

UNITARY AND MODULAR POPULATIONS

Q.What do you mean by Population Viability Analysis (PVA)?

PVA helps to determine whether a population would survive or face the risk of extinction (complete disappearance of a species from the biosphere) under a given set of environmental conditions. Further, each population has a minimum viable size - the size at which it can avoid the extinction due to various biotic and abiotic factors.

Q.Define unitary and modular population.

In **unitary populations**, each individual is derived from zygote (the product of fertilization of male and female gamete) and the growth of such individuals is determinate and predictable. Examples include mammals (including humans), birds, amphibians and insects. Each cow has four legs, two eyes, and a tail., i.e., each individual shows a definite shape and size.



Unitary population of cow A grass showing different ramets

In contrast, **modular populations** are those where an organism develops from a zygote and serves as a unit module and several other modules are produced from it, forming a branching pattern. Examples of modular organisms are plants, sponges, hydroids, fungi, bacteria and corals.

Some modular organisms such as trees may grow vertically while others like grasses spread horizontally on the substratum. The structure and pattern of modular organisms is not determinate and thus unpredictable.

Biologists also use the term Genet to the organism, which arises from a zygote, whereas others arising asexually are known as **Ramet**. In a grass or weed species, a number of young plants may arise through runners or stolons, and upon separation from the parent plant form new plants; a group of such new plants is known as ramets. Individuals of ramets are genetically alike and replica of parent plant. A group of ramets developing from a genet is known as clone since all organisms are genetically alike. The formation of ramets in the plant species is very common and can be easily seen in grasses.

The populations can be **r-selected** or **K-selected**. This type of classification of *populations is based on their growth and survival strategies*. **r-Selected populations** are characterized by high reproductive rates, rapid use of resources over a short span of time and high rates of intrinsic growth (r). These populations exhibit shorter life spans and are also known as opportunistic species. On the other hand, **K-selected populations** are slow growing and tend to be limited by the carrying capacity of the environment, i.e. K . Such populations have long life spans, high competitive ability and low rates of intrinsic growth (r).

Q.What is Allele's principle? Give suitable example.

W.C. Allee, an ecologist known for his extensive research on social behaviour of animals, gave a concept known as Allee's principle.

Allee's principle is a relationship between population density and survival of animals. According to Allee, both under-crowding (low population density) and over-crowding (high population density) limit growth and survival of a population.