

REPRODUCTION IN FUNGI AND FUNGAL LIKE ORGANISMS CAUSING PLANT DISEASES

Aim: To acquaint the students with reproduction in fungi and fungal like organisms causing plant diseases

I. Sexual Reproduction

The sexual reproduction in fungi and other similar micro-organisms involves:

- **Plasmogamy**-. fusion between two sexual cells.
- **Karyogamy**- fusion of the nuclei. It results in the formation of a diploid nucleus, which immediately or later undergoes **meiosis** to form 4 haploid nuclei.

Fungi achieve plasmogamy by a variety of methods:

- Gametogamy**
- Gametangiogamy,**
- Spermatization**
- Somatogamy.**

i) **Gametogamy**: It is the fusion (or copulation) between gametes.

- Gametes are naked wall- less sex cells which copulate to form a zygote.
- If two gametes are similar in size, they are called **isogametes** and their copulation is called **isogamy**.
- Copulation between two dissimilar gametes, one smaller (male) and the other bigger (female) is called **anisogamy**.

- The fusion between motile male gamete and non- motile female gamete (oosphere or egg) lying in the oogonium is called **heterogamy**.
- ii) **Gametangiogamy:** It is the fusion between gametangia (or the sex organs) when gametangia are similar in shape and size, these are called **isogametangia** and are designated as (+) and (-) gametangia rather than male and female.
 - When the gametangia are different in shape and size, they are called **heterogametangia**.
 - The male is usually smaller and club shaped while the female is bigger and globular.
 - Fusion between two similar gametangia results in a zygote which is called a **zygospore**.
 - The zygote formed by the fusion between morphologically distinct gametangia is called **oospore** and the process **oogamy**.
 - The plasmogamy between them is called **gametangial copulation** or **contact**.
- **Gametangial copulation** is of two types:
 - ✓ The entire gametangia fuse, the intervening wall disappears and their contents come to lie in the common cell formed by their fusion, e.g., *Mucor*.
 - ✓ The contents of the male gametangia migrate into the female gametangium through a pore or fertilization tube and the male gametangium is left empty, e.g., *Rhizophidium*.
- **Gametangial contact:** The male nuclei and not the cytoplasm of antheridium migrate into the oogonium through a pore dissolved at the point of contact or through a fertilization tube formed by the antheridium. e.g. *Pythium*, *Phytophthora*, *Albugo*.

iii. Spermatization: It occurs in *Ascomycota* and *Basidiomycota*.

- Spermatia (sing. Spermatium), minute male gametes, are formed like conidia on spermatophores.
- The spermatophores may be formed exogenously or inside a spermogonium e.g. *Puccinia*.
- The spermatium when comes in contact with the female gametangium (or the receptive hyphae) releases the male nucleus into the female gametangium through a pore.

iv. Somatogamy:

In this, sex organs are not formed and somatic cells as such act as gametangia and fuse together. e.g. *Agaricus*. Somatogamy may occur between cells of the same hypha (in a homothallic fungus) or between cells of the different thalli (in a heterothallic fungus). **Anastomosis**, which is the fusion of hyphae is frequent in *Ascomycota* and *Basidiomycota*.

II. Parasexual Reproduction

- The anamorphic (=imperfect) fungi lack sexual reproduction involving karyogamy and meiosis. But the genetic recombination in this case is achieved through the parasexual method.
- In this, the haploidization takes place by aberrant mitosis, whose frequency is, however, very low. It was first discovered by Pontecorvo and Roper in 1952 in *Aspergillus nidulans*.