LESSON :7 THEORIES OF EVOLUTION

I. Hardey – Weinberg Law

1. A mathematical interpretation for the distribution of gene and genotype frequencies in the population developed by **R.A.Fisher** (England) and **Sewal Wright** (USA)

2. A fundamental idea in the form of law to understand population genetics was provided by **G.H.Hardey** (England), **W.Weinberg** (Germany) in 1908.

3. **Law**: The relative frequencies of various kinds of genes in a large and randomly mating sexual population tend to remain constant from generation to generation in the absence of mutation, selection and gene flow or migration.

4. This law concerned with a theoritical situation for a population not undergoing any evolution any change. Normal mendalian geneic frequencies are maintained under certain conditions only.

5. **Gene frequency**: The proportion of an allele in the gene pool as compared with other alleles at the same locus. It is calculated by substracting the number of a particular gene in question from the total number of genes present on that locus in the population.

6. **Calculation**: If the frequency of gene "A" is represented by "P" and of a gene "a" by "q" at gene equilibrium condition their total frequency is represented by 1.

The at equilibrium $P + q=1$

$P= 1-q$; $q=1-P$

7. **Population** : An assemblage of living beings showing a closely interacting system.

8. **Genetic population** : A community of similar individuals living within a limited circumscribed area at a given time and capable of breeding.

9. **Gene Pool**: It comprises a diverse forms of a gene combining and recombining by the process of sexual reproduction.

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II. Genetic drift/ sewal wright effect:-

1. Sewal wright effect is concerned with the gene frequency of a reproducing small population.

2. In a small population not all the alleles which are the representatives of that species may present. (violation of Hardey-Weinberg Law)

3. The genetic drift may remain a significant factor in the origin of new species on islands and other isolated populations.

4. Due to loss of alleles having low frequency, amount of genetic variation may get reduced in small populations.

5. Continual mating within the populations may cause increase in the number of **homozygotes.**

6. The small population as a whole may develop characters different from that found in the main population. Such deviations may even lead to speciation or formation of a new species.

7. **Founder Principle**: When a small group of individuals due to genetic drift become founders of a new population the phenomenon is termed as founder principle.

8. **Bottleneck effect**: The small population might have evolved into a new species. This type of genetic drift is referred to as bottleneck effect.

9. Sometimes genotypic frequencies may get changed in a small population isolated temporarily due to natural calamities.

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