



**COMPILED AND CIRCULATED BY PROF. SANJAY KUMAR DATTA, DEPT. OF BOTANY, NARAJOLE RAJ COLLEGE**

## **VAVILOV'S CONCEPT**

❖ **Vavilov's concept of Centre of origin for crop plant** every taxa has some particular place where it develop for the first time. This region is known as Centre of origin. According to Vavilov's theory there are some direct and indirect evidences which are used to find out the Centre of origin. The place will be regarded as possible Centre of origin of the taxa where-

- Maximum number of species of a genus is found.
- Where most primitive species are found.
- Where the species are less affected by disease and pests.
- Where the size and productivity are at their best.

**The concept of Centre of origin was given by Vavilov (1920) based on his studies eight main Centre of origin are recognized as proposed by Vavilov**

1. Chinese Centre of origin.
2. Indian Centre of origin.
3. Asia minor Centre of origin.
4. Central Asiatic Centre of origin.
5. Mediterranean Centre of origin.
6. Abyssinian Centre of origin.
7. South Mexican and Central American.
8. South American Centre of origin of some crop.



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**Centre of origin of some crop**

**Chinese Centre of origin :** Camellia sinensis (Tea), Papaver somniferum (poppy)

**Indian Centre of origin :** Oryza sativa (rice), Saccharum officinarum (sugarcane)

**Asia minor Centre of origin :** Zea mays (corn)

**Importance of Centre of origin**

1. Form the Vavilov's theory / Centre of origin we can discover origin of any crop.
2. In 2010, researchers linked the origin and primary region of diversity of crop and food with their current importance around the world. In Modern National Food Supplies and agricultural production, the result indicate that foreign crops were 68.7% of National food supplies as a global mean, and their use has greatly increase in the last 50 years.
3. We can find wild species which can be preserved.

**Crop Domestication**

It is the process of artificially selecting plants to increase their suitability to human requirements, taste, yield, storage and cultivation practices. There is increasing evidence that crop domestication can profoundly alter interaction among plants, herbivores, and their natural enemies.



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**Changes in plant species under domestication**

Almost all the characteristics of plant species have been affected under domestication. Some of the important changes that have occurred under domestication are listed below

1. Elimination or reduction in sheltering of pods, spikes etc. This change has taken place in most of the cultivated species.
2. In cereal crop species there has been a decrease in plant height, e.g. cereals, millets. This is often associated with a change from interminate to determinate habit.
3. In some species there has been an increasing in plant height under domestication, e.g. jute, sugarcane, forage grasses etc.
4. Increase in economic yield is the most noticeable as well as desirable change under domestication.
5. Life cycle has become shorter in case of some species. This is particularly found in case of crops like cotton.
6. In many species asexual reproduction has been promoted under domestication, e.g. sugarcane, potato, sweet potato etc.

**Genetic diversity**

Genetic diversity is the total number of genetic characteristics in the genetic in the genetic make up of a species. Genetic diversity serves as a way for population to adapt to changing environment.

**Different way by which genetic diversity takes place**

1. Genetics is necessary in natural selection



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2. Major cause of variation includes mutation, gene flow, and sexual reproduction.
3. DNA mutation causes genetic variation by alternating the genes of individuals in a population.
4. Gene flow leads to genetic variation as new individuals with different gene combination migrate into a population.
5. Sexual reproduction promotes various gene combination in population.

**Loss of genetic diversity**

Genetic diversity may loss for rapid evolutionary response to the geologically unexpected changes in global conditions Origin of Cultivated Plants.

Domestication is selection for desirable characters like higher yield, non-shattering type of grain and elimination of undesirable characters of wild species, through several species are lost. Mere cultivation of crop does not qualify for domestication so they will loss from trait.

**Germplasm**

Germplasm broadly refer to the hereditary material (total content of gene) transmitted to the offspring through germ cell. Germplasm is a living tissues from which new plants can be grown. It can be a seed or another plant can be grown. It can be a seed or another plant part- a leaf, a piece of stem, pollen or even just a few cells that can be turned into the whole plant.



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**Importance of germplasm diversity**

1. Genetic diversity of germplasm gives plant breeders the sustained ability to develop new high yielding, high quality varieties that can resist constantly evolving pests, disease and environmental stresses.
2. Great diversity of plants is needed to keep the various natural ecosystems functioning stably- interaction between species.

**PROBABLE QUESTIONS**

1. According to Vavilov define Centre of origin?
2. What is crop domestication and describe its effect on plant evolution?
3. Define genetic diversity and give the causes of loss of genetic diversity?
4. How does crop domestication affect genetic diversity?
5. What is germplasm diversity and its importance?

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