

THE IMPORTANCE OF MEIOSIS

In sexually reproducing organisms the gametes are haploid (n) (Geek word haploos, meaning single); and two gametes fuse to form a diploid ($2n$) zygote

- (1) Meiosis for reduction division is (important) because it causes the reduction in chromosome number which is very essential during the time of gamete formation in order to maintain a particular diploid number through successive generations of sexually reproducing organisms.
- (2) Chiasmata help in exchanging parts of chromatids between homologous (similar) chromosomes (during meiotic division), thus further ensuring new combines of xters. Meiosis, therefore, helps in bringing about variation in a population.
- (3) It is the mechanism for the transmission of hereditary xters which are carried by the chromosomes.

There are some distinguishing characteristics between mitosis and meiosis. These difference can be summarized as below:

DIFFERENCES BETWEEN MITOSIS AND MEIOSIS

1. Mitosis occurs in somatic cells while meiosis occurs in reproductive cells resulting in the formation of gametes or spores.
2. In mitosis, the chromosome no remains constant (diploid or $2n$), while in meiosis, the chromosome number is reduced to half (haploid or n).
3. In mitosis two products (daughter cells) are produced per cycle, while four cellular productions (gametes or spores) are produced per cycle in meiosis.
4. Prophase of mitosis is short, while it is a prolonged one in meiosis and, therefore, divided into sub-stages.
5. Crossing over (exchange of genes) occurs in meiosis and there is chiasma, but there is no crossing over in mitosis.

6. Pairing (synapsis) of identical (homologous) chromosomes (one paternal and one maternal) occurs in meiosis (each pair subsequently acting as a unit), but no pairing occurs in mitosis. In mitosis on the other hand each chromosome splits longitudinally into two. This gives rise to two chromatids).
7. In mitosis the chromosomes are equally apportioned (divided) to the daughter nuclei, i.e the latter are qualitatively and quantitatively the same as the mother nucleus, while in meiosis the four threads of a chromosome go to the four cells (and their assortment is also a matter of chance, i.e. it is not known which thread will go to which cell). Thus meiosis results in four new types of cells.

TREE BREEDING AND BREEDING SYSTEMS

What is breeding? The art and science of changing plants or animals genetically. Breeding is the art and science of changing the genetic construction (genetic make up) of plants or animals population.

Plant breeding (P.B) is the art and science of changing (or manipulating) plants genetic make up to satisfy mains needs (or requirements).

Tree breeding :- (T.B)is the art and science of changing tree species genetically so as to satisfy man's needs.

Forest tree breeders have been able to make some progress in this direction through the study of Genetics. This science has enabled them to transfer desired traits from one plant to another. The tree and plant breeders alike, utilize to advantage the discoveries of genetics and combine them with those of other branches of science, particularly cytology, taxonomy, physiology, anatomy and biochemistry, to achieve improvements in trees and crops respectively.

Breeding is an art because it involves the ability of human beings to observe some traits of economic value of the organism under investigation.

On the other hand breeding is a science because it is based on the principles of genetics i.e. on the laws of inheritance.

Throughout ages, unconscious selection of superior plants by man has been going on. But with the discovery of sex in plants it has been possible to hybridize plants. Hybridization concept has added to the understanding of plant breeding.

Mendel's exp paved the way for more understanding of P. B. This has made P.B. to be less of an art and more of science. It then become possible to create new types of plants at will, although the art of selection is still needed.

However, tree/P. B. is now based on the thorough understanding and the utilization of gentic principles. A clear understanding of tree/P.B hinges or depends on the firm knowledge of:

1. Botanical xtics of the spp
2. Plants diseases and their epidemiology
3. Insect pests that feed upon the different plants spp
4. Physiological factors related to adaptation of plants.
5. Biochemxtics affecting utilization and value of the spp.

There are certain problems, peculiar to tree improvement in West Africa and Nigeria in particular.