

Polyembryony

Definition: The occurrence of more than one embryo in seed is known as polyembryony.

- This phenomenon was initially discovered by Leeuwenhoek (1719).
- Polyembryony is quite common among Conifers (Gymnosperms). But many species of both dicotyledons and monocotyledons

Ernst and Schaefer classified the polyembryony into two types:

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graph TD
    A[Ernst and Schaefer classified the polyembryony into two types:] --> B[True Polyembryony]
    A --> C[False polyembryony]
    C --> D[Induced]
    C --> E[Spontaneous]
    E --> F[↓ Naturally]
    D --> G[Induced artificially]
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True Polyembryony False polyembryony

Clearance Polyembryony Adventive Polyembryony

• True Polyembryony

The production of embryos within or by projecting into a single embryo sac is termed true polyembryony.

Cleavage Polyembryony:

- Where the embryos arise within an embryo sac either by a cleavage of egg or from the synergids antipodal cells or endosperms.

- Adventive Polyembryony: Where the embryos arise from the tissue lying outside the embryo sac.

- The cells of the Nucellus or the integuments but generally they come to lie within the embryo sac.

False Polyembryony

This type includes the cases in which two or more embryos are formed as a result of the development of the aposporic embryo sac.

Origin of embryos from synergids & antipodal cells:

- The embryos may also be produced from other parts of embryo sac such as synergids and antipodal cells.
- In most cases the synergids

became egg like to form the embryos with or without fertilization. (Lilium)

- Production of embryos from antipodal cell is rare.

origin of embryos from endosperms?

Treub (1898) in *balanophora*, woodworth in *Alnus* and others have reported the embryos developed from endosperm.

- embryos develop normally from egg.

Origin of embryos from cell outside embryo sac

- The embryos also develop from cells of the nucellus and integuments
e.g. *Citrus*, *Mangifera*

Origin of embryo sac from other embryo sac in the ovule

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

They may arise from:

- The derivatives of same Megaspore Mother Cell.
- from two or more MMC. (Megaspore Mother cell.)
- from Nucellar Cells.

Importance of Polyembryony

- Plant breeding and horticulture.
- Nucellar embryos are supposed to be free from disease.
- Propagation of the fruit tree, such as Citrus and Mango.
- Can be used for the development of homozygous diploid.