POLYEMBRYONY &ITS IMPORTANCE

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❖ Introduction :-

- ***The occurrence of more than one embryo in the 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 exhibits this phenomenon.***

❖ Classification :-

- ***Ernst and schnarf classified the polyembryony into two types. :***

1. ***True polyembryony***
2. ***False polyembryony***

- ***True polyembryony may be subdivided into two types. :***

a) ***Cleavage polyembryony***
b) ***Adventive polyembryony***

1. True polyembryony :-

- ***The production of embryos within or by projecting into a single embryo sac is termedtrue polyembryony.***

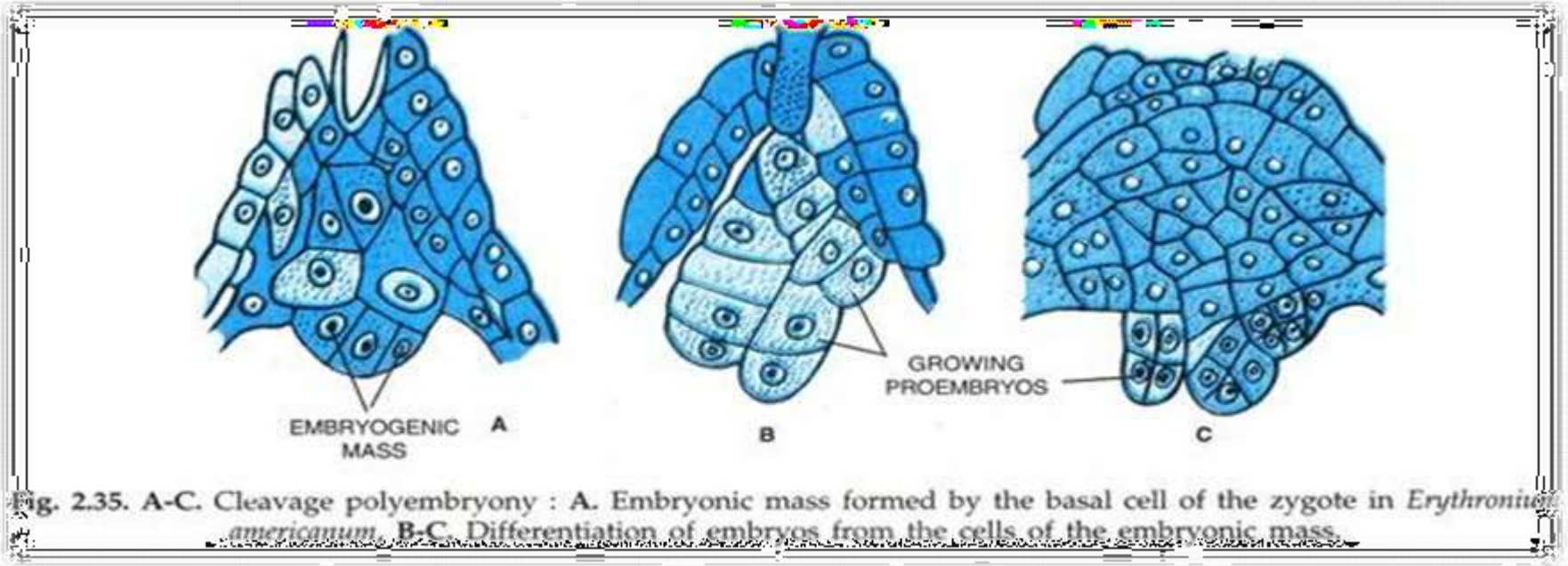
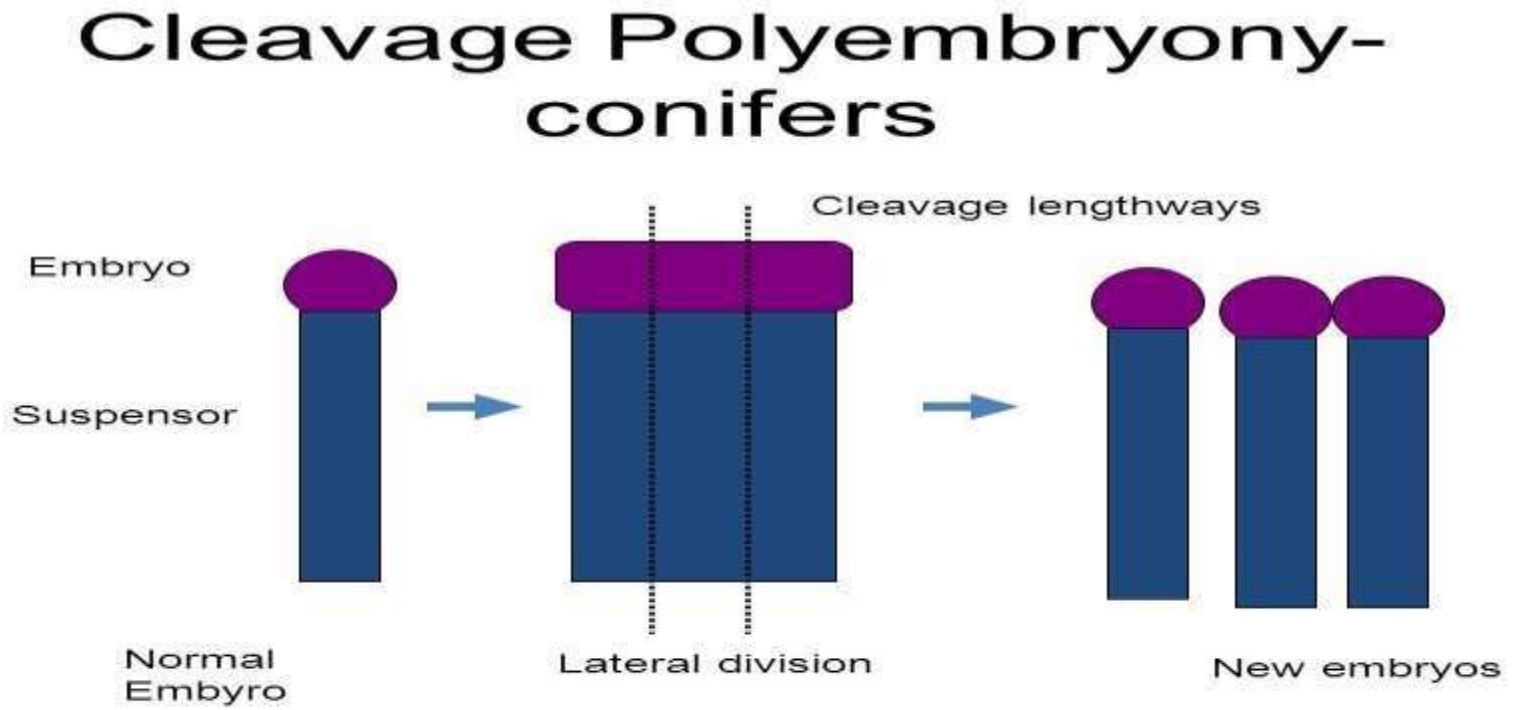


Fig. 2.35. A-C. Cleavage polyembryony : A. Embryonic mass formed by the basal cell of the zygote in *Erythronium americanum*. B-C. Differentiation of embryos from the cells of the embryonic mass.

a) Cleavage polyembryony :-

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



b) ***Adventives polyembryony :-***

- ***Where the embryos arise from the tissue lieing outside the embryos sac.***

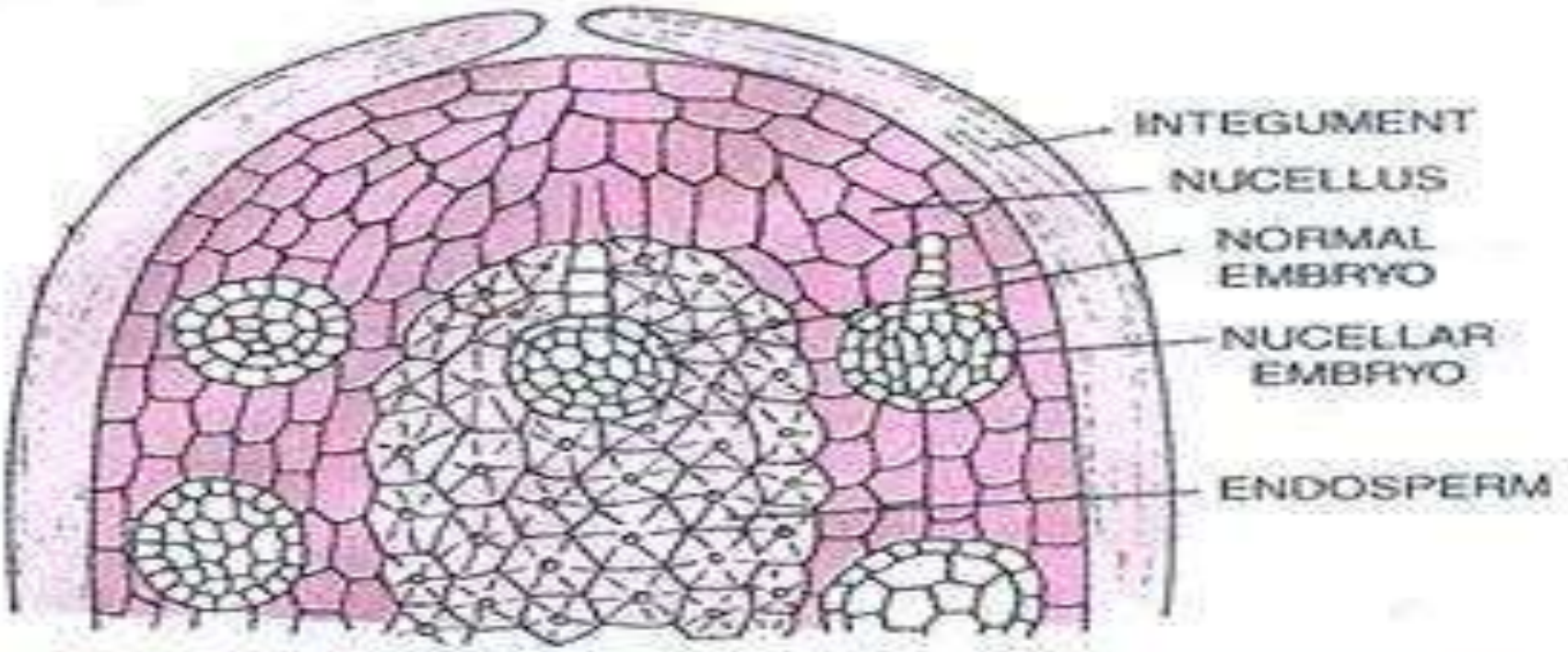


Fig. 2.33. *Citrus* ovule (Young seed) in section showing normal and nucellar (adventive) embryos.

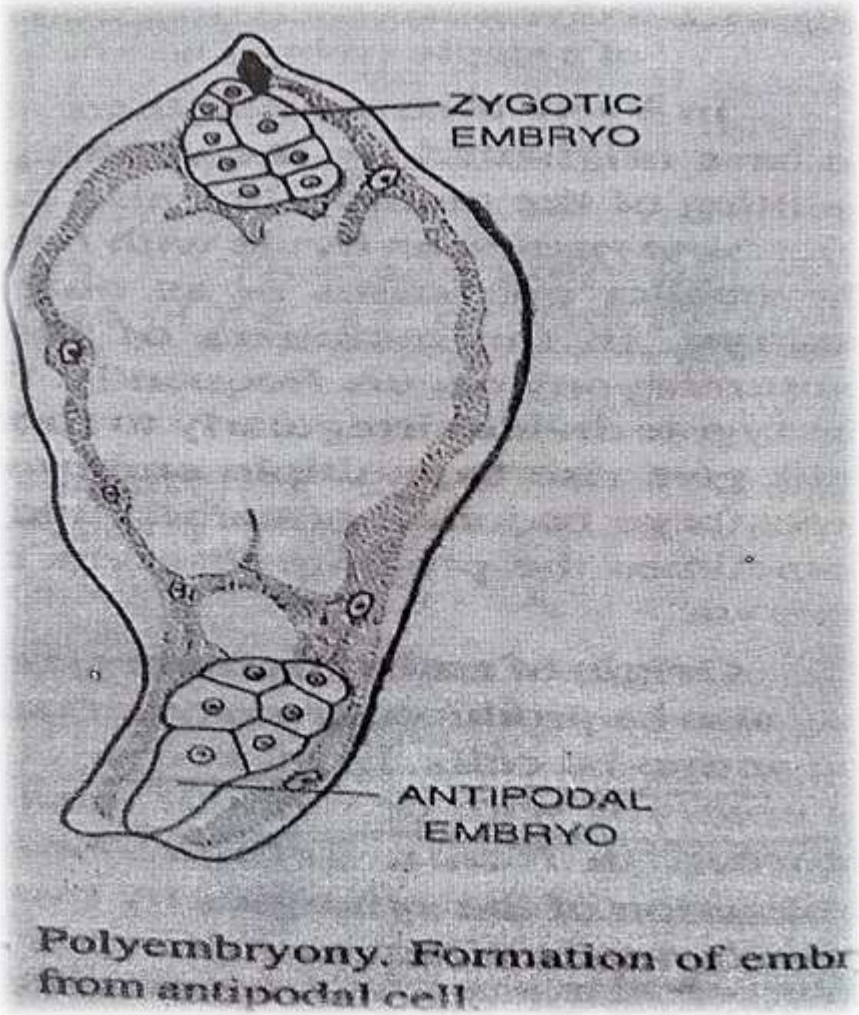
- ***The cells of the nucellus or the integuments but generally they come to lie within the embryo sac.***

2. ***False polyembryony :-***

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

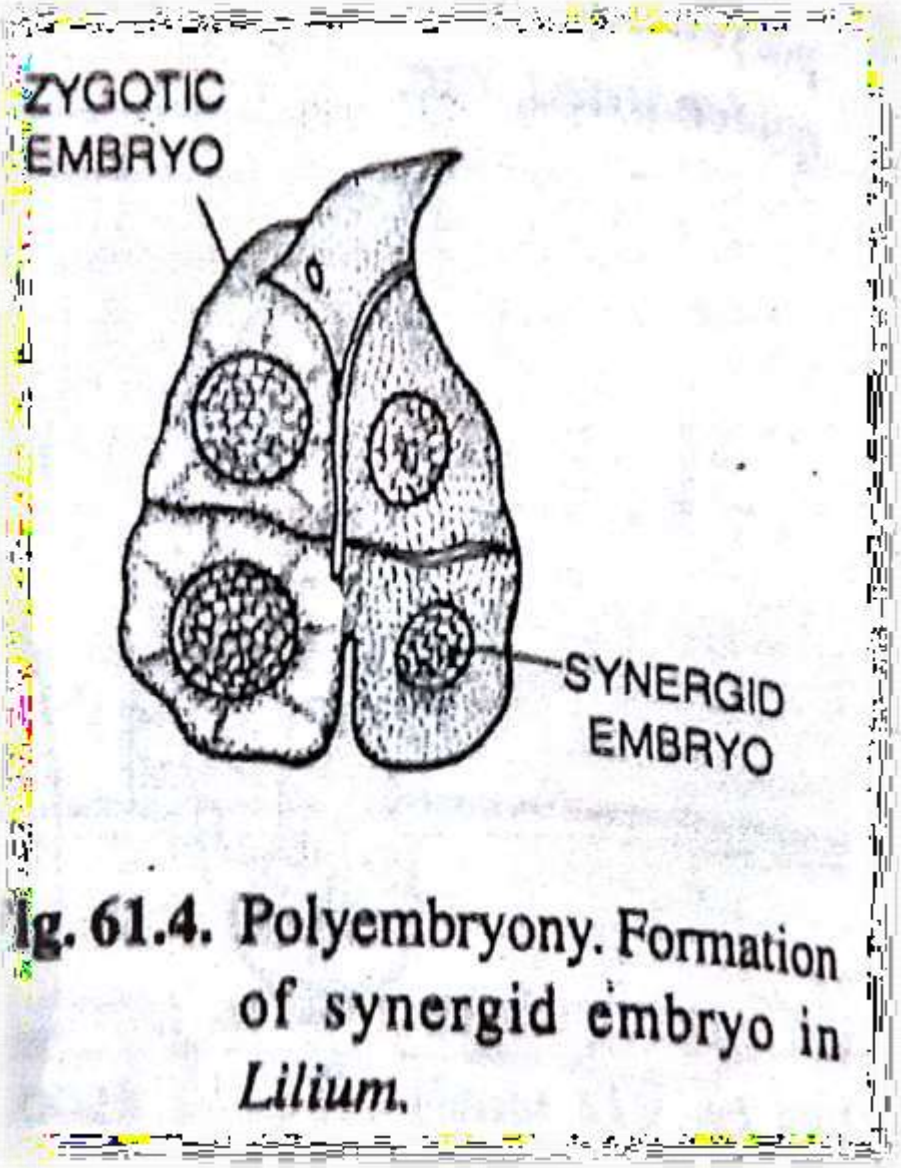
❖ Origin of embryo from synergids or antipodal cells :-

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



Polyembryony. Formation of embr
from antipodal cell

- In most cases the synergids become egg like to form the embryos with or without fertilization.
- Production of embryos from antipodal cell is rare.



g. 61.4. Polyembryony. Formation of synergid embryo in *Lilium*.

❖ Origin of embryos from endosperms :-

- *Treub (1898) in balanophora, Woodworth in Alnus and others have reported the embryos developed from endosperm.*
- *Embryo develops normally from the egg.*

❖Origin of embryos from cell outside embryo sac :-

- *The embryos also develop from the cells of the nucellus and integument.*
- *Ex – Citrus , Mangifera*

❖ Origin of embryos from other embryo sac in the ovule :-

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

- ***They may arise from :***

1. ***The derivatives of the same megaspore mothercell.***
2. ***From two or more megaspore mothercell.***
3. ***From nucellar cells.***

❖ Causes of polyembryony :-

- ***Many theories have been proposed to explain the occurence of polyembryony by different workers different times.***
- ***Some of the important theories are as follows :***

A) Necrohormone theory :

- ***This theory indicates that the degenerating cells of the nucellus act as source of stimulus for the adjacent cells to divide and form adventive embryos.***

B) Hybridization theory :

- ***According to this theory the occurrence of multiple embryo is due to hybridization.***

- ***The recombination of genes takes place during the process of hybridization, forming a single unit that gives rise to the multiple embryos.***

❖ 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.*
- *The application of adventive embryos is also important for providing genetically uniform seedlings in fruit trees.*
- *Can be used for the development of homozygous diploid.*
- *Artificial production of these embryos from the eggs or synergids.*

❖ References :-

- *A Text Book Of Botany - Embryology Of Angiosperms*

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Thank you …