POLYEMBRYONY

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FOR M.Sc 2ND SEMESTER STUDENTS

What is Polyembryony?

As per the name Polyembryony – it refers to the development of many embryos.

When two or more than two embryos develop from a single fertilized egg, then this phenomenon is identified as Polyembryony. In the case of humans, it results in forming two identical twins. This phenomenon is found both in plants and animals.

The best example of Polyembryony in the animal kingdom is the nine-banded armadillo. It is a medium-sized mammal found in certain parts of America and this wild species gives birth to identical quadruplets.

Here, let us learn more in detail about the Polyembryony in plants, types and its Importance.

Polyembryony in Plants

The production of two or more than two embryos from a single seed is termed as the Polyembryony. In plants, this phenomenon is caused either due to the fertilization of one or more than one embryonic sac or due to the origination of embryos outside of the embryonic sac.

This natural phenomenon was first discovered in the year 1719 by Anton van Leeuwenhoek in Citrus plant seeds.

Types of Polyembryony

There are two different types of polyembryony:

1. Induced Polyembryony.
2. Spontaneous Polyembryony.

According to Webber, polyembryony is classified into three different types :

1. **Cleavage Polyembryony**:

2. In the case of this type, a single fertilized egg gives rise to a number of embryos.
3. **Simple polyembryony**: In the case of this type, a number of embryos develop as a result of the fertilization of several archegonia.
4. **Rosette polyembryony**: Additional embryos develop from the rosette cells in certain gymnosperms as this type of polyembryony is termed rosette polyembryony.

Polyembryony in Different Groups of Gymnosperms

- **Polyembryony in Cycadales**

In Cycadales, polyembryony is not a usual phenomenon. But in 1964, Rao reported the occurrence of simple polyembryony in Cycas Circinalis. It is the only gymnosperms species found among natives of Sri Lanka. In this species, two adjacent archegonia of the same ovule sometimes grow independently into two embryos and also rarely into two seedlings. In 1952, De Silva and Tambiah also reported the occurrence of polyembryony. Only one out of the several embryos remains potential and persists in this species.

- **Polyembryony in Coniferales**

In Case of Coniferales, simple polyembryony occurs in the majority of its members and here the number of embryos varies from 2 to many. It has been reported that cleavage polyembryony has occurred in several groups of Pinaceae, Taxodiaceae, Cupressaceae, and Podocarpaceae. In Cupressus, both simple and cleavage polyembryony are common.

- **Polyembryony in Taxales**

Various archegonia are present in the female gametophyte of Taxus. Simple polyembryony occurs due to the fertilization of many of the archegonia eggs. But, out of many, only a single embryo attains maturity. In 1948, Sterling reported that mostly cleavage of suspensor cells occurs only in Taxus. The suspensors separate from each other, and each of them may carry one or more embryonal units. Sometimes, groups of meristematic cells are observed at the base of the suspensor cells These groups of cells are called the rosette embryos. Further development, however, does not take place in these embryos.

- **Polyembryony in Gnetales**

All Gnetales exhibit polyembryony. Polyembryony is found to be of very high order in Gnetum. In this group, “there are not only several prothallines and zygotes in each seed, but there is the multiplication of embryos from each zygote by the branching of the primary suspensors. There can be also the occurrence of further proliferation of the secondary suspensors. In 1965, Sporne stated that only one embryo normally reaches maturity in each seed. Vasil (1959) and Madhulata (1960) have also reported some

cases of polyembryony in Gnetum ula and G.gnemon.