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Unfruitfulness in Fruit Crops

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Harendra

Assistant Professor (Horticulture), School of Agricultural Sciences, G D Goenka University Sohna, Gurugram, Haryana

Unfruitfulness

It is a condition under which plant unable to produce flowers/blooming or fruit set or carry them up to maturity.

Or

In an orchard all the fruit trees do not bear equally or frequently and sometimes fail to set of flower and fruit under similar conditions where another plant bear heavily. Thus, failure to set fruits may be attributed to unfruitfulness.

Or

Any of the fruit orchards which are initially having good bearing capacity but presently that is not in bearing form or no fruit bearing capacity due to several factors, commonly referred to unfruitfulness.

Fruitfulness

It refers to able of fruit plants for flowering and fruiting whereas inability of any fruit plants for blooming and/or fruiting is called unfruitfulness. It is a major problem in fruit crops.

Self fruitful: When the fruiting occurs only by self pollination commonly known as self fruitful.

Self unfruitful: When the fruiting occurs without self pollination commonly known as self pollination.

Causes of unfruitfulness

a) Internal factors

b) External factors

c) Other factors

a) **Internal factors:** These are divided into three parts

- ❖ Due to evolutionary tendencies
- ❖ Due to genetic influences
- ❖ Due to physiological factors

i. Due to Evolutionary Tendencies

1. Imperfect flowers/defective flowers

Monoecious

When male and female flowers are present on the same plant, it is considered as monoecious.

e.g. Cocoa, Aonla and Jackfruit etc.

Dioecious

When male and female flowers are present on the different plant, it is considered as dioecious.

e.g. Papaya, Date palm, Kiwifruit, Pistachio etc.

2. Dichogamy

When staminate and pistillate flowers are mature at the different time. On the basis of maturation, it is divided into two parts:

Protandry: Anther/staminate mature first. e.g. Passion fruit, Coconut, Walnut, *A. muricata*, etc.

Protogyny: Pistillate mature first. e.g. Annona, Fig, Banana, Sapota, Apple, Pear, Pomegranate etc.

3. Heterostyly

A condition in which stigma is at different height due to varying length of styles. e.g. Cashewnut etc.

It is divided into two parts

Pin type: e.g. Pomegranate, Litchi and Sapota etc.

Thrum type: Almond and Carambola etc.

ii. Due to Genetic Influences

1. Due to Incompatibility

Self Incompatibility

The failure of pollen tubes to penetrate the full length of the style and to effect the fertilization in bisexual flowers is known as self incompatibility. It is divided into two types-

Homomorphic

- ❖ It is caused by genetical//physiological factors.
- ❖ In this type, incompatibility is not connected with morphological differences of flowers. It has also two types:

Sporophytic

It is determined by the diploid genotype of the sporophyte generation e.g. Mango, Cocoa and Aonla etc.

Gametophytic

It can be determined by the genotype of the haploid pollens. e.g. Ber, Pineapple and temperate fruits.

Heteromorphic

In this type of incompatibility same species produce more than one morphological type of flower.

e.g. Carambola etc.

2. Due to inter-fertility

3. Due to hybridity

4. Due to reciprocal crosses

iii. Due to physiological influences

1. Poor pollen germination

2. Slow growth of the pollen tubes

3. Premature or delayed pollination

4. Nutritive condition of the plant

b) External Factors

i. Temperature: High temperature leads dry of stigmatic fluid hence pollination fail resulted unfruitfulness.

ii. Relative Humidity: Low humidity leads dry of stigmatic fluid hence pollination fail resulted unfruitfulness.

iii. Rainfall: Washes off the pollen from the anthers hence pollination fail resulted unfruitfulness.

iv. Frost: Destroy of flowers/flower drops.

v. Cloudy weather: Promotes the infestation of diseases/pests.

vi. Light intensity: It determines the fruit set in deciduous plants, especially in strawberry. Fluctuation in light badly affected. (10000 lux light is sufficient)

c) Other factors

i. Nutrient supply

ii. Rootstocks

iii. Pruning

iv. Age and vigour of the plant

v. Locality

vi. Insects and pests

h) Others

Control measures

a) Use of suitable dwarfing rootstocks

b) Control of frost damages

c) Proper nutrition

d) Control of pollination by emasculation (Proper used of pollinizers i.e. Bombay Green and Bombay Yellow in mango while Golden Delicious in apple)

e) Application of PGRs

f) Using breeding tools (To develop regular bearer varieites)

g) To overcome the problem of Self Incompatibility, Male Sterility and other genetic problems.

Conclusion

Unfruitfulness in fruit crops poses significant challenges to global agriculture, food security, and socio-economic well-being. Addressing the multifaceted causes of unfruitfulness requires collaborative efforts among farmers, researchers, policymakers, and stakeholders across the agricultural value chain. By implementing sustainable practices, advancing research and breeding efforts, and promoting pollinator conservation, we can enhance the resilience and productivity of fruit crops, ensuring a more secure and sustainable food future.

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