

Apomixis

Apomixis: Another form of asexual reproduction. In apomixis, seeds are formed but the embryos develop without fertilization. Consequently, the plants resulting from them are identical in genotype to the parent plant. In apomictic species, sexual reproduction is either suppressed or absent. When sexual reproduction also occurs, the apomixis is termed as facultative. But when sexual reproduction is absent, it is referred to as obligate apomixis. Many crop species show apomixis, but it is generally facultative.

Nonrecurrent apomixis: When embryos arise directly from haploid cells.

Recurrent apomixis: embryos arise from diploid cells and the progeny obtained from diploid embryos can be maintained indefinitely.

A simplified classification of apomixis is given below:

- a) Adventive Embryony:** In this case, embryos develop directly from vegetative cells of the ovule, such as nucellus, integument, and chalaza. Development of embryo does not involve production of embryo sac. Adventive embryony occurs in mango, citrus, etc.
- b) Apospory:** In apospory, first diploid cell of ovule lying outside the embryo sac develops into another embryo sac without reduction. The embryo then develops directly from the diploid egg cell without fertilization. Apospory occurs in some species of Hieraceum, Malus, Crepis, Ranunculus, etc.

c) Diplospory: Embryo sac is produced from the megaspore, which may be haploid or, more generally, diploid. Generally the meiosis is so modified that the megaspore remains diploid. Diplospory leads to parthenogenesis or apogamy.

1) Parthenogenesis: The embryo develops from embryo sac without pollination. It is of two types **Gonial parthenogenesis:** – embryos develop from egg cell.

2) Somatic parthenogenesis: – embryos develop from any cell of the embryo sac other than the egg cell.

d) Apogamy: In apogamy, synergids or antipodal cells develop into an embryo. Like parthenogenesis, apogamy may be haploid or diploid depending upon the haploid or diploid state of the embryo sac. Diploid apogamy occurs in *Antennaria*, *Alchemilla*, *Allium* and many other plant species.

Significance of Apomixis:

- ❖ Apomixis is a nuisance when the breeder desires to obtain sexual progeny, i.e., selfs or hybrids.
- ❖ Apomixis is of great help when the breeder desires to maintain varieties. Thus for breeding of apomictic species, the breeder has to avoid apomictic progeny when he is making crosses to produce hybrids or producing inbred lines. But once a desirable genotype has been selected, it can be multiplied and maintained through apomictic progeny. This would keep the genotype of a variety intact.
- ❖ Asexually reproducing crop species are highly heterozygous and show severe inbreeding depression. Therefore, breeding methods in such species must avoid inbreeding.