funicular obturator was observed.

Micropyle is organized by both the integuments. There is formation of exostome and endostome which are not in one line. Narasimhachar [2] did not describe the formation of exo and endostome. Embryo sac development is of polygonum type which has been confirmed in the present study (Fig. II & III). Narasimhachar [1] reported occasional presence of twin Embryo sac. The reserved food material is in the form of starch. In the *Mimosa pudica* Linn. endosperm development is nuclear type. Later on Embryo sac consists of 2/3 cellular and 1/3 coenocytic free nuclear endosperm [2]. However it was seen that the lower end of the endosperm also becomes cellular. Leaving only bulbous endosperm, haustoria with central vacuole which is pointed at the chalazal end (Fig. IV). The mature embryo is dicotyledonous, straight and showed a presence of star shaped druses, which are reported for the first time for this taxon (Fig.V).

The development of seed aspect was completely neglected by Narsimhachar [2]. The inner integument of the ovule is uniformly two layered thick at the mature embryo sac stage. It consist of thin walled polygonal cells, which are much vacuolated. It is non multiplicative type of structure, which showed signs of degeneration in the post fertilization stage. No trace of inner integument was seen at Cordate stage of embryo (Fig. IV). In *Mimosa pudica* Linn. at the mature stage the cells of the outer epidermis of the outer interment, further elongates in radial direction. They are more than

twice the size as compared to that at cordate stage of embryo. Their radial walls are of cellulose in nature. This enlarged layer of compactly arranged cells is called linea lucida by Corner [4]. There was no mucilage outside the linea lucida. The hypodermis forms the characteristic hour glass cells of Mimosaceae in *Mimosa pudica* L. These cells have intercellular spaces, they have peripheral tannin and a small lumen (Fig. VI). This layer is also present in *Prosopis julifera* [5]. Differentiated hour glass layer is absent in *Pithecolobium dulce* [6].

Mesophyll tissue showed variation in respect of its extent and thickening in *Prosopis julifera* [5]. The cells become thick walled having large intercellular space in between them. The mesophyll cells (the inner epidermis gets inflated and showed peripheral tannin). The mesophyll cells in *Mimosa pudica* L. are tanniferous and the development is of exo testal type.

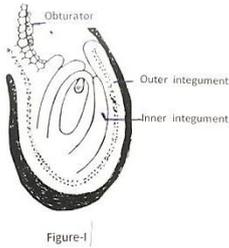


Fig. I) An anatropous bitegmic, crassinucleate ovule,

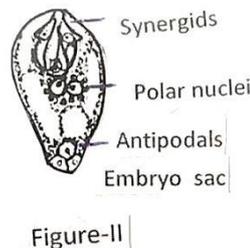


Fig. II) L.S of mature embryo sac

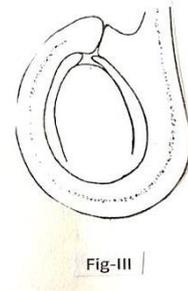


Fig. III) L.S of ovule after fertilization

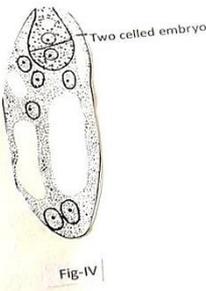


Fig. IV) Two, four celled and cordate stage embryo with endosperm haustoria

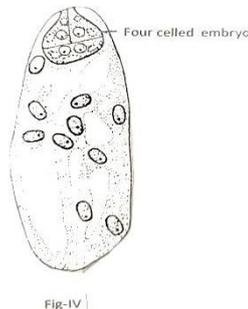


Fig. IV) Two, four celled and cordate stage embryo with endosperm haustoria

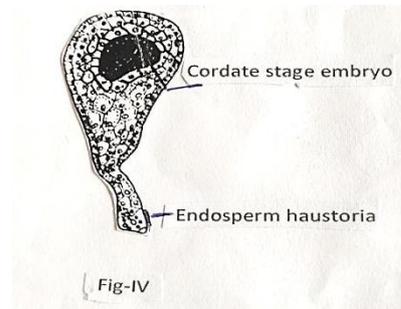


Fig. IV) Two, four celled and cordate stage embryo with endosperm haustoria

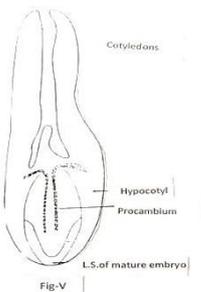


Fig. V) – L.S of mature embryo

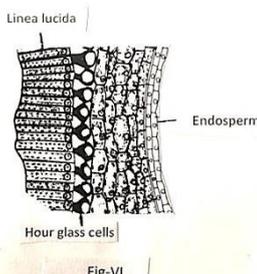


Fig. VI) L.S of seed showing seed coat

**IV. CONCLUSION**

The ovules in *Mimosa pudica* Linn. are anatropous, bitegmic and crassinucellate. Embryo sac is polygonum type. Endosperm is abinitio nuclear. Endosperm shows haustoria. Mostly the endosperm is utilized by developing embryo. Mature embryo is massive and straight. Testa of the seed is formed from outer integument along with palisade and hour glass cells.

**REFERENCES**

- [1]. Narasimhachar, S. G. (1948): Contribution to the Embryology of *Acacia farnesiana* L. (Wild Proceedings of Indian Academy of Sciences 28 B: 144 – 149).
- [2]. Narasimhachar, S. G. (1951): An Embryological studies of *Mimosa pudica* Linn. Ibid. 33 B: 192 – 198
- [3]. Davis, G. (1966): Systematic Embryology of Angiosperms John Wiley and Sons, INC New York
- [4]. Corner, E.J.H. 1976, The seeds of the Dicotyledones, Vol.I & II.; Cambridge university Press, Cambridge, London, New York, Melbourne.
- [5]. Deshpande, P. K. and Gomkale, K.D. 1982, Embryological studies in *Prosopis julifera* (S.W.) J.Ind. Bot.Soc.61:39-46. Endosperm and Embryo
- [6]. Deshpande P.K. and Gomkale, K. D. 1979 Systematic studies in *Pithecolobium dulce* Benth. Proc. Indian Sci. Cong. (65).