Progress Check

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1. Match the items in Column I with those in Column II.

Column I	**Column II**
(i) Feathery stigma hanging out	**Rafflesia**
(ii) Different timings for maturation of anthers and stigma	**Entomophilous**
(iii) Pollination by elephant	**Wind pollination**
(iv) Flowers produce nectar	**Dichogamy**

Solution:

Column I	Column II
(i) Feathery stigma hanging out	Wind pollination
(ii) Different timings for maturation of anthers and stigma	Dichogamy
(iii) Pollination by elephant	Rafflesia
(iv) Flowers produce nectar	Entomophilous

2. Complete the following statements:

(i) Pollination is the process of transfer of _____

(ii) The two kinds of pollination are _____ and _____

(iii) For self-pollination the flowers need not be _____ and showy.

(iv) For self-pollination, _____ and _____ must mature at the same time.

(v) Self-pollination does not yield _____ varieties.

(vi) In _____ pollination there is much wastage of _____.

Solution:

(i) Pollen grains

(ii) Cross-pollination and self-pollination

(iii) Large

(iv) Stamens, carpels

(v) New

(vi) Cross, pollen

Progress Check

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1. **Mention if the following statements are true**
   (i) Intine is the outer wall of pollen grain.
   (ii) Pollen tube enters ovule through micropyle.
   (iii) Zygote gives rise to embryo
   (iv) Ovule becomes fruit.
   (v) Dry sepals may persist in some fruits.

   Solution:

   (i) The statement is false.
   (ii) The statement is true.
   (iii) The statement is true.
   (iv) The statement is false.
   (v) The statement is true.

Review Questions Page: 45

A. Multiple Choice Type

1. Which one of the following is one of the characteristics of self-pollinated flowers?
(a) Flowers are large and showy
(b) Flowers remain closed and do not open
(c) Stigma and anthers mature at the same time
(d) Pollen is produced in very large quantities
Solution:
(c) Stigma and anthers mature at the same time
In self-pollination, the stigma and the anther lie close to each other and mature at the same time.

2. Exine and intine are the parts of
(a) Embryo sac
(b) Pollen grain
(c) Stigma
(d) Seeda
Solution:
(b) Pollen grain
The mature pollen grain is a cell having double wall – the outer exine and the inner intine.

B. Very Short Answer Type

1. State the name of the chief pollinating agent against the corresponding plant by choosing from those given in brackets.
(a) Dahlia _____ (Crow, butterflies, mosquito)
(b) Maize _____ (Bees, locusts, rain, wind).
(c) Vallisneria _____ (wind, water, ants, rabbits).
Solution:
(a) Butterflies
(b) Wind
(c) Water

2. Match the items in column A with those in Column B.

Column A	Column B
(a) Generative nucleus	(i) Pollen tube
(b) Germ pore	(ii) Endosperm nucleus
(c) Exine	(iii) Testa
(d) Secondary nucleus	(iv) Fertlization
(e) Integument	(v) Male nuclei

(f) Egg nucleus **(vi) Rough**

Solution:

Column A	Column B
(a) Generative nucleus	Male nuclei
(b) Germ pore	Pollen tube
(c) Exine	Rough
(d) Secondary nucleus	Endosperm nucleus
(e) Integument	Testa
(f) Egg nucleus	Fertilization

3. **Fill in the blanks with suitable words.**
   (a) Transfer of pollen grains from anthers to stigma of the same flower is called _____
   (b) Different timings for maturation of gynoecium and androecium, is called _____
   (c) _____ is a water-pollinated flower.

   Solution:
   (a) Autogamy
   (b) Dichogamy
   (c) Vallisneria

4. **Name the parts of the ovary which give rise to:**
   (a) Seed _____ **(b) Fruit _____**
   (c) Fruit wall _____

   Solution:
   (a) Ovules
   (b) Ovary
   (c) Ovarian wall

5. **Give one word/term for the following:**
   (a) A flower containing both male and female parts
   (b) Arrangement of flowers on a twig/stem
   (c) When pollen grains of a flower reach the stigma of the same flower
   (d) When maturation time of reproductive parts in a flower is different.
   (e) When stigma and anthers do not grow up to same height, which favours only cross-pollination?
   (f) Pollination of flowers by insects
   (g) Pollination of flowers by birds.

   Solution:
   (a) Bisexual flower
   (b) Inflorescence
   (c) Autogamy/self-pollination
   (d) Dichogamy
   (e) Heterostyly
   (f) Entomophily
   (g) Ornithophily

C. Short Answer Type

1. **Explain the following terms:**
   (a) Ornithophily
   (b) Elephophily
   (c) Artificial pollination.
   Solution:
   (a) Ornithophily – The process of pollination affected by birds is known as ornithophily.
   (b) Elephophily – The process of pollination affected by elephants is known as elephophily.
   (c) Artifical pollination – The process of pollination affected by men through artificial modes is referred to as artificial pollination.

2. **What happens to the following after fertilization?**
   (a) Ovules (b) Calyx (c) Petals (d) Stamens
   Solution:
   (a) Ovules – Ovules become the seed post fertilization
   (b) Calyx – After fertilization, the calyx sheds or falls off or remains intact in a shriveled and dried form.
   (c) Petals – Post fertilization, the petals shed and fall.
   (d) Stamens – Once fertilization takes place, the stamens fall off.

3. **Mention any two contrivances in flowers which favor cross-pollination.**
   Solution:
   The contrivances in flowers that favor cross-pollination is:
   - The property of self-fertilization
   - Unisexuality
   - Dichogamy - The differing maturation timings of gynoecium and androecium
   - The various structural barriers.

D. Long Answer Type

1. **What are the advantages of the following in the flower to the plant concerned?**
   (a) Long and feathery stigma
   (b) Brightly coloured petals
   (c) Smooth and light pollen
   (d) Protruding and easily movable anthers
   (e) Fragrant nectar
   Solution:
   (a) Long and feathery stigma – In wind-pollination, it assists in trapping the pollen grains
   (b) Brightly coloured petals – The bright colors of the petals causes the insects to get attracted for cross-pollination.
   (c) Smooth and light pollen – Light pollen are easily carried away by the wind facilitating cross-pollination.
   (d) Protruding and easily movable anthers – This factor brings about their movement even with the slightest wind.
   (e) Fragrant nectar – Fragrance attracts insects for the process of pollination.

2. Describe the advantages and disadvantages of cross-pollination to the plant.

Solution:

Listed below are the advantages of cross-pollination:

- Nature favors cross-pollination
- The offspring produced this way are healthier
- The seeds produced by this process are viable and in abundance.
- Cross-pollination can be used to produce new varieties using two different varieties of the same species or even two species.

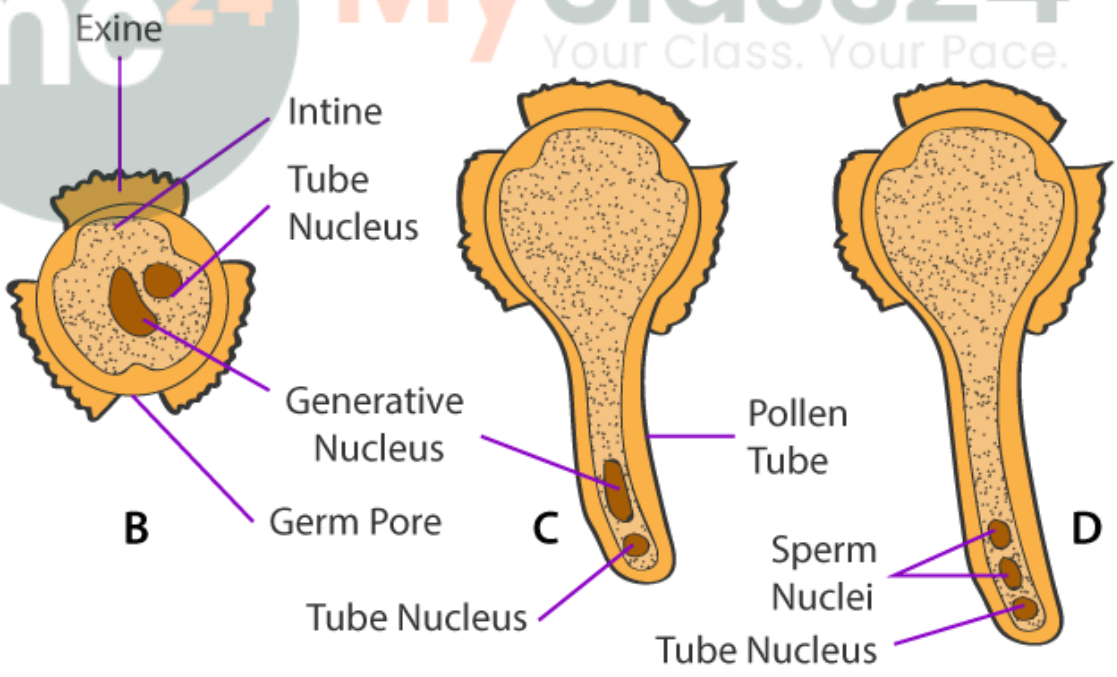
Listed below are the disadvantages of cross-pollination:

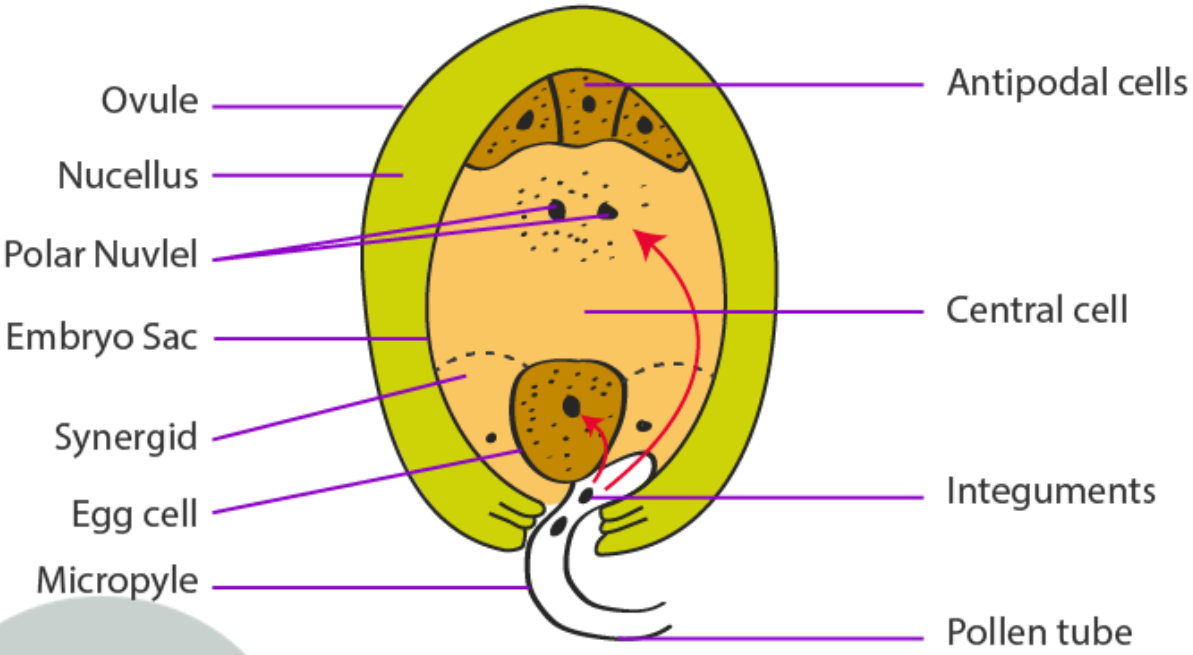
- As some pollinating agents are always required which may not be available at the required time, pollination is not always certain.
- Wastage of pollen takes place as the pollen has to be generated in abundance to ensure pollination
- It is uneconomical for the plant as the flowers are required to be fragrant, vibrant, large and producing nectars to attract the agents causing pollination.

E. Structured/Application/Skill Type

1. What is the function of the pollen tube? Explain it with the help of a diagram.

Solution:





The pollen tube emerges out of the pollen grains by breaking through its exine, growing from the style and stigma as a result of dissolving the tissues brought about by the enzymes, finally reaching the ovary. Here, it makes way to the ovule via the micropyle – a small pore.

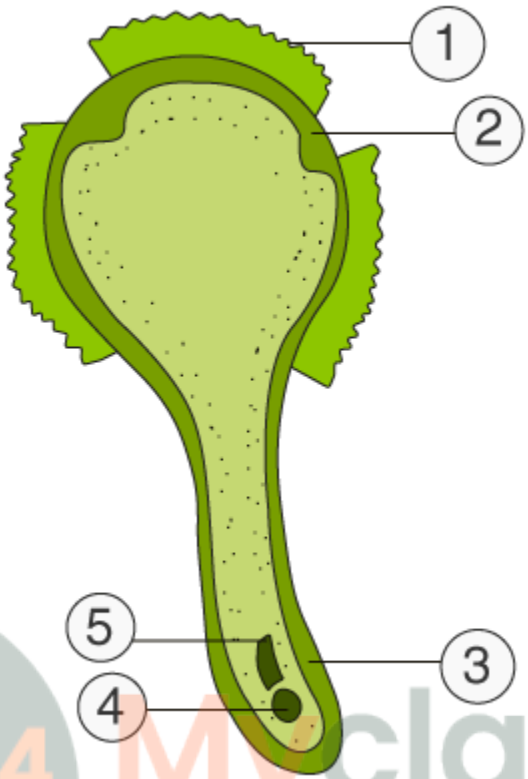
2. Given alongside is a diagrammatic sketch of the sectional view of a germinating pollen grain. Study the same and then answer the questions that follow:

(a) Name the parts labeled 1,2,3,4, and 5

(b) Where does the germination of the pollen grain take place and how?

(c) What is the function of the part labeled '4'?

(d) What happens to the part labeled '5' during the process?



Solution:

(a) The following are the labeled parts of the germinating pollen grain:
1 – Exine
2 – Intine
3 – Pollen tube
4 – Tube nucleus
5 – Generative nucleus

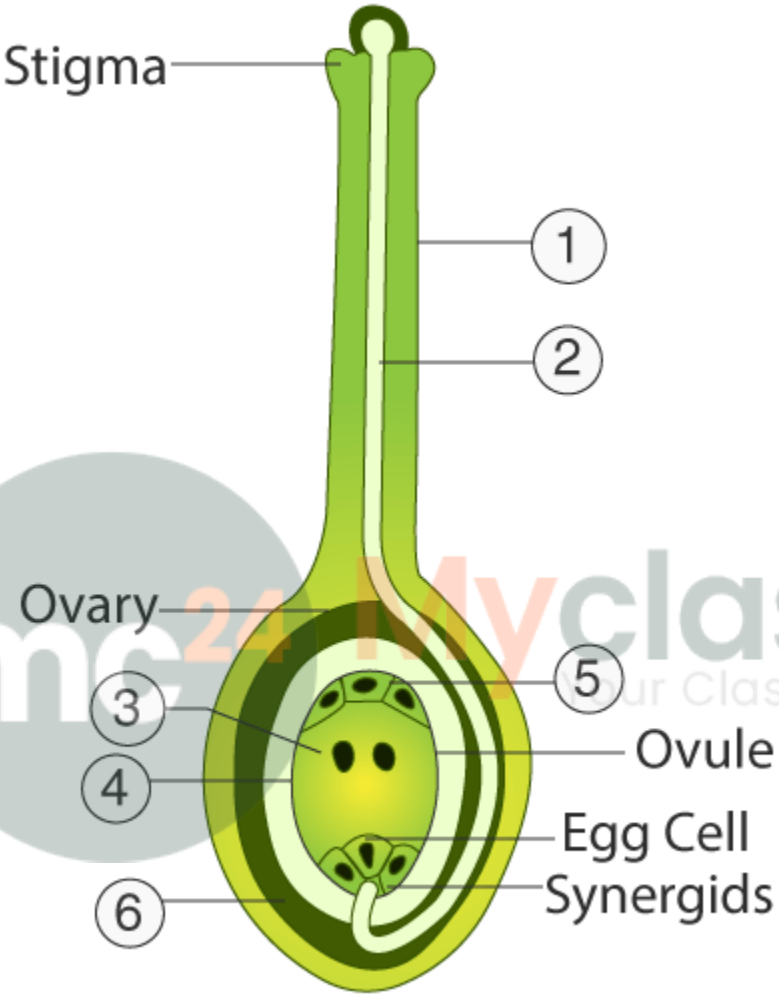
(b) The germination of the pollen grain takes place only if it falls on the stigma of the same plant species. Else, it disintegrates. It is stimulated to germinate upon falling on the stigma as stigma secretes sugars.

(c) The labeled part '4' is the tube nucleus. Its function is to direct the growth of the pollen tube towards the ovary.

(d) The labeled part '5' is the generative nucleus. It is located at the tip of the pollen tube during germination of the pollen grain and splits into two sperm nuclei. The entrance of the pollen tube into one of the synergids causes it to release two of its sperm nuclei, one of which enters the egg cell fusing with nucleus, the other sperm nucleus approaches the two polar nuclei in the central cell fusing with them.

3. Given below is a diagrammatic representation of the process of fertilization. Study the

same and then answer the questions that follows:
(a) Name the parts labeled 1,2,3,4, 5 and 6.
(b) What happens to (i) Ovary (ii) Ovule after fertilization?
(c) What is the function of the synergids?
(d) What part does the stigma play in the process of fertilization?



Solution:

(a) The labelings are as follows:
1 – style
2 – Pollen tube
3 – Polar nuclei
4 – Embryo sac
5 – Antipodal cells
6 – Micropyle

(b) The following are the changes that occur after fertilization:
(i)Ovary – It enlarges for the formation of fruit. The ovarian wall goes on to form the fruit wall.
(ii) Ovule – Develops to become the seed.

(c) Function of synergids –

- It nourishes the egg cell thereby guiding the pollen tube towards the egg
- Ensures proper functioning of the pollen tube
- Responsible for the release of the sperm nuclei

(d) Role of stigma –

During pollination, pollen grain is transferred to the stigma. Pollen grains are germinated only in the event of it falling on the stigma. Post germination, the pollen tube grows through the stigma, reaching the ovary in order for the egg cell to be fertilized.