Class – IX (Science)

Chapter – Reproduction: How Life Continues

Back Exercise Solution

1. **A flower's anthers are removed before it matures. Later, pollen from another plant of the same species is dusted onto its stigma and seedsare produced. Which process has been ensured here?**

   (i) Self-pollination (ii) Cross-pollination

   (iii) Fertilisation (iv) Tissue culture

Ans- The correct answer is (ii) Cross-pollination.

Explanation:

In the question, the anthers were removed before the flower matured. This process is called emasculation and is done to prevent self-pollination. Later, pollen from another plant of the same species was dusted onto the stigma. This ensures that pollen comes from a different plant, leading to cross-pollination.

Cross-pollination increases genetic variation and often results in healthier offspring with improved adaptability.

2. Arrange the following stages of sexual reproduction in plants in the

correct order:

(i) Pollen germination on stigma (ii) Fertilisation

(iii) Pollination (iv) Formation of zygote

Ans- Correct order:

(iii) Pollination → (i) Pollen germination on stigma → (ii) Fertilisation → (iv) Formation of zygote

Explanation:

- Pollination is the transfer of pollen grains from anther to stigma.
- After reaching the stigma, the pollen grain germinates and forms a pollen tube.
- The male gamete travels through the pollen tube and fuses with the egg cell.
- This fusion is called fertilisation, producing a zygote.

3. Assertion (A): The zygote formed after fertilisation immediately attaches to the uterus wall.

Reason (R): The uterus wall is always prepared to receive the zygote.

(i) Both A and R are true, and R is the correct explanation of A.

(ii) Both A and R are true, but R is not the correct explanation of A.

(iii) A is true, but R is false.

(iv) A is false, but R is true.

Ans- Correct option: (iv) A is false, but R is true.

Explanation:

The zygote does not immediately attach to the uterus wall after fertilisation. First, it undergoes repeated mitotic divisions while travelling through the oviduct toward the uterus. Only after several stages of development does implantation occur.

The reason is true because the uterus prepares itself every month by thickening its inner lining to receive a possible embryo.

4. Why does asexual reproduction produce offsprings that are genetically identical to the parent?

Ans- Asexual reproduction produces offspring genetically identical to the parent because it involves only one parent and occurs through mitotic cell division.

During mitosis:

• The chromosome number remains the same.

• Daughter cells receive identical genetic material.

• There is no fusion of gametes and no mixing of genes.

As a result, the offspring are clones of the parent organism. Examples include budding in hydra, spore formation in fungi, and vegetative propagation in plants such as potato and *Bryophyllum* .

5. Explain why the menstrual cycle stops during pregnancy.

Ans- The menstrual cycle stops during pregnancy because after fertilisation and implantation, the uterus must maintain its thick inner lining to nourish and support the developing embryo.

During pregnancy:

• Hormones maintain the uterine lining.

• Ovulation stops temporarily.

• The lining is not shed because it is needed for foetal development.

Since menstruation is the shedding of the uterine lining, it does not occur during pregnancy.

6. Why are flowers that bloom at night white or light in colour as compared to flowers that bloom during the day?

Ans- Flowers that bloom at night are usually white or light coloured because such colours are more visible in dim light or moonlight.

These flowers are generally pollinated by nocturnal pollinators such as moths and bats. White petals reflect even small amounts of light, helping pollinators locate the flowers easily.

In addition:

• Night-blooming flowers often produce strong fragrance.

• Their scent attracts pollinators when visibility is low.

Thus, light colour and fragrance increase the chances of successful pollination at night.

7. Why do vegetatively propagated plants tend to be more vulnerable to diseases than sexually reproduced plants?

Ans- Vegetatively propagated plants are more vulnerable to diseases because they are genetically identical to one another.

Since all plants have nearly the same genetic makeup:

• If one plant is susceptible to a disease, all others are likely to be affected similarly.

• There is very little genetic variation to resist infections or environmental stress.

In sexually reproduced plants, genetic variation creates diversity, increasing the possibility that some individuals may possess disease resistance. Therefore, sexual reproduction improves survival and adaptability.

8. If all flowers in a type of plant were only capable of self-pollination, how would it affect the genetic diversity over several generations? Explain.

Ans- If all flowers of a plant species were capable of only self-pollination, genetic diversity would gradually decrease over generations.

Explanation:

• Self-pollination involves transfer of pollen within the same flower or plant.

• There is little mixing of genetic material between different plants.

• Variations produced through meiosis are limited.

Consequences:

• Reduced adaptability to environmental changes.

• Increased vulnerability to diseases.

• Greater chances of harmful traits accumulating.

Therefore, although self-pollination ensures reproduction, long-term dependence on it reduces genetic diversity and evolutionary potential.

9. A farmer wants to produce a large number of genetically identical plants quickly. Suggest suitable reproduction methods and explain why they are effective.

Ans- The farmer should use vegetative propagation methods such as:

• Cutting

• Grafting

• Layering

• Tissue culture

These methods are effective because:

1. They produce genetically identical plants (clones).

2. Desired characteristics such as high yield, sweetness, disease resistance, or flower colour are preserved.

3. Large numbers of plants can be produced rapidly.

4. Tissue culture especially helps in mass production of healthy disease-free plants.

For example:

• Sugarcane is propagated through stem cuttings.

• Banana plants are produced through tissue culture.

• Roses and mangoes are commonly propagated through grafting.

10. Suresh prepares slides with pollen grains in different sugar concentrations (0%, 2.5%, 5%, 7.5%, 10%) to study the germination of pollen.
(i) What are the different hypotheses which can be tested using this set-up?
(ii) What parameters should be kept the same in this set-up?
Ans- (i) Possible hypotheses:
1. Pollen germination depends on sugar concentration.
2. There is an optimum sugar concentration at which maximum pollen germination occurs.
3. Very low or very high sugar concentrations reduce pollen germination.
4. Pollen grains require an appropriate nutrient medium for successful germination.

(ii) Parameters that should be kept constant:
- Type and age of pollen grains
- Temperature
- Duration of observation
- Amount of solution used
- Light conditions
- Slide size and preparation method
- Humidity
- Number of pollen grains observed

Keeping these variables constant ensures that only sugar concentration affects pollen germination, making the experiment fair and reliable.

11. Look at the picture given below and think in line with the given prompts and find out which type(s) of pollination might have been followed in these flowers —

Tomato	Wheat	Papaya
		
Stamens cover the stigma.	Flowers open after pollination.	Male and female flowers are often borne on different papaya trees.

Ans- Tomato – Self-pollination

Reason: The stamens cover the stigma, making it easy for pollen to fall on the stigma of the same flower.

Wheat – Self-pollination

Reason: The flowers open only after pollination has already occurred. This prevents pollen from coming from other plants.

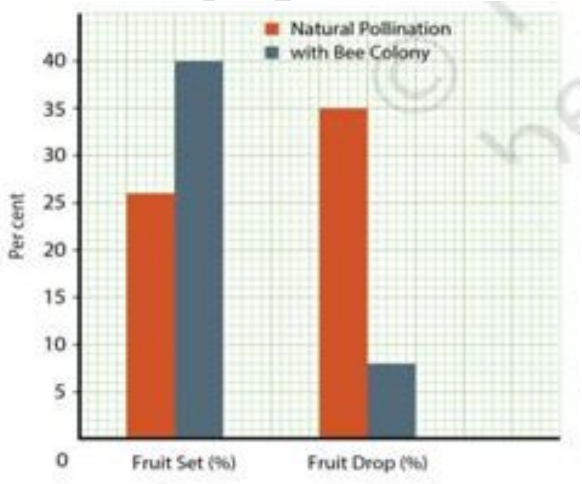
Papaya – Cross-pollination

Reason: Male and female flowers are often present on separate papaya plants. Therefore, pollen must transfer from one plant to another.

Thus:

- Tomato → Self-pollination
- Wheat → Self-pollination
- Papaya → Cross-pollination

12.In the lower Himalayan region of northern India, apples are an important cash crop that contribute significantly to farmer's livelihoods. The fruit yield in apple cultivation is declining continuously, associated with climate change and a significant decline in the population of natural pollinators A researcher-farmer group set up two experimental apple orchards at two distinct locations: Places A and B. In apple orchards at Place A, they allowed natural pollinators Percent to pollinate the flowers of the apple. In apple orchards at Place B, they applied mixed farming techniques of beekeeping. Along with honey, the farmer yielded apples. The yield of apples is depicted in Fig. 11.24, in terms of fruit setting (number of fruits/the total number of corresponding fruit-bearing branches) and fruit drop (premature falling of developing fruits) in the two types of experimental places of apple orchards.



(i) What are the hypotheses the researcher farmers group has thought of for this investigation ?

Ans- (i) Hypotheses:
1. Apple yield increases when pollination by bees is enhanced.
2. Beekeeping improves fruit setting and reduces fruit drop.
3. Pollinators play a major role in successful fertilisation and fruit formation in apple orchards.

(ii) What are the different parameters in the experiment ?
Ans- (ii) Parameters in the experiment:
Independent Variable:
• Presence or absence of bee colonies

Dependent Variables:
• Fruit set percentage
• Fruit drop percentage

Controlled Variables:
• Type of apple plants
• Climatic conditions
• Soil conditions
• Water supply
• Farming practices

(iii) Compare and analyse the data of two experimental orchards Places A and B, in terms of high yields of apple fruits.
Ans- (iii) Analysis of data:
Place A (Natural pollination only):
• Lower fruit set percentage
• Higher fruit drop percentage

Place B (Pollination with bee colonies):
• Much higher fruit set percentage
• Significantly lower fruit drop percentage

This shows that bee pollination greatly improves successful fertilisation and fruit development.

(iv) Based on your analysis, what do you infer from the data?
Ans- (iv) Inference:

The experiment proves that managed pollination through beekeeping increases apple production. Bees are efficient pollinators and help transfer pollen effectively between flowers. Therefore, conserving pollinators and promoting beekeeping can improve agricultural productivity and support farmers' livelihoods.

13. A student claims, "In humans, ovulation always happens on day 14 of the menstrual cycle". Critically examine this claim and state whether the claim is correct or not. Give at least two reasons for your answer.

Ans- The claim is incorrect.

Reason 1:

Although ovulation often occurs around the 14th day in a typical 28-day menstrual cycle, not all women have a 28-day cycle. Menstrual cycles can vary between 21 and 35 days.

Reason 2:

Ovulation timing can vary due to:

- Stress
- Illness
- Hormonal imbalance
- Nutrition
- Physical activity

Reason 3:

In shorter cycles, ovulation may occur earlier, while in longer cycles it may occur later.

Therefore, ovulation does not always happen exactly on day 14. It varies from person to person and even from cycle to cycle.