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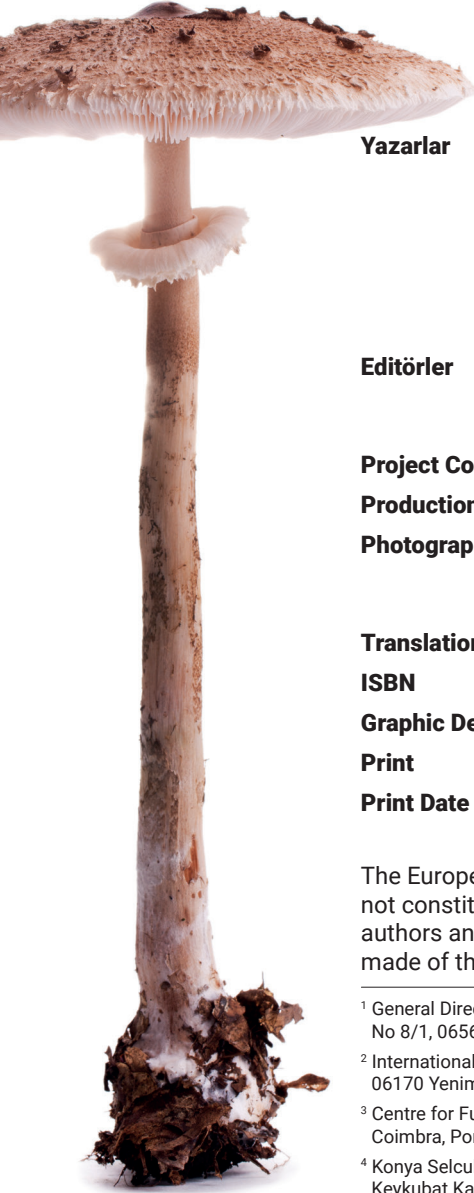
Common Edible
Mushrooms
from Türkiye and the
Mediterranean Basin

TASTEFUNgi



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**Yazarlar****: Introduction to Fungi**

Tarık Durmuş¹, Ahmet Sinan Çalışkan²,
Susana C. Gonçalves³, M. Teresa Gonçalves³

**Common Edible Mushrooms from Türkiye and
Mediterranean Basin**

Ahmet Sinan Çalışkan²,
Prof. Dr. Hasan Hüseyin Doğan⁴

Editörler

: Tarık Durmuş¹, Ahmet Sinan Çalışkan²,
Susana C. Gonçalves³, M. Teresa Gonçalves³,
Prof. Dr. Hasan Hüseyin Doğan⁴

Project Coordinators

: Bülent Sezer²

Production Coordinators: Özgür Balcı¹, Galip Çağtay Tufanoğlu¹, Hakan Birben²

Photographs

: Ahmet Sinan Çalışkan²,
Prof. Dr. Hasan Hüseyin Doğan⁴,
Juan Antonio Sánchez Rodríguez⁵

Translation

: Tarık Durmuş¹

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¹ General Directorate of Forestry, Department of Ecosystem Services, Bestepe Mah. Sogutozu Cd. No 8/1, 06560 Yenimahalle/Ankara, Türkiye

² International Agricultural Training Center, Gayret Mahallesi Fatih Sultan Mehmet Bulvari 3.Km No:36 06170 Yenimahalle/Ankara, Türkiye

³ Centre for Functional Ecology, Department of Life Sciences, University of Coimbra, 3000-456 Coimbra, Portugal

⁴ Konya Selçuk University, Faculty of Science, Department of Biology, Ardicli, Selçuk Univ. Alaaddin Keykubat Kampusu No:341, 42250 Selçuklu/Konya, Türkiye

⁵ Irma SL- Instituto De Restauracion Y Medio Ambiente SI, Calle Arquitecto Torbado, 6, 24003 León, Spain



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Common edible mushrooms from Türkiye and the Mediterranean basin





PICTOGRAM GLOSSARY

Edibility

Edible



**Good
edible**



**Excellent
edible**



Season

**Spring
(Sp)**



**Summer
(S)**



**Autumn
(A)**



**Winter
(W)**



**Coniferous
Forest**



**Broadleaf
Forest**



Grasslands



**Mixed
Forest**





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INTRODUCTION TO FUNGI

About This Publication

This publication aims to introduce, to all those interested, the most common edible mushrooms from the Mediterranean basin, including Türkiye. It will help collectors recognising the most common mushroom species in the territory, those that are traditionally used as food, and potentially marketable. At the same time, it warns against the existence of species that produce fruiting bodies with a similar appearance and which are at the origin of confusions that may cause poisoning, often with disastrous results. Some mushrooms are easy to name, but many are difficult and can easily be mistaken with look-alike species that may be toxic or even deadly. This book is a tool, use it as such. Never eat a mushroom unless you are 100 % sure about its identification.



What are fungi? and mushrooms?

Fungi (singular: fungus) are a group of unique living beings. Once considered to be simple or primitive members of the plant kingdom, fungi are a kingdom of life on their own right, in fact closer to animals. They are easily separated from plants by their inability to synthesize organic compounds with the aid of sunlight; like animals, fungi are heterotrophic. However, fungi don't consume food the same way as animals do. They consume their food by releasing digestive enzymes into the environment and absorb dissolved organic molecules into their cells. Most fungi have cell walls made of chitin (which is also found in animals, for instance in the exoskeleton of insects) and store food reserves as glycogen and lipids, just like animals (not starch as in plants). Fungi reproduce by spores. Most fungi are capable of producing both sexual and non-sexual spores and produce more than one type of spores as part of their life cycles. Fungi that produce spore-bearing structures visible to the naked eye are referred to as macrofungi, and the spore-bearing structures or fruiting bodies are commonly known as mushrooms. The true body of the fungus, however, remains hidden in the soil or other substrate. It is the mycelium, a network of filaments called hyphae (some fungi, the yeasts, are single-celled).



Currently the fungal tree of life comprises eight phyla. The two groups of fungi producing mushrooms are the Ascomycota (including morels and truffles) and the Basidiomycota (mushrooms, brackets, puffballs, earthstars, stinkhorns). The Ascomycota are commonly called the spore-shooters. The spores (ascospores) are formed inside a cell called ascus (plural: asci). The meiosis that takes place in the asci is usually followed by a mitosis leading to the formation of typically eight spores (but numbers can vary). At maturity the spores are ejected. One exception are truffles that have passive spore dispersal. In the Basidiomycota, the spore-droppers, the spores (basidiospores) are produced on basidia (singular: basidium). As a result of the meiosis in the basidium, four external basidiospores are formed that hang on top of sterigmata (singular: sterigma), which are small supporting projections of the basidia.



Fungi are an ancient group on Earth. Earliest fungal fossils are 460 to 455 million years old. Fossil evidence shows that earliest vascular land plants appeared 425 million years ago and it is thought that fungi played an essential role in the colonization of land by these early plants. The number of fungal species is estimated to be 2.2 - 3.8 million, of which less than 10 % are unknown to science.





How do mushrooms feed?

Because fungi are heterotrophs like animals, they depend on other organisms for their carbon and energy. Some fungi obtain their nutrients from dead plants or animals and are called saprotrophs, while others obtain their nutrients from a living host (plant or animal) and are called biotrophs. Some fungal biotrophs are parasites, but others engage in mutual beneficial relationships with their hosts (mutualisms).

Saprotrophic mushrooms feed on dead fungi, plants, animals, or on their waste materials (for instance animal dung or fallen plant leaves). Examples include the genera *Agaricus* and *Lepista*. Unlike saprotrophs, parasitic fungi feed on living cells. Most parasitic mushrooms are wood decaying fungi. Many coexist with their hosts for decades without causing any symptoms but will eventually cause some damage, especially if the trees are subjected to other stress factors like drought or insect attacks. One example is the genus *Laetiporus*.





Fungal parasites of animals don't usually produce visible fruiting bodies, but there are exceptions, e.g., the edible and medicinal mushroom *Ophiocordyceps sinensis* parasitizes underground dwelling larvae of moths (Lepidoptera).

Other important groups of biotrophic fungi are mycorrhizal fungi and lichens. Lichens are mutualistic symbioses between a fungus (usually Ascomycota) and a photosynthetic partner, usually a green alga, sometimes cyanobacteria. Although lichens are very important, they are beyond the scope of this publication and will not be considered further. Mycorrhizal fungi engage with plant roots in a mutual beneficial symbiosis called mycorrhiza, literally meaning fungus + root (plural: mycorrhizas). Different plants associate with different fungi to form mycorrhizas, that can be divided into two big groups: ectomycorrhizas (the fungus doesn't penetrate plant cells) and endomycorrhizas. Only around 2% of plants form ectomycorrhizas but they are the mostly ecologically and economically important trees that dominate temperate, boreal and some tropical ecosystems, e.g., genera *Quercus*, *Fagus*, *Betula*, *Pinus*, *Picea*, *Eucalyptus*, *Shorea*. On the other hand, around 20 000 Ascomycota and Basidiomycota species are ectomycorrhizal fungi. These include the boletes, the chanterelles and the truffles. Ectomycorrhizal fungi evolved from free-living saprotrophic fungi. They are still good at exploring the soil for nutrients that they provide to the tree in exchange for carbon (the tree gets its carbon from photosynthesis). In the forest, one tree is associated with many ectomycorrhizal fungi and a fungus may be connected to many trees. Ectomycorrhizal fungi link trees together via a common mycorrhizal network that is often referred to as the 'Wood-Wide-Web'.





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Common edible mushrooms from Türkiye and the Mediterranean basin





What do mushrooms do?

Saprotrophic mushrooms play an essential role on Earth, ensuring the recycling of organic matter. When plants and animals die, their bodies must be broken down to release the nutrients back into soil, otherwise soil would run out of nutrients and plants would be unable to grow. While bacteria and soil invertebrates also play a role in this process, fungi are the main recyclers. Wood-decaying mushrooms, notably, are the only organisms on the planet capable of recycling the complex molecules (lignocellulose) that make up wood.



Ectomycorrhizal mushrooms provide key benefits to terrestrial ecosystems. They are specialized in the uptake of nitrogen, often a limiting nutrient in boreal and temperate forests. In exchange for plant carbon, they provide soil nitrogen needed by the plant. Moreover, they are also involved in water uptake, pollution tolerance, and protection from pathogens. Critically, the underground mycelium of ectomycorrhizal fungi acts as an important carbon sink. Ectomycorrhizal fungi are also the habitat and food of a variety of animals, including humans.

Parasite mushrooms also play an important ecological role in forests. Although the presence of parasitic mushrooms like the tree pathogen *Armillaria mellea* is feared by gardeners and foresters, parasites are part of healthy ecosystems. Disease outbreaks are often the result of planting tree clones or inadvertently introducing non-native fungi that become invasive. In natural forests, parasites are simply part of the system of checks and balances of nature. Most trees will not succumb to the attack of parasites; the fungus is dependent on the living host and killing it would result in its own death. But old, weakened trees will eventually die, giving opportunity to new seedlings to grow, and promoting tree diversity. On the other hand, many parasite mushrooms have medicinal features. One example is *Fomitopsis betulina*, which the famous 5,300-year-old mummy Ötzi was carrying with him.



Safeguarding the future

Around the world, more than 2,180 species of wild fungi are used for food and, in China alone, more than 1,000 medicinal species have been reported. International trade of wild mushrooms is on the rise, with a steady increase over the last 15 years, and amounting to a trade value of over 5.2 billion US dollars in 2019.

Wild mushrooms' use and trade varies by country. In some regions, it represents the primary livelihood for rural communities and is particularly relevant for women and the elderly. Picking mushrooms is also an important recreational activity in some regions. Wild mushrooms also provide critical functions in terrestrial ecosystems perhaps especially through decomposition and also their key role as mutualists of trees, facilitating nutrient and water uptake, and enhancing carbon sequestration in soil. Mushrooms, including parasites, are a vital part of a healthy forest.





Mushrooms are the fruiting bodies of the fungi, where spores are produced. Like seeds, spores disperse and, when the conditions are right, they will germinate and grow into new fungi. Therefore, improper harvesting practices threaten the balance of forest ecosystems, putting future harvesting at risk and menacing the health of the forest and its capacity to respond to change, for example climate change. Good harvesting practices tackle both direct and indirect impacts: the protection of the target species, but also the protection of the habitat. Harvesting practices also relate to food security as some mushrooms are toxic, even deadly. Beyond misidentification, bad handling, deficient mushroom preservation and mislabelling should all be addressed. Finally, sustaining the harvest of wild mushrooms needs a range of expertise and calls for new alliances among stakeholders including policymakers, scientists, land owners and mushroom pickers.





The wise mushroom picker's guide

Below we highlight a series of good harvesting practices that can form the basis of a legal code of conduct.

1

Be sure picking is allowed. Always get permission to harvest in private lands.

2

If travelling and/or camping to look for mushrooms, respect the land, be careful with campfires and leave the area you use "cleaner than you found it".

3

Know the mushrooms before you pick them. Remember not all mushrooms are edible, be especially careful with edible species that can be mistaken for toxic species.

4

Avoid picking repeatedly in the same area and only in somewhat unspoiled areas. Avoid road sides or agricultural areas (mushrooms tend to concentrate heavy metals and other toxic substances).



5

Depending on the type of mushroom you may use different harvesting techniques: grasp the mushroom at the base, gently rock and twist until it becomes loose (e.g., for puffballs), use a sharp knife to cut the mushroom off (usually used for morels), or insert a knife or stick under the base and pull them out (e.g. *Amanita caesarea*)

6

Return the forest floor to a condition similar to what existed prior to harvest; put dead leaves, mosses or fallen branches back into place.

7

Avoid collecting immature mushrooms that have not released spores yet.



8

Pick only mushrooms in good condition. Inspect them for insects for rejection while still at the harvesting site.

9

Don't destroy mushrooms of species you are not picking, they all have an important function in the ecosystem, even the deadly ones.

10

Do not pick all mushrooms of a given species in a given place (picking one-third of the mushrooms is a good rule of thumb).

11

Transport the mushrooms in appropriate containers such as wicker baskets. They allow spore dispersal and aeration. Never use plastic bags, which promote their rapid deterioration.



Safety rules for the use of wild mushrooms as food



1

Learn to recognize the deadly species (e.g., *Amanita phalloides*) growing in the areas where you usually pick mushrooms. Know what they look like, at what time of year they fruit, near which tree species they occur, and anything else that will help you avoid them. Seek the help of an expert, take an identification course or get a good field guide.

2

Give preference to edible mushroom species that cannot be confused with the toxic species you have learned to identify. If possible, take pictures of the mushrooms you have picked still in their natural habitat.

3

Do not pick mushrooms in potentially contaminated areas such as near industrial plants, on roadsides, on agricultural land or inside urban perimeters.

4

At home, always examine all specimens to ensure that you have not inadvertently picked any non-edible specimen.

5

Discard old mushrooms or those showing signs of deterioration.

6

Eat only one species at a time, especially if you do not usually eat wild mushrooms.





7

Reserve a sample of the fresh mushrooms you are going to cook. In case of poisoning, this sample can save your life! Scientists can identify which toxic species you have ingested, allowing doctors to make a proper diagnosis and start treatment in time.

8

Do not believe in the veracity of popular beliefs intended to identify toxic mushrooms.

9

Always cook wild mushrooms. Some wild mushrooms are toxic only when eaten raw (e.g., *Lepista nuda*, *Amanita rubescens* and some *Helvella* species).

10

Always eat small amounts at a time and never in successive meals or days (particularly if it is your first time consuming a particular species). Each person reacts differently to the ingestion of wild mushrooms and therefore we should experiment our response with caution. On the other hand, the amount ingested can make the difference between life and death.

11

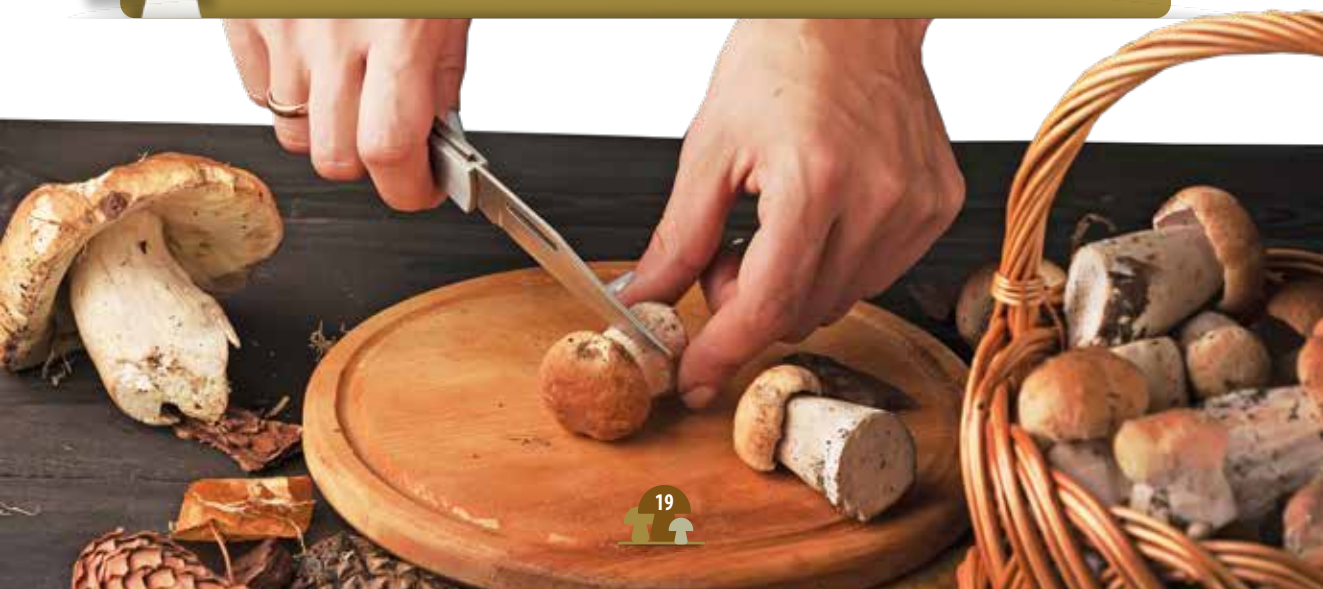
Avoid drinking alcohol when tasting new species and do not consume alcohol with certain species, e.g., *Coprinus atramentarius*.

12

As an additional precaution, do not give wild mushrooms to eat to children, even those considered safe.

13

Do not forget that consuming wild mushrooms can kill you. When in doubt, do not eat them!





How to name a mushroom?

Macroscopy

There are a lot of mushrooms' morphological characters which are crucial to getting the species identification, namely mushroom shape and size followed by characterization of each part. Besides morphology, other important features are mushroom's growth habit, the habitat (e.g. forest or grassland), the substrate they grow in (soil, wood, leaves) and ephemeral characters like taste and odour. The observations should be made on fresh mushrooms, whether in the field or at home.

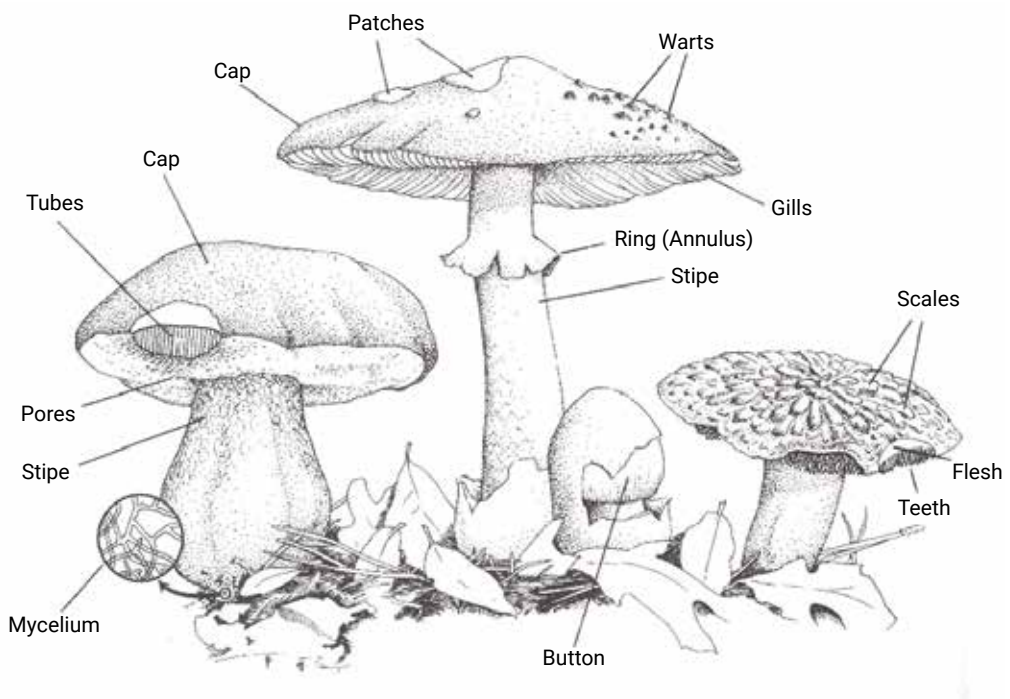


Figure 1: General Appearance of Mushrooms



Morphological diversity of fruiting bodies

Mushrooms can take many different shapes, from a speck on wood, to rounded like a ball, from cap mushrooms to coral-shaped ones, from bowl-shaped to wrinkled caps. Crusts or stain-like mushrooms develop on wood and usually have no economic value for mushroom hunters. Shelf-like or bracket mushrooms grow on trees or dead wood. They are usually flat and wide and parallel to the ground and line up like shelves. Coral-like fungi, so called because of their morphological similarity to corals, grow in various habitats, some being edible and some having medicinal value. Hypogeous mushrooms (*i.e.*, growing underground or very close to the surface) are quite a wide group; they are more or less spherical and some are very prized and valuable economically (*e.g.* *truffles*). Morels (*sensu lato*) are brain-like and easily recognized with some species being much appreciated (*e.g.* white morels).

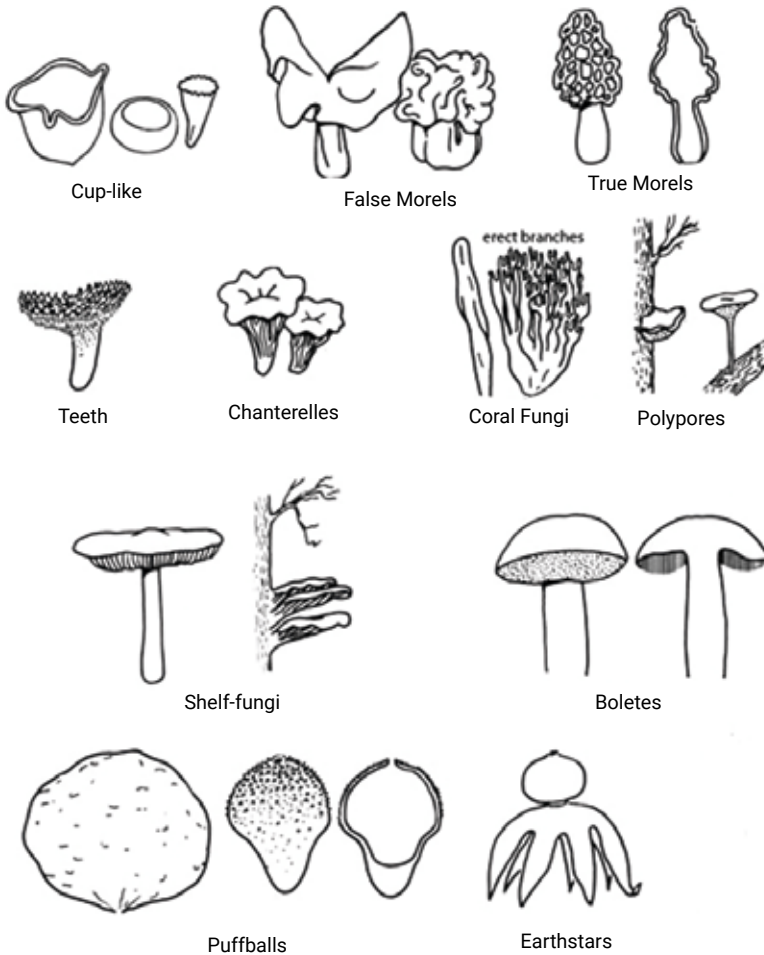


Figure 2: Morphological Diversity of Mushrooms



Growth habit of a species refers to how far apart or close together the specimens grow. Thus, growth habit may be solitary, scattered (mushrooms growing at moderate distances) or gregarious, if mushrooms grow in groups. The species whose fruiting bodies grow very closely to the others, seeming like a tuft, are said to be confluent.

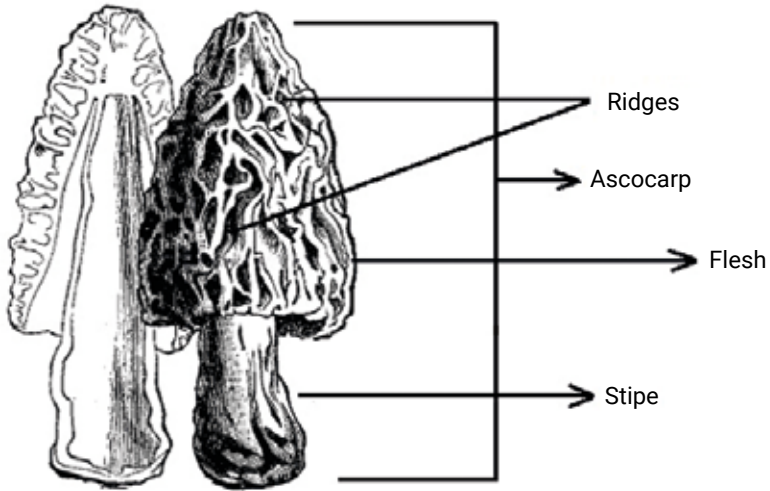


Figure 3: Appearance of Morels

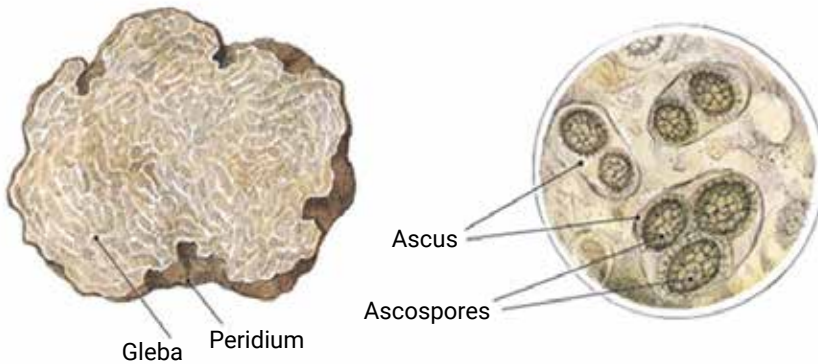


Figure 4: Appearance of Truffles



Mushrooms with a cap and a stipe

In cap mushrooms, the most widely known around the world, the cap is supported by the stipe (usually central). Beneath the cap, one may find gills, pores, spines (teeth) or even wrinkles, all of those with the same function: producing spores. Altogether cap shape, size and colour are essential features for identification. **Cap shape** and size usually change over mushroom development (e.g. from rounded to flattened), so if possible young and mature specimens should be observed. A wide range of shapes may be described, such as applanate, hemispheric, convex, conical, campanulate, umbilicate, umbonate (= with mamelon), embedded. **Cap size** is determined by its widest diameter. Once more, young and mature specimens should be measured because size depends on the mushroom age and growing conditions. **Cap colour** may not be uniform (e.g. it may be different between the central part and the margin); to colour description relate to a common object. Note that colour may vary depending on weather conditions, *i.e.*, some mushrooms present a translucent appearance in wet weather (said to be hygrophanous) while in many species there is no change in appearance in wet weather (non-hygrophanous).



Cap surfaces may vary a lot, from smooth to having warts or “scales” (e.g. in *Amanita muscaria*, the fly agaric, the warts are the remnants of the universal veil, it may be dry or viscous, etc. **Cuticle** is the outermost layer of the cap or stipe. In some mushrooms, such as *Russula ochroleuca* the cuticle can be peeled from the cap, and may be useful as an identification feature.

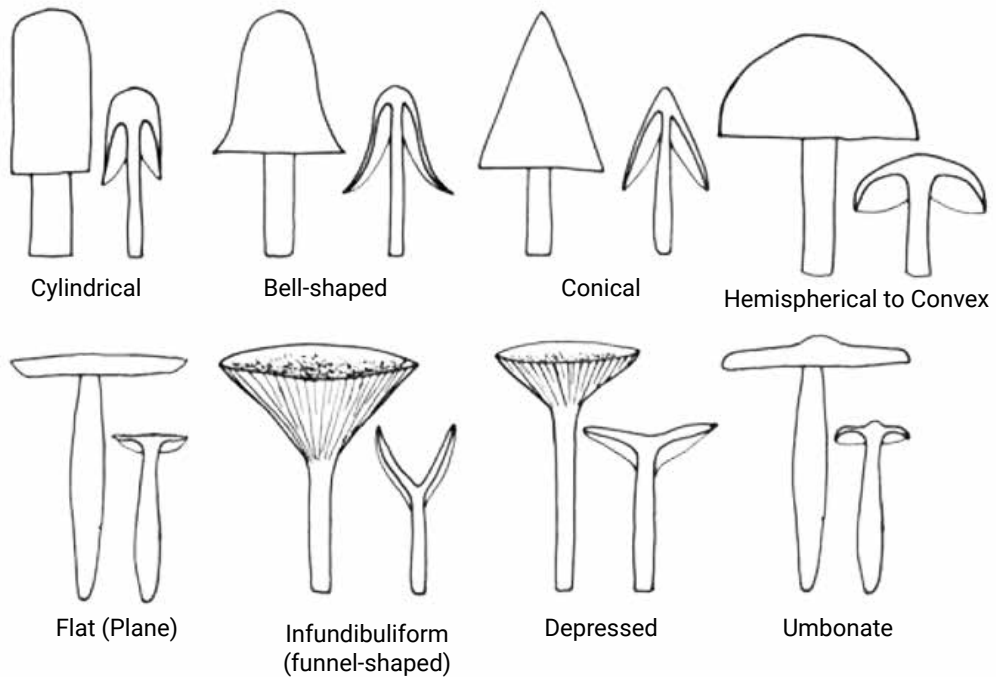


Figure 5: Common Appearance of Mushroom Caps

Hymenium is the fertile tissue, i.e. the spore-bearing layer beneath the cap. In many species the hymenium is formed by gills (e.g. *Amanita* and *Agaricus* genera) whose characteristics are fundamental to mushroom identification. When there are no gills under the cap, spores are formed in tubes (like in all *Boletus* species and alike), in spines or teeth (like in the edible *Hydnum repandum*) or in wrinkles in the well prized *Cantharellus* species and alike.

Gills. Spacing of gills. Gills may be distant (well-spaced), close or even crowded, when a very narrow space exists between adjacent gills. It is also important to check if there are forked gills, i.e., gills branched in two parts. Concerning length, there may be shorter gills, called lamellulae.

Attachment of gills. Gills go from the margin of the cap to the stipe and the way the gills are attached to the stipe is an important feature. Cutting the mushroom longitudinally allows to distinguish free gills, not touching the stipe, from attached gills that can be adnexed, adnate, sinuate or decurrent.

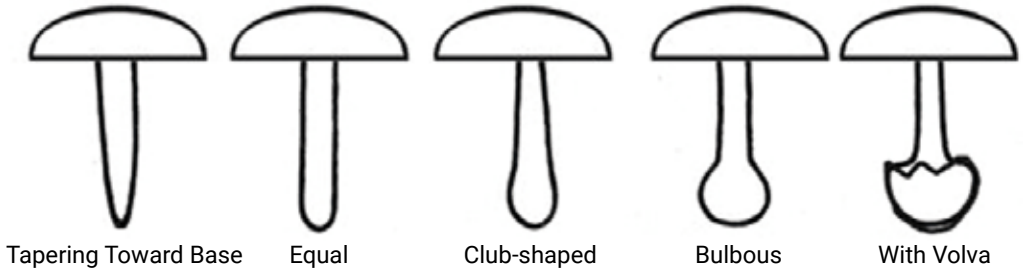


Figure 6: Appearance of Mushroom Stipes



Gill colour may be an important feature that may differ between young and mature gills because mature spores dye the gills. Within the *Agaricus* genus, young gills present light colours but turn purple-black as spores mature. Moreover, gill colour may be important to distinguish edible from toxic species.

Stipe holds the cap and may be central (most species), lateral or eccentric (referring to the *attachment of stem to cap*). Characteristics such as size, shape, colour and consistency (fibrous or granular structure, hollow or solid) are important for identification. Concerning shape, stipes can be cylindrical or attenuated, clavate or more or less barrel-shaped. In some species, the base of the stipe can be bulbous or rooting.

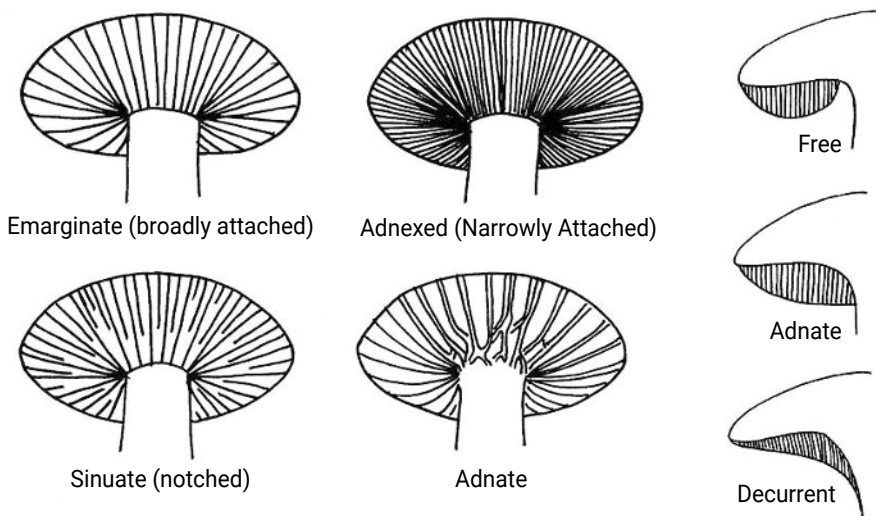


Figure 7: Appearance of Gills



Figure 8: Ring and volva in *Amanita caesarea* specimens.

Ring. Some young mushrooms have a partial veil, which joins the stipe with the cap and protects the young gills (the hymenium). When the mushroom grows, the cap extends and the veil breaks up and its remains may form a ring around the stipe. The presence of a ring and its characteristics may be important for the identification of the mushroom. The ring can be single (e.g. *Agaricus*) or double (like in *Macrolepiota procera*), fixed (most species) or movable (e.g. *M. procera*). In *Amanita phalloides* the ring is skirt-like. Sometimes the ring is ephemeral (i.e. disappears easily), making the identification more difficult.



Cortina is an extremely fine, fragile veil with a thread-like texture extending from the stipe to the margin of the cap. It is a common feature of the genus *Cortinarius* and is only seen in young mushrooms.

Volva is a structure at the base of the stipe, present only in a few genera such as *Amanita* and *Volvariella*, whose young mushrooms are enveloped in a universal veil. As the mushroom grows, this veil breaks up and part of it remains at the base of the stipe. The volva can present different morphologies, for example, saccate or membranous (e.g., *Amanita caesarea*), scaly, conical or spherical, bulbous (NOTE: in some species with universal veil there may be (or not) remnants of it over the cap as in *Amanita rubescens*).

Flesh consistency may be fibrous or brittle like chalk (as in most *Russula* species). To observe flesh colour and possible colour changes, mushrooms should be cut longitudinally. In some species the flesh is immutable (no colour change) while in others a change may be immediate, or after several minutes or gradually. For example, in some *Boletus* species the flesh turns blue almost immediately after cutting or under pressure on the tubes and in *Lactarius deliciosus* a greening of the flesh is seen.



Figure 9: Cortina remains as seen in the stipe of a *Cortinarius* sp.



Figure 10: Specimen of the deadly *Amanita phalloides*. Note the white gills, the ring (skirt-like) and the saccate volva.



Latex. Some species, namely of *Lactarius*, exudate a liquid with milky appearance in the cut surfaces, especially in the gills. The colour of the latex (e.g. orange in *Lactarius deliciosus*), or possible colour changes should be observed; latex taste (e.g. hot or mild) should also be noted.



Figure 11: Latex

Odour. Mushrooms may have distinctive odours, whether pleasant or unpleasant. Although it is a subjective character it may be important for species identification.





For example, some mushrooms smell like fresh flour (e.g. the edible *Clitopilus prunulus* and the toxic *Entoloma lividum* and *Tricholoma pardinum*), anise (e.g. *Agaricus sylvicola*, *Clitocybe odora*), phenol (e.g. *Agaricus xanthodermus* - toxic), garlic (*Lepiota cristata*, *Marasmius alliaceus*), foetid odour (*Russula foetens*), bitter almonds (*Hygrophorus agathosmus*), chlorine (*Mycena alcalina*); radish (*Hebeloma* sp.), raw potatoes (*Amanita citrina*).

Taste is another subjective feature. Generally, taste can be mild or hot like chilli as in many *Russula* species where it is an important feature to identification. Taste can also be sweet, bitter, sour or peppery, for example. To evaluate taste, just chew a small sample (e.g. of gills in *Russula*), and spit out the fragments (never swallow). NOTE: sweet taste is not synonymous of an edible mushroom!

Spore-deposit is the set of spores that drop from the hymenium of mature fruiting bodies. It allows us to determine the colour of spore mass. It may be obtained simply by putting a fresh cap over a paper or aluminium foil for a few hours. It is one of the main features used in identification keys. Colour groups usually considered are: white, cream to yellow (e.g. *Amanita*); pink (e.g. *Clitopilus prunulus*); grey-brown to red-brown (e.g. *Cortinarius*); dark brown to black (e.g. *Agaricus*).



Figure 12: Spore-deposit of a gilled mushroom



Microscopy

The set of macroscopic features described may not be sufficient for the identification of the specimen. In such cases the aid of a microscope is necessary.

Spores. Spore morphology (shape, size, ornamentation) is frequently the key microscopic features in fungal identification. **Spore shape** can vary greatly (globose, ellipsoidal, oval, polygonal, cylindrical, fusiform, drop-shaped, reniform, and rhomboidal to cite some examples). The surface of the spores may be smooth or ornamented (reticulated, warty, spiny). The spore size (length and width) usually varies from 3 to 20 microns (several mature spores should be measured). The **colour** of the individual spores under the microscope usually differs from the colour of the respective spore-deposit. Individual spores are frequently hyaline and simple colouration procedures may be important for some genera and species identification. If spores turn blue in Melzer's reagent and Lugol's reagent, they are amyloid; if they stain reddish-brown in Melzer's reagent, they are dextrinoid.

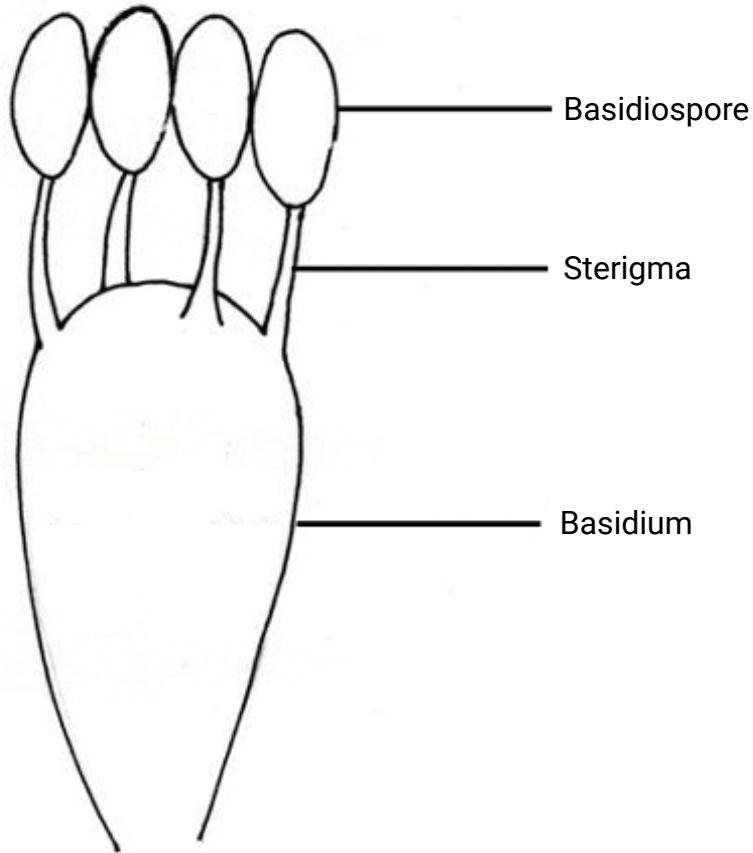


Figure 13: Basidium and Spores

Basidia. Within Basidiomycota, spores are produced in cells called basidia (singular: basidium) lining the gills or tubes of the hymenium. Basidia are usually clavate cells, standing tightly side by side. Each basidia produces 4 basidiospores (by meiosis), which mature outside the cell. The extension that unites the basidium with the spore is the sterile sterigma. Dimensions and shape of basidia and presence or absence of septa in these cells may be of relevance for species identification.

Cystidia are sterile cells that may be in the hymenium, between the basidia, or in sterile surfaces of the mushroom (e.g. the cuticle or the stipe). They are larger than the basidia and are morphologically distinct. They can be cylindrical or look like a bottleneck, with an acute or obtuse end, sometimes with appendages and/or crystals.

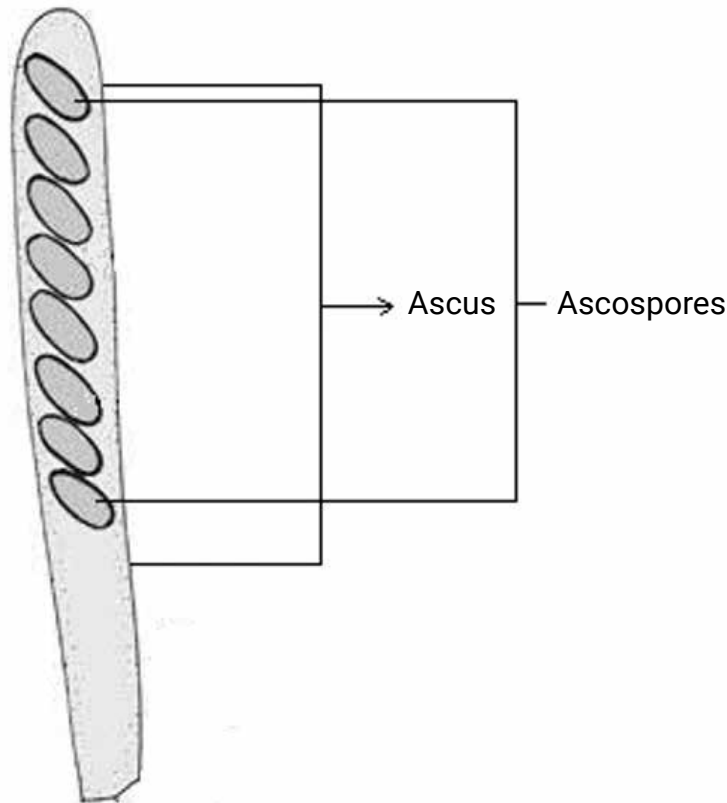


Figure 14: Ascus and Spores

Asci. Within the Ascomycota, the spores are formed inside single-celled asci (singular: ascus) each one usually producing 8 spores (but numbers can vary). The ascospores can be spherical, pyriform, globose, oval or cylindrical. Within the hymenia of Ascomycota, most species have paraphyses which are thin and sterile cells that surround the asci.

Hairs are sterile cells of varied morphology that may appear on the cap and/or stipe. They are frequent in certain Ascomycetes and in Gasteromycetideae under the name of capillary.

Hyphae are the structural units of filamentous fungi, both in vegetative body (mycelium) and in the fruiting bodies. Septate hyphae have transverse partitions in regular shape and number, with a central pore for communication between cells. It is convenient to observe the diameter of the hyphae and the thickness of the wall. The presence or absence of clamp connections in Basidiomycota hyphae or croziers (in Ascomycota dikaryotic hyphae) may be an important diagnostic character identification.

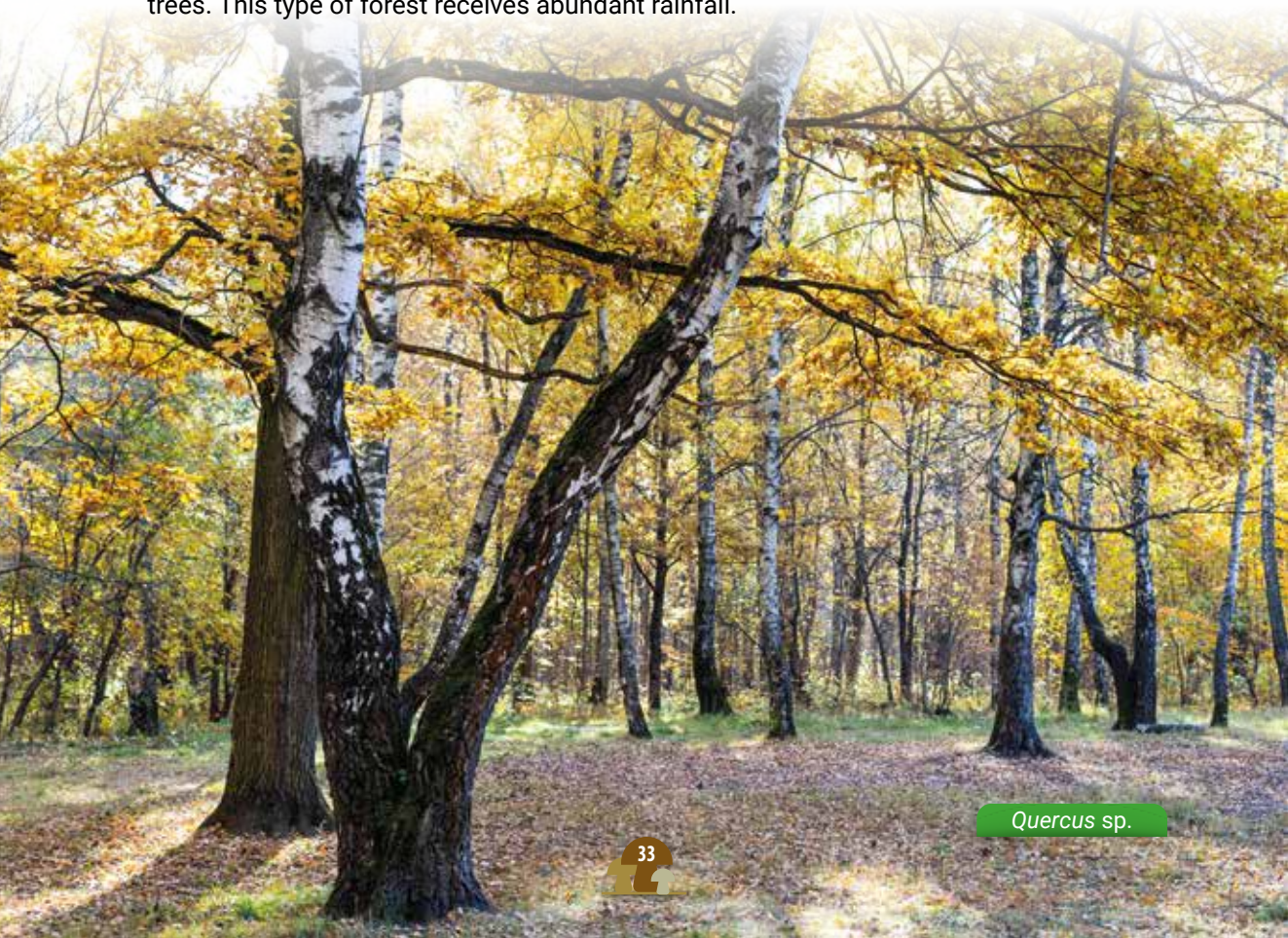


Types of Biomes



Broadleaf Forests

Broadleaf forests seen in regions where humidity and precipitation are high throughout the year, where winters are warm and summers are cool. Since Türkiye is in the temperate climate zone and middle latitudes, it contains these forest types formed by deciduous trees. This type of forest receives abundant rainfall.



Quercus sp.



Erasmus+

Common edible mushrooms from Türkiye and the Mediterranean basin

Fagus sp.

Carpinus betulus





The trees in this belt are at rest in winter. Trees shed their leaves in autumn because they cannot get water due to frost during this period. About 25 tree species are found in broad-leaved forests. Oak (*Quercus* sp.), linden (*Tilia* sp.), hornbeam (*Carpinus betulus*), beech (*Fagus* sp.), birch (*Betula* sp.), maple (*Acer* sp.) and hazelnut (*Corylus colurna*) are some examples. Shrubs and herbaceous plants grow under the trees. As the temperature and other environmental conditions are suitable, there is also a diversity in mushroom species.

Edible Mushrooms in Broadleaf Forests



- | | |
|---|---|
|  <i>Boletus edulis</i> |  <i>Lactifluus piperatus</i>
(<i>Lactarius piperatus</i>) |
|  <i>Boletus reticulatus</i>
(<i>Boletus aestivalis</i>) |  <i>Lactarius volemus</i> |
|  <i>Cantharellus cibarius</i> |  <i>Laetiporus sulphureus</i> |
|  <i>Ceriporus squamosus</i>
(<i>Polyporus squamosus</i>) |  <i>Macrolepiota procera</i> |
|  <i>Clitopilus prunulus</i> |  <i>Mitrophora semilibera</i> |
|  <i>Coprinus comatus</i> |  <i>Morchella esculenta</i> |
|  <i>Cyclocybe cylindracea</i>
(<i>Agrocybe aegerita</i>) |  <i>Pleurotus ostreatus</i> |
|  <i>Faerberia carbonaria</i> |  <i>Pleurotus cornucopiae</i> |
|  <i>Fistulina hepatica</i> |  <i>Russula chloroides</i> |
|  <i>Hericium coralloides</i> |  <i>Russula cyanoxantha</i> |
|  <i>Hericium erinaceus</i> |  <i>Russula delica</i> |
|  <i>Hydnum repandum</i> |  <i>Russula xerampelina</i> |
|  <i>Hygrophorus marzuolus</i> |  <i>Suillus bovinus</i> |
|  <i>Hygrophorus poetarum</i> |  <i>Suillus grevillei</i> |
|  <i>Hygrophorus russula</i> |  <i>Tuber aestivum</i> |
|  <i>Infundibulicybe geotropa</i> (<i>Clitocybe geotropa</i>) |  <i>Tuber borchii</i> |
| |  <i>Tuber brumale</i> |
| |  <i>Tuber macrosporum</i> |



Erasmus+

Common edible mushrooms from Türkiye and the Mediterranean basin



Fir Forest



Coniferous Forests

Coniferous forests are a type of forest that spreads over a large area in Türkiye. Plant formations are with gymnosperm trees of the coniferous class. Conifers are woody plants that do not form fruit and have resin in their wood. They grow in harsh continental climate regions where winters are long and cold and summers are short and cool. In these forests there are trees such as pine (*Pinus* sp.), fir (*Abies* sp.) and spruce (*Picea* sp.). It remains green throughout the year. Green pastures establish beneath the trees. There is a large temperature difference between summer and winter.

Edible Mushrooms in Coniferous Forests



- | | |
|---|--------------------------------|
| 🍄 <i>Boletus pinophilus</i> | 🍄 <i>Suillus grevillei</i> |
| 🍄 <i>Cerioporus squamosus</i>
(<i>Polyporus squamosus</i>) | 🍄 <i>Suillus luteus</i> |
| 🍄 <i>Chroogomphus rutilus</i> | 🍄 <i>Tricholoma anatolicum</i> |
| 🍄 <i>Coprinus comatus</i> | 🍄 <i>Tricholoma caligatum</i> |
| 🍄 <i>Hericium coralloides</i> | 🍄 <i>Tuber aestivum</i> |
| 🍄 <i>Hydnum repandum</i> | 🍄 <i>Tuber borchii</i> |
| 🍄 <i>Hygrophorus marzuolus</i> | |
| 🍄 <i>Lactarius deliciosus</i> | |
| 🍄 <i>Lactarius salmonicolour</i> | |
| 🍄 <i>Lactarius sanguifluus</i> | |
| 🍄 <i>Lactarius volemus</i> | |
| 🍄 <i>Lepista nuda</i> | |
| 🍄 <i>Macrolepiota procera</i> | |
| 🍄 <i>Morchella elata</i> | |
| 🍄 <i>Pleurotus ostreatus</i> | |
| 🍄 <i>Rhizopogon roseolus</i> | |
| 🍄 <i>Russula aurea</i> | |
| 🍄 <i>Russula chloroides</i> | |
| 🍄 <i>Russula xerampelina</i> | |
| 🍄 <i>Sarcodon imbricatus</i> | |
| 🍄 <i>Suillus bovinus</i> | |





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Mixed Forest



Mixed Forests

This type of forest expands over a large area in the Northern Hemisphere. It consists of coniferous forests in humid mid-latitudes and broad-leaved forests that shed their leaves in winter.

Edible Mushrooms in Mixed Forests



-  *Amanita caesarea*
-  *Armillaria mellea*
-  *Boletus aereus*
-  *Boletus pinophilus*
-  *Cantharellus cibarius*
-  *Cantharellus cinereus*
(*Craterellus cinereus*)
-  *Coprinus comatus*
-  *Craterellus cornucopioides*
-  *Hericium coralloides*
-  *Hydnum repandum*
-  *Hygrophorus marzuolus*
-  *Lactarius volemus*
-  *Macrolepiota procera*
-  *Morchella esculenta*
-  *Russula chloroides*
-  *Russula cyanoxantha*
-  *Sparassis crispa*
-  *Suillus grevillei*



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Grassland Areas



Grassland Areas

Temperate zone meadows (or grasslands) fall between desert and forest areas in terms of precipitation. In other words, meadows are formed in areas where precipitation does not allow desertification, but is insufficient for forest formation. Grassland biome occurs in the high parts of the mountains and temperate continental climate zones. The most defining characteristic of the climate in these regions is the long dry summer months and the cold winter months covered with snow. As a result, grassland plants have adapted to low soil moisture, intense sunlight, strong drying winds, extremely hot summer months and extremely cold winter months. In Türkiye, there are wide meadows in Central Anatolia, Eastern and Southeastern Anatolia, and Erzurum Kars plateaus. There are small trees, shrubs, a wide variety of weeds and grasses.



Edible Mushrooms in Grassland Areas

- 🍄 *Agaricus arvensis*
- 🍄 *Agaricus campestris*
- 🍄 *Coprinus comatus*
- 🍄 *Lepista nuda*
- 🍄 *Macrolepiota procera*
- 🍄 *Marasmius oreades*
- 🍄 *Mitrophora semilibera*
- 🍄 *Morchella elata*
- 🍄 *Morchella esculenta*
- 🍄 *Pleurotus eryngii* var. *ferulae*
- 🍄 *Terfezia boudieri*
- 🍄 *Terfezia claveryi*
- 🍄 *Tuber borchii*



1 | *Agaricus arvensis*



Order : Agaricales

Family : Agaricaceae



Macroscopic Features

Cap : 8-20 cm diameter, from globose to convex. Incursion and surplus margin. Cuticle easy to separate, thick, shiny, decorated with fine scales, pure white with a tendency to yellowing in adults or to touch.

Gills : Free. At first pale pink to white in colour, turning brown as spores mature.

Spore deposit : Blackish brown.

Stipe : 8-13 long and 1-2 cm diameter, cylindrical, progressively widening to the base (but not bulbous), hollow, smooth thickening.

Ring : Superior, membranous with cogwheel-like scales eklenecek.

Flavour and Odour : It is an anise-scented species. It has no distinctive taste.

Flesh : White, immutable.



Microscopic Features

Spores : Ellipsoidal, 6-8 x 4-5 μm , ochre, smooth.

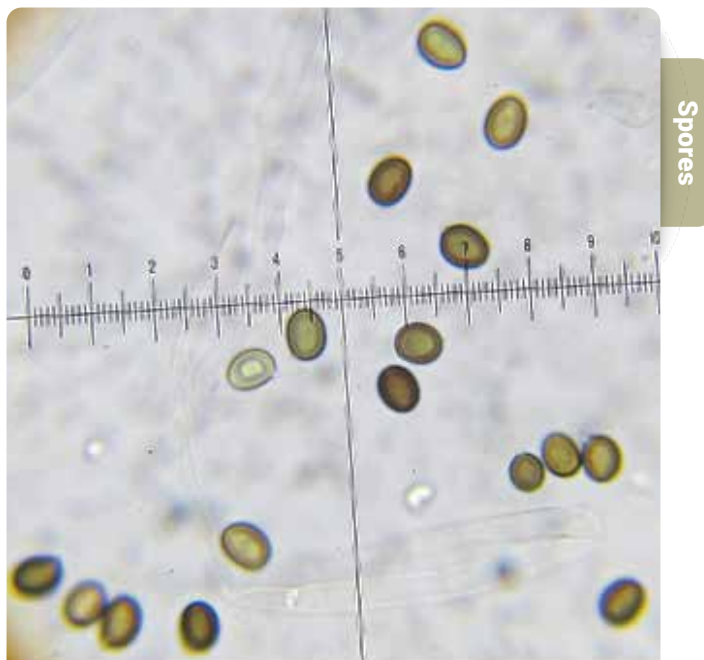


Figure 15: *Agaricus arvensis* spores under the microscope.

Habitat and Season : May be seen in the meadows from the end of Summer to the end of Autumn.

Possible Confusions : Possible confusion with *A. litoralis* and *A. xanthodermus* (toxic, the base of the stipe becomes yellow after cutting), with no anise smell, nor double ring cogwheel shaped, and with *Amanita verna* (deadly toxic) that has an obvious volva at the base of the stipe.

Commercial Use : There have been reports that this edible and highly prized mushroom tends to accumulate heavy metals such as copper and cadmium, so great attention must be paid to the habitat it is collected from. It should not be collected from industrial areas, places very close to cities and residential areas, from the sides of highways and from fields where pesticides have been applied.



2 | *Agaricus campestris*



Order : Agaricales

Family : Agaricaceae



Macroscopic Features

- Cap** : While the cap is spherical in young mushrooms, it becomes flattened during maturation. The cap is white or creamy white, with light brown scaly spots, and may have bits of veil on the margin. Depending on where it grows, it can reach 6-12 cm in diameter.
- Gills** : Free and dense, pink at the young stage and become dark brown as they age.
- Spore deposit** : Chocolate brown.
- Stipe** : Cylindrical, solidly built, 2-10 x 1-2.5 cm in size and white colour.
- Flavour and Odour** : It has pleasant fragrance.
- Flesh** : White, thick flesh when young, becoming pinker with age.



Microscopic Features

Spores : Elliptic, flat, light grey brown, thick-walled, indistinct germinating pored, $7-8 \times 4-5 \mu\text{m}$.

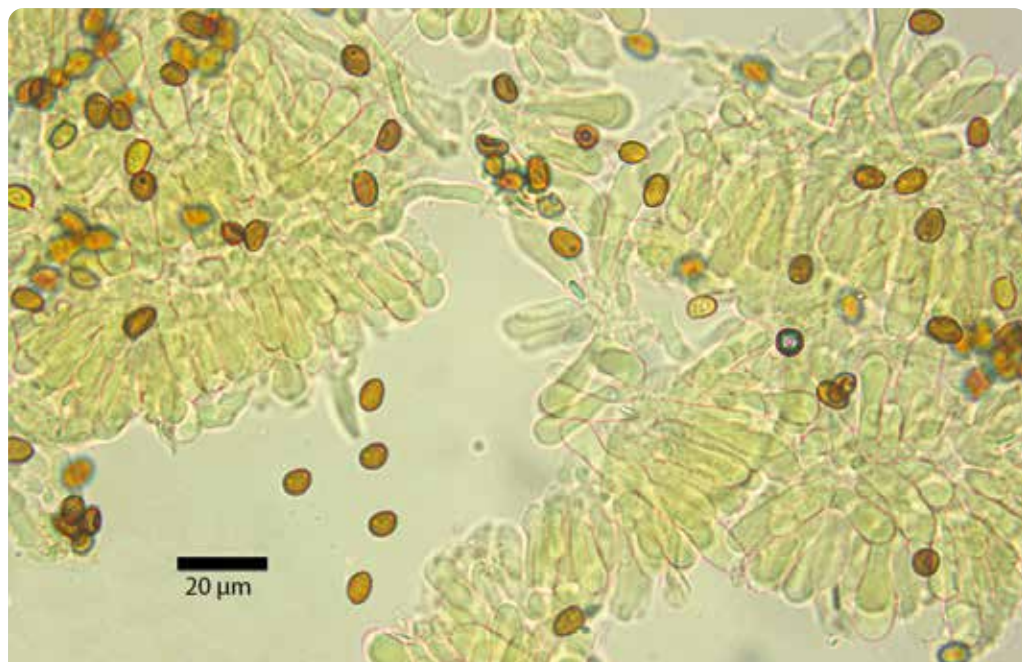


Figure 16: *Agaricus campestris* spores under the microscope.

Habitat and Season : It grows in fields, pastures, forest edges, especially where animal dung is abundant. It grows in spring and autumn.

Possible Confusions : It differs from other *Agaricus* species with its small ring. It differs from the poisonous *Agaricus xanthodermus* species with its pleasant smell and the fact that it does not turn yellow when cut.

Commercial Use : It is recognized and consumed by the public. It is sold at local public markets.



3 | *Amanita caesarea*



Order : Agaricales

Family : Agaricaceae



Macroscopic Features

- Cap** : Red-orange, 15-25 cm in diameter, with grooves.
- Gills** : Free and delicate. Initially pale yellow in colour and then turns golden yellow.
- Spore deposit** : White.
- Stipe** : Yellow, cylindrical and thick. It is 5-12 cm long and 1.5-2.5 cm in diameter. The lower part of the stipe is in the form of a lump with a volva.
- Ring** : There is a yellow ring, the upper surface is striped, the lower surface is flat, hanging like a skirt.
- Volva** : 2-4 mm thick and white, cup-like.
- Flavour and Odour** : It has a light, pleasant and aromatic fragrance.
- Flesh** : It is white and slightly yellow in colour.



Microscopic Features

Spores : Wide elliptical, straight, hyaline, $10-14 \times 6-11 \mu\text{m}$.

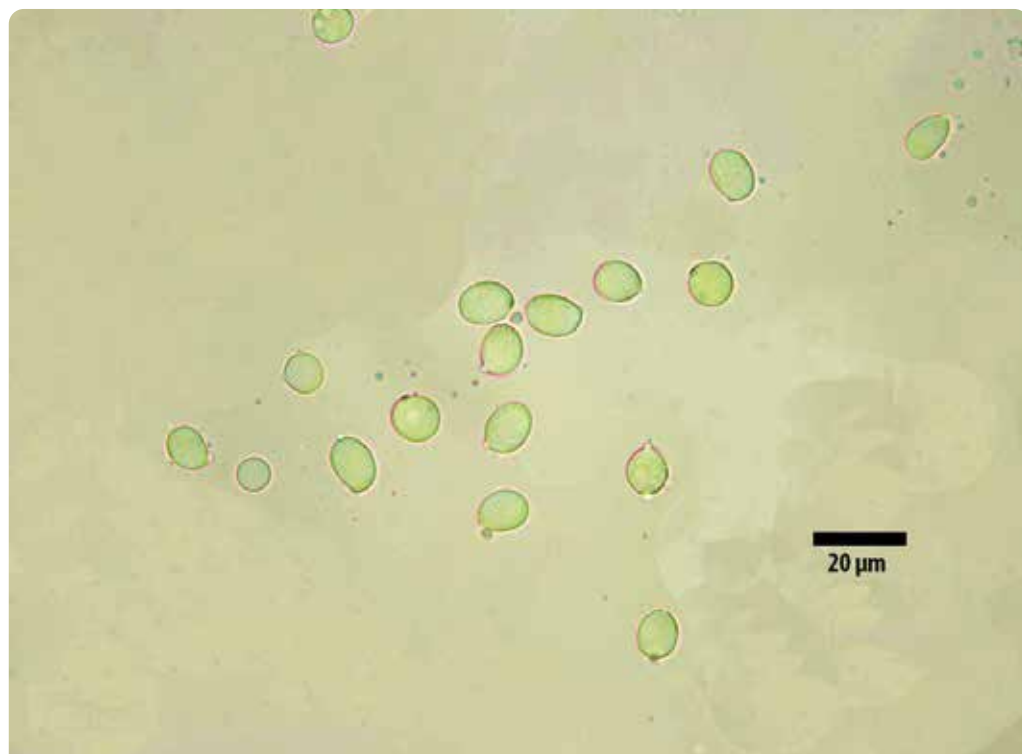


Figure 17: *Amanita caesarea* spores under the microscope.

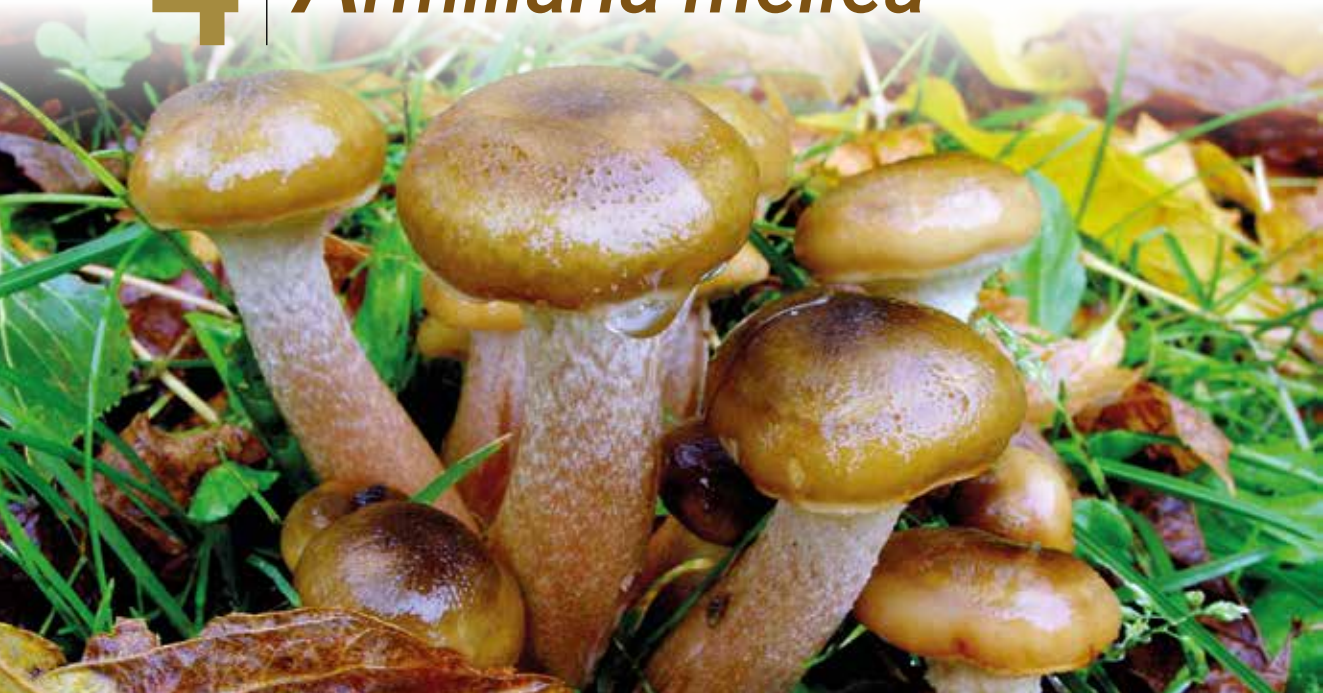
Habitat and Season : It grows in fir-beech, scotch pine, coastal pine, oak, larch-oak forests. It is seen in the autumn months.

Possible Confusions : It is a very valuable species in Europe. The period when the universal veil surrounding it is torn and the orange cap begins to be seen is the period when it is most delicious. Eggs that are not opened can be mixed with poisonous species. The mature ones can be mistaken for *Amanita muscaria*, which has white warts on the cap but may be lost with rain. The stipe and gills of the emperor mushroom are yellow, unlike *Amanita muscaria*, which has white gills.

Commercial Use : It is exported abroad. It is a species well known in European countries.



4 | *Armillaria mellea*



Order : Agaricales

Family : Physalacriaceae



Macroscopic Features

- Cap** : 5–15 cm in diameter, first convex, then flattened from the hemisphere, slightly hollow in the middle. Colour ranges from yellowish brown, honey yellow, honey yellow-dark brown. There are greenish brown scales on it especially concentrated in the centre.
- Gills** : Subdecurrent. First white, then yellowish, when ripe it turns pinkish brown and has dark spots on it. Gills are distant from each other.
- Spore deposit:** : Cream white.
- Stipe** : 5–20 × 0,5–1,5 cm, cylindrical, solid, fibrillated, highly durable, reddish brown
- Ring** : Round distinct white ring.
- Flavour and Odour** : It is strongly scented and bitter.
- Flesh** : It is yellowish white in colour and has a spongy texture.



Microscopic Features

Spores : Wide elliptical, straight, hyaline, oil droplet, 7–9 × 5.5–6.5 μm.

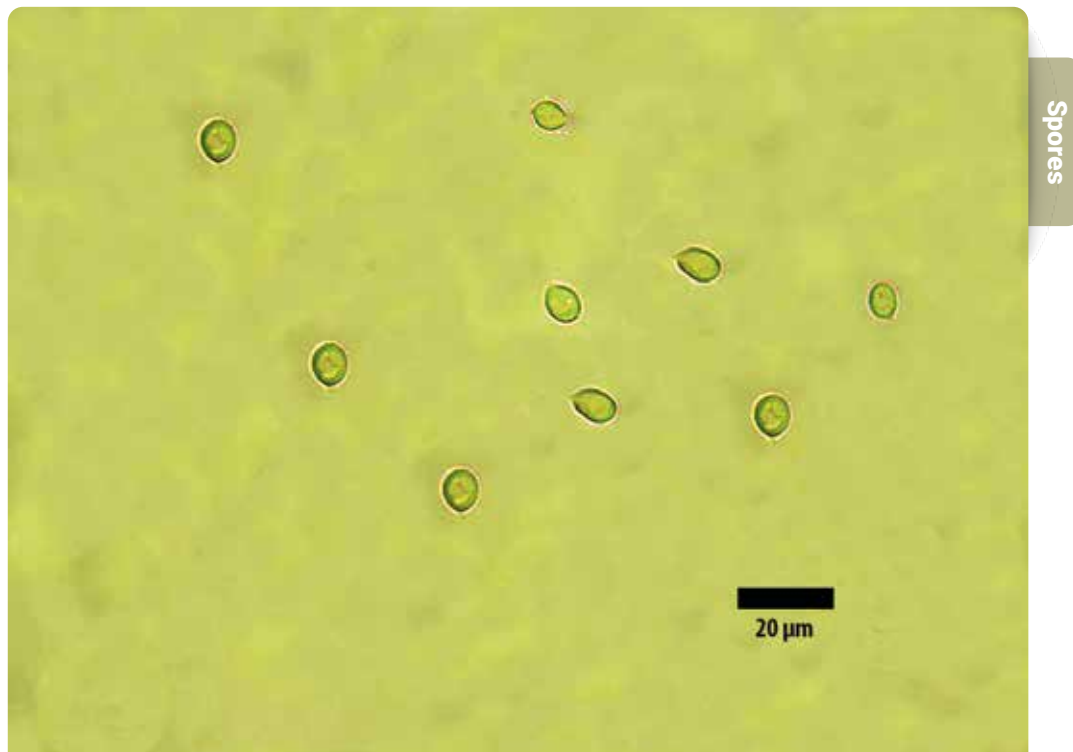


Figure 18: *Armillaria mellea* spores under the microscope.

Habitat and Season : The fungus lives as a parasite in both broadleaf trees and coniferous trees. It is a serious parasite especially in the roots of oaks. They come out more than once from a single region and form a cluster. It is seen in the autumn months.

Possible Confusions : *Armillaria mellea* is similar to the edible *Flammulina velutipes* and oxic *Hypholoma fasciculare*. It may cause indigestion if it is not cooked properly. In addition, it may leave plenty of mucus while cooking. Considered toxic in some countries.

Commercial Use : It is recognized and consumed by the public. It is sold in local public markets.



5 | *Boletus aereus*



Order : Boletales

Family : Boletaceae



Macroscopic Features

Cap : 15-30 cm in diameter, similar to the shape of the hemisphere when young, then the broad bell. Its surface is first finely velvety, then turns to flat and smooth, tobacco brown-dark brown.

Pores and Tubes : White in colour, the tubes are adnate, 1-3 cm long, whitish cream, turning pale wine colour when cut or with touch.

Stipe : 10-15 × 4-8 cm, cylindrical, somewhat similar to the shape of the tenpin. It is clay-brown and has a brown web-shaped structure towards the cap.

Flavour and Odour : *Boletus aereus* has an earthy smell, fresh chestnut and a pleasant mild taste.



Flesh : It is initially white and turns dark white as it ages. It has a spongy soft texture.

Spore deposit : Olive-brown.

Microscopic Features

Spores : Subfusiform, smooth, 13-16 x 4-5.5µm.



Figure 19: *Boletus aereus* spores under the microscope.

Habitat and Season : It grows in beech, oak, larch-oak, scotch pine-oak forests in summer and autumn. It is mycorrhizal, especially with oaks.

Possible Confusions : It is similar to bolets grown in summer. It does not change colour when cut, distinguishing it from poisonous species.

Commercial Use : As it is consumed fresh, it is also consumed in brine and dried. Its soup is famous in Italy and European countries. Almost all of the samples collected from Türkiye are exported abroad.



6 | *Boletus edulis*



Order : Boletales

Family : Boletaceae



Macroscopic Features

- Cap** : 8-30 cm in diameter, semi – globular when young then flat-cushion-shaped. Cuticle is finely hairy, suede in structure, whitish cream when young then varying shades from hazelnut brown to dark brown. The colour is generally reddish-brown fading to white in areas near the margin, and continues to darken as it matures.
- Pores and Tubes** : White when young, then yellow – olive green, no colour change when cut or touched. The tubes are 1-2 cm long, in the same colour as the pores.
- Spore deposit** : Brown.
- Stipe** : 10-25 cm high and 8 cm thick. There is swelling in the middle part close to the base. When it is young, it is creamy white with bumps that look like a web of veins.



Flavour and Odour : It has a pleasant and nutty odour.

Flesh : The flesh is white, thick and firm when young, but becomes somewhat spongy with age. When bruised or cut, it does not change colour.

Microscopic Features

Spores : Spores are elliptical in shape and smooth, measuring 12–19 x 4–6 μm .



Figure 20: *Boletus edulis* spores under the microscope.

Habitat and Season : From July to November it grows in mixed and pure forests. It is especially common in oak and beech forests.

Possible Confusions : It can be confused with *Tylopilus felleus*.

Commercial Use : As it is consumed fresh, it is also consumed in brine and dried. Its soup is famous in Italy and European countries. Almost all of the specimens collected in Türkiye are exported abroad.



7 | *Boletus pinophilus*



Order : Boletales

Family : Boletaceae



Macroscopic Features

- Cap** : 10-30 cm diameter, hemispherical or convex. Adhered, slightly separable, smooth or tomentose, a little bit viscous with moisture, brown, red brown, maroon brown or purple brown. Curved margin and surplus in maturity.
- Pores and Tubes** : Tight and thin, round, unequal, white at first, then yellow and finally olive. Tubes are long and adnexed.
- Spore deposit** : Ochre-olive.
- Stipe** : 7-15 cm long and 3-8 cm diameter, paunchy, thick, hard, white surface at first then yellow, decorated with a red or light brown reticulum.



Flavour and Odour : It has no distinctive odour.

Flesh : White, immutable, under the pink cuticle.

Microscopic Features

Spores : Yellowish, fusiform, smooth, 14-18 x 4-6 μm .

Habitat and Season : It grows in coniferous and mixed forests in Summer and Autumn.

Possible Confusions : It could be confused with the also edible *Boletus aereus* whose cap is darker, almost black and under the cuticle is white.

Commercial Use : This mushroom can be used fresh, canned, dried and cooked. It can be quite popular and expensive, often sold dried.



8

Boletus reticulatus (*Boletus aestivalis*)



Order : Boletales

Family : Boletaceae



Macroscopic Features

- Cap** : 6-18 cm diameter, semispherical at first and then convex, cuticle separable, dry, tomentose when it is young, cracking too easily in dry time, uniform colour ochre, milk coffee, brown or hazelnut.
- Pores and Tubes** : Long, thin and white that turn to green yellow. Almost free, separable from the flesh of the cap. The pores are round and white, which become olive yellow and finally green.
- Spore deposit** : Green-olive.
- Stipe** : 8-16 cm long and 2-6 cm diameter, robust, almost cylindrical, sometimes mace shaped.



Flavour and Odour : It has an earthy smell and a pleasant mild taste.

Flesh : The flesh is white, consistent and firm that becomes soft over time, yellow on the tubes and white under the cuticle.

Microscopic Features

Spores : Elliptical-needle-shaped, sizes 12-16 x 4-5 μm .

Habitat and Season : It grows around broad-leaved trees. It grows from spring to autumn.

Possible Confusions : Similar to *Boletus edulis* but this one has got red-vine flesh under its cuticle.

Commercial Use : It can be consumed fresh as well as dried. Almost all of the samples collected from Türkiye are exported abroad.



9 | *Cantharellus cibarius*



Order : Cantharellales

Family : Cantharellaceae



Macroscopic Features

Cap : 4–10 cm wide. Colour ranges from yellow to dark yellow. It is in the shape of a funnel, with wavy edges and its upper surface is smooth.

Ridges : Extends from the bottom of the cap to half the stipe. Ridges are thick and grained, with the colour of egg yolk.

Stipe : 2-8 cm long, 1-3 cm wide, the part close to the cap is thicker and narrows towards the base. It has the same colour as the cap, and a fine hairy and tight structure.

Flesh : Yellowish white in colour and juicy.

Flavour and Odour : It has a pleasant scent like apricot. Its scent becomes more intense in arid conditions.



Microscopic Features

Spores : Elliptic-oval, flat, hyaline, $7-11 \times 4-6 \mu\text{m}$.

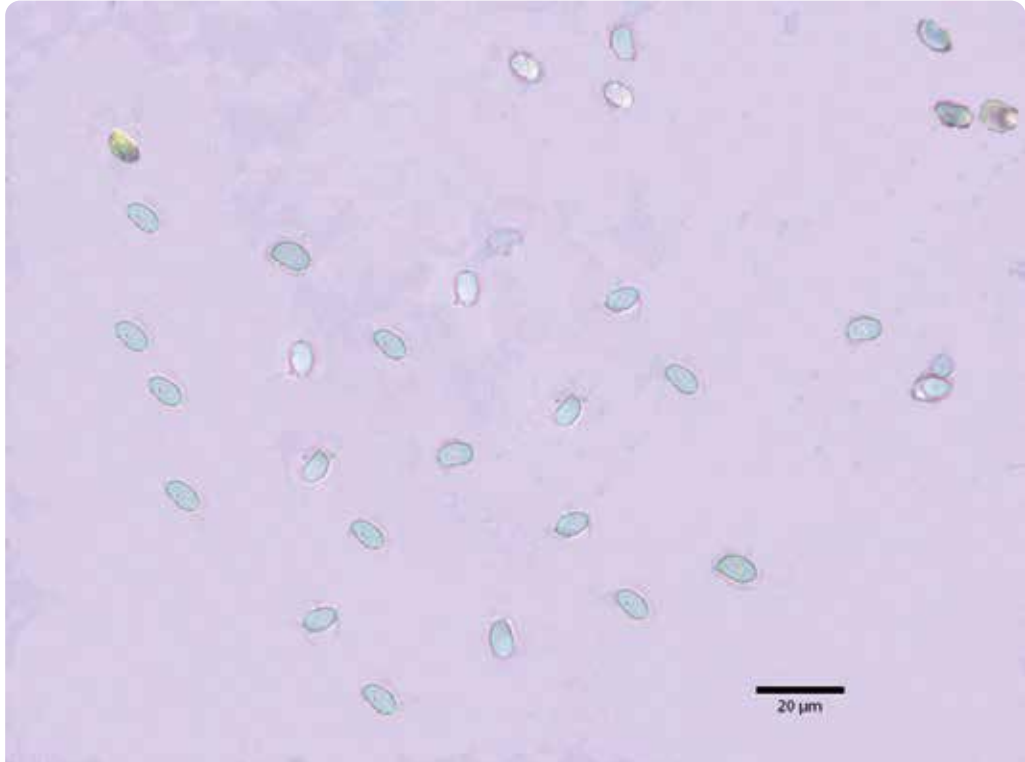


Figure 21: *Cantharellus cibarius* spores under the microscope.

Habitat and Season : It grows in broadleaf forests or in mixed forests with deciduous trees, especially oak, beech-oak, larch-oak forests. It grows year-round as long as there is sufficient rainfall.

Commercial Use : It is consumed fresh as well as pickled and dried. The oven should not be used for drying as it can cause the mushrooms to become bitter. All specimens collected are exported from Türkiye. It is a well-known and consumed species in the Black Sea and Marmara regions.



10 | *Cantharellus cinereus* (*Craterellus cinereus*)



Order : Cantharellales

Family : Cantharellaceae



Macroscopic Features

- Cap** : It has a funnel-shaped cap like a hat and joins a prominent, narrow and hollow stipe. Cap colour is blackish or dark gray. The diameter of the cap is 2-7 cm.
- Ridges** : Spaced, thick, decurrent, branched, anastomosed, ash grey and, when the spores mature, with white tones.
- Spore deposit** : White yellowish.
- Stipe** : Grey, contrasting with the darker colours of the cap 2-6 cm long.



Flavour and Odour : Fruity, plum-like smell and sweet taste.

Flesh : Thin, fibrous and greyish.

Microscopic Features

Spores : Widely ellipsoidal and smooth, 7-11 x 6-7.5 μm .

Habitat and Season : It grows late summer to autumn in mixed forests.

Possible Confusions : It could be confused with *Craterellus cornucopioides*, which shows an ash-grey colour hymenium.

Commercial Use : Although an edible mushroom, it is less palatable than the similar *Craterellus cornucopioides*. It can be dried or stored in oil.



11

Cerioporus squamosus (*Polyporus squamosus*)



Order : Polyporales

Family : Polyporaceae



Macroscopic Features

Cap : It has a diameter of 5–30 cm and a thickness of 1–4 cm, round oval, fan-shaped. The cuticle is yellow to earthy yellow in colour and covered with dark brown coarse scales.

Pores : Pores are angular oval, 0.5–1 por / mm, cream – pale yellow in colour.

Stipe : 3–8 × 1–5 cm in size, thins towards the base, dark brown–straw yellow in colour, covered with black hairs.

Flesh : It is juicy and soft when fresh, hard and brittle when dried. The flesh is white in colour.

Flavour and Odour : It has a nice flour smell and sweetish flavour.



Microscopic Features

Spores : Cylindrical-narrowly oval, flat, hyaline and oil-dripped, 11-15 × 4-5 μm.



Figure 22: *Cerioporus squamosus* spores under the microscope.

Habitat and Season : It lives as semi-parasite on coniferous and especially broad-leaved trees (beech, oak, hornbeam, poplar) and cut logs. It grows in spring and autumn.

Possible Confusions : The appearance of the cap reminds *Sarcodon imbricatus* that grows on soil and has teeth instead of pores.

Commercial Use : It is generally consumed in the domestic market.



12

Chroogomphus rutilus



Order : Boletales

Family : Gomphidiaceae



Macroscopic Features

- Cap** : 3–12 cm in diameter, convex first, as the development progresses, the central part becomes swollen, the edge is always curved towards the stem. Its colour is very variable and can be found in shades of wine red, copper red, orange- magenta, red- magenta. Covered with crumbled remains of veil on the cap and on the stipe as scales. Its surface is sticky when it is moist.
- Gills** : Decurrent. While it is greenish brown in young mushrooms, it turns purplish - wine red in growing mushrooms and progresses up to 1 cm on the stipe.
- Spore deposit** : Purplish black.
- Stipe** : It is 5–15 × 1–1.5 cm, cylindrical, solid, same colour as cap and it is adhesive.



Flavour and Odour : It does not have a pronounced smell. It has a mild nutty flavor.

Flesh : It has a hard and fibrous structure. It has orange-yellow flesh.

Microscopic Features

Spores : It is spindle-shaped, yellow, $17-20 \times 6-7 \mu\text{m}$.

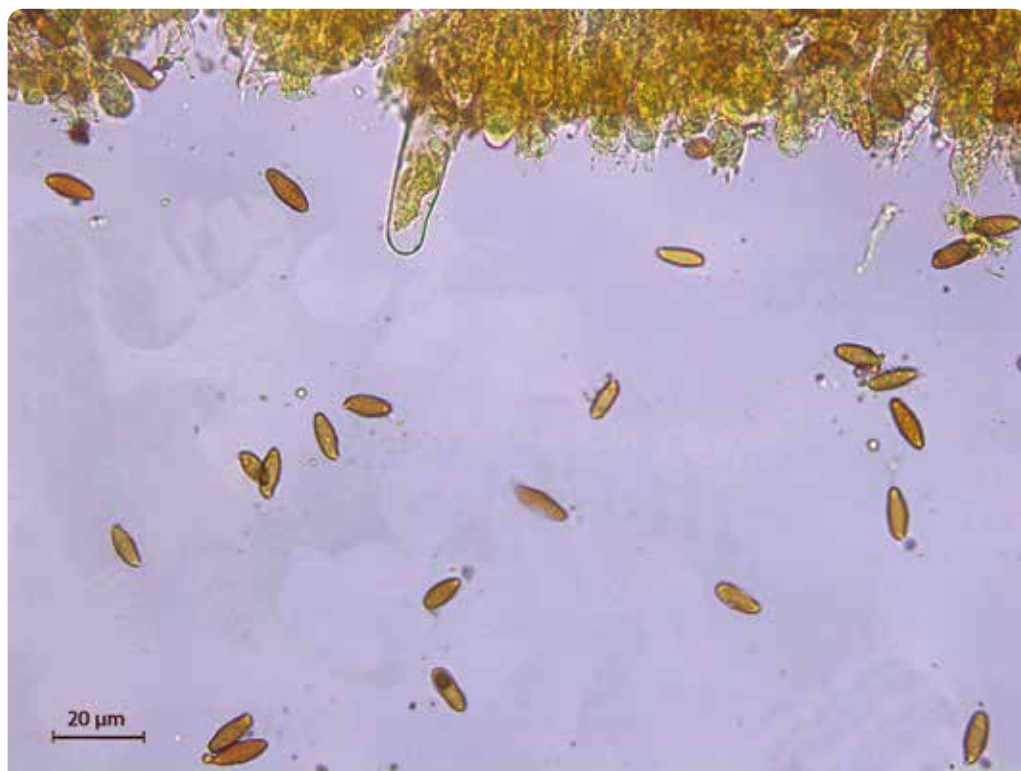


Figure 23: *Chroogomphus rutilus* spores under the microscope.

Habitat and Season : It always grows in pine forests, sometimes under pine needles, sometimes not. It forms mycorrhiza with various coniferous trees, especially with *Pinus* species. It grows from late summer to winter.

Possible Confusions : It is easily identifiable due to the greasy cap in wet weather, bright when the same is dry, to the colour going from the lateritious to the red-wine and to the chrome-yellow flesh at the base of the stem.

Commercial Use : It is recognized and consumed by the public. It is sold at local public markets.



13

Clitopilus prunulus



Order : Agaricales

Family : Entolomataceae



Macroscopic Features

- Cap** : 3-10 cm diameter, convex to depressed or slightly funnel-shaped. Rolled margin, after curved. Cuticle smooth, shiny, whitish, then grayish, pruinous.
- Gills** : Decurrent. First whitish, then pink.
- Spore deposit** : Pink.
- Stipe** : 3-5 cm long and 0.5-1.5 cm diameter, cylindrical, often eccentric, solid, a bit curved, whitish, pruinous, woolly at the base.



Flavour and Odour : Farinaceous, very pleasant, fresh flour.

Flesh : Thick, fragile, whitish.

Microscopic Features

Spores : Fusiform, hyaline, smooth, no amyloid, marked edges showing and hexagonal morphology, 10-14 x 5-6 μm .

Habitat and Season : It grows deciduous forests in Autumn.

Possible Confusions : It could be confused with white *Clytocibe* (poisonous) due to its floury odour and flavour. It is also similar to *Entoloma lividum* (= *E. sinuatum*), another toxic species.

Commercial Use : Only those who know it well collect it. It is a species that requires expertise to consume.



14 | *Coprinus comatus*



Order : Agaricales

Family : Coprinaceae



Macroscopic Features

- Cap** : 5-12 cm high, 2-3 cm diameter and cylindrical in structure, tassel-shaped fibrils formed by the breakdown of cap cuticle have upturned scales. It is milk-white in colour, but its centre is light brown. In developing mushrooms, the cap loses its cylindrical feature and reverts from the bell to the shape of an umbrella. As development progresses, it begins to melt in the form of ink spots and gradually shrinks, dissolves and disappears.
- Gills** : Free. Velvety, first turning white, then pink-brown and eventually black, melting and pouring out in the form of ink spots.
- Spore print** : Blackish brown.
- Stipe** : 10-25 × 1-2 cm, cylindrical, white, hollow, multi-fibrous structure.
- Ring** : It has a white ring.



Flavour and Odour : It has a mild earthy scent and tastes good, in very young specimens.

Flesh : It's white and melts very quickly.

Microscopic Features

Spores : Fusiform, hyaline, smooth, not amyloid, marked edges showing and hexagonal morphology, 10-14 x 5-6 μm .



Figure 24: *Coprinus comatus* spores under the microscope.

Habitat and Season : In spring and autumn, it grows in groups in forests, roadsides, compost.

Possible Confusions : It is difficult to be mistaken for other species.

Commercial Use : It is recognized and consumed by the public. It is sold at local public markets.



15 | *Craterellus cornucopioides*



Order : Cantharellales

Family : Cantharellaceae



Macroscopic Features

- Cap** : It is 3-15 × 2-5 cm in size, trumpet – funnel-shaped, its centre is sunken. Its surface is striped, the inner part of the cap first turns brown black and turns black when mature, while the outer part turns from brown black to gray or ash black.
- Ridges** : Decurrent with slight protrusions. It extends from the bottom of the cap to half of the stipe. Colour is grey to black.
- Spore deposit** : Cream to buff.
- Stipe** : There is no distinction between the stipe and the cap.
- Flavour and Odour** : It is a fragrant, tasty and valuable species.



Microscopic Features

Spores : Wide elliptical, straight, hyaline, thick-walled, 12-17 × 9-11 μm.

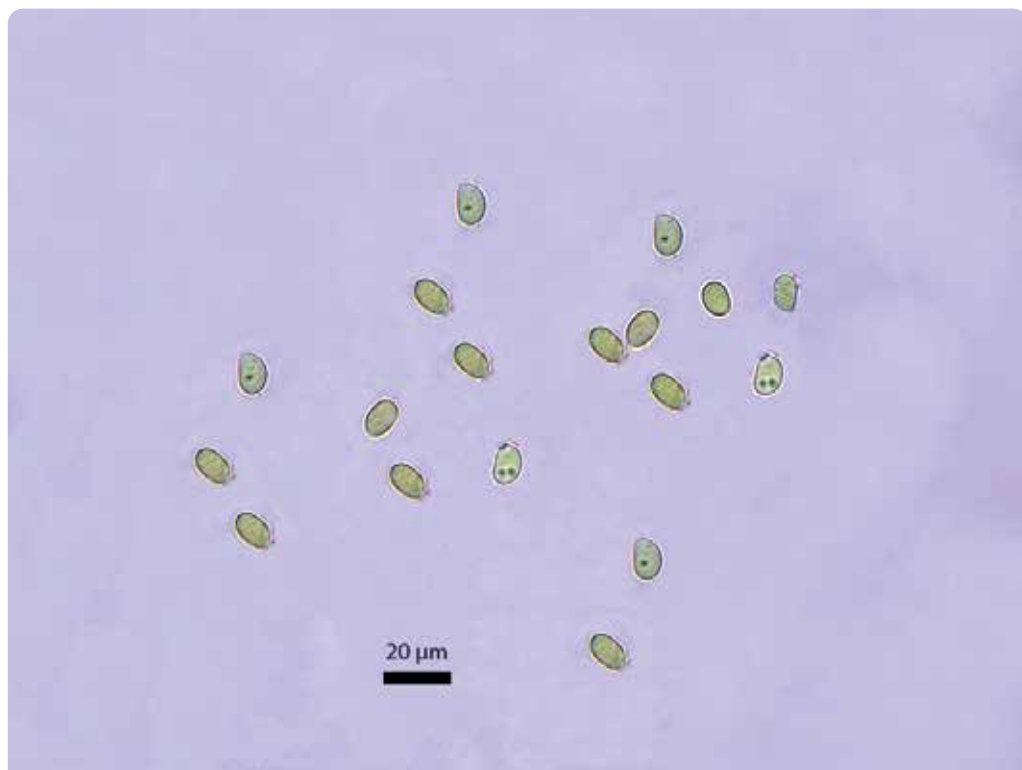


Figure 25: *Craterellus cornucopioides* spores under the microscope.

Habitat and Season : It usually grows in forests composed of mixed coniferous and deciduous trees. It is possible to come across especially in places where beech and fir are mixed. It grows in autumn.

Possible Confusions : Unlike *Canterellus cinereus* it is hollow, and its stipe and cap are not distinct.

Commercial Use : It is consumed fresh as well as pickled and dried. Almost all of the samples collected from Türkiye are exported abroad.



16

Cyclocybe cylindracea (*Agrocybe aegerita*)



Order : Agaricales

Family : Strophariaceae



Macroscopic Features

- Cap** : It is 3-15 × 2-5 cm in size, trumpet – funnel-shaped, its centre is sunken. Its surface is striped, the inner part of the cap first turns brown black and turns black when mature, while the outer part turns from brown black to gray or ash black.
- Gills** : Adnate. Initially cream, turning grey-brown and later mid brown as spores mature.
- Spore deposit** : tobacco brown.
- Stipe** : 8-10 cm long and 1-2 cm diameter, from white to grey cream at the base or brown. Fibrous, cylindrical, full, hard, attenuated at the base, coriaceous in adult specimens.



- Ring** : Soon torn or shrunken frequently brown spotted due to its spores.
- Flavour and Odour** : It smells like walnut. Pleasant, fruity and a little vinegary in adult specimens.
- Flesh** : It is white in colour, but turns slightly brown over time.

Microscopic Features

- Spores** : Ellipsoidal, smooth, 8-10 x 5-7 μm .
- Habitat and Season** : It is especially seen in old poplar trunks, on stream banks. It is also seen in trees such as elm, willow, oak, and fig. It appears from the beginning of spring to the end of Autumn.
- Possible Confusions** : Like many mushrooms, this mushroom is recommended to be consumed in small quantities especially when it is consumed for the first time, since some people have an allergic reaction.
- Commercial Use** : Nowadays, it is cultivated and quite valuable when young due to its fruity odour.



17

Faerberia carbonaria



Order : Polyporales

Family : Polyporaceae



Macroscopic Features

Cap : It is 10–20 mm in diameter, funnel-shaped, sunken in the middle, its edges are flat, umbilicate. Surface smooth, fibrillated, in tones varying from grey to black to brown, with a curved inward edge and slightly wavy.

Gills : Decurrent. Grey-white, forked, thickly structured.

Spore deposit : Tobacco brown.

Stipe : 15–30 × 2–5 mm, cylindrical, thickening towards the base, attached to the cap centrally or laterally, off-white, solid and elastic.

Flavour and Odour : It is fragrant and medium in flavour.

Flesh : It is grey white, off-white in colour, soft and elastic.



Microscopic Features

Spores : Cylindrical – fabiform, straight, hyaline and oil droplet, $8-10 \times 4-6 \mu\text{m}$, chello and pleurocystidia pointed, thick walled, tip densely ornamented.

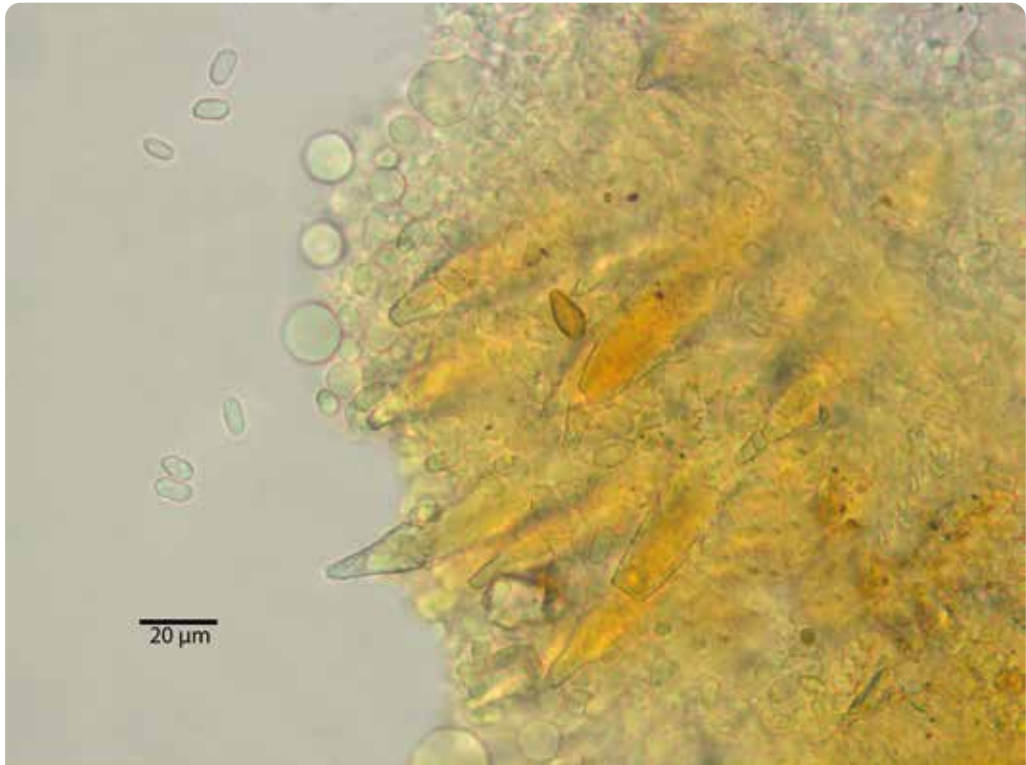


Figure 26: *Faerberia carbonaria* spores under the microscope.

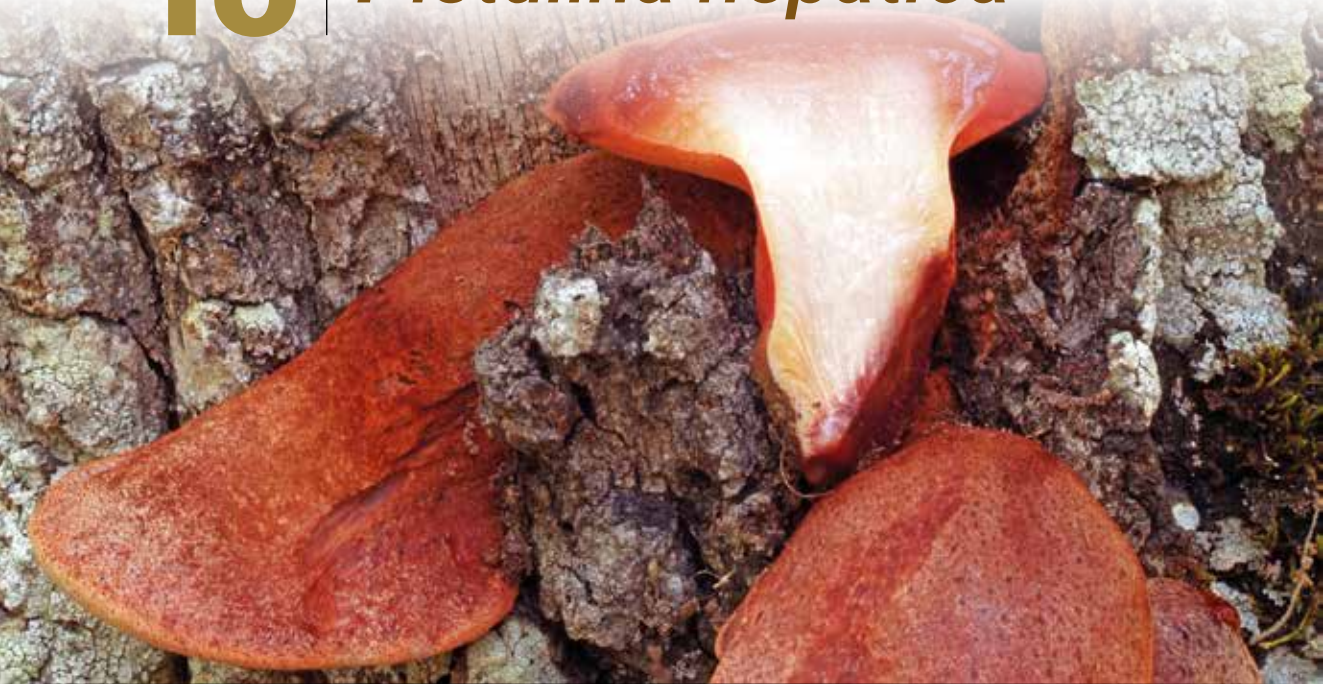
Habitat and Season : It grows abundantly under duff in broad-leaved forests (beech, hornbeam, oak, chestnut, hazelnut).

Possible Confusions : Can be confused *Cantharellus cinereus*. Both species are edible.

Commercial Use : It is generally consumed in the domestic market.



18 | *Fistulina hepatica*



Order : Agaricales

Family : Fistulinaceae



Macroscopic Features

- Cap** : 7–20 cm in diameter and 2–5 cm thick, tongue – shelf-shaped, sessile or attached to the substrate by a very short lateral stipe. Its shape resembles a liver, oysters or steak. The surface varies from convex – pillow to flat, with thin wart, sticky, from salmon to orange – red when young, then changes from wine red to rust red, in this state it is liver-like. The underside consists of fistula-shaped tubes.
- Pores** : Yellowish in colour when young and become pink.
- Spore deposit** : Pink.
- Stipe** : It has a lateral, short, cylindrical stipe.
- Flavour and Odour** : Its smell is not distinctive, but the taste is sour. Young specimens can be eaten.



Flesh : It is soft, elastic, juicy, reddish brown in colour and resembles a liver. The flesh hardens as it ages. It is fibrous and when cut, a red liquid emerges.

Microscopic Features

Spores : Oval, flat, hyaline and 1 droplet, 4–6 × 4–5 μm in size.

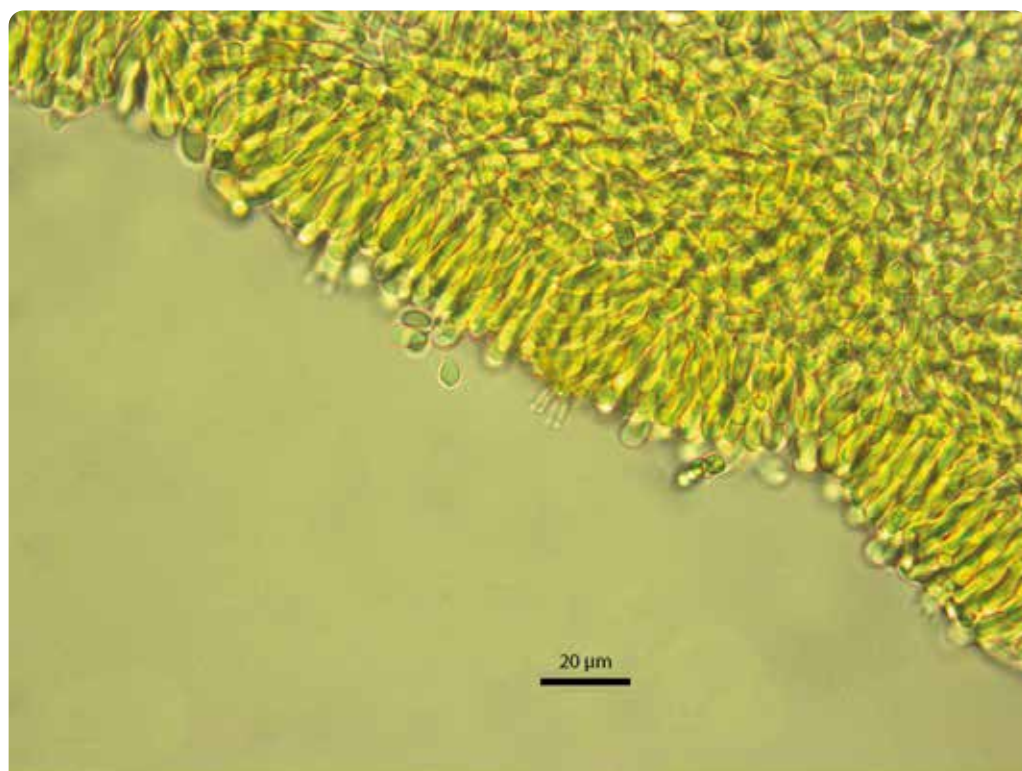


Figure 27: *Fistulina hepatica* spores under the microscope.

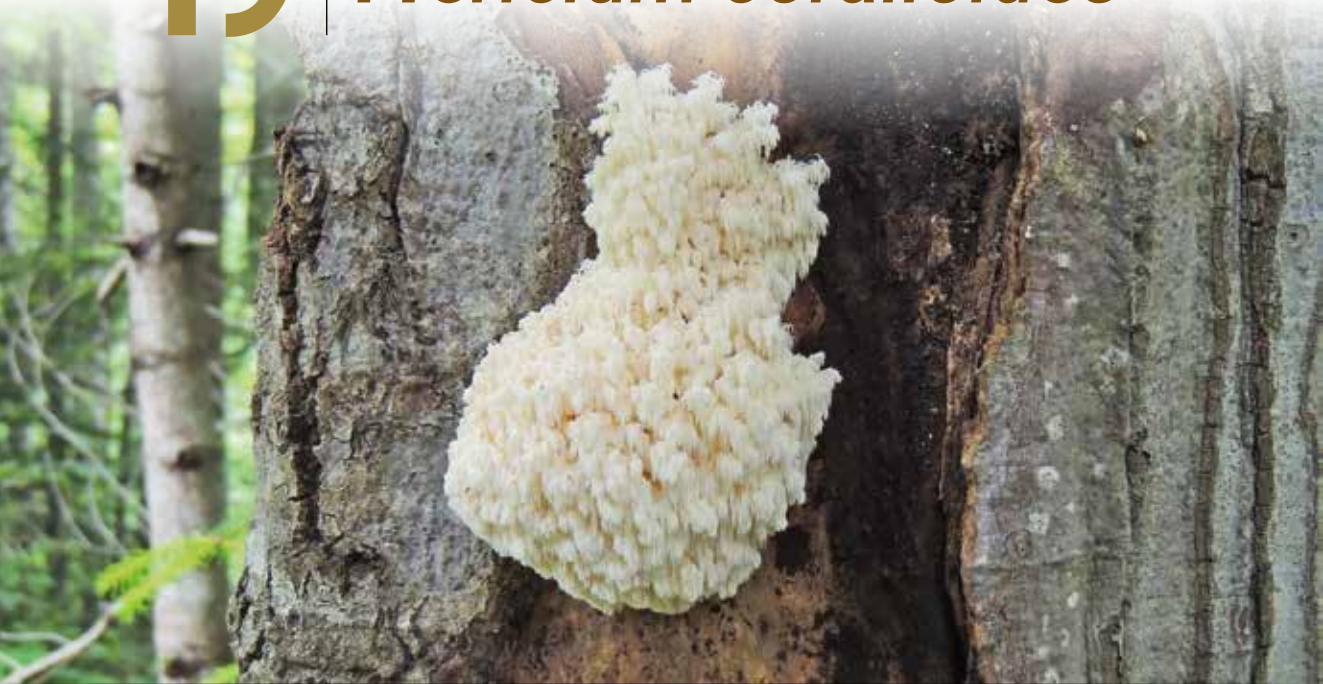
Habitat and Season : It grows on the live or dead trunk of chestnut and oak trees in summer and autumn.

Possible Confusions : It can be mixed with *Fomes fomentarius*, *Ganoderma lucidum* and similar tree fungi.

Commercial Use : It is recognized and consumed by the public. It is sold in local public markets.



19 | *Hericium coralloides*



Order : Russulales

Family : Hericiaceae



Macroscopic Features

- Carpophore** : It is 5–20 cm in size, consists of a basal stem and coral-like branches emerging from it, these branches end in drooping needle-like structure. Its colour is cream to white.
- Hymenium** : It is in the form of thin strands 1–2 cm long. Spore-producing structures are shaped like threaded branches.
- Spore deposit** : White.
- Flavour and Odour** : It has a mild medicinal scent. This odour decreases when cooked. It tastes sweet. Young specimens can be eaten.
- Flesh** : It is white in colour and has a fragile structure.



Microscopic Features

Spores : Large elliptical – hemispherical, surface smooth – thin warts, hyaline and oil droplets, thick-walled, amyloid, $6-7 \times 5-6 \mu\text{m}$.

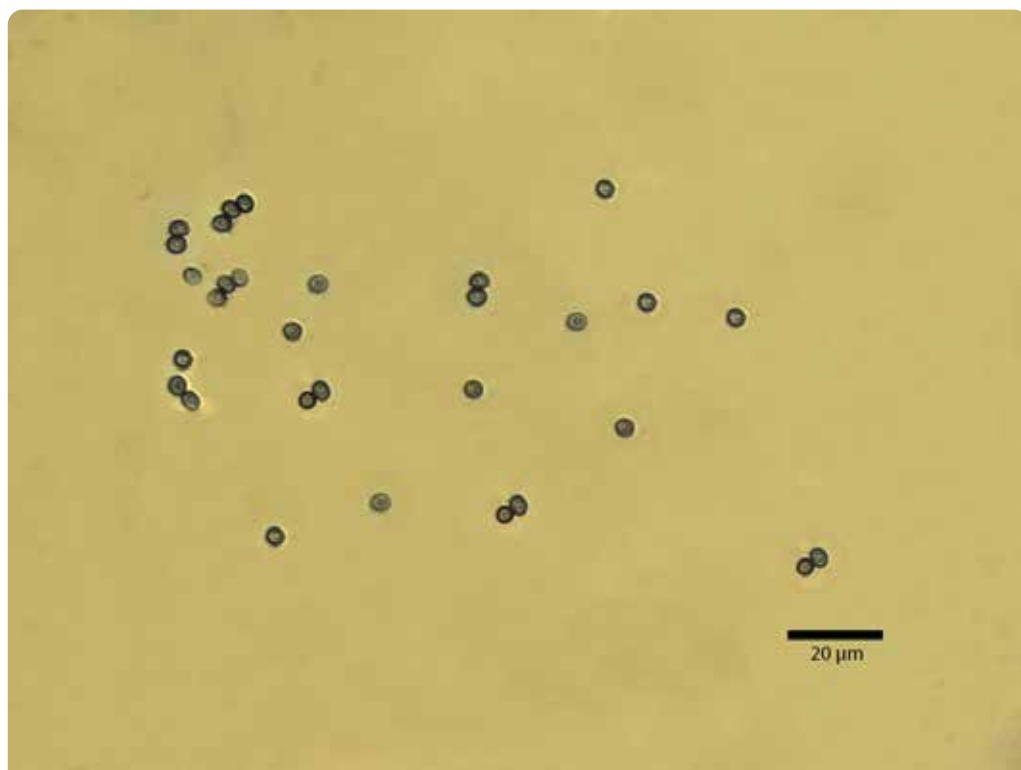


Figure 28: *Hericium coralloides* spores under the microscope.

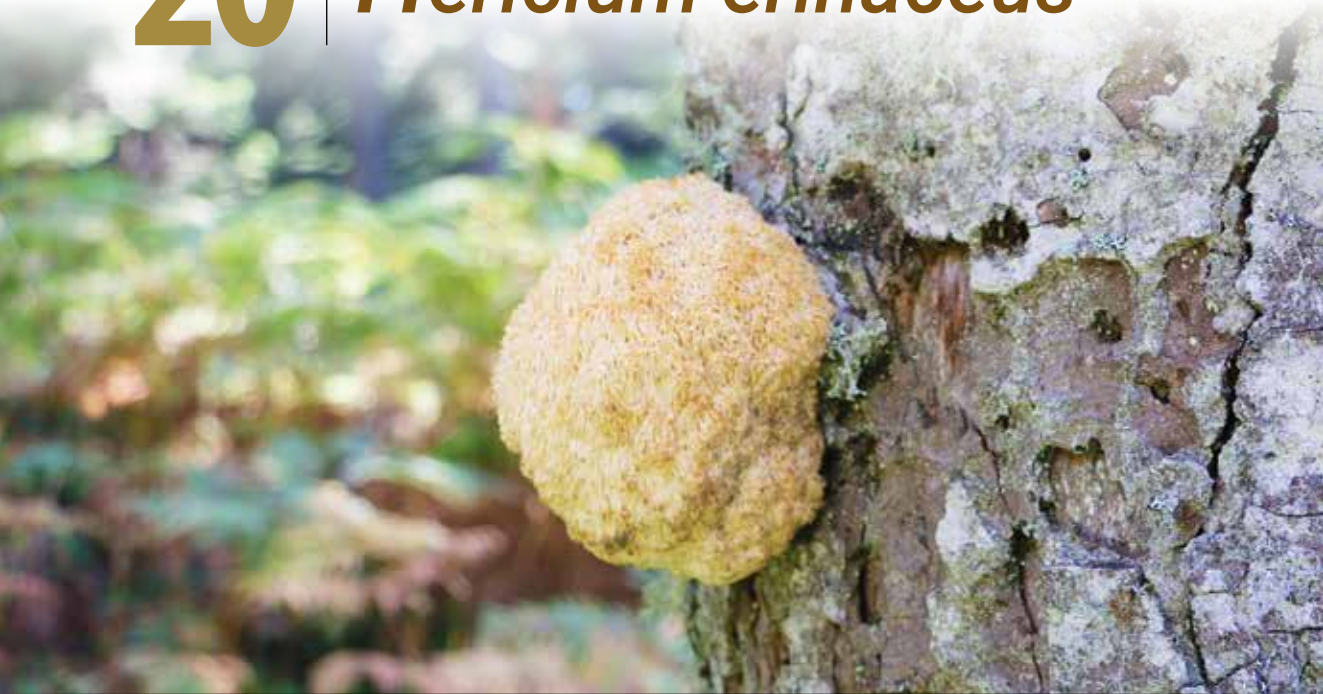
Habitat and Season : It grows on tree stumps in mixed coniferous and broad-leaved forests, especially in fir, beech and hornbeam forests. It grows in summer and autumn. However, if suitable conditions occur, it can grow in spring.

Possible Confusions : It can be confused with other species of *Hericium*.

Commercial Use : Exported abroad and consumed fresh in the country.



20 | *Hericium erinaceus*



Order : Russulales

Family : Hericiaceae



Macroscopic Features

Carpophore : Up to 30 cm in diameter, shaped like a hedgehog, provided with a short trunk covered with stings and long cylindrical spines in the lower side.

Spines : 2-5 cm long, bristled, conical, not branched, whitish, then with age, yellowish cream.

Spore deposit : White.

Flavour and Odour : It does not have a pronounced odour. Fresh samples can be eaten.

Flesh : Compact, abundant, whitish.



Microscopic Features

- Spores** : Broadly ellipsoidal, 5-7 x 4-5.5 μm , finely warty, hyaline, amyloid.
- Habitat and Season** : It grows mainly on deciduous, oak and beech logs. It is rare and seen in the autumn months.
- Commercial Use** : Despite its strange appearance, the fleshy part of the young specimens turns out to be good edible. It is a species with medicinal properties.



21

Hydnum repandum



Order : Cantharellales

Family : Hydnaceae



Macroscopic Features

Cap : It is 4-18 cm in diameter, convex, irregularly rounded, the upper surface is flat, fine hairy, in tones varying from cream to apricot, with a serrated and wavy edge.

Teeth : White to cream tones, decurrent, 6 mm long, brittle and soft.

Spore deposit : White.

Stipe : 2-6 × 1-3 cm, cylindrical, hard, same colour as the cap, smooth surface.

Flavour and Odour : It has a little spicy, unique, bitter taste. It is a fragrant species.

Flesh : It is white to cream white. Flesh is plump and well-structured.



Microscopic Features

Spores : Oval - hemispherical, straight, hyaline and oil droplet, 6-8 × 5-7 μm .

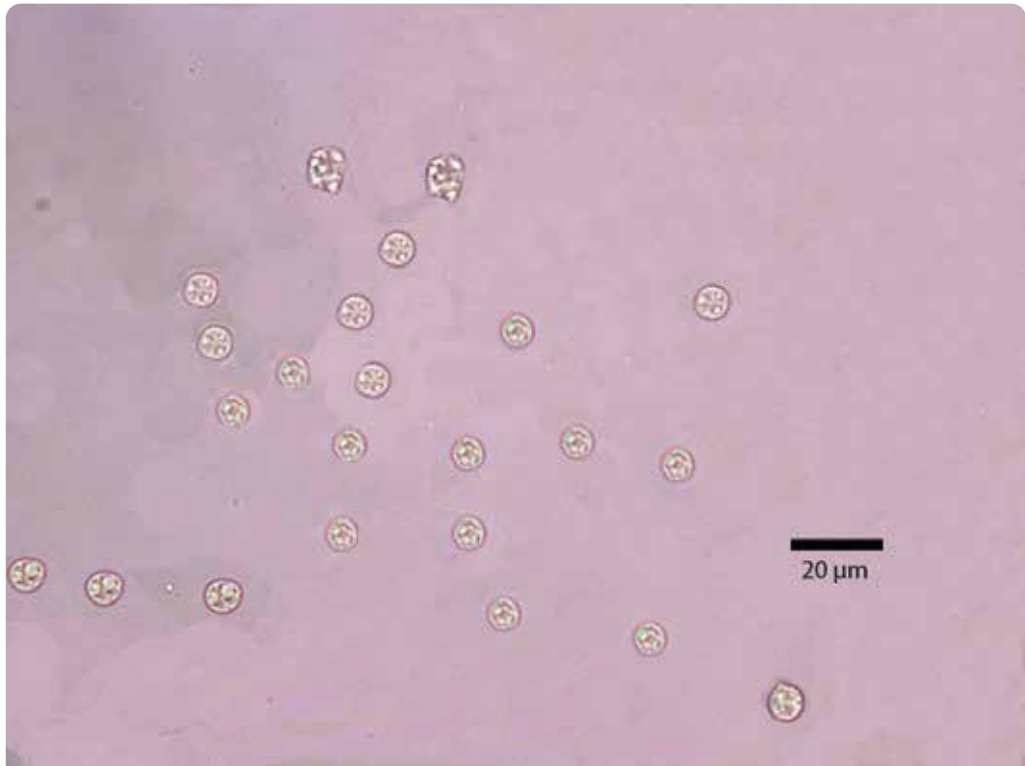


Figure 29: *Hydnium repandum* spores under the microscope.

Habitat and Season : It grows in coniferous or broad-leaved forests. It grows singly or in groups during the summer and autumn months.

Commercial Use : It is exported fresh or dry.



22

Hygrophorus marzuolus



Order : Agaricales

Family : Hydnaceae



Macroscopic Features

Cap : 5-13 cm diameter, from convex to flattened more or less humped, curved margin. Cuticle radial fibrils, glabrous, wet to the touch, whitish, then grey or almost blackish.

Gills : Slightly decurrent, separated, arched, wavy, intervened, whitish, then greyish.

Spore deposit : White.

Stipe : 3-7 cm long and 1.5-4 cm diameter, solid, fibrous, whitish, then greyish from the top.

Flavour and Odour : It has a unique smell and taste.

Flesh : Thick, compact, greyish white.



Microscopic Features

- Spores** : Widely ellipsoid, hyaline, smooth, no amyloid, 6-8.5 x 4-5 μm .
- Habitat and Season** : Mycorrhizal with fir, pine and spruce trees. It grows between February and April.
- Possible Confusions** : It is easily identified by the fact that it is a species that grows in winter.
- Commercial Use** : *Hygrophorus marzuolus* is not a widely recognized species in our country. It is the indispensable mushroom of the spring months together with the *Morchella* sp.



23

Hygrophorus poetarum



Order : Agaricales

Family : Hygrophoraceae



Macroscopic Features

- Cap** : 8-16 cm diameter, from convex to flattened and wavy. Rounded and sinuous edge. Cuticle bright, smooth, slightly viscous, cream pink or pink ochre, sometimes white with yellow or pink spots.
- Gills** : Sinuate. Very spaced, thick, with small gills, white with ochre or pink reflections.
- Spore deposit** : Whitish.
- Stipe** : From 5-10 cm long and 1-3 cm diameter, curved and attenuated towards the base, white ochre, with silver fibrils and scaly dotted.
- Flavour and Odour** : Fruity or jasmine scented, sweet.
- Flesh** : Thick, brittle, white, pink under the cuticle when it is in contact with air.



Microscopic Features

Spores : Ellipsoidal, hyaline and smooth, 6-10 x 4.5-6 μm .

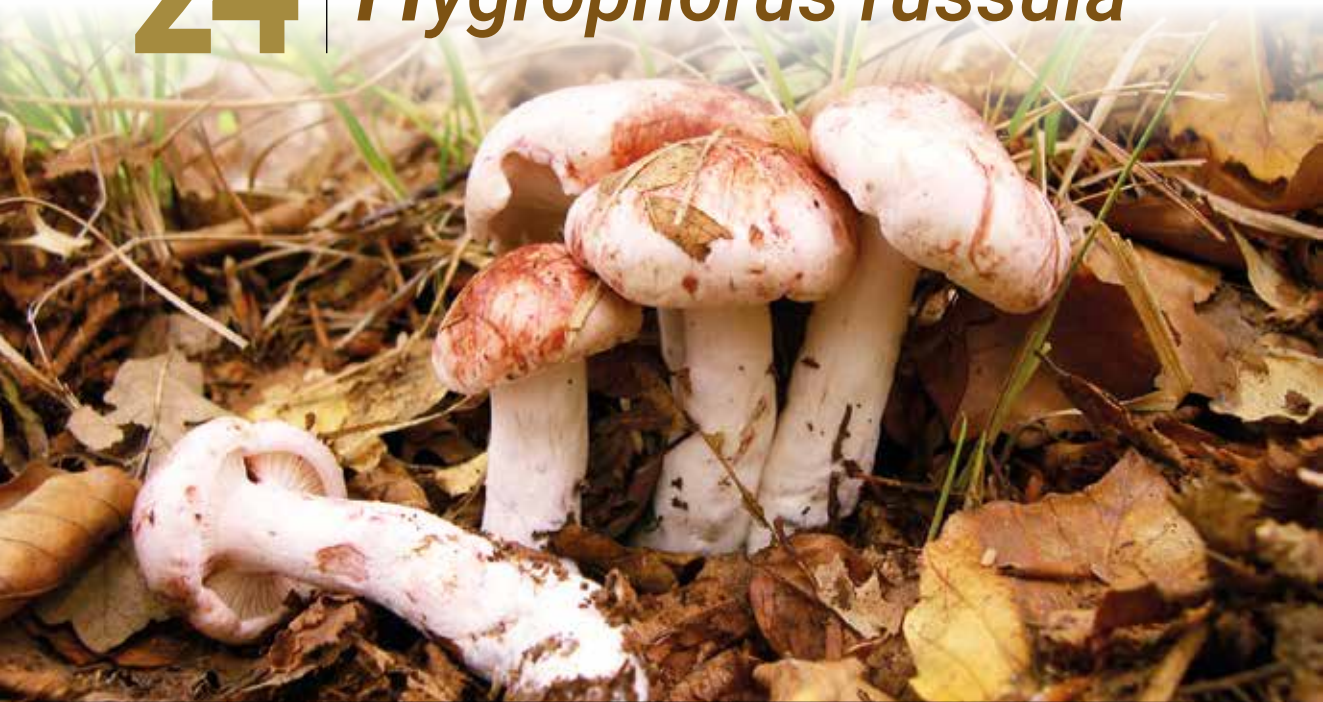
Habitat and Season : It grows in deciduous forests in summer and autumn.

Possible Confusions : It is broadly similar to *Hygrophorus pudorinus*, an edible, mediocre mushroom that grows under coniferous trees.

Commercial Use : It is a species that is not much known by the local people.



24 | *Hygrophorus russula*



Order : Agaricales

Family : Hygrophoraceae



Macroscopic Features

- Cap** : 5-15 cm diameter, convex to flattened or slightly sunken. Cuticle separable, a bit viscous, glossy, vinous red with darker spots.
- Gills** : Subdecurrent. White in the initial stages, but soon develops reddish patches or becomes generally pinkish.
- Stipe** : 3-8 cm long and 1-3 cm diameter, attenuated at the base, sometimes curved, solid, fibrous, whitish, staining vinous red.
- Flavour and Odour** : It has a bitter taste and has no odour.
- Flesh** : Thick, compact, white to reddish.



Microscopic Features

Spores : Widely ellipsoid, hyaline, amooth, no amyloid, 7-9 x 4-5.5 μm .

Habitat and Season : Mycorrhizal with oak trees. Sometimes they form fairy rings. It grows in Autumn.

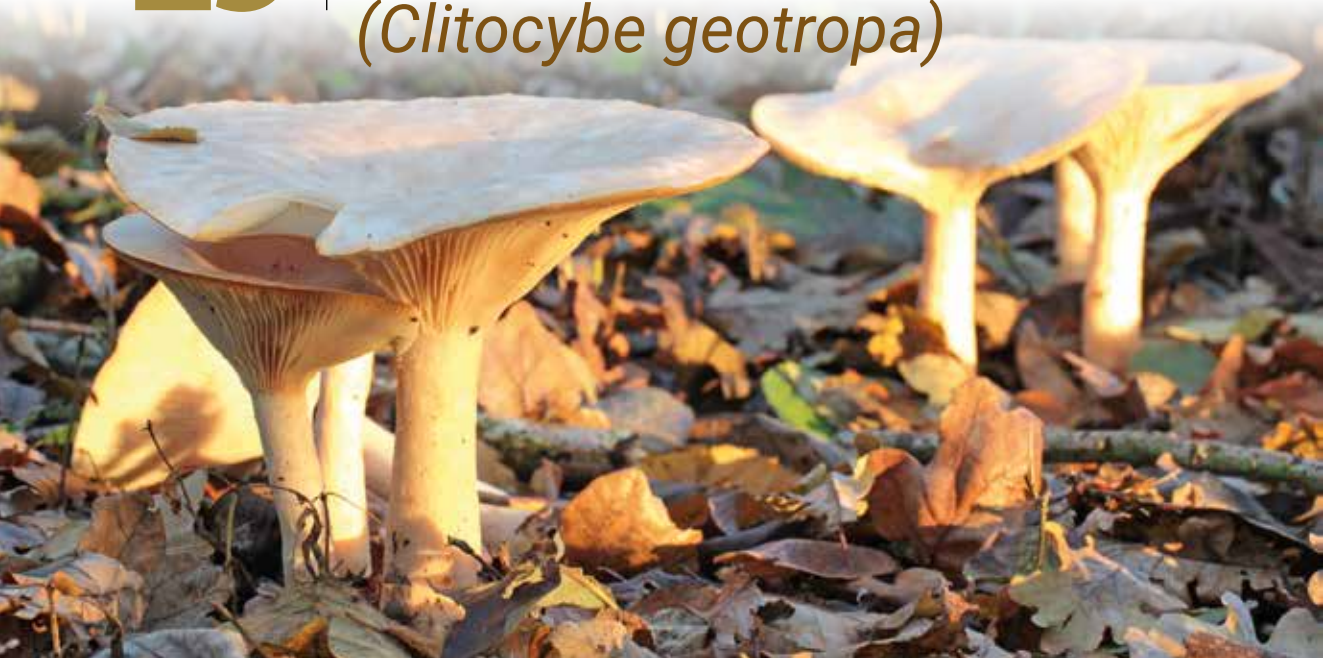
Possible Confusions : It is unmistakable taking into account its characteristics.

Commercial Use : It is not very well known in the country. Its commercial potential can be evaluated.



25

Infundibulicybe geotropa (*Clitocybe geotropa*)



Order : Agaricales

Family : Tricholomataceae



Macroscopic Features

- Cap** : 8-20 cm diameter, convex to flattened, then depressed or as a funnel, with bulkhead. Very rolled margin. Cuticle separable, glabrous, smooth, dry, adorned with adnate fibrils, pruinose, chamois ochre with silver reflections.
- Gills** : Decurrent. Numerous, tight, with short gills, whitish to cream, that darken in maturity.
- Spore deposit** : White.
- Stipe** : 8-15cm long and 1-3 cm diameter, cylindrical, robust, solid, elastic, fibrous, somewhat thickened at the base, paler than cap colour.
- Flavour and Odour** : Smells of bitter almonds.
- Flesh** : It has white flesh and an elastic structure.



Microscopic Features

- Spores** : Ellipsoidal, 5-9 x 5-8 μm , hyaline, smooth, non-amyloid.
- Habitat and Season** : It grows in deciduous forests in Autumn.
- Commercial Use** : It is sold by the local people in the markets. Good edible, especially the young specimens, since the old ones are leathery. The elastic stipe is a decisive factor in identification. Due to its hard structure, the stipe is thrown away and the cap is consumed.



26 | *Lactarius deliciosus*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : It has a diameter of 5–20 cm, convex in young mushrooms, and a hollow in the middle of developed mushrooms and an irregular funnel shape. There are concentric circles on it consisting of different colour tones. It is curved towards the edges. It is in different shades of orange, including dark and light. Green spots occur on mushrooms as they age or on damaged samples. It is very hard and sticky when it is moist.
- Latex** : Orange. This milk turns redish after 15-20 minutes and bluish green after one hour.
- Gills** : Decurrent. In young mushrooms, apricot colour becomes darker and carrot colour in developed ones. Bluish green spots occur on the injured places.
- Spore deposit** : Pale pink.



Stipe : It is 3–5 × 1,5–2 cm, cylindrical, in young mushrooms, it is hollow in the middle of full-grown mushrooms. There are yellowish orange spot-like depressions with darker colours.

Flavour and Odour : It is aromatic fruit scented, slightly tangy and pleasant to taste. When eaten raw it is bitter, when cooked the bitterness disappears.

Flesh : It is yellowish-orange in colour. The flesh is soft when young and becomes crispy as it ripens.

Microscopic Features

Spores : Elliptical, the veins on it form a very regular network, 7–9 × 6–7 µm.

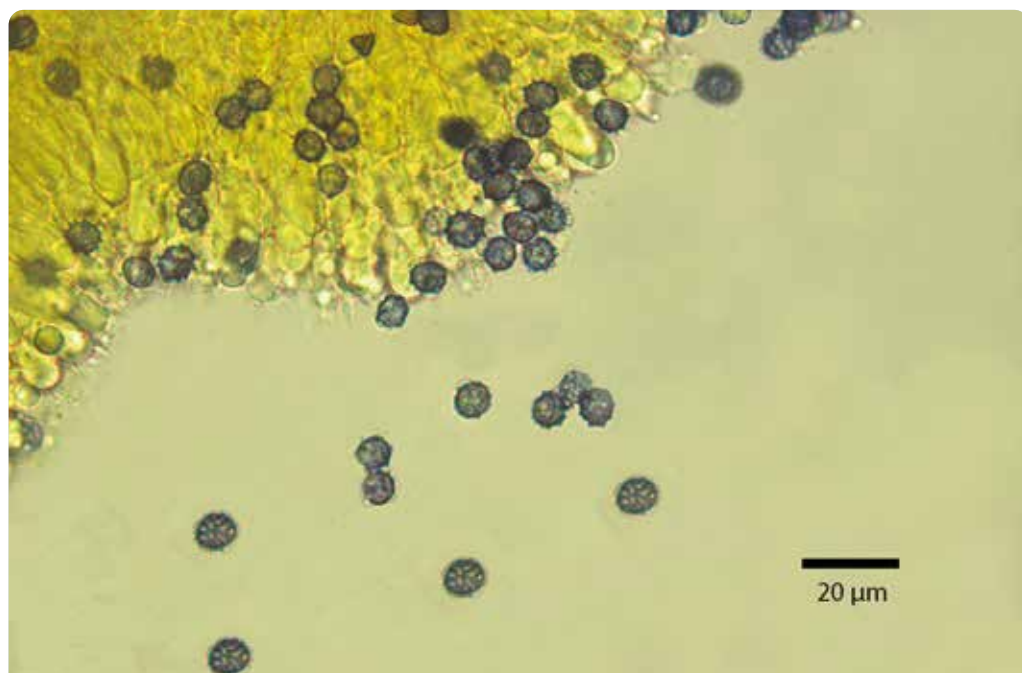


Figure 30: *Lactarius deliciosus* spores under the microscope.

Habitat and Season : It forms mycorrhizas with *Pinus*.

Possible Confusions : Similar to *Lactarius chrysorrheus* and *L. scrobiculatus*. Milk colour is important in defining.

Commercial Use : It is one of the most densely collected species in the Aegean, Marmara, Black Sea and Mediterranean regions. It is consumed fresh or in brine.



27 | *Lactarius piperatus*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : It has a diameter of 5–15 cm, convex first and turns into a flat-wide funnel when development progresses. Its surface is smooth then wrinkled and reticulate when young, silky, ivory-white first, then cream-coloured.
- Latex** : White, no colour change, bitter taste.
- Gills** : Gills are dense and decurrent. Cream when younger then turn orange-cream.
- Spore deposit** : White.
- Stipe** : 2–8 × 1–4 cm, cylindrical, tapering to the base, tight when young then hollow, surface corrugated and white.



Flavour and Odour : It has a fruity odour and a sharp bitter taste when raw. When it is cooked or pickled, the bitterness disappears.

Flesh : White first and then light cream-yellow.

Microscopic Features

Spores : Elliptical shaped, surface half reticulate, amyloid, 7-10 × 5-6 μm .

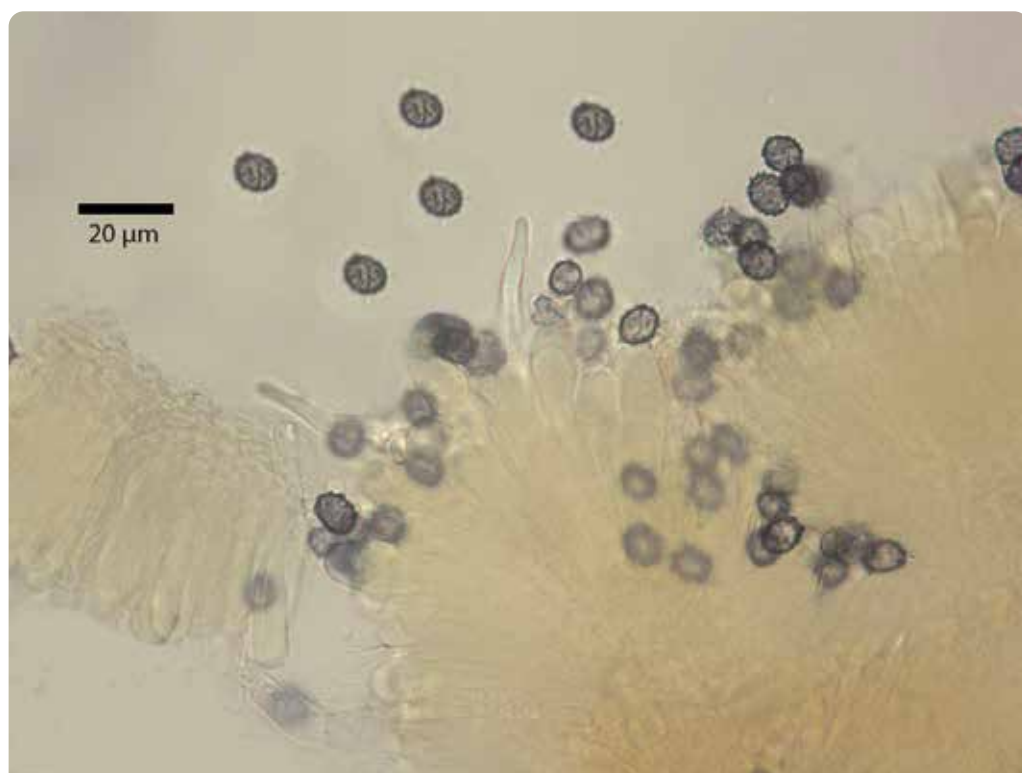


Figure 31: *Lactarius piperatus* spores under the microscope.

Habitat and Season : It grows abundantly in broadleaf forests, especially beech-chestnut, oak forest. It grows from spring to autumn.

Possible Confusions : Similar to *Lactarius vellereus*. The gills of *L. vellereus* are sparse and longer and the cap is velvety hairy.

Commercial Use : It is one of the most famous mushroom species in the Black Sea region. It is prepared in brine and consumed fresh.



28 | *Lactarius salmonicolor*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : It has a diameter of 4-12 cm, convex first, in the form of a flat-funnel as development progresses, zoned and dotted surface, and in tones ranging from orange to dark yellow-orange.
- Latex** : Red. Later it turns wine red. Tastes bitter.
- Gills** : Decurrent. Yellowish when young, then turn light orange.
- Spore deposit** : Pale yellow or orange.
- Stipe** : 3-7 × 1-2 cm, cylindrical, tapering to base, firm when young, later hollow, surface yellow – over orange, orange brown mottled, apex whitish.
- Flavour and Odour** : The fragrance is fruity; spicy fruit flavor.
- Flesh** : It is first whitish, then turns orange, changes to brown when ripe.



Microscopic Features

Spores : Hemispherical - elliptical, surface semi-reticulated, amyloid, 8-11 × 7-9 μm, heliocystidia spindle-shaped pointed, pleurocystidia the same shape.

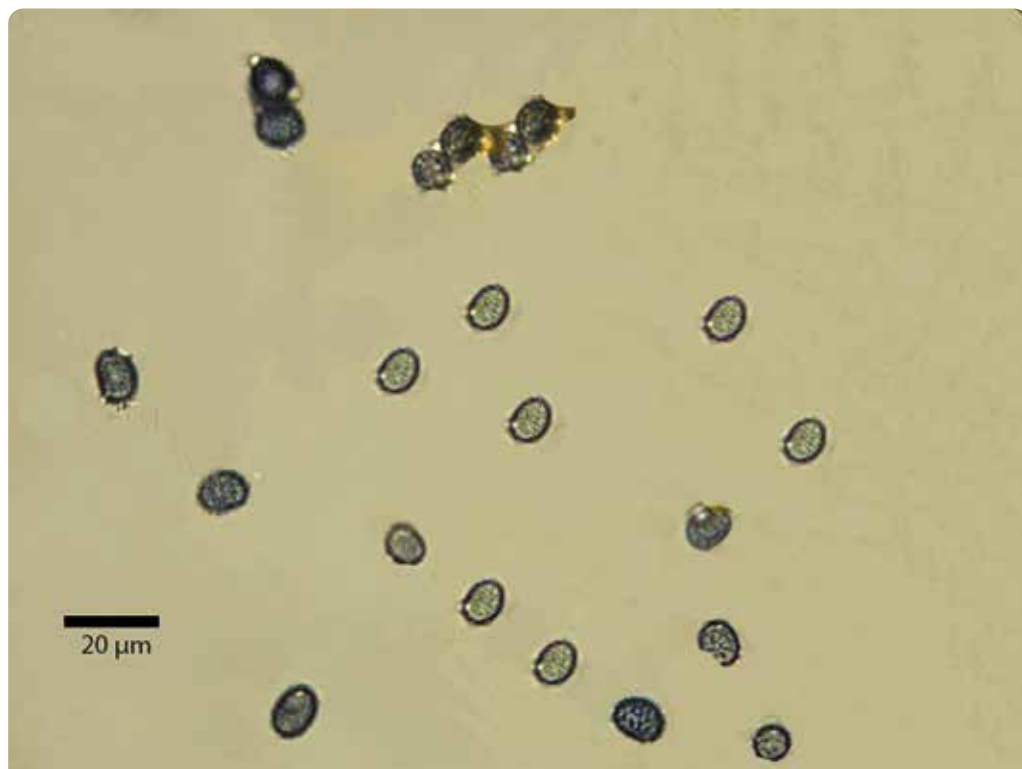


Figure 32: *Lactarius salmonicolor* spores under the microscope.

Habitat and Season : Mycorrhizal in coniferous forests. It grows in spring and autumn.

Possible Confusions : It should not be confused with the species that produce yellow or white milk when cut.

Commercial Use : It is one of the common mushroom species in the Aegean and Mediterranean regions. It is consumed fresh.



29 | *Lactarius sanguifluus*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : 6-13 cm diameter, at the beginning convex, umbilicate, with rolled edges, then extended and just a bit depressed, very fleshy, smooth, slightly viscous. Ochre-coloured, ochre-orange, ochre with red-purple tones, sometimes marked with coloured bands of green-orange.
- Latex** : Wine-red.
- Gills** : Slightly decurrent, tight, thin, often bifurcated. Orange ochre with purple or vinous red reflections.
- Spore deposit** : White.



Stipe : 2-5 cm long and 1-2 cm diameter, robust, lightly attenuated at the base, at first full, then empty, pruinous, red-orange, incarnate or lilac, especially at the top, often with tiny holes or red pits.

Flavour and Odour : It has a spicy taste.

Flesh : Almost white, stains wine-red due to latex, compact and thick.

Microscopic Features

Spores : Spherical, warty, amyloid, 7-8 x 6-7 μm .

Habitat and Season : It grows in coniferous forests in Autumn.

Possible Confusions : It can be confused with other *Lactarius* spp. whose caps are zoned with concentric circles, from pale yellow to red or pink orange- but their latex is not wine-red. *L. zonarius* and *L. acerrimus* have white or yellow gills and white latex. *L. chrysorrheus* has white latex that turns yellow.

Commercial Use : This mushroom, which is known and consumed by local people, is canned and pickled.



30 | *Lactifluus volemus*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : 5-15 cm in diameter, first convex, smooth-funnel-shaped as development progresses, surface slightly velvety when young, then smooth, dark orange-brown, centre darker and inward-slumped.
- Latex** : First white, then turns rust brown, tastes pleasant.
- Gills** : Adnate or decurrent. Cream when young, then turns to a light yellow-earthy colour.
- Stipe** : 5-12 × 1-3 cm, cylindrical, narrows towards the base, solid when young, then hollow, the surface is longitudinally grooved, the same colour as the cap.



Flavour and Odour : With the smell and taste of fish.

Flesh : First white, then turns rust brown.

Microscopic Features

Spores : Round – hemispherical, surface reticulated, amyloid, $7-10 \times 6-9 \mu\text{m}$, heliocystidia spindle-shaped, thick-walled and pointed at the tip.

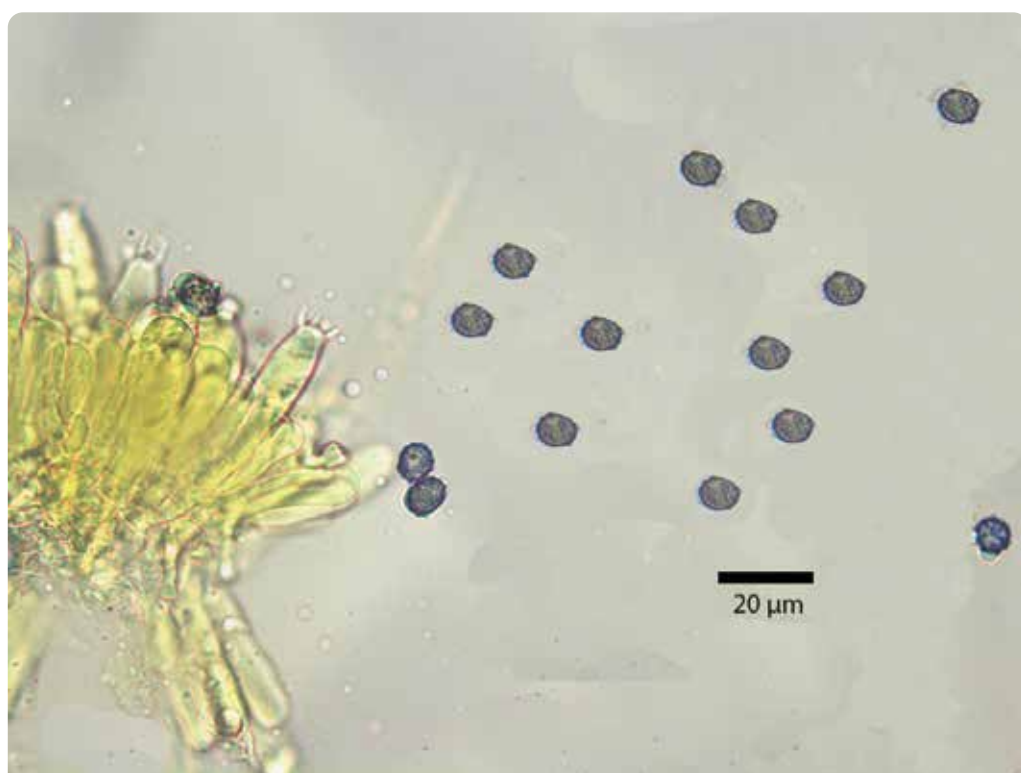


Figure 34: *Lactifluus volemus* spores under the microscope.

Habitat and Season : It grows in coniferous forests, mixed and broad-leaved forests (Fir and Beech) during summer and autumn.

Possible Confusions : It can be eaten raw. The top of the cap is velvety. Its distinguishing feature is the abundant white latex.

Commercial Use : It is one of the most famous mushroom species in the Black Sea region. It is prepared in brine and also consumed fresh.



31

Laetiporus sulphureus



Order : Polyporales

Family : Fomitopsidaceae



Macroscopic Features

Basidiocarp : 10-30 cm, in the form of wavy and folded shelf stacked on top of each other. Each shelf can be up to 4 cm thick. It usually grows in groups of 4-5 shelves. The surface is completely sulfur coloured; some parts are in different shades of yellow. Rarely straight, mostly curved, semicircular or fan-shaped, with corners ranging from sulfur yellow to yellowish orange.

Pores : Pores are round or rectangular, each 1-4 mm in diameter.

Flavour and Odour : It has a sulfur odour when fresh, and turns into a mealy odour when ripe. It tastes bitter.

Flesh : It has a sulfur yellow colour. When the mushroom dries it becomes brittle and disperses like flour.



Microscopic Features

Spores : Elliptical, hyaline, surface smooth, $5.5-7 \times 3.5-5 \mu\text{m}$.

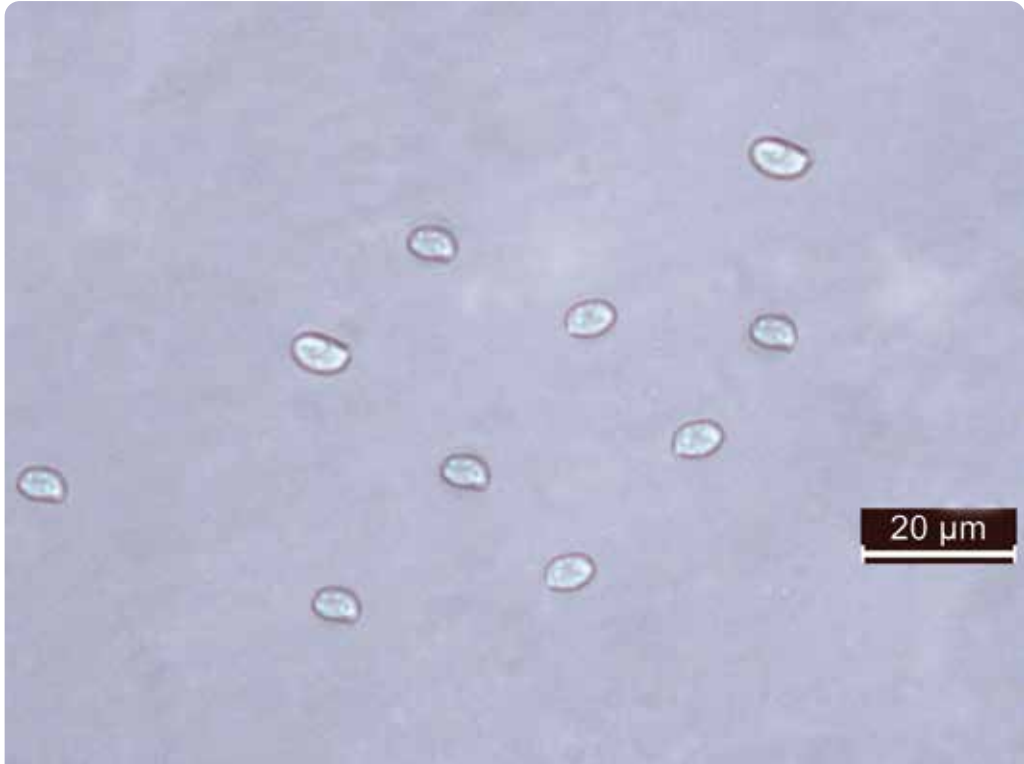


Figure 35: *Laetiporus sulphureus* spores under the microscope.

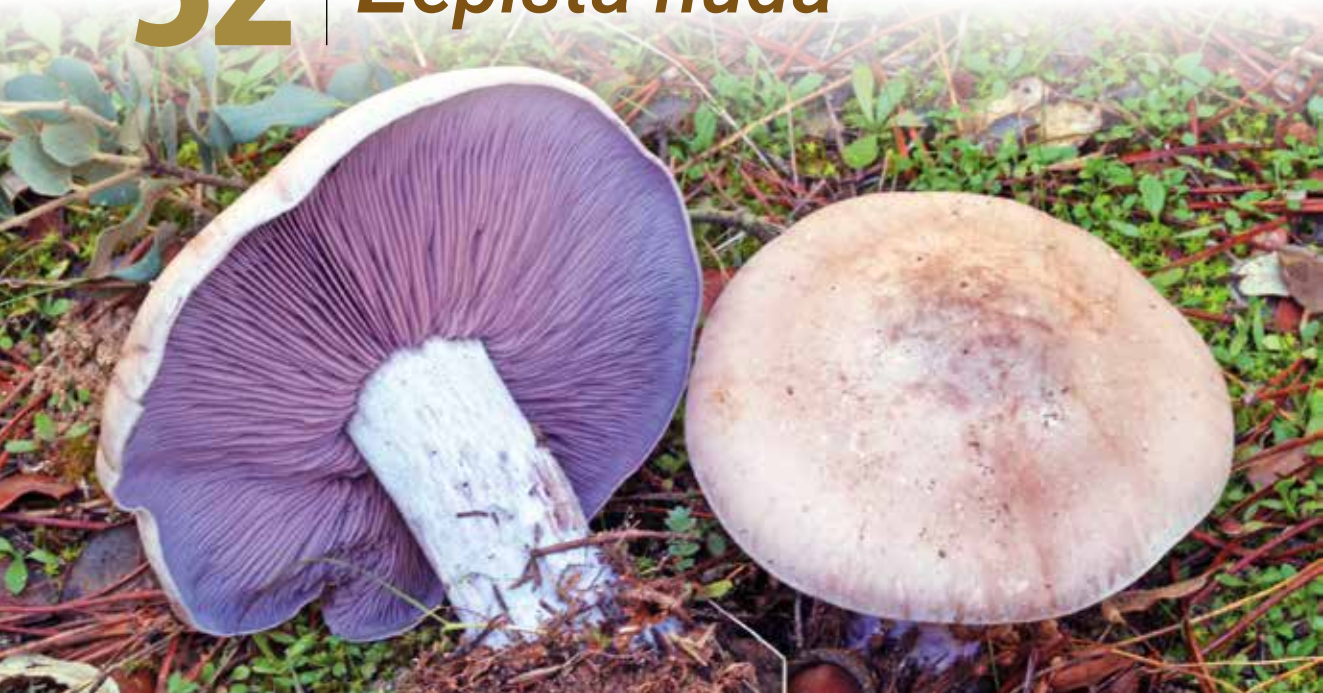
Habitat and Season : It grows on deciduous trees, especially willow, poplar, oak. It grows in summer and autumn.

Possible Confusions : It resembles fungi that grow on trees, such as *Meripilus giganteus*, *Grifola frondosa*, and *Bondarzewia mesenterica*.

Commercial Use : It is generally consumed in the domestic market.



32 | *Lepista nuda*



Order : Agaricales

Family : Tricholomataceae



Macroscopic Features

- Cap** : 5-14 cm in diameter, first hemispheric, then flattened and turning into a wavy margins, the centre is slightly bulged or sunken. When moist, the surface is violet blue or violet brown.
- Gills** : Free, violet – grey or violet, sometimes bluish.
- Stipe** : 5-10 × 1-3 cm, cylindrical, with a swollen base. When young, the surface is violet, then becomes lighter, longitudinally fibrillated.
- Flavour and Odour** : Strongly aromatic, fruity and sweetish. It has a pleasant fragrance.
- Flesh** : White, mauve on the edges.



Microscopic Features

Spores : Elliptical, small warts, hyaline, $6.5-8.5 \times 4-5 \mu\text{m}$.

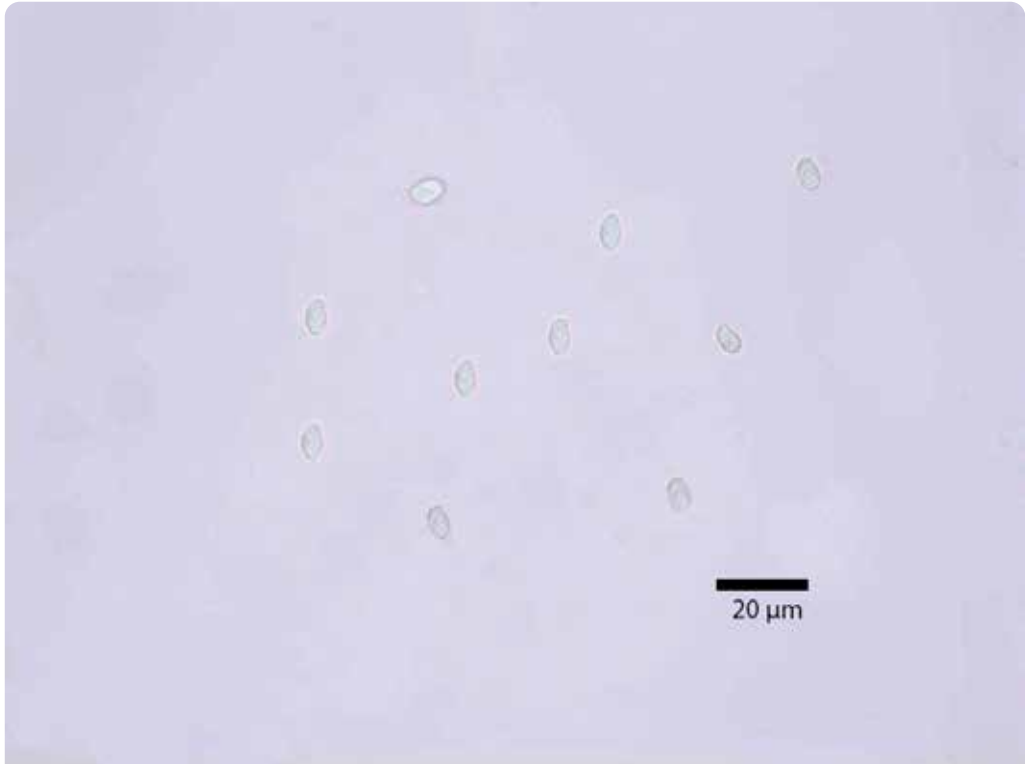


Figure 36: *Lepista nuda* spores under the microscope.

Habitat and Season : It grows abundantly in spring in coniferous forest, in parks and gardens, along roadsides and paths, among lawns.

Possible Confusions : Not to be confused with *Cortinarius* species. The rust spots on the cap, lamellae and stipe is typical of the *cortinarius* species.

Commercial Use : It is a common species. Known throughout Türkiye. It is consumed fresh.



33

Macrolepiota procera



Order : Agaricales

Family : Agaricaceae



Macroscopic Features

- Cap** : 15-25 cm in diameter, oval in the young stage, opens as the development progresses, takes the form of an umbrella, then flattens like a plate. The cap has patch-shaped scales that are upturned at the tips with brown or greyish brown colour, they spread on the light cream surface. It has a large rather distinctive umbo in the centre.
- Gills** : Free, white, distant, close to the stipe show bifurcation or anastomosification.
- Stipe** : 15-40 × 1-3 cm, cylindrical, bulbous. There are scales in the form of zigzags, such as dark brown snake skin, on a hollow and fibrous, rather crunchy, dirty white background.



Flavour and Odour : It has a sweetish and dough smell.

Flesh : White, immutable.

Microscopic Features

Spores : Elliptical, small warts, hyaline, dextrinoid $6.5-8.5 \times 4-5 \mu\text{m}$.

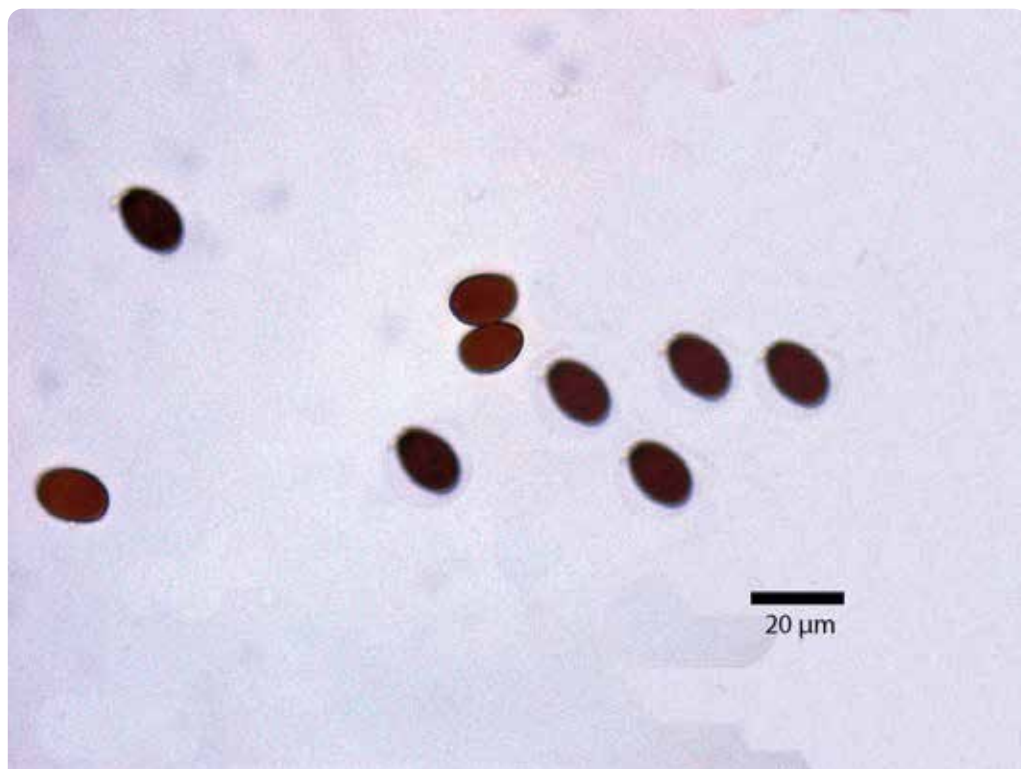


Figure 37: *Macrolepiota procera* spores under the microscope.

Habitat and Season : It grows in coniferous and mixed forests, roadsides, parks, individually or collectively in the summer.

Possible Confusions : The distinctive features of this species are the double movable ring on the stipe, the snake back pattern on the stipe, the scale pattern on the cap, and the white flesh.

Commercial Use : It is recognized and consumed by the public. It is sold at local public markets.



34 | *Marasmius oreades*



Order : Agaricales

Family : Marasmiaceae



Macroscopic Features

- Cap** : 2-6 cm diameter, globose to convex plane, slightly mamelonated. Cuticle hygrophanous, glabrous, not separable from the flesh, colour like the crust of the bread or coffee with milk, somewhat darker in the centre.
- Gills** : Adnate, spaced, with lamellae, first white, then hazelnut.
- Spore deposit** : White.
- Stipe** : 4-7 long and 0,3-0,5 cm diameter, cylindrical, smooth and elastic, which allows to be twisted several times without breaking, hazelnut white.
- Flavour and Odour** : It does not have a specific smell or taste.
- Flesh** : White, firm, very fibrous on the stipe.



Microscopic Features

Spores : Ovoid ellipsoidal, 7.5-10 x 4-6 μm , hyaline, smooth, non-amyloid.

Habitat and Season : It grows in meadows and forest edges from Spring to Autumn.

Possible Confusions : It is a mushroom very easy to identify, however it can be confused with small poisonous *Lepiotas*, of similar colours, but these have a stipe that breaks easily and is decorated with a ring or its remnants as granule or tomentose flakes. Possible confusion can be with *M. collinus*. It can also be confused, especially when the weather is dry, with white *Clitocybe* (toxic for having muscarine) that grow the habitat, but have a white cap, tight, white and decurrent gills and a non-fibrous stipe that breaks easily.

Commercial Use : It is a species often collected by the local people.



35 | *Mitrophora semilibera*



Order : Pezizales

Family : Morchellaceae



Macroscopic Features

Cap : Sharp conical, 2-5 cm diameter. Hymenial surface with longitudinal and other transverse ridges. Between ochre and olive brown, darker when it gets old. The cap is attached to the half-height of its stipe, so the other half is free (semi-free).

Hymenium : The spore-bearing cup surface hymenium is compartmentalized into the characteristic honeycombed pits.

Stipe : 7-15 cm long and 1-3 cm in diameter. It has longitudinal striations, hollow, from white to ochre, with pruine of the same colour.

Flavour and Odour : A little spermatic.

Flesh : It is semi-elastic and white.



Microscopic Features

- Ascus** : It measures $300-320 \times 20-25 \mu\text{m}$, and has 8 spores.
- Spores** : Elliptical and smooth, with very small lipid drops on the outside surface, $22-26 \times 14-18 \mu\text{m}$.
- Habitat and Season** : In the spring under trees of poplar, maple and ash trees. It is seen on the banks of streams and in humid conditions.
- Possible Confusions** : It has been reported that it may contain very small amounts of hydrazine. Therefore, it is not recommended to be consumed raw. It should be consumed by drying, boiling or cooking on a long and low heat to reduce or eliminate the effects of toxins. Similar to *Verpa conica*, whose cap or hymenal surface do not show longitudinal ribs.
- Commercial Use** : With its culinary and economic value, it is a mushroom species that has an important value both in our country and throughout the world, like *Morchella* species.



36 | *Morchella elata*



Order : Pezizales

Family : Morchellaceae



Macroscopic Features

- Cap** : 3-9 cm high 2-3 cm diameter, the apex is slightly curved, blunt and conical. The pits are regularly downward, rectangular, the indentation parts of the young mushrooms are yellowish white, the developed ones are light brown-cream. The protruding parts are brown in the young mushrooms, the developed ones are sooty brown-ash.
- Hymenium** : The spore-bearing cup surface hymenium has been compartmentalized into the characteristic honeycombed pits.
- Stipe** : 3-9 × 1-3 cm, cylindrical, hollow, with thin warty-ish granulated protrusions on the inside and outside. White when fresh, turns yellowish white when developed.
- Flavour and Odour** : It has a pleasant smell and taste.



Flesh : Soft and elastic structure while fresh, hardens when the development progresses. The colour is white, turning pink by breaking or cutting.

Microscopic Features

Ascus : It measures $300-350 \times 25-30 \mu\text{m}$.

Spores : Broadly ellipsoid shaped, colourless, translucent, measuring $18-24 \times 10-14 \mu\text{m}$.



Figure 38: *Morchella elata* spores under the microscope.

Habitat and Season : It grows abundantly in coniferous forests, acidic and burnt soils in the spring season. It generally grows with red pine, black pine, fir and cedar under the needles on the soil. It grows in the spring.

Possible Confusions : It should not be eaten without being cooked thoroughly. It can cause allergic reactions in some people.

Commercial Use : It is one of the most important species known to local people and collected and valued commercially. They are locally known as “Black Morels”. They are freshly consumed and dried and exported to different European countries. It is an important export product.



37 | *Morchella esculenta*



Order : Pezizales

Family : Morchellaceae



Macroscopic Features

- Cap** : It is 5–10 cm high, 4–6 cm in diameter, very variable in shape: from round to ovoid or conical. The tip is usually burnt. The ridges range from bright yellow – orange, honey yellow, yellowish brown. Pits are generally in the form of hexagon with wide corners. Generally chestnut – rust coloured.
- Hymenium** : The spore-bearing cup surface hymenium is compartmentalized into the characteristic honeycombed pits.
- Stipe** : 3.5 - 5 × 1-3 cm, cylindrical, bulging base, short relative to cap, generally slotted structure but the grooves do not run along the entire stipe. The hollow stipe is whitish first then pale yellow.



Flavour and Odour : It does not have a pronounced odour. It is a very tasty and sought-after mushroom.

Flesh : It is elastic and soft when young, it becomes brittle as development progresses, whitish.

Microscopic Features

Spores: Broadly elliptical, colourless, smooth surface, $18-23 \times 9-11 \mu\text{m}$.

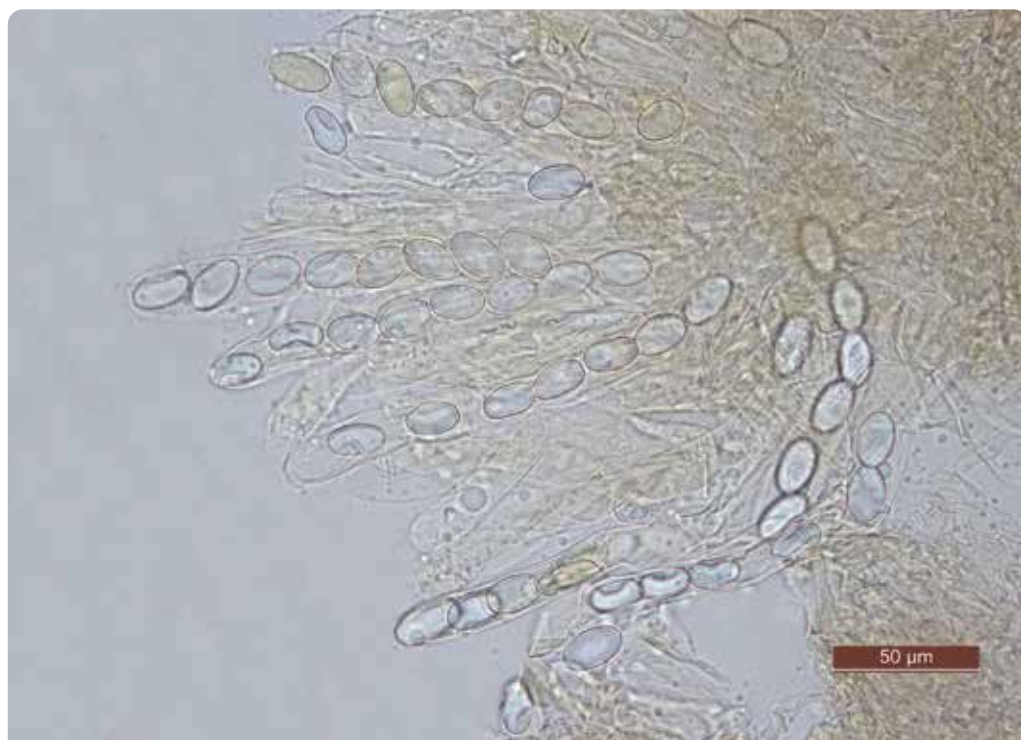


Figure 39: *Morchella esculenta* spores under the microscope.

Habitat and Season : It grows abundantly in the spring, especially in April – May, in pine forests on marly soils, on forest edges in meadows, on moist sandy forest soils, in poplar and garden areas. Often, they are more abundant in places where red pine and oak trees are mixed.

Possible Confusions : It should not be eaten without being cooked thoroughly.

Commercial Use : Locally known as “White, Yellow Morel”. They are freshly consumed and dried and exported to different European countries.



38 | *Pleurotus ostreatus*



Order : Agaricales

Family : Pleurotaceae



Macroscopic Features

- Cap** : 5-25 cm diameter and semicircular-fan shaped, convex when young, surface flat, silky, colour is very variable. It can be cream-beige, light brown to purplish brown, mauve-brown in different colours.
- Gills** : Decurrent. Whitish in cream shades when young, turns yellow when mature.
- Spore deposit** : White.
- Stipe** : 2-4 × 2-3 cm, not fully formed, lateral, white and tight structure, they come out in groups. Inside is plump and fibrous.



Flavour and Odour : It is a fragrant species.

Flesh : White, 2-3 mm thick, juicy, elastic and fibrous.

Microscopic Features

Spores : Cylindrical-elliptic, flat, hyaline, and droplet, $8-10 \times 3-4 \mu\text{m}$.

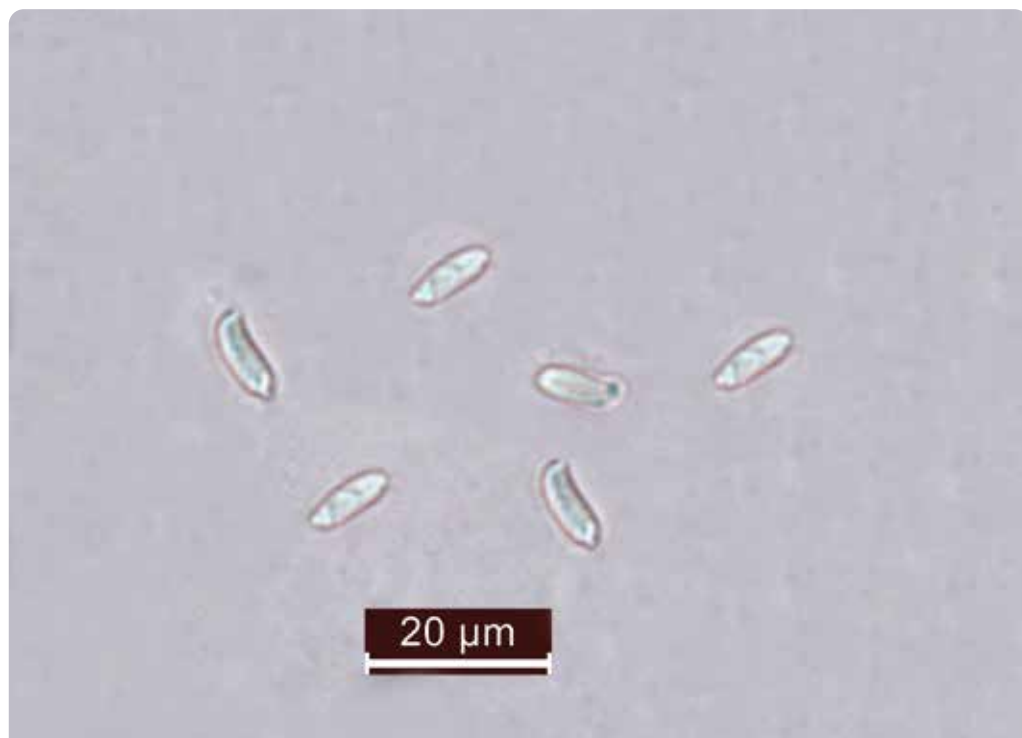


Figure 40: *Pleurotus ostreatus* spores under the microscope.

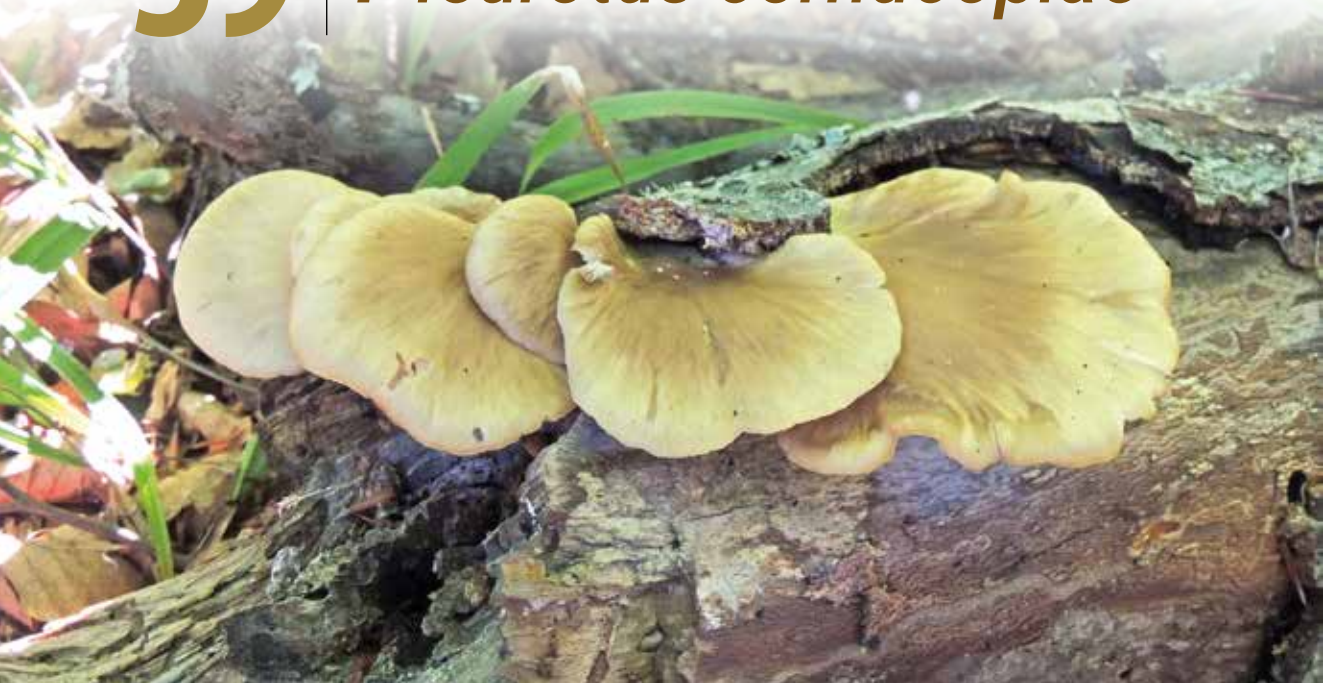
Habitat and Season : It grows as a semi-parasite on coniferous and broad-leaved tree trunks. They usually grow from one point in clusters on top of each other in the form of shelves. It grows in spring and autumn.

Possible Confusions : Similar to *Lyophyllum decastes* and *Tapinella atrotomentosa*. The connection, pleasant smell and white spores of the fungus *Pleurotus ostreatus* with wood are defining for the species.

Commercial Use : It is generally collected and sold locally.



39 | *Pleurotus cornucopiae*



Order : Agaricales

Family : Pleurotaceae



Macroscopic Features

Cap : It has a diameter of 5–15 cm, first convex and then turns into a fan shape. Usually the edges are wavy or slit. When young, the cuticle is cream then turns whitish, then flat and ocher colour and finally yellowish brown.

Gills : Decurrent. Colour ranges from white to dull flesh.

Stipe : 20–50 × 1–2,5 cm, usually lateral and has more than one stem in one common base. At first it is whitish, then takes on the same colour as the cap.

Flavour and Odour : Tastes good, and smells like ammonia.

Flesh : It is elastic and white flesh.



Microscopic Features

Spores : Colourless, hyaline, semi-digested, $8-11 \times 3.5-5 \mu\text{m}$.

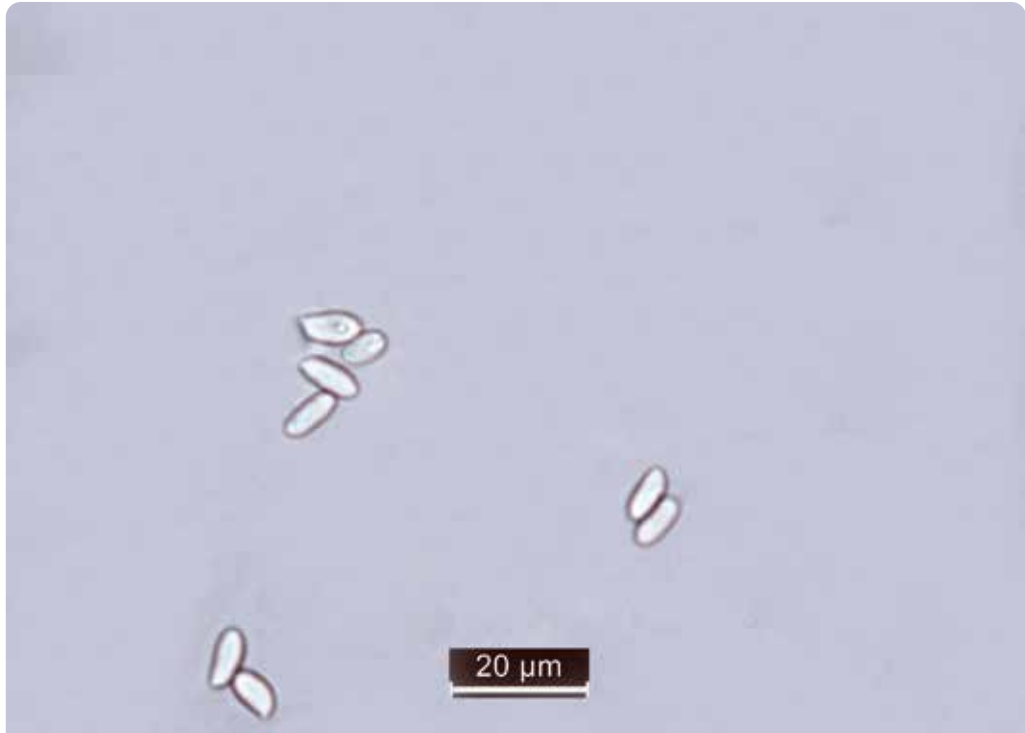


Figure 41: *Pleurotus cornucopiae* spores under the microscope.

Habitat and Season : It grows in dense clusters on the trunks of deciduous trees. Especially oak, beech and hornbeam. It grows in spring and summer.

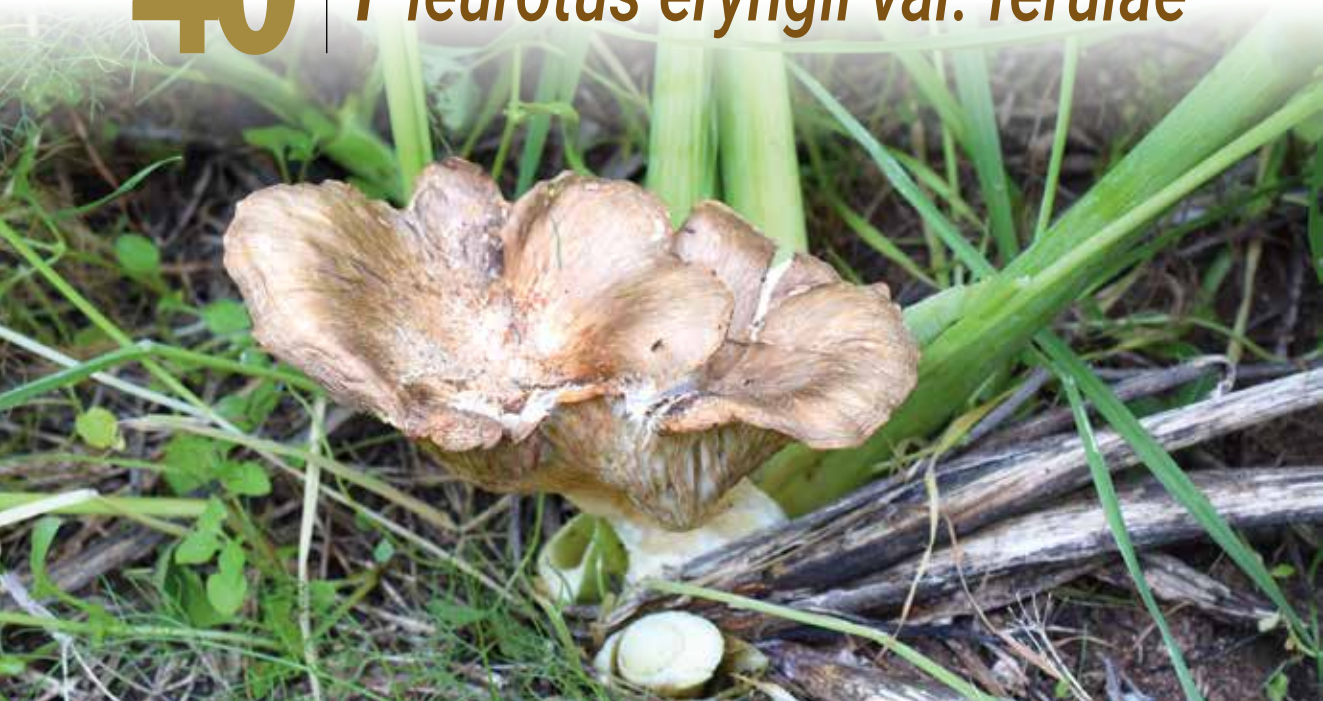
Possible Confusions : This species is similar to *Pleurotus ostreatus*. Both species can be eaten.

Commercial Use : It is generally consumed in the domestic market.



40

Pleurotus eryngii var. *ferulae*



Order : Agaricales

Family : Pleurotaceae



Macroscopic Features

- Cap** : It has a diameter of 5–30 cm, convex first, becoming irregular funnel when development progresses. The cap edges are curved towards the lamellae, the cuticle is white in young specimens and off-white to yellowish white in developed ones. Young mushrooms have a smooth surface, mature mushrooms have a cracked surface.
- Gills** : Decurrent. Gills are white when young, turn yellowish white as the development progresses, and run down the stipe, dense and forked.
- Spore deposit** : White.
- Stipe** : 2–4 × 1,5–2,5 cm central or lateral. White at first and turns yellowish white as development progresses.



Flavour and Odour : It has a very pleasant taste and smell.

Flesh : It is white, juicy, firm, fleshy, thick.

Microscopic Features

Spores : Cylindrical – elliptical, protruding one end, straight, hyaline, oil droplet, $11-13 \times 4.5-6 \mu\text{m}$

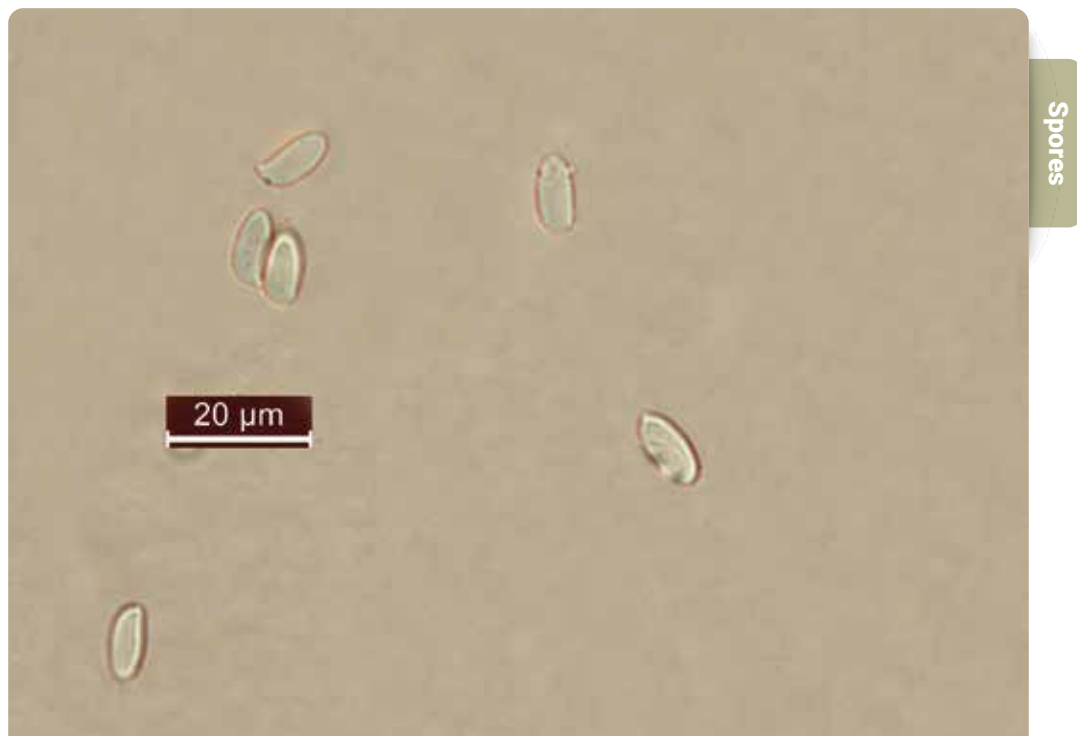


Figure 42: *Pleurotus eryngii* var. *ferulae* spores under the microscope.

Habitat and Season : Mycorrhizal with *Ferula szowitziana*. Especially in steppe areas, it occurs abundantly in spring.

Possible Confusions : *Pleurotus eryngii* mycorrhizal with *Eryngium* sp., *Ferula* sp., *Thapsia* sp., *Laserpitium* sp. and *Elaeoselinum* sp. *Pleurotus eryngii* var. *ferulae* fungus only associates with *Ferula szowitziana*.

Commercial Use : Grows and it is consumed extensively in Eastern Türkiye.



41

Rhizopogon roseolus



Order : Boletales

Family : Rhizopogonaceae



Macroscopic Features

- Basidiocarp** : Small potato tuber like with a diameter of 3–8 cm, kidney-shaped flattened from the top or irregularly shaped in many different shapes. It is off-white in young, pinkish or reddish in developed ones. Fine veining occurs on its surface. The peridium is thick and can easily peel off the gleba. In the part where it connects to the soil, a dense network of white mycelium is formed.
- Gleba** : It is flexible like a sponge, turns dirty white in young, yellow in developed ones and turns green in full maturity. When pressed, its colour becomes pink.
- Flavour and Odour** : It has no taste and odour when young. It smells like apples as it ripens. The scent gets worse as they age.



Microscopic Features

Spores : Elliptical, hyaline, smooth, $7-9 \times 3-3.5 \mu\text{m}$.

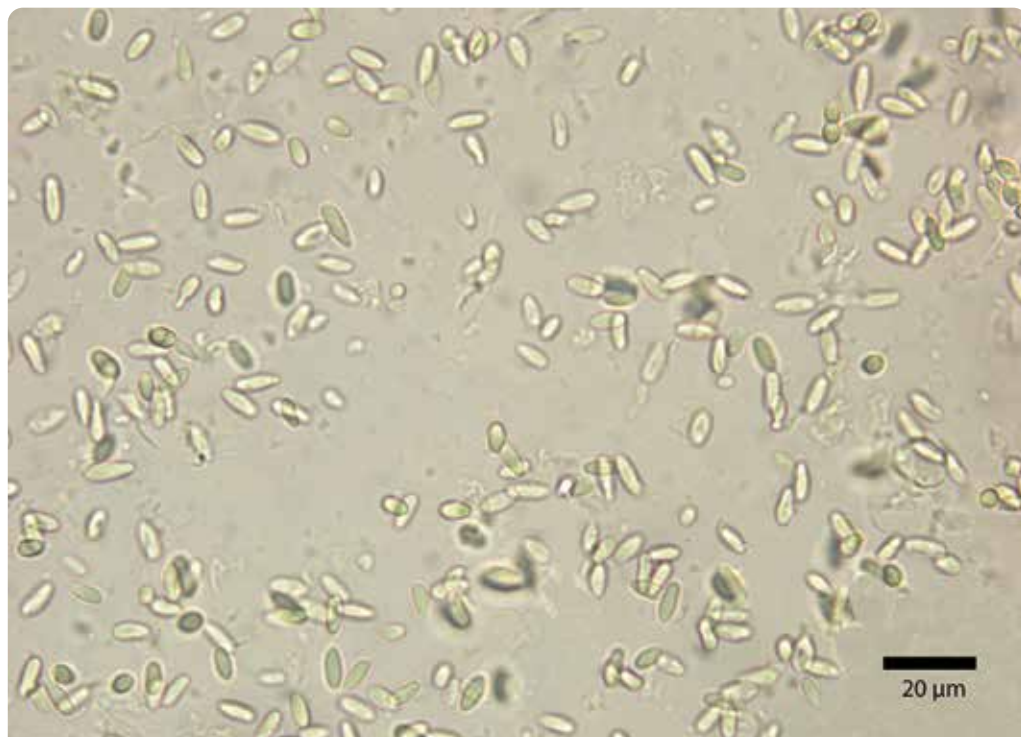


Figure 43: *Rhizopogon roseolus* spores under the microscope.

Habitat and Season : It grows under the ground in coniferous tree forests, especially in pine forests, in groups just after the autumn and spring rains.

Possible Confusions : It is different from *Rhizopogon luteolus* due to its pinkish colour.

Commercial Use : It grows abundantly in larch and red pine stands. It is generally consumed in the domestic market.



42

Russula aurea



Order : Russulales

Family : Russulaceae



Macroscopic Features

Cap : 5-10 cm diameter, from convex to convex-plane, sunken in the centre. Cuticle is rough, adhered, slightly separable, red, orange red with chrome yellow, darker in the centre.

Gills : Free; the widely spaced gills are ochre with yellow edges.

Spore deposit : Ochre yellow

Stipe : The stipe is up to 3–9 cm long and 1–2 cm diameter, cylindrical and white or cream to golden-yellow.

Flavour and Odour : It has a distinctive light and pleasant odour; mild taste.

Flesh : It is fragile and white-lemon yellow in colour.



Microscopic Features

Spores : 7-9 x 6-8 μm .

Habitat and Season : It occurs under deciduous trees from spring to late autumn.

Possible Confusions : One of *Russula* species whose identification is quite easy due to its yellow lemon gills, red cap and sweet flavour. In order not to confuse it with other bitter-vomiting red russula species, all its features should be thoroughly examined and should not be consumed without being sure.

Commercial Use : It is a delicious *Russula* that can be eaten by cooking with many alternative cooking methods and should be recognized by mushroom hunters. It gives fullness to the palate with its fleshy structure and unique taste.



43

Russula cyanoxantha



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : 7-16 cm diameter, from convex to flattened, with sunken centre. Cuticle is viscous when young and then bright, showing multitude of colours: dark olive green, purple, with pink, lilac, ochre or yellowish dyes, lighter in the centre with ochre or grey-plumb tones.
- Gills** : Adnate. Gills feel greasy to the touch, are flexible and do not break.
- Spore deposit** : White.
- Stipe** : The stipe is pure white, slightly convex underneath, from 5–11 cm in height and 1–4 cm in diameter.



Flavour and Odour : It has a mild, nutty taste.

Flesh : White. Under the cuticle, shows the same colour as the cap. When cut it becomes a bit greyish.

Microscopic Features

Spores : Broadly ellipsoidal, warty, 6-9 x 5-7 μm .

Habitat and Season : It grows in deciduous or mixed forests, appearing from May to November.

Possible Confusions : It could be confused with *R. virescens*, which shows a cracker and areolate cuticle and whose flesh turns pink-orange with FeSO_4 . The cap of the grey-green *Russula grisea* is more blue-grey.

Commercial Use : It is not a well-known and collected species in our country. Sold in some local markets.



44 | *Russula delica*



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : 8–16 cm in diameter, first convex, in the form of a funnel when development progresses. Cuticle white when young, then in shades ranging from dirty cream to light earth colour. It is often found half buried. As a result, the caps often trap the surrounding leaf debris and soil on their rough surfaces.
- Gills** : White when young, then grey – cream tones. The gills are decurrent, and are quite close.
- Spore deposit** : Creamy white.
- Stipe** : 2–6 × 2–4 cm, cylindrical, tapering towards the base. Firm when young, then hollow, surface and white, then turns earthy colour.



Flesh : It is white and does not change colour on cutting.

Flavour and Odour : It has a pleasant, fruity smell when young, but at maturity it may develop a faintly fishy or unpleasant smell. It has a spicy, taste.

Microscopic Features

Spores : Hemisphere - broad elliptical shape, surface reticulate ornamented, amyloid, $8-11 \times 8-10 \mu\text{m}$.



Figure 45: *Russula delica* spores under the microscope.

Habitat and Season : It grows in autumn, in fir, oak, beech-larch forests.

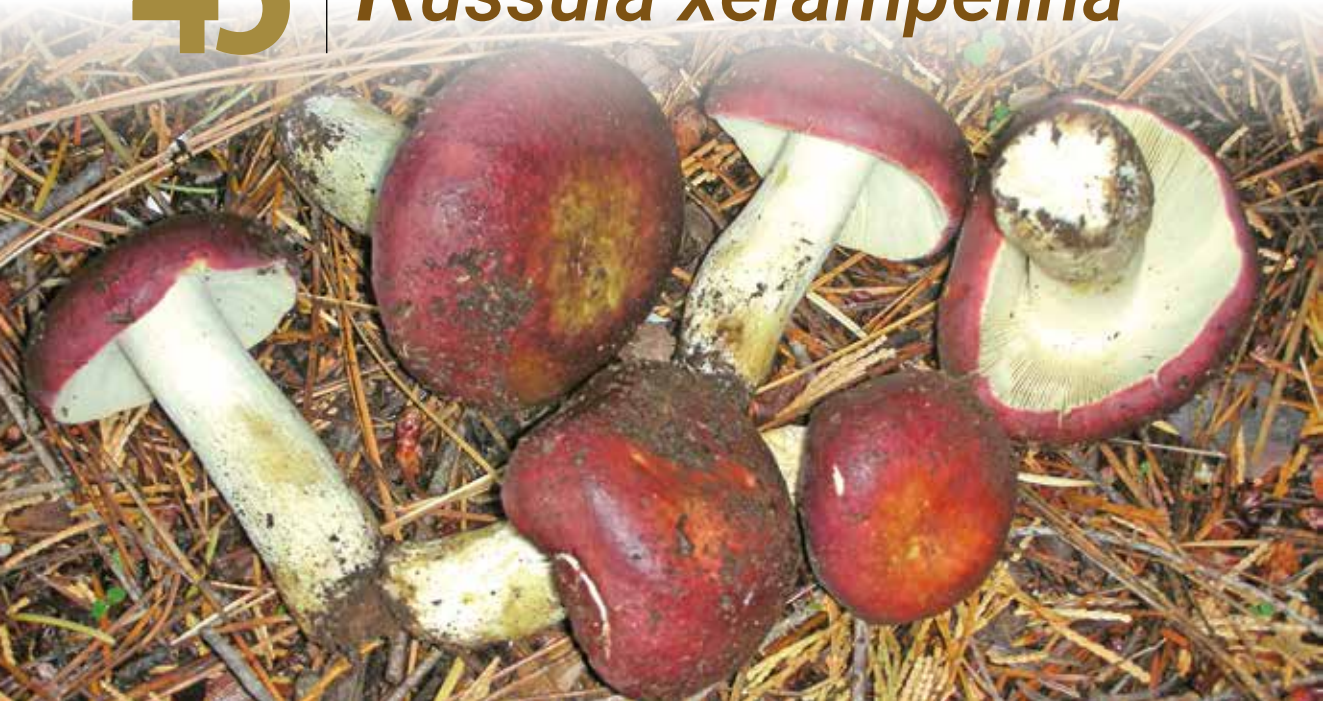
Possible Confusions : It is similar *Russula chloroides* and *L. piperatus*, which are white and cream in colour.

Commercial Use : It is a mushroom known throughout Türkiye. It is consumed fresh, and also pickled in the Black Sea region.



45

Russula xerampelina



Order : Russulales

Family : Russulaceae



Macroscopic Features

- Cap** : 6–12 cm wide, domed, flat, or with a slightly depressed centre, and sticky. Smooth cuticle, vinous lilac with ochrous areas (colour of the vine leaves), to carmine red. The colour is variable, most commonly purple to wine-red, or greenish, and darker towards the centre of the cap. There are fine grooves up to a centimetre long running perpendicular to the margin.
- Gills** : Free, sinuated, close, cream coloured that turn creamy-yellow with age.
- Spore deposit** : creamy-yellow to ochre.



- Stipe** : 4-8 x 1,5-3 cm, full, firm, white with vinous reflections. The stipe is wide, is cylindrical, white or sometimes with a reddish blush, turning ochre or brownish with age.
- Flesh** : Thick, white, brown when cut.
- Flavour and Odour** : Cooked seafood and sweet. *Russula xerampelina* has a characteristic odour of boiled crustacean. The crab, or shrimp taste and smell will persist even after cooking.

Microscopic Features

- Spores** : Broadly ellipsoidal, 8-9 x 6.5-8 μm , hyaline, warty, amyloid.
- Habitat and Season** : Broad-leaved and conifers forests. It grows in Autumn.
- Possible Confusions** : This *Russula* is considered one of the best edible species of its genus. More reddish-capped forms could be confused with the sickener (*Russula emetica*). *Russula emetica* has a white stipe and gills; greener-capped specimens may resemble the also edible *R. cyanoxantha*.
- Commercial Use** : It is not a well-known species to the locals. It is sold in public markets in the Black Sea Region.



46

Sarcodon imbricatus



Order : Thelephorales

Family : Bankeraceae



Macroscopic Features

- Cap** : 10-30 cm diameter, fleshy, flat-convex, depressed in the centre to infundibuliform in old age and with lobed edge, grey, brown or dark brown, covered in large squared scales, concentrically arranged and decreasing in size towards the periphery.
- Teeth** : Up to 1 cm long, decurrent, at first dirty white turning brown-purple over time, very brittle with touch.
- Spore-deposit** : Light brown.
- Stipe** : 3-12 long and 0.5-3 cm diameter, cylindrical, widened at the base, velutinous, at first whitish, with brown reflections in old age.



Flavour and Odour : Taste mild or bitter; Odour not distinctive.

Flesh : Whitish in the cap, slightly brown at the base of the stipe.

Microscopic Features

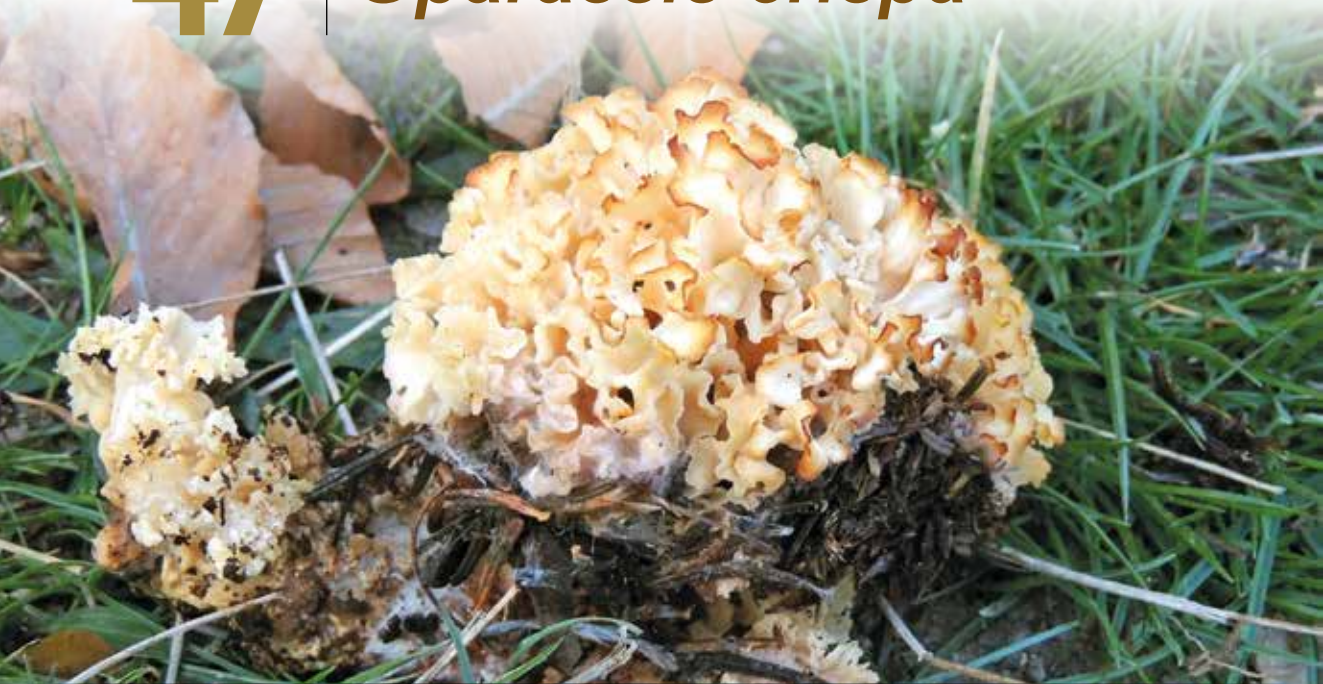
Habitat and Season : It grows in autumn in coniferous forests.

Possible Confusions : Its scales on the cap and the teeth of the hymenium are unmistakable typical features of the species.

Commercial Use : Edible but poor quality. It is recommended to remove water from cooking to avoid the bitter taste.



47

Sparassis crispa

Order : Polyporales

Family : Sparassidaceae



Macroscopic Features

Carpophore : It is hemispherical and cushion-shaped, 10–25 × 10–20 cm in size, it consists of vertical, wavy, numerous and dense branches emerging from the common stem, the ends of the branches are leafy ends, the surface is smooth, cream-coloured, with age, earthy, brown tones. Due to the ramifications, when mature it resembles a cauliflower.

Hymenium : The lobes, which carry the spore-bearing surface, are flat and wavy, resembling pasta noodles.

Flesh : When young they are tough and rubbery but later, they become soft. White to creamy yellow.

Flavour and Odour : The odour is pleasant and the taste of the flesh is mild.



Microscopic Features

Spores : Oval, flat, hyaline, $4-6 \times 3-5 \mu\text{m}$.

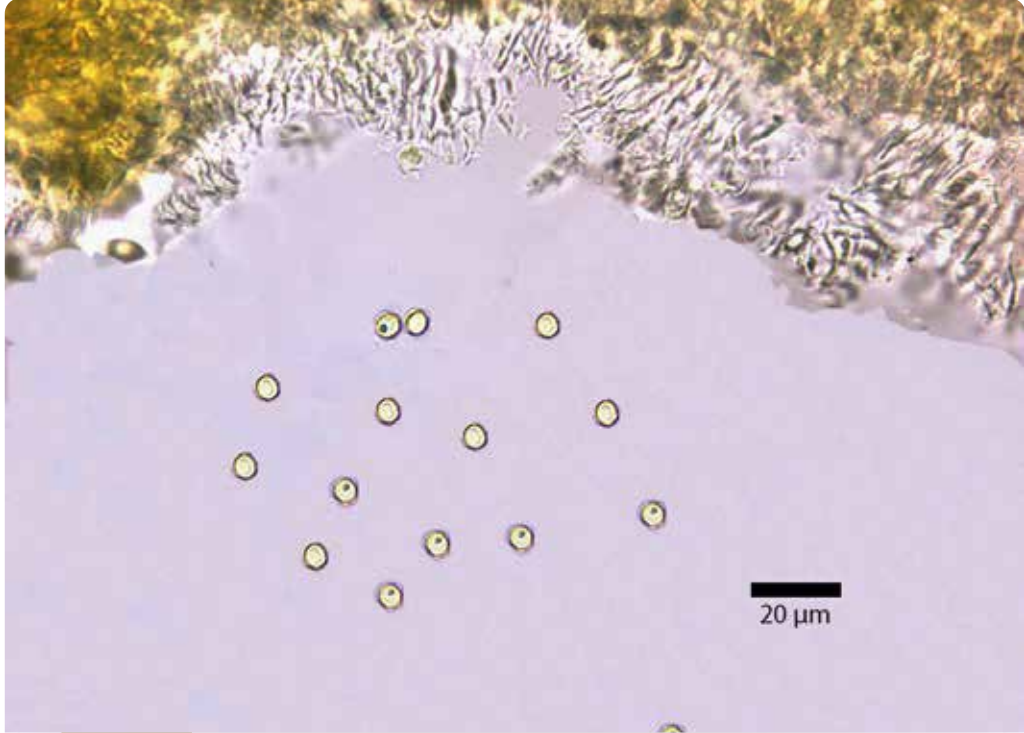


Figure 46: *Sparassis crispa* spores under the microscope.

Habitat and Season : It grows in coniferous and mixed forests, especially on tree stumps and trunks such as beech, hornbeam and chestnut. It grows from september to december.

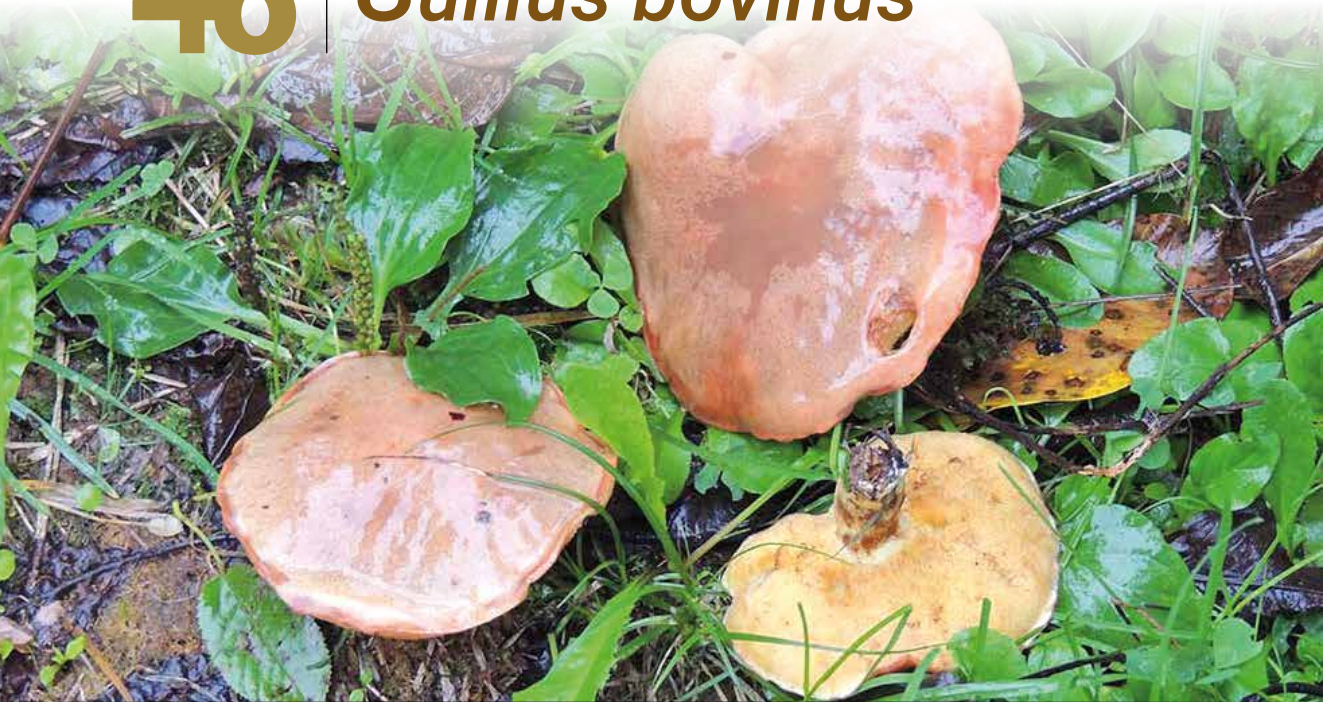
Possible Confusions : When consumed without cooked thoroughly, it causes digestive problems.

Commercial Use : It is common in the Marmara and Black Sea regions. It is consumed fresh.



48

Suillus bovinus



Order : Boletales

Family : Suillaceae



Macroscopic Features

- Cap** : 3–12 cm diameter, convex and curved edges when young, then a straight and irregular wavy shape. Its surface is smooth, slippery when moist, sticky when dry, orange-brown tones.
- Pores and Tubes** : Tubes semi-decurrent. The large tubes, which are yellow first, become darker as they age. Tubes are 3–10 mm long and angular.
- Spore deposit** : Olive-brown colour.
- Stipe** : The stipe is 3–10 x 1-2 cm, light orange colour; same colour as cap. Cylindrical and tends to be narrower towards the base. It has a thinner stem than other *Suillus* species and does not have a ring.



Flavour and Odour : Its taste and scent is reminiscent of colour; fruit.

Flesh : Whitish to yellowish, no change when cut.

Microscopic Features

Spores : The elliptical to spindle-shaped spores have dimensions of 8–10 x 3–4 μm .



Figure 47: *Suillus bovinus* spores under the microscope.

Habitat and Season : It grows abundantly in Fir-Beech and pine forests from late summer to autumn

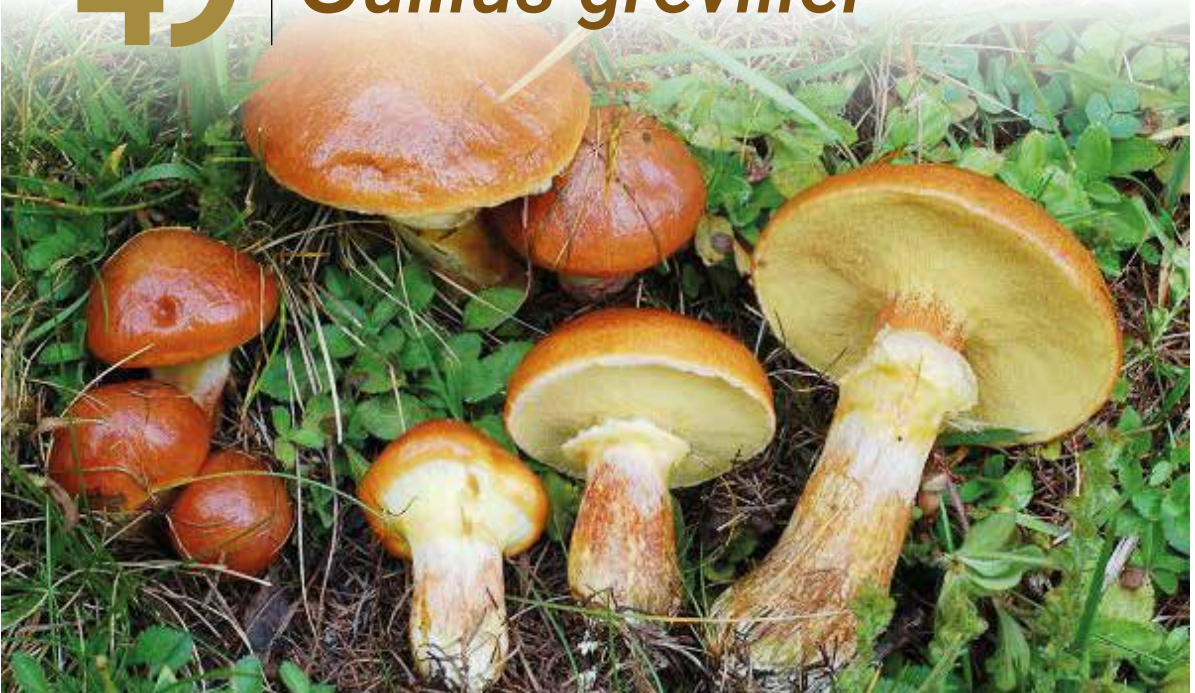
Possible Confusions : It is distinguished from other *Suillus* species by the thinness of the stipe and the wide tubes under the cap.

Commercial Use : It is a common species that is consumed fresh or dried. *Suillus bovinus* tastes mild and is edible, although it is not highly regarded. Its flavour is made more intense by drying.



49

Suillus grevillei



Order : Boletales

Family : Suillaceae



Macroscopic Features

- Cap** : 4–12 cm in diameter, first hemispherical, then flattened. Sticky when surface is moist, slightly slippery when dry, shiny golden yellow – lemon yellow and orange yellow, centre is darker.
- Pores** : It turns wax yellow, then cinnamon brown. The tubes are 5–10 mm long.
- Spore deposit** : Ochre.
- Stipe** : 4–10 × 1–2 cm, cylindrical, slightly thickening towards the base, the surface is light yellow with cinnamon brown granules on it.
- Ring** : Cream-white . This ring fades over time.



Flesh : Light yellow to white, darker under the stipe.

Flavour and Odour : Spicy scented and flavour. It has an odour reminiscent of crushed *Pelargonium* leaves.

Microscopic Features

Spores : Elliptical - spindle-shaped, straight, light greenish yellow, 6.5–10 × 3–4 μm .



Figure 48: *Suillus grevillei* spores under the microscope.

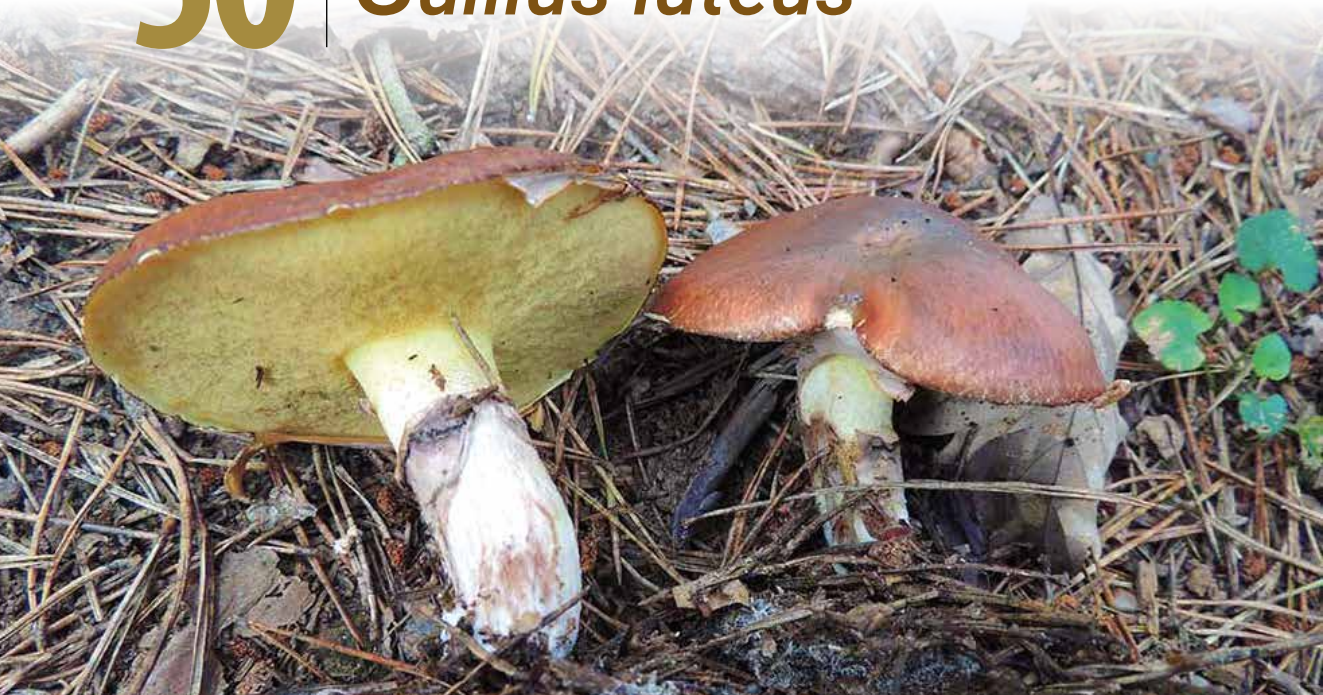
Habitat and Season : It is found in coniferous forests, forests formed by pine species, fir species and cedar trees. It grows in the soil of mixed forests, not always under larch with which it lives in symbiosis. It grows from June until November.

Possible Confusions : *Suillus grevillei* is an edible mushroom if the slimy cuticle is removed off the cap.

Commercial Use : It is a commonly used species in local markets. It is consumed fresh.



50 | *Suillus luteus*



Order : Boletales

Family : Suillaceae



Macroscopic Features

- Cap** : 4-10 cm in diameter, always convex, chestnut brown or dark chocolate brown, turns rust brown when ripe. It is sticky and slippery. It is smooth and glossy even when dry, and the cuticle is easily peeled off.
- Pores and Tubes** : Yellowish brown, easily separated from the flesh of the cap, broad and angular, tubes 3-8 mm long. Adnate or subdecurrent. The pores are tiny, numbering 3 per mm in young specimens and 1-2 per mm in maturity. The tiny, circular pores are initially yellow but turn olive to dark yellow with maturity.
- Spore deposit** : Ochre or clay coloured.
- Stipe** : 5-10 × 1-2 cm, cylindrical, light yellow and above covered with brown dots, first cream white, then violet tone dark reddish brown and has a long-lived ring.



- Ring** : *Suillus luteus* is one of the few members of the genus *Suillus* with a ring. Above the ring, the stipe features glandular dots—minute clumps of pigmented cells. Below the ring, the stipe is dingy white. In humid conditions, the ring has a gelatinous texture.
- Flesh** : It is white, spongy and thick. The white flesh of the entire mushroom does not discolour when damaged, and it is soft—particularly in mature specimens.
- Flavour and Odour** : It has a “pleasant” taste and lacks any distinctive odour.

Microscopic Features

- Spores** : Elliptical-spindle-shaped, flat, light yellow, oil-droplet, and $7-10 \times 3-4 \mu\text{m}$.



Figure 49: *Suillus luteus* spores under the microscope.

- Habitat and Season** : It is abundant in coniferous forests formed by coniferous trees, especially under pine species. It grows in late summer and autumn.
- Possible Confusions** : Similar to *S. grevillei* and *Gomphidius glutinosus*. The cuticle on the cap peels off easily and does not change colour when damaged.
- Commercial Use** : It is a commonly used species in local markets. It is consumed fresh.



51 | *Terfezia boudieri*



Order : Pezizales

Family : Pezizaceae



Macroscopic Features

Ascocarp : 6–10 × 5–6 cm in diameter, rounded, with a potato tuber shape. The surface is generally flat, sometimes rough and divided by large grooves. Peridium 1–2 mm thick, can be easily peeled off the gleba.

Gleba : It is reddish-pale brown, sometimes yellowish or rose in colour. bottom part is lighter than the middle and the edges are lighter and have a marble look.

Flavour and Odour : Smell and taste resembles potato.



Microscopic Features

- Asci** : Rounded, 8 spores, hyphal tissue. 60–90 × 55–70 μm .
- Spores** : Hemispherical, with ornamentation, light yellowish, 20–25 μm .



Figure 50: *Terfezia boudieri* asci with spores under the microscope.

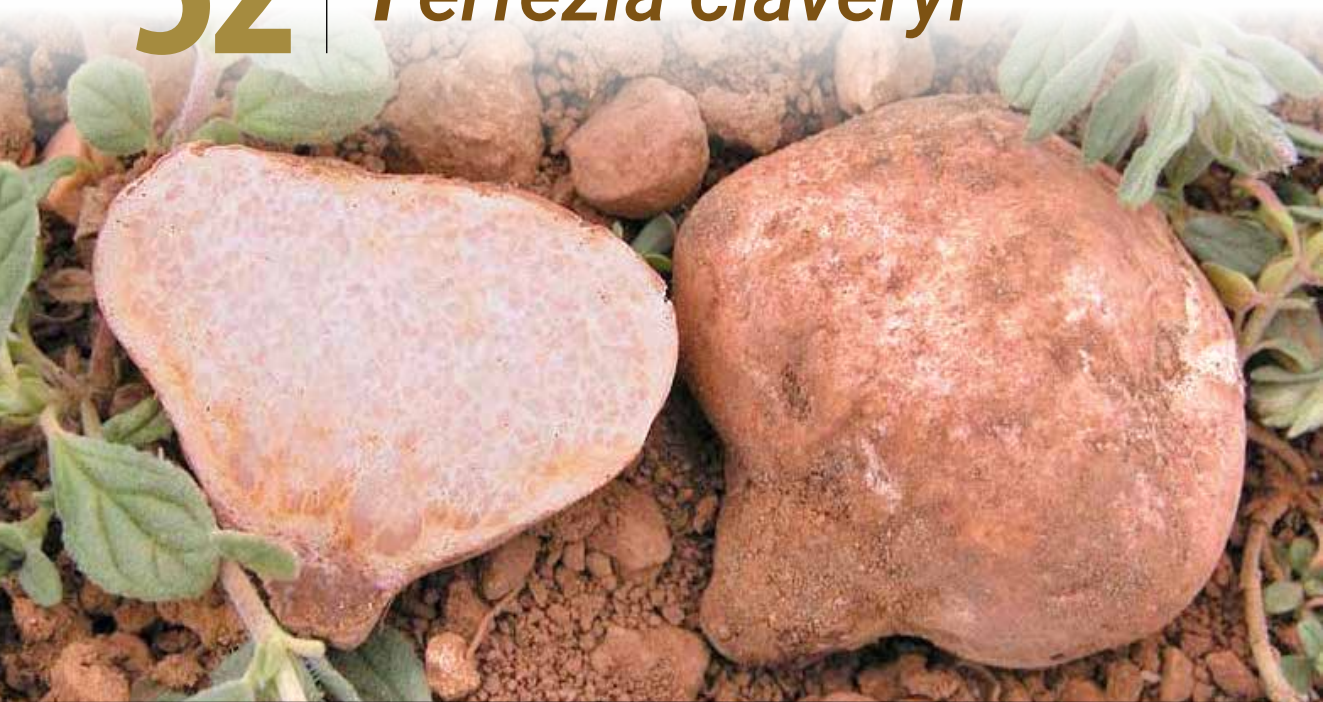
Habitat and Season : It emerges just after the rains in the spring (in April and May), and grows in permeable, sandy soils that have little water holding capacity and dry immediately. It grows abundantly in the steppe areas of Central Anatolia, East and Southeast Anatolia regions, which are not plowed, left in fallow land or in pasture areas. They are mycorrhizal with *Helianthemum* spp. hypogeous fruiting bodies can be found from cracks and swellings they create on the soil surface.

Possible confusions : Similar to *Tuber* and *Picoa* species.

Commercial Use : It is a species well known to local people and named as “desert truffle”. They grow abundantly in the Arabian Peninsula and North Africa.



52 | *Terfezia claveryi*



Order : Pezizales

Family : Pezizaceae



Macroscopic Features

Ascocarp : It is hemispherical, hemispherical-flattened, pear-shaped or with a potato appearance. Its size is up to 10 cm in diameter. The surface turns from light yellowish to yellowish to reddish brown, and in mature specimens to blackish brown.

Peridium : Thick, 0.8–1.2 mm, whitish, turns brown when cut. Hyphae 8–12 μm in diameter, more or less parallel on the surface.

Gleba : It has a whitish or flesh-coloured, then yellowish-reddish, and marble-like veined structure.

Flavour and Odour : Its taste is reminiscent of potatoes and smells of pepper.



Microscopic Features

- Asci** : Rounded, 8 spores. 50–90 × 50–75 μm .
- Spores** : Hemispheric, whitish yellow to yellowish colour, immature almost flattened – warty protrusion, the surface is tubercular in full maturity. Measure 16–23 μm with ornaments.

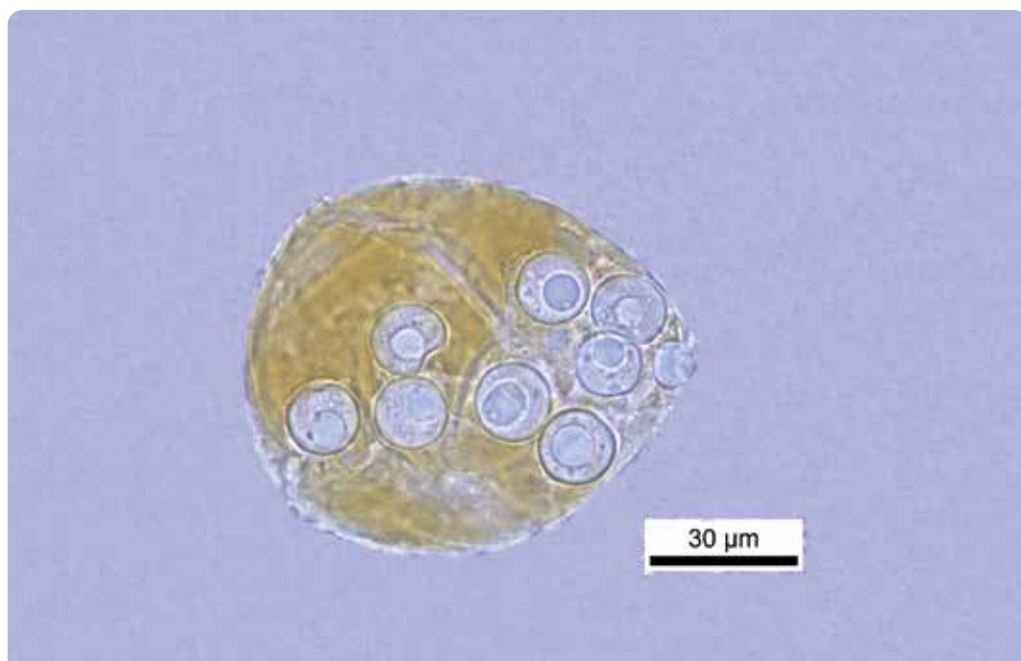


Figure 51: *Terfezia claveryi* ascus with spores under the microscope.

Habitat and Season : It emerges just after the rains in the spring (in April and May), and grows in permeable, sandy soils that have little water holding capacity and dry immediately. It grows abundantly in the steppe areas of Central Anatolia, East and Southeast Anatolia regions, which are not ploughed, left in fallow land or in pasture areas. They are mycorrhizal with *Helianthemum* spp.. The hypogeous fruiting bodies can be found from cracks and swellings it creates on the soil surface.

Possible confusions : It is similar to other hypogeous (growing belowground) mushroom species.

Commercial Use : It is a species well known to local people. Known as “desert truffle” it grows abundantly in the Arabian Peninsula and North Africa.



53

Tricholoma anatolicum



Order : Agaricales

Family : Tricholomataceae



Macroscopic Features

Cap : Diameter of 4–20 cm, first in the form of a knob adjacent to the stipe, then it becomes smooth from a semi-dome shape. White–cream when young, turns yellowish cream as development progresses. The cuticle has a fine wool-like hair, wool-like veins hanging on the edge. In the youth phase of the cap, pale, light brown tones are seen on white. As it matures, it forms cracks, dark brown tones are seen in the middle of the cap, while the light brown and white cracked structure continues as we go down. Since it is usually half covered in the soil, there is soil or mud on the cap.

Gills : Initially pale white, creamy as it matures. It has densely spaced folded gills.

Spore deposit : White.



- Stipe** : 4–10 × 2–5 cm, cylindrical and slightly tapering towards the base. First white, then turns from white to cream yellow. There are fine wool-like veil remains on it. The stipe is surrounded by brown scales, the stipe flesh is hard and full.
- Flesh** : It is thick, white, firm.
- Flavour and Odour** : It is said to have a tar-like scent, smells like cedar leaves, and some say it smells slightly like cucumber. It is a highly edible mushroom. It has an aromatic, natural spicy flavour.

Microscopic Features

- Spores** : Elliptical or hemispherical, colourless, cyanophilic, 6–7.5 × 4–5 µm.
- Habitat and Season** : It is ectomycorrhizal with cedar trees (*Cedrus libani*) and *Astragalus* species in sandy places within cedar trees (*Cedrus libani*) forest. Since cedar forests known as Taurus cedar or lebanese cedar are found in the Taurus Mountains in our country, they are frequently seen in this region, especially at high altitudes. It grows in autumn.

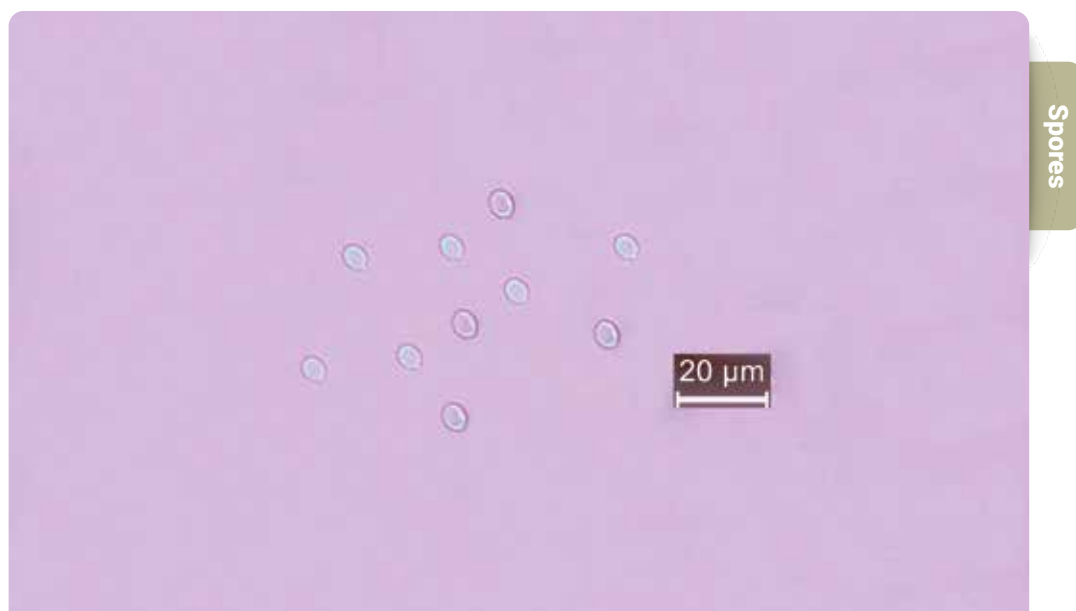


Figure 52: *Tricholoma anatolicum* spores under the microscope.

- Possible Confusions** : It is similar to *Tricholoma caligatum*.
- Commercial Use** : It is endemic to Türkiye. It grows only in cedar forests in the Mediterranean region. Mushrooms are collected fresh in autumn and exported directly to Japan.



54 | *Tricholoma caligatum*



Order : Agaricales

Family : Tricholomataceae



Macroscopic Features

- Cap** : 12-20 cm in diameter, hemispheric when young, the edges are curved inward. When development progresses, it opens and takes the form of an umbrella. In the middle is a blunt bulge. There are greyish yellow or reddish dark brown-chestnut brown scales arranged circularly on the white background. The surface is sticky when moist.
- Gills** : Sinuate, tight, first cream, then reddish-brown spotted as development progresses.
- Stipe** : 10-15 × 1.5-2.5 cm, cylindrical, sometimes in the form of a long barrel, bulging in the middle, tapering towards the base part. The white background is covered with chestnut brown scales curled in the form of snakeskin.
- Ring** : It has a white membrane annulus, a hard structure, always full inside and a fibrous structure.



Flesh : White, soft and abundant.

Flavour and Odour : It is reminiscent of the smell of daffodils. This smell is very strong and can be felt for days if a few mushrooms are left in the room.

Microscopic Features

Spores : Elliptic, hyaline, 5-6 (7) × 4-5 µm.

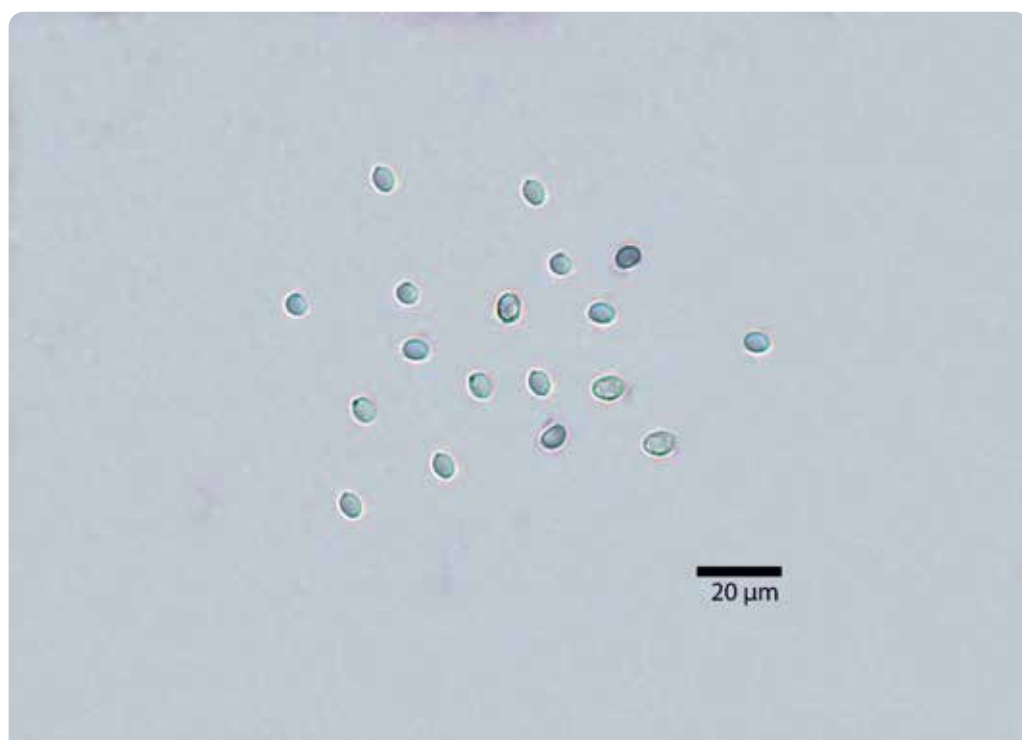


Figure 53: *Tricholoma caligatum* spores under the microscope.

Habitat and Season : In coniferous forests, *Tricholoma caligatum* with pine, rarely fir and spruce species. It grows between October and December.

Possible Confusions : It is distinguished from other *Tricholoma* species due to the scales on the cap and stipe.

Commercial Use : It is well known and consumed in the Mediterranean region. It is exported abroad, especially to Japan.



55 | *Tuber aestivum*



Order : Pezizales

Family : Tuberaceae



Macroscopic Features

- Ascocarp** : Rounded, hemispherical, from 2-4 cm to 6-7 cm. It is hard blackish brown and covered with coarse warts.
- Peridium** : Covered with large, hard, brown - black coarse warts, 4-7 mm wide pyramidal or polygonal, outwardly protruding, tipped and flat.
- Gleba** : Marbled light-brown in full maturity with white veins.
- Flavour and Odour** : Fragrant, pleasant smell.



Microscopic Features

Ascus : Ascus has short stipes, 1-6 spores, mostly 2-4 spores, 80-100 × 60-75 μm.

Spores : Yellowish brown, elliptical hemisphere-shaped, 25-30 × 18-22 μm in size, irregular polygonal mesh.

Habitat and Season : A mycorrhizal species that grows from spring to late summer in mixed forests formed by broad-leaved and coniferous trees up to an elevation of 1,600 m.

Possible Confusions : It is very similar to *Tuber brumale* species.

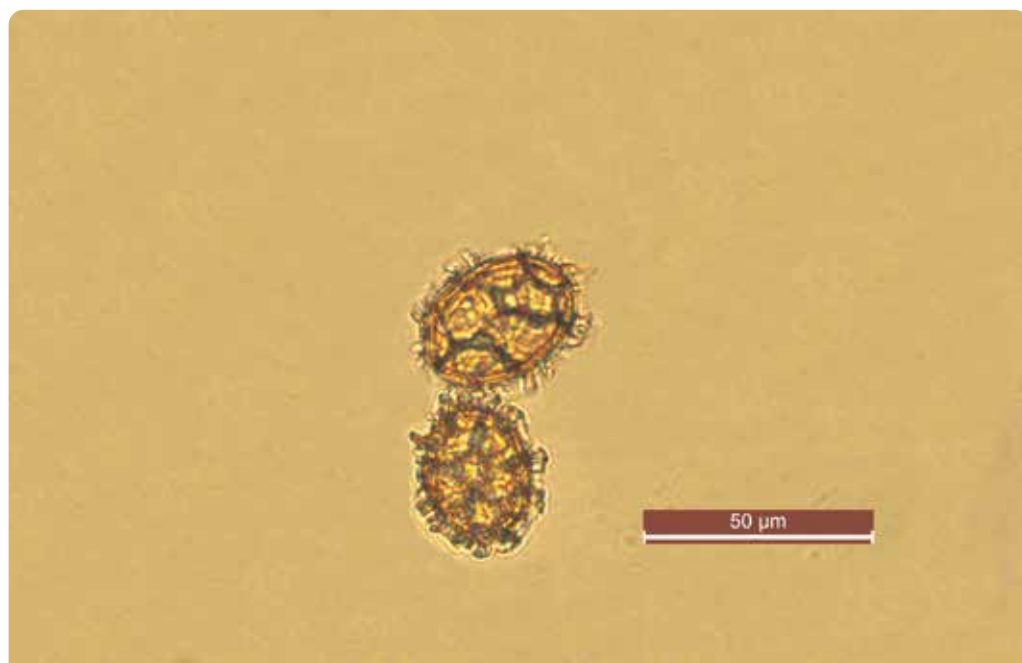


Figure 54: *Tuber aestivum* spores under the microscope.

Commercial Use : It is a species well known and consumed in the European market. Its price is determined daily on the mushroom stock exchange. This species has a large distribution area in Türkiye. With the projects initiated by the General Directorate of Forestry, important steps have been taken to make and spread *Tuber aestivum* plantations. Truffle gardens were established in the Aegean and Mediterranean regions. It is very important that production is stable and that there are no marketing problems. It will be able to make important commercial contributions to the forest villagers in the future.



56 | *Tuber borchii*



Order : Pezizales

Family : Tuberaceae



Macroscopic Features

- Ascocarp** : Tuber-shaped, lobed or gnarled, with a diameter of 2–3 (7) cm. Especially in cavities, the surface may be slightly pubescent. In mature specimens, the surface may be smooth, soiled white to yellowish - brown or reddish-brown, on the surface, reddish spots.
- Peridium** : 0.1–0.2 mm thick, same colour as the inner surface.
- Gleba** : First whitish, then beige, reddish brown and wide whitish irregular veins in between.
- Flavour and Odour** : It is sweetish. The scent is pleasant in young mushrooms but it is disturbing in mature mushrooms.



Microscopic Features

- Ascus** : It contains 1-4 spores, in the form of a hemisphere or elliptical pouch, 70-90 × 50-80 μm, embedded in the hyphae tissue.
- Spores** : Mostly elliptical, but sometimes also the form of a hemisphere, spores are quite variable and 25-40 μm in size. The ornamentation of the spores (4) have 5-8 nets with honeycomb appearance. Spores are brown - yellow, reddish - brown.



Figure 55: *Tuber borchii* spores under the microscope.

Habitat and Season : From the end of November to May, it is possible to find it abundantly in coniferous or broad-leaved forests, in places with low acidity, basic soils on the southern slopes. Since the mushroom grows in the soil, it can be found with specially trained dogs.

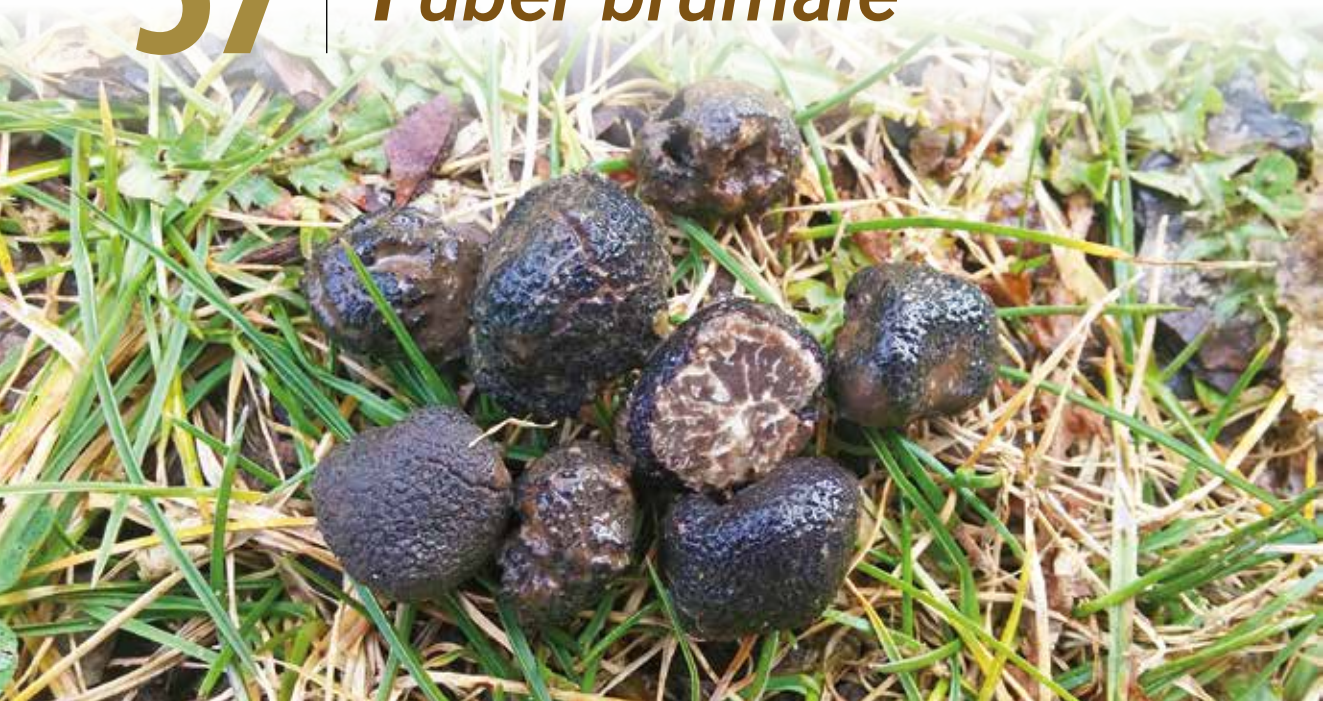
Possible Confusions : Similar to *Tuber dryophilum* and *T. maculatum* species.

Commercial Use : Although white truffles are not as valued as black truffles, they are preferred for their aroma and scent. It is a species known and consumed abroad. It is especially preferred in Italy. It has a wide distribution area in Türkiye and used commercially



57

Tuber brumale



Order : Pezizales

Family : Tuberaceae



Macroscopic Features

- Ascocarp** : Hemispherical or irregular lump-shaped, 3–5 (10) cm in diameter, blackish in colour and coarse warts.
- Peridium** : It is covered with large brown warts, the warts are irregular polygonal in shape, sometimes reddish brown at the base, 2–3 mm wide and not very pronounced, but flattened in the centre. There are wavy longitudinal slits on the surface.
- Gleba** : Brown – grey or blackish grey, whitish or beige.
- Flavour and Odour** : It has a strong, permanent, pleasant and elegant hazelnut smell.



Microscopic Features

- Ascus** : Hemispherical, with short stipes or without stipes, 65–85 × 50–70 μm.
- Spores** : Elliptic, yellowish brown or hazelnut brown, 26–30 × 16–21 μm, densely densely ornamented with pointed spines, that are spaced, hard and sharp, 3–5 (6) μm long.



Figure 56: *Tuber brumale* ascus with spores under the microscope.

Habitat and Season : It is a fairly common species under various deciduous trees in autumn and winter.

Possible Confusions : *Tuber brumale* lives in the same bioms as *Tuber melanosporum* and associates with the same trees. *T. brumale* sometimes have more numerous and thinner veins, but you can distinguish from *T. melanosporum* veins because *T. brumale* veins remain always white.

Commercial Use : It is a species well known and consumed in the European market. It is defined as “Black diamond”. The price is determined daily on the stock exchange.



58 | *Tuber macrosporum*



Order : Pezizales

Family : Tuberaceae



Macroscopic Features

- Ascocarp** : Generally irregular, lobed, hemispherical, 2-5 cm in diameter, warty, blackish brown.
- Peridium** : Consists of very short pale brownish, very short spiny warts with varying surface sizes. Warts on the fruit body surface are short, so that the truffle appears fairly smooth.
- Gleba** : It turns grey brown, blackish lilac, finally violet brown. The thick, white, dense anastomosed veins are embedded in the gleba.
- Flavour and Odour** : It has a fragrant and pleasant scent. Strong, pleasant, garlicky, like *Tuber magnatum*.



Microscopic Features

- Ascus** : Hemispherical-elliptical, with short stipes, 1-3 (4) spores, mostly 3 spores, 90-120 x 60-80 μm .
- Spores** : Large, brown yellow, 45-55 x 27- 32 μm .
- Habitat and Season** : It grows in winter in broad-leaved forests. It is not very common. *Tuber macrosporum* usually grows in limestone soils and often in clay soils. In Italy, you can find these truffles in the same places as *Tuber magnatum*. They are associated with the roots of several trees: poplars, willows, hazels, oaks and lindens.
- Possible Confusions** : *Tuber macrosporum* is easily recognizable by the large spores and the short and flattened warts. Because the truffle sometimes looks almost smooth it receives the popular name of “smooth black truffle”.
- Commercial Use** : It is a species well known and consumed in Europe, but not very common in Türkiye.



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LITERATURE

- Aa. Vv (2000): Vol. 1. Ascomycetes. Nordsvamp. Copenhagen.
- Aa. Vv. (2001): Flora Agaricina Neerlandica. V. Agaricaceae. Balkema. Rotterdam.
- Ágreda Cabo, T., (2002): Sendas Seteras. Itinerarios Micológicos Por Las Tierras De Almazán, Arcos De Jalón, Berlanga De Duero Y Medinaceli. Adema.
- Allard, V. (2001): I Funghi. Le Ricette Per Cucinarli E Conservarli. Dve Italia Spa. Milano.
- Antonin, V. & Noordeloos, M. E. (2004): A Monograph Of The Genera Hemimycena, Delicatula, Fayodia, Gamundia, Myxomphalia, Resinomycena, Rickenella And Xeromphalina (Tribus Mycenae Sensu Singer. Mycena Excluded) in Europe. Ihw Verlag.
- Bastardo, J., García, A. Y Sanz, M. (2001): Hongos: Setas En Castilla Y León. Valladolid.
- Bayuk, B.G. 2016. Acıpayam (Denizli) Yöresinde Yetişen Makrofunguslar Üzerine Taksonomik Bir Araştırma. Yüksek Lisans Tezi. Pamukkale Üniversitesi Fen Bilimleri Enstitüsü Biyoloji Anabilim Dalı. Denizli.
- Bidaud, A., Moëgne-Loccoz, P., Reumaux, P. (2000): Atlas Des Cortinaires. Pars X. Editions Federation Mycologique Dauphine-Savoie.
- S.A.R.L. Editions F.M.D.S. Meyzieu.
- Bon, M. & Roux, P. (2002): Le Genre Gymnopilus En Europe. Fungi Non Delineati. Pars XVII. Mykoflora. Alassio.
- Bunyard, B.A. 2012. Agaricidal Tendencies: Settling The Debate Tver Cutting Vs. Picking, And The Sustainability Of Wild Mushroom Collecting. Fungi Volume 5:1
- Breitenbach, J. & Kränzlin, F. (2000): Champignons De Suisse. Tome 5. Cortinariaceae. Edition Mykologie. Lucerna.
- Çalışkan, A.S. 2022. Ülkemizin Yabani Mantarları. Ankara.
- Consiglio, G., Papetti, C. (2001): Atlante Fotografico Dei Fungi D'Italia Vol. 2. Associazione Micologica Bresadola. Trento.



- Consiglio, G., Antonini, D., Antonini, M. (2003): Il Genere Cortinarius in Italia. Parte Prima. Associazione Micologica Bresadola. Trento.
- Domínguez Cidón, C. (2002): Setas Y Hongos, Duendes En La Cocina. Editorial Everest. León.
- Erdem, Y. 2018. Mantar Avcısının El Kitabı. Samsun.
- Fry, C., Antonelli, A., & Smith, R. (N.D.). State Of The World's Plants And Fungi. Royal Botanical Gardens - Kew.
- Galli, R. (2001): Le Amanite. Edinatura. Milano.
- Gerhardt, E., Vila, J. & Llimona, X. (2000): Hongos De España Y De Europa. Manual De Identificación. Omega S.A. Barcelona.
- Güngöroglu, C., et. al. (2018). Practicability Of EU Natura 2000 Concept in The Forested Areas Of Turkey, Ankara, Turkey: Turkey Foresters' Association.
- Hagara, L, Antonín, V., Baier, J. (2000): Les Champignons. Gründ. Praga.
- Hawksworth, D.L. 1991. The Fungal Dimension Of Biodiversity: Magnitude, Significance, And Conservation. Mycological Research, 95(6), 641-655.
- Hawksworth, D. L. (2001). The Magnitude Of Fungal Diversity: The 1.5 Million Species Estimate Revisited. Mycological Research. 105(12), 1422-1432.
- Karasüleymanoğlu, K.Ş. 2014. Aydın Yöresinden Toplanan Lactarius Cinsine Ait Türlerin Morfolojik Ve Moleküler Tanısı. Adnan Menderes Üniversitesi Fen Bilimleri Enstitüsü Biyoloji Anabilim Dalı. Aydın.
- Kırk, P. M., Cannon, P. F., David, J. S. & Stalpers, J. A. (2001): Ainsworth & Bisby's Dictionary Of The Fungi. 9ª Edición. Surrey.
- Llamas Frade, B. & Terrón Alfonso, A. (2003): Atlas Fotográfico De Los Hongos De La Península Ibérica. Celarayn. León.
- Læssøe, T., & Petersen, J. H. (2019). Fungi Of Temperate Europe. Princeton University Press.
- Malençon, G. & Bertault, R. (2003): Flore Des Champignons Superieurrs Du Maroc. Tome I. Faculte Des Sciences. Rabat. Editions Bopca. Cannes.
- Malençon, G. & Bertault, R. (2003): Flore Des Champignons Superieurrs Du Maroc. Tome II. Faculte Des Sciences. Rabat. Editions Bopca. Cannes.



- Marren, P. (2012): Mushrooms. British Wildlife Publishing Ltd. Dorset.
- Montecchi, A. & Sarasini, M. (2000): Funghi Ipogei D'europa. Associazione Micologica Bresadola. Trento.
- Moreno, G., Illana, C., Castillo, A. & García, J. R. (2001): Mycomycetes De Extremadura. Campiña Sur.
- Muñoz, J. A. (2000): El Género Leccinum En El Norte De España. Fungi Non Delineati. Pars XIII. Mykoflora. Alassio.
- Neubert, H., Nowotny, W., Baumann, K. & Marx, H. (2000): Die Myxomyceten. Vol. III. Stemonitales. Karlheinz Baumann Verlag. Gomaringen.
- Neville, P. & Poumarat, S. (2004): Amaniteae (Amanita, Limacella & Torrendia) Fungi Europaei 9. Edizioni Candusso. Alassio.
- Noordeloos, M. E. (2004): Entoloma S.L (Suppl.). Fungi Europaei 5a. Edizioni Candusso. Alassio.
- Ojer, B., Olaizola, J., De La Parra, B., Oria De Rueda, J. A., Gallo, J. M. (2002): Ecoturismo En La Valdorba. Paseos, Setas Y Gastronomía. Micovaldorba. Programa Life.
- Ortega, A., Linares, E. (2000): Setas Y Trufas. Los Libros De La Estrella. Granada.
- Oyanedel, R., Hinsley, A., Dentinger, B. T., Milner-Gulland, E., & Furci, G. (2022). A Way Forward For Wild Fungi In International Sustainability Policy. Conservation Letters.
- Palazón, F. (2001): Setas Para Todos (Pirineos – Península Ibérica) Guía Práctica De Identificación. Editorial Pirineo.
- Papetti, C., Consiglio, G., Simonini, G. (2000): Atlante Fotografico Dei Fungí D'italia Vol. 1. Associazione Micologica Bresadola. Trento.
- Reina Domenech, S. (2000): Trufa, Truficultura Y Selvicultura Trufera. Mundi-Prensa. Madrid.
- Reumaux, P., Moëne-Loccoz, P. (2003). Les Russules Émétiques. Fédération Mycologique Dauphiné-Savoie. Bassens.
- Riousset, L. Et G., Chevalier, G., Bardet, M. C. (2001). Trufes D'europa Et De Chine. Inra Editions. París.



- Robich, G (2002): *Mycena D'europa*. Associazione Micologica Bresadola. Trento.
- Ruiz, J.M. & Ruiz Pastor, E. (2004): *Guía Micológica*. Tomo 2. Género Amanita En España.
- Sánchez, J. A., Flórez, J., Sierra, J. L., Guerra, B. Y Chamorro, M. (2004). *Los Hongos: Manual Y Guía Didáctica De Micología*. León, España: Irma, S.L.
- Sesli, E., Ve Denchev, C.M. (2008). Checklists Of The Myxomycetes, Larger Ascomycetes, And Larger Basidiomycetes In Turkey. *Mycotaxon*, 106 (2008), 65.
- Sills, J. (2021, 07 23). Science. Retrieved From Science.Org: <https://www.science.org/doi/10.1126/science.abk1312>
- Ulloa, M. & Hanlin, R. (2000). *Illustrated Dictionary Of Mycology*. The American Phytopathological Society. Minnesota.
- Asturnatura: <https://www.asturnatura.com/guia-hongos-setas.html>
- Catalogue Of Life: <http://www.catalogueoflife.org/annual-checklist/2016/browse/tree>



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