



NCERT Solutions for 12th Class Biology: Chapter 2- Sexual reproduction in flowering plants



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NCERT Solutions for 12th Class Biology: Chapter 2-Sexual reproduction in flowering plants

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NCERT 12th Biology Chapter 2, class 12 Biology chapter 2 solutions

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Exercises

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1. Name the parts of an angiosperm flower in which development of male and female gametophyte take place.

Answer

The development of male gametophyte takes place in pollen sac of the anther and of female gametophyte takes place in the nucellus of ovule in an angiosperm flower.

2. Differentiate between microsporogenesis and megasporogenesis. Which type of cell division occurs during these events? Name the structures formed at the end of these two events.

Answer

Microsporogenesis	Megasporogenesis
It is the process of formation of microspores from the microspore mother cell.	It is the process of formation of megaspores from the megaspore mother cell.
It occurs inside the pollen sacs of the anthers.	It occurs in the nucellus part of the ovule.

In both events, meiosis cell division occurs. The structure formed at the end of microsporogenesis is pollen grain (male gametophyte).

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The structure formed at the end of megasporogenesis is embryo sac (female gametophyte).

3. Arrange the following terms in the correct developmental sequence:

Pollen grain, sporogenous tissue, microspore tetrad, pollen mother cell, male gametes

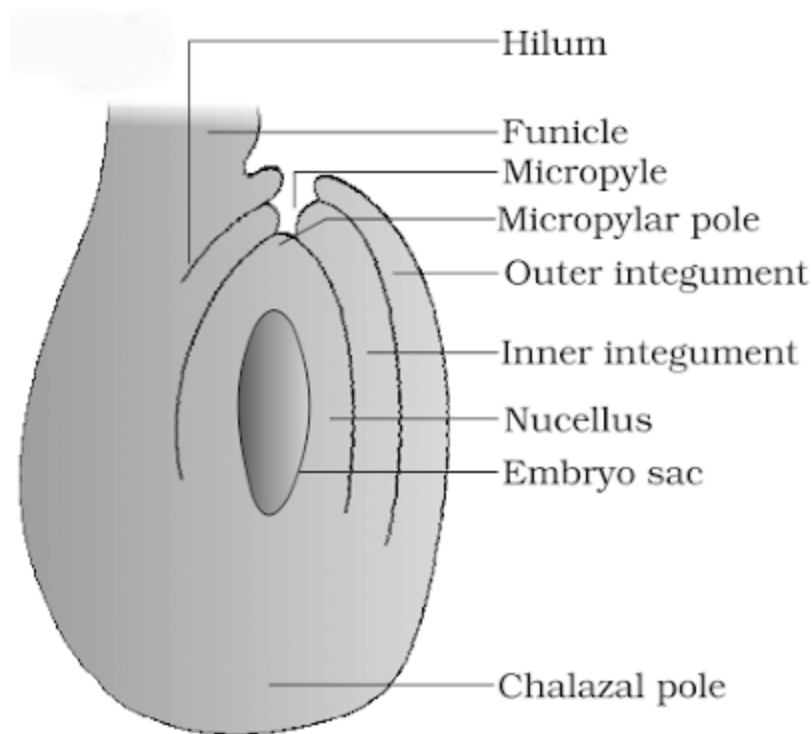
Answer

Sporogenous tissue → pollen mother cell → microspore tetrad → Pollen grain → male gamete

4. With a neat, labelled diagram, describe the parts of a typical angiosperm ovule.

Answer

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The parts of a typical angiosperm ovule are:

- Funicle is the stalk that attaches the ovule to placenta.
- Hilum is the points, where funicle is attached to the ovule body.
- Integuments are one or two layers surrounding the ovule that provide protection to the developing embryo.
- Micropyle is a pore like structure on one side of the ovule, where integuments are absent.
- Nucellus is mass of cells surrounded by the integuments from the outside. Cells of nucellus have abundant reserves of food material.
- Female gametophyte covered by a thin membrane is called embryo sac. It is located in the nucellus.

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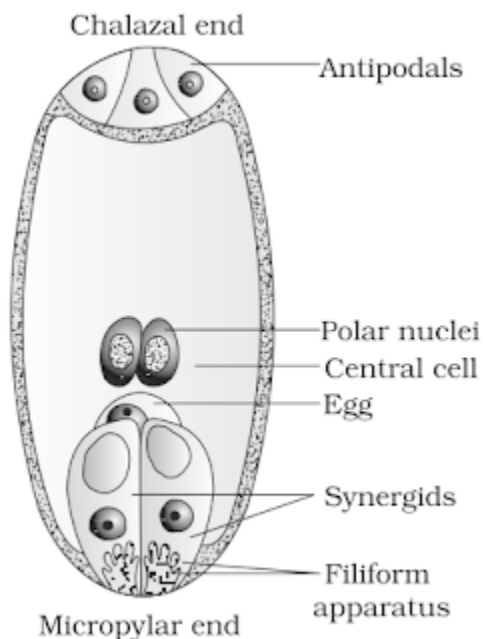
5. What is meant by monosporic development of female gametophyte?

Answer

The formation of embryo sac from a single megaspore is called monosporic development. The nucleus of functional megaspore undergoes successive mitotic divisions to form 8 haploid nuclei.

6. With a neat diagram explain the 7-celled, 8-nucleate nature of the female gametophyte.

Answer



The nucleus of the functional megaspore divides mitotically to form two nuclei which move to the opposite poles, forming the 2-nucleate embryo sac. Two more sequential mitotic nuclear divisions result in the formation of the 4-nucleate and later the 8-nucleate stages of the

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embryo sac. Till now, there is no cytokinesis (cytoplasmic division) has taken place. Now cell walls start to build leading to the organisation of female gametophyte or embryo sac. Six of the 8-nuclei are bound by cell wall and the remaining 2-celled polar nuclei lie below the egg apparatus in the large central cell.

Three cells are grouped together at the micropylar end and constitute the egg apparatus, which is constituted of two synergids and one egg cell. Three cells at the chalazal end are called antipodals. The large central cell has 2-polar nuclei. Thus, at maturity the female gametophyte is 7-celled but 8-nucleated as the central cell has 2-nuclei.

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7. What are chasmogamous flowers? Can cross-pollination occur in cleistogamous flowers? Give reasons for your answer.

Answer

Chasmogamous flowers are the flowers which have exposed anthers and stigma. Cross-pollination cannot occur in cleistogamous flowers as they don't open at all which make their anthers and stigma remain inaccessible.

8. Mention two strategies evolved to prevent self-pollination in flowers.

Answer

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The strategies evolved to prevent self-pollination in flowers are:

- Dichogamy- The maturation of anthers and stigma at different time in a bi-sexual flowers which prevent self-pollination.
- Self-incompatibility: The pollen grains of a flower are incapable of completing growth on the stigma of the same flower.

9. What is self-incompatibility? Why does self-pollination not lead to seed formation in self-incompatible species?

Answer

Self-incompatibility is a genetic mechanism to prevent self pollen from fertilizing the ovules by inhibiting pollen germination or pollen tube growth in the pistil.

Self-pollination does not lead to seed formation in self-incompatible species because of interaction between the chemicals of the pollen and those of the stigma.

10. What is bagging technique? How is it useful in a plant breeding programme?

Answer

Bagging is a technique of covering the female reproductive parts of flowers to prevent stigma from the contamination with undesired pollen. It is useful in a plant breeding programme as only desired pollen grains for pollination and protection of the stigma from contamination of unwanted pollen.

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11. What is triple fusion? Where and how does it take place? Name the nuclei involved in triple fusion.

Answer

Triple fusion refers to the process of fusion of three haploid nuclei. It takes place in the embryo sac. The pollen tube containing two male gametes enters the ovule through the micropyle. Of the two gametes, one joins with the egg cell resulting in the production of zygote and the other with the two polar nuclei producing a triploid primary endosperm nucleus.

12. Why do you think the zygote is dormant for sometime in a fertilised ovule?

Answer

The zygote is dormant for sometime in fertilized ovule the embryo develops only after the formation of the endosperm as endosperm is the source of nutrition for the developing embryo. Thus, the zygote waits for endosperm formation.

13. Differentiate between

- (a) Hypocotyl and epicotyl**
- (b) Coleoptile and coleorhiza**
- (c) Integument and testa**
- (d) Perisperm and pericarp**

Answer

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(a) Hypocotyl and epicotyl

Hypocotyl

The portion of the embryonal axis which lies below the cotyledon in a dicot embryo is known as the hypocotyl.

It terminates at its lower end in the radicle or root tip covered with a root cap.

Epicotyl

The portion of the embryonal axis which lies above the cotyledon in a dicot embryo is known as the epicotyl.

It terminates with the plumule.

(b) Coleoptile and coleorhiza

Coleoptile

It is the pointed protective sheath which covers the plumule in a monocot seed.

It comes out from soil becomes green and perform photosynthesis.

Coleorhiza

It is undifferentiated sheath which covers radicle and root cap in a monocot seed.

It remains inside the soil and is non-green in colour.

(c) Integument and testa

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Integument

Integument is the outer covering of ovules.

Testa

Testa is the outer protective covering of the seed coat.

(d) Perisperm and pericarp

Perisperm

Perisperm is residual, persistent nucellus.

Pericarp

Pericarp refers to the wall of fruit developed from the wall of ovary.

14. Why is apple called a false fruit? Which part(s) of the flower forms the fruit?

Answer

Apple is called a false fruit because it develops from the thalamus instead of ovary.

Ovary is the part of the flower which forms the fruit.

15. What is meant by emasculation? When and why does a plant breeder employ this technique?

Answer

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Emasculation means removal of anthers, with a forceps, from the flower bud before dehiscence.

Plant breeder employs this technique to prevent contamination of stigma with the undesired pollen. This is useful in artificial hybridisation, where desired pollen is required.

16. If one can induce parthenocarpy through the application of growth substances, which fruits would you select to induce parthenocarpy and why?

Answer

Watermelon, lemon, orange should be selected to induce parthenocarpy because seedless variety of these fruits would be much appreciated by the consumers.

17. Explain the role of the tapetum in the formation of the pollen grain wall.

Answer

The tapetum is the innermost layer of the microsporangium. It provides nutrition to the developing pollen grains. It secretes enzymes, hormones and special proteins for the pollen grains to recognise compatibility. It produces Ubisch granules for the formation of exine of pollen grain. The tapetum secretes pollenkit over the outer side of mature pollen.

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18. What is apomixis and what is its importance?

Answer

Apomixis is the process of asexual production of seeds, without fertilisation.

Importance

- It is a cost effective method for producing seeds.
- Hybrid seeds can be cultivated
- It has great use for plant breeding when specific traits of a plant have to be preserved.



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