

Topic: Polyembryony

B.Sc. Botany (Hons.) II

Paper: IV Group: B



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The occurrence of more than one embryo in the seed is known as polyembryony. Polyembryony is quite common among conifers (gymnosperms), but many species both of dicots and monocots (angiosperms) exhibit this phenomenon.

There are two main types of polyembryony -

- i. True polyembryony and
- ii. False polyembryony.

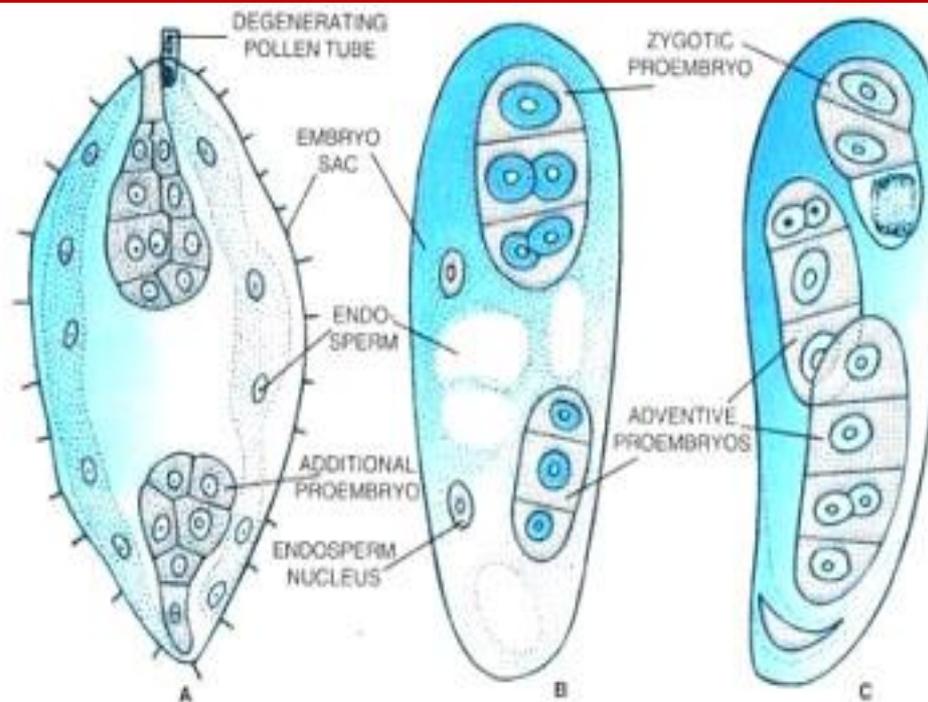
i. True Polyembryony:

The true polyembryony may be subdivided into two types:

- (i) **Cleavage polyembryony**, where the embryos arise within an embryo sac, either by a cleavage of the egg, or from the synergids, antipodals or endosperm;
- (ii) **Adventive polyembryony**, where the embryos arise from the tissues living outside the embryo sac, i.e., the cells of the nucellus or the integuments, but generally they come to lie within the embryo sac.

ii. False Polyembryony:

Sometimes the polyembryony occurs due to the presence of multiple embryo sacs within the ovule.



Polyembryony : A. Development of embryo from antipodal cells. B-C. Adventive pro-embryos developed from the cells of nucellus (they grow along with the zygotic embryos).

They may arise from:

- The derivatives of the same megaspore mother cell;
- From two or more megaspore mother cells, or
- From nucellus cells (i.e., apospory).

Importance of Polyembryony:

This phenomenon plays an important role in plant breeding and horticulture. Nucellar adventive polyembryony is of great value in horticulture, where the nucellar seedlings of Citrus have been proved to be better clones of orchard stock than cuttings.

On the other hand, the nucellar embryos are supposed to be free from disease, and the nucellar seedlings rejuvenate the vigour that is generally lost after continued cutting propagation. The adventive polyembryony is much useful in the propagation of the fruit trees, such as Citrus and Mango. The application of adventive embryos is also important for providing genetically uniform seedlings in fruit trees.

The haploids can be used for the development of homozygous diploid, which are of much value. Due to the practical value of haploids in plant breeding, the methods have been recognized for the artificial production of these embryos from the eggs or synergids.