Chapter 6-12: Kingdom Fungi

Although they were once classified as plants, members of the Kingdom Fungi are not at all plant-like. For example, plants engage in photosynthesis, but fungi are nonphotosynthetic and consume other organisms for food. Also, most fungi have filamentous bodies that penetrate animal waste, soil, or other forms of organic matter. In many cases, the only visible portions of the fungi are its reproductive structures. Fungi are eukaryotic organisms that have cell walls and digestive patterns suited to the absorption of nutrients.

Scientists recognize five divisions of fungi. The fungi we will study here produce sexual, diploid zygospores, but other divisions of fungi produce sexual spores in saclike ascus's, on club-shaped basidias. As noted, we will concentrate on one type of zygote fungus in this plate.

This plate illustrates the sexual and asexual reproductive forms of a typical fungus. Fungi are relatively simple and are commonly found on foodstuffs. All of the structures typical of a fungus are displayed on this plate.

With rare exceptions, (e.g., yeasts), fungi have filamentous bodies that are composed of eukaryotic cells. They live primarily in acidic environments that are near to room temperature and reproduce by both asexual and sexual methods, as we will show in this plate.

We will begin our study with a slice of **bread (A)**. A gray color should be used to shade the slice of bread, including the surface upon which the fungus is growing. The basic unit of this fungus is a long, filamentous, branching set of eukaryotic cells called a **hypha (B)**; these are shown throughout the plate. Specialized branches of the hyphae called **rhizoids (C)** penetrate the surface of the bread and absorb nutrients that sustain the fungus.

Arising from the surface of the bread, certain hyphae form specialized stalks called **sporangiophores (D)**. At the tip of each sporangiophore there is a spore-bearing structure called a **sporangium (E)**. Many sporangia are shown in the plate, and one is shown in detail. You should notice that the open, cross-sectioned **sporangium is releasing its spores (F)**. These spores are **asexual (G)**; they are produced by the cells at the tip of the sporangiophore, which undergo mitosis. These spores are genetically identical.

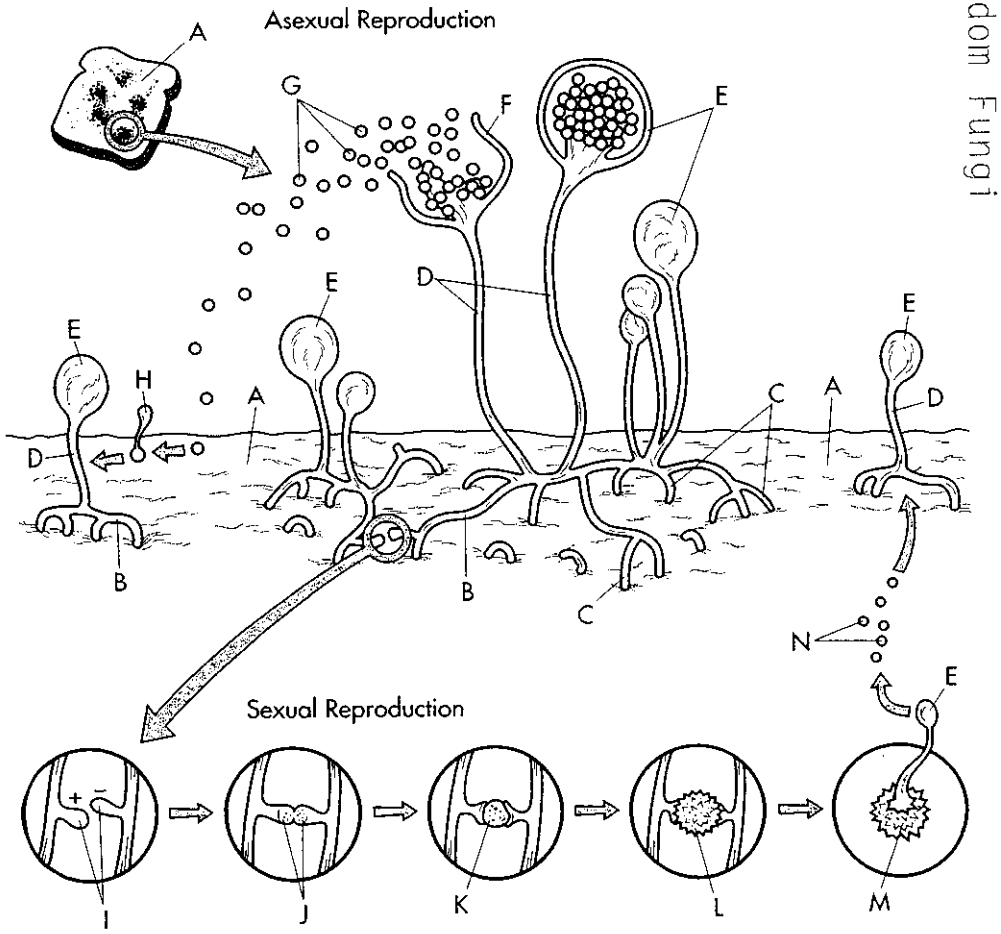
Having pointed out the major structures of the fungus, we will now focus on the process of asexual reproduction. Continue your coloring as you read the text below.

The first type of reproduction displayed by the fungus is asexual reproduction. In this process, the asexual spore produced by mitosis lands on the surface of the bread (A), to become a **germinating spore (H)**. The spore opens, and a new hypha develops. Eventually the hypha will form sporangiophores and sporangium, and new, asexual spores will form within the sporangium, completing the cycle.

We will now look at the second type of reproduction displayed by most fungi: sexual reproduction.

Sexual reproduction takes place when hyphae from opposite mating types meet and form mating structures. In the plate, we see **sexually opposite hyphae (I)** that are distinguished by a plus and minus. In the cutout, the sexually opposite hyphae (I) grow toward one another, forming gamete-bearing sacs called **gametangia (J)**. Eventually the **gametangia fuse (K)** and the nuclei of the cells join to form a diploid zygote. This mature, thickened cell is the **zygospore (L)**, and later, the zygospore will **germinate (M)**. The zygotes have undergone meiosis and reverted to the haploid state, and the zygospore forms a sporangium (E) and releases **sexual spores (N)**. Each sexual spore is capable of landing on the bread or other suitable environment and reproducing new hyphae.

Sexual reproduction results in fewer spores than asexual reproduction, but the sexually produced spores are genetically different from one another, which introduces variation into the fungus and makes evolution possible.



6.12 Kingdom Fungi

a. How do fungi obtain food?
b. Scientists recognize how many divisions of fungi:
c. Describe the body of most fungi:
d. Do fungi prefer an acidic of basic environment?
e. The basic unit of fungi (filamentous eukaryotic cells) is called a:
f. Branches of hypha that penetrate to absorb nutrients are called:
g. These specialized stalks (sporangiophores) branch from hypha and bear spores:
h. Are spores sexual or asexual?
i. What will develop from a spore?
j. When sexually opposite hypha meet, they form gamete bearing sacs called:
k. This will germinate to form a sporangium & release sexual spores:
l. Disadvantage of sexual reproduction:
m. Advantage of sexual reproduction:

Kingdom Fungi

- ○ Bread.....A
- ○ Hypha.....B
- ○ Rhizoids C
- ○ Sporangiophores.....D
- ○ Sporangium .....E
- ○ Spore-releasing Sporangium .....F
- ○ Asexual Spores .....G
- ○ Germinating Spore.....H
- ○ Sexually Opposite Hyphae I
- ○ Gametangia .....J
- ○ Fusing Gametangia.....K
- ○ Zygospore.....L
- ○ Germinating Zygospore.....M
- ○ Sexual Spores.....N