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Paper: III
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Fertilization in Pinus:

After a year of pollination, fertilization occurs. The pollen tube moves downwardly and reaches the neck of the archegonium. It then penetrates the neck and the tip of which bursts to discharge the two male gametes. One of the male gamete unites with the egg to form a diploid zygote.

New Sporophyte:

The zygote is the first cell of the sporophyte which germinates almost immediately after its formation. The zygote nucleus divides to form four free nuclei. These nuclei then moves to the bottom of the zygote where they divide again to form eight nuclei. Subsequently, walls appear between these nuclei except the upper two. Further divisions result in the formation of sixteen cells in four tiers; this sixteen celled structure is termed as the proembryo.

The upper most tiers of four open cells merges into the general mass of the cytoplasm to carry out nutritive function. The next tier of four cells is called rosette tier which is capable of forming abortive embryo; normally it supplies nutrients to the suspensor and the embryo.

The third tier of four cells constitutes the suspension tier. The lower most tier of four cells is the embryo tier. The cells of the suspension tier elongate to form four separate suspensors, each carrying an embryo cell at its tip. The cells of the embryo tier form the embryos. The elongated suspensors push down the embryos into the gametophytic tissue and thus help the later to receive their nutrients.

Each cell of the embryo tier divides to form four potential embryos and secondary suspensor. Formation of more than one embryo in each megasporangium is referred to as polyembryony. In fact, only one of these embryos attains maturity and the others undergo degeneration.

After fertilization, the integument and the megasporangium are converted into seed coat and seed respectively. The seed contains embryo, the membranous nutritive layer perisperm and kernel. The nutritive tissue lies surrounding the embryo. A mature embryo consists of a radical, a hypocotyl, several cotyledons and a plumule. The seed germinates under favorable conditions to form a new sporophyte. This type of germination is called epigeal germination.

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