
	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	DEPARTMENT OF SCIENCE 2024 – 2025 SUBJECT: BIOLOGY	Date: 19/03/2024
Worksheet No: 1 WITH ANSWERS	UNIT-REPRODUCTION CHAPTER: SEXUAL REPRODUCTION IN FLOWERING PLANTS	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

Case Study: -(1) Artificial Hybridization

Pollen-stigma compatibility is essential for successful pollination and fertilization. Once compatible pollen is accepted by pistil, events of fertilization proceed, whereas incompatible pollen will be rejected. This interaction where a pistil is capable of recognizing its pollen is the result of long-term pollen-pistil interaction and chemicals released by pollen.

It is very important to understand pollen-pistil interaction in hybridization. It is one of the innovative methods of the crop production improvement program. During artificial hybridization, only the desired pollen grains are introduced to the stigma through pollination. This helps to avoid unwanted pollen rejection and saves time. Also, the plants with the desired characteristics can be grown.

- Which period in fertilisation process is referred as pollen -pistil interaction. (1)
- How is this interaction initiated and what is the result of this interaction. (1)
- In hybridization, why is understanding pollen- pistil interaction considered as one of the innovative methods of the crop production improvement program. (2)

OR

What are the steps included during artificial hybridization?

Case Study: -(2) Observe the given pictures that depicts pollination process in plants.

Pollination is the transfer of pollen grains from the anther to the stigma of the same flower or different flowers of the same kind.

A



B



- a) Identify the type of pollination shown in figure A & B
- b) How is geitonogamy different from xenogamy?
- c) State any two features of their (Fig.A & B) i) Flower ii) Anther

OR

c) Ms. Agnes is making a display about the process of sexual reproduction in plants. She writes down the stages:

1. An insect enters a flower, and pollen from the anthers sticks to the insect's body and legs.
 2. The insect flies to a different flower.
 3. Pollen from the insect's body and legs sticks to the stigma of the new flower.
 4. The pollen grain grows a tube from the stigma down to the ovule.
 5. Part of the pollen grain moves down the tube toward the ovule.
 6. Part of the pollen grain joins with the ovule inside the ovary and makes a seed.
- i) Which number describes pollination?
 - ii) Which number describes fertilization?

MULTIPLE CHOICE QUESTIONS

1. The two nuclei at the end of the pollen tube are called
 - A. Tube nucleus and a generative nucleus
 - B. Sperm and ovum
 - C. Generative nucleus and stigma
 - D. Tube nucleus and sperm
2. Generative nucleus divides forming
 - A. 2 male nuclei
 - B. 3 male nuclei
 - C. 2 female nuclei
 - D. 3 female nuclei
3. Embryo sac is located inside the
 - A. Stigma
 - B. Ovule
 - C. Micropyle
 - D. Style
4. The structure of bilobed anther consists of
 - A. 2 thecae, 2 sporangia
 - B. 4 thecae, 4 sporangia
 - C. 4 thecae, 2 sporangia
 - D. 2 thecae, 4 sporangia
5. The coconut water from tender coconut is
 - A. cellular endosperm.
 - B. free nuclear endosperm.
 - C. both cellular and nuclear endosperm.
 - D. free nuclear embryo

6. Pollen grains are well preserved as fossils because of presence of
 - A. sporopollenin
 - B. cellulose
 - C. lignocellulose
 - D. pectocellulosic

7. The thalamus contributes to the fruit formation in
 - A. banana.
 - B. orange.
 - C. strawberry.
 - D. guava

8. In a fertilized ovule, n , $2n$ and $3n$ conditions occur respectively in
 - A. antipodal, zygote and endosperm
 - B. Zygote, nucellus and endosperm
 - C. endosperm, nucellus and zygote.
 - D. antipodal, synergids and integuments

9. A botanist studying *Viola* (common pansy) noticed that one of the two flower types withered and developed no further due to some unfavorable condition, but the other flower type on the same plant survived and it resulted in an assured seed set. Which of the following will be correct?
 - A. The flower type which survived is Cleistogamous and it always exhibits autogamy
 - B. The flower type which survived is Chasmogamous and it always exhibits geitonogamy.
 - C. The flower type which survived is Cleistogamous and it exhibits both autogamy and geitonogamy.
 - D. The flower type which survived is Chasmogamous and it never exhibits autogamy.

10. To produce 400 seeds, the number of meiotic divisions required will be
 - A. 400
 - B. 200
 - C. 500
 - D. 800

Question No. 11 to 15 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- A. Both A and R are true and R is the correct explanation of A
 - B. Both A and R are true and R is not the correct explanation of A
 - C. A is true but R is false
 - D. A is False but R is true
11. **Assertion:** Geitonogamy is genetically similar to autogamy.
Reason: The pollen grains come from same plant

 12. **Assertion:** A typical microsporangium of angiosperms is generally surrounded by

four wall layers.

Reason: The outer three wall layers perform the function of protection and help in dehiscence of anther to release the pollen.

13. **Assertion:** Gynoecium consists of pistil.

Reason: It represents the male reproductive part in flowering plants.

14. **Assertion:** Pollen mother cells (PMCs) are the first male gametophytic cells.

Reason: Each PMC gives rise to four pollens.

15. **Assertion:** Pollen grains from male parent are mostly transferred to the stigma in the female parent by some external agency.

Reason: This is because the male flowers or male organs have no internal device to reach the female organs in another flower

ONE MARK QUESTIONS

1. Angiosperm anther is bilobed and ditheous. Justify
2. Distinguish between pericarp and perisperm
3. Identify the step which is not necessary for the artificial hybridisation of unisexual flowers. Give reason
4. What is scutellum?
5. Give any two examples for hydrophytes which are not pollinated through water.

TWO MARKS QUESTIONS

6. What will be the advantage of making the hybrids into apomicts? Why?
7. Are pollination and fertilization necessary in apomixis? Give reason.
8. The flower of brinjal is chasmogamous, while that of beans is cleistogamous. How are they different from each other?
9. Differentiate between albuminous and non-albuminous seeds, giving one example of each.
10. Differentiate between perisperm and endosperm giving one example.

THREE MARKS QUESTIONS

11. State the significance of pollination. List any four differences between wind pollinated and insect pollinated flowers?
12. Banana is a parthenocarpic fruit, whereas oranges show polyembryony. How are they different from each other with respect to seeds?
13. i) Where is Sporopollenin present in plants?
ii) State its significance with reference to its chemical nature.
iii) Why can pollen grain be preserved for many years.
14. Why do pollen grains of some flowers trigger “sneezing” in some people?
15. Write notes on different types of endosperm development

FIVE MARKS QUESTIONS

16. Give reasons why:
- (a) Most zygote in angiosperms divide only after certain amount of endosperm is formed.
 - (b) Groundnut seeds are ex-albuminous and castor seeds are albuminous.
 - (c) Micropyle remains as a small pore in the seed coat of a seed.
 - (d) Integuments of an ovule harden and the water content is highly reduced, as the seed matures.
 - (e) Apple and cashew are not called true fruits.
17. With the help of a neat labelled diagram explain the wall layers of a mature anther of angiosperms
18. Illustrate the process of megasporogenesis and embryo sac development.

FEW PREVIOUS YEAR BOARD QUESTIONS

19. Explain any three advantages the seeds offer to angiosperms. (3)
20. Name the product of fertilization that forms the kernel of coconut. How does the kernel differ from coconut water? (2)
21. Write the cellular contents carried by the pollen tube. How does the pollen tube gain its entry into the embryo sac? (2)
22. Draw a labeled schematic diagram of the transverse section of a mature anther of an angiosperm plant. (3)
23. a) Describe in sequence the process of megasporogenesis in angiosperms.
 b) Draw the seven celled structure formed and label all the different cells. (5)
24. Draw a labeled diagram of globular embryonic stage of angiosperms. (2)
25. Draw a diagrammatic sectional view of a mature anatropous ovule and label the following parts in it: (5)
- (i) that develops into seed coat.
 - (ii) that develops into an embryo after fertilization.
 - (iii) that develops into an endosperm in an albuminous seed
 - (iv) through which the pollen tube enters the embryo sac.
 - (v) that attaches the ovule to the placenta.

MULTIPLE CHOICE QUESTIONS - ANSWERS

1	A	6	A	11	A
2	A	7	C	12	B
3	B	8	A	13	C
4	B	9	A	14	D
5	B	10	C	15	A

Qn. No.	Hints	Marks
1	(Hints: Bilobed – two anther lobes, ditheous – each lobe consists of two chambers)	1
2	(Hints: Pericarp – fruit wall, perisperm – remnant of nucellus in seed)	1
3	(Hints: Emasculation)	1
4	(Hints: Single shield shaped cotyledon of monocots)	1
5	(Hints: Water Lilly and water hyacinth)	1
6	(Hints: To prevent the segregation of desirable characters)	2
7	(Hints: No, it is the development of seeds without fertilisation, from parts like nucellus)	2
8	(Hints: Brinjal – flowers are exposed and cleistogamous – unopened flowers to ensure pollination)	2
9	(Hints: Seeds are with endosperm – albuminous, Seeds are without endosperm – non-albuminous, examples)	2
10	(Hints: Perisperm – remnant of nucellus in seed, endosperm – reserve food material for embryo; examples)	2
11	(Hints: Pollination is necessary for fertilisation. Differences between wind and insect pollinated flowers)	3
12	(Hints: Banana – fruits are formed without fertilisation and hence seedless fruits, orange – seeds consist of more than one embryo)	3
13	(Hints: (i) Exine of microspores (ii) Highly stable and thus pollen grains are even preserved in fossils (iii) Due to the presence of sporopollenin)	3
14	(Hints: Nature of pollen grains, causing allergic responses)	3
15	(Hints: Nuclear type of endosperm development and cellular type of development)	3
16	(Hints: (a) Provides nutrition for embryo (b) Absence and presence of endosperm (c) Facilitates moisture and oxygen entry (d) Helps in the storage of seeds for long time (e) Developed from thalamus and not from fertilised ovary)	5

17	(Hints: Diagram and explanation of wall layers – epidermis, endothecium, middle layers and tapetum)	5
18	(Hints: Represent the diagrammatic stages of megaspore and embryo sac development)	5
19	(Hints: Product of sexual reproduction and thus provides variations, Dormancy and thus can be stored, pollination and fertilisation are not depending on water)	3
20	(Hints: Product of fertilisation – PEN, nuclear endosperm development, wall formation limited to peripheral sides, central free nuclei)	3
21	(Hints: 2 male gametes, chemotropism, enters into ovule through Micropyle and embryo sac with the help of filiform apparatus in synergid)	3
22	(Hints: Diagram)	3
23	(Hints: (a) formation of megaspore mother cell, meiosis, spore tetrad formation and formation of megaspores)	5
24	(Hints: Diagram)	3
25	(Hints: (i) Diagram + label (i) integuments, (ii) egg, (iii) polar nuclei, (iv) one of the synergids (v) funicle)	5

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