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MUTATION and its type:-

Mutation was first of all discovered by 'Hugo deveris'. In the plant Oenothera lamarkiana, popularly known as evening prime rose.

* Definition of Mutation:-

Sudden herritable phenotypic changes in the structure of a gene or chromosome or change in the chromosome number.

Theire are following type of mutation:-

1) Chromosomal mutation:-
It is also known as chromo-somal aberration.

It has following types:-

* Deletion :- The loss of a part of chromosome is

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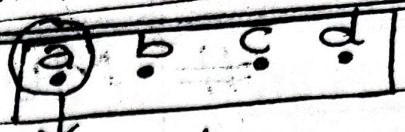
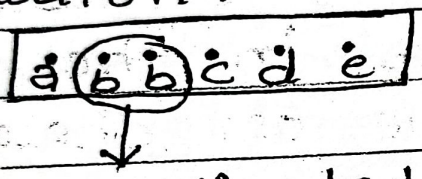
known as deletion.



* Duplication:- Addition of a part of chromosome is known as duplication. Duplication is not ~~know~~ harmful like deletion because duplication often change the phenotype of an organism hence they are important for the process of evolution.

eg:-



* Inversion:- When a part of a chromosome breaks away and reunits in reverse order by 180°, is known as inversion.

Their are two types of inversion.

* Para centric inversion:- The inverted segment doesn't carry centromere.

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* Pericentric inversion :-
The inverted segment carries centromere.

4.* Translocation :-
When the transfer of chromosome segments from one chromosome to another takes place, is known as translocation.

The reciprocal translocations are due to mutual change of chromosome segment between two pairs of non-homologous chromosomes.

II Genomic Mutation :-

It has following type :-

A) Aneuploidy :- In this mutation there is gain or loss of one or more chromosomes.
eg :- 2n + 1 = trisomic
2n + 2 = tetrasomic
2n - 1 = Monosomic
2n - 2 = Nulli somic

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B) Euploidy :- In this mutation there is change in the fullset of chromosome.
eg:- 3n = triploid
4n = tetraploid
5n = pentaploid
6n = Hexaploid

Importance :-

i) They are helpful in plant breeding programms.

ii) Helpful in production of antibiotics

iii) Mutation play dominant role in domestic animal like cow, buffalow etc

iv) Mutation is helpful or mutation play dominant role in evolution.

Ques. Primitive or fern Characters of Cycas
or
Archaic or Filicean features of Cycas.

Ans. Primitive or fern Characters of Cycas:→ Although Cycas is a living fossil of Gymnosperms yet it bears several archaic features that are equally shared by different members of filicales order of pteridophytes. Such characters of Cycas, therefore evidently considered to be primitive features are noted below—

(1) The sporophytic plant normally is divisible into root, stem and frondose leaves as in several ferns.

(2) The developing stem for a time being is subterranean & thus the rhizome a common feature of the majority of ferns.

(3) The erect aerial stem of Caudex nature being similar to Cyathaea, a tree fern.

(4) Presence of the armour of persistent leaf bases around the stem axis similar to Aspi Aspidium and Osmunda.

(5) The crown of large frondose pinnately compound leaves arranged spirally in ascending order seems to be identical as in Cyathaea

(6) Existence of dimorphic leaves is a common feature is bracts scaly leaves may be compared to the ramenta of ferns.

(7) All the leaflets in a developing leaf have circinate ptyxis a common feature of all the terrestrial ferns.

(8) The cortex with leaf gap.

(9) The stem anatomy is similar to most of the ferns owing to presence of massive cortex of pith as well as scanty vascular tissues.

(10) The xylem is mainly composed of tracheids and xylem parenchyma while the phloem with sieve tubes of phloem parenchyma.

(11) Presence of concentric vascular bundles in the leaflet of the axis of ♂ strobilus having mesarch protoxylem.

(12) Foliage nature of mega-sporophyll of C. revoluta & C. pectinata due to pinnately dissected character resemble the true foliage leaf of ferns. The megasporophyll of C. circinalis is physiologically similar to foliage leaf on account of having photosynthetic pigments.

(13) Zonal arrangement of microsporangia on the ventral surface of

microsporophyll and the presence of hairy indusia are evidently the fern characters.

(14) Structure of microsporangium, its eusporangiate type of development, arrangement and dehiscence as well as large output of spores per sporangium are the characters similar to Marattia.

(15) The microsporangial wall at its anterior end behaves like an annulus, a line of dehiscence.

(16) The male gametophyte has a single prothallial cell being similar to Selaginella & Marsilea.

(17) Multiciliate motile sperms require the presence of water for fertilization, a very primitive feature of Cycas which is commonly shared by all the algal, bryophytic and pteridophytic members.

With the aid of the facts laid down above, one may conveniently presume that the filicean stock might have been the ancestor of Cycas. Here the Cycas, a seed plant of modern age might have been evolved from the fern like Cycadofilicales [Pteridospermales] flourishing in the palaeozoic era.