# EVOLUTION

## **BIOLOGICAL EVOLUTION**

#### HARDY-WEINBERG PRINCIPLE-

- In a given population one can find out the frequency of occurrence of alleles of a gene or a locus. This frequency is supposed to remain fixed and even remain the same through generations.
- This principle says that allele frequencies in a randomly mating population are stable and is constant from generation to generation. The gene poll (total genes and their alleles in a population) remains a constant. This is called genetic equilibrium. Sum total of the allelic frequencies is 1.

p + q = 1

Where : p – Frequency of dominant allele (A)

q – Frequency of recessive allele (a)

• The binomial expansion of this equation is :

 $p^2 + 2pq + q^2 = 1$ 

Where:  $p^2$  – Frequency of individuals with genotype AA

q<sup>2</sup> – Frequency of individuals with genotype aa

2pq – Frequency of individuals with genotype Aa

• When frequency measured, differs from expected values, then the difference (direction) indicates the extent of evolutionary change. Disturbance in genetic equilibrium of Hardy-Weinberg equilibrium, i.e. change of frequency of alleles in a population would then be interpreted as resulting in evolution.

### **CLASS XII**

#### BIOLOGY

- Five factors are known to affect Hardy-Weinberg equilibrium. These are-
  - 1. Gene migration are gene flow
  - 2. Genetic drift
  - 3. Mutation
  - 4. Genetic recombination
  - 5. Natural selection