

Pollination investigatory project pdf

Pollination investigatory project class 12 pdf.

You're Reading a Free Preview Pages 7 to 12 are not shown in this preview. You're Reading a Free Preview Pages 17 to 24 are not shown in this preview. All living organisms have one major goal in common, which is to pass along their genetic information to the next generation by creating offspring.

CONTROLLED POLLINATION



Flowering plants create seeds, which carry the genetic information of the parents and develop into a new plant. There are two critical stages in the life cycle of a flowering plant: 1) The transfer of pollen from another to stigma. As we will saw in the lecture on "Breeding Systems", most flowering plants have different types of mechanisms to promote the transfer of pollen from an anther in one flower to a stigma in a different flower, and hopefully this flower will be on a different plant. 2) The dispersal of seeds away from the parent plant. Plants often solicit the aid of animals, as well as abiotic forces such as wind, to accomplish both of these. Much of the flower diversity that you have observed thus far this semester is because of adaptations for pollination by different mechanisms. In this lecture, we will discuss the main types of pollination mechanisms. However, please keep in mind that there are always exceptions; plants and animals that visit flowers have minds of their own! The vast majority of flowering plant species are pollinated by insects; in fact, it seems that flowering plants and many major groups of insects co-evolved together. Animals other than insects can also be important pollinators: bats, birds (especially hummingbirds), and even a few mammals. WHAT IS POLLINATION? Pollination is the act of transferring pollen grains from the male anther of a flower to the stigma of the flower. Pollination is the act of transferring pollen grains from the male anther of a flower to the stigma of the pollination pollination pollination. Plant the pollination pollination pollination pollination. Plant the pollination pollination pollination pollination pollination. The pollination pollination pollination pollination pollination. The pollination pollination pollination pollination. The pollination pollination pollination pollination. The pollination

This form of pollination is early dominant in grasses, most conifers, and many deciduous trees. The productive part of the plant (angiosperms).

PARTS OF FLOWER There are four whorls of a flower which are as follows:- Whorl #1: The Calyx The calyx, which is the outermost whorl of a flower is in its bud state. The grasses of the flower is the corolla, which is composed of the flower is the corolla of the flower is the stamen, the male reproductive part. The Stamens The third whorl of a flower is made of a filament and circular or oblong structure called an anther.

4. Types of Pollination

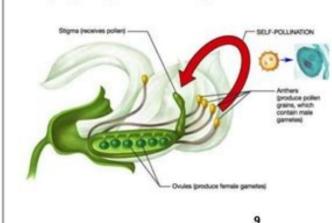
It is of two types:

- Natural Pollination which occurs naturally in plants.
- Induced Pollination which is done by artificial means.
- ❖ Natural pollination is of two types :-
- Self-Pollination
 Cross pollination

✓ SELF POLLINATION

The pollination of a flower by pollen from the same flower (autogamy) or from another flower on the same plant (geitonogamy).

Ex: pea plant, groundnut, barley



The anther produces pollen, which is the male contribution to the reproductive organ, which is composed of three parts: the ovary, the style, and the stigma. The ovary contains the eggs, or ovules, of the plant, and when the ovary sometimes turns into a fruit to house the seed.

The top of the ovary leads to a vertical structure called a style, which supports the stigma catches grains of pollen that the wind or pollination is of two types: • Natural pollination is of two types: • Self-Pollination of a flower by pollen from the same plant (geitonogamy). Ex: pea plant, groundnut, barley Self-pollination is of two types i.e., autogamy & geitonogamy. Autogamy: It is a type of self-pollination in contact with stigma.

8.Advantages Of cross Pollination

- Cross pollination introduces genetic re-combinations and hence in the progeny.
 Cross pollination increases the adaptability of the offspring towards changes
- in the environment.

 It makes the organisms better fitted in the struggle for existence.

 The plants produced through cross pollination are more resistant to diseases.

 The seeds produced are usually larger and the offspring have characters better
- than the parents due to the phenomenon of hybrid vigour.

 New and more useful varieties can be produced through cross pollination.

 The defective characters of the race are eliminated and replaced by better
- characters.

 Yield never falls below an average minimum.

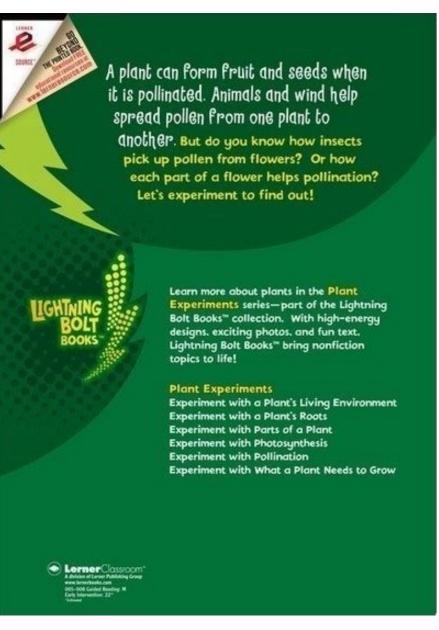
Disadvantages of Cross Pollination It is highly wasteful because plants have to produce a larger number of pollen

- A factor of chance is always involved in cross pollination.

 It is less economical.
- Some undesirable characters may creep in the race.
 The very good characters of the race are likely to be spoiled.

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Pollination and seed set are assured. Pollinators are not required. Ex: oxalis, viola Geitonogamy: It is a type of pollination in which pollen grains of one flower are transferred to the stigma of another flower belonging to either the same plant or genetically similar plant. In geitonogamy flowers often show modifications. Advantages of Self Pollination: 1. It maintains the parental characters or purity of the race indefinitely. 2. Self-pollination is used to maintain pure lines for hybridization experiments. 3. The plant does not develop devices for attracting insect pollinators.



5. It ensures seed production. Rather it is used as fail safe device for crosspollination eliminates some bad recessive characters are seldom introduced. 2. Vigor and vitality of the race decreases with prolonged self-pollination. 3. Immunity to diseases decreases. 4. Variability and hence adaptability to changed environment are reduced. CROSS POLLINATION (xenogamy (Gk. xenos - strange, gamos- marriage). The term allogamy (Gk. aliosother, gamos-marriage) includes both geitonogamy and xenogamy. Cross pollination is performed with the help of an external agency.

Agents of Pollination In angiosperms, pollen are immotile and thus have to be carried to the stigma by external pollinating agents. Depending upon their nature the agents may be - 1. Biotic agents: Insects, Birds, Snails etc. 2. Abiotic agents: Wind, Water. BIOTIC AGENTS I. Entomophily: It refers to the transfer of pollen grains through the agency of insects like moths, butterflies, wasps, bees, beetles, etc. Ex: Salvia, Yucca, Ficus Characters: They are showy or brightly colored. Most insect pollinated flowers have a landing platform. The pollen grains are spiny, heavy and surrounded by a yellow oily sticky substance called pollen kit.

✓ CROSS POLLINATION (xenogamy /allogamy) Cross pollination is the transfer of pollen grains from the anther of one flower to the stigma of a genetically different flower. It is also called xenogamy (Gk. xenos-strange, gamos- marriage). The term allogamy (Gk. alios- other, gamos- marriage) includes both geitonogamy and xenogamy. Cross pollination is performed with the help of an external agency.

Stigmas are often inserted and sticky.

Some flowers provide safe place to insects for laying eggs, e.g., Yucca. II. Ornithophily It refers to the pollination brought about by birds.

Pollination by butterfly, example the Indian paintbrush (Castilleja sp.) by swallowtail butterfly. ABIOTIC AGENTS I. Anemophily It is a mode of cross pollination or transfer of pollen grains through the agency of wind. Ex: Coconut palm, Date palm, Maize, many grasses, Cannabis. Characteristics:

The flowers are colorless, odorless and nectarless. Pollen grains are light, small and winged or dusty, dry, smooth, non-sticky and non wettable.

Stigma is hairy, feathery or branched to catch the wind-borne pollen grains are produced in very large number. II. Hydrophily It is the mode of pollination or transfer of pollen grains through the agency of water. Ex: Zostera, Vallisneria Characters: ■Flowers are small and inconspicuous. ■Nectar and odor are absent. ■Pollen grains are light and non-wettable due to presence of mucilage cover. ■ Stigma is long, sticky but wettable. It is further divided into two parts: Epihydrophily: Pollination occurring on the water surface Ex: Najas,

Ceratophylum, Zostera. Methods to Ensure Cross pollination Dichogamy: The maturation of the stamens and pistils of a bisexual flower at different times, so that self-pollination is prevented. -Protoandry Anthers mature earlier than the stigma of the same flower. There pollen grains become available to stigmas of the older flowers., ex: Sunflower, Salvia -Protogyny Stigmas mature earlier so that they get pollinated before the anthers of the same flower develop pollen grains, e.g., Mirabilis jalapa (4 O'clock). Herkogamy It is a common strategy employed by hermaphroditic angiosperms to reduce sexual interference between male (anthers) and female (stigma) function. Self-incompatibility (SI) It is a general name for several genetic mechanisms in angiosperms, which prevent self-fertilization and thus encourage outcrossing and allogamy. Heterostyly The condition (e.g. in primroses) of having styles of different lengths relative to the stamens in the flowers of different individual plants, to reduce self-fertilization. Prepotency Pollen grains of another flower germinate more rapidly over the stigma than the pollen grains of the same flower, e.g., Apple, Grape. Dicliny (Uni-sexuality) Flowers are unisexual so that self-pollination is not possible. The plants may be monoecious (bearing both male and female flowers, e.g., Maize) or dioecious (bearing male and female flowers on different plants, e.g., Mulberry, Papaya).

Artificial Hybridization Artificial hybridization refers to instances in which these crosses occur under controlled conditions, often under the direction of plant or animal breeders. PROCEDURE: 1. Emasculation: The removal of the anthers of a flower in order to prevent self-pollination or the undesirable pollination of neighboring plants. 2. Bagging The emasculated flowers are immediately covered by paper, plastic or polythene bags. The process is called bagging. It prevents unwanted pollen to come in contact with emasculated flowers. This prevents contamination from foreign pollen grains 3. Rebagging When the flower is bagged flower attains receptivity, mature pollen grains collected from anthers are dusted on the stigma and the flower is rebagged. Advantages Of cross Pollination are the flower is rebagged.

Cross pollination increases the adaptability of the offspring towards changes in the environment.

It makes the organisms better fitted in the struggle for existence. ■ The seeds produced are usually larger and the offspring have characters better than the parents due to the phenomenon of hybrid vigour. ■ New and more useful varieties can be produced through cross pollination. ■ The defective characters of the race are eliminated and replaced by better characters. ■ Yield never falls below an average minimum. Disadvantages of Cross Pollination [] It is highly wasteful because plants have to produce a larger number of pollen grains and other accessory structures in order to suit the various pollination.

It is less economical.

Some undesirable characters may creep in the race. The very good characters of the race are likely to be spoiled.

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