

Zygomycota

Division: **Zygomycota**

The Zygomycota is thought to be the most primitive of the terrestrial fungi. This division has coenocytic mycelium, and asexual spores (= **sporangiospores**) that are produced in **sporangia** borne on stalks (= **sporangiophores**). These characteristics are shared with the divisions of flagellated fungi that were just studied. For this reason the Zygomycota were once thought to be closely related to the aquatic fungi. However, cell wall composition is chitin-chitosan and flagellated spores and gametes are absent in this division as well as in the remaining taxa of terrestrial fungi. Sexual reproduction occurs with the fusion of undifferentiated **isogametangia** or **anisogametangia** to produce a zygote. The zygote later develops into a thick-walled **zygospore**, the diagnostic feature of this division. Two classes are recognized in this division; the Trichomycetes and Zygomycetes. Only the Zygomycetes will be studied.

Class: **Zygomycetes**

Characteristics of the class is the same as those of the division.

***Rhizopus stolonifer*:**

Asexual Reproduction: A typical sporangium (Fig. 1) is produced on a sporangiophore, singularly or in clusters, where rhizoids have formed and grown in the substrate. Within the sporangium proper are **sporangiospores** and a **columella**.

Variations in asexual reproductive structures

There is a great deal of variation that occurs in the sporangia of the Zygomycota. Below are a few of the more common variations:

Sexual Reproduction

Sexual reproduction occurs when opposite mating strains, designated as "+" and "-", grow towards one another. As the opposite mating strains near one another a hormone, trisporic acid, induces formation of progametangia which meet to initiate sexual development. Nuclei migrate into the apex of the **progametangia** where septa will form. The terminal cells are the **isogametangia** and the remainder of what was the progametangia are the **suspensors**. Fusion of gametangia will take place, followed by plasmogamy and karyogamy, and zygote formation. A dark, thick cell wall then forms around the zygote which may now be referred to as a **zygospore**. The formation of the zygospore is the unifying characteristic of the fungi in this division. Life cycle images of *Rhizopus stolonifer* from Dr. Tom Volks.



Figure 7: Pair of **progametangia** of different mating strains: "+" and "-" grow towards each other. Migration of nuclei will occur in the tips of both progametangia where gametangia will form.



Figure 8: Septa are laid down at the apex of the progametangia to form **isogametangia**. The outside, larger cells are the **suspensors** that support the gametangia.

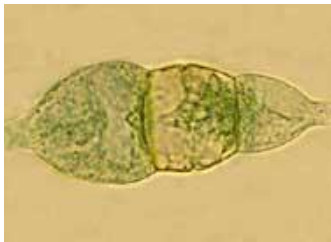


Figure 9: Plasmogamy occurs following fusion of the gametangia. Karyogamy immediately follows to form a multinucleate **zygote**.



Figure 10: The zygote will form a thick, pitted wall around itself to form the **zygosporangium**. Further development will not develop until after it has gone through a period of dormancy.

