Vidya Bhawan Balika Vidyapeeth Lakhisarai

Arun Kumar Gupta

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Sexual Reproduction in Flowering Plants

6. Development of Female Gametophyte Different stages of development of female gametophyte are given below:
(i) One of the megaspores is functional, while the other three degenerate in majority of angiosperms.
(ii) Only the functional megaspore develops into the female gametophyte or embryo sac.
This is called monosporic development.
(iii) Nucleus of the functional megaspore divides mitotically to form two nuclei, which move to the opposite poles forming the 2-nucleate embryo sac.
(iv) Nuclear divisions result into the formation of 4-nucleate and later 8-nucleate stages of the embryo sac.
(v) Six of the eight nuclei are surrounded by cell walls and organised into cells.
The remaining two nuclei called polar nuclei, are situated below the egg apparatus in the large central cell.
(vi) Three cells group together at the micropylar end and constitute the egg apparatus.
(vii) The egg apparatus consists of two synergids and one egg cell.
(viii) A filiform apparatus made of cellular thickenings of synergids at the micropylar end,
plays an important role in guiding the pollen tubes into the synergid.
(ix) At the chalazal end, three cells are present called antipodals.
(x) Thus, a typical angiosperm embryo sac, at maturity is 8-nucleate and 7-celled.

Multiple Choice Questions
Single Correct Answer Type
Question.1. Among the terms listed below, those that are of not technically correct

names for a floral whorl are
i. Androecium ii. Carpel
iii. Corolla iv. Sepal
(a) i and iv (b) iii and iv
(c) ii andiv (d) i and ii
Answer. (c)
• There are 4 floral whorls viz., calyx, corolla, androecium and gynoecium. Calyx and corolla are accessory organs or non-essential whorl, while androecium and gynoecium are reproductive organs.
• The calyx is the outermost whorl of the flower and the members are called sepals.
• Gynoecium is the female reproductive part of the flower and is made up of one or more carpels.

Question.2. Embryo sac is to ovule as is to an anther.
(a) Stamen .(b) Filament
(c) Pollen grain (d) Androecium
Answer. (c)
• Embryo sac (female gametophyte) • Ovule (megasporangium)
• Pollen grain (male gametophyte) • Anther (microsporangium)

Question.3. In a typical complete, bisexual and hypogynous flower, the arrangement of floral whorls on the thalamus from the outermost to the innermost is
(a) Calyx, corolla, androecium and gynoecium
(b) Calyx, corolla, gynoecium and androecium
(c) Gynoecium, androecium, corolla and calyx
(d) Androecium, gynoecium, corolla and calyx
Answer. (a) Arrangement of floral whorls on the thalamus from the outermost to the innermost is calyx, corolla, androecium and gynoecium.

Question.4. A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for the above situation is
(a) Plant is dioecious and bears only pistillate flowers

(b) Plant is dioecious and bears both pistillate and staminate flowers
(c) Plant is monoecious
(d) Plant is dioecious and bears only staminate flowers.
Answer. (d) A dicotyledonous plant bears flowers but never produces fruits and seeds because plant is dioecious and bears only staminate flowers.

Question.5. The outermost and innermost wall layers of microsporangium in an anther are respectively
(a) Endothecium and tapetum (b) Epidermis and endodermis

(c) Epidermis and middle layer (d) Epidermis and tapetum

Answer. (d) Wall layers of microsporangium in an anther are:

Epidermis — Endothecium — Middle layers — Tapetum
(Outermost) (Innermost)