

# Character Variation

The studies on variations, experimental studies and hybridization studies in light of genetic information are termed **biosystematics**. It aims at the study of variations within and amongst different populations.

## TYPES OF VARIATION

The recognition of taxonomic units is based on the identification of the occurrence and the degree of discontinuity in variation in the populations.

In case of **continuous** variation the individuals of a population are separable by infinitely small differences in any of the attributes.

In case of **discontinuous variation**, there is a distinct gap between two populations, each showing its own continuous variation for a particular attribute. The discontinuity between the populations primarily results from **isolation** in nature.

Isolation plays a major role in establishing and widening the gap between the populations, allowing independent evolution in the different populations.

Variation in plants includes three fundamental types: developmental, environmental and genetic.

### Developmental variation

A distinct change in attributes is often found during different stages of development. Juvenile leaves of *Eucalyptus*, *Salix* and *Populus* are often different from the mature leaves, and may often cause much confusion.

### Environmental variation

Environmental factors often play major role in shaping the appearance of a plant. Heterophylly is the common manifestation of environmental variation. The submerged leaves of *Ranunculus aquatilis* are finely dissected, whereas the emergent leaves of the same plant are broadly lobed. The individuals of a species often exhibit **phenotypic plasticity**, expressing different phenotypes under different environmental conditions. Such populations are named **ecophenes**. For example in *Epilobium*, the sun-plants have small, thick leaves, many hairs and a short stature, whereas the shade-plants have larger thinner leaves with fewer hairs and a taller stature. However if both plants are

grown under similar conditions they show similar characters and variations due to environment disappear.

### **Genetic variation**

Genetic variation may result from **mutation** or **recombination**. Mutation is the occurrence of heritable change in the genotype of an organism that was not inherited from its ancestors. It is the ultimate source of variation in a species. Recombination is a reassortment of chromosomes, bringing together via meiosis and fertilization the genetic material from different parents and producing a new genotype. Genetic variation drives evolution i.e these changes are phylogenetically important. Character state change due to genetic mutation are fixed and does not change with environment conditions.

### References

Singh, (2012). *Plant Systematics: Theory and Practice* Oxford & IBH Pvt. Ltd., New Delhi. 3<sup>rd</sup> edition.

