

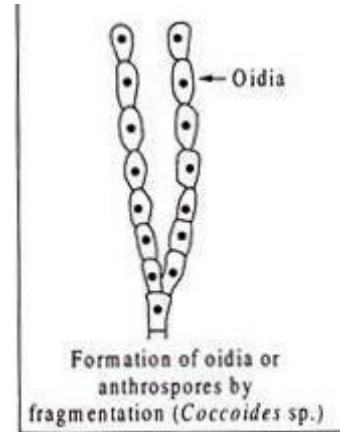
# Reproduction

In fungi there is both sexual and asexual reproduction. In asexual type there is no union of nuclei, sex cells or sex organs. In sexual type there is union of two nuclei.

**Asexual Reproduction:** It takes place by four methods.

## 1. **By fragmentation of soma (hypha):**

- Each fragmentation of hypha growing into new individual. In this hypha break into cells known as oidia (oidon=small egg) or arthrospores (arthron=joint spore=seed) cells become enveloped in thick wall before they separate.



## 2. **Fission of somatic cells into daughter cells:**

- The daughter nuclei separate, cleaves cytoplasm centripetally in the middle till it divides parent protoplasm into two daughter protoplasm.
- A double cross wall is deposited in the middle to form two daughter cells.
- Ultimately the middle layer of double cross wall degenerates and daughter cells are separated.

## 3. **By budding:**

- The cell wall bulges out and softens in the area and protoplasm also bulge out in this region as small protuberance.
- The parent nucleus also divides into two, one of the daughter nuclei migrates into bud, the cytoplasm of bud and mother remain continuous for some time
- As the bud enlarges, a septum is laid down at the joining of bud with mother cell. Then bud separates and leads independent life.
- Some time, bud starts reproducing while still attached with mother cell. This gives branching appearance.
- Budding is the typical reproductive characteristics of Ascomycetes e.g., Yeast

## 4. **By production of spores:**

- It is most common method of reproduction. Each spore germinates to form a germ tube which grows into mycelium. Spores are colorless or green, yellow, orange, red, brown or black. Shape is globose to oval oblong.

**The type of asexual spore produce is**

- Chlamydospores
- Blastospores
- Sporangiospores
- Arthrospores
- Conidiospores

**Mucor cycle:** The spores present in the sporegium are set free the spores germinate and produce hypha. The hypha branch, rebranch and produce mycelium. Mycelium convert into sporangiophores which bear sporangium.

Fungal spores produced asexually are either borne in sporangium (spore-vessel) & such spores are called sporangiospores or free & produced at the tips or sides of hyphae & known as conidia.

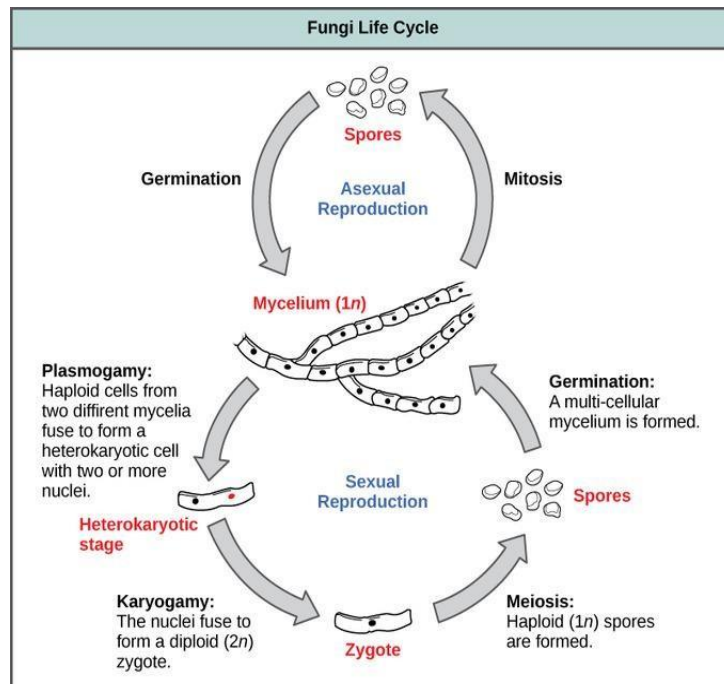
**Aspergillus/penicillium:** The spores are released in air from conidia and they germinate and converted into mycelium. From mycelium conidiophores, vesicle, sterigmata are produced and lastly conidia or spore are produced.

**Sexual reproduction:**

Sexual reproduction introduces genetic variation into a population of fungi. When both mating types are present in the same mycelium, it is called **homothallic**, or **self-fertile**. **Heterothallic** mycelia require two different, but compatible, mycelia to reproduce sexually.

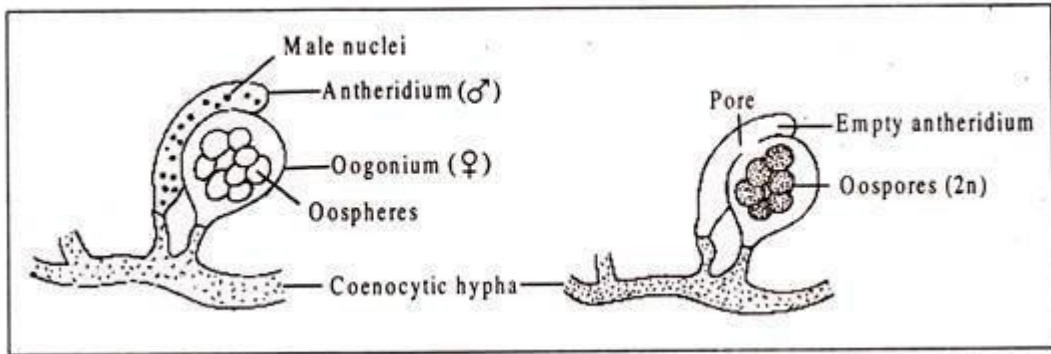
Although there are many variations in fungal sexual reproduction, all include the following three stages.

- **Plasmogamy (marriage or union of cytoplasm)**, two haploid cells fuse, leading to a dikaryotic stage where two haploid nuclei coexist in a single cell.
- **Karyogamy (nuclear marriage)**, the haploid nuclei fuse to form a diploid zygote nucleus.
- **Meiosis** in which gametes of different mating types are generated. At this stage, spores are disseminated into the environment.



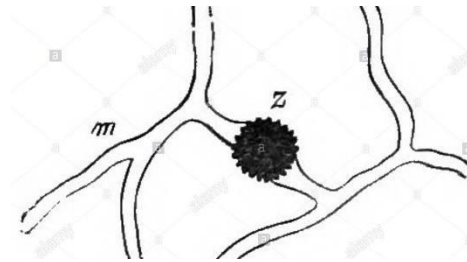
1) **Formation of oospore**

The male gametangium (antheridium) and female gametangium (oogonium) come in contact and the male nuclei pass into the oogonium through a pore to fertilize the oospheres (eggs) resulting in the formation of diploid oospores.



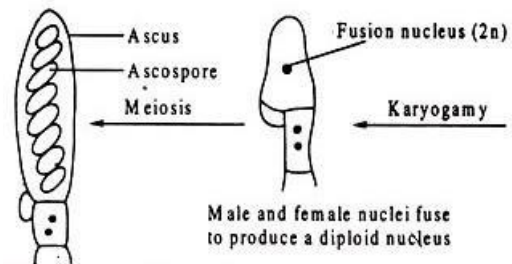
2) **Formation of Zygospore**

Hypha belonging to same mycelium or to different mycelium fuse and form a Zygospore (zygote). When the spore is ripe zygospore ruptures and spores are liberated in air. This method is seen in mucor. Asexually also mucor replicates by sporangiospore.



3) **Formation of Ascospore**

There is fusion of male and female sex cells and due to reproduction, there is formation of structure known as “Ascus” which contain 8 spores. This type of reproduction is seen in yeast.



4) **Formation of Basidiospore** Sexual

spores from a basidium or base. Example is mushroom

