Homothallism and Heterothallism in Fungi

Fungi is a unique group which exhibits homothallism-homothallic and heterothallic conditions of the thallus in many genera.

A Homothallism :- In this case two mycelia of the same thallus or spores can fuse to form a diploid structure. It is self fertile

Homothallic fungi are of two types

① Primary homothallic
② Secondary homothallic

① Primary homothallic fungi the spores are uninucleate and the nucleus has one genotype. eg. Allomyces javanicus, Pyronema omphalides.

② In Secondary homothallic fungi, the spores contain compatible mating nuclei. i.e. spores are heterokaryotic in nature. eg. Neurospora tetrasperma.

B. Heterothallism :- It is the condition or a phenomenon where two complementary individuals are required for the sexual reproduction, it is self sterile

The term 'heterothallism' was first used by the great American geneticist Dr. A.F. Blakeslee in 1904 for the condition of sexual reproduction, which he found in certain species of Mucorales such that conjugation is possible only through the interaction of two different thalli. He used two terms — homothallic and heterothallic species in the following ways:-

"Acc. to their methods of Zygospore formation the ~~various~~ Various species among the Mucoraceae may be divided into two main categories which may be designated as homothallic and heterothallic which correspond respectively to monoecious and dioecious forms among the higher plants"

Thus he considered the homothallic species as bisexual and the heterothallic species as unisexual and termed the unisexual thalli as (+) and (−) types representing two types or sexes although both the thalli are morphologically similar.

From physiological and morphological point of views there are two major types of heterothallism:-

(a) Morphological Heterothallism: In which the two interacting thalli defer by production of morphologically different sex organs or gametes which are identifiable as male or female.

This is found in higher plants and animals.

(b) physiological Heterothallism:— In which the interacting thalli differ in mating types or incompatible irrespective of the presence or absence of sex organs or differentiated gametes.

This type Heterothallism is observed in Mucor and Rhizopus.