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B.Sc HONS Part-III Paper-VI

Topic: Write an essay on Chromosomal Alteration or Chromosomal Mutation

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Q. Write an essay on Chromosomal Alteration

Ans. Each species is characterised by the presence of a specific number of chromosomes and a particular arrangement of genes on the chromosomes. Sometimes changes occur in the number and arrangement of genus and in the number of chromosomes. These changes are called chromosomal aberrations or chromosomal mutation. This may be of two types—

(i) Intrachromosomal aberrations : When the change is confined to one of the chromosome of a homologous pair.

(ii) Inter-Chromosomal aberration : When interchange of chromosomal parts take place between non homologous chromosomes.

Intrachromosomal aberration—

(a) Deletion : Deletion is the loss of a part of a chromosome-of the terminal part is lost it is terminal deletion or if an intrasegmental part is lost it is intorstitial deletion.

(b) Duplication : When a part of the chromosome is repeated in one of the number of the homologous pair.

(c) Inversion : When a broken part of the chromosome reunite with the parts in a reverse order. It reduces the rate of crossing over and maintain heterozygosity in offsprings.

Interchromosomal aberration—

Translocation : It involves the exchange of parts between two non-homologous chromosomes.

Change in chromosomal number : Change in chromosome number is called polidy. Every species have one haploid set of chromosomes in gametes (n) and diploid set (zn) in somatic cells. Sometimes the number is changed during cell division. A set of chromosome is called genome. On the basis of deletion or addition in the number of chromosomes in genomes ploidy may be exploidy or aneuploidy.

Eupliody : In this case the organism contains in its body any number of blanced set of genomes. This is of the following types—

(a) Monoploidy : Organism with one set of genome (n) in body cell. When it is in gametes, it is called haploid.—

(b) Diploidy : Organisms with two sets of genomes ($2n$) are diplodis.

(c) Polabloidy : Organisms with more than two sets of genomes in the multiples of 3,4,5 etc. These are triploids ($3n$), tetraploids ($4n$), pentaploids ($5n$) etc.

Significance—

(1) It helps to study and understood dosage effect.

(2) It produces larger plants

(3) It results in the formations of new species.

Aneuploidy—

This does not include the multiple of haploid set of Chromosomes. To the normal set of Chromosomes one or two chromosome are either added or lost. These result in the formation of the following—

(i) Monosomic : When a diploid organism lacks one member of a homologous pair i.e $zn - 1$. It results in reduced fertility and high mortality.

(ii) Nullosomic : In this case a diploid organism lacks one pair of homologous chromosomes i-e. $2n$-2. It is reduces vigour fertility and lifespan.

(iii) Trisomic : Here a diploid organism has one extra chromosome i.e $2n + 2$. It is causes mongolism.

(iv) Tetrasomic : When one chromosome is present in quadruplicate in a diploid organism i.e $2n + 2$.

(v) Double trisomic : Diploid organism having two distinct chromosomes in triplicate i.e $2n + 1 + 1$.