

Division: *Basidiomycota*

Basidiomycota contains both micro and macrofungi such as rusts, smuts, mushrooms, gasteroid, aphylophoroid and jelly fungi. They are filamentous fungi composed of hyphae and reproduce club-shaped end cells called basidia. Their specialized spores are called basidiospores. Basidiomycota can undergo both asexual and sexual reproduction. They reproduce asexually by either budding or asexual spore formation. Sexual reproduction in Basidiomycota occurs in basidia. The basidia are themselves formed by plasmogamy between mycelia from two different spores. Plasmogamy results in binucleate hyphae, that is, hyphae with two types of nuclei, one from each parent. In the gills of the fruiting body, some cells undergo fusion of these two nuclei. These now diploid cells are the basidia. The diploid phase is very brief. Soon after fusion, meiosis takes place, resulting in four haploid nuclei. The nuclei then migrate to the terminus of the basidium and form four individual projections. These projections are then separated by cell walls to become spores.

Basidiomycota includes içerisinde 3 subdivision, 16 class, 52 order, 177 family, 1589 genera and more than 30.000 species.

Subdivision: *Agaricomycotina*

The subdivision contains 3 classes (*Agaricomycetes*, *Dacrymycetes* and *Tremellomycetes*)

Class: *Agaricomycetes*

Agaricomycetes includes 17 orders, 100 families, 1147 genera, and about 21000 species. The class will be examined under the titles of Mushrooms, Aphylophoroid, Jelly, and Gasteroid fungi.

Group: Mushrooms

Mushrooms are a specific part of the class *Agaricomycetes*. Their sporocarps are visible without using a magnifying apparatus and they have large, easily observed spore-bearing

structures. Most mushrooms are saprobes or mycorrhizal symbionts, but some are pathogens of plants. This group includes 3 orders (*Agaricales*, *Russulales*, and *Boletales*).

Order: *Agaricales* (Agaricoid mushrooms)

Agaricales is characterized by gilled basidiocarps consisting of pileus and stipe. The order includes 33 family, 413 genera, and about 13000 species (example genera; *Agaricus*, *Amanita*, *Armillaria*, *Clitocybe*, *Cortinarius*, *Bolbitius*, *Entoloma*, *Flammulina*, *Galerina*, *Hebeloma*, *Inocybe*, *Lepiota*, *Omphalotus*, *Panaeolus*, *Psilocybe*, *Stropharia*, *Tricholoma*, *Tubaria* and *Xerula*).

Order: *Russulales* (Russuloid mushrooms)

Russulales contains 12 families, 80 genera, and about 1750 species. *Russula* and *Lactarius* are the *Russulales* genera that are very common mushrooms with gills. They produce convex to funnel-shaped caps on top of a stipe which never has a ring nor volva and they all are very similar in general appearance.

Order: *Boletales*

Boletes contain ectomycorrhizal mushrooms which were composed of genera including both poroid (*Boletus*, *Gyroporus*, *Leccinum*, *Pulveroboletus*, *Strobilomyces*, *Suillus*, *Tylopilus*, and *Xerocomus*) and lamellate (*Chroogomphus*, *Gomphidius* and *Paxillus*) fungi.

Group: Aphylophoroid fungi

This is an entirely artificial group that contains clavarioid, corticioid, cyphelloid fungi, cantharelloid, hydroid and poroid fungi.

Order: *Cantharellales*

The most *Cantharellales* members are ectomycorrhizal, forming mutually beneficial associations with certain trees, shrubs, and other vascular plants. The order includes cantharelloid, some of hydroid, clavarioid and corticioid fungi (Example genera: *Cantharellus*, *Craterellus*, *Hydnum*, *Clavulina*, and *Pseudocraterellus*).

Order: Polyporales

Polyporales contains 1800 approximately species. The order includes polyporoid and some corticoid fungi. Members of the order are saprotrophs, most of them wood-rotters (Example genera: *Ganoderma*, *Fomes*, *Polyporus*, and *Trametes*).

Group: Jelly Fungi

The members of the group have a gelatinous and cartilaginous consistency of their fruiting bodies. This group stands out; *Auriculariales*, *Dacrymycetales* and *Tremellales*.

Group: Gasteroid fungi

The gasteroid fungi are polyphyletic group. Unlike most Basidiomycota members, gasteroid fungi are angiocarps. The group contains both hypogeous and epigeous members. Fruit bodies of gasteroid fungi are partially or completely embedded in soil, at least during immaturity. As they mature they rise above the ground and becoming globose, pyriform or clavate. Most gasteroid fungi are saprobe that grows on soil, dead wood or dung but some form mycorrhizal symbioses with plants.

Order: Geastrales

Geastrales is a gasterocarpic basidiomycete order that contains about 64 species within the single-family *Geastraceae*, commonly known as earthstars (Example genera: *Geastrum*, *Myriostoma*, and *Sphaerobolus*).

Order: Phallales

Phallales contains 30 genera and approximately 330 species. The order is consisted of clathroid and phalloid members due to their branched and unbranched basidiomata. While phalloid fungi have unbranched basidiomata with a cylindrical, hollow pseudostipe and mucilaginous gleba covering the external surface of the receptacle, clathroid fungi have branched basidiomata with globose to star like receptacle whose internal surface is covered by mucilaginous gleba.

Subdivision: *Pucciniomycotina*

The subdivision contains 9 classes, 20 orders, and 37 families. Members of the order are plant pathogens, insect parasites, mycoparasites, and orchid mycorrhizal fungi and some of them are found in soil and water or asymptomatic members living on leaves. There are 9 classes (*Agaricostilbomycetes*, *Atractiellomycetes*, *Microbotryomycetes*, *Cystobasidiomycetes*, *Mixiomycetes*, *Cryptomyocolacomycetes*, *Classiculomycetes*, *Tritirachiomycetes* ve *Pucciniomycetes*) in the subdivision.

Class: *Pucciniomycetes*

Pucciniomycetes includes 5 orders, 21 families, 190 genera, and 8016 species. The class contains several important plant pathogens causing forms of fungal rust.

Order: *Pucciniales*

Pucciniales, also known as rust fungi, includes 168 genera and over 7500 species. Members of the order are highly specialized plant pathogens and they are considered among the most harmful pathogens to agriculture, horticulture, and forestry.

Subdivision: *Ustilaginomycotina*

Ustilaginomycotina members are mostly plant parasites on vascular plants. The subdivision comprises 115 genera with more than 1700 species and It consists of the classes *Ustilaginomycetes* and *Exobasidiomycetes*.

Classis: *Ustilaginomycetes*

The class includes 2 order (Urocystidiales ve Ustilaginales), 12 families, 62 genera and approximately 1400 species.

Order: *Ustilaginales*

Ustilaginales, also known smut fungi, are serious plant pathogens that include 8 families, 49 genera, and 851 species.

REFERENCES

Akata I, Gürkanlı CT. 2018. A New Genus Record For Turkish Clathroid Fungi. *Mantar Dergisi* 9 (1): 36-38.

Alexopoulos CJ, Mims CW, Blackwell M (1996). *Introductory Mycology*. John Wiley and Sons.

Doğan HH, Akata I. 2015. New Additions to Turkish Gasteroid Fungi. *Kastamonu Üniversitesi Orman Fakültesi Dergisi* 15 (2): 329-333.

Kabaktepe Ş, Akata I, Akgül H. 2016. A New Anthracocystis (Ustilaginales) Record for Turkey. *Hacettepe J. Biol. & Chem.* 44 (1): 21–24.

Kirk PM, Cannon PF, Minter DW, Stalpers JA. 2008. *Dictionary of the Fungi* (10th ed.). Wallingford, UK: CABI.

Url1.: <https://www.sparknotes.com/biology/microorganisms/fungi/section1>

Url2.: http://www2.muse.it/russulales-news/in_characteristics.asp