



**Black bread
mold**

Rhizopus

Systematic Position

KINGDOM- MYCOTA

DIVISION- EUMYCOTA

SUBDIVISION- Zygomycotina

**CLASS- Mucoromycota
(Zygomycota)**

ORDER- Mucorales

FAMILY- Mucoraceae

GENUS – *Rhizopus*

Type species - *Rhizopus nigricans*

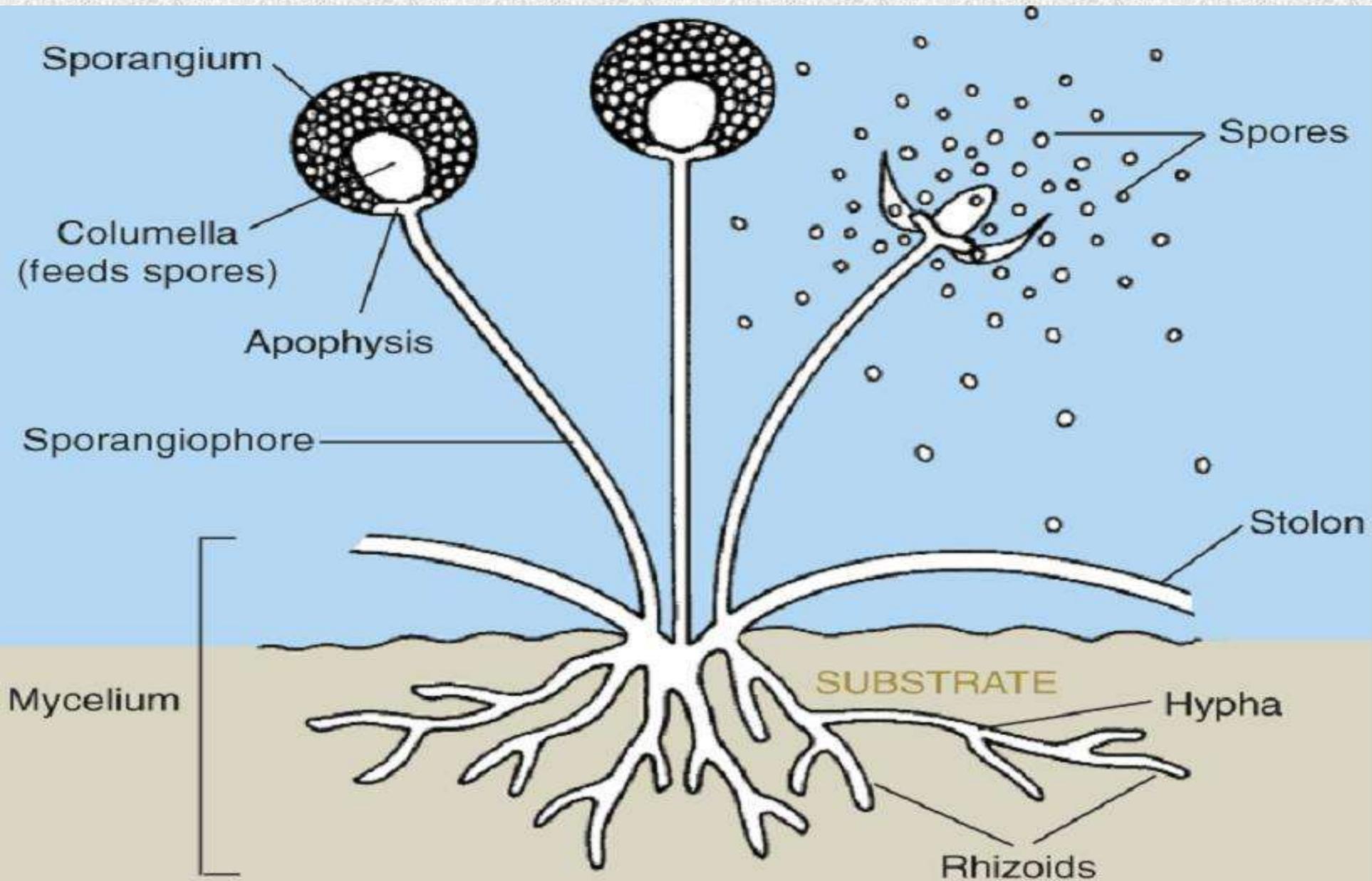
Rhizopus - Ehrenb. (1820)

Synonyms

Crinofera - Nieuwl. (1916)

Pilophora - Wallr. (1833)

Structure of *Rhizopus*



Consists of threadlike structures called Hyphae



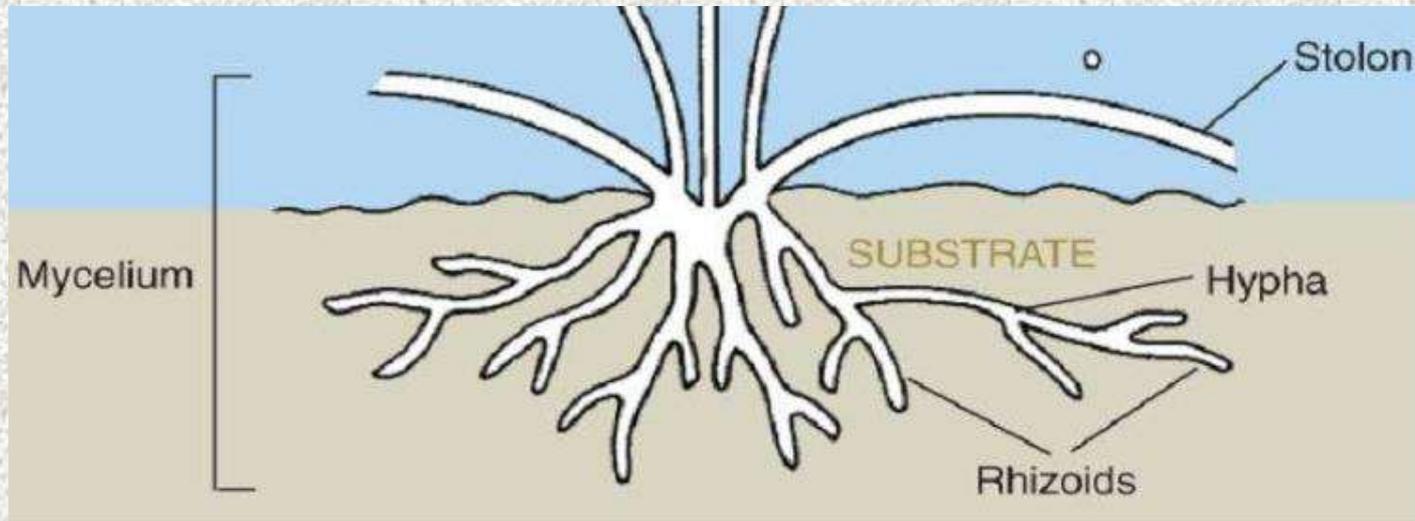
Hypha →

They are tubular with no cross walls and are **multinucleate**. Each nucleus is haploid.

Nucleus

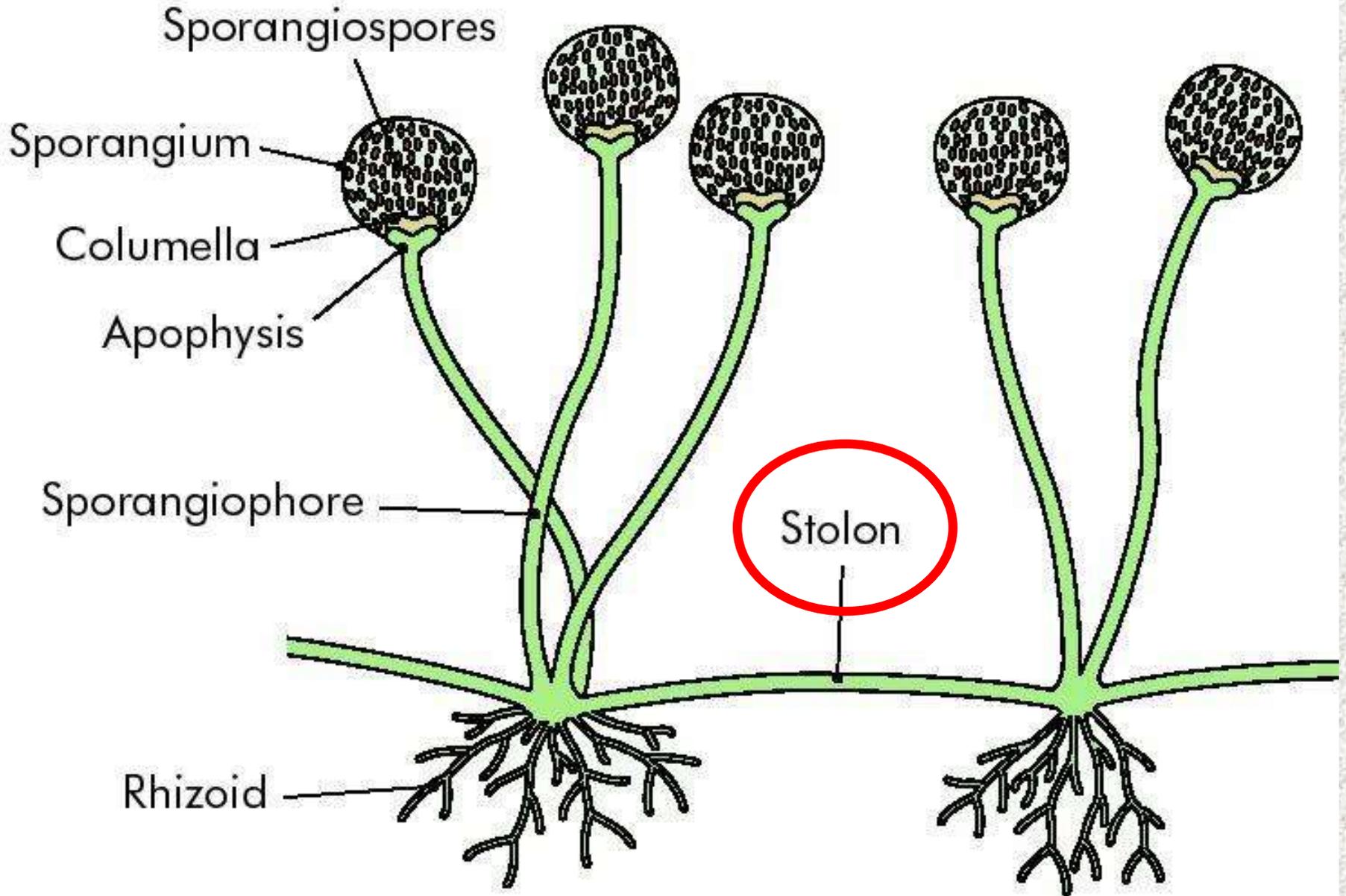


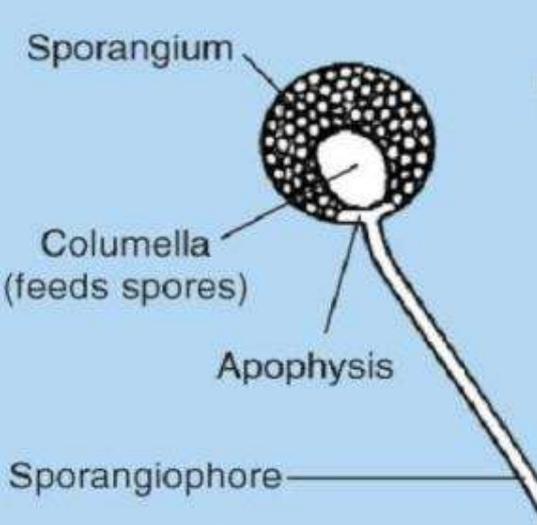
Large numbers of hyphae are called a **mycelium**



- The hyphae digest the substrate on which they grow
- Rhizoids** provide extra surface area for absorption of the digested material
- Stolons are arial hyphae which allow Rhizopus to spread sideways

Structure of *Rhizopus*





Sporangium

Spores

Columella

Apophysis

Sporangiphore

Life cycle of *Rhizopus*

Asexual reproduction

- **Sporangiophores** grow up from the substrate after a number of days
- Cells within the sporangium divide by mitosis to produce **spores** (haploid)



Asexual reproduction

- Cells within the sporangium divide by mitosis to produce **spores** (haploid)



Asexual reproduction

- The sporangium dries out in the right conditions and opens releasing many spores.
- Each spore will grow into a new hypha and mycelium if it lands on a suitable substrate

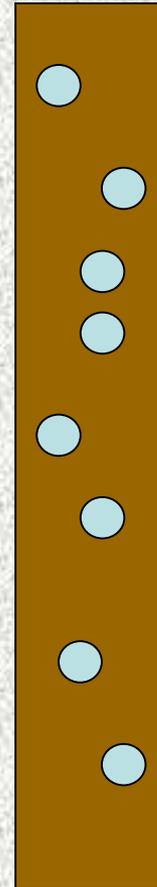




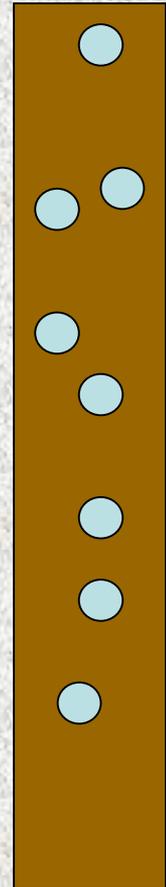
Sexual reproduction

- Sexual reproduction in *Rhizopus* can only occur between a **plus** and a **minus** strain.

+ Strain

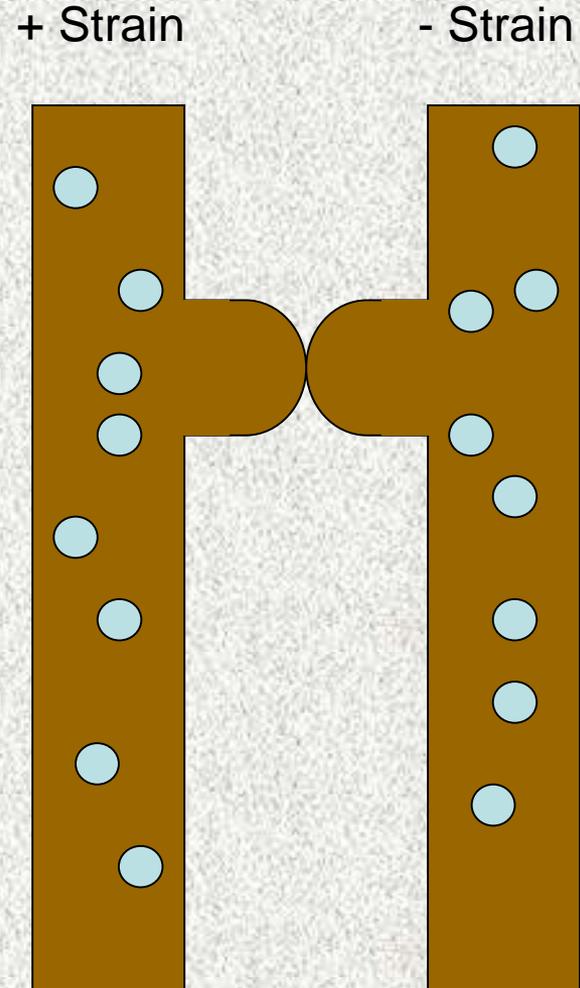


- Strain



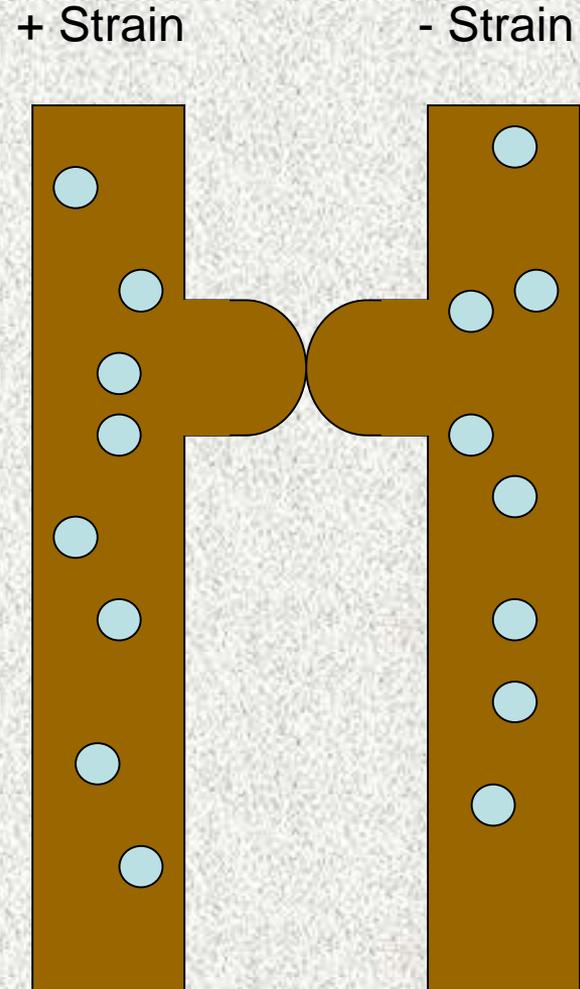
Sexual reproduction

- When hyphae from opposite strains grow close together **swellings** grow on both strains and touch each other.



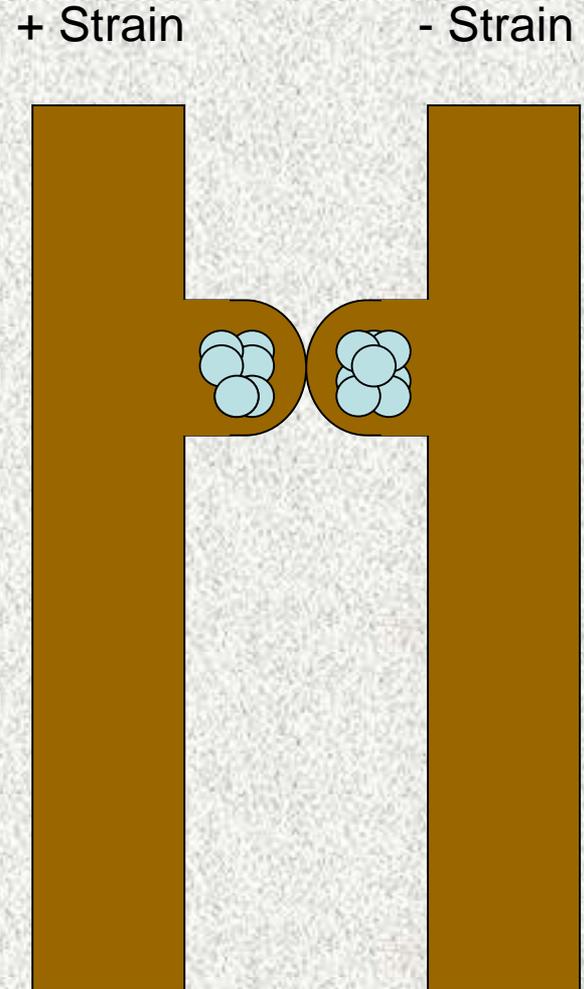
Sexual reproduction

- Nuclei from both hyphae move into these swellings which are now called **progametangia**.



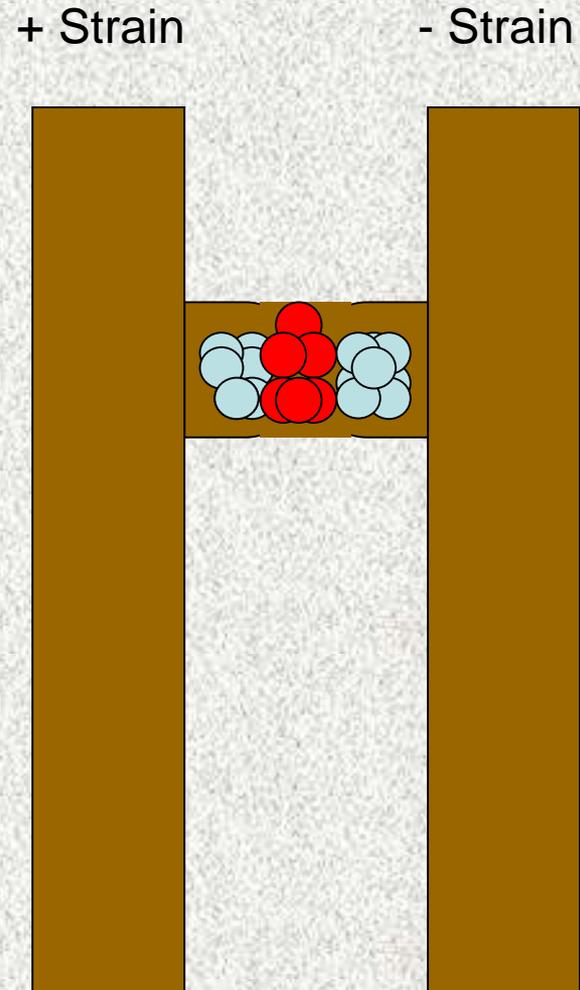
Sexual reproduction

- Cross-walls form to produce **gametangia**.



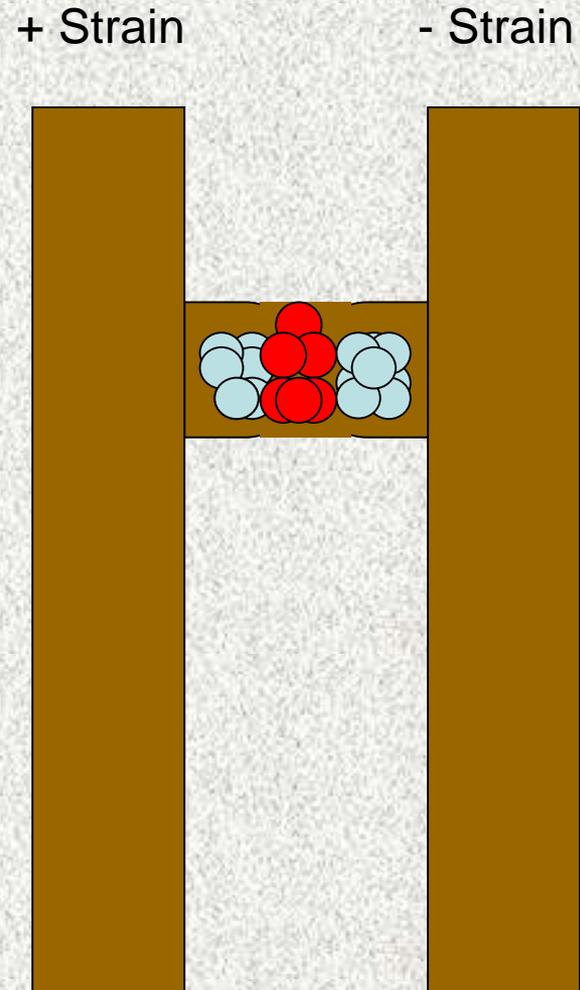
Sexual reproduction

- The walls of the gametangia dissolve and a number of fertilisations take place producing diploid **zygote** nuclei.



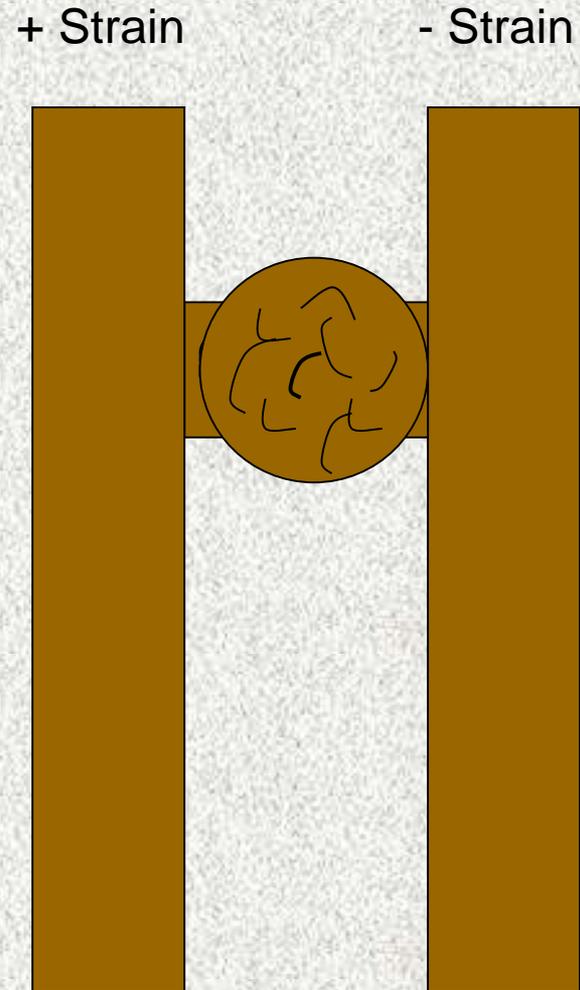
Sexual reproduction

- A **zygospore** forms around these nuclei.
- When conditions are suitable the zygospore germinates by **meiosis**.



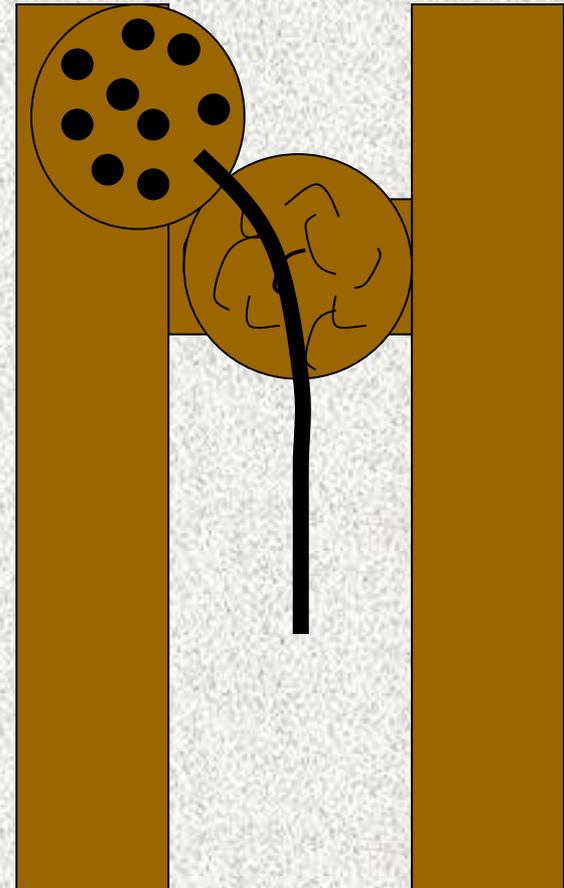
Sexual reproduction

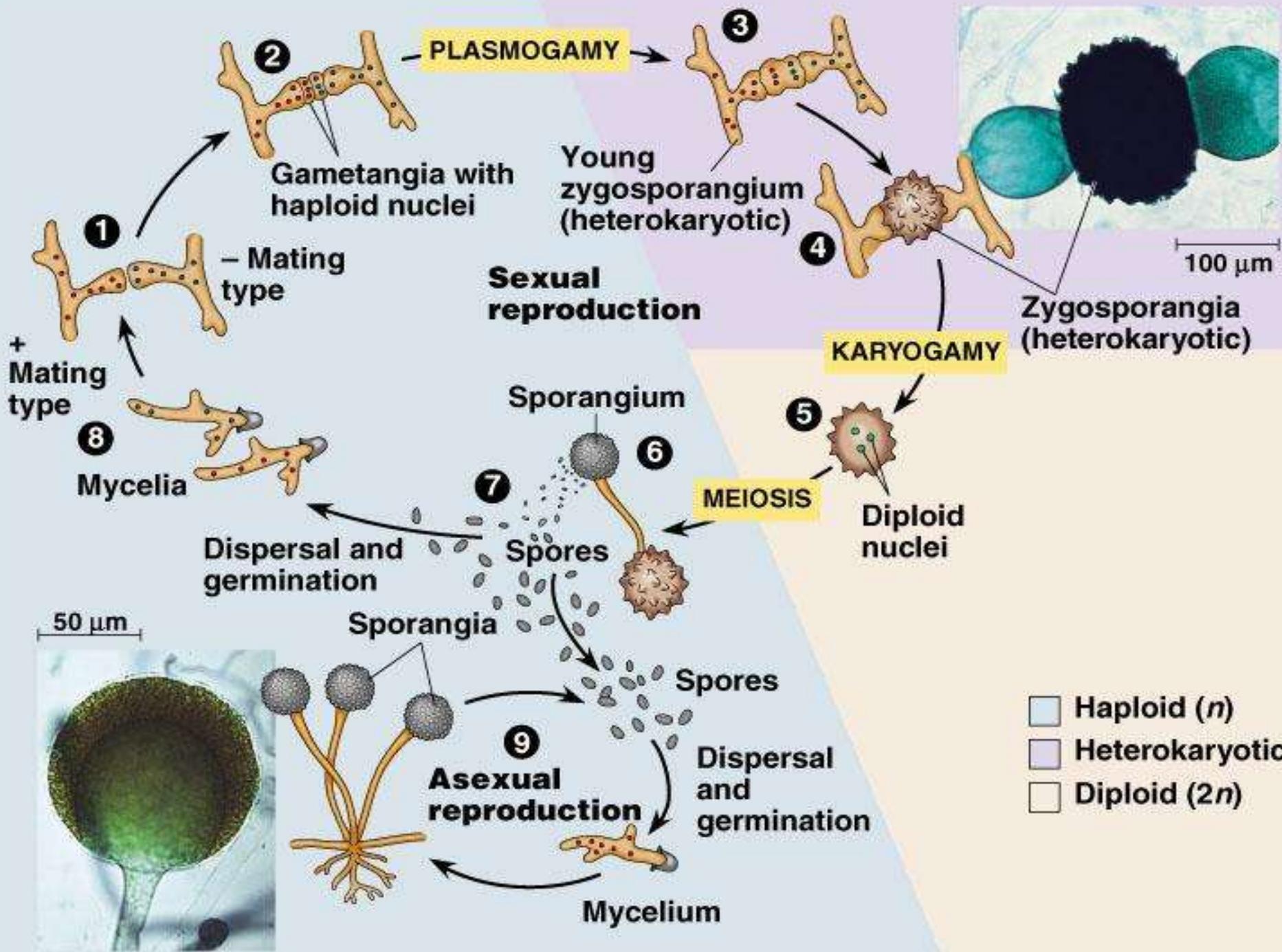
- A **zygospore** forms around these nuclei.
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Sexual reproduction

- A hypha grows out of the zygospore and produces a sporangium at the tip.
- The sporangium opens releasing many haploid spores which grow into new individuals.





Review of sexual reproduction

- Sexual reproduction in Rhizopus can only occur between a **plus** and a **minus** strain
- When hyphae from opposite strains grow close together **swellings** grow on both strains and touch each other
- Nuclei from both hyphae move into these swellings which are now called **progametangia**
- Cross-walls form to produce **gametangia**

- The walls of the gametangia dissolve and a number of fertilisations take place producing diploid **zygote** nuclei
- A **zygospore** forms around these nuclei
- When conditions are suitable the zygospore germinates by **meiosis**
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COMPILED BY KOUSIK GHOSH
FROM DIFFERENT SOURCES

THANK YOU