

EYEWITNESS  HANDBOOKS

# MUSHROOMS

The visual guide to more than 500 species of mushroom from around the world



Winter Polypore



Common Stump Psathyrella



Fly Amanita



Mottled Poison Cort



Green Stain Cup



Luminescent Panellus



Crimson Wax Cap

Yellow-Banded Cort

nas Læssøe

Gary Lincoff

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# MUSHROOMS





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# MUSHROOMS

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DK PUBLISHING, INC.



## A DK PUBLISHING BOOK

### Important Notice

The author and publishers strongly advise anyone gathering fungi for eating to seek the help of an experienced mycologist. Never eat any fungus unless you are 100% certain of its identity. We accept no responsibility for readers who do not follow this advice.

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First American Edition, 1998

2 4 6 8 10 9 7 5 3

First published in the United States by  
DK Publishing, Inc. 95 Madison Avenue  
New York, New York 10016

Visit us on the World Wide Web at  
<http://www.dk.com>

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Dorling Kindersley Limited, London

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Læssøe, Thomas.

Mushrooms / by Thomas Læssøe and  
Gary Lincoff. -- 1st American ed.

p. cm. -- (Eyewitness handbooks)

Includes index.

ISBN 0-7894-3286-2 hardcover

ISBN 0-7894-3335-4 flexibinding

1. Mushrooms--Identification.

2. Mushrooms--Pictorial works.

I. Lincoff, Gary. II. Title. III. Series.

QK617.L248 1998

579.6--dc21

97-44418

GIP

Reproduction by Colourscan, Singapore  
Film output by The Right Type, England  
Printed and bound in Singapore  
by Kyodo Printing Co.

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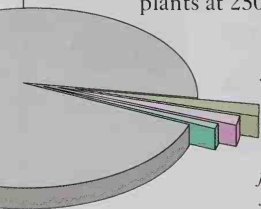


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## INTRODUCTION

*The fungal kingdom is enormous, with fungi occurring in all habitat types all over the world. Ranging in size from microscopic yeasts to large, fleshy mushrooms, fungi also have highly diverse lifestyles, some forming beneficial relationships with living plants, others degrading or even killing their hosts. All play a vital role in the processes that govern life on our planet.*

THE STUDY of the fungal kingdom is referred to as mycology. Until comparatively recently, fungi were simply considered to be a lower form of plant life and were studied as part of botany. They were also often regarded with suspicion due to their habit of appearing seemingly out of nowhere after rain. These factors perhaps help explain why there are so many fungi as yet undescribed, although the sheer volume of species is also an important reason. Current estimates put the number of species in the fungal kingdom at approximately 1.5 million, compared to, for example, flowering plants at 250,000 species.



### KEY

- Macrofungi
- Rusts, smuts, molds
- Lichens
- Not described

### ◁ FUNGUS COUNT

*This pie chart represents the world's 1.5 million species of fungi. The "slices" show species identified so far: 28,700 macro- (fruitbody-forming) fungi; 24,000 rusts, smuts, and molds, and 13,500 lichens.*

### LICHENS ▷

*A lichen is a compound organism, the result of an association between a fungus and algae. Lichens survive on nutrients filtered from the air, aided by the photosynthesis of the algal partner. They also take up air pollutants, so are useful indicators of air quality. The picture shows the very common lichen Yellow Scales (*Xanthoria parietina*).*

Mycologists believe that only about 80,000 of these species have been properly documented – fewer than five percent of the estimated total number in existence. Of the undescribed species up to this point, many are thought to inhabit tropical rain forest areas, but even in much more accessible regions such as northern Europe, which have been quite closely studied, new species are still being discovered, including some that are large and fleshy.



### △ FLY AMANITA

*The colorful but poisonous Amanita muscaria is perhaps the best known of all fungus species.*

### SECRET LIFE

Most of us are familiar with mushrooms and toadstools, found mostly in wooded areas in the fall, but fewer people are aware that each of these is simply the "fruitbody" of a much larger organism



**USEFUL FUNGI** ▷

*Fungi are an essential part of life, playing vital roles in many areas. They are used as food, as flavoring, and to produce alcohol. Antibiotics are made from them, and they contain enzymes that are used in detergents.*

**DETERGENT**

*The cleaning agents in detergents contain enzymes that have been extracted from fungi.*

**PENICILLIN**

*Penicillium molds produce a chemical that kills bacteria and is used in antibiotics.*

**BLUE CHEESE**

*The flavoring in blue cheese is produced by the mold *Penicillium roqueforti*.*

**SALAMI SAUSAGES**

*Salami is flavored and protected by the mold *Penicillium nalgioense*.*



that is concealed in the soil, wood, or other material (substrate) on which the fruitbody is growing. Fruitbodies are produced to enable the dispersal of spores, by which fungi reproduce. However, there are many other species that never produce fruitbodies. Most of these are molds, such as those that occur on old foods like stale bread.

**MACROFUNGI**

Only those fungi that produce more or less conspicuous fruitbodies are featured in this book. Mycologists refer to them as "macrofungi," but most are popularly known as mushrooms or toadstools. They are diverse in form, varying from the well-known cap and stem type to those species with shelflike fruitbodies

**BEER**

*Beer is brewed using a yeast fungus like *Saccharomyces carlsbergensis*.*

**BREAD**

*Bread dough rises through the action of the yeast fungus *Saccharomyces*.*



and those that grow flat (see pp.12–13). Despite this diversity, the fruitbodies of some closely related fungi can look very similar and thus require careful examination for accurate identification. This book will assist in identification and increase your understanding and enjoyment of the fungal kingdom.

**EDIBLE FUNGI**

Although not common in all cultures, the gathering of fungi for eating is an ancient practice. The Shiitake (*Lentinula edodes*) has been cultivated in China and Japan for hundreds of years, and the cultivated mushroom (*Agaricus bisporus* p.161) has long been grown commercially. Today, oyster mushrooms (*Pleurotus* species pp.178–79) and several other species are

widely cultivated, while huge quantities of morels, chanterelles, and boletes are wild-collected and sold worldwide.

Before eating any mushroom that has been collected from the wild, be sure it is correctly identified as edible (see also p.23). If poisoning is suspected, seek medical advice immediately and take along a sample of the mushroom.



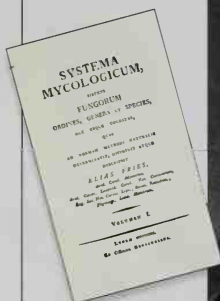
**SHIITAKE MUSHROOMS**



**AGARICUS BISPORUS**



**OYSTER MUSHROOM**



### △ ELIAS FRIES (1794–1878)

*Elias Fries was an outstanding early mycologist. His Systema Mycologicum (1821–1832) laid the foundations for the modern classification system.*

### EATING WILD MUSHROOMS

As well as making identification easier, the species section of this book also details edibility. However, it is strongly recommended that beginners take along an experienced forager if they are gathering mushrooms for eating; many fungi are, or can be, poisonous. There are also some edible species that look very similar to poisonous ones (see p.23). The species entries warn of any specific dangers relating to each fungus. The effects of eating a poisonous

mushroom vary from a stomach upset to severe or even fatal liver damage, so it is not advisable to experiment.



◁ DEADLY SPECIES  
*Amanita virosa* (far left) and *Amanita phalloides* (left) cause severe liver damage or death if they are eaten.

### AMERICAN MUSHROOMS

This edition is based on the premise that mushrooms whose photographs and original descriptions come primarily from Europe can be used to identify North American collections. To make a usable field guide for both beginners and more experienced collectors, many of the common names used incorporate part of the scientific generic name and are based on field-observed characteristics.

### CLASSIFICATION OF FUNGI

Within the fungal kingdom there are three major phyla (see p.11). These are divided into classes, then orders. Within orders, fungi with similar traits are grouped into families and then genera, which link closely related species. Each subdivision has its own scientific (Latin) name; the name for individual species consists of the genus name and a specific epithet.

As an example, the full classification for Common Chanterelle (*Cantharellus cibarius* p.28) is shown below.

KINGDOM  
 Fungi  
 PHYLUM  
 Basidiomycota  
 CLASS  
 Hymenomycetes  
 ORDER  
 Cantharellales  
 FAMILY  
 Cantharellaceae  
 GENUS (PLURAL GENERA)  
*Cantharellus*  
 SPECIES  
*Cantharellus cibarius*

*Cantharellus cibarius* ▷



# HOW THIS BOOK WORKS

**T**HE FUNGI FEATURED in this book are placed in one of 16 main sections, based on their most obvious visual characteristics (see pp.24–27). To make identification even simpler,

the larger sections are divided into subsections according to more detailed traits. Most of the fungi are shown at slightly smaller than life size; a few are enlarged to show more detail.

name of the section • scientific name • season(s) during which fruitbodies appear

238 • FUNGI WITH SPINES

scientific family name •	Family HYDNACEAE	Species <i>Hydnum repandum</i>	Season Autumn
--------------------------	------------------	--------------------------------	---------------

**COMMON HEDGEHOG TOOTH**

This very fleshy fungus has a massive, slightly off-center stem and a large, convex or centrally depressed cap, which is often irregular in shape. It has a smooth or slightly felty upper surface and fragile spines on the underside. Pale cream to ochre in color, the whole fruitbody stains orange with age and when bruised. This is a choice edible; Cook older specimens thoroughly, as the flesh can become bitter with age.

- OCCURRENCE Mycorrhizal with both deciduous trees and conifers in woods. Widespread in northern temperate zones, including colder regions.
- SIMILAR SPECIES *Hydnum albidum* has a white cap, smaller spores, and occurs on alkaline soil. Closely related *H. rufescens* is smaller and orange.

**habitat and geographical distribution**

**fungi that share similar traits are described**

**scale of the fruitbody is shown in relation to a 8in (20cm) hand**

**similar or related species often appear as subentries**

**key differences between the subentry and the main species are described**

**description of the main characteristics of the species**

**stem is typically thick and slightly off-center**

**close-up of spore-producing surface**

**close-up of spore-producing surface**

**close-up of spore-producing surface**

1cm

CAP UNDERSIDE

SECTION

Dimensions CAP ⌀ 5-15cm | STEM ↓ 3-7cm ↔ 1-3cm | Spores White | Edibility IOI

**SYMBOL KEY**

- ☠ Poisonous
- ☒ Inedible
- IOI Edible
- ↑ Height
- ↔ Width
- ⊕ Diameter
- ⊕ Thickness
- ⊕ Specimen enlarged compared to others in panel
- edibility (see key, above)

**measurement ranges of typical mature specimens are given to enable more accurate identification**

**cross-sections show useful details such as flesh color**

**spore deposit color (see pp.16-17) is often crucial for distinguishing between similar species**

**illustrations and captions indicate the usual growth habit and typical habitat of the species**

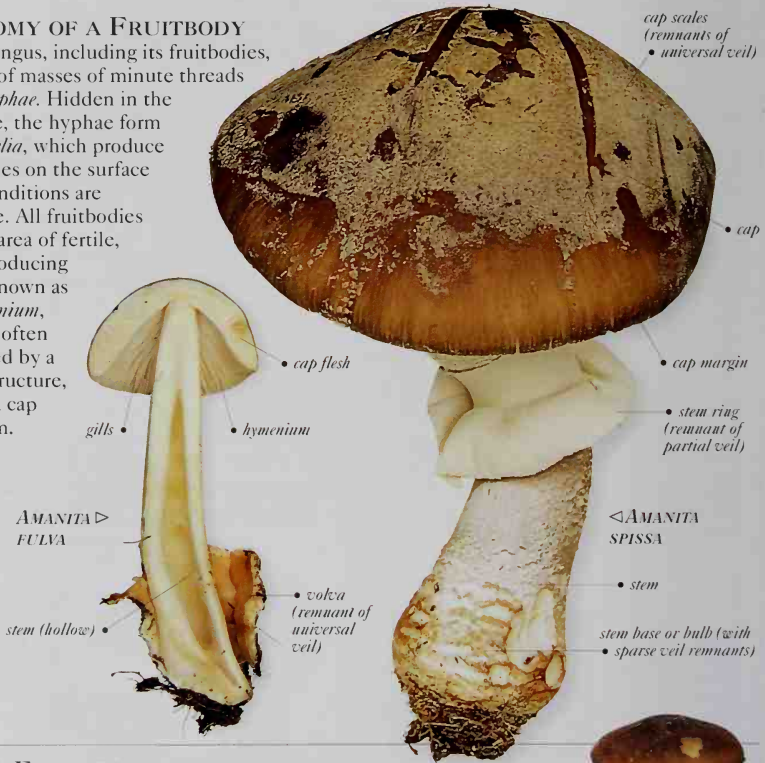
# WHAT IS A MUSHROOM?

**I**N POPULAR USAGE, mushrooms are fungi that produce conspicuous fruitbodies. Often the only visible part of a fungus, fruitbodies vary from the well-known cap and stem type shown below to the variety illustrated on pp.12-13. Their function is to produce sexual spores, and

mycologists divide most fungi into three groups, or phyla, according to the way in which they do this (see p.11). The majority of species in this book belong to Basidiomycota; all but two of the others to Ascomycota. Zygomycota is represented by two mushroom parasites.

## ANATOMY OF A FRUITBODY

Every fungus, including its fruitbodies, consists of masses of minute threads called *hyphae*. Hidden in the substrate, the hyphae form into *mycelia*, which produce fruitbodies on the surface when conditions are favorable. All fruitbodies have an area of fertile, spore-producing tissue, known as the *hymenium*, which is often supported by a fleshy structure, such as a cap on a stem.



## OTHER FEATURES

### VEIL >

The veil, if present, protects all or part of a young fruitbody. On a mature fruitbody, its remains can be seen as scales, a stem ring, or a volva.



### HYPHAL CORDS >

Some fruitbodies have thick hyphal cords attaching them to the mycelium hidden within the substratum.

MEGACOLLYBIA > PLATYPHYLLA



**ASCOMYCOTA**

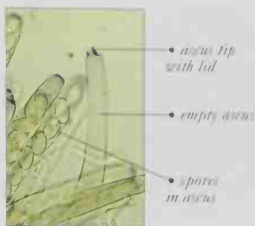
Ascomycetes form spores inside tiny saclike structures called asci, each typically producing eight spores. Asci are sited within the hymenium. The hymenium may be on the outside of the fruitbody, such as in morels, or the asci may be loosely distributed inside the fruitbody, as they are in truffles. Many ascomycetes do not produce fruitbodies, but reproduce by asexual spores (*conidia*).

**COMMON MOREL** ▷

*Morchella esculenta*  
forms spores within asci lining the honeycomb-like structure of the cap.

**CUP-FUNGUS ASCI** ▷

Here, some of the asci have discharged their spores, while others still contain spores that are not yet mature.

**FALSE FLASK-FUNGUS ASCI** ▷

Once the spores in these asci have reached maturity, they are released through an opening in the top.

**BASIDIOMYCOTA**

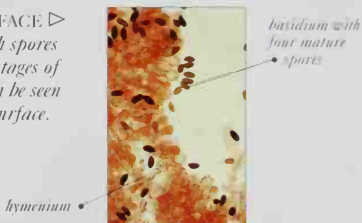
Nearly all basidiomycetes produce fruitbodies. The hymenium consists of club-shaped cells (*basidia*) with outgrowths (*sterigmata*) at one end, on which the spores are formed. On each basidium there are typically four sterigmata, each producing one spore. Many basidiomycetes are further distinguished from other fungi by clamp connections between their hyphae.

**COMMON PUFFBALL** ▷

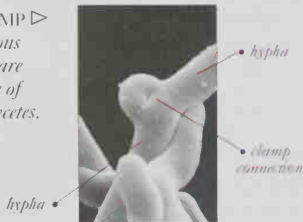
*Lycoperdon perlatum*  
forms spores on basidia in the hymenium, which is in the top of the fruitbody.

**GILL SURFACE** ▷

Basidia with spores at different stages of maturity can be seen on this gill surface.

**HYPHAL CLAMP** ▷

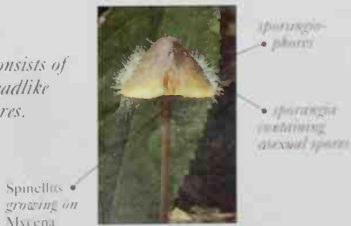
Clamp connections between hyphae are a typical feature of many basidiomycetes.

**ZYGOMYCOTA**

Zygomycetes do not have fruitbodies. Their sexual spores (zygospores) are long lived and are able to wait for perfect conditions before germination. Zygomycetes also form asexual spores in structures called sporangia at the end of threadlike sporangiophores. The gray molds found on foods or dung are mainly zygomycetes.

**SPINELLUS FUSIGER** ▷

This species consists of masses of threadlike sporangiophores.



## FRUITBODY SHAPES

**F**UNGAL FRUITBODIES occur in a wide range of forms, with several different ways of arranging the spore-producing hymenium. This may be found on gills, in tubes, or on smooth surfaces on the fruitbody; in some fungi it is concealed inside. When the fruitbody is mature the

spores are dispersed either actively or passively (see also pp.16–17). The shape of the fruitbody can reveal the method of spore dispersal. For example, tuber-like, rounded fruitbodies, found below ground (pp.258–59), have internal spores that are passively dispersed.

**CAP AND STEM** ▷

*The hymenium lines the sides of the gills under the cap. The spores are actively discharged.*



**STEM OFF-CENTER OR ABSENT** ▷

*The hymenium lines the gills under the cap. The spores are actively discharged.*



**SADDLE-LIKE CAP** ▷

*The hymenium lines the folds of the cap. The spores are actively discharged.*



**HONEYCOMB-LIKE CAP** ▷

*The hymenium lines the cavities in the cap. The spores are actively discharged.*



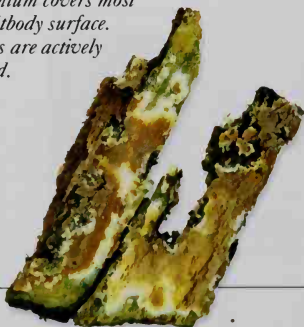
**BRACKETLIKE** ▷

*The underside is smooth or has tubes lined with the hymenium. The spores are actively discharged.*



**SKINLIKE, GROWING FLAT OR CRUSTLIKE** ▽

*The hymenium covers most of the fruitbody surface. The spores are actively discharged.*



◁ **CLUB-SHAPED**

*The hymenium either covers the surface or is situated in flasks embedded in the flesh. The spores are actively discharged.*



**PHALLUS-SHAPED** ▷

*The hymenium is formed within an egglike structure and is then elevated on a stem. The slimy spore mass is dispersed by flies.*





◁ANTLERLIKE  
The hymenium covers most of the surface. The spores are actively discharged.



▷CORAL-LIKE  
The hymenium covers most of the surface. The spores are actively discharged.

▷ROUNDED  
The hymenium is formed internally or in flasks. The spores are passively or actively discharged.



▷PEAR- TO PESTLE-SHAPED  
The hymenium is formed internally. The spores are passively dispersed, often by raindrops.



▷CUP- OR DISK-SHAPED  
The hymenium lines the inner or upper side. The spores are actively discharged.



▷CUP-SHAPED CONTAINING "EGGS"  
The "eggs" have an internal hymenium. The whole "egg" is propelled by rain splashes.



▷TRUMPET-SHAPED  
The hymenium is on the smooth to wrinkled outer surface. The spores are actively discharged.



▷STAR-SHAPED  
The hymenium is formed in a closed structure that splits. The spores are dispersed by rain splashes or flies.



▷CAGELIKE  
The hymenium is within a structure that splits into a mesh. The spores are dispersed by insects.

▷EARLIKE  
The hymenium is on the surface of the lobes. The spores are actively discharged.



▷LOBED AND GELATINOUS  
The hymenium is on the surface of the lobes. The spores are actively discharged.



## CAP FEATURES

**T**HE CAP can provide lots of clues to the identity of a species. Its overall shape and features on the surface, such as scales or marginal threads (indicating

remains of the veil) are important. Key characteristics include any structures on the underside of the cap, such as gills or pores, and their attachment to the stem.

### CAP SHAPES AND SURFACES

Cap shape and surface texture can change as the fruitbody matures, so try to examine several specimens. A usually sticky surface may become nonsticky in dry weather. Test it by touching it with a moistened lower lip (the "kiss" test). If it sticks to the lip, it will have been sticky in more humid conditions.



**CONVEX**  
*Cap is more or less the shape of a bun*



**CONICAL**  
*Cap is cone- or almost cone-shaped*



**FUNNEL-SHAPED**  
*Cap has a depressed center*



**UMBONATE**  
*Raised boss in center of cap*



**LOOSE SCALES**  
*Removable veil scales*



**PLEATED**  
*Surface of cap is folded radially into pleats*



**SCALY**  
*Cap skin is covered with fixed scales*



**STRIATE**  
*Striations are gills seen through cap skin*



**GROOVED MARGIN**  
*Distinct radial ridges at edges of cap*



**CONCENTRIC ZONES**  
*Different color zones*



**SHAGGY**  
*Dense layer of long, fibrous scales on cap*



**STICKY**  
*Cap skin is sticky-slimy (may dry up)*



**INROLLED MARGIN**  
*Cap edge rolls inward, especially when young*



**FOLDED**  
*Whole cap consists of many folds of flesh*



**SADDLE-SHAPED**  
*More or less folded cap, shaped like a saddle*



**HONEYCOMBED**  
*Cap with indented cells similar to a honeycomb*

## GILLS IN SECTION

If the cap has gills it is vital to note how, and if, they are attached to the stem (if present). This is seen by cutting out a section with a sharp knife. Free gills are not connected to the stem, which can often be loosened from the cap by twisting. If only a very narrow part of the gill runs down the stem, this is often called decurrent with a tooth.



**DECURRENT**  
*Gills run down stem, slightly or markedly*



**ADNATE**  
*Broadly attached gills*



**ADNEXED**  
*Narrowly attached gills appear almost free*



**FREE**  
*Gills not joined to stem, which can be removed*



**NOTCHED**  
*Gills indented just before joining stem*



**SINUATE NOTCHED**  
*Curved and indented before joining stem*

## GILLS FROM BENEATH

Taking note of the cap underside can be useful in identification. For example, the proportion of full-length gills to shorter gills is an important feature, as is the number of gills and the distance between them.



**EQUAL**  
*All gills reach stem and are the same length*



**UNEQUAL**  
*Full-length gills mixed with shorter ones*



**FORKED**  
*Gills divide one or several times*



**CROWDED**  
*Gills are arranged very close together*



**WIDELY SPACED**  
*Gills are far apart from each other*



**JOINED TO COLLAR**  
*Gills joined at a collar instead of reaching stem*



**RADIATING**  
*Gills radiate from the margin of the cap*

## OTHER SPORE-PRODUCING SURFACES

Instead of having gills, some cap and stem fungi and bracketlike species have the hymenium on surfaces that are smooth to wrinkled, toothed, or in tubes. Rounded to angular pores on the fruitbody underside indicate that the hymenium is in tubes.



**GILL-LIKE VEINS**  
*Hymenium covers folds and wrinkles on the undersurface*



**TUBES WITH PORES**  
*Hymenium lines tubes, which are vertical with porelike openings*



**SPINES**  
*Hymenium positioned vertically on spine-shaped structures*

## SPORES AND SPORE DISPERSAL

**F**UNGI PRODUCE SPORES to colonize suitable substrates, and just one fruitbody can produce billions of them. Spores can be asexual or sexual. Asexual spores (conidia) may produce individual

mycelia that can then grow on their own. Sexual spores can sometimes establish independent mycelia, but often a fusion with another mycelium has to take place before they can continue to grow.

### HOW SPORES ARE DISPERSED

Spores can be dispersed either passively or actively. Passive dispersal relies on animals, wind, or water; active discharge occurs when the fruitbody itself has a special mechanism that ejects or propels the spores when they reach maturity.



#### EJECTION

*In flask fungi, including this Xylaria, the mature asci eject the spores some distance through the mouths of the tiny fruitbodies.*



#### BY ANIMAL

*Sticky spore masses, such as on this Phallus species, are eaten by insects. Some spores stick to the insects and are borne away.*



#### BY WATER AND WIND

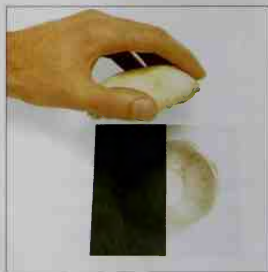
*As rain falls on the fruitbodies of puffballs like this Lycoperdon, they compress and the spores are released, to be dispersed by wind.*

### SPORE DEPOSITS

A useful way of confirming the genus to which a fungus belongs is to find out the color of its spore deposit. Taking a spore deposit from a gilled mushroom (agaric) is an easy process and can produce fascinating results: it reveals both the pattern of the gill spaces and the color of the spores. Cut the cap from a fresh specimen and place it gill-side down on paper. Use black paper to take pale spore deposits; for unknown colors, place the cap half over white paper and half over black paper.



**1** *COVERING THE CAP*  
Remove the stem and place the cap, gills down, on the paper. A drop of water on the cap keeps it moist. Cover with glass – a bowl or tumbler – and leave for several hours or overnight.



**2** *REMOVING THE CAP*  
Gently lift the glass, then the cap to reveal the spore deposit. The thicker the deposit, the easier it is to get an accurate idea of the spore color. The deposit should be observed in natural light.

### SPORE COLOR

Species within a genus typically have spore deposits of more or less the same color, so the genus of a specimen can be revealed by its spore color. For example, all *Agaricus* species have spores in dark brown shades. In some genera, such as *Russula* (pp.120-31), the spore color can also be used to differentiate between similar species. Spore deposits are usually black, white to cream, or red, purple, or brown shades. Exceptions include *Chlorophyllum molybdites* (p.166), which has a green deposit.



### SPORE SHAPE AND SIZE

Spore shape and size can be very important in the final correct identification of a species. Most spores are less than 20 microns ( $\mu\text{m}$ ) long or wide (0.02mm), and many are smaller than  $5\mu\text{m}$ , although some can be up to about 2mm in diameter. Their shape varies according to the method of their dispersal: actively discharged spores are typically asymmetrical, whereas those dispersed by passive means tend to be symmetrical. The spore chart on pp.284-88 gives spore shapes and average sizes, as well as other details, for species in this book.



<MICROSCOPE  
To identify spore shapes and sizes, you will need a good quality, but not necessarily very expensive, microscope. Ideally, enlargement should be  $\times 1000$ , but good results can be obtained at only  $\times 400$ . A built-in light source is very useful.

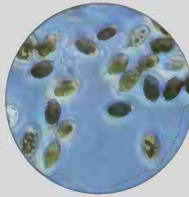
all of these close-ups are  $\times 2000$  life size



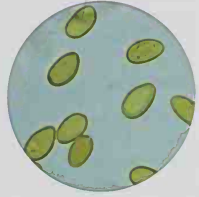
**ENTOLOMA CONFERENDUM**  
*Entoloma species have angular spores. Those of E. conferendum are starlike in shape and many faceted.*



**GANODERMA APPLANATUM**  
*G. applanatum has rough-textured spores that are truncated at one end and have a double skin.*



**COPRINUS ATRAMENTARIUS**  
*Like many Coprinus species, the black spores of this species each have a tiny pore from which the hyphae germinate.*



**CONIOPHORA PUTEANA**  
*The ellipsoid spores of C. puteana have a smooth surface and appear yellow-brown in color.*

## MUSHROOM LIFESTYLES

ONCE A MUSHROOM has established itself by forming a mycelium, it has to find a way to continue to grow and live. Different types of fungi have different methods of survival. Many have to form a mutually beneficial, or mycorrhizal, relationship with a living partner, such as a tree, which enables both to survive; others, known as saprotrophs, degrade (break down) dead material. There are also some fungi that kill plants or animals. These are called necrotrophs. Through their ability to break down dead matter or provide suitable growing conditions for other living things, fungi play a vital role in the ecological balance of the environment.



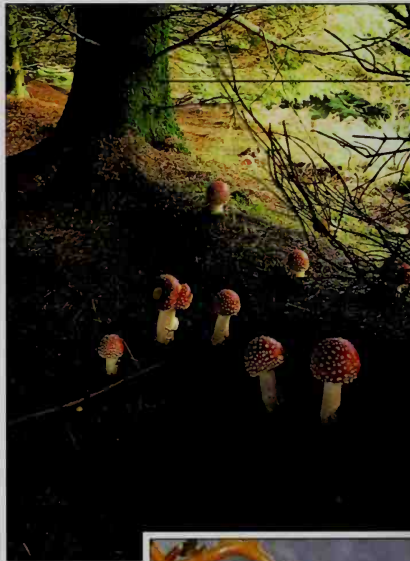
◁ THE HOST TREE  
A single tree species can provide different fungi with what they need to survive. The spruce, shown here, can support mycorrhizal fungi, saprotrophs can live off its litter, and necrotrophs may kill it and live off its remains.

### MYCORRHIZAL

Mycorrhizae are the basis for a close beneficial relationship between the tree and the fungus, in which the tree gives the fungus sugars, while the fungus provides water and nutrients. A mycorrhizal relationship is formed when the hyphae of fungi species, including some agarics and most boletes, penetrate roots of a suitable living host tree.

### SPECIAL RELATIONSHIP ▷

These fruitbodies of *Amanita muscaria* (p. 146) are near a spruce tree with which they may have formed mycorrhizae. Other trees, such as birch and oak, also form mycorrhizae with fungi.



plant host is a spruce tree

fungus partner is a Fly Amanita

forked tips

### BELOW GROUND ▷

Where there is a mycorrhizal partnership, the fungus grows a mantle around the tiniest tree roots and a net of hyphae in between the outer root cells. Nutrients are exchanged between the partners via complex chemical pathways.



pine roots

a pale, forked mantle typifies pine mycorrhizae

**SAPROTROPHIC**

With the aid of enzymes, which they release externally, saprotrophic fungi degrade many types of dead organic matter, including fungi and animals. Some saprotrophs, such as *Strobilurus esculentus* (right), occur only on one substrate, in this case a spruce cone. Others are wider in their range. Some fungal species are even present in a passive form in living plants, waiting to start their activity once the plant dies.

 $\Delta$  *STROBILURUS ESCULENTUS* (p.133)

*This specialized saprotroph degrades only fallen spruce cones. It produces fruitbodies after obtaining the materials it needs from the substrate.*

**NECROTROPHIC**

Necrotrophs, or parasites, live off of, and eventually kill living plants. Some kill their host by blocking or destroying the plant's water and nutrient systems with hyphae or specially produced, yeastlike cells; others use toxins. After killing the plant, the necrotroph acts like a saprotroph (see above), degrading the plant as a substrate. Parasitic fungi include *Fomes fomentarius* (p.219), and *Armillaria* species (pp.42 and 80).

 $\Delta$  *HETEROBASIDIUM ANNOSUM* (p.222)

*This species causes extensive damage in large spruce stands, spreading from tree to tree via the roots. Following the death of the tree, the wood is degraded by the fungus and brackets are produced.*

**BIOTROPIC**

Like mycorrhizal fungi, biotrophic fungi, such as rusts and mildews, depend on a living host. However, in this case the plant does not benefit. Special hyphae are often produced by the fungus, which penetrate the host cells and transport the nutrients back to the fungus. Although the plant is not killed, its life processes may be affected. For example, spores may infect seeds and germinate in seedlings.

 $\Delta$  *LOPHODERMIVM PICEAE*

*This tar-spot fungus produces black marks on spruce needles. Other Lophodermium species may cause severe leaf fall on pines and other trees.*

## MUSHROOM HABITATS

**F**UNGI OCCUR throughout the world, but most of the species in this book can be found in the northern temperate zones. Some are widespread, occurring in North America, Europe, and Asia; others are restricted to a single continent

or a very localized region within it. Most fungi are confined to a very specific environment, so it is important to be able to recognize the main habitats, including their indigenous plants, and which mushrooms occur in them.

### WOODLAND

The many varieties of woodland support different types of fungal life. Alkaline loam dominated by ash trees tends to contain non-mycorrhizal species, such as *Lepiota*. Acidic, peaty soil, with beech or birch trees, has a high proportion of mycorrhizal fungi, such as boletes, trichs, and russulas. Mineral-laden soil, along paths or beside ditches, can support species of *Lepiota*, *Psathyrella*, and *Peziza*, which thrive on comparatively small amounts of organic matter.



#### △ PINE WOODLAND

*Sandy pine woods are home to many boletes, such as Suillus bovinus (p.200), as well as russulas (pp.120–29). Wetter, mossy pine forests are also rich in fungi.*



△ SUILLUS BOVINUS

#### ◁ OAK WOODLAND

*Mycorrhizal fungi and saprotrophs, such as *Fistulina* species, occur with oak trees. Some of the same species are also found growing with chestnuts.*



◁ FISTULINA HEPATICA

### CONIFEROUS TREES

Most coniferous trees, or conifers, form important mycorrhizal relationships with fungi. Many fungus species are found only under one particular type of conifer, so knowing the tree's name makes an accurate identification of the fungus more likely. The trees shown are among the most important.



LARCH (*LARIX*)



SPRUCE (*PICEA*)



PINE (*PINUS*)

## GRASSLAND

There are many types of grassland, from the basic monocultures of wheat and barley to heavily fertilized pastures or near-natural, unfertilized but grazed or mown grassland. The mushrooms in such habitats may be directly associated with the grass or other plants in the turf, or they may be dung-fungi, living on the droppings of the animals that graze there. Soil composition is also important, with different fungi species occurring in very acidic grassland compared to more neutral or very alkaline soils.



### Δ FERTILIZED PASTURE

*Typically grazed by farm animals, and with limited flora other than grass, fertilized pasture is a suitable habitat for many species of Agaricus, Coprinus, and Panaeolus, which like dung-rich environments.*



Δ *AGARICUS  
CAMPESTRIS*

### ◁ UNFERTILIZED MEADOW

*This type of grassland is rich in plant and mushroom species. Dominant fungi include species of Clavaria, Entoloma, and Hygrocybe, which do not thrive in fertilized pasture, possibly because they cannot compete with other fungi that flourish where nutrient levels are high.*



◁ *HYGROCYBE  
PUNICEA*

## DECIDUOUS TREES

Mycorrhizal relationships often exist between fungi and deciduous trees shown here. There are several other important deciduous trees, including ash, elm, and maple, which have less direct relationships with fungi.



BIRCH (*BETULA*)



BEECH (*FAGUS*)



OAK (*QUERCUS*)

## FORAGING FOR MUSHROOMS

**W**HEN LOOKING FOR FUNGI, remember to leave some fruitbodies in place so that they can mature, and, after your studies, throw leftovers on a compost heap or put them back in the woods. Check for maggots before gathering edibles.

### EQUIPMENT

A sharp knife and a basket or a compartmentalized collection box are essential equipment for foragers. Tweezers are helpful for handling tiny specimens, and a hand lens reveals small details. A camera and note pad are useful for documenting finds.



FLAT BASKET



COLLECTION BOX  
WITH COMPARTMENTS



KNIFE



TWEEZERS



HAND  
LENS



CAMERA WITH  
MACRO LENS



NOTEPAD  
AND PENCILS

### HOW TO PICK

Although most species can be gathered using a knife, shears, or a small pruning saw can be useful for collecting specimens on twigs or pieces of wood. Once picked, keep the fungi in closed containers so that important features are not lost and they do not dry out. Take a sniff when opening the container to detect diagnostic smells. Avoid picking poisonous or endangered species by making a preliminary attempt at identification before lifting specimens.



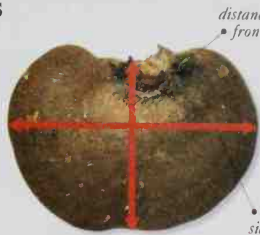
**CUTTING WITH A KNIFE**  
*When picking a mushroom, use a knife to lift out the stem base. Do not handle specimens more than absolutely necessary; this could damage or destroy useful identification characteristics.*

### THINGS TO NOTE

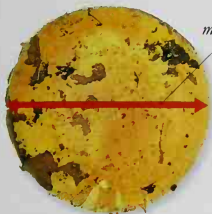
- **STAINING** Scratch with a finger nail to test for color changes.
- **TEXTURE** Rub the flesh between your fingers to check its texture.
- **SMELL** Check for any distinctive fragrance.
- **TASTE** Test only with a tiny piece and always spit the sample out.
- **CHEMICAL TESTS** Join a local mycology group to get help with chemical tests, which can be very useful in identification.

### TAKING MEASUREMENTS

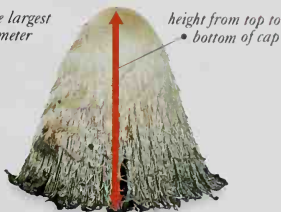
Standard measurements for different types of fungi are shown here. Although mushrooms vary in size, and can grow quite a bit before they are fully mature, it is useful to take measurements as an aid to identification. The dimensions given in the species descriptions are of average mature specimens.



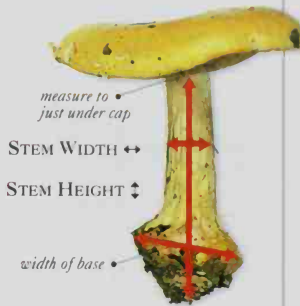
BRACKET WIDTH BY DEPTH ⊕



CAP DIAMETER ⊕



CAP HEIGHT ↓



### POISONOUS OR EDIBLE?

Some poisonous mushrooms look similar to edible ones, so foragers are strongly advised to familiarize themselves with dangerous species. Never eat anything you cannot identify accurately. If you suspect poisoning, seek medical advice and take along a sample of the fungus. Of the fungi here, *Amanita pantherina* can be lethal; *Agaricus xanthoderma* and *Russula mairei* produce minor poisonings. Note also: *Amanita phalloides* p.151, *A. virosa* p.150, *Cortinarius rubellus* p.72, and *C. orellanus* p.73.



AMANITA PANTHERINA p.149



AMANITA RUBESCENS p.147



RUSSULA MAIREI p.129



RUSSULA XERAMPHELINA p.127



AGARICUS XANTHODERMA p.159



AGARICUS ARVENSIS p.158

# IDENTIFICATION

**T**O IDENTIFY A MUSHROOM, use the keys on the following pages to find out what type it is and where it is most likely to be described in the species section. Answer the question (right), then follow the instructions and illustrations to the end. If at any point you become "stuck," start over again and double-check each characteristic. **Note:** Remember, never eat a mushroom unless you are absolutely certain of its identity.

DOES IT HAVE A CAP AND STEM?



YES

SEE BELOW ▾

NO

SEE PAGE 26 ▷▷

## CAP AND STEM FUNGI: MAIN TYPES

Examine the cap, especially the underside, and choose the most similar illustration below to proceed to the next step. If the underside has gills, decide whether they are decurrent, adnexed to adnate, or free. A section will

reveal this more clearly. If there are pores or spines instead (see p.15), choose a different illustration. Also check the stem is central. **Note:** the illustrations are for example only; your specimen could differ in color or shape.



With decurrent gills  
SEE PAGE 25



With adnexed to adnate gills  
SEE PAGE 25



With free gills  
SEE PAGE 25



With stem off-center  
SEE PAGE 178



With pores  
SEE PAGE 25



Honeycomb-, brain-  
or saddlelike cap  
SEE PAGE 207



With spines  
SEE PAGE 234

**CAP AND STEM FUNGI: OTHER CHARACTERISTICS**

In this book, cap and stem fungi with gills or pores are divided into the subsections shown below. Choose the illustration and description that is closest to the fruitbodies you wish to

identify, then turn to the page given. Be prepared to try again with any fruitbodies that fit more than one subsection. Spore color and size is often required to confirm identity.

**DECURRENT GILLS**



Funnel-shaped with fibrous flesh  
SEE PAGE 28



With convex cap and fibrous flesh  
SEE PAGE 37



Crumbly flesh exuding milk  
SEE PAGE 43

**ADNEXED TO ADNATE GILLS**



Fleshy with no obvious veil  
SEE PAGE 56



With cobweb-like veil  
SEE PAGE 69



With stem ring or ring zone  
SEE PAGE 78



With fibrous gill and dark spores  
SEE PAGE 98



Medium-sized with smooth cap  
SEE PAGE 103



With crumbly flesh  
SEE PAGE 120

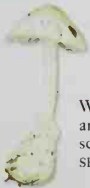


Very small with smooth cap  
SEE PAGE 132



Very small, cap not smooth  
SEE PAGE 142

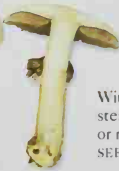
**FREE GILLS**



With volva and/or veil scales  
SEE PAGE 145



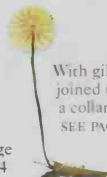
With stem ring or ring zone  
SEE PAGE 156



Without veil  
SEE PAGE 171



Inky with age  
SEE PAGE 174



With gills joined to a collar  
SEE PAGE 177

**WITH PORES**



With soft flesh  
SEE PAGE 184



With rough flesh  
SEE PAGE 202

## OTHER FUNGI: MAIN TYPES

This part of the key features fungi that do not combine a cap and stem and are not, for the most part, the traditional mushroom shape. The best first clue to their identity is to decide on their shape and appearance, followed by other features such as texture or where they grow (see p.27). Compare your specimen with the shapes illustrated and choose the closest

example, bearing in mind that there are many variations, some of which can be seen in the final part of the key on p.27. Do not expect to see the exact replica of what you have found illustrated here, and do not be put off by differences in color or details. Turn to the pages indicated to learn about variations in shapes and sizes within each section.



Bracket- or skinlike  
SEE PAGE 27



Cap without stem  
SEE PAGE 178



Club-shaped  
SEE PAGE 27



Antler- to coral-like  
SEE PAGE 248



Rounded  
SEE PAGE 27



Pear- to pestle-shaped  
SEE PAGE 260



Cup- to disk-shaped  
SEE PAGE 27

Antler- to coral-like  
with spines  
SEE PAGE 239



Trumpet-shaped  
SEE PAGE 275



Star-shaped  
SEE PAGE 277



Cage-like  
SEE PAGE 277



Brain- or earlike  
SEE PAGE 281



## OTHER FUNGI: OTHER CHARACTERISTICS

In this book, the sections that contain a wide variety of forms are further subdivided. The subsections for fungi that are not the familiar cap and stem shape are illustrated below. Pick the illustration and description most similar to

the fruitbodies you have found, then turn to the page given. It is helpful to use a hand lens to check whether the underside of a bracket is smooth or has thousands of minute pores.

**Note:** The illustrations here are not to scale.

## BRACKET- OR SKINLIKE



With pores  
SEE PAGE 211



Wrinkled or smooth underneath  
SEE PAGE 228



Skinlike, growing flat or crustlike  
SEE PAGE 232

## CLUB-SHAPED



Smooth or hairy  
SEE PAGE 240



With pimples  
or a dusty  
surface  
SEE PAGE 244



Phallus-shaped  
SEE PAGE 246

## ROUNDED



Above ground  
SEE PAGE 253



Below ground  
SEE PAGE 258

## CUP- TO DISK-SHAPED



Without "eggs"  
SEE PAGE 264



Cup-shaped  
containing "eggs"  
SEE PAGE 274

# CAP & STEM FUNGI WITH DECURRENT GILLS

*Mushrooms that have caps and stems, with gills under the caps, are called agarics. This section consists of agarics with "decurrent" gills – gills that run down the stem. Chanterelles are included in this section.*



## FUNNEL-SHAPED WITH FIBROUS FLESH

**T**HIS SUBSECTION features agarics with funnel-shaped or depressed caps. They also have fibrous flesh, unlike the crumbly flesh of *Lactarius* species (see pp.43–55) or russulas (see pp.120–31). The combination of fibrous flesh and funnel-shaped caps can also be found in distantly related families.

Family CANTHARELLACEAE	Species <i>Cantharellus cibarius</i>	Season Summer–winter
------------------------	--------------------------------------	----------------------

### COMMON CHANTERELLE

Widely varied in color, but often yellow with a hint of red, most forms of this species smell like dried apricots, and all make very good edibles. The cap is depressed in the center and often has a wavy margin; it has thick, decurrent, forked, gill-like veins. The pale cap flesh often bruises orange to red.

• **OCCURRENCE** Mycorrhizal with spruce and pine, also with deciduous trees, such as oak. Widespread in cold- and warm-temperate areas of the Northern Hemisphere; very common to rare.

• **SIMILAR SPECIES** *Hygrophoropsis aurantiaca* (p.29) is not mycorrhizal. *Omphalotus olearius* (p.29) has a luminous quality and grows on dead wood.



**FRUITING** In troops on well-drained soil.

decurrent, forking, gill-like veins •



△ *CANTHARELLUS SUBALBIDUS*  
This fleshy, off-white to cream species is found in the Pacific Northwest coastal woods. [O]

Dimensions CAP ↕ 2–12cm	STEM ↕ 2–10cm ↔ 0.4–1.5cm	Spores Pale cream	Edibility [O]
-------------------------	---------------------------	-------------------	---------------

Family PAXILLACEAE

Species *Omphalotus olearius*

Season Summer–autumn

## JACK O' LANTERN

This bright orange species has gills that glow in the dark. It has a strongly depressed to funnel-shaped, shiny, smooth cap, a slightly paler stem, and firm, pale yellow flesh. It causes severe poisoning. Tropical and subtropical relatives of Jack O'Lantern also have a luminous quality.

• **OCCURRENCE** Found on dead or dying trees and stumps, often olive trees or oaks; causes white rot. Along with other closely related species, it is found mainly in southern parts of northern temperate zones and in the tropics.

• **SIMILAR SPECIES** The edible *Cantharellus* species (pp.28, 30, 275–76) are always mycorrhizal and have thick-edged, forked, veinlike “gills.”



**FRUITING** In clusters on dead trees or buried roots.

*luminous, golden to orange gills*



*medium-spaced, strongly decurrent gills*

*funnel-shaped, orange to orange-brown cap*

*paler stem tapers toward base*



*dry, shiny, smooth cap surface*



Dimensions CAP ⊕ 6–14cm | STEM ↓ 6–15cm ↔ 0.8–2cm

Spores Off-white

Edibility ☠

Family PAXILLACEAE

Species *Hygrophoropsis aurantiaca*

Season Summer–winter

## FALSE CHANTERELLE

The orange-yellow to reddish orange cap of this chanterelle look-alike is convex to depressed with a fine felt covering and often with an incurved margin. The similarly colored stem becomes black with age. The thin flesh has an earthy smell and is white to pale orange. There are other forms: one is larger with brown cap scales; another has nearly white gills.

• **OCCURRENCE** Found growing among needle litter, rotten wood, or sawdust. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Cantharellus cibarius* (p.28). *Omphalotus olearius* (above).



**FRUITING** A few together or in troops in woodland.

*finely felted cap surface*

*orange-yellow to reddish orange cap*



*thin, soft, white to pale orange flesh*

*fairly thin, hollow stem*

*gills are soft and decurrent*

*stem turns black as it ages*

*pale or dark orange gills are forked and fairly crowded*



SECTION

Dimensions CAP ⊕ 2–8cm | STEM ↓ 2–5cm ↔ 3–8mm

Spores Off-white

Edibility ☠

Family CANTHARELLACEAE	Species <i>Cantharellus cinnabarinus</i>	Season Summer–autumn
------------------------	--	----------------------

**CINNABAR CHANTERELLE**

This very brightly colored species has a broadly convex cap that becomes funnel-shaped with a distinctly incurved and wavy margin as it matures. The cap emerges cinnabar-red and ages to pink-red. The pink to red stem is fairly short. The decurrent, pink, gill-like veins are forked with thick edges. The edible, fibrous flesh is fairly thin and red to off-white in the cap, thicker and white in the stem.

- **OCCURRENCE** Mycorrhizal, especially with oak trees, often appearing in moss. Widespread and common in eastern North America.
- **SIMILAR SPECIES** *Hygrocybe cantharellus* has comparatively sharp-edged, unforked gills.


*cinnabar-red cap matures pink-red*

*cap surface is matted and fibrillose*

*convex cap ages to funnel-shaped*

*incurved, wavy cap margin*

*decurrent, thick-edged, forked "gills"*



**FRUITING** Appears in large troops of conspicuous fruitbodies on soil along paths in woodland.

Dimensions CAP ↻ 1–4cm   STEM ↓ 1.5–4cm ↔ 0.3–1cm	Spores Pinkish cream	Edibility   10
---	----------------------	----------------

Family CANTHARELLACEAE	Species <i>Cantharellus tubaeformis</i>	Season Autumn–winter
------------------------	---	----------------------

**TRUMPET CHANTERELLE**

This species, when young, has a domed cap that becomes funnel-shaped with a wavy margin with age. The cap is in shades of brown; the stem is chrome-yellow, fading to dull yellow in mature specimens. It has gill-like veins. Its thin flesh tastes bitter but has an aromatic smell. The dull coloring makes it fairly difficult to find, but when discovered it is normally abundant, enabling large quantities to be gathered for eating.

- **OCCURRENCE** Mycorrhizal with both deciduous and coniferous trees, especially in older spruce forests. Widespread throughout northern temperate zones.
- **SIMILAR SPECIES** *Cantharellus lutescens* (p.275) lacks veins under cap.

*wavy, irregular cap margin*

*funnel-shaped mature cap*


*more or less hollow stem*

*pale gray veins are decurrent*

*chrome-yellow stem fades to dull yellow*

*cap occurs in shades of brown*

*wrinkled and forked veins*



**SECTION**

**FRUITING** In large troops among mosses in woodland.

Dimensions CAP ↻ 1–6cm   STEM ↓ 3–8cm ↔ 3–8mm	Spores Cream	Edibility   10
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Family TRICHOLOMATACEAE

Species *Lepista flaccida*

Season Summer-early winter

## TAWNY FUNNEL CAP

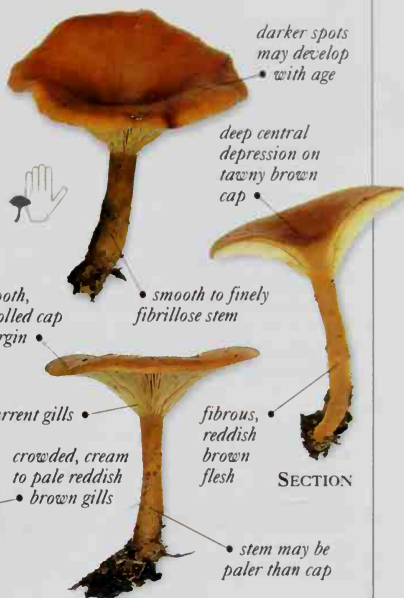
The cap of this species is funnel-shaped, with an inrolled margin. It is tawny brown and may develop darker spots with age. Deeply decurrent gills run down the stem, which may be smooth or finely fibrillose. It is worthless as an edible.

• **OCCURRENCE** In woodland, especially near coniferous trees. Widespread and common in Europe; world distribution unknown.

• **SIMILAR SPECIES** Like most *Lepista* species, this mushroom is best distinguished from look-alikes, such as species of *Clitocybe* (pp.31, 33-34, 39-40) and *Tricholoma* (pp.59-64, 81), by microscopic features like its rough-walled spores. *Clitocybe gibba* (below) is less fleshy and has a paler spore deposit. *L. gilva* is more yellow with a margin that is distinctly spotted.



**FRUITING** In troops or fairy rings on woodland litter.



Dimensions CAP ⊕ 4-12cm | STEM ↓ 3-7cm ↔ 0.5-1cm

Spores Cream

Edibility

Family TRICHOLOMATACEAE

Species *Clitocybe gibba*

Season Late summer-late autumn

## COMMON FUNNEL CAP

The cap of this species is pale leather-brown, with a pink tinge, and is markedly depressed in the center, sometimes with a small umbo. The stem is smooth and paler than the cap. The deeply decurrent gills are almost pure white. The Common Funnel Cap is edible but is not recommended because it can be confused with other members of the genus (see also SIMILAR SPECIES).

• **OCCURRENCE** Found in a very wide range of wooded habitats, from lowland to alpine. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Lepista flaccida* (above). *L. gilva* is more fleshy and paler with a spotted cap margin.



**FRUITING** In troops on woodland litter.



Dimensions CAP ⊕ 3-8cm | STEM ↓ 2.5-6cm ↔ 0.5-1cm

Spores White-cream

Edibility

Family TRICHOLOMATACEAE	Species <i>Pseudoclitocybe cyathiformis</i>	Season Late autumn–early winter
-------------------------	---	---------------------------------

## GOBLET FUNNEL CAP

This very distinctive species has a strongly funnel-shaped cap, very dark coloration, and a tall stem. The cap dries from dark gray-brown to pale grayish leather-brown and has an inrolled margin. The flesh is aromatic and mild tasting; although edible, it is not recommended. The genus *Pseudoclitocybe* differs from *Clitocybe* (pp.31, 33–34, 39–40) in that the spores produce a blue reaction in iodine reagents (amyloid).

• **OCCURRENCE** In woodland and open areas, on litter in tall grass, or on very decayed trunks of deciduous trees. Widespread in northern temperate zones; quite common.

• **SIMILAR SPECIES** Other *Pseudoclitocybe* species, on the whole smaller and paler, are often found in more open habitats. *Omphalina* species (p.36) are smaller.



FRUITING Singly or in troops in a range of habitats.



dark gray-  
brown cap dries  
to pale grayish  
leather-brown



fairly  
crowded,  
grayish cream gills  
age to pale brown

smooth, deeply  
funnel-shaped cap

inrolled  
cap margin

longitudinal  
striations  
on stem

gills are  
strongly  
decurrent



SECTION

stem is  
cylindrical to  
club-shaped

Dimensions CAP ⌀ 3–7cm   STEM ↓ 6–10cm ↔ 0.5–1cm	Spores Cream-white	Edibility 10
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Family TRICHOLOMATACEAE	Species <i>Leucopaxillus giganteus</i>	Season Late summer–autumn
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## GIANT FUNNEL CAP

A large, funnel-shaped cap that is flat when young is characteristic of this species. The cap, gills, flesh, and comparatively short stem are off-white to cream. The spores turn blue in the presence of reagents containing iodine (amyloid) – a trait shared by all *Leucopaxillus* species. It can often cause stomach upsets.

• **OCCURRENCE** Borne from mycelia that may be hundreds of years old. The fruitbodies are found in grassland and also in parks and open woodland areas. Widespread in Europe; world distribution is poorly understood.

• **SIMILAR SPECIES** *Clitocybe geotropa* (p.33) has a longer stem.

dingy white  
to cream cap  
ages to pale  
brown

short stem  
hidden in  
grass



margin is  
inrolled when  
young, splitting  
with age

huge, funnel-  
shaped cap up to  
40cm across

crowded gills  
are decurrent  
and cream



FRUITING Appears in fairy rings, which may be huge, mostly on nutrient-rich grassland.

Dimensions CAP ⌀ 12–40cm   STEM ↓ 4–8cm ↔ 2–4cm	Spores Whitish cream	Edibility 10
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Family TRICHOLOMATACEAE

Species *Clitocybe geotropa*

Season Autumn-early winter

## STOUT-STALKED FUNNEL CAP

A funnel-shaped, fairly fleshy cap with a central umbo on a tall stem, pale leather-brown coloring, and a tendency to grow in fairy rings is typical of a closely related group of North American species. The genus *Clitocybe* is ridden with identification problems.

• **OCCURRENCE** Occurs mostly in woodland. In some parts it is found growing under deciduous trees, but it also thrives in certain types of coniferous woodland. Widespread and common in Europe, although not in cooler regions; worldwide distribution is poorly understood.

• **SIMILAR SPECIES** *Clitocybe nebularis* (p.40), often found in similar woodland habitats, is much grayer and has a bun-shaped cap. *Leucopaxillus giganteus* (p.32) has a shorter stem and fruits mostly in nutrient-rich grassland.



Dimensions CAP  $\oplus$  5-20cm | STEM  $\updownarrow$  8-20cm  $\leftrightarrow$  1-3cm

Spores White

Edibility

Family TRICHOLOMATACEAE	Species <i>Clitocybe metachroa</i>	Season Autumn–winter
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**GRAY-BROWN FUNNEL CAP**

Like many small members of this genus, this pale gray-brown species is difficult to identify with certainty. A very indistinct smell, which is not yeasty like many *Clitocybe* species, is perhaps its clearest characteristic. The flattened to deeply depressed cap dries with age, remaining darker at the center with a striate margin.

- **OCCURRENCE** Found growing among tree litter in deciduous and coniferous woodland. Widespread and common throughout Europe; worldwide distribution not known.
- **SIMILAR SPECIES** *Clitocybe vibecina* has a strong, rancid-yeast smell and taste.



**FRUITING** In troops on poor and more fertile soil.



- thin, striate cap margin
- very felty white mycelium at base of smooth stem

**SECTION**



- decurrent, gray-white gills
- faint smell from white flesh
- stem more or less hollow



- cap dries out to a paler shade of brown



- gills are crowded

Dimensions CAP ⬆️ 2.5–6cm	STEM ⬆️ 3–6cm ↔ 3–7mm	Spores Off-white	Edibility
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Family TRICHOLOMATACEAE	Species <i>Clitocybe dealbata</i>	Season Summer–autumn
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**POISON LAWN FUNNEL CAP**

This is a highly poisonous mushroom, sometimes classed as two species: *Clitocybe rivulosa*, which has brown coloring, and *C. dealbata*, which is almost pure white. The convex to funnel-shaped cap has a mealy surface, often with dark spots in concentric rings; it cracks and dries even paler. The stem is off-white to pale brown. The white to buff-brown flesh has a somewhat yeasty smell.

- **OCCURRENCE** In grassy areas, including parks, lawns, and sports fields; may be found growing with the edible *Marasmius oreades* (p.117), which is distinguished by its adnexed to almost free gills and rubbery stem. Widespread in northern temperate zones.



**FRUITING** Often in fairy rings among grasses.



- cap surface is thin and develops cracks
- stem is off-white to pale brown
- mealy layer on cap

often has dark spots in concentric rings • on cap surface







- decurrent gills are white to pale gray

Dimensions CAP ⬆️ 2–6cm	STEM ⬆️ 1.5–4cm ↔ 3–6mm	Spores White	Edibility
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Family <b>PAXILLACEAE</b>	Species <i>Paxillus involutus</i>	Season Summer–autumn
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## POISON PAX


A strongly inrolled, yellow- to red-brown cap, with a downy margin and slightly depressed center, are particularly clear indicators of this very common poisonous species. So are the soft, crowded yellow gills that stain brown where touched and are removable with a knife tip. Colored like the cap, the stem is short and felty; the flesh is pale yellow to pale brown and darkens on cutting.

- **OCCURRENCE** Mycorrhizal mostly with coniferous trees and birch, in woodland, parks, and gardens. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *Paxillus filamentosus* has a less incurved margin, yellow flesh, and occurs under alder.


### SECTION




- *decurrent gills are soft and easy to remove*
- *flesh is pale yellow to pale brown*



**FRUITING** In troops, rings, or a few together under trees.



- *short, felt-covered stem*
- *felty to smooth, yellow- to red-brown cap*
- *finely downy, inrolled cap margin*



Dimensions CAP ↻ 6–15cm   STEM ↕ 4–8cm ↔ 1–2cm	Spores Yellowish brown	Edibility ☠
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Family <b>POLYPORACEAE</b>	Species <i>Lentinus tigrinus</i>	Season Summer–autumn
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## TIGER LENTINUS

The funnel-shaped, off-white cap of this species has brown scales at the center and an incurved margin; the stem is also off-white, with brown scales that may appear to be stripes. The off-white gills are tough and decurrent. In one form the veil over the gills fails to open, making it look like it is parasitized by a mold.

- **OCCURRENCE** On deciduous trees, where it causes a white rot. Widespread and common in Europe and also in eastern North America.
- **SIMILAR SPECIES** *Lentinus lepideus* typically appears singly or in small clusters on conifers and produces a crumbly brown rot.



- *funnel-shaped cap is off-white*
- *toothed or torn gill edges*
- *thick, cobweb-like veil may stick to gills*
- *cap margin is incurved*
- *scales in stripes on off-white stem*

**FRUITING** In clusters on old branches or logs, particularly of poplar and willow, often near water.

Dimensions CAP ↻ 1–10cm   STEM ↕ 1.5–7.5cm ↔ 0.5–1cm	Spores White	Edibility 🚫
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Family TRICHOLOMATACEAE	Species <i>Omphalina ericetorum</i>	Season Spring-late autumn
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**LICHEN AGARIC**

The yellow-brown cap of this small species has a central depression and radial striations, each one representing a gill beneath. The thin stem is smooth and is also yellow-brown, with a violet-gray tinge at the top. The flesh is very thin and off-white to ochre.

- **OCCURRENCE** This species is also a lichen, *Botrydina vulgaris*, living with an algal partner. The energy produced by the algae through photosynthesis enables it to colonize harsh acidic environments. It is found on turf or sphagnum moss, often at higher altitudes but also in lowlands. Widespread in cooler regions of northern temperate zones; widely distributed across northern North America.
- **SIMILAR SPECIES** *Omphalina alpina*, found growing in alpine and arctic areas, is a brighter yellow color.

**FRUITING** Appears singly or a few together.

Dimensions CAP ⊕ 0.5–1.5cm   STEM ↓ 1–2cm ↔ 1–2mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Rickenella fibula</i>	Season Summer-autumn
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**ORANGE MOSS AGARIC**

Orange to pale yellow in color, this species is tiny, with a semi-spherical cap that is centrally depressed and has radial striations that fade as it dries. The stem is long and thin, and the gills are strongly decurrent. A hand lens reveals fine hairs all over the fruitbody. This and *Rickenella setipes* (inset, right) are the two most common species in the genus. *Rickenella* species have been classified under *Mycena*, *Omphalina*, and *Gerronema*.

- **OCCURRENCE** Parasitic on moss in a range of grassy habitats; a typical lawn mushroom. Widespread and common in northern temperate zones.

**FRUITING** Singly or in small groups or troops.

**Δ RICKENELLA SETIPES**  
This tiny species is pale gray to gray-brown; the cap center (navel) is almost black. The top of the stem is tinged dark violet.

Dimensions CAP ⊕ 0.3–1cm   STEM ↓ 3–5cm ↔ 1–2mm	Spores White	Edibility
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# WITH CONVEX CAP AND FIBROUS FLESH

**T**HE SPECIES here have semi-spherical, convex, or umbonate caps and fibrous flesh. Unlike the species on pp.28–36, the caps very rarely develop a central depression. Those on pp.43–55 may have caps of a similar shape, but they are distinguished by their crumbly, cheeselike flesh.

Family GOMPHIDIACEAE	Species <i>Chroogomphus rutilus</i>	Season Autumn
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## PINE GOMPH

This agaric has a convex or umbonate, rusty brown cap with a wine-red flush; unlike species in the related *Gomphidius* genus (p.38), it is greasy only in wet weather. The rust-orange stem has zones of threadlike, reddish brown veil remains. The flesh is orange to wine-red or chrome-yellow at the stem base; it has no distinct taste or smell.

• **OCCURRENCE** Mycorrhizal with pine trees in woods and stands. Widespread and locally common in northern temperate zones.



**FRUITING** In small groups or troops on sandy soil.

fairly broad, medium-spaced gills

soft gills can be loosened from cap flesh



wine-red flush on rusty brown cap surface

decurrent gills are olive-brown becoming gray-black

fibrillose, reddish brown remains of veil

stem tapers toward base



Dimensions CAP 4–8cm   STEM 4–12cm ↔ 0.5–1.5cm	Spores Almost black	Edibility
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Family HYGROPHORACEAE	Species <i>Hygrophorus hypothejus</i>	Season Late autumn–early winter
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## LATE FALL WAX CAP

This late-fruiting species has a convex to funnel-shaped, slimy, brown to olive-brown cap, a slimy stem, and decurrent yellow gills. An orange form, known as

*Hygrophorus aureus*, is occasionally found.

• **OCCURRENCE**

Mycorrhizal with pine trees, preferring sandy soil; typically found following the first frosts. Widespread in northern temperate zones; locally common.

• **SIMILAR SPECIES** *H. lucorum* is bright yellow and is associated with larch. Several other *Hygrophorus* species that are also found with pine are all distinguished from *H. hypothejus* by their different coloring.

thick slime layer on cap surface

stem top is not slimy

brown to olive-brown cap with paler margin

slimy, pale yellow stem



well-spaced, pale to deep yellow gills

clearly decurrent gills



**FRUITING** In small groups among mosses and lichens.

Dimensions CAP 3–5cm   STEM 4–7cm ↔ 0.5–1cm	Spores White	Edibility
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Family GOMPHIDIACEAE

Species *Gomphidius roseus*

Season Late summer–autumn

## ROSY GOMPH

This unmistakable species has a coral-red cap that is convex with an inrolled margin when young, becoming flattened with age. The stem is spindle-shaped and bears the remains of the slimy, colorless veil, which is often stained black by the falling spores. The flesh is off-white with a coral-red tint and has no distinctive smell or taste. It is edible but not recommended, due to its rarity.

• **OCCURRENCE** Under pine trees on sandy soil, among mosses, lichens, and pine litter. Widespread in northern temperate zones.



### Δ *GOMPHIDIUS GLUTINOSUS*

This gray-brown species is covered in a colorless, slimy veil. The stem has an indistinct ring zone, often stained black by spores, and its base is lemon-yellow. Mycorrhizal with spruce. [C]



**FRUITING** A few together with *Suillus bovinus* (p.200).

Dimensions CAP ⬆ 1.5–5cm | STEM ⬆ 2–4cm ↔ 0.5–1cm

Spores Almost black

Edibility [C]

Family HYGROPHORACEAE

Species *Hygrocybe pratensis*

Season Throughout autumn

## BUFF WAX CAP

This orange species has a fleshy, dry to greasy, convex cap that flattens with age. It has a wavy margin and sometimes a central umbo. The faintly striated stem is paler than the cap and may taper toward the base. A popular edible, with fairly solid, buff flesh, it has an earthy smell and pleasant taste. Along with *Hygrocybe virginea* (p.39), it is often classified in the genera *Camarophyllus* or *Cuphophyllus*.

• **OCCURRENCE** Found in unimproved grassland, rarely in damp woodland. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES** *Hygrophorus uemoreus* has a dry cap and grows in oak woods.



widely spaced, thick, waxy gills •



• cap color is uniform orange or slightly frosted with white



**FRUITING** In groups or rings with moss and grass.

Dimensions CAP ⬆ 2.5–6cm | STEM ⬆ 2.5–6cm ↔ 0.5–1.5cm

Spores White

Edibility [C]

Family HYGROPHORACEAE

Species *Hygrocybe virginea*

Season Autumn

## SNOWY WAX CAP

The most obvious characteristics of this variable species are an absence of slime, a dry to greasy, ivory-white cap, which may be translucently striate at the margin, and well-spaced, decurrent gills. The white stem sometimes has a pink base due to an infection that may produce a smell of coconut. Two varieties occur: var.

*fuscescens* has a yellow-ocher to brown cap center;

var. *ochraceopallida* has a pale

leather-brown cap. Slimy-

capped specimens are

sometimes classified as *H. nivea*.

• **OCCURRENCE** In grassland or open woods. Widespread and common in eastern and northern North America.

• **SIMILAR SPECIES** *H. russocoriacea* smells of leather, sandalwood, or pencil shavings. It is also widespread in northern temperate zones.

convex to flat cap, often with navel or

• small umbo

ivory-white cap surface

• is not slimy

well-spaced, • decurrent, thick, waxy, white to cream gills

• dry, solid, white stem



SECTION



**FRUITING** Found in troops or fairy rings among grass.

Dimensions CAP ⊕ 1.5–5cm | STEM ↓ 2–7cm ↔ 0.3–1cm

Spores White

Edibility |○|

Family TRICHOLOMATACEAE

Species *Clitocybe odora*

Season Summer–autumn

## ANISE FUNNEL CAP

The convex or umbonate cap of this species matures from blue-green to gray or gray-brown; it is rarely funnel-shaped. The adnate or only slightly decurrent gills are unusual in this genus, but the strong anise smell of the marbled flesh is common to a number of *Clitocybe* species. It is edible, but see SIMILAR SPECIES.

• **OCCURRENCE** Among deciduous or coniferous litter in woodlands. Widespread in northern temperate zones.

• **SIMILAR SPECIES**

A number of species that smell similar, including *C. fragrans*, are typically smaller, white or leather-brown, and have decurrent gills. They are not edible.

inrolled cap margin •

adnate • to slightly decurrent gills

marbled flesh •

• green-blue cap surface, tinged brown with age

SECTION



• finely felted white mycelium

• crowded gills, paler than cap or stem



**FRUITING** In troops on soil; it prefers fertile soil.

Dimensions CAP ⊕ 3–6cm | STEM ↓ 3–6cm ↔ 0.4–1cm

Spores Dull pink

Edibility |○|

Family TRICHOLOMATACEAE

Species *Clitocybe nebularis*

Season Autumn—early winter

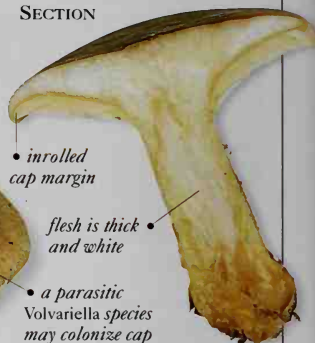
## CLOUDED FUNNEL CAP

This species has a convex to flattened or slightly depressed, dark gray-brown to gray cap with a finely felty surface and an inrolled margin. The stem is slightly swollen toward the base and is paler than the cap. A fleshy species, with a strong aroma, it causes stomach upsets in many people; see also SIMILAR SPECIES.

• **OCCURRENCE** In a range of wooded habitats. Widespread; mostly common in northern temperate zones.

• **SIMILAR SPECIES** *Entoloma sinuatum* (p.68) is poisonous.

SECTION



• inrolled cap margin

• flesh is thick and white

• a parasitic *Volvariella* species may colonize cap

• pale gray-brown stem

• slightly felted to smooth cap surface often has white bloom



• stem has slightly swollen base



**FRUITING** Typically forms fairy rings on fertile soil.



• crowded, pale cream gills are slightly decurrent

Dimensions CAP  $\leftrightarrow$  8–20cm | STEM  $\updownarrow$  5–10cm  $\leftrightarrow$  1.5–4cm

Spores Cream

Edibility

Family TRICHOLOMATACEAE

Species *Clitocybe clavipes*

Season Late summer—autumn

## ALCOHOL FUNNEL CAP

This species is identified by its club-shaped stem, which is swollen at the base and tapering toward the top, and by its fairly large size and soft, cream-colored gills. The cap is almost flat and feels greasy; it is gray-brown, often with a clear, pale margin. The white to cream flesh has a strong, sweet smell and is soft and spongy; the fruitbody can hold large amounts of water. When consumed with alcohol, this mushroom causes illness.

• **OCCURRENCE** Mostly under conifers, but also in deciduous woodland, typically under birch trees. Widespread and common in northern temperate zones.



**FRUITING** In small groups on humus-rich, acidic soil.



• cap is almost flat and feels greasy



• swollen stem base, to 3cm wide

• crowded gills



• strongly decurrent cream gills

• gray-brown stem

• soft, spongy, white to cream flesh



SECTION

Dimensions CAP  $\leftrightarrow$  4–8cm | STEM  $\updownarrow$  3–10cm  $\leftrightarrow$  to 1.5cm

Spores White

Edibility

Family ENTOMATACEAE

Species *Clitopilus prunulus*

Season Autumn

## BREAD DOUGH CLITOPILUS

A pale gray-white cap and decurrent, pale pink gills, combined with a strong smell of fresh bread dough, distinguish this species. The cap is convex to funnel-shaped; the stem is central or off-center and is similar in color to the cap. This species is a choice edible, with soft white flesh, but see also SIMILAR SPECIES.

• **OCCURRENCE** In mostly acidic woodland; also found growing in open, grassy places, but close to trees. Widespread and rather common in northern temperate zones.

• **SIMILAR SPECIES**

Species of *Clitocybe* and *Entoloma* can look very similar and are poisonous.



FRUITING A few or in troops on humus-rich soil.

Dimensions CAP ⊕ 3–9cm | STEM ↓ 2–6cm ↔ 0.4–1cm

Spores Pale pink

Edibility

Family TRICHOLOMATACEAE

Species *Lyophyllum decastes*

Season Autumn, mostly late

## SHIMEJI FUNNEL CAP

This is one of several fleshy *Lyophyllum* species that are apparently closely related and are difficult to separate. Its convex to flattened, gray-brown cap has a smooth margin and becomes wavy with age. The stem is off-white or pale gray-brown, as are the slightly decurrent, fairly crowded gills.

It has no distinctive taste or smell, but is considered a good edible.

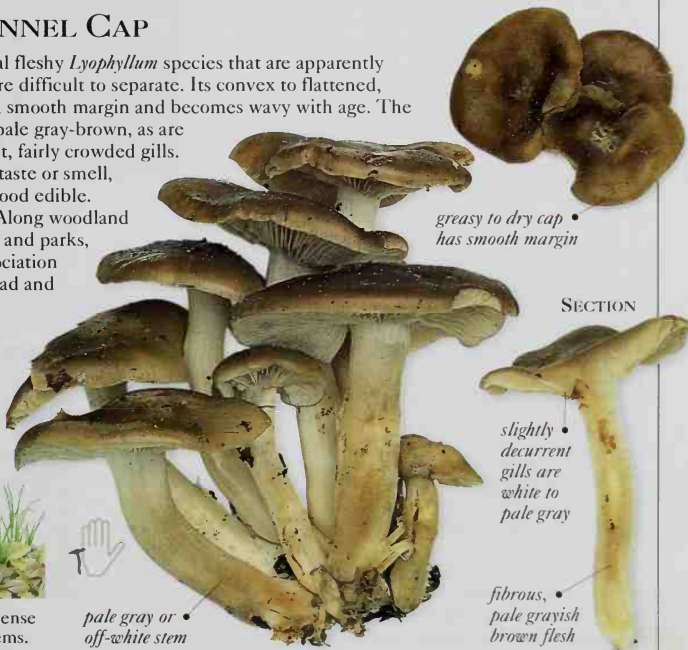
• **OCCURRENCE** Along woodland paths and in gardens and parks, but not in direct association with trees. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

*L. fumosum* has a stem fused into a trunklike base.



FRUITING Often in dense clusters with fused stems.



Dimensions CAP ⊕ 5–10cm | STEM ↓ 4–10cm ↔ 0.5–2.5cm

Spores White


Edibility

Family TRICHOLOMATACEAE	Species <i>Lyophyllum connatum</i>	Season Autumn
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**POISON ROADSIDE FUNNEL CAP** *convex cap with wavy margin* *decurrent, pale gray to white gills*

The cap of this white mushroom is convex, often with a wavy margin, and the stem tapers toward the base. The rather crowded, white to pale gray gills are slightly decurrent; they stain violet when in contact with solid or dissolved ferrous sulfate (FeSO<sub>4</sub>). The flesh is white and also stains violet.

- **OCCURRENCE** Mostly on disturbed soil on woodland edges. Widespread in northern temperate zones, including alpine areas.
- **SIMILAR SPECIES** Some of the white *Clitocybe* species are fairly similar in appearance. They are distinguished by their failure to stain violet.



**FRUITING** Singly or in clusters of fruitbodies on road edges in woodlands.


Dimensions CAP ⊕ 3–10cm | STEM ↓ 5–12cm ↔ 0.5–1.5cm | Spores White | Edibility ☠

Family TRICHOLOMATACEAE	Species <i>Armillaria tabescens</i>	Season Autumn
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**RINGLESS HONEY MUSHROOM** *erect brown scales at cap center* *fibrous, off-white stem*

The convex to flat or depressed, dry, yellowish brown cap of this species has erect brown scales at the center. The stem is fibrous and off-white and is often fused with many others at its base. Black mycelial strands are present on the substrate. Its off-white flesh is edible after careful cooking.

- **OCCURRENCE** Attached to roots or near trees. Rare in warmer parts of Europe but widespread and common in eastern North America.
- **SIMILAR SPECIES** *Armillaria mellea* (p.80) has a stem ring. *Clitocybe* species (pp.31, 33–4, 39–40) lack the cap scales and the black mycelial strands.



**FRUITING** In clusters on the ground near trees such as oaks; it kills the host tree.


Dimensions CAP ⊕ 2.5–10cm | STEM ↓ 7.5–20cm ↔ 0.5–1.5cm | Spores Pale cream | Edibility ⓪

Family BOLETACEAE	Species <i>Phylloporus rhodoxanthus</i>	Season Summer–autumn
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**GILLED BOLETE** *convex to flat or depressed cap* *bright yellow gills may bruise green or blue* *decurrent gills with interlinking veins*

This species has a dry, reddish brown cap. Its stem is red to reddish yellow. This is a gilled bolete, but it may produce a tube layer and is more closely related to pored boletes, such as *Boletus pascuus* (p.192), than to agarics. The gills are easily separated from the yellow to red-tinged flesh.

- **OCCURRENCE** Mycorrhizal with oak; also found under conifers. Widespread and common in northern temperate zones, except the far north.
- **SIMILAR SPECIES** *Phylloporus leucomycelinus* has a white mycelium at the base.



**FRUITING** Singly or scattered in small groups or troops.

Dimensions CAP ⊕ 2.5–7.5cm | STEM ↓ 4.5–10cm ↔ 0.5–1cm | Spores Ochre-yellow | Edibility ⓪

# CRUMBLY FLESH EXUDING MILK

**B**ELONGING EXCLUSIVELY to the genus *Lactarius*, all species in this subsection have slightly decurrent gills and variable cap shapes, and almost all exude a white or colored fluid from cut

or broken flesh. This “milk” may change color rapidly on exposure and is a good identification feature; the best way to see this is by testing one or two drops on a white handkerchief.

Family RUSSULACEAE

Species *Lactarius piperatus*

Season Summer–early autumn

## PEPPERY LACTARIUS

This large, crumbly-fleshed species has an off-white fruitbody, very crowded gills, and an almost smooth cap that is depressed in the center. The white milk, which dries olive-green, has a very peppery taste. Although not edible, this species can be rendered safe by layering in salt and storing before cooking.

• **OCCURRENCE** Mycorrhizal with both deciduous and coniferous trees in woodlands on well-drained soil. Widespread and rather common in northern temperate zones.

• **SIMILAR SPECIES** The milk of *Lactarius glaucescens* dries grayish blue-green. *L. vellereus* (p.44). *L. deceptivus* has a cottony inrolled cap margin, and the milk does not change color.



• smooth or velvety cap margin when young

• off-white to cream cap with depressed center



SECTION

very crowded, off-white gills may have spots of dried olive-green milk

decurrent gills

white flesh throughout



**FRUITING** In fairy rings and troops in woodland.



### Δ *HYPOMYCES LACTIFLORUM*

This orange-red flask mushroom parasitizes *Lactarius* (pp.45–55) and *Russula* species (pp.120–31). If the host is edible, it can be eaten. ☐

Dimensions CAP ⊕ 8–20cm | STEM ↓ 8–15cm ↔ 2–4cm

Spores Off-white

Edibility ☐

Family RUSSULACEAE

Species *Lactarius vellereus*

Season Autumn

## FLEECY LACTARIUS

The white to cream cap of this very large species is densely felted and has a clear central depression. Its cream gills are fairly crowded, and it has a comparatively short, tapered stem. The white milk from its crumbly white flesh is copious and dries to brown on the gills; it does not stain with potassium hydroxide (KOH).

• **OCCURRENCE** Mycorrhizal with deciduous trees, such as beech, but also found with various conifers. Exact range unknown but widespread in northern temperate zones.

• **SIMILAR SPECIES** The milk in *Lactarius bertillonii* stains yellow then orange with KOH and has a hot taste. *L. piperatus* (p.43) is distinguished by more crowded gills, a longer stem, and a smooth cap.



cap white to cream with felted surface

huge cap with deep depression in center, almost funnel-shaped at maturity



cream gills are decurrent

short, thick, smooth stem

fairly crowded gills



milk is almost mild in taste, but flesh is acrid

milk dries to brown on gills



**FRUITING** In rings and troops in leaf litter under trees.

Dimensions CAP ↔ 10–25cm | STEM ↓ 4–8cm ↔ 2–5cm

Spores Off-white

Edibility

Family RUSSULACEAE

Species *Lactarius controversus*

Season Autumn

## PINK GILL LACTARIUS

Salmon-pink gills distinguish this mushroom from other *Lactarius* species. It is off-white, with faint gray or pink zoning on the convex to depressed cap, which has an inrolled margin. The short stem is white or flushed pink to gray; the crumbly flesh exudes copious white milk, which does not change color as it dries.

• **OCCURRENCE** Mycorrhizal with both willow and poplar, in woods and sand dunes. Widespread in northern temperate zones but not very common.



• sticky cap is covered with debris

• slightly decurrent gills

• short, often tapered stem



• white or pinkish white flesh yields white milk

• forked and crowded, salmon-pink gills

SECTION



FRUITING Singly or in fairy rings or troops.

Dimensions CAP  $\updownarrow$  7–20cm | STEM  $\updownarrow$  2–7cm  $\leftrightarrow$  1.5–4cm

Spores Off-white

Edibility

Family RUSSULACEAE

Species *Lactarius torminosus*

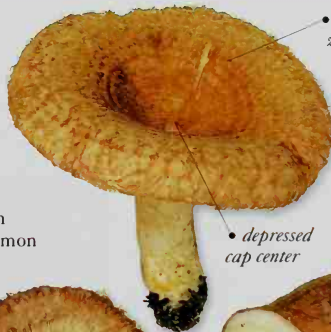
Season Summer–autumn

## WOOLLY LACTARIUS

This species has a strongly depressed cap with a shaggy surface and an inrolled margin. The crowded, off-white to pale pink gills are slightly decurrent. Its crumbly white flesh produces very hot-tasting white milk and stains pale yellow; it does not change color as it dries. It is edible only after salting and pickling.

• **OCCURRENCE** Mycorrhizal with birch; often found in open, grassy sites. Widespread and common in parts of northern temperate zones.

• **SIMILAR SPECIES** *Lactarius pubescens* is paler and has a less shaggy cap and fainter zones. *L. scoticus* is also pale and is smaller.



• cap with zones in shades of orange and orange-brown

• depressed cap center



FRUITING In rings and troops on damp ground.

• shaggy cap surface, especially at the inrolled margin



• short, smooth, club-shaped stem, hollowing with age

SECTION

Dimensions CAP  $\updownarrow$  5–15cm | STEM  $\updownarrow$  3–6cm  $\leftrightarrow$  1–3cm

Spores Pale yellowish cream

Edibility

Family RUSSULACEAE

Species *Lactarius deliciosus*

Season Late summer–autumn

## ORANGE LATEX LACTARIUS

This brownish orange species has a depressed cap with faint concentric zones and an inrolled margin; its short stem is covered with orange depressions. It has thick, crumbly, pale yellow to orange flesh yielding carrot-orange milk, which does not change color. A choice edible, it has the harmless, if slightly alarming, effect of making urine turn red.

• **OCCURRENCE** Mycorrhizal with pine trees, often on sandy, alkaline soil. Widespread in northern temperate zones, but distribution is unclear.

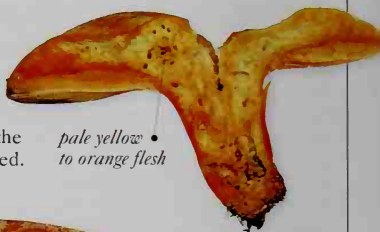
• **SIMILAR SPECIES** *Lactarius deterrimus* (inset, below left).

*L. indigo* has blue flesh and milk in the cap and stem.

It grows with pines.

*L. salmonicolor*, which grows with firs, is larger.

*L. semisanguifluus* (inset, below right).



pale yellow  
to orange flesh

SECTION



faint brownish  
orange zones on cap

orange dents mark  
the short stem



cap is greasy or  
dry and smooth



fairly crowded,  
brownish orange,  
decurrent gills



cap margin  
is inrolled

△ *LACTARIUS DETERRIMUS*

Found with spruce trees, this has a smooth stem and exudes green-staining orange milk. Common and widespread in the Rockies. [O]

△ *LACTARIUS SANGUIFLUUS*

This species is a popular edible, particularly in Spain. It has blood-red milk, staining green as it dries. It is mycorrhizal with pine. [O]



**FRUITING** In groups or troops in grass or pine litter.

Dimensions CAP ↔ 5–15cm | STEM ↑ 3–7cm ↔ 1–3cm

Spores Off-white

Edibility [O]

Family RUSSULACEAE	Species <i>Lactarius necator</i>	Season Summer–autumn
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## MUTAGEN LACTARIUS

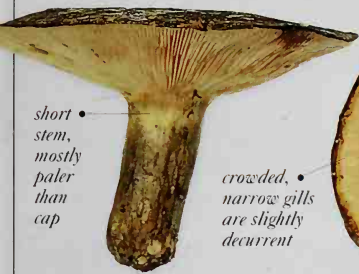
Marked by its dark olive-green coloring, this species has a sticky cap with a depressed center and a felty margin, inrolled when young. The crumbly white flesh produces copious white milk, which dries in greenish brown spots on the off-white to pale green gills. Although eaten salted or marinated in eastern Europe, it may contain carcinogens.

• **OCCURRENCE** Mycorrhizal with birch and spruce, in woods, parks, and gardens. Widespread from Europe to east Asia; absent in North America.

• **SIMILAR SPECIES** *Lactarius blennius* (below) and *L. fluens* are paler and often more distinctly zoned or spotted on their caps.



• shiny, dark olive-green cap



short stem, mostly paler than cap



crowded, narrow gills are slightly decurrent



FRUITING Singly, a few together, or in troops.

Dimensions CAP $\leftrightarrow$ 6–15cm   STEM $\updownarrow$ 4–7cm $\leftrightarrow$ 1–2.5cm	Spores Off-white	Edibility
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Family RUSSULACEAE	Species <i>Lactarius blennius</i>	Season Summer–autumn
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## EURO SLIMY LACTARIUS

This species has a smooth cap with a central depression. Of varying shades, usually in a mixture or brown, gray, and olive, it is typically ringed with dark spots near the cap margin. Its firm white flesh produces white milk that dries to olive-gray on the white gills. Although considered inedible, it has been eaten after boiling or salting.

• **OCCURRENCE**

Mycorrhizal with beech. Widespread and very common in Europe and adjacent parts of Asia.

• **SIMILAR SPECIES** *Lactarius circellatus* grows only under hornbeam and has darker, ochre gills. *L. fluens* is larger and greener with cream gills and a zoned cap with a near white margin. *L. hortensis* (p.48). *L. trivialis* (p.49).



smooth cap is slimy when wet



smooth stem is paler than cap

spots of milk on crowded gills



slightly decurrent white gills



FRUITING Mostly found in troops in beech litter.

SECTION

Dimensions CAP $\leftrightarrow$ 4–9cm   STEM $\updownarrow$ 3–7cm $\leftrightarrow$ 1–2.5cm	Spores Pale yellow	Edibility
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Family RUSSULACEAE

Species *Lactarius fuliginosus*

Season Autumn

## VELVETY LACTARIUS

This species has a brown, slightly velvety cap, often with a central depression, and a tapering, pale brown to almost white stem. The firm, off-white flesh becomes pink-brown on exposure. White milk is exuded and slowly turns pink on the flesh. The other gills bruise pinkish brown. The spores are spherical, with crests and a netted surface.

• **OCCURRENCE** Mycorrhizal with deciduous trees, such as oak and beech, in woods.

European, but world distribution unclear.

• **SIMILAR SPECIES** Other brown *Lactarius* species with white milk that turns pink are identified by the speed with which this occurs and by cap color and spore ornament:

*L. acris* is pale and fast staining; *L. lignyotus*, found by conifers, is dark brown velvet, and slow reacting; *L. pterosporus* has a lighter colored cap and winged spores.



• cap is mid- to dark brown

where exposed, off-white flesh stains pink-brown •

• pale brown to almost white stem with white base

SECTION



very slightly decurrent gills

• well-spaced gills

young, inrolled margin

• velvety cap surface



**FRUITING** Appears singly or a few together.

Dimensions CAP ⬆ 6–10cm | STEM ⬇ 4–7cm ↔ 1–1.5cm

Spores Pale ocher

Edibility

Family RUSSULACEAE

Species *Lactarius pyrogalus*

Season Summer–autumn

## ZEBRA-SPORED LACTARIUS

The pale gray-brown cap of this species is often wavy margined with a depressed center; it is faintly concentrically zoned and slightly greasy. The other gills are unusually well spaced for a *Lactarius* species. A tiny drop of the white milk yielded by the crumbly flesh produces a burning taste that lasts for hours.

• **OCCURRENCE** Mycorrhizal with hazel in woods or gardens. Widespread and fairly common in Europe and adjacent areas of Asia.

• **SIMILAR SPECIES** *L. circellatus*

grows with hornbeam trees. It has more crowded gills and more dense, well-marked zones on the cap. *L. vietus*, which grows under birch trees, is more violet-gray, less zoned, and has yellowish white gills, gray-spotted with age. Its white milk dries lead-gray.



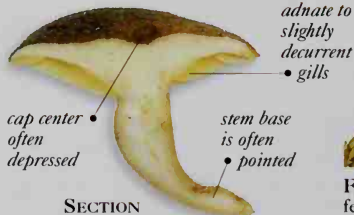
faint zones on cap surface

short stem is white to pale gray

greasy cap with wavy margin



• well-spaced, ocher gills



adnate to slightly decurrent gills

cap center often depressed

stem base is often pointed



**FRUITING** In troops or a few together on fertile soil.

Dimensions CAP ⬆ 4–10cm | STEM ⬇ 3–7cm ↔ 0.5–2cm

Spores Pale ocher-yellow

Edibility

Family RUSSULACEAE	Species <i>Lactarius trivialis</i>	Season Summer–autumn
--------------------	------------------------------------	----------------------

## SLIMY LEAD LACTARIUS

This species has a large, fleshy cap that is often spotted or faintly concentrically zoned. It appears in colors ranging from violet- to yellow-gray. The crumbly white flesh exudes acrid white milk that dries to greenish beige on the gills. It is safe only after salting and storing.

• **OCCURRENCE** Mycorrhizal with conifers and birch, often in damp woodlands. Widespread and locally common in northern temperate zones.

• **SIMILAR SPECIES** *Lactarius argillaceifolius* grows in eastern North America under oaks and has gills that stain and age brownish.



• pale cream gills

• compact white flesh

SECTION

• stem may soon become hollow

crowded gills are slightly decurrent



depressed cap  
• center

• smooth, greasy cap may fade in color with age



stem has tint of cap color

stem may be quite long

• inrolled cap margin



FRUITING In troops or a few fruitbodies together.



Dimensions CAP ⬆ 6–20cm   STEM ⬆ 4–10cm ↔ 1–3cm	Spores Pale yellow	Edibility
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Family RUSSULACEAE	Species <i>Lactarius pallidus</i>	Season Autumn
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## PALLID LACTARIUS

The cap and stem of the Pallid Lactarius are pale buff-yellow with a pale pink tinge. The cap is very faintly concentrically zoned and convex to depressed in the center.

Its copious white milk does not stain, and the thick white flesh tastes mild to slightly bitter. It has a very faint smell.

• **OCCURRENCE** Mycorrhizal with beech in woods and parks. Widespread in Europe; rare in North America.

• **SIMILAR SPECIES** *Lactarius blennius* (p.47). *L. curtus* has hot-tasting milk. *L. musteus* is slightly darker and grows under conifers.



smooth stem

• convex to slightly depressed cap

pale buff-yellow cap



FRUITING Mostly a few fruitbodies appear together.



adnate or decurrent gills are quite crowded

• pale yellow gills may have pink to brown tint




Dimensions CAP ⬆ 5–12cm   STEM ⬆ 3–8cm ↔ 0.5–2cm	Spores Pale ocher	Edibility
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Family RUSSULACEAE	Species <i>Lactarius mitissimus</i>	Season Autumn
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**MILD LACTARIUS**

This smallish lactarius has a convex orange cap that develops a central depression with age. Its crumbly, pale yellowish orange flesh has a mild taste and produces copious, nonstaining, white milk.


- **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, often found with moss. Widespread in Europe; similar, closely related forms are found in other northern temperate zones.
- **SIMILAR SPECIES** Relatives of a similar size tend to be darker, less vividly orange, or with more or less hot-tasting milk. *Lactarius ichoratus* is slightly larger, reddish orange, and has an unpleasant, sickly smell. *L. volemus* (p.54) is larger.




**FRUITING** Typically, a few fruitbodies appear together.



gills are medium spaced •



convex to depressed cap center •  
smooth, dry, yellow-orange to orange cap •  
stem paler or same color as cap •



off-white gills are slightly decurrent •  
pale yellowish orange flesh •

**SECTION**


Dimensions CAP ↔ 2–6cm   STEM ↓ 2–5cm ↔ 3–8mm	Spores Creamy pink	Edibility
---	--------------------	-----------

Family RUSSULACEAE	Species <i>Lactarius theiogalus</i>	Season Autumn
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**YELLOW-STAINING LACTARIUS**

The pale orange-tinted, gray-brown cap of this species has a central umbo; its margin is often furrowed. Its thin, pale flesh tastes mild, and the white milk stains yellow on a white handkerchief in 30 seconds or less. The stem is fairly long and is a similar color to the cap. The larger, more wrinkled form is sometimes regarded as a separate species, *Lactarius tabidus*.


- **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, often in damp, acid conditions among leaf litter. Widespread and common in many areas of northern temperate zones.
- **SIMILAR SPECIES** *L. lacunarum* also stains yellow but has a less wrinkled, non-striate, darker colored cap.



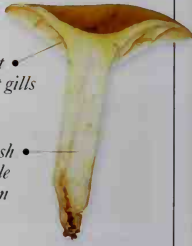
**FRUITING** In troops or a few fruitbodies together.



gills are crowded •  
off-white to cream gills •



furrowed cap margin •  
orange-tinted, gray-brown surface •  
stem same color as cap or darker •  
stem is fairly long and thin •



somewhat decurrent gills •  
pale flesh is fragile and thin •

**SECTION**

Dimensions CAP ↔ 2–5cm   STEM ↓ 3–8cm ↔ 0.4–1cm	Spores Off-white, tinged pink	Edibility
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Family RUSSULACEAE	Species <i>Lactarius hepaticus</i>	Season Autumn
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## LIVER LACTARIUS

The smooth cap of this mushroom has a depressed or slightly raised center and is dull liver-brown. The stem is a similar color or paler. It has crumbly, cream to pale brown flesh, exuding white milk that turns yellow. The flesh tastes hot and is not recommended for eating.

• **OCCURRENCE** Mycorrhizal with pine trees in woods and stands on very acidic, sandy soil; it has become more common because of the increase in acid rain. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Lactarius badiosanguineus* is shinier and red-brown; its milk displays a faint yellow reaction. *L. rufus* (p.53) is often found in the same habitat and has unchanging milk. The much paler *L. theiogalus* (p.50) has the same yellow milk reaction.



dull liver-brown cap sometimes has faint olive-green sheen

cap is smooth with depressed or slightly umbonate center

cylindrical stem



adnate to decurrent gills

thin, crumbly, cream or pale brown flesh

SECTION



fairly crowded, pink-tinged, brown or other gills



**FRUITING** In small groups or troops on pine needles.

Dimensions CAP ⊕ 3–6cm   STEM ⊕ 4–6cm ↔ 0.6–1cm	Spores Cream	Edibility
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Family RUSSULACEAE	Species <i>Lactarius subdulcis</i>	Season Summer–autumn
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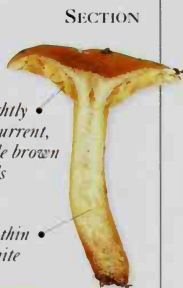
## DULL LACTARIUS

This species is most easily identified by its negative characteristics. These include white milk that does not turn yellow and thin white flesh without a hot taste. The buff to dull brown cap is convex with a center that may be slightly depressed or umbonate. The stem is a similar color to the cap, and the slightly decurrent gills are off-white at first, becoming pale brown.

• **OCCURRENCE** Mycorrhizal with deciduous trees, chiefly beech. Widespread and common in Europe; world distribution unknown.



buff to pale brown stem, darker toward base



SECTION

slightly decurrent, pale brown gills

flesh is thin and white



**FRUITING** Typically a few fruitbodies appear together.

fairly crowded gills



white milk does not stain



convex cap may be slightly depressed or umbonate

Dimensions CAP ⊕ 3–7cm   STEM ⊕ 3–6cm ↔ 0.5–1cm	Spores Cream to pink-cream	Edibility
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Family RUSSULACEAE	Species <i>Lactarius hygrophoroides</i>	Season Summer–autumn
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### DISTANT-GILLED LACTARIUS

This orange-brown species has a convex to flat or depressed cap without any zoning. Both the cap and the stem have a dry surface. The crumbly flesh is white and exudes abundant, unchanging white milk, which has a mild taste.

• OCCURRENCE

Mycorrhizal, especially with oak trees in wooded areas. Widespread and common in eastern North America; not found in Europe.

• SIMILAR SPECIES

*Lactarius corrugis* has a reddish brown cap with a wrinkled margin, ocher gills, and milk that stains brown. See also *L. volemus* (p.54). Both are choice edibles, and all three species can be found in the same area at the same time of the year.

*well-spaced, white to cream gills exuding milk drops* • *dry, orange-brown cap is convex to flat*



*gills are decurrent* •

*stem is dry and orange-brown*



**FRUITING** Appears in scattered but often abundant troops on the ground in open woodland.

Dimensions CAP ↔ 3–10cm   STEM ↓ 3–5cm ↔ 0.5–1.5cm	Spores White	Edibility
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Family RUSSULACEAE	Species <i>Lactarius quietus</i>	Season Summer–autumn
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### OAK LACTARIUS

This abundant species produces a variably zoned, dull gray-to red-brown cap, which has a slight depression when mature. It has crumbly, pale brown flesh and exudes sparse, creamy milk that does not change. Its characteristic oily smell is often likened to the smell of stinkbugs.

• OCCURRENCE Strictly mycorrhizal with oak trees, in mostly acidic woodland. Very common in Europe and neighboring parts of Asia.

• SIMILAR SPECIES *Lactarius chrysorrhoeus* is also mycorrhizal with oak but is paler and more yellow; it has copious white milk that quickly turns sulfur-yellow. *L. serifulus* has a similar but even stronger smell and a much darker cap.



*adnate to slightly decurrent gills*

*pale brown flesh with sparse milk*

SECTION



*older caps have small central depression*

*dark spots or zones on cap*

*stem usually same length as cap diameter*



*club-shaped stem base*

*medium-spaced, pale brown gills, becoming redder with age*



**FRUITING** Appears in troops of fruitbodies.

Dimensions CAP ↔ 4–8cm   STEM ↓ 3–7cm ↔ 0.5–1.5cm	Spores Cream to pink	Edibility
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Family RUSSULACEAE	Species <i>Lactarius camphoratus</i>	Season Autumn
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## FRAGRANT LACTARIUS

This species is dark red-brown, with a depressed or umbonate cap center and a rather thin stem with a purple-brown base. Its strong chemical or spicy smell, reminiscent of camphor or lovage, develops as it dries; when fresh, it is similar to that of the paler, zoned *Lactarius quietus* (p.52). The crumbly, pale rust-brown flesh has an unpleasantly bitter aftertaste. The milk is watery white and does not change color.

• **OCCURRENCE** Mycorrhizal with conifers or deciduous trees, favoring acidic, well-drained soil. Sometimes found on mossy, decayed stumps. Widespread and quite common in northern temperate zones.

• **SIMILAR SPECIES** *L. helvus* (p.55) has a similar smell.

dry, slightly scurfy cap surface



decurrent, medium-spaced, quite thick gills

pale red-brown gills become rusty-spotted with age



furrowed cap margin

dark red-brown cap with central depression or umbo



purple-brown stem



FRUITING In troops or small groups under trees.

Dimensions CAP ↔ 3–6cm   STEM ↓ 3–6cm ↔ 4–8mm	Spores White to cream	Edibility
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Family RUSSULACEAE	Species <i>Lactarius rufus</i>	Season Summer–autumn
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## RED-HOT LACTARIUS

Most specimens of this species have a cap that has a central depression with an umbo. The fruitbody is reddish brown, the gills being pale brown. The pale brown flesh is crumbly and exudes milk that remains white; the flesh tastes very hot after about 30 seconds but can be eaten only after being salted and then pickled.

• **OCCURRENCE** Mycorrhizal with conifers and birch, mostly on acid soil. This is one of the most familiar *Lactarius* species in many areas. Widespread and common in many regions of northern temperate zones.

• **SIMILAR SPECIES** *L. hepaticus* (p.51) exudes white milk that stains yellow as it dries.



dry, reddish brown cap with a silvery sheen due to surface fibers



white stem base

cap diameter equal to, or slightly less than, stem length



FRUITING In troops or a few fruitbodies together.



fairly crowded, pale brown gills

adnate to decurrent gills



SECTION

pale brown flesh

Dimensions CAP ↔ 3–10cm   STEM ↓ 5–10cm ↔ 0.5–2cm	Spores Off-white	Edibility
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Family RUSSULACEAE	Species <i>Lactarius glycosmus</i>	Season Summer–autumn
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## COCONUT-SCENTED LACTARIUS

A smell like freshly baked coconut cookies exudes from this species, which has subtle gray to ochre coloring, with pink-tinged, pale cream gills. The cap may have a central depression and an upward-flaring margin. The thin white flesh produces sparse amounts of mild- or slightly acid-tasting white milk that does not stain on exposure to air.

• **OCCURRENCE** Mycorrhizal with birch, often in damp places. Widespread and common in many areas of northern temperate zones.

• **SIMILAR SPECIES**

*Lactarius hibbardae* in northeastern North America has the same odor but is much darker and grows with conifers.



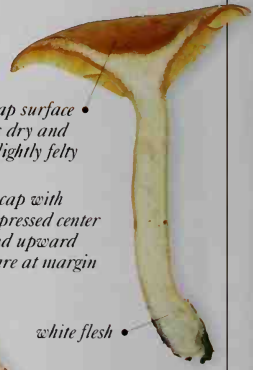
• *slender stem is paler shade of cap color*  
 • *fairly crowded gills*



• *slightly decurrent, pale cream gills with pink tinge*



• *cap surface is dry and slightly felty*  
 • *cap with depressed center and upward flare at margin*



• *white flesh*

SECTION



**FRUITING** Appears in troops among leaf litter.

Dimensions CAP ⊕ 2–6cm   STEM ↓ 2–7cm ↔ 0.5–1cm	Spores Pale yellow	Edibility
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Family RUSSULACEAE	Species <i>Lactarius volemus</i>	Season Autumn
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## LUSCIOUS LACTARIUS

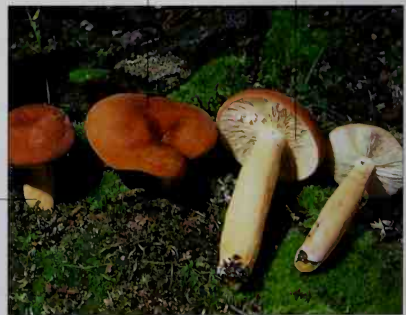
This very fleshy, matte orange species has a thin, cracking skin on its cap and a thick, paler orange stem with a velvety surface. When cut, its off-white, mild-tasting flesh produces copious white milk, which stains brown, and it smells strongly of shellfish, especially in mature specimens. The crowded, slightly decurrent gills are pale golden yellow.

• **OCCURRENCE** Mycorrhizal, mostly with oak and beech. Widespread but mostly uncommon in northern temperate zones.

• **SIMILAR SPECIES** *Lactarius hygrophoroides* (p.52), an equally common and choice edible in eastern North America, lacks the odor, does not stain, and has distant gills.

• *skin is thin and cracking on convex, matte orange cap*

• *crowded gills are slightly decurrent*



• *thick stem is pale orange*

**FRUITING** In troops or a few together under deciduous trees, more rarely conifers.

Dimensions CAP ⊕ 6–12cm   STEM ↓ 4–12cm ↔ 1–4cm	Spores Off-white	Edibility
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Family **RUSSULACEAE**

Species *Lactarius helvus*

Season Summer–autumn

## POISON LACTARIUS

A strong, spicy smell, similar to curry or the herbs lovage and fenugreek, characterizes this yellow-ocher to gray-brown species. Fairly large, it becomes funnel-shaped, with a central umbo, as it matures. Its crumbly flesh is yellow, white, or pale pink, and its mild-tasting milk is more sparse and watery than in most *Lactarius* species.

• **OCCURRENCE** Mycorrhizal with birch, pine, and spruce trees; often found growing among sphagnum moss.

Widespread in northern temperate zones.

• **SIMILAR SPECIES** *L. aquifluus* is very similar in appearance and occurs in North America.



large convex cap, becoming  
• funnel-shaped with age

smooth stem, •  
slightly paler  
than cap or  
with red tinge

central umbo on dry,  
• felted cap surface

slightly •  
decurrent  
gills

milk exuded from  
gills and flesh is  
sparse and watery •

SECTION

stem may be  
immersed in turf or  
sphagnum moss •

medium-spaced •  
gills are yellowish  
ocher, tinged pink



**FRUITING** In troops in wet, acidic sites under trees.

Dimensions CAP  $\updownarrow$  5–16cm | STEM  $\updownarrow$  5–13cm  $\leftrightarrow$  0.7–3cm

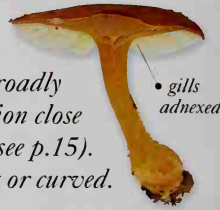
Spores Pale yellow to pinkish

Edibility 

# CAP & STEM FUNGI WITH ADNEXED TO ADNATE GILLS

This section consists of agarics in which the gill attachment to the stem varies from very narrow (adnexed) to very broad (broadly adnate). Some gills have a sharp indentation close to the stem; this is known as a notch (see p.15).

The gill edge may be straight or curved.



gills  
adnexed



gills  
adnate

## FLESHY WITH NO OBVIOUS VEIL

**T**HIS SUBSECTION features agarics on the cap, the cap margin, or the stem (pp.69–97). It includes the blewits but which, unlike other fleshy species, and most of the mycorrhizal trichs, do not have obvious veil remains either well as a range of other groups.

Family HYGROPHORACEAE

Species *Hygrocybe punicea*

Season Autumn

### CRIMSON WAX CAP

This large, fleshy mushroom has a broadly conical to almost flat, slightly moist, crimson-red cap and pale crimson-red to orange gills. The yellow stem is red flushed with a dry surface and a covering of fine, longitudinal fibers.

Its taste and smell are unremarkable; it should not be eaten.

#### • OCCURRENCE

In open deciduous and coniferous woods on the East and West coasts. Usually found growing with other species of *Hygrocybe*, *Geoglossum*, and *Clavulinopsis*; also in humus under coastal redwood trees in California.

#### • SIMILAR SPECIES *H. coccinea* (p.105).

*H. splendidissima* is brighter vermilion-red with a dry cap and a sweet, sickly smell.



gills are  
adnexed

moist,  
crimson-red  
cap surface  
darkens  
to gray  
with age



#### SECTION

well-spaced,  
thick, waxy  
gills



white, yellow, or pale  
red flesh



FRUITING Appears in small groups or troops.

Dimensions CAP ⬆ 4–12cm | STEM ⬆ 5–12cm ↔ 0.5–2.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Lepista irina*

Season Autumn

## PUNGENT FALSE BLEWIT

This species is gray-brown all over, although the mature gills are pink tinged. The convex cap becomes flattened with age, and the stem has a fibrillose surface. The strongly perfumed, off-white flesh is edible in Europe, but the common American form makes some people ill.

• **OCCURRENCE** Typically on calcareous soil in leaf litter, sometimes in mass fruitings late in the season. Widespread in Europe; found in northern North America and the Rockies.

• **SIMILAR SPECIES** *Lepista nuda* (below) and *L. personata* (p.58) are of similar stature but have violet or lilac tints and fainter smells.



**FRUITING** Often in fairy rings on leaf litter in forests.

convex cap is often wavy-margined



Dimensions CAP ⊕ 5–15cm | STEM ↓ 5–10cm ↔ 1–2cm

Spores Dingy pink

Edibility

Family TRICHOLOMATACEAE

Species *Lepista nuda*

Season Mainly autumn

## TRUE BLEWIT

The violet-brown cap of this easily identified, choice edible emerges dark and bun-shaped, becoming convex then flattened; its color becomes paler from the margin as the cap surface dries. The stem, with a club-shaped base, is a similar violet-brown; the sinuate gills are brighter violet, aging to buff-brown; the perfumed, firm flesh is marbled lilac-blue.

• **OCCURRENCE** Nutrient-rich woodland and garden habitats, such as in compost and thick leaf litter. Widespread and common in Europe and North America.

• **SIMILAR SPECIES** Unrelated poisonous look-alikes include species of *Entoloma* (p.68, 109–10, 144), *Cortinarius* (p.69–77), and *Hebeloma* (p.67, 82, 93).

bun-shaped, dark young cap



Dimensions CAP ⊕ 5–20cm | STEM ↓ 4–10cm ↔ 1.5–3cm

Spores Dingy pink

Edibility


**FRUITING** Appears in small groups and fairy rings.

Family TRICHOLOMATACEAE	Species <i>Lepista personata</i>	Season Autumn
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## BLUE-STALKED BLEWIT

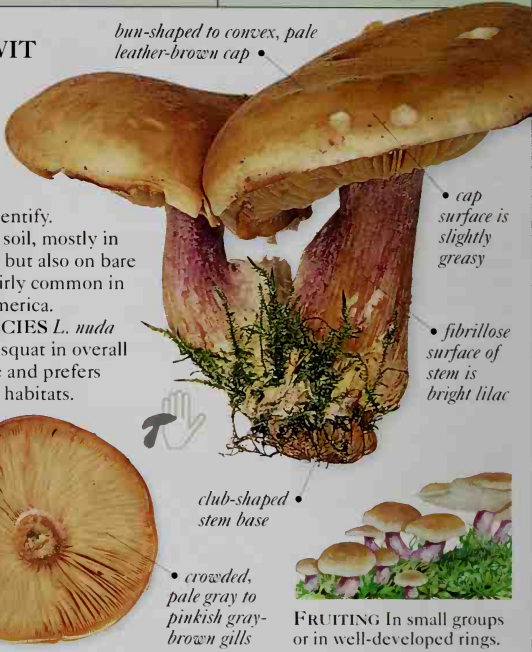
This fleshy agaric has a convex or bun-shaped, smooth-margined, pale leather-brown cap, which becomes flattened with age, and a fibrillose, bright lilac stem. The perfumed, firm flesh has a pale lilac tint. A popular edible, it is easy to identify.

- **OCCURRENCE** On rich alkaline soil, mostly in open grassland, roadsides, and parks but also on bare soil in woodland. Widespread and fairly common in Europe and North America.
- **SIMILAR SPECIES** *L. nuda* (p.57) is less squat in overall appearance and prefers woodland habitats.




- sinuate gills
- firm, pale lilac-tinted flesh

SECTION



- bun-shaped to convex, pale leather-brown cap
- cap surface is slightly greasy
- fibrillose surface of stem is bright lilac
- club-shaped stem base
- crowded, pale gray to pinkish gray-brown gills



FRUITING In small groups or in well-developed rings.


Dimensions CAP ⬆ 5–20cm   STEM ⬆ 3–7cm ↔ 1.5–4cm	Spores Brownish pink	Edibility  ⊙
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Family TRICHOLOMATACEAE	Species <i>Calocybe gambosa</i>	Season Late spring–summer
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## ST. GEORGE'S MUSHROOM

A very fleshy species, this mushroom is usually cream-white, although a pale brown to orange-brown form exists. It has a fleshy, rounded to convex cap with a slightly inrolled margin. The stem is smooth, and the adnexed gills are crowded. Smelling and tasting strongly yeasty with firm flesh, this is a much-valued edible.


- **OCCURRENCE** In grassland, woods, and quite often in gardens and parks. Widespread and locally common in Europe and adjacent parts of Asia. Not reported in North America.
- **SIMILAR SPECIES** Spring-fruiting white *Entoloma* species are distinguished by pink spore deposits and pink mature gills.



- slightly greasy cap surface
- smooth, inrolled margin



- crowded, adnexed, cream-white gills



FRUITING In troops or rings on rich, calcareous soil.

Dimensions CAP ⬆ 3–12cm   STEM ⬆ 2–7cm ↔ 1–2.5cm	Spores Cream-white	Edibility  ⊙
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Family TRICHOLOMATACEAE

Species *Tricholoma terreum*

Season Autumn

## DARK GRAY TRICH

The subtle colors of the Dark Gray Trich blend with the soil. It has an umbonate, dark gray cap with radial fibers and a smooth margin, and a silky-fibrillose, gray-white stem. The gills are sinuate, notched, and pale gray; unlike those of *Tricholoma scalpturatum* (below), they do not stain yellow. The pale flesh smells and tastes mild. It is edible, but see SIMILAR SPECIES.

• **OCCURRENCE** Mycorrhizal with conifers on rich, calcareous soil. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *T. pardinum* (p.60), is poisonous, bigger, scaly, and smells yeasty. *T. scalpturatum* (below).



**FRUITING** Appears in troops among needle debris.



• medium-spaced, pale gray gills



dry, dark gray cap with central umbo

• stem is short and sturdy



sinuate, notched gills

SECTION



fibrillose cap with a smooth margin

Dimensions CAP ⊕ 3–7cm | STEM ↓ 2–5cm ↔ 0.5–1.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma scalpturatum*

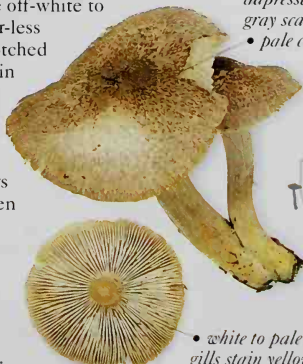
Season Early summer–late autumn

## YELLOW-STAINING TRICH

This belongs to a complex group of related species, making it difficult to identify; some experts recognize a paler form as *Tricholoma argyraceum*. The convex to umbonate, pale cap has gray scales flat against the surface (adpressed). The off-white to pale gray stem is more-or-less fibrillose; the gills are notched and sinuate. All parts stain yellow with age. Not safe to eat because of poisonous look-alikes.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, often birch. Widespread and common in Europe; recently reported in northern Rockies.

• **SIMILAR SPECIES** Poisonous *T. pardinum* (p.60). *T. terreum* (above).



adpressed gray scales on pale cap

• white to pale gray gills stain yellow



convex to umbonate cap

fibrous, pale flesh smells yeasty or like cucumber

SECTION



**FRUITING** Often in large troops of several hundred.

Dimensions CAP ⊕ 2–8cm | STEM ↓ 3–7cm ↔ 0.5–1cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma atosquamosum*

Season Autumn–late autumn

## DIRTY TRICH COMPLEX

This complex has a convex or umbonate, pale gray cap, with radially arranged upturned, dark, threadlike, fibrous scales and an inrolled margin. The pale stem is covered with black scales, and the flesh is pale and fibrous with a spicy fragrance like geranium (*Pelargonium*). It can be hard to identify (see SIMILAR SPECIES), so eating it is not recommended.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees. Widespread but local in Europe; world distribution not clear.

• **SIMILAR SPECIES** *Tricholoma orirubens* stains green and pink. *T. pardinum* (inset, right) is poisonous. *T. squarulosum* is even more scaly.



**FRUITING** Singly or in small groups on alkaline soil.

• dark radial fibers and scales on pale gray cap surface



• sinuate, notched, pale gray gills stain black at or near edge

SECTION

• gills are medium spaced

• pale flesh smells of spice

• club-shaped stem base



• hairlike black scales on stem



Δ **TRICHOLOMA PARDINUM**  
This species has a black-scaly cap and flesh that smells and tastes yeasty. It is found growing in mixed woods. ☠

Dimensions CAP ⊕ 3–12cm | STEM ↓ 4–8cm ↔ 0.5–1.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma sciodes*

Season Autumn

## SPOTTED GILL TRICH

This species has an off-white cap partially concealed by dark scales flattened against the surface (adpressed); it has a fairly prominent umbo. The gills have distinctive black spots, and the more or less cylindrical, pale stem is clad in hairlike gray scales; both may be pink flushed.

It has earthy-smelling, sharp-tasting flesh, and is inedible.

• **OCCURRENCE** Mycorrhizal with deciduous trees, often beech, on fertile soil. Widespread and common in Europe, except the boreal-arctic; world distribution not clear.

• **SIMILAR SPECIES** *Tricholoma orirubens* stains green and pink. *T. virgatum*, found in rich conifer forests, is silvery gray and conical.



**FRUITING** A few specimens together in leaf litter.

• fairly crowded, sinuate, notched gills

• pale gray gills have dark edges

• fibrous, pale flesh with earthy smell



SECTION

Dimensions CAP ⊕ 4–8cm | STEM ↓ 4–10cm ↔ 1–2cm

Spores White

Edibility

Family TRICHOLOMATACEAE	Species <i>Tricholoma saponaceum</i>	Season Late summer-late autumn
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## SOAPY TRICH

An extremely variable species, the Soapy Trich is often divided into a number of varieties. All forms are fleshy and smell strongly of soap. Some have dark scales on the stem. The gills are cream to gray-green, staining in shades of red or becoming pale green with age. The flattened to umbonate cap is gray-green here but is variable in color and lacks the streaking of *Tricholoma portentosum* (below) and *T. sejunctum* (p.63). Its surface is greasy when damp, becoming scaly when dry.

• **OCCURRENCE** Mycorrhizal with deciduous trees, it is also found with conifers. Widespread throughout northern temperate zones.



**FRUITING** Singly or in troops on a variety of soils.



SECTION

Dimensions CAP $\updownarrow$ 4-10cm	STEM $\updownarrow$ 4-10cm $\leftrightarrow$ 1-3cm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Tricholoma portentosum</i>	Season Autumn-late autumn
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## STICKY GRAY TRICH

This gray species is best identified by the combination of a shiny, radially fibrillose, fairly light gray cap and a gray stem that is flushed with yellow; the cap margin and the gills may stain yellow with age. The cap is convex, becoming umbonate, and is sticky when young or wet; soil and debris may adhere to the surface. This is a choice edible with a yeasty taste and smell.

• **OCCURRENCE** Mycorrhizal with conifers. Widespread and relatively common in northern temperate zones.

• **SIMILAR SPECIES** The cap of *Tricholoma sejunctum* (p.63) has green or brown hues.



**FRUITING** Singly or in troops, often on sandy soil.



SECTION

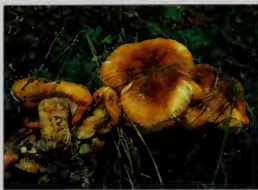
Dimensions CAP $\updownarrow$ 5-12cm	STEM $\updownarrow$ 5-10cm $\leftrightarrow$ 1-3cm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Tricholoma ustale</i>	Season Autumn-late autumn
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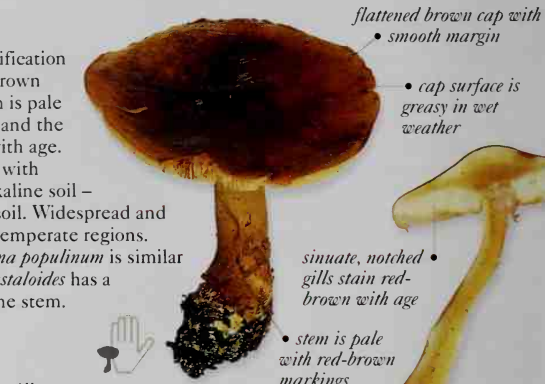
## BURNT TRICH

This species lacks unique identification features. The convex then flat brown cap is greasy when wet; the stem is pale brown with red-brown marking; and the off-white gills stain red-brown with age.

- **OCCURRENCE** Mycorrhizal with deciduous trees on neutral to alkaline soil – often found with beech on rich soil. Widespread and common throughout European temperate regions.
- **SIMILAR SPECIES** *Tricholoma populinum* is similar but occurs with poplar trees. *T. ustaloides* has a distinct pale zone at the top of the stem.



Δ **TRICHOLOMA AURANTIUM**  
Mainly found with conifers, this species is orange with white showing on the stem. The cap may be sticky or almost velvety, depending on the weather. ☞



gills are off-white



pale flesh becomes darker at stem base  
gills are fairly crowded



SECTION



FRUITING Appears singly or in troops of fruitbodies.

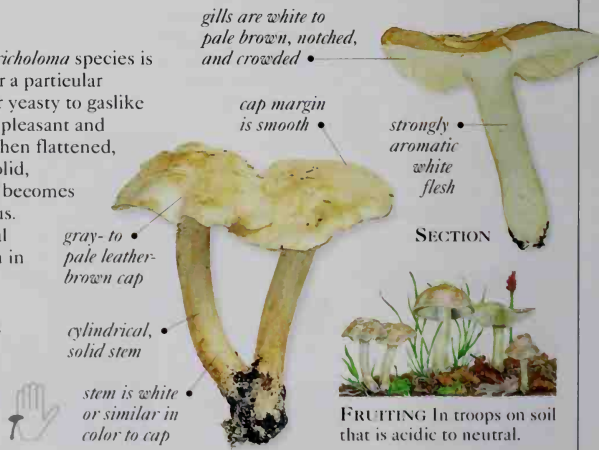
Dimensions CAP ⬆ 3–10cm   STEM ⬆ 4–10cm ↔ 0.5–2cm	Spores White	Edibility ☞
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Family TRICHOLOMATACEAE	Species <i>Tricholoma lascivum</i>	Season Autumn-late autumn
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## OAK TRICH

This small to medium-sized *Tricholoma* species is recognized by its preference for a particular habitat and then by its sweet or yeasty to gaslike smell, which some people find pleasant and others dislike. It has a convex then flattened, pale leather-brown cap and a solid, cylindrical, off-white stem that becomes pale brown. It may be poisonous.

- **OCCURRENCE** Mycorrhizal with oak, beech, and hornbeam in woodland. Widespread and common throughout Europe.
- **SIMILAR SPECIES** Among other pale *Tricholoma* species, *T. album* is almost pure white and found only with birch. *Calocybe gambosa* (p.58) occurs mostly in spring.



SECTION



FRUITING In troops on soil that is acidic to neutral.

Dimensions CAP ⬆ 4–8cm   STEM ⬆ 5–8cm ↔ 1–1.5cm	Spores White	Edibility ☞
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Family TRICHOLOMATACEAE

Species *Tricholoma sejunctum*

Season Autumn

## FALSE EDIBLE TRICH

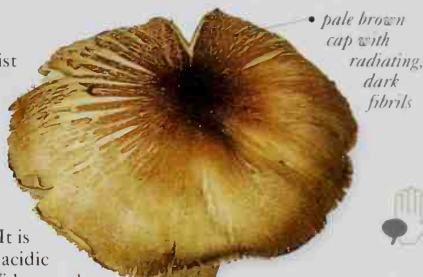
The green or brown cap of this species is moist and domed, flattening with age. Its surface has dark fibrils and is greasy in wet weather. The white stem develops yellow flushes with age, and the flesh is off-white, tinted yellow under the cap skin. It causes nausea if eaten; see also SIMILAR SPECIES.

• **OCCURRENCE** Mycorrhizal with deciduous trees, such as beech, and conifers. It is found in woodland or large stands, usually on acidic soil; the beech form occurs on alkaline soil. Widespread throughout northern temperate regions.

• **SIMILAR SPECIES** *Tricholoma portentosum* (p.61). The poisonous *Amanita phalloides* (p.151) is distinguished by its volva, stem ring, and free gills.



**FRUITING** Appears in small groups or troops.



• pale brown cap with radiating, dark fibrils



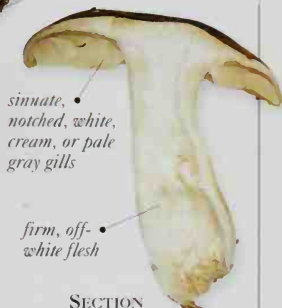
• pointed stem base



cap • surface is greasy when wet

• cap is domed, flattening with age

white stem • develops yellow flushes with age



sinuate, notched, white, cream, or pale gray gills

firm, off-white flesh

SECTION

Dimensions CAP ⊕ 5–10cm

STEM ↓ 5–8cm ↔ 1–1.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma flavovirens*

Season Autumn–early winter

## EDIBLE YELLOW TRICH

There are several forms of this species, which is also known as *Tricholoma auratum* or *T. equestre*. They are all yellow, with an expanded convex cap and pale yellow stem, but differ in fruitbody size, being slender or more robust depending on location. The flesh is a whitish yellow and has a faint to strong yeasty smell, differing in the various forms and strongest in the form associated with pine (shown here). It is a choice edible, but the pine form can be difficult to clean because it is ingrained with grit.

• **OCCURRENCE** Mycorrhizal: robust forms occur in pine woods; slender forms are mostly found under spruce and aspen. Widespread and fairly common throughout northern temperate zones.

medium-spaced, sinuate, notched gills

expanded-convex, yellow-brown cap

dirt sticks to cap and stem

pale yellow stem

gills are bright yellow



**FRUITING** In troops; different forms are found with pine, on sandy soil, or with spruce or aspen.

Dimensions CAP ⊕ 5–14cm

STEM ↓ 5–10cm ↔ 1.5–2.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma sulphureum*

Season Autumn-late autumn

## POISON GAS TRICH

This poisonous species can be recognized instantly by its sulfur-yellow fruitbody and the nauseating smell it exudes. The smell, like that of a gasworks, is produced by a chemical compound called scatol. The cap is convex to umbonate with a smooth margin. The stem surface is slightly fibrillose with an off-white base that may be swollen. Some mycologists distinguish a smaller species, *Tricholoma bufonium*, which has a red-dyed cap center and a similar smell.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees. Widespread in northern temperate zones.

smooth  
cap margin



well-spaced,  
sinuate,  
notched gills



cap is convex  
to umbonate



dry, sulfur-  
yellow cap  
surface

sulfur-  
yellow  
flesh  
smells of gas

slightly  
fibrillose stem



SECTION

stem base is  
off-white and  
often swollen



FRUITING Appears singly or in troops of fruitbodies.

Dimensions CAP  $\leftrightarrow$  2-8cm | STEM  $\updownarrow$  4-10cm  $\leftrightarrow$  0.5-2cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Tricholoma fulvum*

Season Autumn

## BIRCH TRICH

This tall species is best identified by its warm orange-brown coloring and bitter-tasting, bright yellow flesh. It has a yeasty smell. The cap is convex with an umbo and a furrowed margin. Its pale yellow gills, which become brown-spotted with age, are sinuate and notched - typical of *Tricholoma* species. It may be poisonous.

• **OCCURRENCE** Mycorrhizal with birch trees and possibly with spruce. Widespread throughout northern temperate zones.

• **SIMILAR SPECIES** *Tricholoma albobrunneum*, found under conifers, has flesh that is white or brown-tinged. *T. ustale* (p.62).

slight umbo at  
cap center



smooth, dry cap  
surface, greasy  
when wet

yellow-  
brown stem

yellow flesh  
is bitter and  
smells yeasty



SECTION

pale yellow  
gills are sinuate  
and notched



FRUITING Appears in troops, mostly on damp ground.

Dimensions CAP  $\leftrightarrow$  4-10cm | STEM  $\updownarrow$  7-15cm  $\leftrightarrow$  1-2.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE	Species <i>Melanoleuca polioleuca</i>	Season Autumn
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## BLACK AND WHITE TRICH

This species has an umbonate, dark gray-brown cap and a mealy, dark stem, contrasting with the white to pale gray gills. The white flesh stains very dark brown from the stem base upward. With its indistinct smell and taste, it is not worth eating.

• **OCCURRENCE** On soil; found in large numbers in gardens, parks, and along roadsides. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Melanoleuca melaleuca*, once regarded as the same species, is now considered to be a rarer member of the genus. It grows mostly with pine. There are many other similar *Melanoleuca* species.



**FRUITING** In troops on soil that has been disturbed.



Dimensions CAP ⊕ 4–7cm   STEM ↓ 3–8cm ↔ 0.5–1cm	Spores Very pale cream	Edibility
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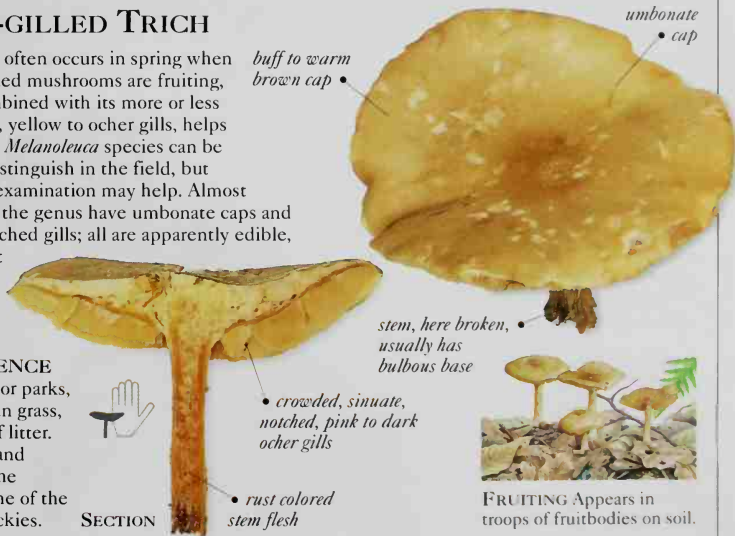
Family TRICHOLOMATACEAE	Species <i>Melanoleuca cognata</i>	Season Spring–autumn
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## OCHER-GILLED TRICH

This species often occurs in spring when few other gilled mushrooms are fruiting, and this, combined with its more or less pink-flushed, yellow to ocher gills, helps to identify it. *Melanoleuca* species can be difficult to distinguish in the field, but microscopic examination may help. Almost all species in the genus have umbonate caps and narrowly attached gills; all are apparently edible, or at least not

poisonous, but are not worthwhile for cooking.

• **OCCURRENCE** In woodland or parks, on bare soil, in grass, or among leaf litter. Widespread and frequent in the spruce-fir zone of the Colorado Rockies.



**FRUITING** Appears in troops of fruitbodies on soil.

Dimensions CAP ⊕ 5–12cm   STEM ↓ 3–8cm ↔ 0.5–1.2cm	Spores Cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Megacollybia platyphylla</i>	Season Spring-summer
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### BROAD-GILLED COLLYBIA

The mid- to pale brown cap of this species is convex to umbonate, with broad gills, and the pale brown stem has longitudinal fibers. At the stem base, thick stringlike rhizoids spread wide and deep into the substrate. Known in North America as *Tricholomopsis platyphylla*, it causes gastric upsets.

- **OCCURRENCE** On buried deciduous branches and stumps; often appears to be fruiting on leaf litter or growing on rotten deciduous stumps. Widespread and common throughout northern temperate zones.
- **SIMILAR SPECIES** *Pluteus cervinus* (p.171) has free gills and a salmon-pink spore print.



FRUITING Singly or in small groups connected by rhizoids.



Dimensions CAP 6-15cm   STEM 5-12cm ↔ 1-2.5cm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Tricholomopsis rutilans</i>	Season Late summer-late autumn
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### PLUMS-AND-CUSTARD WOOD TRICH

This species is instantly recognizable by its yellow cap, heavily streaked with purple, and contrasting egg-yellow gills. The cap is convex with a central depression. The hollow stem is powdery with fine, purple to purple-yellow scales.

- **OCCURRENCE** Unlike the similar mycorrhizal *Tricholoma* species, *T. rutilans* causes decay in conifers. It is found in woodlands and large stands of conifers or pine. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *T. decora*, a rarer species in most regions, lacks the red shades and has fine black hairs on the yellow cap.



FRUITING In small clusters of fruitbodies on rotten wood.



Dimensions CAP 5-10cm   STEM 4-10cm ↔ 1-2.5cm	Spores White	Edibility
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Family TRICHOLOMATACEAE

Species *Collybia maculata*

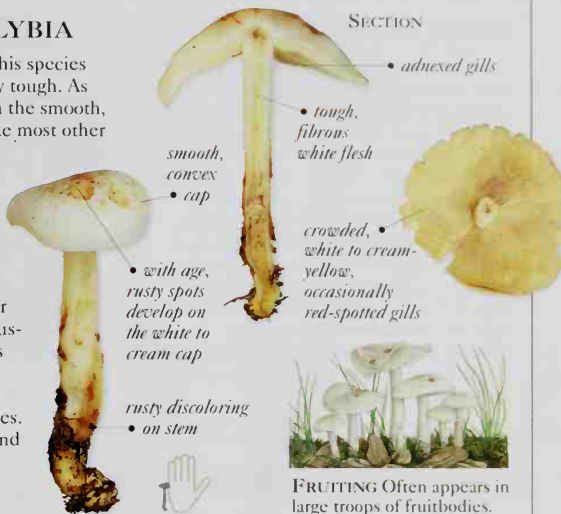
Season Autumn

## RUST-SPOTTED COLLYBIA

On emergence, the fruitbodies of this species are pure white to off-white and very tough. As they mature, rusty spots develop on the smooth, convex cap and the stem. It is unlike most other *Collybia* species and more akin to *Tricholoma* species (p.59–64) in stature. This, together with its cream-orange spore deposit, has led to proposals that the genus *Rhodocollybia* be reinstated for it and a few other similar species.

• **OCCURRENCE** In woods, under conifers or deciduous trees on humus-rich, acidic soil. It can produce mass fruitings, making it difficult to find anything else. It is widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *C. distorta* and *C. proluxa* are similar in stature but have darker caps. *Tricholoma album* has softer, strong-smelling flesh.



Dimensions CAP ⬆ 4–10cm | STEM ⬆ 6–12cm ↔ 1–2.5cm

Spores Cream-orange

Edibility

Family CORTINARIACEAE

Species *Hebeloma crustuliniforme*

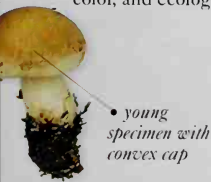
Season Summer–autumn

## POISON PIE HEBELOMA

This species has a convex, somewhat fleshy, buff cap. The stem is off-white with a mealy surface and widens toward the base. Drops of clear liquid exude from the edges of the gills; mature spores are trapped in the drops, making dark spots at the gill edges. The thick white flesh of this poisonous mushroom smells of radishes.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, in parks and woods. It and close relations are widespread and common in northern temperate zones.

• **SIMILAR SPECIES** Related species, such as *Hebeloma edurum*, *H. leucosarx*, and *H. sinapizans*, have a similar smell of radishes or sometimes a hint of cocoa, and are distinguished by spore size and shape, their reactions in iodine reagents, and subtle differences in size, cap color, and ecology.



Dimensions CAP ⬆ 4–9cm | STEM ⬆ 3–8cm ↔ 0.8–2cm

Spores Brown

Edibility

Family ENTOMATACEAE	Species <i>Entoloma sinuatum</i>	Season Autumn
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## LEAD POISON ENTOLOMA

A convex, pale gray-brown to ocher-cream cap with medium-spaced, sinuate, notched, pale yellow young gills, which become the typical *Entoloma*-pink with age, are good indicators of this mushroom. It also has a white to grayish cream stem and a yeasty to nauseating smell. It is important to get to know this *Lepista* look-alike because it is responsible for a high percentage of mushroom poisonings.

• **OCCURRENCE** In mature deciduous woodlands, often on clay soil. Widespread but local in Europe. Replaced by close relatives in North America and East Asia.

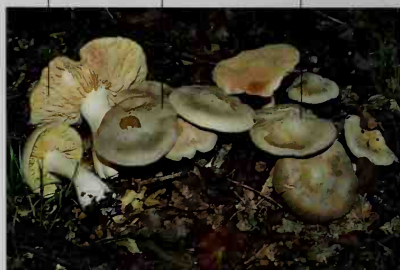
• **SIMILAR SPECIES** *Lepista irina* (p.57) is strongly perfumed, and its gray-brown stem is fibrillose.



*sinuate, notched, medium-spaced gills*

*cap is pale gray-brown to ocher-cream*

*convex cap with central umbo*



**FRUITING** Appears in small groups often under deciduous trees, such as oak or beech, in woods.

Dimensions CAP ⊕ 8–20cm   STEM ↓ 10–18cm ↔ 2–4cm	Spores Pale pink	Edibility ☠
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Family ENTOMATACEAE	Species <i>Entoloma rhodopolium</i>	Season Autumn–late autumn
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## BEECH WOODS ENTOLOMA

This very varied species is difficult to identify. The gray or gray-brown cap is convex with an umbo, or slightly depressed. The gray stem is often long and slender with pale gray to pale brown flesh, odorless or smells of gas. The gaslike form is more slender and was once considered a separate species, *Entoloma nidorosum*. All forms are poisonous.

• **OCCURRENCE** In deciduous woodlands, especially beech woods, on rich soil. Widespread and locally common in northern temperate zones; world distribution unclear.

• **SIMILAR SPECIES** A number of similar species differ subtly in coloring and various microscopic characteristics.



### Δ *ENTOLOMA CLYPEATUM*

This spring-fruiting species has a gray-brown cap, a brown-tinged, white stem, and sinuate, notched, pale gray gills aging to pink. ☠

*slender, silky gray stem with longitudinal fibers*

*crowded, whitish gray then dirty pink gills*



*broad, thick gills are sinuate and notched*

*cap margin may have radial striations*

*soft, pale gray to pale brown flesh*

SECTION



**FRUITING** Appears in troops among leaf litter.

Dimensions CAP ⊕ 4–12cm   STEM ↓ 6–15cm ↔ 0.5–2cm	Spores Dirty pink	Edibility ☠
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Family ENTOLOMATACEAE	Species <i>Entoloma porphyrophacum</i>	Season Summer–autumn
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**PURPLISH ENTOLOMA**

Gray-purple coloring and a tall stature, along with a grassland habitat, make this species easily recognizable. The cap is umbonate, becoming conical with age. It has white flesh, with no distinctive smell, and may be poisonous.

•**OCCURRENCE** In unimproved grassland, often associated with Hygrophoraceae and Clavariaceae; also in alpine areas. Widespread but uncommon in Europe and eastern North America; it has suffered from the farming practice of using commercial fertilizer on pastures.



**FRUITING** Singly or in small groups of fruitbodies.



Dimensions CAP ↔ 4–8cm   STEM ↓ 7–14cm ↔ 0.5–2cm	Spores Pale pink	Edibility
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## WITH COBWEBLIKE VEIL


**S**PECIES OF *CORTINARIUS*, which are featured in this subsection, are highly variable in size and shape. However, they all have a partial veil, resembling a fine spider's web, which protects the young gills. They also have rusty brown spore deposits, often seen as a rusty smudge on the veil remains.

Family CORTINARIACEAE	Species <i>Cortinarius bolaris</i>	Season Summer–autumn
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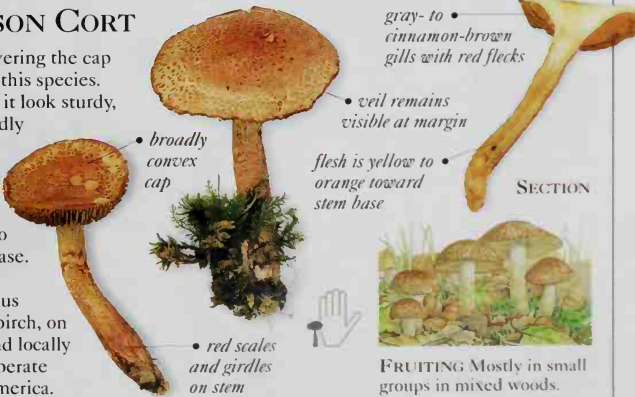
**MOTTLED POISON CORT**

Distinctive red scales covering the cap and stem readily identify this species. A fairly short stem makes it look sturdy, and the fleshy cap is broadly convex with remains of the veil visible as fine threads at the margin. Thick, off-white flesh in the cap becomes yellow to orange toward the stem base.

•**OCCURRENCE** Mycorrhizal with deciduous trees, especially oak and birch, on acidic soil. Widespread and locally common in northern temperate zones in eastern North America.



**FRUITING** Mostly in small groups in mixed woods.



Dimensions CAP ↔ 3–6cm   STEM ↓ 3–6cm ↔ 0.8–1.5cm	Spores Rusty brown	Edibility
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Family CORTINARIACEAE	Species <i>Cortinarius pholideus</i>	Season Autumn
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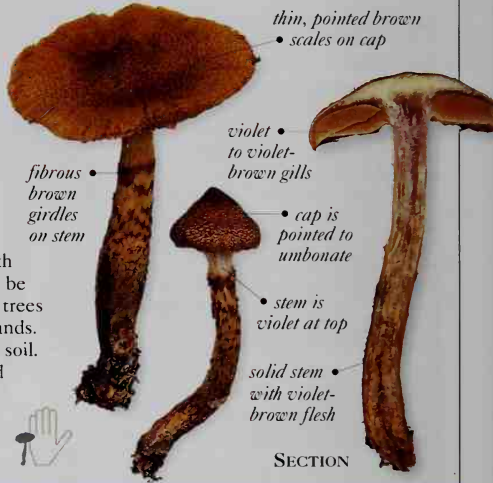
## SCALY CORT

A brown-scaled cap and a long stem ringed with brown veil girdles characterize this web-cap. The cap is more or less convex when young, flat with a central umbo when mature. When young, the adnate gills are violet-blue; they age to violet-brown as the spores mature to rusty brown. A faint smell reminiscent of fresh tangerines exudes from the violet-tinged, pale brown flesh.

• **OCCURRENCE** Typically mycorrhizal with birch but may also be found with other trees in mixed woodlands. It prefers acidic soil. Widespread and quite common in northern temperate zones.



**FRUITING** Appears in small groups on mossy soil.



SECTION

Dimensions CAP ⬆️ 3–8cm   STEM ⬆️ 5–12cm ↔️ 0.5–1cm	Spores Rusty brown	Edibility
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Family CORTINARIACEAE	Species <i>Cortinarius semisanguineus</i>	Season Summer–autumn
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## POISON DYE CORT

The uniform red-brown coloring and blood-red gills are the best aid to identification of this species. It has a convex, olive- to red-brown cap, becoming umbonate with age; the paler stem exhibits threadlike veil remnants.

The flesh of the cap is a paler red-brown than that of the stem. The Poison Dye Cort is an excellent source of a dye used for coloring wool.

• **OCCURRENCE** Almost exclusively mycorrhizal with conifers, it is often abundant under young spruce trees in large stands. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Cortinarius phoeniceus* has a redder cap and more distinct red veil girdles around the stem.



**FRUITING** In troops under conifers, often in moss.



SECTION



△ **CORTINARIUS CINNAMOMEUS**  
This close relative occurs with deciduous trees and conifers. It has orange or orange-yellow gills aging to cinnamon-brown. ☠️

Dimensions CAP ⬆️ 2–7cm   STEM ⬆️ 4–10cm ↔️ 0.5–1cm	Spores Rusty brown	Edibility
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Family CORTINARIACEAE

Species *Cortinarius paleuceus*

Season Summer–autumn

## GERANIUM CORT

Fine, white to off-white veil scales on an umbonate or pointed, dark brown cap and a geranium-like fragrance (*Pelargonium*) help identify this species. On some specimens, the scales are almost absent, or the cap margin may be striate. The margin usually also displays veil remnants, and the slender stem has a thin ring and often white veil bands (forms with lilac on the stem are sometimes distinguished as a separate species called *Cortinarius paleifer*). The widely spaced gills, which may be violet-tinged when young, age to cinnamon-brown.

• **OCCURRENCE** Mycorrhizal mainly with conifers in damp woods, but also found under deciduous trees in a wide range of woodland habitats. Widespread in northern temperate zones.

• **SIMILAR SPECIES** There is a wide range of similar but not very distinctive small *Cortinarius* species.



**FRUITING** In troops, often among moss and pine litter.

remnants of veil on cap margin



umbonate, dark brown cap dries to pale brown

thin ring on stem

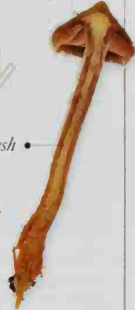
broad, notched gills become cinnamon-brown with age



umber flesh

fine, pointed, off-white veil scales on cap surface

SECTION



Dimensions CAP ⊕ 1–3cm | STEM ↓ 4–7cm ↔ 3–5mm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius violaceus*

Season Summer–autumn

## EDIBLE CORT

A deep violet-blue coloring sets this species apart. The convex to umbonate cap has fine radial fibers, and the stem bears the cobwebby remains of the veil on top of longitudinal fibers. The thick, broad gills are adnexed and become violet-brown as the spores mature. There are two forms, distinguished by their mycorrhizal associations (see OCCURRENCE). The scaly-capped, dark violet Corts are the only safe edibles in this genus in North America.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees; the coniferous form may be a separate species, *Cortinarius hercynicus*. Widespread but local in northern temperate zones.



**FRUITING** In small groups in damp woods or by bogs.

deep violet-blue stem

club-shaped stem base



fine radial fibers cover dry, violet-blue cap

fibers on stem are mixed with remains of veil

weblike white veil at cap margin

paler flesh at stem base

SECTION



Dimensions CAP ⊕ 6–15cm | STEM ↓ 6–14cm ↔ 1–2.5cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius armillatus*

Season Summer–autumn

## RED-BANDED CORT

This web-cap has a large, thick-fleshed, convex, orange-brown cap, the surface of which is covered with fine fibers. The tall, sturdy stem is girdled with prominent cinnamon-red veil remains.

The cap margin also bears the remains of the veil.

## • OCCURRENCE

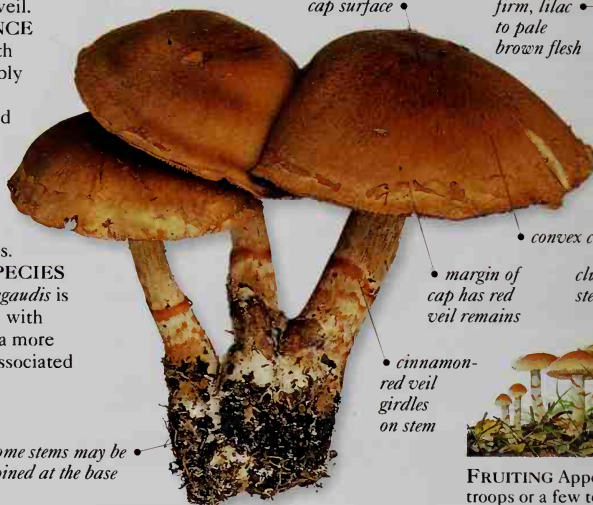
Mycorrhizal with birch and possibly other trees, in damp woods and boggy areas. Widespread and rather common in northern temperate zones.

## • SIMILAR SPECIES

*Cortinarius paragaudis* is slightly smaller, with stem girdles of a more dirty red. It is associated with conifers.



some stems may be joined at the base



adnate gills are pale brown, darkening with age

SECTION

fine scales and fibers cover cap surface

firm, lilac to pale brown flesh

convex cap

margin of cap has red veil remains

club-shaped stem base

cinnamon-red veil girdles on stem



FRUITING Appears in troops or a few together.

Dimensions CAP ⌀ 5–12cm | STEM ↓ 7–15cm ↔ 1–3cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius rubellus*

Season Summer–autumn

## DEADLY CONIFER CORT

This deadly poisonous mushroom, which smells of radishes, is reddish orange with a pointed, umbonate cap covered with fibrils. The cylindrical to club-shaped, orange-brown stem has pale yellow to other bands indicating the veil remnants. The medium-spaced, adnexed to adnate gills are pale ocher-brown, darkening to deep rust-brown with age.

• OCCURRENCE Mycorrhizal, mostly with coniferous trees, on acidic soil.

Widespread and locally common in Europe and parts of Asia.

• SIMILAR SPECIES *C. limonium*, also poisonous, has more vivid orange coloring. *C. orellanus* (p.73) has a less conical cap and grows near deciduous trees.

pointed, umbonate cap with fibrils

pale veil girdles on pale orange-brown stem

stem base is up to 2cm wide



FRUITING Appears singly or in troops of fruitbodies on acid soil.

Dimensions CAP ⌀ 3–8cm | STEM ↓ 5–11cm ↔ 0.8–1.5cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius orellanus*

Season Autumn

## DEADLY CORT

This deadly poisonous species has an umbonate to flattened, red-brown cap with a strongly fibrillose surface. The thick, adnexed to adnate gills are rusty yellow and well spaced, whereas the cylindrical stem is pale yellow-brown. The stem also bears darker, threadlike traces of the universal veil, but it has no girdles, unlike *Cortinarius rubellus* (p.72). Ingestion of this deadly mushroom causes severe kidney damage; the symptoms typically appear a long time after eating.

• **OCCURRENCE** Mostly associated with deciduous trees, such as oak, on acidic soils. Widespread in warm-temperate parts of Europe; absent from North America.

umbonate to flattened cap with fibrillose surface

cap surface is orange-red

adnexed to adnate gills are rusty yellow

cylindrical stem may taper toward base

stem base is yellow-orange without obvious girdles



**FRUITING** Appears mainly in small groups of fruitbodies on acid soil under deciduous trees.

Dimensions CAP ⬆ 3–6cm | STEM ⬆ 4–9cm ↔ 1–2cm

Spores Rusty brown

Edibility ☠

Family CORTINARIACEAE

Species *Cortinarius alboviolaceus*

Season Autumn

## SILVERY VIOLET CORT

This species has a convex to umbonate, fleshy, silvery violet cap. The twisted, often club-shaped stem is also silvery violet and is sometimes marked rust-brown around the veil zone by deposited spores. The rather broad, sinuate, notched gills are medium spaced and light gray-blue to cinnamon-brown.

• **OCCURRENCE** Mycorrhizal, usually with deciduous trees, but also found with conifers, often on acidic soil. Widespread in northern temperate zones; common in eastern North America.

• **SIMILAR SPECIES** *Cortinarius malachius* has a slightly scaly cap. It is associated with conifers, as are *C. camphoratus* and *C. traganus*, which are noted for their penetrating smells: the former reminiscent of half-rotten potatoes, the latter sweet and sickly.

convex, dry, silvery violet cap

SECTION

light gray-blue or cinnamon-brown gills

off-white flesh with violet tinge

remains of white veil, often rust-brown from spores

twisted, silvery violet stem

club-shaped stem base



**FRUITING** Singly or in small groups in leaf litter.

Dimensions CAP ⬆ 5–8cm | STEM ⬆ 5–12cm ↔ 1–2cm

Spores Rusty brown

Edibility ☠

Family CORTINARIACEAE

Species *Cortinarius torvus*

Season Autumn-late autumn

## SHEATHED CORT

Comparatively pale coloring, along with a "stocking" on the stem and a fleshy cap with widely spaced gills, help identify this mushroom. The cap is bun-shaped and grayish brown, with white veil remnants (violet when young) at the margin, and radiating fibers on the surface. The buff-brown flesh may be tinged violet in the upper stem.

• **OCCURRENCE** Mycorrhizal with beech or pine, in woodlands on a variety of soil types. Widespread in Europe and eastern North America.

• **SIMILAR SPECIES** *Cortinarius subtorvus* is darker and grows with willow and the woody perennial Mountain Avens (*Dryas octopetala*) in mountain areas. There are several other similar species that differ mostly in coloring or in habitat preference.



bun-shaped, grayish  
• brown cap

thick, firm, sinuate,  
notched gills •

• "stocking"  
rim on stem

• club-shaped  
stem base



SECTION



widely spaced, •  
violet gills age to  
rusty brown



FRUITING Singly or a few  
together among leaf litter.

Dimensions CAP ↔ 4-8cm | STEM ↓ 4-9cm ↔ 0.5-1.5cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius anserinus*

Season Autumn

## PLUM-SCENTED CORT

This is a fleshy species with a convex, yellow-brown cap and a sturdy stem with a bulbous base. As its common name suggests, it smells of plums. It is inedible; the lilac to off-white flesh is mild tasting, but the cap skin is bitter.

• **OCCURRENCE** Mycorrhizal with beech on alkaline soil. Widespread and locally common in Europe. World distribution not clear.

• **SIMILAR SPECIES** A host of other related species, such as *Cortinarius calochrous* (below), occur in similar habitats.



△ **CORTINARIUS CALOCHROUS**  
This species has a yellow-green cap with a dark center, lilac gills, and a stem bulb. Both its flesh and its cap skin taste mild.



thick, firm flesh is  
off-white in cap •

adnexed  
gills •

gray-blue or lilac •  
gills age rusty gray-brown

lilac flesh •  
in stem

SECTION

• remains of veil  
visible at cap margin

top of stem  
paler than base •

veil remnants  
color stem  
bulb ocher



FRUITING Appears singly  
or in small groups.

Dimensions CAP ↔ 6-12cm | STEM ↓ 6-12cm ↔ 1-2.5cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius triumphans*

Season Summer–autumn

## YELLOW-BANDED CORT

This impressive species has a greasy, convex, orange-yellow cap, often with veil remnants at the margin, and prominent yellow veil girdles on the sturdy stem. The thick, yellow-cream flesh tastes bitter and has a faint, pleasant smell.

• **OCCURRENCE** Mycorrhizal with birch, in woods and on damp lawns in gardens and parks. Widespread but local in Europe and parts of Asia; reported in northeastern North America.

• **SIMILAR SPECIES** *Cortinarius chiduchus* has a darker cap and grows on alkaline soil among deciduous trees.

*C. olidus* has a darker cap and a brown-olive veil. It smells strongly earthy and is not found with birch. *C. saginus* has a redder cap and is found growing among pines.



**FRUITING** In troops in grass under birch trees.



greasy, convex cap is  
• orange-yellow

notched, gray to  
blue-white gills •

• veil girdles  
are yellow,  
stained brown  
by falling  
spores

• sturdy,  
pale yellow  
stem, pointed  
at base

Dimensions CAP ⊕ 8–15cm | STEM ↓ 10–15cm ↔ 1–3cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE

Species *Cortinarius mucosus*

Season Summer–autumn

## ORANGE SLIME CORT

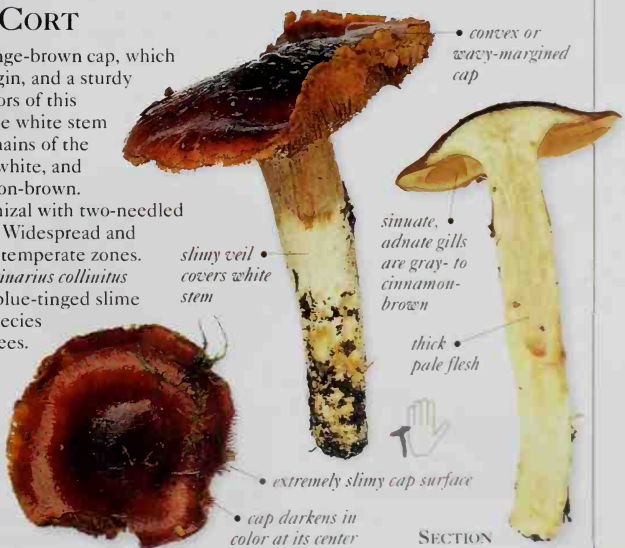
A fairly dark reddish to orange-brown cap, which is convex or has a wavy margin, and a sturdy white stem are good indicators of this species. Both the cap and the white stem are covered in the slimy remains of the veil. The flesh is thick and white, and the gills are gray- to cinnamon-brown.

• **OCCURRENCE** Mycorrhizal with two-needled pines, usually on sandy soil. Widespread and locally common in northern temperate zones.

• **SIMILAR SPECIES** *Cortinarius collinitus* occurs with spruce and has blue-tinged slime on its stem. Other similar species grow under different host trees.



**FRUITING** Singly or a few together beneath pines.



• convex or  
wavy-margined  
cap

slimy veil •  
covers white  
stem

sinuate, •  
adnate gills  
are gray- to  
cinnamon-  
brown

thick •  
pale flesh

• extremely slimy cap surface

• cap darkens in  
color at its center

SECTION

Dimensions CAP ⊕ 6–10cm | STEM ↓ 7–12cm ↔ 1–2.5cm

Spores Rusty brown

Edibility

Family CORTINARIACEAE	Species <i>Cortinarius sodagnitus</i>	Season Autumn
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BITTER LILAC CORT

The convex cap of this species is bright violet, as is the slender stem, which has a prominent bulb at the base. The coloring becomes ocher-buff from the cap center with age. The cap skin is bitter tasting, but the flesh is mild; this mushroom is not recommended for eating.

- **OCCURRENCE** Mycorrhizal, mainly with beech trees. Widespread but locally common in northern temperate zones.
- **SIMILAR SPECIES** *Cortinarius dibaphus* is slightly larger and even more colorful. It has a similar distribution in northern temperate zones.

SECTION

gills are pale lilac, then rusty brown, often with lilac edges

FRUITING Singly or a few together on calcareous soil.

Dimensions CAP ↔ 4–10cm   STEM ↑ 6–10cm ↔ 0.5–1.5cm	Spores Rusty brown	Edibility
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Family CORTINARIACEAE	Species <i>Cortinarius rufolivaceus</i>	Season Autumn
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RED AND GREEN CORT

This large species, belonging to the subgenus *Phlegmacium*, is identified by a unique color combination: its convex to umbonate cap is rich copper with rhubarb-pink or olive-green at the margin. The typically long, slender but bulbous stem is many-colored; the gills can be tinged olive-green or lilac. The white flesh is purple-tinged in the cap and upper stem.

- **OCCURRENCE** Mycorrhizal, especially with beech and oak trees. Widespread but local in Europe; not reported in North America.
- **SIMILAR SPECIES** Several other subgenus *Phlegmacium* species have olive coloring, including *Cortinarius atrovirens*, which has a fleshy, dark olive cap, a sulfur-yellow stem, and olive to rusty brown gills.

SECTION

This fleshy species has a gray-blue cap and stem with white veil patches and purple gills. It ages to yellow-ocher.

FRUITING In small groups in leaf litter on soil.

Dimensions CAP ↔ 6–10cm   STEM ↑ 7–12cm ↔ 1.5–2cm	Spores Rusty brown	Edibility
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Family CORTINARIACEAE

Species *Cortinarius splendens*

Season Autumn

## LOVELY POISON CORT

A striking species with a convex, wavy-margined yellow cap. The stem has fibrous, sulfur-yellow veil remains and a bulbous base. Potassium hydroxide (KOH) turns the yellow flesh reddish pink. This is a relatively small member of the *Phlegmacium* subgenus.

• **OCCURRENCE** Mycorrhizal, often with beech. Widespread and common in Europe; not reported in North America.

• **SIMILAR SPECIES**

*Cortinarius citrinus* has a greenish yellow tinge. Similar-looking edible *Tricholoma* species (pp.63-4) have white spore deposits and lack the cobwebby veil.



• shiny cap surface



• orange-brown in cap center

SECTION

• bright yellow flesh



• prominent stem bulb  
• adnexed, sinuate, bright yellow gills age to rusty yellow



FRUITING Singly or a few together on alkaline soil.

Dimensions CAP ⊕ 3-7cm | STEM ↓ 4-9cm ↔ 0.7-1.4cm

Spores Rusty brown

Edibility ☠

Family CORTINARIACEAE

Species *Cortinarius elegantissimus*

Season Autumn

## ELEGANT CORT

The convex, orange-yellow cap of this species is greasy, as in other subgenus *Phlegmacium* species. The stem is yellow and smooth, although covered with threads remaining from the veil. The flesh is very pale yellow, with a blue tinge in the upper stem, darker yellow in the bulbous stem base. This fungus has a fruity smell and mild-tasting flesh and cap skin.

• **OCCURRENCE** Mycorrhizal with beech. Widespread but local in Europe; not reported in North America.

• **SIMILAR SPECIES** Other similar subgenus

*Phlegmacium* species, including *Cortinarius aureofulvus* and *C. osmophorus*, differ in smell and taste, and in the amount of green in the cap.

convex, orange-yellow cap



SECTION

• sinuate, notched gills  
• veil threads on smooth yellow stem



• greenish yellow bulb to 5cm across



• shiny, greasy cap surface  
• vivid yellow to cinnamon-yellow gills



FRUITING Singly or a few together on calcareous soil.

Dimensions CAP ⊕ 6-10cm | STEM ↓ 6-10cm ↔ 2-3cm

Spores Rusty brown

Edibility ☠

## WITH STEM RING OR RING ZONE

**T**HE FUNGI in this subsection have a veil that protects the young gills. As the cap expands to its mature size, the veil, or part of it, remains attached to the stem, either as a distinct ring around the stem or as a fibrillose zone. (See also pp.69–77 for species that have cobweblike veil remains.)

Both the rings and the zones are often stained by falling spores, thus the true veil color can be difficult to see on mature specimens. Agarics from the mainly white-spored Tricholomataceae, and families with colored spores, including Strophariaceae, Cortinariaceae, and Coprinaceae, are featured here.

Family STROPHARIACEAE

Species *Pholiota aurivella*

Season Autumn, rarely spring

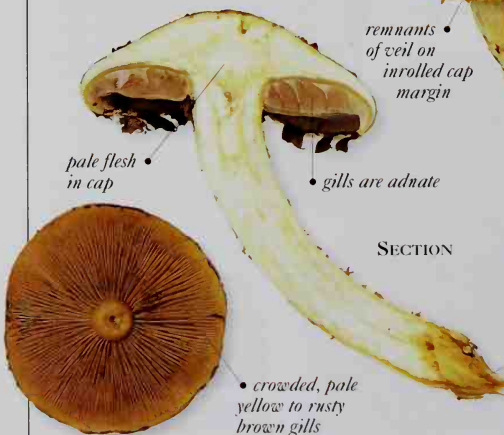
## ONION-BAGEL PHOLIOTA

The convex to broadly umbonate, slimy, bright yellow cap of this species has a striking pattern of dark rust-brown veil scales, and its inrolled margin also bears veil remnants. The stem is also slimy and scaly. The inedible but pleasant-smelling flesh is very pale in the cap, darker in the stem.

• **OCCURRENCE** Typically found growing high in living but damaged deciduous trees, for example, where branches have been broken. It has a preference for beech trees, although it is also found on linden and willow. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Pholiota jahonii* has more upturned, black-tipped cap scales and smaller spores (5.5 x 3.5µm compared to 9 x 5.5µm for *L. aurivella*). *P. limonella* also has smaller spores (7 x 4.5µm).

dark scales on cap surface may disappear in rain •



**FRUITING** Appears in clusters of fruitbodies.

Dimensions CAP ⬆ 7–15cm | STEM ⬆ 5–15cm ↔ 1–2cm

Spores Brown

Edibility

Family STROPHARIACEAE

Species *Pholiota squarrosa*

Season Autumn–early winter

## DRY SCALY PHOLIOTA

This dry-skinned species has dense, upturned scales on its convex to umbonate cap. Veil remnants are visible at the cap margin.

The pale yellow flesh smells of onions and, if eaten, can cause stomach upsets.

• **OCCURRENCE** Found in built-up areas as well as in woods, at the base of deciduous trees, such as elm and rowan. Widespread in northern temperate zones.

• **SIMILAR SPECIES** Smaller and paler *Pholiota squarrosoides* is highly sticky-slimy beneath the scales. It also occurs on deciduous trees but is rare in Europe, more common in North America. *Gymnopilus junonius* (p.83), found in the same habitat, lacks the distinctive cap scales.

concentric, pointed,  
dark scales on  
dry yellow cap

crowded,  
whitish gray  
to mid-  
brown  
gills



dark  
scales on  
yellow stem

base of stem  
often darker

adnate  
gills



FRUITING In clusters on living trunks or stumps.

Dimensions CAP ⊕ 5–15cm | STEM ↓ 6–15cm ↔ 1–2cm

Spores Brown

Edibility

Family TRICHOLOMATACEAE

Species *Oudemansiella mucida*

Season Autumn, rarely summer

## EURO PORCELAIN MUSHROOM

This unmistakable species has a convex, thickly slimy, pale gray to ivory-white cap and a prominent gray to gray-brown ring on the off-white stem. Above the ring, the stem is dry; below, it is slimy and often gray. These features, combined with its habitat, make it easy to identify. It is edible but not worth eating.

• **OCCURRENCE** On beech or, more rarely, on oak. On living trees, it will often appear high up where the tree has been damaged, such as where a branch has been broken off. Widespread in northern temperate zones but absent in North America.

broadly adnate,  
sinuate gills

slimy, pale gray to  
ivory-white cap

stem dry above  
stem ring

SECTION

bulbous  
stem base

tough white gills  
are medium- to  
well spaced



prominent stem  
ring, gray or brown  
underneath

thick slime on  
cap surface



FRUITING In clusters or singly on standing or fallen trees.

Dimensions CAP ⊕ 2–15cm | STEM ↓ 3–8cm ↔ 0.3–1cm

Spores Pale cream

Edibility

Family TRICHOLOMATACEAE	Species <i>Armillaria mellea</i>	Season Autumn
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## HONEY MUSHROOM

This large agaric has a convex, flattened, or wavy, olive-tinged, pale yellow-brown cap with a darker center and sparse pale scales. There is a black, stringlike, luminescent mycelium on the host wood. The well-spaced, adnate gills begin white and become pink-brown, often with some dark spotting, with age. *Armillaria mellea* once included a range of species with similar features and they have now been reclassified separately (see *A. cepistipes*, below). The Honey Mushroom is collected in quantities as a popular fall edible even though it can cause stomach upsets.

• **OCCURRENCE** Found in woods, mainly with beech, often on fallen stumps and logs. Widespread but local in northern temperate zones.

*slender, pale ocher-yellow stem is long and tapers to point*  
*center of cap is darker brown than edge*  
*pale yellow-brown cap with ocher tinges*

*stems joined in groups at their bases*

*white ring has yellow margin*

*cap is convex, flattened, or wavy*



**FRUITING** Almost always found growing in dense tufts with stems joined at the base.

Dimensions CAP ⬆ 3–10cm   STEM ⬆ 8–10cm ↔ 1–2cm	Spores White	Edibility ☹
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Family TRICHOLOMATACEAE	Species <i>Armillaria cepistipes</i>	Season Autumn
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## FINE-SCALY HONEY MUSHROOM

This species has a sturdy, fibrous stem, with a pendent, thin, white to pale gray ring, and a convex to umbonate, tawny to ocher cap with sparse, fibrous scales. The adnate gills are pale yellow to pale tan and well spaced. Scaly capped Honey Mushrooms are more apt to cause stomach upsets than the smooth capped species.

• **OCCURRENCE** Mostly with dead or dying deciduous trees, but also on conifers, in woods, parks, and gardens. Widespread; common in northern temperate zones; throughout Pacific Northwest.

• **SIMILAR SPECIES** The young cap of *A. gallica* has a pale center, and the stem ring is white to yellow. *A. ostoyae* has a thicker stem, turning brown from the base, a big, brown-edged ring, and coarser cap scales.



**FRUITING** Clustered or scattered near deciduous trees.

*fine, pointed, dark scales on tawny-ocher cap*

*thin white to pale gray stem ring is pendent and short lived*



*swollen stem base*



SECTION



*thick white flesh*

Dimensions CAP ⬆ 3–12cm   STEM ⬆ 4–12cm ↔ 1–3cm	Spores White	Edibility ☹
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Family TRICHOLOMATACEAE

Species *Tricholoma caligatum*

Season Late summer–autumn

## BROWN MATSUTAKE

The convex to flat cap of this species has a brown-scaled, dry surface. The slender stem is white above the flaring ring and has

brown veil zones and patches below. The flesh is white. The name actually encompasses a widespread complex of very similar mushrooms, which range from spicy-fragrant, choice edibles with a nutty fowl to forms that smell foul and are unpalatable.

• **OCCURRENCE** Found growing under deciduous trees, like oaks, in eastern North America; with conifers, like spruce, in the Rockies and Pacific Northwest; widespread and common across northern North America. Associated with atlas cedar (*Cedrus atlantica*) in parts of southern Europe and North Africa.

stem is white above ring

stem sheathed by flaring white ring

brown zones and patches below ring

cap surface is pale cream under the brown scales

convex to flat cap with a dry surface

crowded gills are sinuate, notched, each with a tooth



**FRUITING** Singly or a few fruitbodies together under deciduous and coniferous trees.

Dimensions CAP ⬆ 5–12.5cm | STEM ⬆ 5–10cm ↔ 2–3cm

Spores White

Edibility 100

Family TRICHOLOMATACEAE

Species *Tricholoma magnivelare*

Season Late summer–autumn

## WHITE MATSUTAKE

This choice edible, with firm white flesh, has a distinctive smell of cinnamon and pine. Its convex white cap has an inrolled margin and is tacky when moist. It becomes flat with age and develops yellow to rusty brown scales and spots. A flaring ring sheaths the stem, which is white above the ring, aging light brown below it.

• **OCCURRENCE** Under conifers. Widespread and common across northern North America and in the south in the Rocky Mountains; most common on the Pacific Northwest coast.

• **SIMILAR SPECIES**

*Amanita* species such as *A. smithiana* (p.148) lack the spicy smell and have free gills. They also have loose veil patches on their caps.

crowded, notched gills

cap is white with light brown scales

cottony, threadlike veil remains at cap margin

ring on stem is prominent and flaring

white gills stain pinkish brown with age



**FRUITING** Appear singly or in groups of a few fruitbodies together under coniferous trees.

Dimensions CAP ⬆ 5–20cm | STEM ⬆ 5–15cm ↔ 2–4cm

Spores White

Edibility 100

Family CORTINARIACEAE

Species *Hebeloma radicosum*

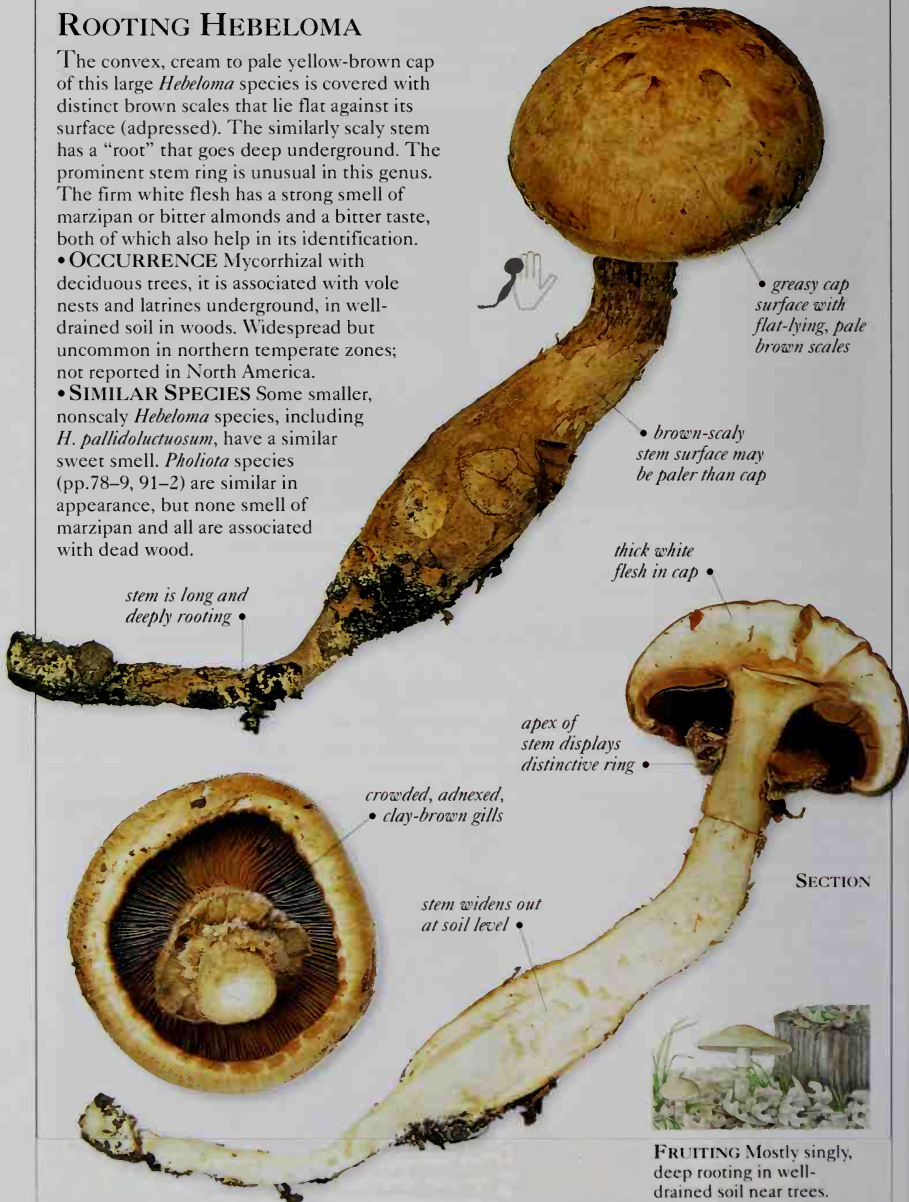
Season Autumn

## ROOTING HEBELOMA

The convex, cream to pale yellow-brown cap of this large *Hebeloma* species is covered with distinct brown scales that lie flat against its surface (adpressed). The similarly scaly stem has a "root" that goes deep underground. The prominent stem ring is unusual in this genus. The firm white flesh has a strong smell of marzipan or bitter almonds and a bitter taste, both of which also help in its identification.

•**OCCURRENCE** Mycorrhizal with deciduous trees, it is associated with vole nests and latrines underground, in well-drained soil in woods. Widespread but uncommon in northern temperate zones; not reported in North America.

•**SIMILAR SPECIES** Some smaller, nonscaly *Hebeloma* species, including *H. pallidolucuosum*, have a similar sweet smell. *Pholiota* species (pp.78–9, 91–2) are similar in appearance, but none smell of marzipan and all are associated with dead wood.



stem is long and deeply rooting •

• greasy cap surface with flat-lying, pale brown scales

• brown-scaly stem surface may be paler than cap

thick white flesh in cap •

apex of stem displays distinctive ring •

crowded, adnexed, clay-brown gills •

stem widens out at soil level •

SECTION



**FRUITING** Mostly singly, deep rooting in well-drained soil near trees.

Dimensions CAP ⬆ 5–12cm | STEM ⬆ 6–20cm ↔ 1.5–2.5cm

Spores Tobacco-brown

Edibility

Family TRICHOLOMATACEAE

Species *Phaeolepiota aurea*

Season Summer–autumn

## GOLDEN PHAEOLEPIOTA

This large, golden yellow agaric, which smells of bitter almonds, has a convex cap with a fringed margin and granular surface, and a flaring stem ring beneath which the stem is very wrinkled. The adnexed gills are crowded and off-white, becoming russet-brown. It is sometimes classified within the Cortinariaceae family due to its ocher-brown spore deposit. It is reported as edible but can cause stomach upsets.

• **OCCURRENCE** In woods, along bridle paths or in other disturbed sites; it prefers rich soil. Widespread and locally common in northern temperate zones; found in Pacific Northwest.

• **SIMILAR SPECIES** *Gymnopilus spectabilis* (below) occurs on rotting wood and has a streaked cap and stem.

golden yellow cap surface is granular

cap margin is fringed with veil remains

large, flaring stem ring is stained ocher-brown by falling spores



**FRUITING** Appears in large groups of fruitbodies on nutrient-rich soil.

Dimensions CAP  $\leftrightarrow$  10–25cm | STEM  $\updownarrow$  10–30cm  $\leftrightarrow$  1.5–4cm

Spores Ocher-brown

Edibility

Family CORTINARIACEAE

Species *Gymnopilus spectabilis*

Season Autumn

## BIG LAUGHING GYM

A tuft-forming habit, prominent stem ring, and threadlike veil at the margin of the convex to umbonate cap help to identify this variable mushroom. The cap is dry and orange-yellow with a threadlike veil at the margin; the fibrillose stem is a similar color but stained darker near the ring by falling spores. The fleshiest *Gymnopilus* species, it is bitter, inedible, and contains hallucinogens.

• **OCCURRENCE**

Grows on rotten deciduous trees and stumps, rarely on conifers. Widespread in northern temperate zones.

• **SIMILAR SPECIES**

The Honey Mushroom, *Armillaria mellea* complex (p.80), is similar in color, shape, and habitat. It has a white spore deposit and print.

convex to umbonate, orange-yellow cap is radially streaked and dry

ring near stem top

close, notched to adnate gills are yellow, aging to rust-brown

flesh is pale yellow

grows in tufts but may occur singly

base of stem widens slightly




**FRUITING** In tufts on dead wood, mostly at soil level.


SECTION

Dimensions CAP  $\leftrightarrow$  5–15cm | STEM  $\updownarrow$  5–15cm  $\leftrightarrow$  1–3.5cm

Spores Rust-brown

Edibility

Family STROPHARIACEAE	Species <i>Psilocybe cubensis</i>	Season All year
<h2>SAN ISIDRO PSILOCYBE</h2> <p>This large <i>Psilocybe</i> species has a bell-shaped to umbonate, sticky, yellow-brown cap, the surface of which may be covered with small white scales – the remains of the veil. The stem is off-white with a pendent ring that soon becomes black from falling spores. The white to cream flesh bruises blue. The fairly crowded, adnate gills are purple-brown with white edges when mature.</p> <p>It is a hallucinogen.</p> <p>• <b>OCCURRENCE</b> In subtropical to tropical grassland, where animals graze. Widespread and common in Caribbean and Gulf coastal areas of North America and elsewhere in the tropics. It has been introduced into Europe, where it can be cultivated.</p> <p>• <b>SIMILAR SPECIES</b> <i>Panaeolus semiovascularis</i> (p.95) does not stain blue.</p>		
		
Dimensions CAP ⬆ 2–12cm   STEM ⬆ 5–15cm ↔ 0.5–1.2cm	Spores Dark purple-brown	Edibility ☠

Family STROPHARIACEAE	Species <i>Psilocybe squamosa</i>	Season Autumn–late autumn
<h2>SCALY-STALKED PSILOCYBE</h2> <p>Short-lived, concentric cap scales and a distinctive stem ring characterize this large <i>Psilocybe</i> species. The umbonate cap is yellowish white with white-edged, gray or purple-brown to almost black gills; the stem is scaly and off-white, turning brown with age. It is not edible; the flesh has a slight aroma and a mild to slightly bitter taste.</p> <p>• <b>OCCURRENCE</b> In woods, emerging from buried or half-buried deciduous debris, wood chips, or sawdust. Widespread and fairly common in northern temperate zones.</p> <p>• <b>SIMILAR SPECIES</b> A variant found in northern North America is <i>P. thrausta</i>, which has a brick-red cap.</p>		
		
		
Dimensions CAP ⬆ 2–5cm   STEM ⬆ 10–15cm ↔ 3–5mm	Spores Purple-brown	Edibility ☠

Family BOLBITIACEAE

Species *Agrocybe cylindracea*

Season Late spring–autumn

## POPLAR AGROCYBE

This fleshy mushroom has a convex, ochre-tinged, white cap; as with most *Agrocybe* species, the smooth surface cracks in dry weather. The stem has a well-developed ring and is off-white, becoming brown with age. Widely cultivated and eaten in southern Europe, it has pale flesh with a rather strong, yeasty smell and taste.

• **OCCURRENCE** On or inside dead or pollarded willows and poplars. Widespread in warm northern temperate to subtropical zones.

• **SIMILAR SPECIES** *A. praecox* (below) grows on wood chips or in grass and is usually smaller.



SECTION



**FRUITING** Appears mostly in tufts but also singly.

• *adnate to slightly decurrent, pale gray-brown gills*

• *margin may have veil remains*

Dimensions CAP ⊕ 6–15cm

STEM ↓ 8–15cm ↔ 1–3cm

Spores Clay-brown

Edibility

Family BOLBITIACEAE

Species *Agrocybe praecox*

Season Spring–summer

## SPRING WOOD-CHIP AGROCYBE

This highly variable mushroom usually has a stem ring, but sometimes the veil is attached to the cap margin. The convex to umbonate cap dries very quickly from light brown to yellowish gray-white; its smooth surface may crack. The base of the stem may be swollen. The pale, yeasty-smelling flesh often has a bitter aftertaste.

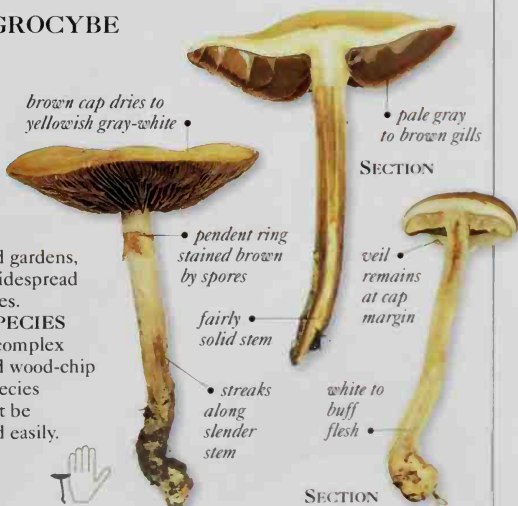
• **OCCURRENCE** In woods, parks, and gardens, among rotting wood chips or in grass. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

There is a complex of grass and wood-chip *Agrocybe* species that cannot be recognized easily.



**FRUITING** Appears in small groups or troops of fruitbodies.



SECTION

SECTION

Dimensions CAP ⊕ 3–7cm

STEM ↓ 4–10cm ↔ 0.6–1cm

Spores Tobacco-brown

Edibility

Family STROPHARIACEAE	Species <i>Hypoloma capnoides</i>	Season Summer–autumn
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### CONIFER TUFT PSILOCYBE

The convex cap of this agaric is yellowish orange, drying to pale orange-brown, and has veil remnants visible at the pale margin. It is greasy when wet. The stem is pale yellow at the top and rusty brown at the bottom. This mushroom has mild-tasting, pale yellow flesh.

• **OCCURRENCE** One of the few agarics found almost all year, except in cold winters, on strongly decayed conifer stumps. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *H. radicosum* is much rarer but is found in similar sites. *Hypolomas* and *Stropharias* are now often called *Psilocybes*.



yellowish orange to pale orange-brown cap

cap is greasy and darker when wet

pale gray to purplish brown gills

veil remnants at cap margin

crowded, adnate gills



FRUITING In clusters of fruitbodies or singly.

Dimensions CAP 3–7cm   STEM 5–8cm ↔ 0.5–1cm	Spores Purplish brown	Edibility
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Family STROPHARIACEAE	Species <i>Hypoloma fasciculare</i>	Season Summer–autumn
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### SULFUR TUFT PSILOCYBE

Greenish yellow gills and a tendency to cluster on dead wood are two characteristics of this familiar woodland agaric. It has a convex, pale yellow cap, often darker in the center, and a yellow stem. The remains of the white veil may be visible at the cap margin. The inedible, sulfur-yellow flesh smells earthy; a very hot, bitter taste is another identification mark. Species referred to as

*Hypoloma* were until recently, *Naematolomas* and are now *Psilocybes*.

• **OCCURRENCE** On rotten deciduous stumps and upturned roots, rarely on conifers. Widespread and common in northern temperate zones.



crowded, adnate gills

green sheen on greenish yellow to olive-brown gills

convex cap is pale yellow with darker orange center

pale yellow stem becomes orange-brown toward base

fine fibers on stem surface



FRUITING Appears in small and large clusters.

Dimensions CAP 3–7cm   STEM 4–10cm ↔ 0.3–1cm	Spores Purplish brown	Edibility
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Family STROPHARIACEAE

Species *Hypholoma sublateritium*

Season Autumn-late autumn

## BRICK CAP PSILOCYBE

This large species is best identified by its size, the lack of green in the gills, and the distinct brick-red cap color. The cap is convex and the stem fibrous and pale yellow at the top, reddish brown at the base. The yellow to reddish brown flesh has a pleasant odor and a nutty flavor when cooked.

• **OCCURRENCE** On deciduous stumps or roots, in woodland or parks. Widespread in eastern North America and other northern temperate zones.

• **SIMILAR SPECIES**

A range of much smaller species, such as *H. udum* and *H. elongatum* occur in boggy places. *H. marginata* occurs in large troops on needle beds or on conifer remains.



• young cap margin with white veil, stained black by spores



smooth, brick-red cap

fairly crowded, adnate gills are white-gray to olive-brown

fibrous surface of sturdy stem



stem base is reddish brown



SECTION



FRUITING Appears in clusters of fruitbodies.

Dimensions CAP ⬆ 5-10cm | STEM ⬆ 5-10cm ↔ 0.5-1.5cm

Spores Purplish brown

Edibility

Family CORTINARIACEAE

Species *Rozites caperata*

Season Summer-autumn

## GYPSY ROZITES

Egg-shaped on emerging, the cap of this species becomes convex to umbonate with age. It is yellow-brown with a wrinkled surface and remnants of the white to lilac veil in the center. The smooth stem has a narrow, sheathing ring.

• **OCCURRENCE** Mycorrhizal and most commonly found with conifers but also occurs with deciduous trees, often beech. Widespread in some areas of northern temperate zones; local in eastern and northwestern North America.

• **SIMILAR SPECIES** *Cortinarius* species (pp.69-77) are related, but have no true stem rings and have rust-brown spores.



FRUITING Appears in troops or small groups on acidic soil.



• umbonate to convex cap is yellow-brown

• ring on stem is narrow and sheathing

center of cap bears pale veil remnants



surface of cap has furrows or wrinkles



• edges of gills are toothed

• solid, fibrous stem flesh

SECTION



gills are medium spaced and adnexed

Dimensions CAP ⬆ 5-12cm | STEM ⬆ 5-15cm ↔ 1-2cm

Spores Pale brown

Edibility

Family STROPHARIACEAE

Species *Stropharia cyanea*

Season Autumn

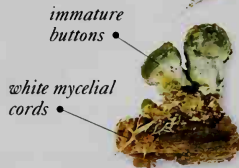
### BLUE-GREEN PSILOCYBE

This mushroom is distinguished from other blue-green *Stropharia* species by its gills, which are not white edged. The convex, greasy cap is blue-green, soon fading and developing yellow spots. Its margin has pale veil remnants, but the ring on the scaly, fibrous, blue-green stem is inconspicuous. The off-white flesh has an indistinct smell. All *Stropharias* and *Hypholomas* are referred to by some as *Psilocybe*.

- **OCCURRENCE** Among leaf litter on fertile soil; often in European beech woods on alkaline soil.
- **SIMILAR SPECIES** *S. aeruginosa* has darker spores and gills with white edges. *S. pseudocyanea* smells of freshly ground black pepper.



**FRUITING** Appears in small groups or singly.



Dimensions CAP ⬆ 3-7cm | STEM ⬆ 4-8cm ↔ 0.4-1cm

Spores Purplish brown

Edibility

Family STROPHARIACEAE

Species *Stropharia aurantiaca*

Season Summer-~~autumn~~

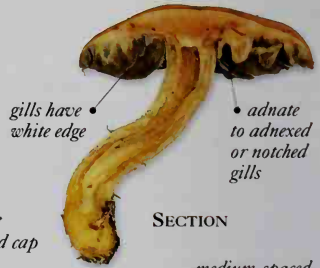
### RED-CAP PSILOCYBE

This is a distinctive species, best recognized by its sturdy, bright orange-capped fruitbodies and its occurrence on wood chips. The cap is convex then flat. The stem is off-white with a fibrous surface and is often hollow. The flesh is off-white, sometimes with an orange flush, and has an indistinct smell; its edibility is unknown.

- **OCCURRENCE** Mostly on decaying wood chips or sawdust mixed with soil. Widespread and spreading in Europe; reported from California.
- **SIMILAR SPECIES** An orange variety of *Psilocybe squamosa* (var. *thrausta*) has an umbonate cap and thinner flesh.



**FRUITING** In troops, often in mulched flowerbeds.



medium-spaced, cream to olive- or purple-brown gills

Dimensions CAP ⬆ 1.5-6cm | STEM ⬆ 2-6cm ↔ 2-8mm

Spores Purplish brown

Edibility

Family STROPHARIACEAE

Species *Stropharia rugoso-annulata*

Season Spring and autumn

## BURGUNDY CAPS

The smooth, dry cap of this species is red to tan, depending on its exposure to light. It is bell-shaped, becoming convex to flat with age. The off-white stem has a ring with dark lines above and coglike structures below.

The stem base is widened or bulbous and has a conspicuous, cordlike white mycelium. The flesh is white and tastes good if eaten when young.

• **OCCURRENCE** In wood-chip mulch. Widespread in southern Europe, rare farther north; also found in North America.

• **SIMILAR SPECIES**

*Stropharia aurantiaca* (p.88) is smaller and more bright orange-red. *Agaricus* species (pp.156–163) have free gills.

gills are purplish gray and fairly crowded

stem is firm and off-white



coglike structures on underside of ring

dark lines from spores on top of stem ring

bell-shaped to convex then flat cap is red to tan



**FRUITING** In abundant troops in wood-chip mulch; it has two distinct fruiting seasons.

Dimensions CAP 5–15cm | STEM 10–15cm ↔ 1–2cm

Spores Purplish gray-black

Edibility

Family STROPHARIACEAE

Species *Stropharia coronilla*

Season Autumn

## POISON LAWN PSILOCYBE

This fairly small but sturdy species has extremely thick white flesh, particularly in the convex, ocher-yellow cap. The narrow ring may be attached to the white stem. The gills are violet-gray, turning dark purple-brown. This species smells strongly of radishes. Recent reports suggest it could be poisonous.

• **OCCURRENCE** Common in grassy areas in drier situations, including gardens, parks, heathland, and sand dunes. Widespread in northern temperate zones.

• **SIMILAR SPECIES** Some forms, which have different spore sizes and coloring, are regarded as distinct species, including *Stropharia halophila* and *S. melasperma*.



**FRUITING** Singly or a few together in grass or on sandy soil.



ocher-yellow cap surface, greasy in wet weather

narrow ring may be attached to white stem

extremely thick white flesh in cap



violet-gray to purple-brown gills

medium-spaced gills

gills have white edges

stem has solid white flesh



SECTION

Dimensions CAP 1.5–6cm | STEM 2.5–4cm ↔ 0.4–1cm

Spores Dark purplish brown

Edibility

Family STROPHARIACEAE	Species <i>Stropharia semiglobata</i>	Season Late spring–autumn
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**DUNG PSILOCYBE**

This elegant, slender species has a smooth, often hemispherical, light yellow cap and a long, slender, slimy, off-white stem. In common with many of its close relatives, its cap is greasy when wet, and it has an inconspicuous, tiny stem ring, which is frequently stained black by deposited spores. The inedible, thin, pale flesh has a yeasty smell.

- **OCCURRENCE** In grassland and pastures on old horse, cow, and sheep manure. A range of fungi fruit on herbivore dung at different stages of decay. Widespread in northern temperate zones and elsewhere.
- **SIMILAR SPECIES** *Stropharia unbonatescens* has a pimple or umbo at the cap center and basidia with only 2 spores; those of *S. semiglobata* have 4.

smooth cap surface, greasy in wet weather • SECTION

convex or hemispherical cap

white edge on olive-gray gills

broad, adnate, medium-spaced gills

hollow stem

long, slender stem

stem base slightly swollen

FRUITING Appears in small groups on dung.

Dimensions CAP ↻ 0.5–4cm   STEM ↕ 2–8cm ↔ 2–5mm	Spores Purplish black	Edibility
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Family STROPHARIACEAE	Species <i>Galerina mutabilis</i>	Season Summer–autumn
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**SCALY-VEILED GALERINA**

Formerly known as *Kuehneromyces mutabilis*, this species has an umbonate, honey-brown to yellow cap, which dries from the center, producing a two-tone effect. The distinct stem ring is often stained ocher-brown by falling spores; below the ring, the stem is covered with pointed scales. Although edible, it would prove fatal to confuse it with the Deadly Galerina (p.91).

- **OCCURRENCE** On rotten deciduous trees and, rarely, conifers, in deep woods. Widespread and common in western North America.
- **SIMILAR SPECIES** A group of poisonous *Galerina* species are similar: *G. unicolor* (p.91) and *G. marginata* have fibers and no stem scales.

two-toned cap dries from center • SECTION

broadly adnate to decurrent gills

medium-spaced, pale to rusty brown gills

stem above ring is pale and smooth

pale, brown, aromatic flesh

FRUITING In dense troops of individual clusters.

stem is dark and scaly below ring

Dimensions CAP ↻ 2–7cm   STEM ↕ 3–7cm ↔ 0.4–1cm	Spores Ocher-brown	Edibility
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Family CORTINARIACEAE

Species *Galerina unicolor*

Season Summer–winter, into spring

## DEADLY GALERINA

The convex to broadly umbonate, wavy-margined cap of this species is rich brown; it changes to pale yellow-brown as it dries.

The off-white to basally brown stem has a ring toward the top and is fibrous below.

The narrow gills are adnate to slightly decurrent and are medium spaced.

*Galerina* species need careful identification; there are seven others that can cause severe poisoning.

• **OCCURRENCE** On dead and rotten stumps and trunks, often on moss and leaf litter in damp, boggy deciduous woodland. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Armillaria mellea*, the Honey Mushroom (p.80), is typically larger with a white spore print.



FRUITING Mostly appears in dense swarms.

Dimensions CAP Ⓢ 1–5cm | STEM Ⓢ 3–7cm ↔ 3–7mm

Spores Rust-brown

Edibility ☠

Family STROPHARIACEAE

Species *Pholiota alnicola*

Season Autumn

## ALDER PHOLIOTA

A yellow cap – or yellow with some green intermixed – and a clump-forming habit are two distinguishing features of this species. A scaly cap is typical of the genus, but in this and some other members, the scales are not very conspicuous and are usually seen more clearly in young specimens as veil scales at the cap margin. The wavy stem is almost smooth, more fibrous at the base. The pale flesh has a pleasant smell and a mild taste.

• **OCCURRENCE** On dead or dying deciduous trees, such as alder and birch, rarely on conifers; often in damp sites. Widespread in northern temperate zones; exact distribution unknown.

• **SIMILAR SPECIES** Three forms of *Pholiota alnicola* are sometimes classified separately: *P. salicicola* grows on willow and tastes bitter; *P. flavida* and *P. pinicola* grow on conifers.



FRUITING Appears in clusters of fruitbodies.

Dimensions CAP Ⓢ 3–7cm | STEM Ⓢ 8–15cm ↔ 0.6–1cm

Spores Brown

Edibility 🍄

Family STROPHARIACEAE	Species <i>Pholiota gummosa</i>	Season Autumn-late autumn
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**OCHER-GREEN PHOLIOTA**

The key identification points of this species are a convex then flattened cap with a slightly scaly, straw-yellow surface, flushed pale ocher-green; yellow to brown gills; and a dirty yellow to off-white, scaly stem. The cap is slimy only when wet and quickly dries out. The white to yellow flesh becomes rusty brown at the stem base. It has no distinct smell or taste.

- **OCCURRENCE** Often along roads, mostly from wood underground. Not reported in North America.
- **SIMILAR SPECIES** *Pholiota scamba* is smaller and grows on conifers.

*cap is greasy in wet weather, quickly drying*

*medium-spaced gills*


*pale yellow-brown to brown gills*

*gills adnate or with a decurrent tooth*


*green flush on straw-yellow cap*

*stem, often long and slender, is dry with off-white scales*

**SECTION**



**FRUITING** In large troops or clusters on buried wood.

Dimensions CAP ⊕ 2-6cm   STEM ↓ 4-9cm ↔ 0.4-1cm	Spores Brown	Edibility 
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Family STROPHARIACEAE	Species <i>Pholiota lenta</i>	Season Late autumn
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**SLIMY GROUND PHOLIOTA**

Pale yellow to brown gills and a greasy cap that is slimy in wet weather, with scattered white veil scales, are good indicators of this mushroom. The cap is convex, off-white, pale yellow, or pale gray, and normally has a totally smooth surface. The inedible flesh is pale with a smell of straw and a mild taste.

- **OCCURRENCE** Mostly on underground woody substrates; typically in beech woods but also with other deciduous trees and occasionally under conifers. Widespread in northern temperate zones.

*inconspicuous veil remains on slightly inrolled cap margin*

*stem base often club-shaped*

*scaly, fibrous stem*


*fairly crowded, pale yellow to brown gills*

*cap very slimy in wet weather with white veil remains*


*adnate or notched to slightly decurrent gills*

*stem mealy at top*

**SECTION**



**FRUITING** Singly or in small groups among leaf litter.

Dimensions CAP ⊕ 4-8cm   STEM ↓ 5-8cm ↔ 0.7-1.2cm	Spores Brown	Edibility 
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Family STROPHARIACEAE	Species <i>Pholiota highlandensis</i>	Season Almost all year
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## CHARCOAL PHOLIOTA

Apart from its distinctive habitat – on bonfire sites – this mushroom is notable for having a fairly fleshy, orange-brown fruitbody with a convex to somewhat wavy, slimy cap. It has a dry stem, which is fibrous toward the base, and the inedible flesh is pale yellow to rusty brown with a mild taste; the smell is not distinctive.

- **OCCURRENCE** On bonfire sites or in woods and tree stands where a fire has occurred. Widespread in northern temperate zones.
- **SIMILAR SPECIES** Other gilled mushrooms found on charred sites, including *Mycena galopus* (p.137) and *Tephroclype anthracophilum*, are usually smaller; *Myxomphalia maura* is a darker shade.



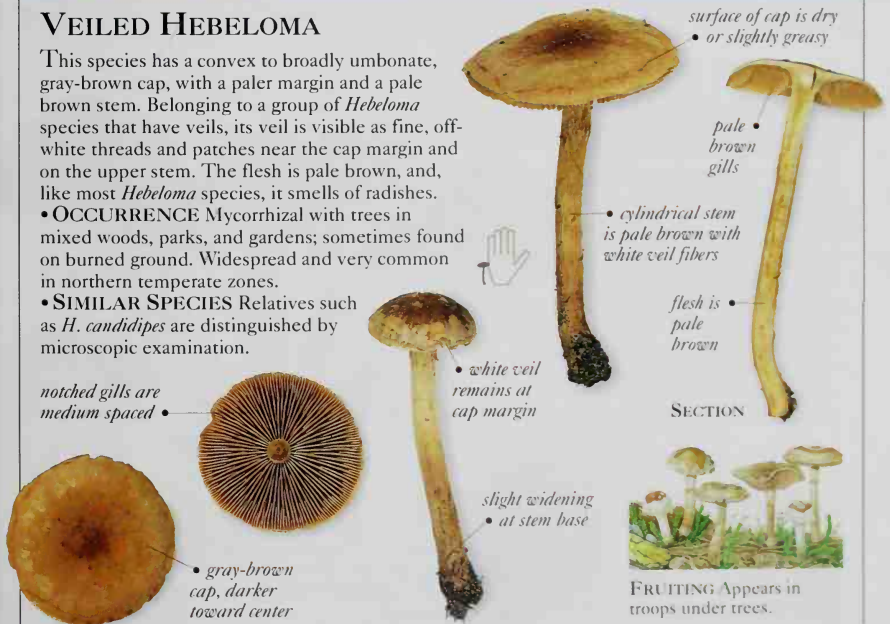
Dimensions CAP ↻ 2–6cm   STEM ↕ 2–6cm ↔ 0.4–1cm	Spores Brown	Edibility
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Family CORTINARIACEAE	Species <i>Hebeloma mesophaeum</i>	Season Autumn–late autumn
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## VEILED HEBELOMA

This species has a convex to broadly umbonate, gray-brown cap, with a paler margin and a pale brown stem. Belonging to a group of *Hebeloma* species that have veils, its veil is visible as fine, off-white threads and patches near the cap margin and on the upper stem. The flesh is pale brown, and, like most *Hebeloma* species, it smells of radishes.

- **OCCURRENCE** Mycorrhizal with trees in mixed woods, parks, and gardens; sometimes found on burned ground. Widespread and very common in northern temperate zones.
- **SIMILAR SPECIES** Relatives such as *H. candidipes* are distinguished by microscopic examination.



Dimensions CAP ↻ 2–5cm   STEM ↕ 2–6cm ↔ 3–7mm	Spores Tobacco-brown	Edibility
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Family CORTINARIACEAE	Species <i>Gymnopilus penetrans</i>	Season Autumn
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### FRECKLE-GILLED GYM

This is a fairly uniformly orange-brown species with a convex to flattened or umbonate cap and a paler stem with an indistinct veil zone. The pale yellow gills have rusty flecks. It is sometimes divided into two more species:

*Gymnopilus hybridus* and *G. sapineus*. All *Gymnopilus* species occur on dead wood or plant remains, unlike related *Cortinarius* species (pp.69-77), which are mycorrhizal.

• **OCCURRENCE** On dead wood, mostly conifers, in woods and tree stands. Widespread in northern temperate zones.

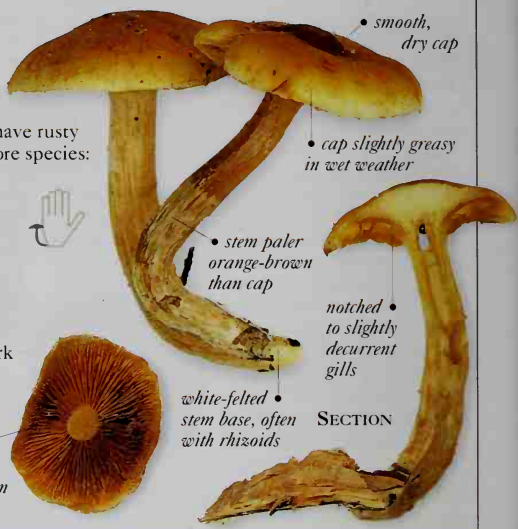
• **SIMILAR SPECIES**

*G. picreus* has a dark stem and vivid yellow gills.



**FRUITING** Appears mostly in small groups or singly.

*pale yellow gills age to cinnamon-brown with rusty flecks*



Dimensions CAP ↔ 3-8cm   STEM ↓ 4-7cm ↔ 0.4-1cm	Spores Rust-brown	Edibility
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Family COPRINACEAE	Species <i>Psathyrella piluliformis</i>	Season Autumn
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### COMMON STUMP PSATHYRELLA

In the large genus *Psathyrella*, consisting mainly of little brown mushrooms – so-called LBMs – among which it is difficult to distinguish, this species has some helpful characteristics: it occurs in clusters and has a distinct white veil, stained brown by spores, at the cap margin. The convex to bell-shaped cap is dark red-brown when wet, drying to paler yellowish brown. Details such as spore size ultimately ensure correct identification.

• **OCCURRENCE** In woods on rotten deciduous stumps; rarely on conifers. Widespread and common in northern temperate zones.



**FRUITING** In dense clusters on and near deciduous stumps.



Dimensions CAP ↔ 1.5-6cm   STEM ↓ 3-10cm ↔ 3-9mm	Spores Dark purplish brown	Edibility
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Family COPRINACEAE

Species *Psathyrella candolleana*

Season Late spring–autumn

## COMMON PARK PSATHYRELLA

An early fruiting species, and perhaps one of the most common in this difficult genus of mostly little brown mushrooms, *Psathyrella candolleana* has a convex to umbonate, yellow-brown cap, which rapidly dries to ivory-white, and a threadlike veil that disappears with age, leaving an almost smooth surface. The fruitbody is extremely brittle when dry. As the spores mature, the gills change color from white through lilac to brown.

• **OCCURRENCE** In gardens, parks, and woods; it is found close to rotten deciduous trees. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** The much darker *P. spadiceogrisea* occurs along forest paths and in similar sites in late spring and early summer.



**FRUITING** In troops on and around rotten wood.



gray- to chocolate-brown mature gills

convex to umbonate cap dries to ivory-white

stem is hollow

SECTION

cap margin thin and with veil remains when young

fragile, smooth stem

crowded gills are adnexed

Dimensions CAP ⊕ 1.5–7cm | STEM ↓ 3–9cm ↔ 2–6mm

Spores Brownish purple

Edibility

Family COPRINACEAE

Species *Panaeolus semiovatus*

Season Late spring–autumn

## COMMON RINGED PANAEOLUS

A distinguishing feature of this species is its cap, which is sticky when wet and shiny, often with wrinkles, when dry. White to ivory or beige, it is egg-shaped to bell-shaped with a margin that is smooth or has white veil remnants. The stem has a white ring that is typically stained black from falling spores. The white to pale straw-yellow flesh may contain a hallucinogen.

• **OCCURRENCE** In pastures on dung or straw mixed with dung. Widespread in northern temperate zones.

• **SIMILAR SPECIES**

*P. antillarum* lacks a stem ring.



**FRUITING** Singly or a few on each dropping of dung.



cap margin smooth or with veil remnants

broad, adnate gills are mottled black and white

bell-shaped cap is sticky when wet, shiny when dry

erect then pendent, white stem ring with black staining from spores

fragile beige to brown stem

cap is egg-shaped on young specimens

white stem base

SECTION

Dimensions CAP ⊕ 1–6cm | STEM ↓ 6–10cm ↔ 3–5mm

Spores Black

Edibility

Family BOLBITIACEAE

Species *Conocybe arrhenii*

Season Late summer–late autumn

## DEADLY CONOCYBE COMPLEX

This is one of the most common members of a subgroup of *Conocybe* species often called *Pholiotina*.

Members are so similar that they are best distinguished by their spores. They have scaly veil remnants at the cap margin or a stem ring. The ring tends to be loose and is easily lost. The gills are fairly crowded and adnexed, often with a white margin. All members are suspected to be poisonous.

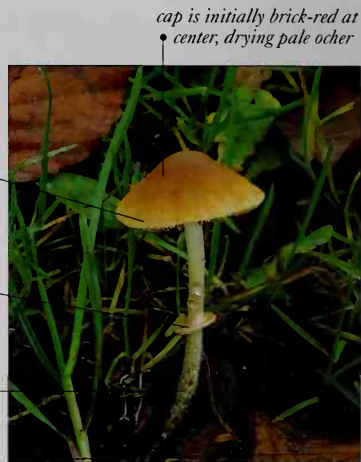
• **OCCURRENCE** Typically on nutrient-rich soil in disturbed sites. Often occurs alongside other *Conocybe* species and with species of *Lepiota* and *Psathyrella*. Widespread in Asia and Europe; world distribution not clear.

• **SIMILAR SPECIES** *C. blattaria* and *C. perincata* have 2-spored basidia; those of *C. arrhenii* are 4-spored.

cap is striate at margin when moist

cufflike white ring is striate on top

stem is pale brown, paler toward top



cap is initially brick-red at center, drying pale ochre

**FRUITING** Often singly or just a few fruitbodies, along roads and beside paths.

Dimensions CAP ⊕ 1–3cm | STEM ↓ 1.5–5cm ↔ 1.5–3mm

Spores Rusty brown

Edibility ☠

Family TRICHOLOMATACEAE

Species *Cystoderma terreii*

Season Autumn

## CINNABAR CYSTODERMA

A convex to umbonate, brick-red cap with a mealy surface and a club-shaped stem with red scales on the lower part are the main features of this species. It has fairly crowded, adnexed, pale gills. When examined with a hand lens, the gills can be seen to be fimbriate. A microscope reveals cystidia (special sterile cells) on the edges of the gills.

• **OCCURRENCE** Woodland areas and in planted areas on humus-rich, acidic soil. The world distribution of this species is not fully understood, but it is widespread in Europe, Japan, and North America.

• **SIMILAR SPECIES** There are several similar *Cystoderma* species found in similar habitats. *C. granulorum* has more dirty, rusty brown coloring. Close relative *C. adnatifolium* lacks cystidia and is brighter in color.

edges of pale gills are fimbriate (visible through hand lens)

pale pink to orange flesh

mealy, brick-red cap surface

convex to umbonate cap

stem is swollen at base

small red scales on lower stem



SECTION

**FRUITING** Appears singly or a few together.

Dimensions CAP ⊕ 2–8cm | STEM ↓ 3–7cm ↔ 4–8mm

Spores Off-white

Edibility ⚠

Family TRICHOLOMATACEAE

Species *Cystoderma amianthinum*

Season Autumn

## SAFFRON CYSTODERMA

This bright ochre-yellow species has a bell-shaped to flat cap with a mealy surface and a fringed margin. Below the short-lived ring, the stem surface is mealy or granular. The crowded, adnexed gills are white, becoming creamy yellow with age; the pale yellow flesh is thin and has a musty, pungent odor. The identity of *Cystoderma* species is best confirmed by microscopic comparison of spore size: those of *C. amianthinum* are generally  $6 \times 3 \mu\text{m}$ .

• **OCCURRENCE** In varied sites – in moss in woodland, with willow, or with grasses or bracken. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Cystoderma amianthinum* var. *rugoso-reticulatum* has a deeply wrinkled cap and pungent odor. *Cystoderma jasonis* is darker with a coarser cap surface; its spores are larger ( $7 \times 4 \mu\text{m}$ ).



mealy or granular surface below stem ring

ochre-yellow cap has fringe at margin

bell-shaped to flat cap with mealy surface



**FRUITING** Appears singly or a few fruitbodies together among mosses in damp, acidic woodland.

Dimensions CAP  $\oplus$  1–4cm | STEM  $\updownarrow$  2.5–6cm  $\leftrightarrow$  3–7mm

Spores Off-white

Edibility

Family TRICHOLOMATACEAE

Species *Cystoderma carcharias*

Season Autumn–late autumn

## PINK-GRAY CYSTODERMA

Besides the pinkish gray color of both cap and stem, this species is characterized by a prominent, cufflike, pink-gray stem ring. The surfaces of the cap and stem are powdery, as in other members of the genus *Cystoderma*. The adnexed gills are white and medium spaced.

The white flesh has an unpleasant, rancid smell.

• **OCCURRENCE** In woods and on wasteland. Widespread in parts of northern temperate zones but not as common as *C. amianthinum* (above).

• **SIMILAR SPECIES** *C. ambrosii* has fruitbodies that are almost pure white and become slightly brown with age. The fruitbodies of *C. fallax* are yellow-brown. *Lepiota* species have free gills.



center of pinkish gray cap is umbonate

distinctive, cufflike stem ring

white gills are adnexed and medium spaced

cap has fringed margin

stem is pinkish gray and powdery, particularly below ring



**FRUITING** Typically in small groups or singly, always on acidic soil and humus among leaf litter and moss.

Dimensions CAP  $\oplus$  2–5cm | STEM  $\updownarrow$  4–8cm  $\leftrightarrow$  2–7mm

Spores Off-white

Edibility

## WITH FIBROUS CAP AND DARK SPORES

**T**HIS SUBSECTION comprises agarics that, in addition to having adnate to adnexed gills (see p.56), have a cap with a distinctly fibrous or scaly surface. The spore deposits of all the species featured here are in various shades of brown, although not rust-colored (see pp.69–77 for species with rusty brown

spores). The species that belong in this subsection are members of the genera *Inocybe* and *Lacrymaria*. Some have veils; others do not. Those *Inocybe* species that lack veils have very fine hairs covering the entire stems. A hand lens is needed in order to see these hairs, which are called cystidia.

Family CORTINARIACEAE

Species *Inocybe haemacta*

Season Autumn

## GREEN AND PINK INOCYBE

The fruitbodies of this species have green tones, rare in this usually dull-colored genus. The convex to umbonate, gray- to greenish brown cap has a fibrous or scaly center. Both the cap and the pale gray flesh become redder with age. The greenish gray stem is fibrous toward the base and has a mealy covering at the top, which is paler in color. The Green and Pink *Inocybe* smells similar to urine or a stable.

• **OCCURRENCE** Mycorrhizal with deciduous trees on rich soil, in parks and woods or on roadsides.

Widespread but local to rare in Europe; not reported in North America.

• **SIMILAR SPECIES** *Inocybe corydalina*, which has a ciderlike smell, may have green hues on the cap.

greenish gray stem,  
paler at top

paler flesh visible  
• beneath fibers

gray- or greenish brown  
• cap reddens with age

• convex or  
umbonate cap

adnexed, gray to  
gray-brown gills  
become pinker then  
• brown with age

flesh ages from  
pale gray to  
redder hue

SECTION

gills are fairly  
crowded

• mealy covers  
upper stem

• fibrous or  
scaly cap center



**FRUITING** Appears singly or a few together.

Dimensions CAP Ⓢ 3–6.5cm | STEM Ⓢ 2–8cm ↔ 4–6mm

Spores Tobacco-brown

Edibility ☠

Family CORTINARIACEAE	Species <i>Inocybe erubescens</i>	Season Spring-autumn
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## DEADLY INOCYBE

The early appearance of this fleshy species, which is known to be involved in poisonings (see SIMILAR SPECIES), is a noteworthy characteristic, as is the fact that the fruitbody stains red when older or if handled. It has a bell-shaped to broadly conical or umbonate cap, the surface of which has distinct radial fibers, common to the genus. The squat stem, which is rarely longer than the diameter of the cap, is sturdy, and its surface has a mealy covering.

- **OCCURRENCE** Mycorrhizal with trees such as beech and linden, on clay or calcareous soil. Widespread but local in Europe and parts of Asia.
- **SIMILAR SPECIES** It has been mistaken for edible fungi, such as *Calocybe gambosa* (p.58). *Inocybe pudica* stains red, but has more slender, whiter fruitbodies.



cap often has involled margin

nearly free gills are off-white to dirty olive-brown

red bruising on gills

white flesh stains red when cut or bruised

SECTION

mealy covering at top of stem



FRUITING In troops on fruitbodies on rich soil.



Dimensions CAP ⊕ 3-9cm   STEM ↓ 4-7cm ↔ 1-2cm	Spores Snuff-brown	Edibility ☠
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Family CORTINARIACEAE	Species <i>Inocybe godeyi</i>	Season Autumn
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## RED-STAINING INOCYBE

The conical to bell-shaped cap of this species is creamy white to pale ocher, soon turning bright orange-red. The off-white stem is covered with fine meal and has a bulbous base; it also develops red tones with age, as does the faintly scented flesh.

- **OCCURRENCE** Mycorrhizal with deciduous trees, especially beech, on alkaline soil. Widespread but rather local in Europe; reported in eastern North America.
- **SIMILAR SPECIES** *I. pudica*, found in Pacific Northwest, is also white, aging pale pink, but lacks the stem bulb.



cap ages and stains orange-red

adnexed gills

white flesh, staining red

SECTION

conical to bell-shaped cap is creamy white to pinkish buff

bulbous stem base



stem covered with fine meal

medium-spaced gills are cream to reddish brown



FRUITING Typically a few together on soil beside paths.

Dimensions CAP ⊕ 1.5-5cm   STEM ↓ 2-7cm ↔ 3-6mm	Spores Tobacco-brown	Edibility ☠
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Family CORTINARIACEAE	Species <i>Inocybe geophylla</i>	Season Autumn
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## WHITE OR LILAC INOCYBE

This species, which smells strongly spermatic, has a conical to umbonate, silky, streaked cap. The upper stem has a mealy covering; the lower stem is more fibrous. There is no stem bulb.

It occurs in two main color forms: white, sometimes with ochre tinges, and lilac with brown gills. This is one of the most common *Inocybe* species.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, among pine needles or on rich soil, often bare and disturbed, such as along ditches or beside roads. It is widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *I. sindonia* is also white, but it is more robust. It is found only under conifers. Other pale species tend to be bigger or have more fibrillose or scaly caps.

WHITE FORM



upper stem has mealy covering

lower stem is fibrous

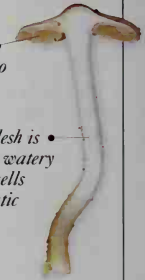


umbro on lilac cap

gills are fairly crowded

• umbonate cap with silky, streaky covering of radial fibers

SECTION



adnexed gills are pale gray to gray-brown

white flesh is slightly watery and smells spermatic



FRUITING A few together or in troops near trees.

Dimensions CAP ♂ 1-4cm   STEM ♀ 2-5cm ↔ 3-5mm	Spores Brown	Edibility ☠
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Family CORTINARIACEAE	Species <i>Inocybe rimosa</i>	Season Summer-autumn
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## STRAW-COLORED INOCYBE

This common, variable mushroom has a distinctive, pointed cap with coarse, radiating fibers and, with age, an upturned margin that tears very easily. The fruitbody is more or less yellow in color. The upper stem is finely downy; the base is wider but not bulbous. Typically, the gills will have a yellowish flush.

• **OCCURRENCE**

Mycorrhizal, mostly with deciduous trees on more fertile, often disturbed soil along bridle paths. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** The equally common *Inocybe maculata* has a darker reddish brown cap with patches of off-white veil. Its pale stem may have a small basal bulb. The hundreds of other *Inocybe* species are accurately identified only by using very specialized literature.



• cap margins flare upward and split with age

• stem is off-white or flushed yellow

• thicker stem base, but no bulb

SECTION



• narrow, adnate, yellowish gray to yellowish brown gills

• flesh is pale and smells spermatic

cap is covered with coarse, radial fibers



FRUITING Appears mostly in small groups on soil.

Dimensions CAP ♂ 3-7cm   STEM ♀ 6-10cm ↔ 0.5-1cm	Spores Tobacco-brown	Edibility ☠
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Family CORTINARIACEAE	Species <i>Inocybe griseolilacina</i>	Season Autumn
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## GRAY AND LILAC INOCYBE

Small brown scales cover the convex, ochre-brown cap of this species.

The scaly, fibrous stem is pale lilac, and a lilac flush may be visible on the cap. There is no basal stem bulb.

**• OCCURRENCE**

Mycorrhizal with deciduous trees on more fertile soil; often found along road edges, like other close relatives.

Widespread in northern temperate zones, but exact distribution is not known.

**• SIMILAR SPECIES**

*Inocybe cincinnata* has a darker cap, and the lilac stem color is stronger near the top. *I. pusio* also has lilac stem coloring but is less scaly on the cap.



Dimensions CAP ↔ 0.8–4cm   STEM ↓ 4–7cm ↔ 2–6mm	Spores Brown	Edibility
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Family CORTINARIACEAE	Species <i>Inocybe lacera</i>	Season Spring–autumn
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## TORN-CAP INOCYBE

Fine fibers and scales cover the convex cap of this dull brown to dark brown species. Young specimens display a veil at the cap margin. The brown fibrous stem does not have a basal bulb. The flesh is typically pale in the cap and becomes darker toward the stem base. A microscope will reveal smooth, cylindrical spores and thick-walled cystidia of this variable species.

**• OCCURRENCE** Mycorrhizal with various trees, including willow and conifers; found on hard-packed forest trails. Widespread and common in northern temperate zones.

**• SIMILAR SPECIES** *Inocybe lanuginosa*

has a more woolly stem and spores with nodules.



**FRUITING** A few together or in troops, often on poor soil.

Dimensions CAP ↔ 1–4.5cm   STEM ↓ 2.5–6cm ↔ 2–6mm	Spores Tobacco-brown	Edibility
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Family CORTINARIACEAE	Species <i>Inocybe asterospora</i>	Season Autumn
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## STAR-SPORED INOCYBE

A distinctive, flattened bulb at the base of a slender, downy stem and a slightly umbonate, pale cap thickly covered with radiating, coarse, dark red-brown fibers characterize this species. Microscopic examination reveals star-shaped spores: the spores of *Inocybe* species are usually either smooth or have nodules (a star shape is an extreme form of the latter type).

• **OCCURRENCE** Mycorrhizal with deciduous trees, especially hazel or beech; often on bare soil. Widespread in northern temperate zones, locally common in eastern North America.

• **SIMILAR SPECIES** *I. margaritispora* has star-shaped spores but a paler, yellower cap. *I. napipes* has a less marked bulb, is smaller, and has ordinary noduled spores.

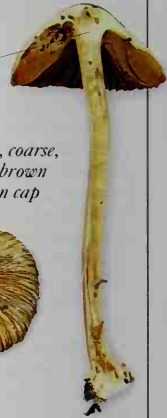


**FRUITING** Appears singly or a few fruitbodies together.



slightly umbonate cap is pale beneath fibers

pale cap flesh, darker in stem



SECTION



radiating, coarse, dark red-brown fibers on cap

flattened, rimmed bulb at stem base



adnexed, tobacco-brown gills

stem downy along its length

Dimensions CAP $\updownarrow$ 3-7cm   STEM $\updownarrow$ 4-9cm $\leftrightarrow$ 0.5-1.2cm	Spores Tobacco-brown	Edibility
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Family COPRINACEAE	Species <i>Psathyrella velutina</i>	Season Autumn
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## WEeping GILLED PSATHYRELLA

The convex or umbonate cap of this species is brownish gray to ocher with a felted surface. The similarly colored stem is fibrillose and fragile. Gray becoming black, the gills are well spaced and adnate. Milky drops can be seen along the gill edges when they are young – hence the common name; these droplets fill with spores and dry as black spots.

• **OCCURRENCE** Saprotrophic; on nutrient-rich, disturbed soil. Widespread in northern temperate zones.

• **SIMILAR SPECIES** There are several similar species, including *Psathyrella glareosa* and *P. pyroticha*. These are distinguished by their size and cap color and by spore characteristics.



cap is convex or with an umbo

brownish gray to ocher cap is felted

gills are gray with droplets at the edge

well-spaced, adnate gills



**FRUITING** Appears in large troops of fruitbodies along roads and paths, often near nettles.

Dimensions CAP $\updownarrow$ 2-10cm   STEM $\updownarrow$ 4-12cm $\leftrightarrow$ 0.5-2cm	Spores Blackish	Edibility
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## MEDIUM-SIZED WITH SMOOTH CAP

**I**N THIS SUBSECTION, species with adnate, adnexed, or notched gills (see pp.15 and 56) have been grouped together according to their size and cap characteristics. Medium-sized refers to the fruitbodies that have caps typically in the range of 1.5 to 6cm in diameter. The smooth surface of the

caps is one of the most readily visible characteristics. The color of the spore deposits of species featured here varies widely from white, which is common to *Hygrocybe* species, through cream (found in species of *Collybia*) to pink (produced by *Entoloma* species) and black (which occurs in many *Psathyrella* species).

Family HYGROPHORACEAE

Species *Hygrocybe calyptraeformis*

Season Throughout autumn

## PINK WAX CAP

The elegant and fragile, dusky pink fruitbodies of this rare species are quite unmistakable. Each has a cap that begins conical and opens out fully as it matures, eventually splitting radially. The stem is very brittle and is difficult to pull out of the substrate. It has mild-tasting, pale pink to white flesh. It is not recommended for eating because of concern about its conservation, and its edibility has not been very well documented.

• **OCCURRENCE** Long-established areas of grassland where commercial fertilizers have not been applied, often on alkaline soil. Widespread throughout Europe, including the islands of the North Atlantic.

• **SIMILAR SPECIES** *Hygrocybe citrinovirens* is similar in shape but is yellow-green and orange; it is also rare. Other *Hygrocybe* species have conical caps, but *H. calyptraeformis* and *H. citrinovirens* are the only ones that split so widely. *H. conica* (p.104) blackens with age. *H. spadicea* has a dark cap and yellow gills. It does not blacken.



SECTION



**FRUITING** In small groups among grasses and mosses.



Dimensions CAP ↔ 3–7cm | STEM ↓ 5–10cm ↔ 0.5–1cm

Spores White

Edibility

Family HYGROPHORACEAE	Species <i>Hygrocybe conica</i>	Season Summer-late autumn
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## BLACKENING WAX CAP

The slightly conical cap of this variable fungus is dry and fibrillose; the stem is yellow to red with longitudinal lines.

This species occurs in a wide variety of colors, sizes, and shapes, and, among *Hygrocybe* species, it probably has the broadest range of habitats (leading some mycologists to suggest it is a range of species and varieties). It blackens with age or when handled. It may be slightly poisonous.

• **OCCURRENCE** In grassy areas, and open woods. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *H. acutoconica* does not stain black nor does

*Entoloma salmonium*, which has a pink spore print and angular spores.



**FRUITING** Appears mostly in small groups of fruitbodies.



• mostly dry, fibrillose cap surface



• pale gray, yellow, or red gills

• yellow to red cap



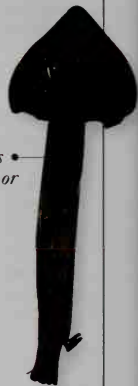
• paler stem base, unless stained black

• longitudinal fibers on stem

• fruitbody turns black with age or when handled

SECTION

• crowded gills are sinuate, almost free to adnexed



Dimensions CAP ⬆️ 1-5cm   STEM ⬆️ 2-10cm ↔ 0.4-1.5cm	Spores White	Edibility ☠️
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Family HYGROPHORACEAE	Species <i>Hygrocybe chlorophana</i>	Season Autumn-late autumn
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## GOLDEN WAX CAP

This fairly large *Hygrocybe* species, ranging from rich orange-yellow to shades of pale yellow, has a slimy, convex to flattened cap, aging grayish yellow and with a more or less striate margin. The stem can be slimy but tends to have a powdery top. Edible, but not recommended, it has mild, pale yellow flesh.

• **OCCURRENCE** In various unimproved grassy areas, mostly with other *Hygrocybe* species. Widespread and common in eastern North America, Texas, and Pacific Northwest.

• **SIMILAR SPECIES** *H. ceracea* is smaller and less slimy on the cap, with adnate or decurrent gills. *H. flavescens* has a similarly colored slimy cap but has a white stem base. *H. glutinipes*.



• broad, adnexed, fleshy gills

• convex, sticky-slimy cap

• striations at slightly wavy cap margin

• sticky or dry stem with powdery top

SECTION

• well-spaced gills are paler than cap



**FRUITING** Appears in troops and fairy rings.

Dimensions CAP ⬆️ 1.5-7cm   STEM ⬆️ 2.5-10cm ↔ 3-8mm	Spores White	Edibility 🍴
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Family HYGROPHORACEAE	Species <i>Hygrocybe coccinea</i>	Season Late summer–late autumn
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## SCARLET WAX CAP

A slightly grainy surface on the bell-shaped cap, which is dry but becomes sticky in wet weather, and adnate gills help to distinguish this mushroom from other red *Hygrocybe* species. It is edible, but not choice, with a faint smell and taste. Small and more orange forms of *H. coccinea* can be difficult to distinguish and need to be studied with a microscope and identified using very specialized literature.

• **OCCURRENCE** In unimproved grassy areas. Widespread and fairly common in eastern North America and California.

• **SIMILAR SPECIES** *H. punicea* (p.56) and *H. splendidissima* are fleshier and have adnexed gills. The latter has an almost smooth stem and smells of honey.



**FRUITING** Appears in troops or small groups.



Dimensions CAP ⬆ 1.5–6cm   STEM ⬆ 4–8cm ↔ 0.4–1cm	Spores White	Edibility 101
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Family HYGROPHORACEAE	Species <i>Hygrocybe psittacina</i>	Season Summer–late autumn
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## PARROT WAX CAP

This spectacular species may be difficult to identify because of the vast range of colors exhibited by specimens of different ages. When young, the convex or bell-shaped cap is deep bottle-green; with age, purple, orange, and yellow develop. The stem is yellow, tinged blue-green. The fruitbody has a slimy surface when young and is almost odorless. It is inedible.

• **OCCURRENCE** In meadows, roadsides, and woods on rich soil, with species of *Geoglossum* (p.242) and *Clavulinopsis* (p.240), and other members of the Clavariaceae. Widespread and common in northern temperate zones; common in eastern North America.

• **SIMILAR SPECIES** *Hygrocybe psittacina* var. *perplexa* lacks green color and is somewhat brick-red.



**FRUITING** In small groups, mostly in meadows.

Dimensions CAP ⬆ 1–4cm   STEM ⬆ 3–7cm ↔ 4–8mm	Spores White	Edibility 101
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Family HYGROPHORACEAE	Species <i>Hygrophorus eburneus</i>	Season Autumn–early winter
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### SATIN WAX CAP

The convex to flattened, sparkling white cap of this species drips with slime in wet weather. The stem is also slimy and white. Both stain slightly yellow with age. The gills are thick and waxy, and the white flesh smells pleasantly aromatic but is not worth eating.

- **OCCURRENCE** Mycorrhizal with beech trees on fertile soil. Widespread in northern temperate regions where beech grows; found in eastern North America and California.
- **SIMILAR SPECIES** *Hygrophorus discoxanthus* stains deep orange.



**FRUITING** In small clusters among leaf litter on soil.



- *satin-white cap slowly turns slightly yellow with age*
- *slimy white stem is powdery at the top*
- *more or less decurrent gills*
- *white flesh smells aromatic*

**SECTION**

- *thick, waxy white gills are medium spaced*

Dimensions CAP ⊕ 3–8cm   STEM ↓ 4–10cm ↔ 0.5–1cm	Spores White	Edibility
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Family BOLBITIACEAE	Species <i>Agrocybe pediades</i>	Season Summer–autumn
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### COMMON LAWN AGROCYBE

Normally completely smooth with a gently convex, yellowish ocher cap and no veil, this species is not particularly distinctive. The stem is solid, cylindrical, and straight, and the flesh is pale with a yeasty smell and taste. Some experts divide *Agrocybe pediades* into several species, mainly by habitat and microscopic features, such as spore size.

- **OCCURRENCE** Typically in lawns and other types of grassland but can also grow on mulch containing horse manure. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *A. arvalis* has a downy stem that springs from a black sclerotium. Related *A. dura* is paler and fleshier, with a veil at the cap margin.



**FRUITING** Appears singly or in troops of fruitbodies.



- *convex, ocher-yellow cap becomes greasy when wet*
- *smooth cap surface cracks in dry conditions*

- *adnate brown gills*

- *grows in grass turf*

- *well-spaced gills*
- *gills have off-white edge*
- *solid stem has a few surface hairs*

**SECTION**

Dimensions CAP ⊕ 1–3.5cm   STEM ↓ 2.5–5cm ↔ 3–5mm	Spores Tobacco-brown	Edibility
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Family COPRINACEAE

Species *Panaeolus papilionaceus*

Season Summer-late autumn

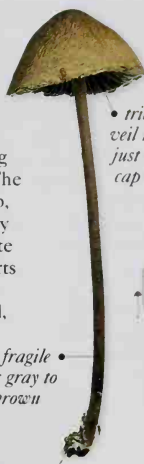
## FRINGED PANAEOLUS

Triangular veil remnants at the cap margin are characteristic of this species. The cap is convex or bell-shaped and varies from dark gray to brownish gray; older specimens may have pale caps contrasting with the dark brown stems. Marbled gills caused by uneven ripening of the spores are typical of *Panaeolus* species. The flesh is dark brown in the stem, paler in the cap, and has no distinct smell. A form with a strongly veined cap was previously regarded as a separate species, *P. retirugis*. Because of conflicting reports on toxicity, this species should not be eaten.

• **OCCURRENCE** On old dung or in manured, grazed fields. Widespread in northern temperate zones and elsewhere.

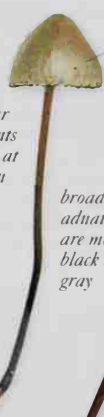


**FRUITING** Singly or a few together on or near manure.



• triangular veil remnants just visible at cap margin

rather fragile stem is gray to dark brown



convex or bell-shaped, smooth cap

SECTION

broad, adnate gills are mottled black and gray



medium-spaced, nearly black gills with white edges



sooty gray-brown cap indicates an older specimen

stem is hollow

Dimensions CAP ⊕ 1-4cm | STEM ↓ 4-10cm ↔ 2-3mm

Spores Black

Edibility ☠

Family STROPHARIACEAE

Species *Psilocybe cyanescens*

Season Autumn-early winter

## COMMON WOOD-CHIP PSILOCYBE

This hallucinogenic agaric has a flattened cap with a wavy margin; reddish buff at first, it dries to creamy ocher and develops dark blue discoloration when handled. It becomes greasy in wet weather. The off-white to gray stem, which also stains blue, has no ring. Several stems are frequently joined at the base. The white flesh has a faint yeasty smell.

• **OCCURRENCE** Mostly in disturbed sites, such as a flower bed mulch that contains coniferous wood chips. Widespread but rather local, in northern temperate zones.

• **SIMILAR SPECIES** The many blue-staining *Psilocybes* in North America can be reliably identified to species only with technical literature.



**FRUITING** In troops or clusters in disturbed sites.

fairly well-spaced gills

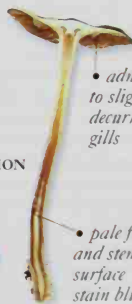


blue most obvious at cap margin

gills are whitish gray to dark purplish brown with white edges

cap margin may be wavy and upturned when old

SECTION



adnate to slightly decurrent gills

pale flesh and stem surface stain blue

silky, fibrillose, off-white to gray stem



Dimensions CAP ⊕ 2-4cm | STEM ↓ 3-6cm ↔ 3-8mm

Spores Dark purplish brown

Edibility ☠

Family TRICHOLOMATACEAE	Species <i>Macrocystidia cucumis</i>	Season Late summer–autumn
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## CUCUMBER-SCENTED MUSHROOM

This agaric has a strong, rancid smell of rotten cucumbers or pickled herrings. The dark brown or orange-brown cap has a pale yellow margin and velvety surface. The fairly tough stem is also densely velvety; it is dark at the base and paler near the top. The spore print is sometimes off-white to pale pink, indicating a complex of species.

• **OCCURRENCE** In gardens, parks, or along roads, on rich soil mixed with leaf litter or sawdust. Widespread but local in northern temperate zones; widespread in Europe but more local in the Pacific Northwest.



FRUITING A few fruitbodies together or in troops.

fairly crowded, medium to very broad gills



adnexed gills are pale cream to pale reddish brown

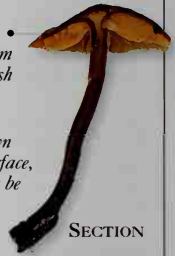
fine down on cap surface, which may be striated

yellow cap margin



cap may be convex, conical, or bell-shaped

black to dark brown stem base



SECTION



Dimensions CAP ⌀ 0.5–5cm   STEM ↑ 3–7cm ↔ 2–5mm	Spores Rusty ocher or off-white	Edibility
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Family COPRINACEAE	Species <i>Psathyrella multipedata</i>	Season Autumn
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## TUFTED PSATHYRELLA

The bell-shaped to conical, gray- or red-brown cap of this cluster-forming species has striations halfway to the center. It dries to pale yellow-brown and has no obvious veil. Clusters of up to 80 smooth white stems are joined at the base and extend, rootlike, deep into the soil. This is among the very few *Psathyrella* species with clear identification features, distinguishing it from most other little brown mushrooms (LBMs).

• **OCCURRENCE** On rich, loamy, or clay soil, often in urban areas such as city parks and on roadsides. Widespread in Europe; reported in the Midwest.

• **SIMILAR SPECIES** *P. piluliformis* (p.94).

Other tufted agarics in open areas include *Lyophyllum decastes* (p.41) and other species of *Lyophyllum* (p.132), which all have white spore deposits.



FRUITING Always in tight clusters, rooted deeply in turf.



smooth cap dries from center to pale yellow-brown

moist, gray- or red-brown cap, striated at margin

hollow stems

SECTION

pale gray to dark purple-brown gills are white edged

crowded, narrow, adnexed gills



Dimensions CAP ⌀ 0.8–4cm   STEM ↑ 8–14cm ↔ 2–4mm	Spores Brownish black	Edibility
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Family COPRINACEAE

Species *Psathyrella conopilus*

Season Late summer–late autumn

## DARK CONE PSATHYRELLA

Known for its elegant stature and dark reddish brown cap, which dries to pale ochre-yellow, this is a distinctive, if fragile, *Psathyrella* species. The conical cap is smooth with marginal striations. When examined with a hand lens, thick-walled dark hairs are visible on the cap surface and in the thin flesh – a unique feature in the genus.

• **OCCURRENCE** Along roadsides, bridle paths, and in parks on disturbed soil, especially among wood chips and debris. Widespread and common in Europe and North America.

• **SIMILAR SPECIES** A number of similar species are smaller, paler, and often have pink tinges. In sand dunes, one of the most common gilled mushrooms is *P. ammophila*, which grows on marram grass.



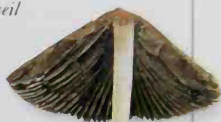
**FRUITING** In scattered fruitbodies or in troops.



• orange-brown cap dries to pale ochre-yellow



• conical cap with marginal striations but no veil



white edge to adnexed gills

SECTION



• quite crowded, fragile gills are gray to black



• base, to 5mm wide, has tints of cap color

• very tall, fragile, hollow white stem

Dimensions CAP  $\leftrightarrow$  2–6cm | STEM  $\updownarrow$  9–19cm  $\leftrightarrow$  2–3mm

Spores Black

Edibility

Family ENTOMATACEAE

Species *Entoloma cetratum*

Season Early summer–late autumn

## HONEY-COLORED ENTOLOMA

This is an elegant species, identifiable by its warm honey-brown coloring, the clear striations on its cap, and its tall stature. The cap is bell-shaped to convex, and the stem is fibrillose. Examination under a microscope reveals its two-spored basidia. This and other *Collybia*-like *Entoloma* species are also sometimes classified in the genus, or subgenus, *Nolanea*.

• **OCCURRENCE** Under conifers on humus-rich soil but also in acidic, deciduous woods and bogs. Widespread and common in Europe; not reported in North America.

• **SIMILAR SPECIES** *E. lanuginosipes* and *E. pallescens* are distinguished by heavily powdered stem surfaces and four-spored basidia.



**FRUITING** A few fruitbodies appear together or singly.

adnexed, honey-toned gills turn pink with age



• well-spaced gills

darker center on honey-brown cap surface

• cap surface

lines at cap margin

SECTION

• young stem is powdered at the top

• fine fibers run lengthwise on stem



• thin, fragile, pale flesh

Dimensions CAP  $\leftrightarrow$  0.5–3cm | STEM  $\updownarrow$  5–8cm  $\leftrightarrow$  2–4mm

Spores Pale pink

Edibility

Family ENTOMATACEAE	Species <i>Entoloma conferendum</i>	Season Spring-late autumn
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## STAR-SPORED ENTOLOMA

Despite an elegant stature and a strongly fibrillose, silvery stem, this species is not easy to identify. A microscope reveals its key identification feature: star-shaped spores. The reddish brown to gray-brown cap tends to be conical, aging to convex or umbonate; darker striations on the surface fade as it dries to pale gray-brown. The crowded gills are adnate, and the pale flesh smells and tastes yeasty.

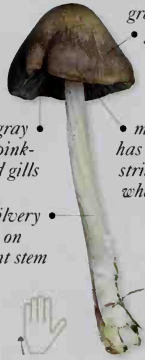
• **OCCURRENCE** Mostly in grassy places in parks and playing fields but also in grass or moss in open woods. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

There are several *Entoloma* species that are similar in appearance, such as *E. cetratum* (p.109), which is warmer honey-brown, and *E. sericeum* (inset, right). All have spores that are angular and not star-shaped.



Δ **ENTOLOMA SERICEUM** Short-stemmed, with a dark sepia-brown to horn-gray cap, this common European species has a very strong rancid-yeasty smell. The spores are angular but not star-shaped. ☠



cap dries from reddish brown or gray-brown to pale gray-brown

pale gray then pink-tinged gills

margin has darker striations when moist



young cap is conical



FRUITING Appears singly or in small groups.

Dimensions CAP ⊕ 2-4cm   STEM ⊕ 3-6cm ↔ 3-7mm	Spores Pale pink	Edibility ☠
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Family ENTOMATACEAE	Species <i>Entoloma nitidum</i>	Season Autumn
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## STEEL-BLUE ENTOLOMA

This is among the very few blue *Entoloma* species that are quite large and fleshy. It is very dark gray-blue with a convex to umbonate, smooth to fibrillose cap and a slender, twisted stem. The well-spaced, adnate gills are white, becoming pale pink with age. The white cap flesh has a blue tinge near the skin and has a faint smell. This species should not be eaten.

• **OCCURRENCE** Among moss in damp, acidic coniferous woods or tree stands. Widespread but mostly in northern Europe and adjacent parts of Asia; not reported in North America.

• **SIMILAR SPECIES** *E. bloxamii* is fleshier and prefers alkaline grassland. *E. enchroum* is smaller, bluer, and grows on deciduous trees.

dark gray-blue cap is smooth to fibrillose

cap is convex to umbonate



well-spaced, white gills age to pink

slender, twisted stem is dark gray-blue

FRUITING Appears singly or in small groups of fruitbodies in damp woods.

Dimensions CAP ⊕ 1-2.5cm   STEM ⊕ 2-6cm ↔ 2-4mm	Spores Pale pink	Edibility ☠
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Family TRICHOLOMATACEAE

Species *Collybia fusipes*

Season Summer–autumn

## EURO SPINDLE-SHANK COLLYBIA

A clustered habit and deeply rooting stems, with twisted fibers along their length, are distinctive features of this weak parasite; a digging tool is necessary to get the entire stem out of the ground. The cap varies in shape from convex to umbonate or irregular. The fox-brown stem, paler at the top, is very tough, with pale, fibrous flesh that is mild in taste and indistinct in smell.

• **OCCURRENCE** Attached to buried roots, mainly of old oak trees, in parks and older forests. Fairly common and widespread in the oak regions of Europe; not reported in North America.



• fairly well-spaced, thick gills are cream with rust-brown spots

long portion of stem in soil



convex, reddish brown cap often has dark spots and darkens when wet

• surface of cap is smooth and greasy

adnexed, notched to slightly decurrent gills are toothed

pale, fibrous flesh

SECTION



FRUITING In clusters on oak roots, rarely on beech.

Dimensions CAP Ⓢ 4–8cm | STEM Ⓢ 4–8cm ↔ 0.5–1.5cm

Spores White

Edibility

Family TRICHOLOMATACEAE

Species *Collybia dryophila*

Season Summer–early autumn

## COMMON COLLYBIA

This species has a slightly greasy, convex to flat, pale leather-brown cap that can be distorted by a jelly mushroom parasite (species of *Syzygospora*). The smooth stem is similarly colored, paler toward the top. Not recommended as an edible because of reported digestive upsets.

• **OCCURRENCE** Mostly in woods or open grassy sites, on leaf litter and humus-rich soil. Widespread and very common in northern temperate zones.

• **SIMILAR SPECIES**

*Collybia aquosa* has pale pink rhizoids, and *C. oclior* has a rather dark cap and pale yellow gills. Both are mostly late spring to summer fruiting. *Marasmius oreades* (p.117) fruits in rings in grass.



crowded, fairly broad gills



adnexed or almost free gills

SECTION

• white to cream gills

• tan cap dries to pale leather-brown

• stem base with white rhizoids



FRUITING In troops on leaf litter and humus.

Dimensions CAP Ⓢ 2–6cm | STEM Ⓢ 3.5–7cm ↔ 3–5mm

Spores Cream

Edibility

Family TRICHOLOMATACEAE	Species <i>Collybia erythropus</i>	Season Autumn-late autumn
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### STALKED COLLYBIA

The convex to flat, cream to pale leather-brown cap of this species is more or less striate at the margin and has a slightly greasy surface. The smooth stem is fox-red. The flesh is white in the cap and red-brown in the stem. It has an indistinct smell and taste and is not a worthwhile edible.

• **OCCURRENCE** In deciduous woods, it grows on mossy tree trunks or emerges from half-buried, very decayed wood. Fairly common and widespread in Europe; not reported in North America.

• **SIMILAR SPECIES** *Collybia acervata* grows in clusters of fruitbodies on or under conifers.

*C. dryophila* (p.111). *Marasmius* species (pp.114, 117, 138, 177) are also similar.



• fairly broad gills often inter-connect



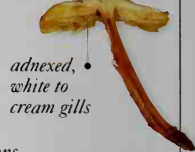
smooth, fox-red stem



smooth, cream to pale leather-brown cap is slightly greasy

• striations at cap margin

flesh is paler in cap



adnexed, white to cream gills

SECTION



FRUITING In clusters or, more rarely, singly.

Dimensions CAP ⊕ 1-4cm   STEM ↓ 3-7cm ↔ 2-5cm	Spores Pale cream	Edibility  ⊙
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Family TRICHOLOMATACEAE	Species <i>Collybia butyracea</i>	Season Late summer-early winter
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### BUTTERY COLLYBIA

This species is recognized by its greasy, umbonate cap, which changes color as it dries, creating zones of light and dark, and by its distinctly club-shaped stem base. The flesh is tough and fibrous and is hollow or has a soft pith in the stem; although edible, it is not worthwhile.

• **OCCURRENCE** In deciduous woods, mostly on humus-rich soil and in leaf litter. Widespread and common to abundant in northern temperate zones.

• **SIMILAR SPECIES**

A darker form, *Collybia filamentosa*, grows in acidic woods and is sometimes regarded as a separate species.



FRUITING In troops on leaf litter and soil.



greasy cap surface

• slightly striate, dark brown to horn-gray cap



crowded white gills

fibrillose, club-shaped stem base

gills are adnexed, but appear almost free

rough, fibrous flesh



SECTION

Dimensions CAP ⊕ 3-6cm   STEM ↓ 4-7cm ↔ 0.5-2cm	Spores Pale cream	Edibility  ⊙
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Family TRICHOLOMATACEAE	Species <i>Collybia confluens</i>	Season Autumn
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## TUFTED COLLYBIA

Producing dense tufts of fruitbodies, this species has a tall, slender stem clothed in gray-white felt, and a rounded, very pale grayish white cap, smaller than those of most *Collybia* species. It has a faint, pleasantly aromatic smell and taste, but it is not considered a worthwhile edible.

• **OCCURRENCE** In deciduous and coniferous woods, on thick leaf litter; probably more common on rich, fertile soil. Widespread in northern North America.

• **SIMILAR SPECIES** *C. acervata* also grows in clusters, but it has reddish coloring, stems with felt on the lower half only, and is always associated with coniferous trees.



• dry, smooth, very pale gray-white cap

dense, gray-white felt on entire stem

flesh is off-white to pale brown

• stem is dark brown on overly mature specimens



SECTION



• crowded, narrow, white to cream gills



FRUITING In dense tufts, sometimes in fairy rings.

Dimensions CAP ⌀ 1–3cm   STEM ↓ 5–9cm ↔ 3–7mm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Collybia peronata</i>	Season Autumn–late autumn
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## BITTER WOOLLY-FOOT COLLYBIA

The leather-brown cap of this species is bell-shaped to almost flat and has radial but irregular, dark brown streaks. Its main distinguishing features are its stem and its taste: the pale yellow stem is covered with felty yellow fibers at the base, becoming downy toward the top, and the inedible, strongly acid-tasting flesh is white to sulfur-yellow, tough, and fibrous. Also useful in identification are its fairly well-spaced gills.

• **OCCURRENCE** In deciduous and coniferous woods on leaf litter. Widespread in northern temperate zones; common in Europe, rare in North America.

• **SIMILAR SPECIES** Both *Collybia alicivirens* and *C. fuscopurpurea* have darker caps and stem felt that is not yellow. They both have a mild taste.



fairly well-spaced, narrow, tough gills



thick, feltlike covering on lower stem, which is often curved and footlike



adnexed or almost free, tan gills

white to sulfur-yellow flesh



FRUITING In troops or small clusters of fruitbodies.



• dry cap is leather-brown with darker streaks

SECTION

Dimensions CAP ⌀ 2.5–6cm   STEM ↓ 4–8cm ↔ 3–5mm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Marasmius alliaceus</i>	Season Late summer–autumn
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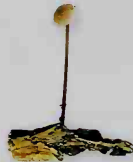
## EURO GARLIC MARASMIUS

A pungent smell, reminiscent of rancid garlic, a fairly pale leather-brown cap, and an almost smooth black stem identify this large *Marasmius* species. The cap is convex or umbonate, and its surface may have darker striations, either at the margin or rarely almost to the center. They disappear with age. Despite the very rancid taste, some people use it as a garlic substitute in cooking.

- **OCCURRENCE** On buried branches or trunks in beech woodland. Widespread in the beech regions of Europe and adjacent parts of Asia.
- **SIMILAR SPECIES** *M. scorodonium* is smaller and paler but with a similar smell. It often occurs in grassland.



**FRUITING** Solitary or in troops in beech woodland.



**DWARF FORM**



Dimensions CAP ⊕ 1.5–4cm   STEM ↓ 7–15cm ↔ 3–6mm	Spores Off-white	Edibility ☉
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Family TRICHOLOMATACEAE	Species <i>Flammulina velutipes</i>	Season Late autumn–spring
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## ENOKI COLLYBIA

The orange-brown cap and velvety, dark brown stem make this species easy to identify. It is one of the very few agarics that survive frosts. The gills are adnexed, crowded, and white to pale yellow. The thin, pale yellow flesh has a mild flavor; in Japan, it is cultivated for cooking.

- **OCCURRENCE** On living but unhealthy trees, especially willow or poplar; on weakened sites, such as where a branch has broken. Rarely found on conifers. Widespread and rather common in northern temperate zones.
- **SIMILAR SPECIES** *Flammulina fennae* and *F. ononidis* are rarer and have different habitats.



**ZYGITES MEGALOCARPUS** Δ  
A gray-white species, parasitic on a range of agarics, including *Flammulina*. ☹



**FRUITING** In dense clumps of fruitbodies.

Dimensions CAP ⊕ 1–6cm   STEM ↓ 2–7cm ↔ 0.3–1cm	Spores White	Edibility ☉
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Family HYDNANGIACEAE

Species *Laccaria amethystina*

Season Autumn

## PURPLE LACCARIA

When young, this very common species is easily identified by its amethyst coloring and thick, well-spaced gills; the coloring fades with age, making older specimens difficult to distinguish from the redder *Laccaria* species. The dry, slightly felted cap has an inconspicuous navel and pale margin striations. Its widely spaced gills are typical of the genus; microscopic examination reveals globose, spiny spores (9.5µm in diameter). It is edible, without a strong taste or smell, but contains minute amounts of arsenic.

• **OCCURRENCE** Mycorrhizal with a range of trees, including beech and conifers.

Widespread and abundant in eastern North America.



**FRUITING** In troops on soil in leaf litter in moist woodland.



central cavity in stem

pale flesh is firm and fibrillose

fibrillose stem is same color as cap

SECTION

striate cap margin

stem base has off-white, felted mycelium

well-spaced, thick, adnate gills

Dimensions CAP ⊕ 2–5cm

STEM ↓ 3–7cm ↔ 4–8mm

Spores Pale violet to white

Edibility 100

Family HYDNANGIACEAE

Species *Laccaria laccata*

Season Summer–early winter

## COMMON LACCARIA

This species appears in varying pink-brown shades and fades with age. Otherwise, it is similar to *Laccaria amethystina* (above), with a dry, slightly felted or scaly cap, often toothed at the margin and depressed in the center, a strongly fibrillose stem, and thick gills. It has spherical or near-spherical, spiny, 9 x 8µm spores and four-spored basidia. The thin, red-brown flesh has no distinct taste or smell.

• **OCCURRENCE** Mycorrhizal with trees in woods and parks; under willow in boggy places. Widespread and abundant in northern temperate zones.

• **SIMILAR SPECIES** *L. bicolor* has contrasting, pale blue gills. *L. fraterna* has two-spored basidia, as does the smaller, larger-spored *L. pumila*. *L. proxima* is larger with a more fibrillose stem. *L. ochropurpurea* is much larger and has purple gills; *L. trullisata* grows in sand along the East Coast and has elliptical, smooth spores.



**FRUITING** In troops, often on damp soil.



dry cap, here reddish brown, but may be shades of pink-brown

toothed cap margin

robust, strongly fibrillose stem

gills each have a decurrent tooth

SECTION

well-spaced pink gills

slight depression in cap center

Dimensions CAP ⊕ 1–5cm

STEM ↓ 2–6cm ↔ 2–6mm

Spores White

Edibility 100

Family TRICHOLOMATACEAE	Species <i>Calocybe carnea</i>	Season Mid—late autumn
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## PINK LAWN TRICH

This species is easily identified by its pink cap and stem, contrasting with its crowded, sinuate, notched white gills, although it can be difficult to spot in deep grass. Indistinct in smell and taste, it is considered to be edible but the fruitbodies are so small that it is not really worth the effort.

• **OCCURRENCE** Grassland, including fertilized agricultural pasture and lawns. Widespread in northern temperate zones; uncommon in North America.

• **SIMILAR SPECIES** *Calocybe persicolor*, possibly the same species, is said to be duller and have a hairy stem base, often joined in clusters. *C. obscurissima* is even duller and grows on calcareous soil in woods.

*Entoloma rosea* is a brighter shade with a pink spore deposit.

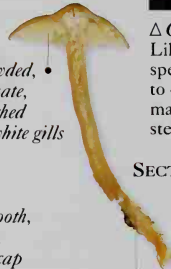
smooth, fleshy, pink stem



cap is convex to umbonate

smooth, fleshy, pink cap

crowded, sinuate, notched white gills



off-white flesh has no smell



△ *CALOCYBE IONIDES*  
Lilac coloring identifies this species, which has an umbonate to depressed, sometimes wavy-margined cap, a club-shaped stem, and cream-white gills.

### SECTION



FRUITING Singly or in small groups of fruitbodies.

Dimensions CAP ⊕ 1–4cm   STEM ↓ 2–4cm ↔ 3–8mm	Spores Cream-white	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena galericulata</i>	Season Summer—early winter
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## COMMON TUFTED MYCENA

Two distinguishing features of this common but difficult-to-identify agaric are its unusual toughness compared to other *Mycena* species, and a noticeable tendency for the gills to take on a pale pink hue with age. The cap varies from bell-shaped to convex and may be yellow-brown or gray-brown. The similarly colored stem is hollow but very tough and can be twisted without breaking. The flesh has a yeasty, rancid smell and a similar taste.

• **OCCURRENCE** In woods on the trunks, stumps, and fallen branches of various types of deciduous trees. Widespread and common in northern temperate zones, extending south.

Throughout North America.



FRUITING Appears in tufts and troops of fruitbodies.



medium-spaced, white to gray gills age to pale pink



dry cap surface, greasy when wet

bell-shaped, umbonate to convex cap

extremely tough stem

pale brown cap often has furrows and wrinkles

tough, adnexed gills, often interveined or forked

### SECTION

Dimensions CAP ⊕ 1–6cm   STEM ↓ 3–8cm ↔ 2–7mm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE

Species *Marasmius oreades*

Season Early summer–mid-autumn

## FAIRY RING MARASMIUS

Producing characteristic rings in turf, this mushroom has a bell-shaped to convex cap, which becomes flatter with a broad umbo with age; it emerges tan and dries to pale leather-brown from the center. The off-white to pale buff stem is tough and solid. It is pleasant tasting, with a smell reminiscent of bitter almonds, but see SIMILAR SPECIES before eating.

• **OCCURRENCE** In grassland, including lawns. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

The poisonous *Clitocybe dealbata* (p.34) is found in the same grassy habitat. It is distinguished by its decurrent gills.



cap surface dries to  
• pale leather-brown

adnexed or  
• almost free gills

creamy white  
to leather-  
brown flesh



moist cap  
surface is  
tan

off-white stem  
• top is finely  
velvety or  
powdery



• well-spaced,  
cream to pale  
leather-brown  
gills

SECTION



FRUITING Appears in fairy rings among grasses.

Dimensions CAP ⬆ 1–5cm | STEM ⬆ 3–6cm ↔ 3–7mm

Spores Off-white

Edibility

Family TRICHOLOMATACEAE

Species *Oudemansiella radicata*

Season Summer–late autumn

## ROOTING COLLYBIA

This species has an umbonate to flattened, greasy, gray- to yellow-brown cap and a twisted, furrowed stem, which is white at the top, brown toward the base. The stem extends 5–15cm into the soil and the buried substrate, with the same amount above ground. This, and some more velvety species, all lacking stem rings, are placed by some in the genus *Xerula*, and by others in *Collybia*.

• **OCCURRENCE** In parks and woods, by trees and stumps. Widespread in northern temperate zones; common in some regions; world distribution unclear.

• **SIMILAR SPECIES** *Oudemansiella pudens* and *O. causei* have dry caps and strongly velvety stems.



adnate gills, each with  
• a decurrent tooth

• greasy,  
veined cap  
surface

• pale gray-  
brown stem,  
with white  
upper part

tough,  
• off-white  
flesh

medium-spaced, pale  
cream gills, often  
• with brown edges

twisted,  
• furrowed  
stem



SECTION

FRUITING Appears singly or in scattered groups.

Dimensions CAP ⬆ 3–10cm | STEM ⬆ 5–15cm ↔ 0.5–1cm

Spores Pale cream

Edibility

Family TRICHOLOMATACEAE	Species <i>Mycena pelianthina</i>	Season Summer–autumn
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## DARK GILL-EDGE MYCENA

This somber-looking agaric has a large cap compared to most *Mycena* species. Convex to flat, it is purplish gray when wet, drying to pale gray-lavender. Margin striations are clearer when the cap is wet. The medium-spaced gills are broad and gray-purple with a serrated, almost black edge. The radishlike smell is similar to that of *M. pura* (below). Overall, it is like a *Collybia* (pp.111–113), but microscopic features, such as amyloid spores and large cystidia with colored contents, place it in *Mycena*.

**• OCCURRENCE** Mostly in rich, alkaline woodland, on thick leaf litter, mainly from beech trees. Widespread but rather local in Europe and adjacent parts of Asia.



toothed black  
• gill edge



• broad, narrowly attached gills



cap surface dries from purplish gray to pale gray-lavender



hollow stem  
• is pale purple or purple tinged

fragile, watery flesh

SECTION



• stem thicker towards base



FRUITING Singly or a few fruitbodies together.

Dimensions CAP ↔ 3–6cm	STEM ↓ ↑ 4–8cm ↔ 4–8mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena pura</i>	Season Late summer–early winter
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## POISON RADISH GROUND MYCENA

This variable species comes in many different colors, usually with purple tints. Some are considered separate species or varieties; all smell of radishes. A large pink form, *Mycena rosea*, has been implicated in poisonings. The convex to umbonate cap shows a distinct striate margin when wet. The hollow, dry stem may have a yellow hue or can be paler but tinted in the cap color.

**• OCCURRENCE** In wooded and open habitats on humus-rich soil. Common in northern temperate zones, extending south.

**• SIMILAR SPECIES** *M. diosma* has a dark cap, which changes color as it dries, smells of cedarwood, and grows on alkaline soils.



pink-colored form, also known as *M. rosea*



stem color is usually similar to the cap, or paler



SECTION

adnexed to adnate gills may be sinuate and notched

hollow stem

fairly crowded gills

FRUITING Singly or in small groups on rich soil.

Dimensions CAP ↔ 2–6cm	STEM ↓ ↑ 3–9cm ↔ 0.3–1cm	Spores White	Edibility
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Family TRICHOLOMATACEAE

Species *Mycena crocata*

Season Late summer–autumn

## EURO ORANGE-STAINING MYCENA

Conical to convex and more or less umbonate, the cap of this species is brown-gray with a paler margin and striations. Its stem exudes a saffron-orange liquid when cut or broken, leading to its other common name, Orange-milking *Mycena*. The lower stem is also saffron-orange; the upper part is paler. The well-spaced gills are white, staining yellow.

• **OCCURRENCE** Almost exclusively associated with beech, found mainly on fallen, often half-buried branches or in thick leaf litter. Widespread in beech regions within Europe and locally very common; also found in Japan.

• **SIMILAR SPECIES** A few other *Mycena* species produce colored or white liquid when damaged. *M. haematopus* (p.136) has blood-red juice, as does *M. sanguinolenta*; *M. galopus* (p.137) exudes a white liquid.



FRUITING A few together or in troops of fruitbodies.

Dimensions CAP ⊕ 1–3cm | STEM ↓ 5–12cm ↔ 1–3mm

Spores Pale cream

Edibility

Family TRICHOLOMATACEAE

Species *Mycena polygramma*

Season Autumn–early winter

## GRAY-LINED MYCENA

This fairly large, tough-fleshed *Mycena* species has a silvery stem with distinct grooves along its length. The pale gray to gray-brown cap is umbonate with radiating wrinkles on the dry surface. The off-white flesh is almost odorless. Occasionally forms that are entirely white can be found.

• **OCCURRENCE** In woods, attached to buried deciduous wood and around stumps; also on the base of living trees; occasionally on conifers. Widespread; common in Europe and adjacent Asia; also found in Japan and eastern North America.

• **SIMILAR SPECIES** *M. vitilis* is smaller with an equally tough, smooth, shiny stem. It occurs in the same habitat and is more common. *M. galericulata* (p.116) is even tougher and has a smooth stem.



FRUITING Appears singly or in small groups.

Dimensions CAP ⊕ 1–4cm | STEM ↓ 5–12cm ↔ 2–4mm

Spores White

Edibility

## WITH CRUMBLY FLESH

**T**HE SPECIES FEATURED in this subsection all belong to the genus *Russula*, and all have adnexed to adnate gills and crumbly flesh. The crumbly flesh is created by round tissue cells that are grouped in “nests” in the flesh. Russulas are very similar in appearance to the *Lactarius* (pp.43–55), which also have flesh that is crumbly. However, *Lactarius* species exude a milky

liquid when cut and tend to have decurrent gills. Most *Russula* species have brighter-colored fruitbodies than those of the *Lactarius*.

All *Russula* species form mycorrhizal relationships (see pp.18–19) with trees or, in a few cases, shrubs and herbaceous plants. As a rule, mild-tasting russulas are edible, while those that taste hot are considered poisonous.

Family RUSSULACEAE

Species *Russula delicata*

Season Summer–autumn

## MILK WHITE RUSSULA

This is a large species, with a funnel-shaped cap, stout stem, and firm white flesh. Soil and leaf litter often stick to it, hiding its creamy white coloring. The well-spaced white gills may have a turquoise sheen. This species is known in North America as *Russula brevipes*.

• **OCCURRENCE** Mycorrhizal with coniferous and deciduous trees on well-drained soil. It is widespread and common in many parts of northern temperate zones.

• **SIMILAR SPECIES** *R. brevipes* var. *acrior* has more crowded gills, often with a turquoise zone around the stem top. *Lactarius vellereus* (p.44) is usually larger with a felted cap surface and white milk.

dry, more or less funnel-shaped cap



creamy white cap, often marked with the soil from which it emerges

gills may have turquoise sheen

gills quite well spaced

adnate, off-white gills

very short, stout, off-white stem



**FRUITING** A few together or in troops in woodland.

Dimensions CAP ⌀ 5–15cm | STEM ↑ 2–5cm ↔ 1.5–3cm

Spores White or cream

Edibility

Family RUSSULACEAE

Species *Russula foetens*

Season Summer–autumn

## FETID RUSSULA

This rancid-smelling species has a fleshy, convex, greasy, orange-brown cap with a grooved margin. Its white stem, stained brown at the base, is short and almost barrel-shaped. The crumbly, very hot-tasting flesh is off-white and may be stained brown.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees in woods.

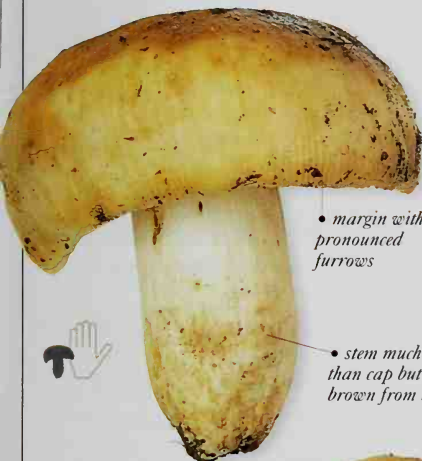
Widespread and common in many areas of northern temperate zones.

• **SIMILAR SPECIES** *Russula laurocerasi* smells of marzipan. *R. illota* has a rancid, slightly almondy smell and dark gill edges. The flesh of *R. subfoetens* stains yellow with potassium hydroxide (KOH). *R. foetens* has no reaction.



• surface of cap is greasy, particularly in wet weather

• flesh off-white or stained brown



• margin with pronounced furrows

• stem much paler than cap but stains brown from base



• fragile, adnexed, white to cream gills, often stained brown



SECTION

• short, barrel-shaped stem has chambers within



• crowded gills



FRUITING Singly or in troops in woodland.

Dimensions CAP ↔ 8–15cm | STEM ↑ 6–12cm ↔ 1.5–3cm

Spores Cream

Edibility

Family RUSSULACEAE	Species <i>Russula nigricans</i>	Season Summer–autumn
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## BLACKENING RUSSULA

This large species has an off-white to sooty brown cap with a depressed center, and a sturdy stem. The crumbly but firm flesh is off-white when cut, slowly turning red and then completely black. It tastes mild to bitter. Unlike most *Russula* species, the gills are of different lengths. Dried-up black fruitbodies persist until the following year.

• **OCCURRENCE** Mycorrhizal with deciduous trees and conifers, on well-drained soil. Widespread and common in many areas of northern temperate zones.

• **SIMILAR SPECIES** *R. albonigra* stains black (no red);

*R. adusta* stains red then gray and tastes mild.

*R. anthracina* and *R. acrifolia* have hot-tasting gills. *R. densifolia* has crowded gills and is smaller.

smooth, dry cap, depressed in center



cap has inrolled margin



stem is short, sturdy, and veined



**FRUITING** Appears in troops or fairy rings.



adnexed, pale, dirty yellow gills

flesh smells fruity

### SECTION

when cut, crumbly flesh turns cherry-red, then black

thick, very distant gills vary in length



Dimensions CAP ⬆️ 5–20cm	STEM ⬆️ 3–8cm ⬆️ 1–4cm	Spores White	Edibility
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Family RUSSULACEAE	Species <i>Russula fellea</i>	Season Summer–autumn
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## GERANIUM RUSSULA

A very familiar ocher-orange-buff *Russula* species, this mushroom has a stout, smooth stem, expanding slightly toward the base, a convex, firm-fleshed cap with indistinct margin furrows, and a very bitter taste. The gills and stem are a paler ocher-buff shade.

• **OCCURRENCE** Mycorrhizal with deciduous trees, especially beech, on well-drained, acid soil in woods.

Widespread in Europe; in North America it is represented by its close relative *R. similima*.

• **SIMILAR SPECIES**

*R. farinipes* has paler gills, stronger marginal grooves, and a powdery stem surface.

pale gills, tinted with cap color

smooth, white flesh dry cap aging yellow



rather crowded, adnexed gills



**FRUITING** Appears singly or in groups of fruitbodies.

Dimensions CAP ⬆️ 3–6cm	STEM ⬆️ 3–7cm ⬆️ 1–2cm	Spores Off-white	Edibility
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Family <b>RUSSULACEAE</b>	Species <i>Russula claroflava</i>	Season Summer–autumn
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## GRAYING YELLOW RUSSULA

This highly attractive, brightly colored species has a convex to flat, vivid yellow cap and edible, mild-tasting, firm white flesh. The gills are pale yellow and mainly full length (all reaching the stem). Both the flesh and the smooth, cylindrical to barrel-shaped white stem turn gray with age or when bruised.

• **OCCURRENCE** Mycorrhizal with birch in very damp or boggy woodland, where the soil may be so wet that sphagnum moss covers the ground. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

*Russula claroflava* has a stem that grays strongly on bruising. *R. ochroleuca* (below). *R. ochroleucoides* is a bitter-tasting American equivalent, growing in East Coast oak woods.



**FRUITING** Appears singly or in troops of fruitbodies.



SECTION

Dimensions CAP ⌀ 5–10cm   STEM ↑ 4–10cm ↔ 1–2cm	Spores Ochre	Edibility
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Family <b>RUSSULACEAE</b>	Species <i>Russula ochroleuca</i>	Season Summer–autumn
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## YELLOW-UCHER RUSSULA

One of the most common woodland agarics, this species is marked by the matte ochre-yellow coloring of its convex cap and its white gills. The cap sometimes has a green tinge. The barrel-shaped stem is white with a buff base, and the crumbly white flesh has a completely bland taste.

• **OCCURRENCE** Mycorrhizal with both conifers and deciduous trees in well-drained soil in woods. Widespread in northern temperate zones; common in Europe and parts of Asia.

• **SIMILAR SPECIES**

*Russula fellea* (p.122) and *R. claroflava* (above).



**FRUITING** Singly or in troops, mostly in woodland.

Dimensions CAP ⌀ 5–12cm   STEM ↑ 3–8cm ↔ 1–2.5cm	Spores White	Edibility
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Family RUSSULACEAE

Species *Russula cyanoxantha*

Season Summer–autumn

## VARIABLE RUSSULA

This large species has a convex to flat, green to wine-red cap, off-white gills, and a chunky, off-white stem. The flesh is firm but brittle and the gills are not crumbly but feel oily to the touch. It is a highly valued edible.

### • OCCURRENCE

Mycorrhizal with deciduous trees, especially beech, but also with conifers; it prefers acidic soil. Widespread and common in parts of northern temperate zones.

### • SIMILAR SPECIES

*Russula integra* and *R. vinosa* (see insets, below). *R. variata* occurring in North America has forked gills.



cap may be green to wine-red, or a mixture of both

cap is smooth and slightly greasy

chunky stem is off-white



gills are pliable and feel oily



crowded, adnexed, off-white gills



### SECTION

firm but brittle flesh is pleasant tasting and can be eaten raw



FRUITING Singly or in troops in well-drained woodland.

### Δ *RUSSULA VINOSA*

This species, found with pine, has a variably brown-spotted, wine-red cap. The pleasant-tasting flesh and the white stem turn gray when cut or with age. The crowded, adnexed gills are cream, tinged gray with age. 101

### Δ *RUSSULA INTEGR*

Distinguished by a yellow-buff spore deposit, this coniferous species varies in color. It has thick, well-spaced, almost free gills. The stem is white, aging to brown spotted. The firm white flesh tastes of almonds. 101

Dimensions CAP ⬆ 5–15cm | STEM ⬆ 5–10cm ⬆ 1–3cm

Spores White

Edibility 101

Family RUSSULACEAE	Species <i>Russula vesca</i>	Season Summer–autumn
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## BARE-TOOTHED RUSSULA

This distinctive species owes its common name to the white gills that are clearly visible at the cap margin. The flattened-convex to depressed cap is pale wine-red, mixed with brown, and rust-brown spots often mark the pointed, off-white stem base. The edible, firm white flesh has a nutty taste.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees in well-drained woods. Widespread in northern temperate zones; common in Europe.

wine-red or brown wine-red cap, sometimes paler •

almost all gills reach stem •

exposed gills at margin •

firm • SECTION white flesh

gills are white, brittle, and fairly crowded

rust-brown spots at stem base •



**FRUITING** Appears singly or in troops of fruitbodies.



Dimensions CAP ⬆ 5–10cm   STEM ⬆ 3–6cm ↔ 1.5–2.5cm	Spores White	Edibility  O
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Family RUSSULACEAE	Species <i>Russula aeruginea</i>	Season Summer–autumn
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## TACKY GREEN RUSSULA

This species has a convex to depressed green cap that is often marked with rust-to red-brown spots and frequently has furrows at the margin. The crowded, almost free gills are white, as is the cylindrical stem. Its firm but crumbly white flesh has a slightly hot taste, which is destroyed by cooking.

• **OCCURRENCE** Mycorrhizal with birch; also found under oak, live oak, aspen, and some conifers. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Russula heterophylla* has firmer flesh. The cap of *R. virescens* (p.131) has small scales. Both are mild tasting. There is a green form of *R. serampelina* (p.127).

white flesh on cap, exposed by slugs •

young cap may be smooth or veined •

shiny green cap is darker at center, often with rust-brown spots

white stem may be rust-brown spotted

white to cream gills



**FRUITING** In troops in grass and among leaf litter.

Dimensions CAP ⬆ 4–9cm   STEM ⬆ 4–7cm ↔ 1–2.5cm	Spores Cream	Edibility  O
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Family RUSSULACEAE	Species <i>Russula puellaris</i>	Season Summer–autumn
<h2>YELLOW-STAINING RUSSULA</h2> <p>The convex to depressed cap of this fragile species is purplish reddish brown, possibly even almost black at the center with a paler margin. It takes on ochre-yellow hues with age and when bruised. From the cap margin, the skin can be peeled back almost to the center. It is a mediocre edible, with odorless, thin, mild white flesh.</p> <ul style="list-style-type: none"> <li>• <b>OCCURRENCE</b> Mycorrhizal with conifers and deciduous trees. Widespread in northern temperate zones in Europe and northern North America.</li> <li>• <b>SIMILAR SPECIES</b> <i>Russula odorata</i> has a strong, fruity smell and grows mostly with oak trees. <i>R. versicolor</i> has a hot taste and stains only slightly.</li> </ul>		
<p>shiny, slightly greasy cap</p> <p>adnexed to free gills</p> <p>cap margin furrowed</p> <p>stem spongy in center, firm at surface</p> <p>SECTION</p> <p>white flesh stains orange-yellow</p> <p>medium-spaced gills</p> <p>cream to ochre-yellow gills</p> <p>FRUITING Scattered or in troops in damp woods.</p>		
Dimensions CAP ↔ 3–6cm   STEM ↓ 3–6cm ↔ 0.7–1.5cm	Spores Dark cream	Edibility ☉

Family RUSSULACEAE	Species <i>Russula rosea</i>	Season Summer–autumn
<h2>ROSY FIRM RUSSULA</h2> <p>Very hard flesh and a cap of a diluted red color, with very thin, nonpeeling skin, make this russula easy to identify among the many reddish-colored <i>Russula</i> species. It has a rather short, cylindrical to club-shaped stem, either white or the color of the convex to flat cap. Its taste has been compared to the wood of a pencil. There is disagreement over its name and many experts prefer to call it <i>R. lepida</i>.</p> <ul style="list-style-type: none"> <li>• <b>OCCURRENCE</b> Often mycorrhizal with beech, it is found on well-drained soil in deciduous woods. Widespread and common in European beech woods; reported in northeastern North America.</li> <li>• <b>SIMILAR SPECIES</b> <i>R. velutipes</i> has peelable cap skin and more fragile flesh.</li> </ul>		
<p>dry cap is diluted red and matte with non-peeling skin</p> <p>stem flesh is hard but crumbly</p> <p>nearly free, pale cream gills may have pinkish edges</p> <p>medium-spaced gills are brittle</p> <p>stem either off-white or tinted with cap color</p> <p>FRUITING Singly or in troops on woodland soil.</p>		
Dimensions CAP ↔ 4–12cm   STEM ↓ 3–8cm ↔ 1–3cm	Spores Pale cream	Edibility ☉

Family RUSSULACEAE	Species <i>Russula turci</i>	Season Summer–autumn
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## IODINE RUSSULA

This species has a cap with a depressed center and a smooth margin, which may have a fine dustlike coating. It is colored in shades of wine-red, sometimes mixed with green, black, or orange. A distinct smell of iodine, especially at the base of the club-shaped stem, along with a pale ocher spore deposit, helps to identify it. The crumbly white flesh has a mild taste.

• **OCCURRENCE** Mycorrhizal with pine trees (mainly two-needled species) and possibly also with spruce. Widespread in Europe and also across northern North America.

shiny cap • dries matte  
club-shaped stem base smells of iodine

cap is zoned in shades of wine-red and other colors

adnexed gills are white, then yellow

well-spaced gills smell fruity



white stem



**FRUITING** Appears in troops or a few together.

Dimensions CAP ⊕ 3–10cm   STEM ↓ 3–7cm ↔ 1–2.5cm	Spores Pale ocher	Edibility IO
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Family RUSSULACEAE	Species <i>Russula xerampelina</i>	Season Summer–autumn
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## CRAB RUSSULA

Although treated as one species here, *Russula xerampelina* can be divided into a number of closely related species, all with a shellfishlike smell that intensifies with age, and flesh that turns dark green in contact with iron sulfate ( $\text{FeSO}_4$ ). The smooth cap varies from dark red to green, and the cylindrical stem often has rust-brown spots; the whole fruitbody may stain brown with maturity. A choice edible when fresh, it has firm but crumbly white flesh, aging to brown.

• **OCCURRENCE** The different species occur in different habitats – woods and sand dunes – in various mycorrhizal associations. As a group of closely related species it is common and widespread in northern temperate zones.



flesh turns dark green with iron sulfate



swollen or cylindrical stem

cap varies from red, with a black center, to green and brownish purple

### SECTION

some specimens have a depressed cap center



adnexed gills are crowded and crumbly

white flesh, staining brown with age



smooth cap margin

white, pink, or red stem



**FRUITING** In troops under willow or pine trees.

Dimensions CAP ⊕ 6–15cm   STEM ↓ 4–8cm ↔ 1.5–3cm	Spores Ocher	Edibility IO
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Family RUSSULACEAE	Species <i>Russula paludosa</i>	Season Summer–autumn
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## TALL BOG RUSSULA

Taller than most, this large, attractive *Russula* species has a convex to depressed, orange-red cap, with yellow discoloration in the center and a slightly sticky surface when damp. The crowded, adnexed gills are off-white. Both the gill edges and the cap margin are often red. The cylindrical to narrowly club-shaped stem is white, flushed pink, and turns slightly gray with age. It is good to eat, with firm, crumbly, mild-tasting flesh, but see SIMILAR SPECIES.

### • OCCURRENCE

Mycorrhizal with conifers, especially pine. Widespread and locally common in northern temperate zones.

• **SIMILAR SPECIES** The poisonous and hot-tasting *R. emetica* (below) has no yellow coloring on the cap.

cap margin may be red

white stem is flushed pink, gray with age



cap surface is slightly sticky when wet

crowded, off-white gills

cap discolors to yellow in center



**FRUITING** Appears in troops or scattered under conifers often in boggy areas.

Dimensions CAP ⬆ 8–16cm   STEM ⬆ 10–15cm ↔ 1–3cm	Spores Pale ocher	Edibility ☹
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Family RUSSULACEAE	Species <i>Russula emetica</i>	Season Summer–autumn
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## EMETIC RUSSULA

This species has a convex to slightly depressed, scarlet-red cap, the surface of which is smooth and often shiny, becoming sticky when wet. Its white stem is club-shaped with a scurfy skin. The crumbly, odorless white flesh has a very hot taste, which soon alerts an unwary eater, but in any case it is not highly poisonous.

• **OCCURRENCE** Mycorrhizal, mainly with coniferous trees in boggy areas. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Russula sikkicola* is the common dry woodland species across North America. *R. faeticola* usually grows under beech and also tastes hot. *Amanita muscaria* (p.146) has veil patches on the cap, a stem ring, and a bulb.

convex to slightly depressed, smooth and often shiny, scarlet-red cap

slightly scurfy, club-shaped stem

faintly furrowed margin

adnexed to free, white to pale cream gills

medium-spaced gills



**FRUITING** In troops or singly in damp sites under conifers.

Dimensions CAP ⬆ 3–8cm   STEM ⬆ 5–8cm ↔ 1–2cm	Spores White	Edibility ☠
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Family RUSSULACEAE	Species <i>Russula mairei</i>	Season Summer–autumn
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## EURO EMETIC RUSSULA

The smooth, matte, strongly scarlet-red cap of this species is convex to flat and sticky when wet. The club-shaped, off-white stem has a smooth surface. Its crumbly poisonous flesh is firm and white and smells slightly sweet.

• **OCCURRENCE** Mycorrhizal with beech trees in woods. Widespread and common in the beechwood regions of Europe and adjacent parts of Asia.

• **SIMILAR SPECIES** *Russula emetica* (p.128). *R. velenovskyi*, which is edible, is smaller, and typically occurs near birch.



**FRUITING** In troops or singly in well-drained beech woods.



Dimensions CAP ⊕ 3–7cm	STEM ↓ 3–5cm ↔ 0.7–2cm	Spores White	Edibility ☠
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Family RUSSULACEAE	Species <i>Russula fragilis</i>	Season Summer–autumn
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## FRAGILE RUSSULA

A small species, the Fragile Russula is best identified with a hand lens, which will reveal the serrated edges of its white to cream gills. The convex to depressed cap is a mixture of reds and purples, with a touch of olive-green; the colors are darkest in the center. The slightly club-shaped stem is white. The crumbly white flesh tastes very hot and is poisonous.

• **OCCURRENCE** Mycorrhizal with a variety of trees, often birch and oak, in woods. Widespread and locally common in northern temperate zones.



**FRUITING** In troops or small groups, rarely singly.



Dimensions CAP ⊕ 2–5cm	STEM ↓ 3–7cm ↔ 0.5–2cm	Spores White	Edibility ☠
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Family RUSSULACEAE

Species *Russula sanguinea*

Season Summer–autumn

## BLOOD-RED RUSSULA

Known as *Russula rosacea* in North America, this slightly poisonous species has a convex to depressed blood-red cap and a red-streaked stem that turns grayish pink with age. It has crumbly white flesh and can be identified by its moderately hot taste and the pale ocher color of its spore deposit.

• **OCCURRENCE** Mycorrhizal with conifers, mostly pine.

Widespread in northern temperate zones.

• **SIMILAR SPECIES**

*Russula helodes* has a lighter stem that turns a more distinct gray with age; often found in sphagnum moss.



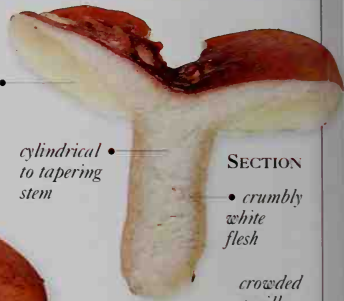
**FRUITING** Appears singly or in troops on acid soil.



stem is streaked blood-red, and ages to grayish pink

gills may be slightly decurrent

cap with thin, bloody-red skin



cylindrical to tapering stem

SECTION

crumbly white flesh

crowded gills



fragile, cream to ocher gills



Dimensions CAP ⊕ 5–10cm | STEM ↓ 4–7cm ↔ 1–2cm

Spores Pale ocher

Edibility ☠

Family RUSSULACEAE

Species *Russula atropurpurea*

Season Summer–autumn

## SPRING RUSSULA

This rather fleshy species has a convex cap, the usually depressed center of which is almost black; the rest of the cap surface is purple or violet, often spotted yellow. The cap color contrasts strongly with the white to cream stem and gills. The stem is fairly short and club-shaped, and the gills are crowded and adnexed. The white to gray flesh is slightly hot tasting and inedible.

• **OCCURRENCE**

Mycorrhizal with oak trees, rarely found with other trees. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Russula*

*brunneo-violacea* has a darker spore deposit, as does *R. romellii*.

short, white to cream stem

adnexed gills are white to cream and crowded



center of cap is almost black

purple or violet cap may have yellow spots



**FRUITING** In troops beneath oak trees, mostly on acidic soil, in woodland sites.

Dimensions CAP ⊕ 4–10cm | STEM ↓ 3–6cm ↔ 1–2.5cm

Spores White

Edibility ☠

Family <b>RUSSULACEAE</b>	Species <i>Russula sardonia</i>	Season Summer–autumn
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## PUNGENT RUSSULA

An attractive, comparatively large species with a convex, shiny dark purple cap and contrasting lemon-yellow gills; its purple to wine-red stem is club-shaped. It actually has a slightly fruity smell and a hot taste. The gills and white flesh turn pink when they come in contact with ammonia vapor.

• **OCCURRENCE** Mycorrhizal strictly with pine trees. Widespread and common in regions of northern temperate zones; western US.

• **SIMILAR SPECIES**

*Russula queletii* is smaller, with paler gills, a paler spore deposit, and tastes just as hot. It does not react to ammonia.



**FRUITING** In troops under pine trees.



• dark purple to rich wine-red cap



smooth, shiny, convex cap

adnexed to slightly decurrent gills



• crowded, lemon-yellow to ochre gills

purple to wine-red stem with hint of gray



Dimensions CAP ⬆️ 4–10cm   STEM ⬆️ 4–10cm ↔ 1–2.5cm	Spores Pale ochre	Edibility 🚫
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Family <b>RUSSULACEAE</b>	Species <i>Russula virescens</i>	Season Summer–autumn
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## GREEN QUILT RUSSULA

This firm-fleshed species is best identified by the velvety, yellow- to blue-green cap surface, which soon cracks, creating a scaly appearance. The stem is white but the base develops a brown-sealy surface. The brittle white gills are fairly crowded and adnexed.

This mushroom turns orange-pink in contact with iron sulphate (FeSO<sub>4</sub>).

• **OCCURRENCE**

Mycorrhizal with deciduous trees, such as beech. Widespread and locally common in northern temperate zones.

• **SIMILAR SPECIES** *Russula crustosa*

has orange tones in its cap and has an orange-yellow spore print.

convex to flat cap feels velvety

cap surface cracks, creating scales

blue-green to yellow or cream cap



white stem with brown-sealy base



**FRUITING** Appears singly or in small groups of fruitbodies on well-drained soil.

Dimensions CAP ⬆️ 4–10cm   STEM ⬆️ 4–8cm ↔ 1–3cm	Spores White	Edibility 100
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## VERY SMALL WITH SMOOTH CAP

**T**HERE ARE MANY small agarics with smooth caps, and they belong to an extremely wide range of genera and families, although, in this book, it is the small, gilled, white-spored members of

the Tricholomataceae that predominate. Species included here may have a fine bloom on the cap but never have distinct hairs, coarse fibers, or scales (see pp.142–144).

Family TRICHOLOMATACEAE	Species <i>Lyophyllum palustre</i>	Season Summer–autumn
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### BOG LYOPHYLLUM

On a thin, pale gray-brown stem, the grayish brown cap of this species is convex, expanding to flat or slightly depressed. The cap surface is striated from the margin to its center, and it has inedible, thin flesh, which smells faintly of yeast. The white to pale gray gills are adnexed and medium spaced.

- **OCCURRENCE** Found only in boggy locations on sphagnum moss, which it kills. Widespread throughout northern temperate zones; in eastern North American bogs.
- **SIMILAR SPECIES** Other species found with sphagnum moss, such as *Galerina paludosa*, *G. tibiicystis*, *Omphalina sphagnicola*, and *O. philonotis*, usually have brown spores or decurrent gills.



*cap is convex to flat or depressed*  
*long, rooting stem is gray-brown*  
*striations from margin to cap center*



**FRUITING** Appears in troops or fairy rings on sphagnum moss in boggy areas.

Dimensions CAP ⬆️ 1–3cm   STEM ⬆️ 4–8cm ↔️ 1–3mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Baeospora myosura</i>	Season Autumn–late autumn
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### CROWDED-GILL CONE COLLYBIA

This pale brown member of the small genus *Baeospora* has a flat to slightly umbonate, dry cap and a powder-covered stem. It has a musty smell and indistinct taste. The gills are almost free.

- **OCCURRENCE** In parks and woods on cones and cone scales from various conifers, including spruce and pine. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *B. myriadophylla* is also pale brown but has brighter, more or less lilac gills. It grows mainly on fallen trunks of conifers and is rare or absent in most regions. Other mushrooms found on conifer cones include *Strobilurus esculentus* (p.133) and *Mycena seyneii*, which has a pale wine-pink cap and dark red-brown gill edges.



*dry, pale brown cap surface*

*crowded, fairly narrow, pale gray gills*



*adnexed or free gills*



**SECTION**



**FRUITING** A few on a cone or singly on detached scales.

Dimensions CAP ⬆️ 0.5–2cm   STEM ⬆️ 1–4cm ↔️ 1–2mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Strobilurus esculentus</i>	Season Late autumn–spring
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## DISTANT-GILL CONE COLLYBIA

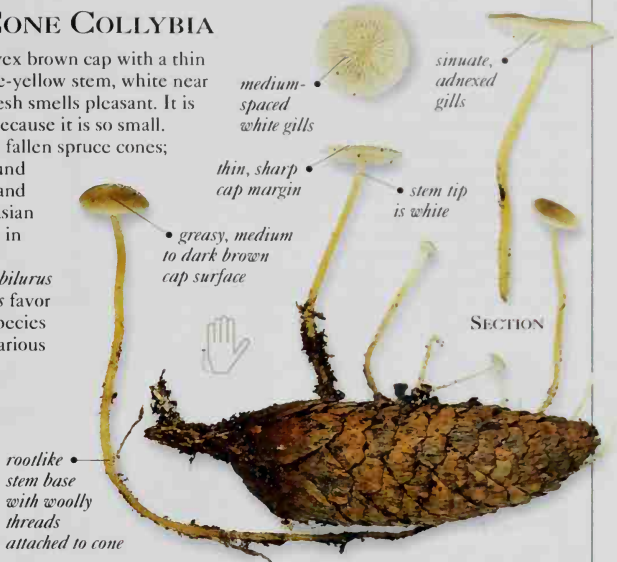
This small agaric has a convex brown cap with a thin margin and a smooth, orange-yellow stem, white near the top. The tough white flesh smells pleasant. It is edible but not worthwhile because it is so small.

• **OCCURRENCE** Only on fallen spruce cones; on cones that are above ground in damp areas. Widespread and common in European and Asian spruce regions; not reported in North America.

• **SIMILAR SPECIES** *Strobilurus stephanocystis* and *S. tenacellus* favor pine cones. Small *Collybia* species (pp.67, 111–113), differ in various microscopic features.



**FRUITING** In small groups in spruce forests.



Dimensions CAP ⬆ 0.5–3cm   STEM ⬆ 2–5cm ↔ 1–2.5mm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena inclinata</i>	Season Summer–early winter
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## CLUSTERED OAK MYCENA

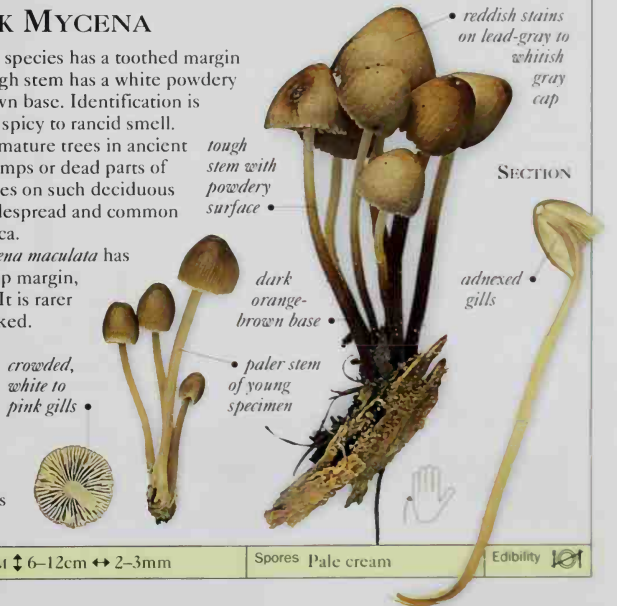
The bell-shaped cap of this species has a toothed margin and radial striations; the tough stem has a white powdery covering and an orange-brown base. Identification is helped by the characteristic spicy to rancid smell.

• **OCCURRENCE** Prefers mature trees in ancient forests. Mostly found on stumps or dead parts of standing oak trees; sometimes on such deciduous trees as sweet chestnut. Widespread and common in Europe and North America.

• **SIMILAR SPECIES** *Mycena maculata* has an earthy smell, a smooth cap margin, and a purplish brown stem. It is rarer but also tends to be overlooked.



**FRUITING** Appears in clusters of fruitbodies on wood.



Dimensions CAP ⬆ 1–4cm   STEM ⬆ 6–12cm ↔ 2–3mm	Spores Pale cream	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena arcangeliana</i>	Season Autumn-early winter
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### LATE-SEASON MYCENA

This species is not easy to identify in the field, although the young fruitbodies often have a lilac stem. The cap can be any shape from convex to bell-like, in various shades of dull gray. If put inside an airtight can, a strong, antiseptic, iodine-like smell will become noticeable in a few minutes.

• **OCCURRENCE** In gardens, cemeteries, parks, and rich woods, on mossy bark at the base of living trees or bushes, or on woody debris, such as fallen branches. Widespread and common in Europe; rare but widespread in North America.



FRUITING Often in troops on varied woody debris.



stem has smooth surface



convex cap may vary to bell-shaped

gills are adnexed

pale horn-gray stem sometimes has lilac tones

SECTION

dry gray cap surface may have faint pink or olive hues



fairly crowded, white to pink gills



Dimensions CAP ⊕ 1-2.5cm   STEM ↓ 3-7cm ↔ 2-3mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena olivaceomarginata</i>	Season Autumn
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### EURO FIELD MYCENA

Occurring in a wide range of cap colors from gray-brown to yellow or shades of pink, this mushroom is most easily identified by using a hand lens. This reveals a distinctive, olive-brown edge to the adnate gills. It has a fairly fragile stem, thin flesh, and, like many *Mycena* species, smells weakly of radishes; some forms smell faintly of chlorine.

• **OCCURRENCE** On mossy turf and in cut or grazed grassland, including open parks and coastal areas. Widespread and common in Europe; not reported in North America.

• **SIMILAR SPECIES** Other *Mycena* species have colored gill edges: red - *M. rubromarginata*, found on wood, and *M. seyeii*, found on cones; yellow - *M. citrinomarginata* and *M. flavescens*, occurring in grass or woodland litter.



FRUITING Singly or in troops in short grass.



brown or gray cap, sometimes with yellow or pink tints

fine olive-brown gill edge

radial striations on cap

convex to conical cap

gills are sinuate, adnate

fairly fragile, hollow stem

stem gray-brown or in paler tones of cap color

SECTION

medium-spaced, pale gray to gray-brown gills



Dimensions CAP ⊕ 0.7-1.5cm   STEM ↓ 3-6cm ↔ 1-2mm	Spores White	Edibility
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Family TRICHOLOMATACEAE

Species *Mycena epipterygia*

Season Summer-early winter

## YELLOW-STALKED MYCENA

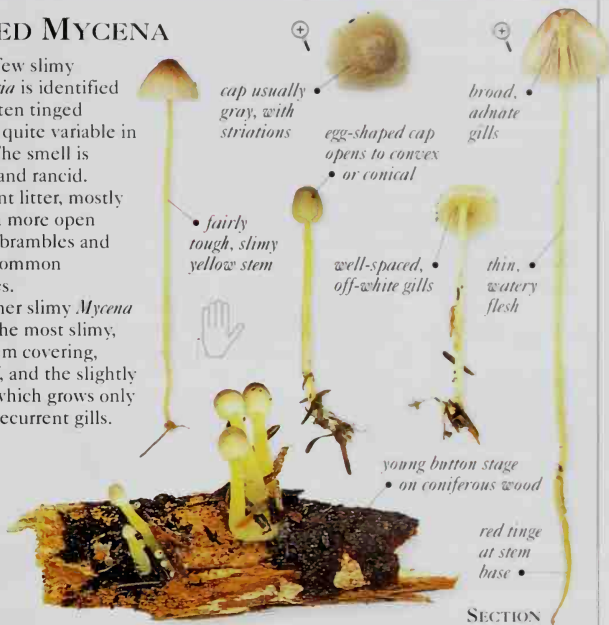
One of the comparatively few slimy *Mycena* species, *M. epipterygia* is identified by its vivid yellow stem, often tinged rusty brown, but otherwise quite variable in size, shape, and coloring. The smell is typically somewhat yeasty and rancid.

• **OCCURRENCE** On plant litter, mostly in coniferous woods; also in more open habitats on acidic soil with brambles and bracken. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** Other slimy *Mycena* species include *M. rorida*, the most slimy, which has a thick, slimy stem covering, thicker than the stem itself, and the slightly slimy-stemmed *M. belliae*, which grows only on reeds and has strongly decurrent gills.



FRUITING In troops or small groups of fruitbodies.



Dimensions CAP ⊕ 0.5–2.5cm

STEM ↓ 3–8cm ↔ 1–2.5mm

Spores Cream

Edibility

Family TRICHOLOMATACEAE

Species *Mycena leptoccephala*

Season Summer-winter

## CHLORINE LAWN MYCENA

The bell-shaped to conical, pale gray to lead-gray cap of this species is distinctly striate when moist. The stem is rather fragile, as is the watery flesh. This is by far the most common of a group of *Mycena* species that smell similar to bleach or chlorinated water.

• **OCCURRENCE** On mossy lawns and among tall grasses, woodland litter, or brambles. Widespread and common throughout northern temperate zones.

• **SIMILAR SPECIES** *M. abramsii* is larger with a less greasy cap. In North America, *M. alcalina* is a complex of species growing on decaying conifer wood. *M. capillaripes* has red gill lining (seen when viewed under a hand lens) and grows on conifer debris. All smell of chlorine.



FRUITING Singly or often in troops on mossy lawns.



Dimensions CAP ⊕ 0.6–1.5cm

STEM ↓ 3–7cm ↔ 1–2mm

Spores White

Edibility

Family TRICHOLOMATACEAE	Species <i>Mycena filipes</i>	Season Autumn
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## IODINE MYCENA

This species is best identified with the aid of a microscope, which shows its spiny cystidia and other characteristics, and by its combination of fragile stem, gray coloring, and antiseptic, iodine-like smell. Both cap and stem have a covering of white bloom, and the cap has striations to its center.

• **OCCURRENCE** Mostly in deciduous woods, often along paths, on humus or small pieces of litter, but also under conifers on needle beds. Widespread and common in Europe and across northern North America and Pacific Northwest.

• **SIMILAR SPECIES** *Mycena arcangeliana* (p.134). *M. metata* tends to have pinkish hues and prefers more acidic conditions and conifer woods. Both smell of iodine and appear very similar under a microscope.



FRUITING Appears singly or in troops of fruitbodies.



medium-spaced gills



fragile, gray-white or brown stem

conical or umbonate cap

fine white bloom on cap surface

adnexed white gills

gray cap with fine striations

### SECTION

very thin flesh

Dimensions CAP $\leftrightarrow$ 0.8–2cm	STEM $\updownarrow$ 6–10cm $\leftrightarrow$ 1–2mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Mycena haematopus</i>	Season Summer–autumn
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## BLEEDING MYCENA

The bell-shaped, red-brown cap of this species has a fine powdery surface and a toothed margin. When the fragile, red-brown stem, which is also covered with powder, is bruised or broken, the thin, watery flesh oozes a dark blood-red liquid.

• **OCCURRENCE** On rotten wood, in most types of forest. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Mycena crocata* (p.119) has orange milk; *M. inclinata* (p.133) produces tight clusters but no milk. *M. sanguinolenta* is smaller with a more slender build and red-brown gill edges. It has red milk and normally grows on leaf litter.



△ **SPINELLUS FUSIGER**  
This fungus is a common parasitic on *Mycena* species and appears like pins stuck into a pincushion. It is closely related to black bread mold.



more-or-less bell-shaped cap

medium-spaced gills tinted with cap color

blood-red liquid exudes from broken stem

toothed cap margin

stems typically joined at base

adnexed gills

### SECTION



FRUITING In dense clusters of fruitbodies.

Dimensions CAP $\leftrightarrow$ 0.5–3cm	STEM $\updownarrow$ 3–7cm $\leftrightarrow$ 2–4mm	Spores Whitish cream	Edibility
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Family TRICHOLOMATACEAE

Species *Mycena galopus*

Season Late summer–winter

## WHITE MILK MYCENA

This highly variable species is most easily identified by the copious white liquid found in the stems of many specimens (noticeable at the stem base) and by the gills, which are well spaced compared to most *Mycena* species. A gray form is shown here, but there are also completely white and black forms; the black form is sometimes treated as a separate species, *M. leucogala*. The faint smell of this mushroom resembles radishes. Its edibility is unknown, but clearly its size makes it not worthwhile.

• **OCCURRENCE** In all types of woods on fallen conifer needles and on the leaf litter of deciduous trees; also on humus-rich soil in semiopen habitats. Widespread and common in Europe and east and west coasts of North America.

• **SIMILAR SPECIES**

*M. erubescens* has sparse, watery white milk, which slowly turns brownish red, and bitter flesh.



Dimensions CAP  $\leftrightarrow$  0.5–2cm | STEM  $\updownarrow$  3–7cm  $\leftrightarrow$  1–2mm

Spores Pale cream

Edibility

Family TRICHOLOMATACEAE

Species *Mycena acicula*

Season Spring–early winter

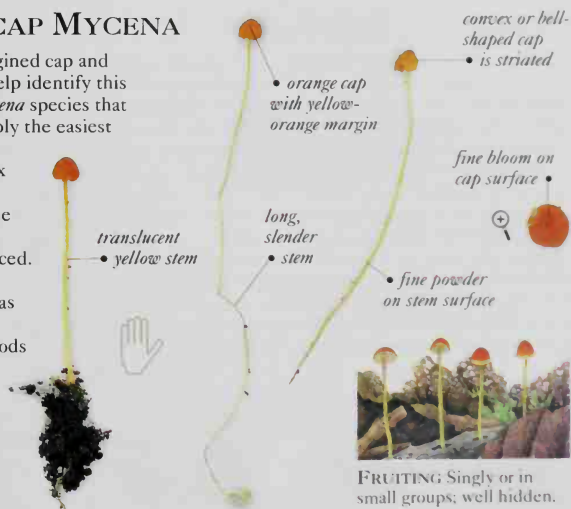
## TINY ORANGE-CAP MYCENA

A vivid orange, yellow-margined cap and a translucent yellow stem help identify this species; among the tiny *Mycena* species that favor plant litter, it is probably the easiest to recognize. Both the long, slender stem and the convex to bell-shaped cap have a powder-covered surface. The adnexed, rather broad, pale yellow gills are medium spaced.

• **OCCURRENCE** On tiny pieces of woody litter, such as bark flakes; in moist places, such as under nettles; in woods and parks hidden deep among leaves. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES**

*Rickenella fibula* (p.36) has very arched, decurrent gills.



Dimensions CAP  $\leftrightarrow$  0.3–1cm | STEM  $\updownarrow$  2–6cm  $\leftrightarrow$  0.5–1mm

Spores Off-white

Edibility

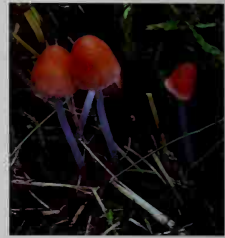
Family TRICHOLOMATACEAE	Species <i>Mycena flavoalba</i>	Season Autumn
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## YELLOW-WHITE MYCENA

A characteristic of this species is the diluted yellow of its convex or conical cap. It may also have a dark "eye-spot" and faint striations; the gills are white. The stem is translucent yellow-white. The thin white flesh smells and tastes of radishes.

• **OCCURRENCE** In mossy grassland; on litter in coniferous woods. Widespread and common in Europe, eastern North America, the Rockies, and Pacific Northwest.

• **SIMILAR SPECIES** It is easily mistaken for a variety of other cream-colored species, such as those that belong to the genus *Hemimycena*.



△ **MYCENA ADONIS**  
This is a beautiful species, which fruits in modest numbers. It has a striking, coral-red cap, which fades with age, and a translucent white stem.



**FRUITING** In huge troops, often of over a hundred.

Dimensions CAP ↕ 0.5–2cm	STEM ↕ 3–5cm ↔ 1–2mm	Spores Off-white	Edibility
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Family TRICHOLOMATACEAE	Species <i>Marasmius androsaceus</i>	Season Summer-late autumn
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## HORSEHAIR MARASMIUS

This species has a very thin, extremely tough, shiny stem and a convex, flat-topped, dark-centered, pale brown cap with radial furrows, striations, and often wrinkles. Its gills are attached directly to the stem, instead of to a little wheel around the stem like many *Marasmius* species. It produces tough, horsehairlike threads of densely interwoven hyphae to colonize a new substrate, enabling it to grow in inhospitable habitats. It has a faint smell and a mild taste and is not worth eating.

• **OCCURRENCE** In pine woods, on pine needles and other small pieces of tree litter; also among sand dunes near pine stands. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Micromphale perforans* has a finely felted stem and smells of rotten cabbage.



**FRUITING** In troops in a wide variety of sites.

Dimensions CAP ↕ 0.3–1cm	STEM ↕ 2.5–5cm ↔ 0.3–0.5mm	Spores White	Edibility
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Family TRICHOLOMATACEAE

Species *Micromphale foetidum*

Season Autumn-late autumn

## FETID MARASMIUS

Occasionally, this fairly small species can be detected by its strong smell alone, which is similar to that of rotten cabbage. It has a convex, smooth, orange-brown cap, darker at the center, with striations and furrows and a thin, sharp, upturned margin. The hollow stem is velvety black and widens at the top.

•**OCCURRENCE** Only on fallen branches in deciduous woods, preferring areas of rich alkaline soil. Widespread but local in northern temperate zones.

•**SIMILAR SPECIES** *Micromphale brassicolens* grows on beech twigs and leaves. It has more crowded, paler gills. *M. perforans* is smaller and occurs on pine needles. Both smell rotten.



**FRUITING** Appears in dense groups of fruitbodies.



well-spaced,  
often forked  
gills, connected  
• by veins

adnate to  
decurrent  
gills •



slightly  
gelatinous,  
reddish  
brown flesh •



upturned,  
thin cap  
margin •

SECTION

furrowed cap with  
dark striations  
• when moist



hollow,  
velvety  
black stem

orange-brown  
cap dries to  
leather-brown



center  
of cap is  
darker



Dimensions CAP ⊕ 0.5–3cm | STEM ↓ 1–4cm ↔ 2–4mm

Spores Off-white

Edibility

Family TRICHOLOMATACEAE

Species *Marasmiellus ramealis*

Season Summer-autumn

## TWIG MARASMIUS

This tiny *Marasmiellus* species has a cream to pale leather-brown cap that is convex, aging flat, and finely wrinkled and furrowed. The short, curved, pale tan stem is clothed in pale scales at its base. Similar in color to the stem, the flesh is thin, tough, and fibrous. The broad gills are well spaced; the smooth spores, 9 x 3µm, are spindle-shaped to ellipsoid.

•**OCCURRENCE** In damp woods, growing on dead sticks and twigs or *Rubus* (raspberry and blackberry) canes. It will also tolerate fairly dry conditions.

Widespread and common in Europe and North America.

•**SIMILAR SPECIES** *M. candidus* has a whiter cap and a black stem base. *M. vaillantii* is best distinguished by microscopic examination of the cystidia and spores.



**FRUITING** Appears in crowds of fruitbodies.



finely wrinkled  
and furrowed  
• cap surface

small pale  
scales at base  
of curved  
stem

cream to pale  
leather-brown cap



pale  
tan stem  
becomes  
reddish tan  
toward base

broad, well-  
spaced  
gills •



adnate,  
off-white  
to pinkish  
cream gills

SECTION

Dimensions CAP ⊕ 0.3–1.5cm | STEM ↓ 0.5–2cm ↔ 0.5–1.5mm

Spores White

Edibility

Family CORTINARIACEAE

Species *Galerina calytrata*

Season Summer–autumn

## TINY BOG GALERINA

This is a small, slender, honey-brown agaric with a convex, striate cap that dries to paler cream-brown. It has thin, pale brown flesh and gills, and usually smells of yeast. The stem is long, thin, and smooth. Microscopic examination is needed to distinguish it from similar species; its spores are warty and broadly spindle-shaped with a loosening outer wall.

• **OCCURRENCE** On lawns or in damp woods.

Widespread, but not reported in North America.

• **SIMILAR SPECIES** *Galerina hypnorum* is differentiated by its spores – the outer wall does not loosen. *G. sphagnorum* grows only in sphagnum moss and has a ring zone on the stem. There are many other *Galerina* species, mostly associated with various mosses or rotten wood.



**FRUITING** Singly or in small groups on mossy ground.

tiny, convex cap with distinct striations



cap is honey-brown, drying paler

extremely long, thin stem



translucent, yellow-brown stem

widely spaced, adnate, pale brown gills



base of stem rooting in moss

SECTION

very thin, pale brown flesh

Dimensions CAP ↔ 0.3–0.8cm | STEM ↓ 3–5cm ↔ 1–2mm

Spores Ocher-brown

Edibility

Family BOLBITIACEAE

Species *Conocybe lactea*

Season Summer–autumn

## WHITE LAWN CONOCYBE

Its elongated cap and ivory coloring enables *Conocybe lactea* to be identified without the aid of a microscope, unlike most *Conocybe* species. The cap is faintly striate and becomes wrinkled with age; the gills are crowded and pale to rust-brown. The surface of the stem is covered in powder and faintly lined. The flesh is thin and fragile.

• **OCCURRENCE** In grass on fertile soil.

Disappears by mid-day. Widespread in northern North America, Gulf Coast, California.

• **SIMILAR SPECIES** *C. huijsmanii* has an almost rounded to convex cap. *Bolbitius lacteus* has a more

viscid cap and smaller spores, 9.5 x 5.5µm: those of *C. lactea* are 12.5 x 8µm. *Galerina* species (pp.91, 140) typically have gills that are more distant and usually adnate.



**FRUITING** In troops or a few fruitbodies together.

smooth cap surface develops slight wrinkles with age

elongated, ivory-white cap

when moist, cap margin has fine striations

faint lines on stem surface



gills are adnexed at first, becoming free

SECTION

hollow, very slender stem

Dimensions CAP ↔ 1–1.5cm | STEM ↓ 5–11cm ↔ 1–3cm

Spores Orange-brown

Edibility

Family STROPHARIACEAE

Species *Psilocybe semilanceata*

Season Summer–autumn

## LIBERTY CAP PSILOCYBE

This well-known hallucinogenic agaric has an elegant, conical cap with a distinct pimple on the top; striate and olive-gray in young specimens, it quickly dries to cream without striations. The slender stem is colored like the cap but may have a blue base. The flesh is cream or pale in color and has a musty smell. The symptoms from ingesting this species range from hilarity to incoordination to disorientation, lasting up to four hours.

• **OCCURRENCE** In fertilized grassland, either on heavily grazed or mown areas or hidden deep among clumps of grass.

• **SIMILAR SPECIES** *Psilocybe fimetaria* has a white veil at the margin. It grows in horse manure.



**FRUITING** Singly or in large troops of fruitbodies.

• *striate and olive-gray when moist, the cap dries to cream without striations*

*medium-spaced, adnexed to nearly free gills*

*pale olive-gray gills, purplish black when mature*

• *cap surface smooth, often greasy and sticky*

SECTION

• *often waxy, long, slender stem*

*stem base is occasionally blue*

*stem usually same color as cap*

Dimensions CAP ⊕ 0.5–2cm | STEM ↓ 4–10cm ↔ 2–3mm

Spores Purplish black

Edibility ☠

Family COPRINACEAE

Species *Panaeolina foenicetii*

Season Late spring–autumn

## LAWN MOWER'S MUSHROOM

This very common grassland species has a hemispherical to flat, smooth, red-brown cap, and a similarly colored stem with a pale surface bloom. As the cap dries, its colors become zoned, and its surface may break into minute, flattened scales.

It has well-spaced, free gills.

This species is also placed in the genera *Panaeolus* and *Psathyrella*, but its spores are dark brown; a microscope reveals warty spores, each with a pore. Its flesh has a pleasant, spicy smell but is poisonous.

• **OCCURRENCE** In damp grass. Extremely common in Europe and North America.

• **SIMILAR SPECIES** *P. ater* has black gills and smooth spores.

*red-brown cap dries to pale brown*

*cap surface may break into minute scales*

*red-brown stem with surface bloom*



**FRUITING** In troops in soil, particularly nutrient-rich soil, in a variety of grassland, including lawns.

Dimensions CAP ⊕ 1–3cm | STEM ↓ 4–6cm ↔ 2–3mm

Spores Dark brown

Edibility ☠

## VERY SMALL, CAP NOT SMOOTH

**A**GARICS IN THIS SUBSECTION, as in the last (pp.132–141), have very small fruitbodies, but are characterized by their very varied, never smooth, cap surfaces. They too are represented in many different families and genera. Their cap surfaces may be fibrous or scaly, or they can be covered with loose grains, as in *Coprinus disseminatus* (p.143), which also has fine hairs.

Family TRICHOLOMATACEAE	Species <i>Crinipellis stipitaria</i>	Season Summer–autumn
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### SCALY ZONED COLLYBIA

The stem of this tough species has a dense covering of stiff, gray to brown hairs. The convex to umbonate, sometimes depressed cap has silky, pale brown hairs, arranged in concentric zones, and has radial streaks. The flesh is off-white and tough; neither the smell nor the taste is noteworthy.

- **OCCURRENCE** In dry grassy areas and on sand dunes. Widespread and locally common in northern temperate zones; widely distributed in northeastern and northcentral US.
- **SIMILAR SPECIES** There are only a few *Crinipellis* species in temperate zones. One tropical species (*C. pernicioso*) causes severe damage to cacao trees.

• *adnexed or nearly free gills*

• *tough, wavy stem with clusters of stiff, gray to brown hairs*

• *silky, pale brown to fox-red hairs lying flat on cap surface*

• *medium-spaced, thick, fairly tough, off-white gills*

**FRUITING** Solitary or in troops on dead plant stems.

Dimensions CAP ↻ 0.5–1.5cm   STEM ↓ 1.5–3.5cm ↔ 1–2mm	Spores White	Edibility
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Family TRICHOLOMATACEAE	Species <i>Asterophora parasitica</i>	Season Autumn
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### RUSSULA PARASITE

This species has a silky-fibrillose gray cap and stem and well-developed, thick, widely spaced gills with decurrent teeth. It is not considered a worthwhile edible.

- **OCCURRENCE** On rotten fruitbodies of *Russula* and *Lactarius*, typically *R. nigricans* group (p.122), in wooded sites. Widespread in northern temperate zones; rare.
- **SIMILAR SPECIES** Other mushrooms that grow on rotting agarics include *Asterophora lycoperdoides*, which looks similar to a small puffball; *Volvariella surrecta*, on *Clitocybe nebularis* (p.40); and a few small *Collybia* species.

• *bell-shaped to convex gray cap*

• *dark brown flesh*

• *silky-fibrillose, brown-flushed, pale stem*

• *decurrent teeth on gills*

• *thick, widely spaced, pale brown gills*

• *silky fibers on surface of cap*

**FRUITING** In small clusters on fruitbodies.

Dimensions CAP ↻ 0.5–1.5cm   STEM ↓ 1–3cm ↔ 2–4mm	Spores White	Edibility
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Family COPRINACEAE	Species <i>Coprinus disseminatus</i>	Season Spring-early autumn
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## MASSED LESSER INKY CAP

Cream-white when young, the pleated (parachute-like) cap of this species ages gray, but, unlike many *Coprinus* species, produces only a little ink. Fine hairs and grains on the surface are visible through a hand lens. The delicate stem is white, as is the very thin flesh.

- **OCCURRENCE** On and around stumps and dying deciduous trees. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *Psathyrella pygmaea* is similar in appearance and habitat, but its cap surface has neither hairs nor grains and is less pleated.

medium- to closely spaced gills



fine hairs and grains on cap surface



pleats clearly visible on young cap



cap color is darker in center

free gills are white to gray-black



### SECTION

thin white flesh



broadly egg-shaped cap with pleated surface



**FRUITING** Appears in huge troops near deciduous stumps.

delicate, off-white stem



huge troops appear on stumps or by dying trees

Dimensions CAP ⌀ 0.5–1.5cm   STEM ↓ 1–4cm ↔ 1–2mm	Spores Black	Edibility
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Family HYGROPHORACEAE	Species <i>Hygrocybe miniata</i>	Season Summer-autumn
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## FINE-SCALY RED WAX CAP

This mushroom is one of several small *Hygrocybe* species with dry caps densely covered in small scales. They are difficult to tell apart without examining the spores under a microscope: those of this Wax Cap are mostly pear-shaped. The fruitbodies are bright scarlet with a convex, scaly cap and a smooth, shiny stem. The gills are adnate, and the red-orange flesh has an unremarkable smell and taste.

- **OCCURRENCE** In open deciduous or mixed woods, on unimproved grassland. Widespread in northern temperate zones and widely distributed throughout North America.
- **SIMILAR SPECIES** The early fruiting *H. helobia* prefers less acidic conditions, smells of garlic, and has spores of a more regular ellipsoid shape. *H. calciphila* also has more regular-shaped spores and tends to occur on alkaline soil.

bright scarlet cap with scurfy surface

smooth, shiny, bright scarlet stem

adnate gills are yellow to pale red



**FRUITING** In troops, mostly on slightly acidic soil, in undisturbed grassland.

Dimensions CAP ⌀ 1–3cm   STEM ↓ 1–6cm ↔ 2–8mm	Spores White	Edibility
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Family ENTOLOMATACEAE	Species <i>Entoloma serrulatum</i>	Season Late summer–autumn
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## SAW-GILLED BLUE-CAP ENTOLOMA

The convex, dark blue-black cap surface of this mushroom is dry to the touch with tiny, erect scales and a central, navel-like depression. The stem is a similar color to the cap. The adnexed, pale blue gills have a serrated, blue-black edge.

• **OCCURRENCE** In grassland, among sparse roadside vegetation, or in open woods. Widespread in Europe and North America.

• **SIMILAR SPECIES** Similar, more-or-less blue *Entoloma* species with colored gill edges include *E. caesiocinctum*, with a browner cap; *E. chalybaeum*, with brown-edged, blue gills that are less serrated; and *E. querquedula*, which has an olive-tinged cap.



**FRUITING** In small groups on most types of soil.

central depression on dry, blue-black cap surface



cap surface has tiny, erect scales

thin, bluish white flesh has faint aroma



SECTION

medium-spaced gills are adnexed

pale blue gills turn pinkish blue with age



gill edge is serrated and blue-black

Dimensions CAP ↔ 1–2.5cm   STEM ↓ 2–6cm ↔ 2–4mm	Spores Pale pink	Edibility ☠
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Family ENTOLOMATACEAE	Species <i>Entoloma incanum</i>	Season Summer–early autumn
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## GREENISH ENTOLOMA

The overall color of this species is green or green-brown, but the flesh discolours to sky-blue when bruised and smells strongly of mice. The cap is convex, with a slightly depressed center, and the slender stem is hollow. It is probably poisonous. Although perhaps the most striking of the smaller *Entoloma* species, its coloring camouflages it well in its grassy habitat.

• **OCCURRENCE** On soil in calcareous grassland or along paths in forests. Widespread but uncommon in Europe and North America.



**FRUITING** Appears singly or in troops of fruitbodies among herbaceous plants.



gills are medium spaced

pale grass-green to greenish golden brown cap

translucent green stem stains blue where bruised

pale pink gills may be adnate or adnexed

hollow stem



SECTION

cap margin is often wavy

striations at cap margin

slight depression in cap center

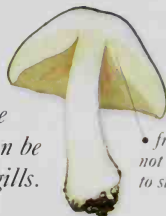
stem base is white and stains blue



Dimensions CAP ↔ 1–3cm   STEM ↓ 2–6cm ↔ 2–4mm	Spores Pale pink	Edibility ☠
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# CAP & STEM FUNGI WITH FREE GILLS

*This section features the few families of agarics – Amanitaceae, Agaricaceae, and Pluteaceae – in which the species have “free” gills, meaning those that are not attached to the stem. Often the stem can be twisted from the cap flesh without damage to the gills.*



• free gills not attached to stem

## WITH VOLVA AND/OR VEIL SCALES ON CAP

**T**HIS GROUP OF AGARICS consists of the universal veil persist as a saclike structure at the stem base (volva) and/or as loose scales on the cap. Some species from the genera *Amanita* and *Volkvariella*. They are comparatively large and fleshy, and distinct remains of also have a ring around the stem.

Family AMANITACEAE	Species <i>Amanita caesarea</i>	Season Summer–autumn
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### CAESAR'S AMANITA

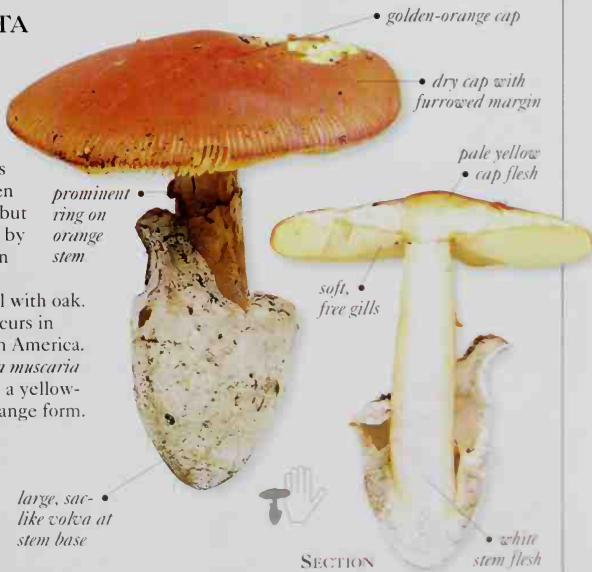
A legend in warm regions, this mushroom has a convex to flat, golden orange cap and an orange stem with a prominent, loose white volva (up to 5cm wide), at the base. The soft gills are crowded and cream to golden yellow. This is a choice edible, but unless it is positively identified by an expert, it should not be eaten (see SIMILAR SPECIES).

• **OCCURRENCE** Mycorrhizal with oak. A complex of similar species occurs in eastern and southwestern North America.

• **SIMILAR SPECIES** *Amanita muscaria* (p.146) has a yellow-orange form.



**FRUITING** Singly or in troops on sandy soil.



Dimensions CAP ⊕ 8–20cm   STEM ↓ 8–16cm ↔ 2–3cm	Spores Off-white	Edibility
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Family AMANTITACEAE

Species *Amanita muscaria*

Season Summer–autumn

## FLY AMANITA

This is the classic fairy-tale toadstool. It has a convex to flattened cap with a smooth or faintly grooved margin and white veil scales on the surface. It occurs in several color forms, including yellow-orange and orange (eastern North America); the brilliant red version (Alaska) is the most familiar. The swollen stem base lacks the loose volva found in other *Amanita* species, such as *A. virosa* (p.150). Although used in minute amounts by native people in Siberia for shamanic purposes, this mushroom is poisonous if eaten in larger quantities.

• **OCCURRENCE** Mycorrhizal, mostly with birch or spruce, usually on acidic soil.



faint grooves • at cap margin

• red, orange, or orange-yellow cap

• white stem with remnants of veil

• prominent white scales on cap surface vanish after rain



gills are • free of stem

pendent stem ring • may have teeth

swollen stem • base, to 3cm wide, with scaly surface

full-length gills are mixed with short ones, as in most agarics •

white to pale yellow flesh •



**FRUITING** In troops or rings under or near trees.



SECTION

• crowded, white to off-white gills



Δ *AMANITA MUSCARIA* VAR. *FORMOSA*

This is a yellow- to orange-capped variant, common in eastern North America. ☠

Dimensions CAP ↔ 6–15cm | STEM ↕ 8–20cm ↔ 1–2.5cm

Spores Off-white

Edibility ☠

family AMANTITACEAE

Species *Amanita rubescens*

Season Summer–autumn

## BLUSHING AMANITA

The convex cap of this species is pinkish brown with gray to pink veil patches. The downy, gray, white, or pink stem bears a prominent pendent ring with furrows on its upper surface; the base is swollen and girdled. Small insects lay eggs in the fruitbodies, and the damaged flesh becomes pink tinged – often the best clue to its identity. It is difficult to recognize so should be picked for eating only by experienced foragers.

• **OCCURRENCE** Mycorrhizal with trees, such as beech, and conifers.

Widespread and common in northern temperate zones.



• pendent ring, with furrows on upper surface

downy stem is gray, white, or pink



gray to pink veil patches on cap surface

• convex cap is pinkish brown

• swollen stem base, to 4cm wide, is girdled with veil remains



SECTION



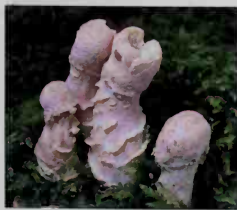
soft white flesh slowly stains pink

pink tinges appear on damaged areas



gills are free of stem

crowded, soft, white to off-white gills



△ **HYPOMYCES HYALINUS**  
A white flask fungus, parasitic on *Amanita rubescens* in eastern North America. It can also occur on *A. virosa* (p.150). ☠



**FRUITING** Singly or in groups, often on acidic soil.

Dimensions CAP ⊕ 6–18cm | STEM ⊕ 6–15cm ↔ 1.5–4cm

Spores White

Edibility ☠

Family AMANTITACEAE	Species <i>Amanita spissa</i>	Season Summer–autumn
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### STOUT-STALKED AMANITA

This species has a convex, usually dark brown cap with a smooth margin and gray veil patches. The ring on its club-shaped stem has grooves on the upper surface. It smells faintly of canola oil. Although this mushroom is edible after cooking, it is not recommended; see SIMILAR SPECIES. *A. excelsa*, considered by some to be a separate species, is paler with a rooting stem and no smell.

• **OCCURRENCE** Typically with beech or spruce in woods. Widespread in northern temperate Europe, Asia, and eastern North America.

• **SIMILAR SPECIES** Poisonous *A. pantherina* (p.149). *A. rubescens* (p.147) has pink tinges.



**FRUITING** Appears singly or a few together.

dark brown cap with pale gray veil patches •



free gills are white, crowded, and soft •

smooth or slightly striate cap margin •

clearly defined grooves on pendent stem ring •



club-shaped stem • base with brown to gray-brown veil girdles



Dimensions CAP ↔ 7–15cm   STEM ↓ 8–14cm ↔ 2–4cm	Spores White	Edibility
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Family AMANTITACEAE	Species <i>Amanita smithiana</i>	Season Autumn
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### TOXIC LEPIDELLA AMANITA

This species has a convex to flat white cap with conical veil patches. The veil is also visible in shreds around the smooth cap margin. The scaly white stem has a ragged ring and gets larger toward the rooting base, where the basal bulb may be up to 5cm wide. The thick, white, faintly pungent flesh can cause kidney failure or liver disease.

• **OCCURRENCE** Mycorrhizal with conifers. Widespread and common in the Pacific Northwest.

• **SIMILAR SPECIES** *Tricholoma magnivelare* (p.81) has a spicy smell and a rooting stem. *Amanita virosa* complex (p.150), with a smooth cap and saclike volva, is easily distinguished.

veil shreds at smooth cap margin •

crowded, free white or cream gills •

scaly white stem with ragged ring •



**FRUITING** Singly or in scattered groups under conifers in woods.

Dimensions CAP ↔ 5–12.5cm   STEM ↓ 10–20cm ↔ 1–3cm	Spores White	Edibility
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Family AMANTACEAE

Species *Amanita pantherina*

Season Summer–autumn

## PANTHER AMANITA

This dangerous hallucinogen has variable coloring, which complicates identification. The flattened cap is normally pale brown, with many small veil scales on the surface and fine radial grooves.

Identification features are the bulblike stem base, with its distinct rim, and a stem ring with no grooves on its upper side. The white flesh is poisonous.

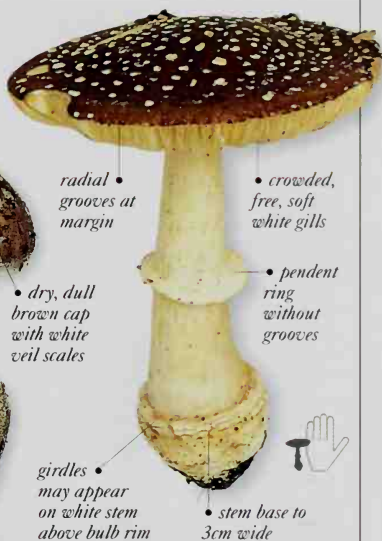
• **OCCURRENCE** Mycorrhizal with conifers and a range of deciduous trees, mostly on alkaline soil, in woods and parks. Widespread and common in northern temperate zones.



**FRUITING** Singly or in small groups beneath trees.



pointed bulb at base of stem



radial grooves at margin

crowded, free, soft white gills

dry, dull brown cap with white veil scales

pendent ring without grooves

girdles may appear on white stem above bulb rim

stem base to 3cm wide



Dimensions CAP ⊕ 5–12cm | STEM ↓ 6–12cm ↔ 0.5–1.5cm

Spores Off-white

Edibility ☠

Family AMANTACEAE

Species *Amanita gemmata*

Season Summer–autumn

## GEMMED AMANITA

This species has a flattened, ocher-yellow cap with a furrowed margin and white veil patches on the surface. Off-white to pale yellow, the solid stem has an indistinct ring zone left by the short-lived ring, veil girdles, and a narrow-rimmed basal bulb, up to 2cm wide. A wide range of forms occur in North America, making correct identification difficult.

• **OCCURRENCE** Mycorrhizal with conifers, or in deciduous forests, on sandy soil. As a complex, widespread but local in northern temperate zones.

• **SIMILAR SPECIES**

*Amanita citrina* (p.150) has more persistent scales on the cap and smells of raw potatoes.

soft, crowded gills



narrow rim on bulb

free white gills



furrows at margin of ocher-yellow cap

SECTION

soft flesh is white, becoming yellow near surface



**FRUITING** Appears in small groups of fruitbodies.

Dimensions CAP ⊕ 3–10cm | STEM ↓ 5–10cm ↔ 0.5–1.5cm

Spores White

Edibility ☠

Family AMANITACEAE	Species <i>Amanita virosa</i>	Season Summer–autumn
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## DESTROYING ANGEL

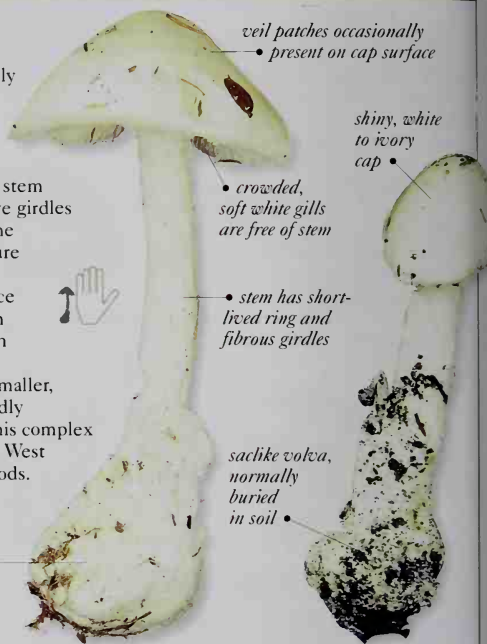
The saclike volva of this species is normally buried in the soil, so specimens should be dug up carefully for correct identification. The shiny, white to ivory cap usually lacks veil patches and is bell-shaped or conical. Unlike many *Amanita* species, the stem ring is indistinct and the stem tends to have girdles of fine fibers. It is deadly poisonous; anyone picking edible mushrooms should make sure they are familiar with this species.

• **OCCURRENCE** Mycorrhizal with spruce in northern Europe but with oak in eastern and western North America. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *A. bisporigera* is a smaller, more slender, two-spored, but equally deadly mushroom of eastern oak woods. Also in this complex is *A. ocrata*, common in West Coast oak woods.



**FRUITING** Appears singly or in groups on poor soil.



volva can be up to 3cm wide



Dimensions CAP 6–11cm   STEM 10–20cm 1–2cm	Spores White	Edibility
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Family AMANITACEAE	Species <i>Amanita citrina</i>	Season Late summer–autumn
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## CITRON AMANITA

Two good identification features of this species are its lemon-yellow or white coloring and the swollen, rounded bulb, up to 3cm wide and with a distinct rim at the base of its stem. The cap is convex, with a smooth margin and often veil remnants; the stem bears a large pendent ring toward its top. The white flesh has a distinctive and strong smell of raw potatoes.

• **OCCURRENCE** Mycorrhizal with conifers and deciduous trees, mostly on acidic soil. Widespread and common in northern temperate zones.



Dimensions CAP 5–10cm   STEM 6–13cm 0.8–1.5cm	Spores Off-white	Edibility
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Family AMANTACEAE

Species *Amanita phalloides*

Season Late summer–autumn

## DEATH CAP AMANITA

This species has a convex to flattened, green to gray cap with a smooth margin but a fibrous surface. The stem may be similarly colored or off-white with a prominent white volva, 3–5cm wide. Young specimens are relatively easy to identify by their green tinges, free gills, and prominent white volvas. There is usually a stem ring, but it may be absent. Older specimens may have gray caps (see SIMILAR SPECIES). This is a deadly poisonous mushroom.

• **OCCURRENCE** Mycorrhizal with American oaks, pines, and Norway spruce, on rich soil. Widespread and common in parts of Europe and northern North America.

• **SIMILAR SPECIES** Some *Volkariella* species (pp.154–55) look similar to older specimens of *Amanita phalloides*. They are distinguished by a pale pink spore deposit and lack of a stem ring. *A. virosa* (p.150) is completely white.



**FRUITING** Singly or in troops of fruitbodies.

*immature*, •  
green-capped  
fruitbody



• surface of gray or green cap is fibrous  
• smooth cap margin

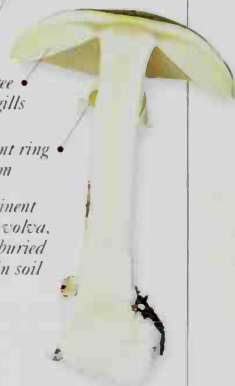


SECTION

soft, free white gills

pendent ring on stem

prominent white volva, half buried in soil



Dimensions CAP ↔ 8–15cm | STEM ↓ 8–16cm ↔ 1–2.5cm

Spores Off-white

Edibility ☠

Family AMANTACEAE

Species *Amanita porphyria*

Season Summer–autumn

## PURPLE-BROWN AMANITA

Named after the color of its convex to umbonate cap, which is porphyrous (purplish brown), the Purple-brown Amanita has a pendent gray ring around its stem, which is bulbous at the base, with an off-white or pale gray volva, to 2.5cm wide. It smells like raw, peeled potatoes and is slightly poisonous. It could easily be confused with its deadly relatives so should be avoided.

• **OCCURRENCE** Mycorrhizal with conifers on acidic soil. Widespread in northern temperate Europe, Asia, and northern North America.

• **SIMILAR SPECIES** *A. ritirina* (p.150) has a similar smell, but its habitat and coloring are different.

*A. spissa* (p.148) has similar coloring but lacks the smell.



**FRUITING** Appears singly or in small groups.



• gray-brown to purple-gray cap surface has few or no veil patches

pendent ring near stem middle

soft, crowded, free white to off-white gills



SECTION

white or pale yellow stem is smooth

soft white to yellow flesh smells of raw potato



bulb at stem base is pale gray or off-white

Dimensions CAP ↔ 5–9cm | STEM ↓ 8–13cm ↔ 1–2cm

Spores White

Edibility ☠

Family AMANTACEAE

Species *Amanita fulva*

Season Summer–autumn

## TAWNY GRISETTE

This species has a conical to umbonate, smooth, tawny brown cap and a downy and slightly fibrillose stem in a similar color. A furrowed cap margin and the absence of a stem ring or girdles indicate that this species belongs to the subgenus *Amanitopsis*. Many *Amanitopsis* species can be difficult to identify: the color of the volva – off-white to pale brown in this species – is an important characteristic. Although edible, *Amanita fulva* must be cooked thoroughly before being eaten. The soft, watery flesh is off-white. It turns chocolate-brown in contact with phenol.

• **OCCURRENCE** Mycorrhizal with birch trees in wooded areas. Widespread in northern temperate zones, especially common in eastern North America.

• **SIMILAR SPECIES** *A. crocea* and *A. vaginata* (both p.153).



insect or slug damage

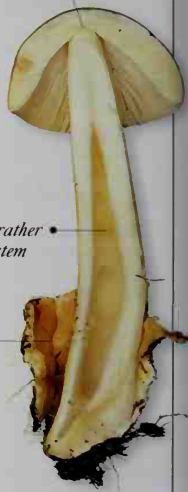
cap center  
• may be darker brown



hollow, rather fragile stem

inside of volva is off-white to brown

gills are crowded



**FRUITING** Appears singly or in small groups of fruitbodies.

Dimensions CAP ↔ 3–8cm | STEM ↓ 7–15cm ↔ 0.7–1.2cm

Spores Off-white

Edibility

Family AMANTACEAE

Species *Amanita crocea*

Season Early summer–autumn

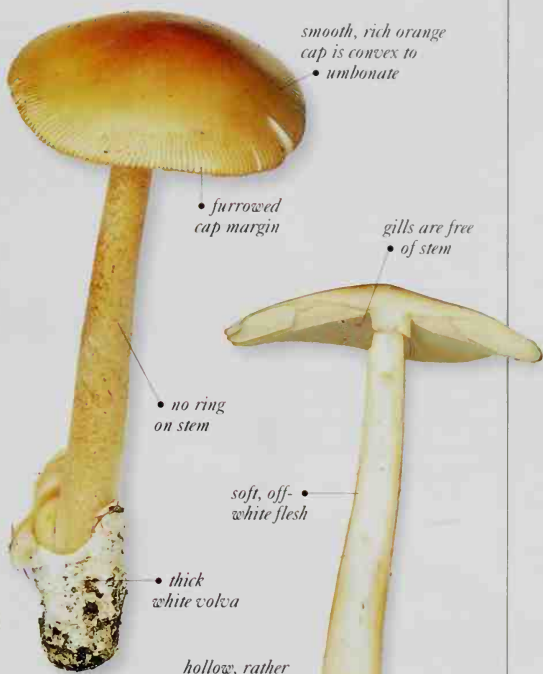
## ORANGE GRISETTE

This striking species has a convex to umbonate, shiny orange cap, which is smooth with a furrowed margin. The stem, which is without a ring, has thin orange girdles and a prominent, thick white volva. Like *Amanita fulva* (p.152), it belongs to the subgenus *Amanitopsis*. Although both species are often found near birch, *A. crocea* prefers much richer soil. It is edible, with soft, off-white flesh, but must be thoroughly cooked before eating. If harvested for eating, the fruitbodies should be used as soon as possible since they do not keep well.

• **OCCURRENCE** Mycorrhizal with birch trees, and possibly also spruce, beech, and oak, on fairly rich soil in lowland areas and at higher altitudes, near the tree line. Widespread in Europe and North America.

• **SIMILAR SPECIES**

*A. fulva* (p.152) has off-white flesh turning chocolate-brown in contact with phenol, whereas the flesh of *A. crocea* turns dark wine-red. *A. vaginata* (inset, below).



SECTION

white to cream gills are crowded

inside of volva is pale yellow



soft gills



Δ **AMANITA VAGINATA**

This gray to near white species has a convex to umbonate cap, furrowed at the margin. The stem has a mealy surface and a prominent volva. It occurs mainly under deciduous trees on rich soil. Beware of the deadly look-alike *Amanita virosa* (p.150). ☹️



FRUITING Singly or in small groups under birch.

Dimensions CAP ⬆️ 6–12cm | STEM ⬆️ 10–20cm ↔ 1–2cm

Spores Off-white

Edibility ☹️

Family PLUTEACEAE

Species *Volvariella bombycina*

Season Summer–autumn

## TREE VOLVARIELLA

An easy species to identify, but not so easy to find; it is rare and may be high up in trees. It has a very large, conical to umbonate, white to pale yellow cap, covered in silky fibers, and a pronounced volva at the base of the white to yellowish cream stem. It has a pleasant smell and is edible, but because of its saclike volva it must be identified accurately.

• OCCURRENCE

On standing dead trees, on stored wood, or in buildings. Widespread in northern temperate zones, but mostly local; also farther south.

• SIMILAR SPECIES The Deadly Amanitas also have a saclike volva but grow on the ground.



FRUITING Singly or in clusters, often on elm.



broad umbo  
• on cap

prominent brown volva,  
• to 8cm wide

hairlike, white to pale yellow-brown scales  
• on cap surface

volva often breaking up  
• or splitting

white to pale yellow, conical to convex or umbonate cap



smooth stem

crowded gills are free of stem

### SECTION



solid but soft, off-white flesh

soft, white to pinkish brown gills

Dimensions CAP ↔ 10–25cm | STEM ↓ 8–20cm ↔ 1–2.5cm

Spores Pale pink

Edibility

Family PLUTEACEAE

Species *Volvariella gloiocephala*

Season Summer–autumn

## FIELD VOLVARIELLA

This is the largest of all the soil-growing *Volvariella* species; it is distinguished by a smooth, sticky, conical or umbonate cap that ranges between white and mouse-gray in color. The stem is off-white to dingy gray-yellow with a white to pale gray volva at the base. The off-white flesh tastes like cucumber and smells of radishes. Once gathered, the fruitbodies deteriorate quickly. It is a synonym of *V. speciosa*.

• **OCCURRENCE** On disturbed, nutrient-rich soil, compost beds, bark mulches, or under haystacks. Widespread and common in northern temperate zones, extending farther south.

• **SIMILAR SPECIES**

A close relative, *V. volvacea*, is commercially grown in parts of southeast Asia. It has a shorter stem and a dark gray volva. The caps of young specimens are darker gray-brown.



• free gills



• conical to umbonate, smooth cap

• greasy cap surface, often darker in center

• off-white flesh

• off-white to dingy gray-yellow stem

• crowded, soft, white to pale pink gills

• white to pale gray volva at base of bulbous stem

SECTION



**FRUITING** In troops and singly, often on straw.



Dimensions CAP  $\leftrightarrow$  6–14cm | STEM  $\updownarrow$  10–25cm  $\leftrightarrow$  0.7–1.5cm

Spores Pale pink

Edibility

## WITH STEM RING OR RING ZONE

**T**HE SPECIES in this subsection have free gills (see p.145) and the remains of the partial veil clearly visible on the stem, as either a ring or a ring zone. The ring varies from large to small and may be persistent or short-

lived. Where there is no ring, the area where it would be – the ring zone – is marked by threads or darker marking. Most species featured have white or dark brown to black spore deposits and belong to the family Agaricaceae.

Family AGARICACEAE

Species *Agaricus syzkicola*

Season Summer–autumn

## WOODS AGARICUS

This species is a woodland form of *Agaricus arvensis* (p.157); its stem is more slender, and the bulb is usually flat. The cap is convex to expanded, then flat, with a yellow- or off-white to orange-yellow or pale ochre smooth surface. It smells of almonds or anise, and its white flesh very slowly stains yellow. A choice edible, it must be identified accurately because the Deadly Amanitas also occur on the ground in woods, have membranous stem rings, white spore prints, and saclike volvas.

• **OCCURRENCE** On rich forest soil mixed with debris, under trees. Widespread and common throughout northern temperate zones.



SECTION



**FRUITING** A few together or occasionally in rings.

Dimensions CAP ⬤ 6–12cm | STEM ⬆ 8–12cm ↔ 1–2cm

Spores Chocolate-brown

Edibility ⓪

Family AGARICACEAE

Species *Agaricus arvensis*

Season Summer–autumn

## HORSE AGARICUS

This species has a rounded to convex cap with a smooth, yellow- to off-white surface that very slowly stains orange-yellow to ochre, particularly where bruised. The yellowish stem, which thickens toward the base, has a pendent ring with a wheel-like pattern on its underside. The thick, firm white flesh also stains very slowly. It smells strongly of almonds and is edible but contains high levels of cadmium.

• **OCCURRENCE** Often found in horse-grazed pasture and on lawns and in parks, near spruce. Widespread and common in northern temperate zones; throughout western North America.

• **SIMILAR SPECIES** There are several similar species. *Agaricus augustus* (p.158). *A. macrosporus* is very fleshy, with scaly stem girdles. *A. sylvicola* (p.156) is a woodland form. *A. xanthoderma* (p.159).



yellow- to off-white cap  
stains orange-yellow  
to ochre

pendent double  
ring with scales  
on underside



smooth  
stem surface

gills are  
free of stem

thick but not  
bulbous stem base



young cap is  
smooth with an  
inrolled margin

flesh is white  
and smells of  
almonds



SECTION



pale pink to  
chocolate-brown  
gills are crowded



**FRUITING** Mostly appears in fairy rings in grass.

Dimensions CAP ↕ 7–15cm | STEM ↕ 7–15cm ↔ 1–3cm

Spores Chocolate-brown

Edibility

Family AGARICACEAE

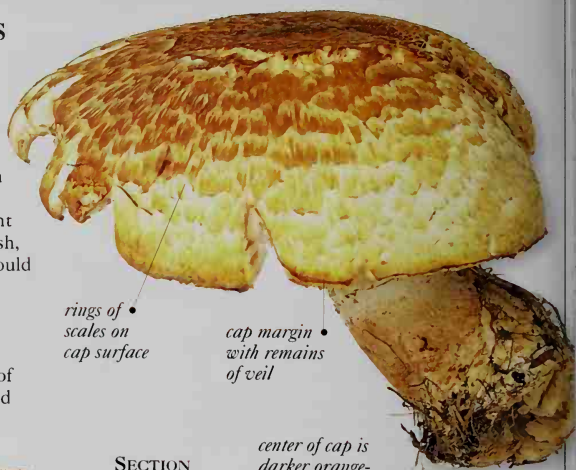
Species *Agaricus augustus*

Season Autumn

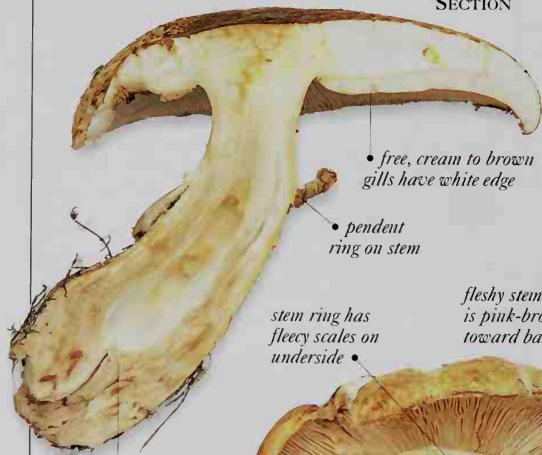
## PRINCE AGARICUS

Orange-brown scales on the surface of both cap and stem, together with yellow-staining flesh that smells of almonds, identify this species. The scales are in a concentric pattern on the convex to expanded cap, and the stem has a large, pendent ring. With its firm, abundant flesh, it makes a choice edible, but should only be eaten in moderation because, like some other edible *Agaricus* species, it concentrates heavy metals like cadmium.

• **OCCURRENCE** In all types of woods and parks, on rich soil, and on garden compost. Widely distributed in North America.



### SECTION



center of cap is darker orange-brown



• almond-scented, off-white flesh slowly stains yellow when bruised

• gills are very crowded



**FRUITING** A few together or in large troops on soil.

Dimensions CAP ⌀ 8–15cm | STEM ↑ 7–12cm ↔ 1.5–3.5cm

Spores Chocolate-brown

Edibility

family AGARICACEAE

Species *Agaricus xanthoderma*

Season Summer–autumn

## TOXIC YELLOWING AGARICUS

Despite having a yellow-staining surface and flesh, this poisonous mushroom appears whiter, almost chalk-white in comparison with the other, slower-staining *Agaricus* species. Its most obvious characteristics are its stem base, which is very bright yellow at the tip when cut lengthwise, and its smell, which is very similar to that of ink.

• **OCCURRENCE** On bare soil or in grass in parks, cemeteries, and similar places. Widespread throughout northern temperate zones and elsewhere.

• **SIMILAR SPECIES** *A. arvensis* (p.157) and *A. sylvicola* (p.156) have a distinctive almond smell. Both are slower to stain yellow and are edible. *A. praeclaresquamosus* (p.160) is darker in color and poisonous.



gills free of stem

SECTION

yellow-staining flesh

flesh at stem base turns very bright yellow

smooth cap is chalk-white or pale gray toward center

cap often "squared-off" with near-vertical sides and flat top

gills are crowded



pendent double stem ring with scales on underside



pink-gray to chocolate-brown gills



### Δ *AGARICUS CALIFORNICUS*

This species from California has a convex white to pale brown cap with a scaly surface, a pendent ring on the white stem, and white gills that turn bright pink then dark brown. Most parts stain yellow. ☠



### Δ *AGARICUS HONDENSIS*

This is a foul-smelling woodland species from the Pacific coast of North America. Its cap is white to pinkish gray, aging darker, and there is a flaring to pendent stem ring. The gills are grayish pink. ☠



**FRUITING** Often in large troops or fairy rings.

Dimensions CAP ↔ 5–13cm | STEM ↓ 5–10cm ↔ 1–2cm

Spores Chocolate-brown

Edibility ☠

Family AGARICACEAE

Species *Agaricus praeclaresquamosus*

Season Late summer–autumn

## TOXIC SCALY AGARICUS

The convex to flattened cap of this unpleasant-smelling species has pointed, gray-brown to sooty black scales. The stem is off-white, staining yellow then brown, and the white flesh quickly turns to yellow when cut. An ally of *A. xanthoderma* (p.159), it has similar poisonous properties and can cause severe gastric upsets.

• **OCCURRENCE** On rich soil, usually in alkaline woods or in parks. Widespread, but local to rare, in northern temperate zones.

• **SIMILAR SPECIES**

*A. meleagris* is the western North American equivalent. *A. placomyces* is common in eastern North America. Both are poisonous.



**FRUITING** Appears in fairy rings or large troops.



white stem turns yellow then brown

scales are gray-brown to sooty-black

crowded, pinkish gray to chocolate-brown gills

### SECTION



stem ring has scales on underside

swollen base, to 2.5cm wide, is stained yellow



Dimensions CAP ⊕ 5–14cm | STEM ↓ 6–10cm ↔ 1–1.5cm

Spores Chocolate-brown

Edibility ☠

Family AGARICACEAE

Species *Agaricus campestris*

Season Summer–autumn

## MEADOW AGARICUS

A familiar edible mushroom with a faintly reddening white fruitbody. The cap is convex to flat with a smooth to fibrillose surface; it may be pinkish gray in older specimens. The gills are pink, then chocolate-brown, unlike most other *Agaricus* species, which have paler gill edges. The small stem ring is single and smooth. The firm white flesh smells and tastes musty.

• **OCCURRENCE** Almost exclusively found in the open – often in pastureland and in grassy areas in urban parks. Widespread and common in northern temperate zones.



fleshy cap with smooth surface

gills are free of stem

crowded gills are pink then chocolate-brown throughout

### SECTION

white flesh ages and bruises pink



**FRUITING** Appears in large groups or fairy rings.

Dimensions CAP ⊕ 4–10cm | STEM ↓ 3–7cm ↔ 0.8–1.5cm

Spores Chocolate-brown

Edibility ☺

Family AGARICACEAE	Species <i>Agaricus bitorquis</i>	Season Summer–autumn
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## SPRING AGARICUS

This species has several distinguishing features: a prominent double stem ring, which is sheathed and upturned; its acidic-smelling, firm flesh slowly turns pink; it has a squared cap with an inrolled margin. Although it is edible, it is safer collected in parks than along roadsides.

- **OCCURRENCE** Mostly found in urban areas, in hard or packed soil, or in schoolyards. Widespread and common in Europe and North America.
- **SIMILAR SPECIES** *Stropharia rugoso-annulata* (p.89) has gills that are attached to the stem and a purple-black spore print;

- cap has distinct shoulders
- smooth cap is white to off-white
- stem ring is double and upturned



cap surface is often soiled

free gills are pink then chocolate-brown



**FRUITING** A few together. They can be found emerging from hard soil or tarmac.

Dimensions CAP 5–12cm   STEM 4–8cm ↔ 1–3.5cm	Spores Chocolate-brown	Edibility
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Family AGARICACEAE	Species <i>Agaricus bisporus</i>	Season Late summer–autumn
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## CULTIVATED AGARICUS

This species is perhaps the best known of all edible mushrooms. It is cultivated on a large scale; only species like *Volkariella volkacea* (Paddy Straw Mushroom), *Pleurotus ostreatus* (Common Oyster Mushroom, p.178), and *Lentinula edodes* (Shiitake) compete in commercial importance. Its convex cap varies from white to dark brown, and its stem has an upturned ring. Its flesh stains very slightly red.

- **OCCURRENCE** By roadsides, in cemeteries, and other sites with rich, disturbed soil. Widespread throughout northern temperate zones.

### SECTION



crowded gills are free

stem ring turns upward when young

convex to flat cap with smooth, dry surface

veil remains at margin



white to dark brown cap

faint carrot-red stain on stem from handling or bruising

gills are chocolate-brown when mature



**FRUITING** Appears in troops and fairy rings.

Dimensions CAP 5–10cm   STEM 3–6cm ↔ 1–2cm	Spores Chocolate-brown	Edibility
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Family AGARICACEAE

Species *Agaricus bernardii*

Season Summer–autumn

## SALT-LOVING AGARICUS

This very fleshy mushroom tolerates soil that is rich in salt. It has a flattened or convex, white to gray-white cap, the surface of which often cracks into a scaly pattern. The thickset stem has a sheathing ring with a narrow, upturned rim. The Salt-loving Agaricus has firm, white, foul-smelling flesh that slowly turns pink with age. It is edible but is not worth eating.

• **OCCURRENCE** In the salt-spray zones of coastal areas or along roads that are salted during the winter. Widespread on east and west coasts of North America and in Europe.

• **SIMILAR SPECIES** *Agaricus bitorquus* (p.161) is found in similar sites.



• white flesh  
• turns pink  
• when bruised

SECTION

• convex or flattened  
• cap with dry surface



• extremely  
fleshy, white  
to gray-  
white cap

• sheathing stem  
• ring has narrow,  
upturned rim

• cap may have  
scaly pattern

• smooth cap  
margin



• cap margin  
is inrolled

• pink to chocolate-  
brown gills are  
crowded and free



**FRUITING** Appears in  
troops of fruitbodies.

Dimensions CAP ↔ 7–15cm | STEM ↓ 5–10cm ↔ 2–4cm

Spores Chocolate-brown

Edibility

Family AGARICACEAE	Species <i>Agaricus sylvaticus</i>	Season Summer–autumn
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## RED-STAINING AGARICUS

The convex to umbonate cap of this species is covered with fine brown fibers. The stem, with its pendent ring, may have a fibrous-scaly surface. Also known as the Pinewood Mushroom, Wood Mushroom, and Scaly Wood Mushroom, this choice edible has pleasant-smelling, off-white flesh that stains deep red, mostly after bruising, although the color reaction is less marked than in some of its relatives.

- **OCCURRENCE** On conifer debris in forests, parks, and damp woods. Widespread in northern temperate zones.
- **SIMILAR SPECIES** *Agaricus langei*, also a good edible, is more fleshy and stains a deeper red. *A. phaeolepidotus* stains yellow and is poisonous.



**FRUITING** Appears in troops of fairy rings.



convex to umbonate cap with radiating scales on surface

gills are crowded and free

SECTION



pendent ring on brown stem

fibrous scales may be present on stem surface



dark brown cap center

base up to 2.5cm wide

pale gray gills are rose-pink then chocolate-brown



Dimensions CAP ⬆ 5–10cm   STEM ⬆ 5–10cm ↔ 0.5–1.5cm	Spores Chocolate-brown	Edibility 100
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Family AGARICACEAE	Species <i>Agaricus porphyizon</i>	Season Throughout autumn
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## PURPLISH YELLOW AGARICUS

This species is an unusually sturdy, fleshy member of a group of mostly small *Agaricus* species, called section *Minores*, that all have an almond smell, yellow-staining flesh, and, often, purple cap colors. The cap is convex, with a covering of fine, purple-lilac fibers on a paler background, and the stem is white with a bulbous yellow to orange base and a fragile, narrow stem ring. The gills are gray-pink to purple-black. It has edible white flesh that slowly stains yellow.

- **OCCURRENCE** On soil and leaf litter in deciduous woods, but also on conifer debris and in gardens. Widespread but local in Europe; not reported in North America.

pale convex cap with lilac-purple fibers

gray-pink, free gills



**FRUITING** Appears singly or a few fruitbodies together on rich soil among leaf litter.

Dimensions CAP ⬆ 5–8cm   STEM ⬆ 4–6cm ↔ 0.7–1cm	Spores Chocolate-brown	Edibility 100
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Family AGARICACEAE

Species *Leucoagaricus leucothites*

Season Late summer–autumn

## SMOOTH LEPIOTA

The convex cap of this white species has a smooth, dry surface. The stem has a thin ring, which may be loose, and a club-shaped base.

The white flesh smells pleasant but is poisonous. Subtle color differences have led some experts to divide *Leucoagaricus leucothites* into a small group of separate species. This complex is known in the US as *L. naucinoides*.

• **OCCURRENCE** In grass along roadsides and in parks, gardens, and sand dunes. Widespread in Europe and North America.

• **SIMILAR SPECIES** Several *Agaricus* species are similar, but their spore deposits and mature gills are chocolate-brown.



crowded gills



**FRUITING** In small groups or fairy rings, mostly in grass.



SECTION

Dimensions CAP  $\oplus$  5–8cm | STEM  $\updownarrow$  4–8cm  $\leftrightarrow$  0.8–2cm

Spores White

Edibility

Family AMANTACEAE

Species *Limacella guttata*

Season Late summer–autumn

## SLIME-VEIL FALSE LEPIOTA

The slightly greasy, convex cap of this species is creamy ocher to very pale red-brown. The stem is dry with a prominent ring that exudes a clear liquid, which dries as olive-brown spots. There is no volva at the stem base. The white gills are free and crowded. This white-fleshed, yeasty-smelling mushroom is edible but not recommended.

• **OCCURRENCE** Found in deciduous or coniferous forests, on rich soil among thick leaf litter. Widespread but local in Europe; in the Midwest and Rockies in North America.

• **SIMILAR SPECIES** *Limacella glioderma* is extremely slimy with an orange-brown cap. Some *Amanita* and *Lepiota* species are superficially similar, but neither genus has species with a slimy outer veil.

cap is creamy ocher; darker with age

pale red-brown center of convex, greasy cap

crowded gills are white and free



**FRUITING** Appears in troops of fruitbodies or singly in rich soil and litter in woodland areas.

Dimensions CAP  $\oplus$  7–15cm | STEM  $\updownarrow$  8–14cm  $\leftrightarrow$  1–2.5cm

Spores White

Edibility

Family AGARICACEAE

Species *Macrolepiota procera*

Season Summer–autumn

## PARASOL LEPIOTA

This spectacular large mushroom is distinguished by a beautiful snakeskin pattern on its stem, which also has a large, movable ring. The cap is umbrella-shaped to flat with a raised, dark gray-brown center, and with a concentric pattern of attached scales.

The pale flesh does not stain when bruised. Some consider this to be one of the best edible mushrooms.

• **OCCURRENCE** In dunes, dry grassland, and small grassy areas in woods and parks. Widespread and fairly common in Europe and North America.

• **SIMILAR SPECIES** The poisonous *Chlorophyllum molybdites* (p.166) has a stouter stalk and a green spore print. *M. rhacodes* (p.166).

cap center is dark

• gray-brown

concentric brown scales on cap

• surface



very tall stem

with delicate snakeskin

• pattern



stem ring is large and movable

• cap emerges egg-shaped, becoming umbrella-shaped or flat with a raised center



• crowded, free, white to cream gills



**FRUITING** In scattered troops on sandy grass or soil.

slightly bulbous stem base

stem may be 4cm wide at base

Dimensions CAP ⊕ 10–30cm | STEM ↓ 15–30cm ↔ 0.8–2cm

Spores White or pale pink

Edibility

Family AGARICACEAE

Species *Macrolepiota rhacodes*

Season Summer–autumn

## SHAGGY PARASOL LEPIOTA

This shaggy species has concentric, pale brown scales covering the surface of the convex cap, which flattens with age; very young specimens resemble flower bulbs. The stem has a prominent double ring. Its white flesh turns bright carrot-red when bruised.

Although edible, some varieties cause stomach upsets, so only small quantities should be eaten (see also SIMILAR SPECIES).

• **OCCURRENCE** On rich soil in parks and gardens; also under conifers. Widespread and common throughout Europe and North America.

• **SIMILAR SPECIES** *Macrolepiota permixta* and *M. procerca* (p.165) are larger, with snakeskin-patterned stems.

*Chlorophyllum molybdites* (inset, below) is poisonous and has a green spore deposit.

young specimen already has pale brown scales •

concentric scales • on cap surface



gills are crowded •

• prominent, movable double stem ring

• free gills are white to cream

SECTION

immature specimen with egg-shaped cap

• white flesh first stains carrot-red then dark red

basal • bulb to 4cm wide

• smooth to fibrillose stem

• cap margin is shaggy



**FRUITING** Appears in troops or fairy rings.



Δ **CHLOROPHYLLUM MOLYBDITES**  
Also known as *Macrolepiota molybdites*, this scaly-capped species is pale brown, bruising red-brown, with a double stem ring. As they mature, the white gills become olive-green. ☠

Dimensions CAP ↔ 5–15cm | STEM ↓ 10–15cm ↔ 1–2cm

Spores White

Edibility | ○ |

Family AGARICACEAE	Species <i>Lepiota aspera</i>	Season Late summer–autumn
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## SHARP-SCALED LEPIOTA

This large species has a convex, off-white cap, covered with conical or pyramidal brown scales that wear away with age. The stem is brown with a large, pendent, dark-rimmed ring and a swollen base; its surface is scaly or fibrous below the ring. It has an unpleasant smell and may be poisonous.

• **OCCURRENCE** In woods along roadsides in rich, alkaline soil. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Lepiota hystrix* exudes brown liquid from its very dark scales.

*L. perplexum* tends to be smaller with less crowded gills.

*Macrolepiota procera* (p.165) has a movable stem ring and a faint, pleasant smell.



**FRUITING** Appears singly or in small groups.



• brown scales on off-white cap



• large, pendent stem ring



• stem below ring is brown and scaly or fibrous

• swollen base of stem, to 2cm wide



• free, white to pale cream, very crowded gills

SECTION

Dimensions CAP ⬆ 5–15cm   STEM ⬆ 5–12cm ↔ 0.5–1.5cm	Spores White	Edibility
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Family AGARICACEAE	Species <i>Lepiota oreadiformis</i>	Season Autumn
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## EURO GRASS LEPIOTA

A conical cap and crowded, thin, free white gills make this species typical of the genus; however, unlike most *Lepiota* species, the stem ring is hardly visible. The overall coloring of the fruitbody is off-white to cream, with the cap having a browner center. The stem is girdled by the remains of the veil, and the cap margin also bears veil remnants. Some mycologists separate *L. oreadiformis* into three or more distinct species.

• **OCCURRENCE** In dry open grassland, often in coastal sites and on sand dunes. Widespread throughout Europe; not reported in North America.

• **SIMILAR SPECIES** *Marasmius oreades* (p.117) is superficially similar but has adnexed gills, tough flesh, and no sign of any veil remnants.

• stem ring is hardly visible, if seen at all

• free, crowded gills are pale cream

• cap is off-white to cream with darker center



**FRUITING** In troops of fruitbodies among lichens and short grass in open grassland and coastal sites.



Dimensions CAP ⬆ 2–6cm   STEM ⬆ 3–5cm ↔ 0.8–1.2cm	Spores White	Edibility
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Family AGARICACEAE	Species <i>Lepiota ignivolvata</i>	Season Throughout autumn
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## EURO ORANGE LEPIOTA

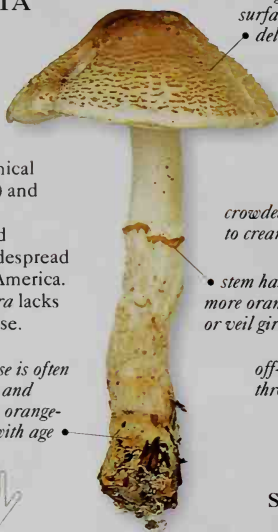
This fairly fleshy *Lepiota* species is best identified by its orange-margined ring, situated low on the club-shaped white stem. The convex cap has concentric, fine, orange-brown scales and a raised ocher-brown center. Its off-white flesh has an unpleasant chemical smell, reminiscent of *L. cristata* (p.169) and similar to the odor when metal is cut.

- **OCCURRENCE** Under conifers and deciduous trees on calcareous soil. Widespread across Europe; not reported in North America.
- **SIMILAR SPECIES** *L. ventriospora* lacks the orange on the veil and the stem base.



**FRUITING** Appears in troops or singly in leaf litter.

stem base is often swollen and becomes orange-tinged with age



orange-brown cap surface breaks into delicate scales

soft, free gills

crowded, white to cream gills

stem has one or more orange rings or veil girdles

off-white flesh throughout



SECTION

Dimensions CAP 4-11cm   STEM 5-15cm ↔ 0.5-2cm	Spores White	Edibility
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Family AGARICACEAE	Species <i>Lepiota clypeolaria</i>	Season Throughout autumn
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## SHAGGY-STALKED LEPIOTA

This fairly large but not very fleshy species is mainly white to cream, although the bell-shaped to flat cap may have brown-tinged scales; the specimen shown is a brown example. The cap margin and the stem bear clear remnants of the pure white veil, making young specimens appear shaggy. The faint-smelling flesh is white to pale brown. The spores are spindle-shaped.

- **OCCURRENCE** In deciduous or coniferous forests on fertile soil among leaf litter or on needle beds. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES**

*Lepiota alba* grows in open habitats and has a smoother stem. *L. ventriospora* has yellow or yellow-brown tinges to the stem veil and cap.



club-shaped stem base

white to cream gills are crowded



cap surface with pale ocher-brown scales

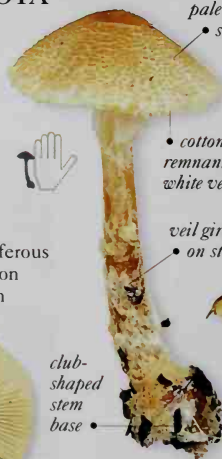
cottonlike remnants of white veil

veil girdles on stem

free gills

SECTION

thin, white to pale brown flesh



**FRUITING** Appears singly or in small groups.

Dimensions CAP 3-7cm   STEM 5-12cm ↔ 0.5-1cm	Spores White	Edibility
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Family AGARICACEAE	Species <i>Lepiota cristata</i>	Season Summer–autumn
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## BURNT-RUBBER LEPIOTA

This is the most common of the smaller *Lepiota* species. Its best identification characteristics are its pale colors, the concentric pattern of flat, orange-brown scales on the convex cap, and an unpleasant chemical smell. The stem ring is short lived but can be seen as an upturned cuff on younger specimens.


- **OCCURRENCE** In lawns, among mosses, or near nettles, at the edges of paths and roads, on fairly rich soil. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** The very poisonous *L. lilacea* is much rarer, with a similar shape but with purple to purple-brown colors.




center is always darker red-brown than rest of cap



crowded, free white gills





**FRUITING** In small groups or troops on bare soil.

Dimensions CAP ⬆ 1–4cm   STEM ⬆ 2.5–5cm ↔ 2–4mm	Spores White	Edibility ☠
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Family AGARICACEAE	Species <i>Lepiota castanea</i>	Season Throughout autumn
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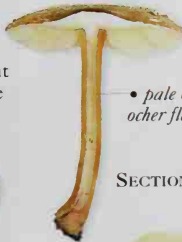
  

## DEADLY LEPIOTA COMPLEX

This small and dark species has dark brown scales on both the convex to flat cap and the stem. It also has a strong, fairly unpleasant smell. The stem ring is short lived. Microscopic features are important when identifying small *Lepiota* species; the genus has three different spore shapes: projectile, egg, or spindle. Those of *L. castanea* are projectile-shaped.


- **OCCURRENCE** On disturbed rich soil, often along woodland ditches and paths. Widespread, mostly in the south of northern temperate zones.
- **SIMILAR SPECIES** *L. fulvella* is paler orange-brown and bigger; *L. pseudohebeola* has a more prominent stem ring and a fainter smell. Because some are deadly and many are poisonous, no small *Lepiota* species should be eaten.






SECTION

pale or ochre flesh



free white gills are crowded



**FRUITING** Mostly a few fruitbodies together.

△ **LEPIOTA BRUNNEOINCARNATA**  
 The convex cap of this sturdy species has concentric, dark pink-brown scales on the surface. The pink-tinged stem has dark scales below the indistinct ring zone. ☠

Dimensions CAP ⬆ 2–4cm   STEM ⬆ 2–5cm ↔ 2–4mm	Spores White	Edibility ☠
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Family AGARICACEAE

Species *Leucocoprinus badhamii*

Season Late summer–late autumn

## EURO RED-STAINING LEPIOTA

Initially almost white, with a pattern of delicate, pale brown scales on the flattened cap, any part of this agaric turns saffron-red or deep blood-red when handled, finally becoming nearly black. It belongs to a group of rare, red-staining species that are considered to be toxic. Prominent on the velvety stem, the ring is fragile and turns upward. The edible, red-staining *L. americana* occurs in sawdust and plant debris.

• **OCCURRENCE** Found growing on calcareous or nutrient-rich soil, among leaf and garden litter, or on needle beds; particularly under yew trees but also under deciduous trees. Widespread in the warmer parts of Europe; not known in North America.



**FRUITING** Singly or in small groups on rich soil.

white to cream gills are crowded and free •



• flat cap



brown scales in concentric circles on cap surface

• prominent, upturned stem ring

surface of stem stained after handling •



• white flesh stains blood-red

SECTION

• club-shaped stem base



Dimensions CAP ⊕ 3–8cm | STEM ↓ 3–7cm ↔ 4–8mm

Spores White

Edibility ☠

Family AGARICACEAE

Species *Leucocoprinus luteus*

Season All year

## FLOWERPOT LEPIOTA

This species has distinctive yellow coloring. The surface of the bell-shaped cap has fine, golden yellow to orange-yellow or yellow-brown scales on a sulfur-yellow ground. The stem is a similar color with a short-lived ring and becomes club-shaped toward the base, which is up to 6mm wide. The gills are also yellow and are crowded and free. Inedible, possibly poisonous, it has thin yellow flesh. The fruitbodies are short lived, almost like those of the Inky Caps (*Coprinus*, pp.174–76); the genus name means White Inky Cap, a reference to the white spore deposit.

• **OCCURRENCE** In flowerpots and greenhouses in northern temperate zones, or in the wild in warm subtropical or tropical climates; widespread.

fine golden yellow scales on bell-shaped cap •

yellow stem ring is mostly short lived •

club-shaped stem base is yellow and powdery •



**FRUITING** Often found growing in tufts on soil that is rich in compost.



Dimensions CAP ⊕ 1–5cm | STEM ↓ 4–10cm ↔ 2–4mm

Spores White

Edibility ☠

## WITHOUT VEIL

**T**HIS SUBSECTION FEATURES one genus, *Pluteus*. It is the only genus to combine gills that are free of the stem with a complete lack of a universal veil. All the species in the genus produce pink spore deposits and have very crowded gills. The majority of species grow on decayed wood,

either in the form of fallen trunks or on beds of wood chips or sawdust.

The genus *Volkvariella* is a close relative of *Pluteus*, but *Volkvariella* species, such as *V. bombycina* (p.154), have a universal veil that covers the immature fruitbody; the veil splits to reveal a volva at the base.

Family PLUTEACEAE

Species *Pluteus cervinus*

Season Late spring–late autumn

## FAWN PLUTEUS

Typically, this highly variable species has a dark brown cap and a white stem, with dark fibers that are particularly pronounced at the club-shaped base. The cap may be convex to umbonate or flat; its surface is felted at the center and greasy when wet. It is edible but has an indistinct taste.

• **OCCURRENCE** On decaying deciduous trees in woods, parks, and gardens; it reaches its most impressive dimensions when growing on sawdust or wood chips. Widespread in northern temperate zones and extending south.

• **SIMILAR SPECIES** *Entoloma* species, many of which are poisonous, have a similar spore print color, attached gills, and occur on the ground or near very rotten wood.



• cap is usually dark brown

cap is greasy  
• when wet

gills free  
• of stem

• dark fibers on white stem



thick  
• white flesh

SECTION



gills are  
• crowded



• center of cap is felted

• soft, white to pinkish brown gills

• stem base to 3cm wide



**FRUITING** Singly or in small groups of fruitbodies.

Dimensions CAP ⬆ 4–10cm | STEM ⬆ 4–10cm ↔ 0.5–1.5cm

Spores Pale pink

Edibility ⓪

Family PLUTEACEAE

Species *Pluteus umbrosus*

Season Summer–autumn

## VELVETY PLUTEUS

Velvety, dark brown cap and stem surfaces and dark gill edges make this *Pluteus* species easy to identify.

Its cap is umbonate with a radiating vein pattern on the surface, while the pale stem is heavily dotted with brown scales. The flesh is white to pale brown and smells acidic.

• **OCCURRENCE** Often on large-diameter, naturally decaying deciduous trunks alongside other *Pluteus* species. Widespread in northern temperate zones; mostly uncommon.

• **SIMILAR SPECIES** *P. cervinus* (p.171) is darker, with no vein patterning on the cap. *P. atomarginatus* is similar but grows on conifer wood and has different microscopic characters.



• cap surface is velvety dark brown



SECTION

• white to pale brown flesh in stem

• gills are free of stem



**FRUITING** Appears singly or in small groups.

Dimensions CAP ⌀ 4–11cm | STEM ↓ 5–8cm ↔ 0.4–2cm

Spores Pale pink

Edibility

Family PLUTEACEAE	Species <i>Pluteus aurantiorugosus</i>	Season Summer–autumn
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## FLAME PLUTEUS

This species has a vivid, flame-red cap that varies from convex to nearly flat; the color makes it easy to distinguish from its relatives. The cap surface consists of round cells, making it very delicate, in contrast to the fiber-covered *Pluteus cervinus* (p.171). The pale, more or less yellow stem curves, allowing the fruitbody to fit inside the cracks and hollows of decaying wood. It has no distinctive smell or taste.

• **OCCURRENCE** On fallen trunks or logs, or on pollarded trees such as poplar, ash, and elm. Widespread but uncommon in northern temperate zones.

• **SIMILAR SPECIES** *P. admirabilis*, a North American species, is more golden.



FRUITING Singly or in small groups on decaying wood.



SECTION

- crowded, soft, pale pink gills

Dimensions CAP ⊕ 2–5cm   STEM ↓ 3–8cm ↔ 3–6mm	Spores Pale pink	Edibility
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Family PLUTEACEAE	Species <i>Pluteus chrysophaeus</i>	Season Summer–autumn
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## GOLDEN PLUTEUS

There are many forms of this conspicuous species, thought by some experts to be separate species. Although all have yellow caps and pale yellow stems, the color distribution and intensity vary. The cap is convex to umbonate with a smooth surface, the margins showing striations when wet. The stem is paler than the cap, and the off-white to yellow flesh is odorless and tasteless.

• **OCCURRENCE** On well-rotted deciduous stumps and fallen, moss-covered trunks. Widespread in Europe and eastern North America.

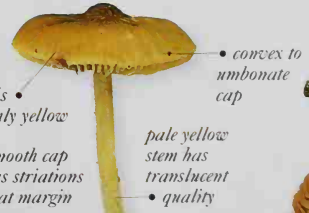
• **SIMILAR SPECIES** *P. xanthophaeus* has green tones, whereas *P. chrysophaeus* tends toward reddish. *P. romellii* has a darker cap and yellow coloring at the stem base.



FRUITING Singly or in small groups on rotten wood.



SECTION



- soft, crowded, pink-toned gills

Dimensions CAP ⊕ 1–6cm   STEM ↓ 3–8cm ↔ 3–8mm	Spores Pale pink	Edibility
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# INKY WITH AGE

**T**HIS SUBSECTION consists solely of a selection of members of the large genus *Coprinus*, the Inky Caps. Most species of *Coprinus* have gills that dissolve (deliquesce) from the margin inward into an inklike liquid, colored black by mature spores. Other spores are shot into the air, just before the

dissolving process reaches the point on the gills where the spores are produced. The gills are usually much more crowded than in most agarics.

*Coprinus* species are often tiny with thin flesh, and many grow on the dung of herbivorous animals such as deer, cows, horses, and rabbits.

Family COPRINACEAE	Species <i>Coprinus comatus</i>	Season Autumn
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## SHAGGY-MANE INKY CAP

The cap of this species is either an elongated egg shape or broadly conical. It is 5–20cm high and has a shaggy or scaly surface that is off-white to pink tinged, soon becoming black from the margin. The stem has a distinctive ring that stains black by falling spores. This species deliquesces quickly and is more fleshy than most members of the genus. The young fruitbodies are popular edibles because of their fleshy texture and mild, pleasant flavor. Specimens for eating should be collected early in the day and cooked soon after.

• **OCCURRENCE** In lawns and along roads and forest paths, on disturbed soil. Widespread and common in northern temperate zones.



scaly cap surface becomes  
• inky from margin

SECTION



extremely  
• crowded,  
free gills  
become inky

• midpoint  
stem ring,  
stained with  
spores

asparagus-like  
• stem is tall  
and hollow

cap is elongated  
egg-shaped or  
broadly conical •



stem base •  
widens  
slightly



**FRUITING** Appears in large troops of fruitbodies.

Dimensions CAP ↔ 2–6cm   STEM ↑ 10–35cm ↔ 1–2cm	Spores Black	Edibility
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Family COPRINACEAE	Species <i>Coprinus atramentarius</i>	Season Spring–autumn
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## ALCOHOL INKY CAP

The cap of this fleshy species is egg-shaped, expanding to become slightly umbonate with age. Gray to gray-brown, it deliquesces slowly from the margin. It causes palpitations and nausea if eaten with alcohol; avoid drinking alcohol for several days after eating this mushroom. A more red-brown, scaly form is sometimes called *Coprinus romagnesianus*.

• **OCCURRENCE** In woods, parks, and gardens, at soil level but always associated with decaying deciduous stumps or dying trees. Often found growing on the base of unhealthy city trees. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Coprinus insignis* has warty spores; *C. micaceus* is smaller and more fragile. It has a brownish cap with glistening granules (when young).



**FRUITING** In dense clusters of fruitbodies.



SECTION

Dimensions CAP ⊕ 3–7cm   STEM ↓ 5–12cm ↔ 0.8–1.5cm	Spores Black	Edibility ☠
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Family COPRINACEAE	Species <i>Coprinus picaceus</i>	Season Autumn
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## MAGPIE INKY CAP

This unmistakable mushroom has a black and white pattern on the cylindrical or bell-shaped cap, caused by the veil breaking up into scales as the cap expands. The cap is 5–10cm high; the stem is tall and white, with a fine fleecy covering. It has an unpleasant, fetid smell and is not recommended as an edible.

• **OCCURRENCE** In deciduous woods; occasionally occurs in great numbers where wood chips have been used as a mulch. Widespread in beech regions of Europe; reported in California.



SECTION

Dimensions CAP ⊕ 2–6cm   STEM ↓ 8–30cm ↔ 0.6–2cm	Spores Black	Edibility ☠
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Family COPRINACEAE	Species <i>Coprinus micaceus</i>	Season Late spring–early winter
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### MICA INKY CAP

Grainy veil remnants create a sheen on the surface of the egg-shaped to slightly expanded, pleated, tawny brown cap of this species, which has a splitting or lobed margin. The stem is white, thin, and fragile; the flesh is pale. The mycelium produces many fruitings in one season.

• **OCCURRENCE**

Abundant both in urban areas and in the heart of wood, on and around old stumps and unhealthy trees.

Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** Some close relatives produce a thick, orange-yellow mat (ozonium) on the substrate. One of these, *Coprinus domesticus*, is often found in damp cellars. Along with others, it is also found behind loose bathroom tiles and in other damp sites. *C. radicans* is another, like *C. domesticus*, that produces ozonium. *C. micaceus* is most common near the base of elm stumps.

pleated cap is shiny from grainy veil remains •

cap is 1–3.5cm high •

white to brown gills shrivel and become inky with age •



SECTION

off-white • stems are hollow and fragile

FRUITING In dense clusters of fruitbodies.

Dimensions CAP ⊕ 2–4cm   STEM ↓ 4–10cm ↔ 2–5mm	Spores Black	Edibility
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Family COPRINACEAE	Species <i>Coprinus niveus</i>	Season Summer–autumn
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### SNOW-WHITE INKY CAP

Best identified by its snow-white coloring and the loose, mealy remnants of the veil over its cap surface, this species is quite small, although not the tiniest of the *Coprinus*. The conical to bell-shaped cap has an upturned margin, the crowded gills are gray when young, black when mature, and the stem has a slightly swollen base. The incredible flesh is very thin and pale.

• **OCCURRENCE** Nearly always found on fairly fresh horse manure in wet grass. Widespread and common in Europe and North America.

• **SIMILAR SPECIES** *C. cortinatus* grows on soil. *C. cothurnatus* often has brown scales at the cap center. Tiny *C. friesii* is found growing on rotten grass. *C. stercoreus* has a slight, fetid smell.

fine mealy covering on cap • may wash off in rain

rolled back cap margin

cap is egg-shaped when young •

free gills • are black and inky when mature

mealy white • stem



FRUITING Appears in groups of a few fruitbodies.

Dimensions CAP ⊕ 1–3cm   STEM ↓ 5–8cm ↔ 1–3mm	Spores Black	Edibility
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## WITH GILLS JOINED TO A COLLAR

**T**HIS SUBSECTION FEATURES species from a group of agarics that have gills attached to a “wheel” (collarium), rather than being free or joining the

stem. The arrangement resembles the spokes of a bicycle wheel. Most species in the group are in the genus *Marasmius* and occur in the tropics.

Family TRICHOLOMATACEAE

Species *Marasmius rotula*

Season Midsummer–autumn

### PINWHEEL MARASMIUS

The gills of this species are attached to a little “wheel,” or collar, rather than the stem top. The convex ivory cap has a darker, navel-like center, deep, radial grooves, and thin, tough, off-white flesh. This mushroom can revive after being totally desiccated.

• **OCCURRENCE** On twigs and branches in deciduous and coniferous woods. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** Many other *Marasmius* species also have a “wheel”; most occur in tropical rainforests, but a few tiny species can also be found in temperate zones: brick-red *M. curreyi* grows in grass; pale brown *M. bolliardii* occurs in swarms on leaf litter in damp woods; pale *M. limosus* grows on reeds. *Marasmiellus ramealis* (p.139), found in similar sites, lacks the gill “wheel” and the cap grooves.



**FRUITING** Appears in troops of fruitbodies.

Dimensions CAP ⊕ 0.5–2cm | STEM ↓ 2–4cm ↔ 1mm

Spores Off-white

Edibility

Family COPRINACEAE

Species *Coprinus plicatilis*

Season Early summer–autumn

### UMBRELLA INKY CAP

When fully expanded, the cap of this small *Coprinus* species has a pleated surface, resembling a Japanese umbrella. The cap is smooth, without hairs or veil remnants. The gills are joined to a collar, are more distant, and become less inky than in most *Coprinus* species (pp.174–76).

• **OCCURRENCE** In lawns, appearing after rainfall.

Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *C. auricomus* tends to be a bit bigger and has a browner cap. A microscope reveals thick-walled brown hairs, confirming its identity. Other similar species include *C. kuehneri*, *C. leiocephalus*, and *C. nudiceps*.

They can be distinguished only by carefully measuring the spores.

rather distant gills are joined to a collar

very thin stem is delicate and smooth

conical to flat cap is smooth and pleated



**FRUITING** Singly or in small groups. Appears overnight and withers by noon.

Dimensions CAP ⊕ 0.8–2cm | STEM ↓ 4–8cm ↔ 1–2mm

Spores Black

Edibility

# CAP FUNGI WITH STEM OFF-CENTER OR ABSENT

Among the gilled fungi are some species with a stem that is not centrally placed under the cap. It may be attached to the side of the cap and, in some species, can be very small. Other gilled species lack a stem altogether. Most of these fungi are known as oyster mushrooms, but not all are related to each other.



Family POLYPORACEAE

Species *Pleurotus ostreatus*

Season Autumn–winter

## COMMON OYSTER MUSHROOM

smooth cap surface •

The cap of this species is more or less oyster-shaped; in Europe, the coloring ranges from cream to almost black; in North America, from cream to gray-brown. The white stem is positioned at the cap margin or may be absent. The white flesh has a pleasant taste, and its firm texture makes it a popular edible. The complex is now commercially cultivated. This species prefers cold weather and appears later in the season than some similar species (see below).

• **OCCURRENCE** On a wide range of dead or dying deciduous trees; more rarely on conifers. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Pleurotus*

*dryinus* has a veil on the stem when young. *P. pulmonarius* is cream to pale brown; it appears earlier in the season.

stem at cap margin or absent

crowded, decurrent, soft, cream gills



**FRUITING** In tiers and rows on deciduous trees.



### Δ *LENTINELLUS URSINUS*

Although edible, this species has a bitter taste. The cap is densely hairy and pale brown, and the gills have toothed edges. ☉

Dimensions CAP ↔ 6–20cm | STEM ↑ 0–5cm ↔ 1–2cm

Spores Pale gray-lilac

Edibility ☉

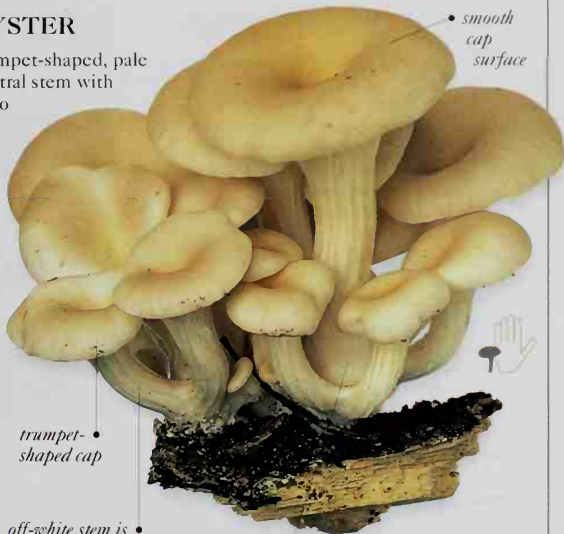
Family POLYPORACEAE	Species <i>Pleurotus cornucopiae</i>	Season Spring–autumn
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## EURO TRUMPET OYSTER

This species has a distinctive trumpet-shaped, pale leather-brown cap and a fairly central stem with decurrent gills that join together to form a net. The white flesh has a pleasant taste and smells floury.

• **OCCURRENCE** Forms a white rot on deciduous trees, often elm; it has increased where Dutch elm disease has left abundant substrate. Widespread but mainly in southern Europe; not reported in North America.

• **SIMILAR SPECIES** *Pleurotus citrinopileatus* occurs in east Asia and is yellow. *P. pulmonarius* has simple gills and less of a stem.



### Δ *PLEUROTUS ERYNGII*

This European choice edible occurs on umbellifer roots. The pale cap has a suedelike surface and an inrolled margin. The stem is off-center or absent. ☹️

trumpet-shaped cap

off-white stem is tinged with cap color

clustered • fruitbodies are typical



network of decurrent gills



**FRUITING** Appears in clustered groups or singly.

Dimensions CAP ⬆️ 4–12cm   STEM ⬆️ 1–5cm ↔ 0.5–2.5cm	Spores Pale lilac	Edibility ☹️
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Family AURISCALPIACEAE	Species <i>Lentinellus cochleatus</i>	Season Late summer–autumn
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## COCKLESHELL LENTINELLUS

This species has a more or less cockleshell-shaped, smooth, red-brown cap with an inrolled margin.

The stem is attached to one side.

The pale white-brown gills are decurrent and, like all *Lentinellus* species, have toothed edges. Some smell of anise; others are odorless.

• **OCCURRENCE** Rotting deciduous stumps. Widespread in northern temperate zones; locally common.

• **SIMILAR SPECIES** *Clitocybe* species have central stems; *Pleurotus* species have gills with smooth edges.



inrolled cap margin

smooth, red-brown cap surface

**FRUITING** Appears in layered clusters on rotting stumps of deciduous trees.

Dimensions CAP ⬆️ 2–6cm   STEM ⬆️ 2–5cm ↔ 0.8–1.5cm	Spores White	Edibility ☹️
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Family TRICHOLOMATACEAE	Species <i>Pleurocybella porrigens</i>	Season Autumn
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### ANGEL'S WINGS OYSTER

This small edible species is easily noticed from a distance because its light coloring contrasts strongly with the dark wood substrate. It has a clean, fan-shaped, stemless fruitbody with a distinct incurved margin and crowded gills. It is white, becoming tinted with yellow as it ages. The thin white flesh smells and tastes pleasant.

• **OCCURRENCE** On the decaying trunks and stumps of coniferous wood, such as spruce and fir. Widespread and locally common in northern temperate zones.

• **SIMILAR SPECIES** *Panellus mitis* is much smaller and grows on the twigs and branches of conifers.

fan-shaped cap has a smooth, dry surface

cap margin is distinctly incurved

gills are white and crowded

fruitbody is like an oyster mushroom

color of fruitbody is overall white



**FRUITING** Appears in large clusters on decaying conifers in open or dense woodlands.



Dimensions FRUITBODY ↓ 2–10cm ↔ 2–7cm	Spores White	Edibility
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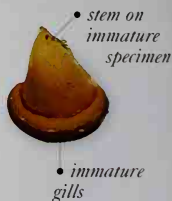
Family TRICHOLOMATACEAE	Species <i>Panellus serotinus</i>	Season Late autumn
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### FALL OYSTER MUSHROOM

Shaped like an oyster mushroom (*Pleurotus*, pp.178–79), the Fall Oyster Mushroom is easy to identify. It has olive and yellow coloring, a velvety cap surface, and a short, indistinct stem. Not worthwhile as an edible, it has more or less gelatinous white flesh, which tastes mild to slightly bitter and smells faintly mushroomy. Some mycologists prefer to classify *Panellus serotinus* in the genus *Sarcomyxa*.

• **OCCURRENCE** Often found fruiting near water on dead or living tree trunks and fallen branches, rarely on conifers. Widespread throughout northern temperate zones.

• **SIMILAR SPECIES** The stemless, ocher-gilled *Phyllotopsis nidulans* is similar to old or atypical specimens but has an ocher-pink spore deposit.



immature gills

short, ocher-yellow stem with dark, dotlike scales

gills are slightly decurrent



crowded cream gills



**FRUITING** In often dense rows of fruitbodies.

oyster-shaped, velvety cap



olive-yellow cap becomes dull brown with age

cap surface greasy in wet weather

Dimensions CAP ↔ 3–10cm   STEM ↓ 0.8–1.5cm ↔ 0.5–1cm	Spores White	Edibility
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Family TRICHOLOMATACEAE

Species *Panellus stypticus*

Season Autumn–winter

## LUMINESCENT PANELLUS

This inedible small, oyster-shaped, pale leather-brown species has tough fruitbodies that usually survive until spring. It has a mealy cap surface and a very short stem. The off-white to pale yellow flesh has an aromatic, fruity smell but tastes bitter and astringent. American specimens have luminescent gills, but European ones do not.

• **OCCURRENCE** In woods on stumps of deciduous trees such as beech and oak. Widespread in northern temperate zones; common in eastern North America.

• **SIMILAR SPECIES** *Panellus mitis* is whiter, smaller, and has a mild taste. It occurs very late in the season on conifers.



**FRUITING** Appears in crowded tiers and rows.



short stem at cap margin •

brown gills with paler edges •

well-spaced gills

pale leather-brown surface

oyster-shaped cap

cap surface cracks slightly with age

Dimensions CAP ⊕ 1–4cm

STEM ↓ 0.1–1cm ↔ 2–7mm

Spores Off-white

Edibility

Family SCHIZOPHYLLACEAE

Species *Schizophyllum commune*

Season All year

## SPLIT-GILL MUSHROOM

This fan-shaped mushroom belongs to a genus distinguished by gill-like structures that are split lengthwise, the two parts curling inward in dry conditions to protect the spore-bearing hymenium. Stemless, or with a short, stemlike base, it is covered with gray-white felt. The tough, pale flesh is reportedly eaten by certain tribal people and has been used as a chewing gum. Easily cultivated on artificial substrates, this species is popular for research in genetics and anatomy.

• **OCCURRENCE** On a wide range of woody substrates, also on straw bales, mostly in exposed sites: it is able to grow on sun-baked or wind-dried wood, often driftwood. Locally, it can have substrate preferences – beech in northern Europe, for example. Widespread and common in northern temperate zones; absent from northernmost areas.

pinkish beige “gills” radiate from attachment point



“gills” curl inward when dry

felted, gray-white cap surface

split or lobed cap margin

green tinge from algae growing on cap



**FRUITING** Fans appear in crowded tiers.

Dimensions FRUITBODY ⊕ 1–5cm

Spores White

Edibility

Family PAXILLACEAE

Species *Paxillus atrotomentosus*

Season Summer–autumn

## VELVET PAX

This fleshy, velvet-covered species has a dark brown cap with a depressed center and an inrolled margin. Its thick stem is usually attached to the side of the cap. The soft, cream to brown gills are crowded, and the pale flesh is bitter and odorless.

• **OCCURRENCE** Mycorrhizal; in woods and tree stands, on and around conifer stumps. Widespread and common in many northern temperate regions; common in eastern North America.

• **SIMILAR SPECIES** *P. panuoides* is thinner and paler, has no real stem, and occurs on conifer wood. It may belong to the genus *Tapinella*.



FRUITING Singly or a few together around stumps.

inrolled cap margin •

dark brown cap surface is finely velvety •

decurrent gills can be removed with a blade •

dark brown or black "velvet" on short stem •

cream, ocher, or buff flesh

SECTION

Dimensions CAP ⬆️ 10–25cm

STEM ⬆️ 5–10cm ↔ 2–5cm

Spores Yellowish brown

Edibility

Family PAXILLACEAE

Species *Paxillus corrugatus*

Season Summer–autumn

## CRINKLE-GILLED PAX

Distinctly furrowed and ridged gills are the most easily recognized features of this stemless, shelf-forming, yellowish brown to olive-orange species. It has an oyster-shaped cap and widely spaced, yellow to orange gills. Not mycorrhizal like *P. involutus* (p.35), this species may be closely related to the genus *Pseudomerullius*.

• **OCCURRENCE** Found growing on dead conifers and deciduous trees. Widespread and common in eastern North America; absent from Europe.

• **SIMILAR SPECIES** *Paxillus panuoides*, a species found in Europe, Asia, and Japan, is similar but with mostly even gills.

oyster-shaped, brownish yellow cap •

corrugated or wrinkled gills •

gills are yellow to orange •



FRUITING Large, shelved clusters on trees in woodland and parks.

Dimensions FRUITBODY ⬆️ 5–10cm

Spores Olive-buff

Edibility

Family CREPIDOTACEAE

Species *Crepidotus mollis*

Season Autumn

## SOFT CREP

The gelatinous surface and flesh of this species distinguishes it from the many, mostly smaller, *Crepidotus* species. The smooth, oyster- to fan-shaped cap changes color from gray-brown to off-white as it dries; when it is wet, radiating striations are clearly visible at the margin. The stem is very rudimentary or absent. The cap skin is easily peeled from the pale cap flesh, which may have a weak smell.

- **OCCURRENCE** On dead trunks of deciduous trees such as elm, ash, poplar, and beech. Widespread in northern temperate zones.
- **SIMILAR SPECIES** Closely related *C. calolepis* has pale brown scales toward the point where the cap is attached to its deciduous substrate.

*gills radiate out from attachment point*

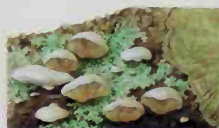


• *wet cap is gray-brown*

• *medium-spaced gills on oyster-shaped cap*



• *wet cap has clear margin striations*



**FRUITING** Singly or in tiers of fruitbodies.



• *pale gray-brown gills*



• *dry cap is off-white*

Dimensions CAP Ⓢ 2–7cm

Spores Tobacco-brown

Edibility

Family CREPIDOTACEAE

Species *Crepidotus variabilis*

Season Summer–early autumn

## VARIED CREP

This small, oyster-shaped, off-white species is one of several similar mushrooms, all with tobacco-brown spores, most easily distinguished by spore characteristics seen under a microscope: it has oblong-ellipsoid, minutely warty spores, 6.5 x 3µm. The cap surface is dry with some fine fibers. There is little or no stem; the cap is often attached to the substrate by its back, with the gills facing downward.

- **OCCURRENCE** On sticks, often among brush piles in damp woods. Widespread and common in northern temperate zones in western North America.
- **SIMILAR SPECIES** *Crepidotus cesatii* has more rounded spores; those of *C. inhoneustus* are smooth. *C. luteolus* has a yellow flush on the cap.

• *off-white cap*



• *gills radiate out from point where fungus is attached*

• *dry cap surface with some fine fibers*



• *pale gray-brown to cinnamon-brown gills*



**FRUITING** Singly or in tiers on rotten deciduous trunks.

• *oyster-shaped cap*

• *absent or rudimentary stem*

Dimensions CAP Ⓢ 0.5–3cm

Spores Tobacco-brown

Edibility

# CAP & STEM FUNGI WITH PORES

*This section consists of fungi that produce spores in crowded tubes. The spores are released through pores on the fruitbody underside. Some of these fungi look similar to agarics (see p.10). Boletes have soft flesh (see below). Polypores have tough flesh (see p.202). For bracketlike fungi with pores see p.211.*



## WITH SOFT FLESH

**T**HE MUSHROOMS in this subsection are known as boletes. They all have fairly short-lived fruitbodies, characterized by their soft, firm flesh, combined with pores on the underside of the cap. The fruitbodies of many

of the species that belong here are attractive as food to a wide range of animals, including humans.

All of the boletes form mutually beneficial (mycorrhizal) associations with trees (see p.18–19).

Family BOLETACEAE

Species *Porphyrellus porphyrosporus*

Season Summer–autumn

### BLUEING CHOCOLATE BOLETE

This dark bolete is well camouflaged in its litter-rich habitat. Its convex cap is sepia colored with a velvety-textured surface, which may crack into scales; the stem is the same color with a velvety to smooth surface. The adnate or notched tubes, 1–2cm long, have wine-buff pores that become blue-green or black when bruised or otherwise damaged. The pale-colored flesh smells and tastes unpleasant; on cutting, it turns blue, green, black, or sometimes red. It has been reported as poisonous.

• **OCCURRENCE** Mycorrhizal with deciduous trees, such as beech, and conifers. As a complex, widespread and common to locally absent in northern temperate zones.

pale flesh turns blue, green, or black

stem is velvety to smooth, and sepia colored

pores are wine-buff, bruising blue-green or black

cap surface may crack into scales

velvety surface on convex cap



**FRUITING** Appears singly or in troops of fruitbodies, often in deep litter in woodland areas.



Dimensions CAP 5–15cm

STEM 5–12cm 1–3cm

Spores Purple-brown

Edibility

Family BOLETACEAE	Species <i>Strobilomyces floccopus</i>	Season Summer–autumn
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## OLD MAN OF THE WOODS

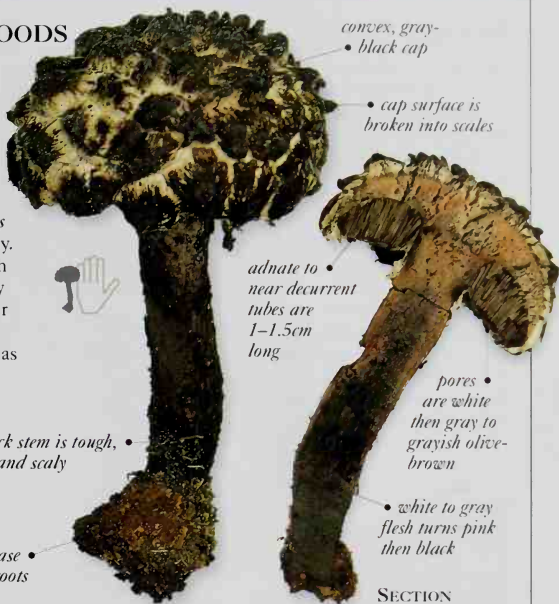
The convex cap of this unusual bolete has a scaly, gray-black and white surface resembling a pine cone. It has a tough, fibrous, scaly, gray-black stem and tough flesh that stains pink then black when cut. The pores are rounded to angular. Also known as *S. strobilaceus* and placed by some in its own family.

• **OCCURRENCE** Grows with both conifers and deciduous trees, mostly on fertile soil. Widespread but rather local in northern temperate zones.

• **SIMILAR SPECIES** *S. confusus* has erect scales on its cap.



**FRUITING** Often appears singly or in small groups.



Dimensions CAP ⊕ 5–10cm   STEM ↓ 8–16cm ↔ 1–2cm	Spores Purplish black	Edibility
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Family BOLETACEAE	Species <i>Chalciporus piperatus</i>	Season Summer–autumn
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## PEPPERY BOLETE

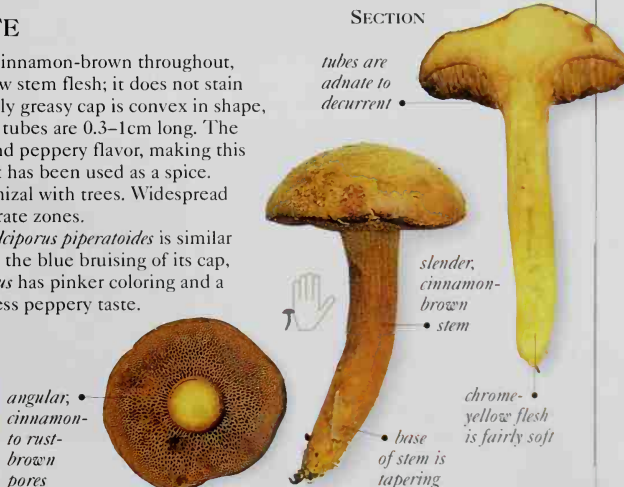
A very small bolete that is cinnamon-brown throughout, except for the chrome-yellow stem flesh; it does not stain blue on bruising. The slightly greasy cap is convex in shape, and the stem is slender; the tubes are 0.3–1cm long. The flesh has an intensely hot and peppery flavor, making this species inedible, although it has been used as a spice.

• **OCCURRENCE** Mycorrhizal with trees. Widespread throughout northern temperate zones.

• **SIMILAR SPECIES** *Chalciporus piperatoides* is similar but can be distinguished by the blue bruising of its cap, tubes, and pores. *C. amarellus* has pinker coloring and a less peppery taste.



**FRUITING** Mostly a few together or singly.



Dimensions CAP ⊕ 3–5cm   STEM ↓ 4–6cm ↔ 0.3–1cm	Spores Rusty brown	Edibility
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Family BOLETACEAE	Species <i>Tylophilus felleus</i>	Season Summer–autumn
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### BITTER BOLETE

Slightly to distinctly pink pores on the underside of the bun-shaped brown cap and a dark net on the thick stem are characteristic of this bolete. It has soft, white to cream flesh with an unpleasant smell and a taste that is too bitter to make it edible (see also SIMILAR SPECIES).

• OCCURRENCE

Mycorrhizal with conifers and deciduous trees on acidic soil. Widespread and common in eastern North America.

• SIMILAR SPECIES When young this is easily mistaken for the King Bolete, *Boletus edulis* (p.187) except that it is very bitter and has a dark stem net.



FRUITING Singly or in troops on well-drained, acidic soil.



stem is thick with a prominent coarse, dark net

immature pores are off-white

brown cap feels like suede



notched tube layer, 1–2.5cm long, has fine pores



pores mature to deep pink



Dimensions CAP ⬆ 6–15cm   STEM ⬆ 5–12cm ↔ 2.5–5cm	Spores Dingy pink	Edibility
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Family BOLETACEAE	Species <i>Boletus barrowssii</i>	Season Summer
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### BARROW'S BOLETE

This species has a convex to flat, white to gray or tan cap with pores that are white when young, aging to yellowish green. The tube layer, 2–3cm deep, is adnate to slightly depressed around the club-shaped stem, which is white with a distinctive off-white net pattern. The white flesh is thick and tastes sweet.

• OCCURRENCE

Mycorrhizal with both conifers and deciduous trees. Widespread and common in North America; not found in Europe.

• SIMILAR SPECIES *Boletus edulis* (p.187) and closely related boletes have the white net patterning but darker caps.

distinctive net pattern on upper stem



white pores age yellowish green

cap is dry and white to gray or tan

convex cap becomes flat with age



FRUITING Appears in large groups of fruitbodies, or scattered under conifers and deciduous trees.

Dimensions CAP ⬆ 7.5–25cm   STEM ⬆ 10–25cm ↔ 2–4cm	Spores Olive-brown	Edibility
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Family BOLETACEAE

Species *Boletus edulis*

Season Summer–autumn

## KING BOLETE

Widely known as cepc, porcini, steinpilz, and belygrib, this bolete has a white net pattern on the upper stem and pale yellow to olive-brown pores. It has a bun-shaped, pale or dark brown cap, and a barrel-shaped stem. Its white, nonstaining flesh is pleasant-smelling and tastes mild and nutty.

• **OCCURRENCE** Mycorrhizal with trees in moss-rich woods. As a complex, widespread in northern temperate zones.

• **SIMILAR SPECIES** *Boletus variipes* has a dry, tan cap and grows with oak; *Tylopilus felleus* (p.186) is similar when young but tastes bitter.



smooth, slightly greasy  
• rap surface

• bun-shaped brown cap

• skin slightly overhanging rap margin

• white net of veins on upper stem

fine, round, white to yellow pores



notched  
• tubes

• tubes, 1–4cm long, mature olive-brown and are easily loosened

• white flesh may have maggot holes or yellow staining from the parasite *Sepedonium chrysospermum* (inset, right)



SECTION



**FRUITING** Singly or in troops on well-drained soil.



△ **BOLETUS PINOPHILUS**  
This rich brown species is found under pine. It has a pale stem net. The cap surface is slightly sticky; it dries felty or granular, often with distinct wrinkles. ☉



△ **SEPEDONIUM CHRYSOSPERMUM**  
A parasite of boletes, this species appears first as a white mold, becoming powdery golden yellow due to the asexual spores. ☹

Dimensions CAP ⊕ 10–25cm | STEM ↓ 10–20cm ↔ 3–10cm

Spores Olive-brown

Edibility ☉

Family BOLETACEAE	Species <i>Boletus appendiculatus</i>	Season Summer–autumn
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### SPINDLE-STEMMED BOLETE

The tubes of this species are vivid lemon-yellow, aging to brownish yellow and staining blue; the stem net pattern is similar in color. The tapering stem is often rooting. A choice edible, it has firm, pale yellow to rusty flesh, which stains slightly blue, and a faint, pleasant smell.

• **OCCURRENCE** Mycorrhizal with oak trees in woods. Widespread in southern Europe; reported in California.

• **SIMILAR SPECIES**

The cap of *Boletus radicans* is paler with a stouter stem.

*firm flesh is pale yellow and stains slightly blue*

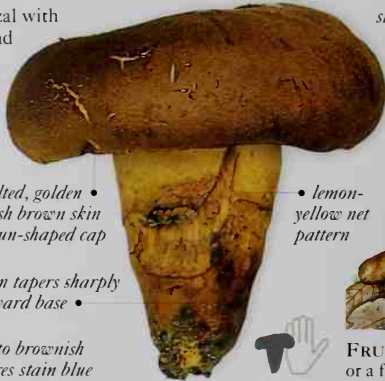
*notched tubes are 1–2.5cm long with fine, rounded pores*

*stem apex can be wide*

SECTION



FRUITING Appears singly or a few together.



*fine felted, golden reddish brown skin on bun-shaped cap*

*stem tapers sharply toward base*

*lemon- to brownish yellow pores stain blue*

*lemon-yellow net pattern*



Dimensions CAP ↔ 8–20cm   STEM ↑↓ 7–15cm ↔ 2.5–6cm	Spores Olive-brown	Edibility
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Family BOLETACEAE	Species <i>Boletus badius</i>	Season Late autumn
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### BAY BOLETE

The bun-shaped cap of this species is smooth, rather greasy, and dark chestnut-brown with white to yellow-olive pores, which stain blue. The cylindrical stem is brown without a net pattern. It is easiest to find in late autumn when other boletes are less common. Staining on the white flesh disappears with cooking.

• **OCCURRENCE** Mycorrhizal with pine; also found with deciduous trees. As a complex, widespread and common in eastern North America.

• **SIMILAR SPECIES** *Boletus edulis* (p.187) has a barrel-shaped stem with net patterning.

*sinuate tubes, 0.6–1.5cm long*

*fine, rounded pores are white to yellow-olive, as are tubes*

*bun-shaped, dark chestnut-brown cap*

SECTION



FRUITING Singly or in scattered groups in woods.



*smooth, rather greasy cap*

*brown stem is paler than cap and finely streaked*

*blue staining appears on bruised pores*



Dimensions CAP ↔ 4–15cm   STEM ↑↓ 4–12cm ↔ 1–4cm	Spores Olive-brown	Edibility
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Family BOLETACEAE

Species *Boletus reticulatus*

Season Summer–autumn

## SUMMER BOLETE

The bun-shaped cap of this species has a dry, matte skin that tends to crack; it is warm orange-brown. A white to brown net pattern covers the barrel-shaped, pale brown stem. It has firm, nutty-flavored white flesh, which does not stain when cut.

• **OCCURRENCE** Mycorrhizal with deciduous trees like beech and oak; with *Boletus luridiformis* (below) in some areas. Widespread in northern temperate zones; absent in North America.

• **SIMILAR SPECIES** *B. edulis* (p.187) has a darker cap and a less extensive, paler stem net.



### △ BOLETUS AEREUS

A late-fruiting, brown species, reported in California, this has a velvety cap and a pale stem net. The flesh stays white. ☉

• fine cracks may cover surface of dry, matte cap

• white to brown net over surface of pale brown stem



• sinuate, notched tubes, 1–1.5cm long

• tubes are white then green-yellow to olive-brown

• cap skin tends to overhang at margin



SECTION



FRUITING In troops or a few together in woodland.

Dimensions CAP ⊕ 7–15cm | STEM ↓ 6–15cm ↔ 2–5cm

Spores Olive-brown

Edibility ☉

Family BOLETACEAE

Species *Boletus luridiformis*

Season Summer–autumn

## DOTTED-STEM BOLETE

Belonging to the group of boletes whose flesh turns blue when cut, this choice edible has a bun-shaped, dark brown cap with deep blood-red pores and yellow tubes. The yellow stem is densely covered with red dots and has no net pattern.

• **OCCURRENCE** Mycorrhizal with trees, in well-drained, mostly acidic and moss-rich, woodland soil. Widespread and common in Europe; not reported from North America.

• **SIMILAR SPECIES** *Boletus erythropus* and *B. subvelutipes* are two nearly indistinguishable species reported from North America. *B. luridus* (p.190) has a stem net.

• notched yellow tubes, 1–3cm long, stain blue-black

• cap is velvety to smooth

• dark rich brown cap

• yellow flesh stains blue-black

• club-shaped stem



• blood-red pores



SECTION



FRUITING Singly or a few fruitbodies together.

Dimensions CAP ⊕ 5–20cm | STEM ↓ 5–15cm ↔ 2–6cm

Spores Brown to olive-brown

Edibility ☉

Family BOLETACEAE

Species *Boletus calopus*

Season Summer–autumn

## SCARLET-STEMMED BOLETE

The skin on the bun-shaped cap of this bolete overhangs the margin and is felted, somewhat veined, and smoky gray or gray-brown. The cylindrical, barrel-shaped, or tapered stem is red at the base, yellow toward the top. It has a pale yellow net pattern, which is pale yellow above, darker and redder toward the base. The inedible, and possibly slightly poisonous flesh tastes bitter and is pale yellow, staining pale blue.

- **OCCURRENCE** Mycorrhizal with trees on acidic, sandy soil. Widespread but mostly local in northern temperate zones; not reported from North America.
- **SIMILAR SPECIES** Two similar bitter boletes, which can be found under conifers in western North America, both with blue-staining yellow pores, are *B. frustosus* and *B. confervarum*.



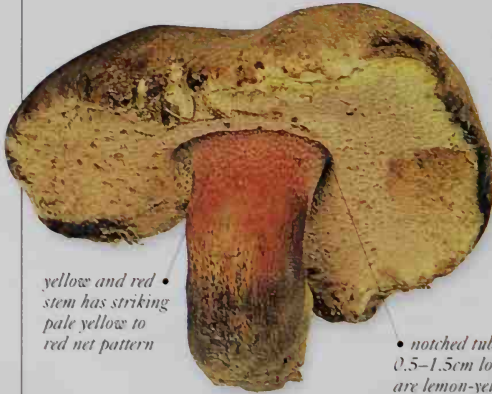
felted, somewhat veined cap skin

smoky gray or gray-brown cap sometimes olive flushed

cylindrical, tapering, to barrel-shaped stem



cap skin overhangs at cap margin



yellow and red stem has striking pale yellow to red net pattern

notched tubes, 0.5–1.5cm long, are lemon-yellow



lemon-yellow pores stain pale blue



### △ BOLETUS LURIDUS

This species has a prominent, orange-red stem net and lemon-yellow flesh that turns blue-black, as do the orange pores. There is a red line above the tube layer. ☒



### △ BOLETUS BICOLOR

A common summer species in eastern North America, this bolete has a bright rose-red cap and stem, and yellow pores. Its thick yellow flesh slowly bruises to blue. ☒



**FRUITING** Appears singly or in troops under trees.

Dimensions CAP ⌀ 6–14cm | STEM ↑ 6–10cm ↔ 3–5cm

Spores Olive-brown

Edibility ☒

Family BOLETACEAE

Species *Boletus satanas*

Season Summer–early autumn

## SATAN'S BOLETE

A fleshy species with a bun-shaped, smooth, pale, almost white cap. Satan's Bolete is best identified by its orange to blood-red pores and the prominent yellow to blood-red net pattern on its fat, yellow to red stem. The yellow to white flesh stains slightly blue, as do the pores. The notched tubes, 1–3cm long, are yellowish green. Mature fruitbodies smell unpleasant and taste mild but are poisonous, causing gastrointestinal problems.

• **OCCURRENCE** Mycorrhizal with deciduous trees. Widespread in southern Europe; reported in California.



yellow to red stem  
with net pattern

smooth cap is pale,  
almost white



**FRUITING** Singly, a few together, or in troops with trees such as beech and oak.

Dimensions CAP ⊕ 10–25cm | STEM ↓ 5–15cm ↔ 4–12cm

Spores Olive-brown

Edibility ☠

Family BOLETACEAE

Species *Boletus pulcherrimus*

Season Late summer–autumn

## PRETTY POISON BOLETE

This brightly colored species is easily recognizable by its blood-red pores that turn blue-black when they are bruised; its bun-shaped, felted, reddish to olive-brown cap; its firm yellow flesh, which turns blue on cutting; and its swollen, but not abruptly bulbous, reddish brown stem that has a dark red net pattern covering the upper part. The notched tubes are 0.5–1.5cm long and yellow-green.

• **OCCURRENCE** Mycorrhizal with tanbark oak, Douglas fir, and giant fir in mixed forests and woodland. Widespread on the west coast of North America and New Mexico. Not found in Europe.



stem is swollen and  
reddish brown

bun-shaped cap  
with felt covering



**FRUITING** Appears singly or in troops in forests that consist of a mixture of trees.

Dimensions CAP ⊕ 7.5–25cm | STEM ↓ 7.5–15cm ↔ to 10cm

Spores Brown

Edibility ☠

Family BOLETACEAE

Species *Boletus legaliae*

Season Summer–early autumn

## LE GAL'S BOLETE

This species belongs to a group of red-colored, net-stemmed boletes. It has a smooth, pink-orange cap and a similarly colored stem with red netting at the top. The pores are red, and the notched tubes are 1–2cm long. The off-white to pale yellow flesh bruises light blue; the stem base stains pale pink.

It has a mild taste and smell but is poisonous.

• **OCCURRENCE** Mycorrhizal with deciduous trees, preferring calcareous soil. Widespread throughout much of southern Europe; not reported in North America.

• **SIMILAR SPECIES** The cap of *Boletus rhodoxanthus* is purple-orange.



pink-orange stem is  
swollen, with a net

smooth, bun-shaped  
cap is pink-orange



**FRUITING** Appears singly or a few fruitbodies together on alkaline soil.

Dimensions CAP ⊕ 5–15cm | STEM ↓ 8–16cm ↔ 2.5–5cm

Spores Olive-brown

Edibility ☠

Family BOLETACEAE	Species <i>Boletus pukerulentus</i>	Season Summer–autumn
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### MIDNIGHT BLUE BOLETE

When bruised, all parts of this distinctive bolete almost immediately turn dark blue. It has a convex, brown to red-brown cap with pointed, dull yellow pores on the underside. The red-dotted, yellow stem is comparatively thin. The slightly notched to slightly decurrent tubes are 0.5–1.5cm long and pale yellow to olive-yellow; the firm flesh is yellow. It has a mild taste but does not rate as a choice edible.

• **OCCURRENCE** Mycorrhizal with deciduous trees, often oak, on fertile soil. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Boletus luridiformis* (p.189) has a similar, but typically thicker, stem and has red pores. Its flesh turns blue when cut.

cap is brown to red-brown and convex  
pale yellow pores stain black  
yellow stem has red surface dotting



**FRUITING** Appears singly or a few fruitbodies together; rarely, it may occur in troops.

Dimensions CAP ↔ 4–10cm   STEM ↓ 4–10cm ↔ 1–3cm	Spores Olive-brown	Edibility 10
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Family BOLETACEAE	Species <i>Boletus chrysenteron</i>	Season Summer–autumn
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### RED-CRACKING BOLETE

One of the smaller, less fleshy boletes, this species has a convex, red-brown cap, with skin that tends to crack, revealing a red layer. The thin, cylindrical, yellow to red stem is streaked but lacks distinct patterning. The angular, yellow to olive pores bruise faintly blue; the pale flesh hardly blues at all. It is edible but bland.

• **OCCURRENCE** Mycorrhizal with deciduous trees, often beech, on well-drained, humus-rich soil formed under acidic conditions. Widespread and common in parts of northern temperate zones; under conifers in California.

• **SIMILAR SPECIES** *B. truncatus* has an abruptly tapering stem and truncated spores.

cap surface cracked, showing red underlayer

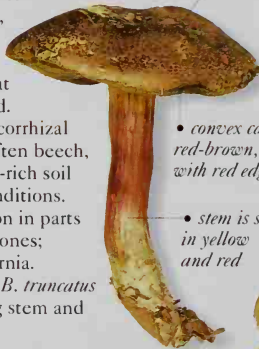


**Δ BOLETUS POROSPORUS**

This bolete has a white-cracked brown cap and lemon-yellow flesh, pores, and tubes that stain blue. It is best identified by its truncated, spindle-shaped spores, 13 x 5 μm 10

convex cap is red-brown, often with red edge

stem is streaked in yellow and red



slightly notched to decurrent tubes, to 1cm long



yellow to olive pores stain slightly blue

pale yellow young pores

SECTION



**FRUITING** Often in large troops but also singly.

Dimensions CAP ↔ 3–10cm   STEM ↓ 3–10cm ↔ 0.5–2cm	Spores Olive-brown	Edibility 10
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Family BOLETACEAE	Species <i>Boletus rubellus</i>	Season Summer–autumn
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## RED-CAPPED BOLETE

A small species with a deep red cap and stem. The cap is convex; the stem may have a thickened, pointed base. The yellow-olive pores stain blue when bruised; the yellow tubes are 0.5–1cm long. It has slowly blue-staining, pale yellow flesh.

It is often placed in the genus *Xerocomus* with similar colored species as *Boletus chrysenteron* (p.192).

• **OCCURRENCE** Mycorrhizal with deciduous trees in grass, open woods, and parks. Widespread but local in northern temperate zones.

• **SIMILAR SPECIES** Although eaten in Europe, it is not a safe edible in North America.



- yellow tubes are notched to decurrent
- smooth, convex cap is dark red, becoming browner with age
- angular, yellow-olive pores stain blue
- stem is paler red than cap
- stem base may be thickened and pointed



SECTION

- pale yellow flesh



FRUITING Mostly in troops of fruitbodies.

Dimensions CAP ⊕ 3–6cm   STEM ↓ 3–8cm ↔ 0.5–1cm	Spores Olive-brown	Edibility ☹
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Family BOLETACEAE	Species <i>Boletus subtomentosus</i>	Season Summer–autumn
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## YELLOW-CRACKING BOLETE

Despite its common name, the surface of the golden brown cap of this species rarely cracks or does so only with age. The stem is also golden brown, and the angular pores and the tubes, 0.5–1.5cm long, are yellow. The pores stain slightly blue when they are bruised. Although edible, the soft, pale yellow flesh tastes bland.

• **OCCURRENCE** Mycorrhizal with both deciduous trees and conifers. Widespread and fairly common in northern temperate zones, extending into subarctic and alpine regions.

• **SIMILAR SPECIES** *B. chrysenteron* has a reddish brown cap that cracks to reveal a red underlayer. *B. pruinatus* is smaller.



- felty surface of bun-shaped cap
- golden brown to olive-brown cap
- yellow tube layer is notched
- pale yellow flesh stains slightly blue
- golden brown or pale yellow stem
- faint streaks on pointed stem

SECTION

large, yellow to olive pores bruise slightly blue



FRUITING Singly or a few fruitbodies together.


Dimensions CAP ⊕ 6–10cm   STEM ↓ 6–10cm ↔ 1–2.5cm	Spores Olive-brown	Edibility ☹
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Family BOLETACEAE	Species <i>Boletus parasiticus</i>	Season Summer–autumn
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**EARTH-BALL BOLETE**

An unusual habitat helps to distinguish this small bolete (see OCCURRENCE). Fairly uniformly ocher-brown all over, with no blue-staining reaction, it has a convex cap and a thin stem. The yellow to ocher tubes are 3–7mm long and decurrent. The flesh is pale yellow. Its is not recommended as an edible because its host is toxic.


•**OCCURRENCE** Mycorrhizal with deciduous trees, it grows on the fruitbodies of the fungus *Scleroderma citrinum* (p.256), to which it does little or no damage. Widespread in Europe and reported in eastern North America.




convex, ocher-brown cap

coarse pores are lemon-yellow to rust-brown

grows on the fruitbodies of *Scleroderma citrinum*



surface of cap is slightly velvety and a little greasy



**FRUITING** In clusters on *Scleroderma citrinum*.

Dimensions CAP ⊕ 2–7cm   STEM ↓ 3–6cm ↔ 0.8–1.5cm	Spores Olive-brown	Edibility
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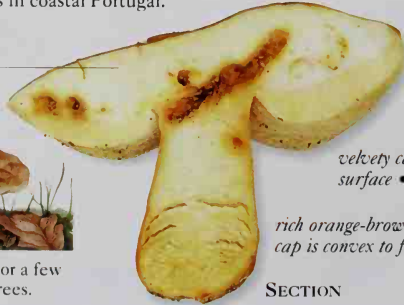
Family BOLETACEAE	Species <i>Gyroporus castaneus</i>	Season Summer–autumn
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**CHESTNUT BOLETE**

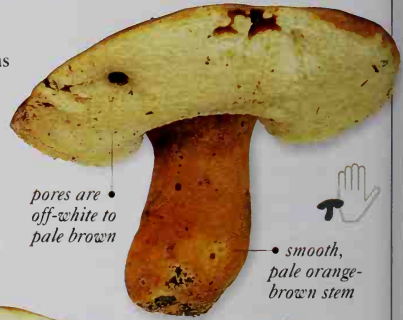
As with all *Gyroporus* species, the Chestnut Bolete has pale spores; a fragile, chambered stem; and off-white to pale brown tubes, 3–6mm long, which are almost free. The convex to flat cap and smooth stem are a distinctive rich orange-brown. Its flesh, which does not stain when cut, tastes pleasantly nutty.

•**OCCURRENCE** Mycorrhizal with deciduous trees, especially oak, but also with pine. Often found on sandy soil. Widespread and locally quite common in northern temperate zones.

•**SIMILAR SPECIES** There is an apparently poisonous species in coastal Portugal.




brittle, off-white flesh does not stain




pores are off-white to pale brown

smooth, pale orange-brown stem



rich orange-brown cap is convex to flat

velvety cap surface



**FRUITING** Singly or a few under deciduous trees.

**SECTION**

Dimensions CAP ⊕ 3–8cm   STEM ↓ 4–7cm ↔ 1–3cm	Spores Pale yellow	Edibility
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Family BOLETACEAE

Species *Gyroporus cyanescens*

Season Summer–autumn

## BLUEING CHAMBERED BOLETE

The most distinctive feature of this species is revealed when it is cut or its tube layer is scratched – the off-white flesh and tubes turn greenish blue to indigo; other blue-staining boletes (mainly *Boletus* species) typically turn darker blue or even blue-black. Otherwise, it has the characteristic fragile flesh, almost free tubes, 5–10mm long, and chambered stem of the genus. It has small, rounded pores and a bulbous stem base that tapers abruptly to a point. A choice edible, it has a pleasantly nutty flavor.

### • OCCURRENCE

Mycorrhizal with conifers and deciduous trees in woods. Widespread and locally common but rare in most northern temperate zones.



FRUITING Singly or a few together on sandy soil.



abrupt point on bulbous stem •

• convex or flat cap has finely felted, matte surface

• stem is pale yellow-ocher



white to straw-yellow pores turn blue if scratched

SECTION



• blue-staining, off-white flesh and tubes



Dimensions CAP ↔ 5–8cm | STEM ↓ 6–10cm ↔ 2–3cm

Spores Pale yellow

Edibility |◎|

Family BOLETACEAE

Species *Leccinum crocipoedium*

Season Summer–autumn

## YELLOW-PORED SCABER-STALK

The yellow coloring of this fungus is unusual among species in the *Leccinum* genus, as is the cracking cap skin. The pores are ocher-yellow, staining lilac-brown, and the stem is yellow with ocher-yellow spotting, becoming net-like and brown toward the base; the bun-shaped cap is yellow-brown with a slightly velvety surface. The pale yellow flesh stains wine-red to violet-black. All species of *Leccinum* should be cooked thoroughly before eating.

### • OCCURRENCE

Mycorrhizal with oak trees in warmer parts of eastern North America.



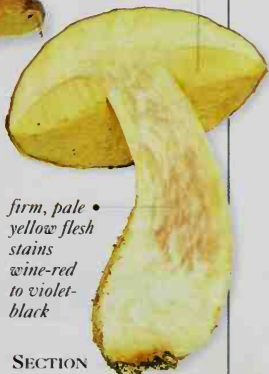
FRUITING Singly or a few together; prefers fertile soil.

club-shaped stem •



yellow-brown cap, sometimes with scales

notched, lemon-yellow tubes, 1.5–2.5cm long •



firm, pale yellow flesh stains wine-red to violet-black

SECTION

Dimensions CAP ↔ 4–10cm | STEM ↓ 5–12cm ↔ 1–3cm

Spores Olive-ocher

Edibility |◎|

Family BOLETACEAE

Species *Leccinum scabrum*

Season Summer–autumn

## BROWN SCABER-STALK BOLETE

A brown cap with gray-white pores and a white to gray stem covered with gray-black scales are key identification marks of this species, which is treated in a broad sense here: distinguishing between it and its near relatives is difficult, and *Leccinum scabrum* is often used as a collective name for all brown-capped *Leccinum* species (see also *L. varicolor*, inset). The flesh is soft in the bun-shaped cap, fibrous in the club-shaped stem; unlike that of some relatives, it hardly stains. Although edible, it is not choice and, once gathered, does not keep well.

• **OCCURRENCE** Mycorrhizal with birch, often on damp ground. Widespread in eastern North America.

bun-shaped cap  
• is brown

slightly  
• overhanging  
skin on cap

sturdy,  
club-  
shaped  
stem •

gray to  
black scales  
cover stem

soft, gray-  
white to  
buff tubes,  
1.5–2.5cm  
long, are  
notched

firm, fibrous  
• flesh in stem

SECTION

color of flesh  
hardly changes at  
all when cut

FRUITING Singly, a few together, or in troops.

△ *LECCINUM VARICOLOR*

This species has a mottled, sooty brown cap with white or cream pores. The base of the gray-scaled, white stem usually has a pale blue stain. The white stem flesh stains pink and turquoise; the cap flesh is pink with gray-white tubes. ☉

Dimensions CAP ↔ 6–15cm | STEM ↓ 10–20cm ↔ 1–3cm

Spores Ocher-brown

Edibility ☉

Family BOLETACEAE

Species *Leccinum versipelle*

Season Summer–autumn

## ORANGE SCABER-STALK BOLETE

A very handsome mushroom, this species, also known as *L. testaceoscabrum*, has a bun-shaped, orange cap contrasting with its tall, black-scaled, white stem; the cap skin overhangs the cap margin and has a finely felted surface. The pores vary from pale gray to ocher-gray, while the notched tubes, 1–3cm long, are dirty white. Staining gray-black, the firm, off-white flesh is reasonably tasty but lacks the quality of some of the *Boletus* species.

• **OCCURRENCE** Mycorrhizal with birch in damp woods. Widespread and common in northern temperate zones; north-eastern North America.

tubes are notched and dirty white to buff

gray-black staining on off-white flesh

bun-shaped mature cap

SECTION

pores may be pale gray to ocher-gray



cap skin overhangs cap margin

black scales cover tall stem

very dark stem of immature specimen

bright orange cap surface is finely felted



**FRUITING** Singly or a few fruitbodies together.

Dimensions CAP  $\leftrightarrow$  8–15cm | STEM  $\updownarrow$  10–18cm  $\leftrightarrow$  1.5–4cm

Spores Ocher-brown

Edibility

Family BOLETACEAE	Species <i>Leccinum quercinum</i>	Season Summer–autumn
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## EURO SCABER-STALK

This bolete belongs to a group of red-capped *Leccinum* species and is distinguished in the group by its mycorrhizal partner and by the reddish brown scales on the stem. Its bun-shaped cap is orange-brown, the pores are off-white to gray or olive-yellow, and its firm white flesh stains almost black. It makes a good edible.

**• OCCURRENCE**

Mycorrhizal with oak trees in forests. Widespread and common in some regions of northern temperate zones.

**• SIMILAR SPECIES**

*L. aurantiacum* has a more orange cap and is associated with aspen and poplar trees. *L. insigne* is common under aspens in the Rockies and has flesh that stains lilac-gray.



pale gray tubes, 2–3cm long, are notched

**SECTION**

cap is bun-shaped

cap skin is dark chestnut-brown and overhangs margin

almost black stains on firm white flesh

reddish brown scales cover stem surface

almost cylindrical stem widens at base



**FRUITING** Typically a few fruitbodies together.

Dimensions CAP ↔ 8–15cm   STEM ↓ 10–15cm ↔ 1.5–3cm	Spores Ocher-brown	Edibility
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Family BOLETACEAE	Species <i>Suillus luteus</i>	Season Late summer–autumn
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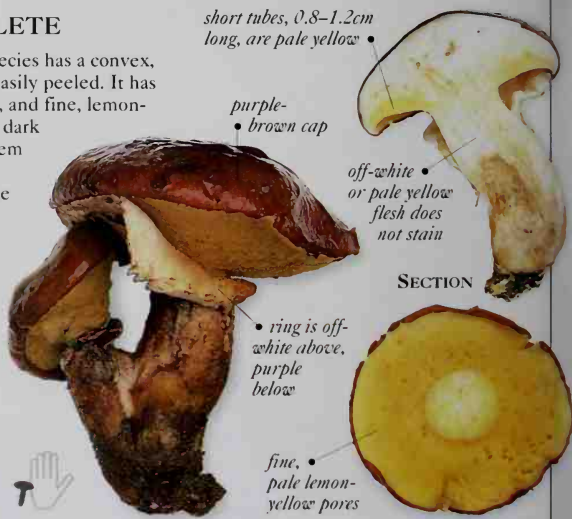
## SLIPPERY JACK BOLETE

Short-stemmed and slimy, this species has a convex, purple-brown cap, whose skin is easily peeled. It has adnate to slightly decurrent tubes, and fine, lemon-yellow pores. The stem ring has a dark purple underside. Below it, the stem is white, aging purple; above, it is pale yellow with darker dots. Some people are allergic to this species.

**• OCCURRENCE** Mycorrhizal with pine trees. Widespread and common in eastern North America under two- and three-needled pine.



**FRUITING** Typically in troops under two-needled pine trees.



short tubes, 0.8–1.2cm long, are pale yellow

purple-brown cap

off-white or pale yellow flesh does not stain

**SECTION**

ring is off-white above, purple below

fine, pale lemon-yellow pores

Dimensions CAP ↔ 5–10cm   STEM ↓ 5–10cm ↔ 1.5–3cm	Spores Ocher-brown	Edibility
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Family BOLETACEAE

Species *Suillus grevillei*

Season Autumn

# LARCH BOLETE

This vividly colored bolete has a convex, bright yellow to yellowish orange cap, which is very slimy, and lemon-yellow pores that bruise cinnamon-brown. The white and yellow ring near the top of the yellow-brown stem is also slimy. It is edible, without a distinctive flavor, and, when young, has firm yellow flesh that does not stain; the slimy cap skin is best peeled off when gathering for eating.

**• OCCURRENCE**

Mycorrhizal with larch trees in woods, stands, and gardens; may be found some distance from the host tree. Widespread and common in northern temperate zones.



• short tubes, 1cm long, are notched to slightly decurrent

• yellow flesh is fairly firm

SECTION

• convex, bright yellow to yellowish orange cap

• white and yellow ring near stem apex is slimy and prominent

• cap surface is slimy

• fine, lemon-yellow pores



• immature specimen at button stage



**FRUITING** In troops near larch in grass and litter.



**Δ SUILLUS AERUGINASCENS**  
This dingy olive-brown species, found with larch, has a slimy cap with a white veil. Its off-white to gray-brown pores turn olive-green when bruised. ☉



**Δ SUILLUS FLORANS**  
Exuding milky droplets from its pores and stem glands, this red-flecked, yellow-brown-capped species grows with *Pinus cembra* and other 5-needled pines. ☉

Dimensions CAP ↔ 5-10cm | STEM ↓ 4-10cm ↔ 1-2cm

Spores Yellowish brown

Edibility ☉

Family BOLETACEAE	Species <i>Suillus bovinus</i>	Season Late summer–autumn
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### EURO COW BOLETE

This usually small, orange-rusty brown bolete, with its convex to flat cap and short, ringless stem, is notable for its compound pores: the olive-green pore layer has an outer layer of coarse, angular pores and an inner layer of fine pores. The stem is often barely visible until the fruitbody is picked. The Euro Cow Bolete is edible, with soft, pink-flushed to brownish cream flesh, but it lacks flavor.

• **OCCURRENCE** Mycorrhizal with two-needled pine trees. Often found with *Suillus variegatus* (p.201) and *Gomphidius roseus* (p.38). Widespread and common in Europe and parts of Asia including Japan; absent in North America.



PORE SURFACE



• cap greasy when wet

• adnate-decurrent tubes are 0.3–1cm long and yellow to olive-yellow

• orange-rusty brown cap

• compound pores are more or less olive-green

FRUITING In troops, often with moss or on sandy soil.

Dimensions CAP ↔ 3–7cm   STEM ↓ 3–6cm ↔ 0.5–1cm	Spores Brownish olive	Edibility (O)
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Family BOLETACEAE	Species <i>Suillus granulatus</i>	Season Late summer–autumn
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### DOTTED-STALK BOLETE

This species has a ringless stem with distinctive yellow dots and a pointed base. The cap is rusty brown to yellow-orange. In young fruitbodies, the fine, rounded pores exude milky droplets, as do the stem glands. The white to pale yellow flesh is firm with a mild, nutty flavor.

• **OCCURRENCE** Mycorrhizal with two-needled pine, on alkaline soil. Widespread in northern temperate zones.

• **SIMILAR SPECIES** A similar form occurs under 5-needled white pine and may be a different species. *S. placidus* and *S. americanus* occur under eastern white pine; *S. sibiricus* under western white pine.

• adnate, pale yellow or pale brown tubes, 0.3–1cm long

• cap surface becomes greasy and slimy in wet weather

• pale yellow stem with yellow to red glands

• fine, rounded yellow pores

• dry, shiny cap is convex to flat

SECTION



FRUITING In troops or a few together near pines.

Dimensions CAP ↔ 4–10cm   STEM ↓ 4–8cm ↔ 1–1.5cm	Spores Pale brown	Edibility (O)
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Family BOLETACEAE

Species *Suillus variegatus*

Season Summer–autumn

## VARIEGATED BOLETE

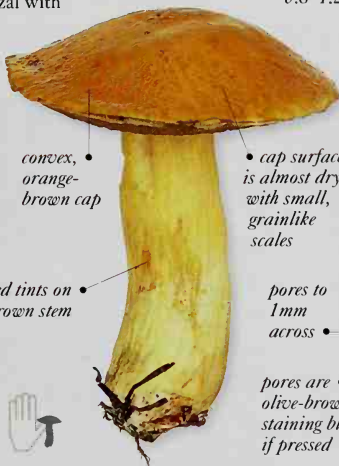
Tall-stemmed and fleshy, the Variegated Bolete rarely exhibits the sliminess that is characteristic of the genus *Suillus*. Its convex, orange-brown cap has a felty to finely scaly surface. The small pores are brown to olive-brown and, like the pale yellow flesh, stain blue when pressed. The stem is brown with olive-green or pale red tints. Although edible, it has a metallic smell and unpleasant taste.

•**OCCURRENCE** Mycorrhizal with two-needled pine trees, often found with heathers and other acid-loving plants, on sandy soil. Widespread and common in Europe and nearby parts of Asia.

•**SIMILAR SPECIES** *S. tomentosus* is the equivalent species in western North America.



**FRUITING** Appears a few together or in troops.



convex, orange-brown cap

red tints on brown stem

cap surface is almost dry with small, grainlike scales

pores to 1mm across

pores are olive-brown, staining blue if pressed



notched to slightly decurrent, short brown tubes, 0.8–1.2cm long

SECTION

blue staining on cut pale yellow flesh



Dimensions CAP ⬆ 7–13cm | STEM ⬇ 6–10cm ↔ 1.5–2cm

Spores Brownish olive

Edibility

Family BOLETACEAE

Species *Suillus spraguei*

Season Summer–autumn

## PAINTED BOLETE

With its dry, scaly red cap, partial white veil, and large yellow pores, this species is very easily recognized. The cap is convex, and the red-flecked, yellow stem may be somewhat club-shaped. The partial veil, which covers the immature pores at first, leaves a cobweblike ring on the upper part of the stem.

The tubes are adnate to slightly decurrent. The yellow flesh, which becomes pink tinged on exposure to air, has a firm texture and a mild taste.

•**OCCURRENCE** Mycorrhizal with eastern white pine (*Pinus strobus*) in woods and parks. Widespread and common in eastern North America, wherever eastern white pine grows.

yellow stem is flecked with red

dry, convex cap is red with pale background

scales cover surface of cap



**FRUITING** Appears in scattered fruitbodies or in large groups under eastern white pine trees.

Dimensions CAP ⬆ 3–12cm | STEM ⬇ 4–12cm ↔ 1–2.5cm

Spores Olive-brown

Edibility

## WITH TOUGH FLESH

**T**HE MUSHROOMS in this subsection are known as polypores; they have pores on the cap underside and tough flesh. The polypores featured here also have a more or less distinct stem (for

polypores with a bracketlike fruitbody and no stem, see pp.211–233).

Unlike the boletes (pp.184–201), the tube layer of polypores is not easy to separate from the flesh.

Family POLYPORACEAE	Species <i>Albatrellus ovinus</i>	Season Summer–autumn
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### SHEEP POLYPORE

From above, this creamy to pale gray-brown polypore looks like an agaric (see p.28) or a hedgehog mushroom (p.238), but it has minute pores on the underside. It stains lemon or greenish yellow, particularly on the pores. The skin of the convex cap often cracks with age. It has a sturdy stem and very firm, mild to slightly bitter white flesh.


- **OCCURRENCE** Under conifers, mycorrhizal with spruce on moss-covered soil. Widespread throughout northern temperate zones; locally common.
- **SIMILAR SPECIES** *Albatrellus confluens* is more orange and does not stain yellow; it tastes bitter. *A. subrubescens* stains orange.

angular pores, 2–4 per mm on underside

short, sturdy, cream to gray stem

cap margin is often waxy

convex cap is creamy to pale gray brown



**FRUITING** Appears in troops and groups under established stands of spruce trees.

Dimensions CAP ⊕ 7–18cm   STEM ↓ 3–7cm ↔ 1–3cm	Spores White	Edibility   ⊕
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Family POLYPORACEAE	Species <i>Polyporus umbellatus</i>	Season Summer–early autumn
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### UMBRELLA POLYPORE

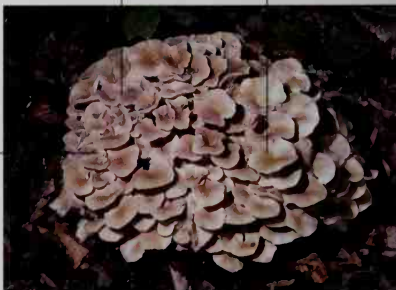
This large, fleshy polypore has a single, multi-branched stem that supports many centrally stemmed, small, circular, pale gray to gray caps. The underside has angular pores, 1–3 per mm, which are white to pale yellow. A choice edible, it has firm, mild-tasting, white to cream flesh. Unlike most polypores, this species has a large black pseudosclerotium with an interior marbled black and white by a mixture of hyphae and earth.

- **OCCURRENCE** On the ground in open deciduous woods. Scattered in northern temperate zones.
- **SIMILAR SPECIES** The individual brackets of *Grifola frondosa* (p.216) do not have central stems.

overlapping, pale gray to gray caps

each cap has a small central stem

clustered fruitbody up to 50cm high



**FRUITING** On the ground, springing from pseudosclerotium; appears in large clusters.

Dimensions CAP ⊕ 1–4cm   STEM ↓ 5–7.5cm ↔ 2–3cm	Spores White	Edibility   ⊕
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Family POLYPORACEAE

Species *Polyporus squamosus*

Season Late spring–summer

## DRYAD'S SADDLE POLYPORE

A circular to fan-shaped bracket, covered with brown scales, a black stem positioned to one side, and a decurrent off-white to ochre tube layer, 0.5–1cm thick, make this mushroom unmistakable. Early in the season, it seems to explode out of half-dead trees or stumps; it becomes very large, but is soon devoured by a multitude of insects, leaving only a dried-up carcass, which is broken down by other fungi. The white flesh is soft and smells and tastes of watermelon rind. It can be eaten when very young.

• **OCCURRENCE** Parasitic or saprotrophic on deciduous trees in woods, on street trees, and in parks.

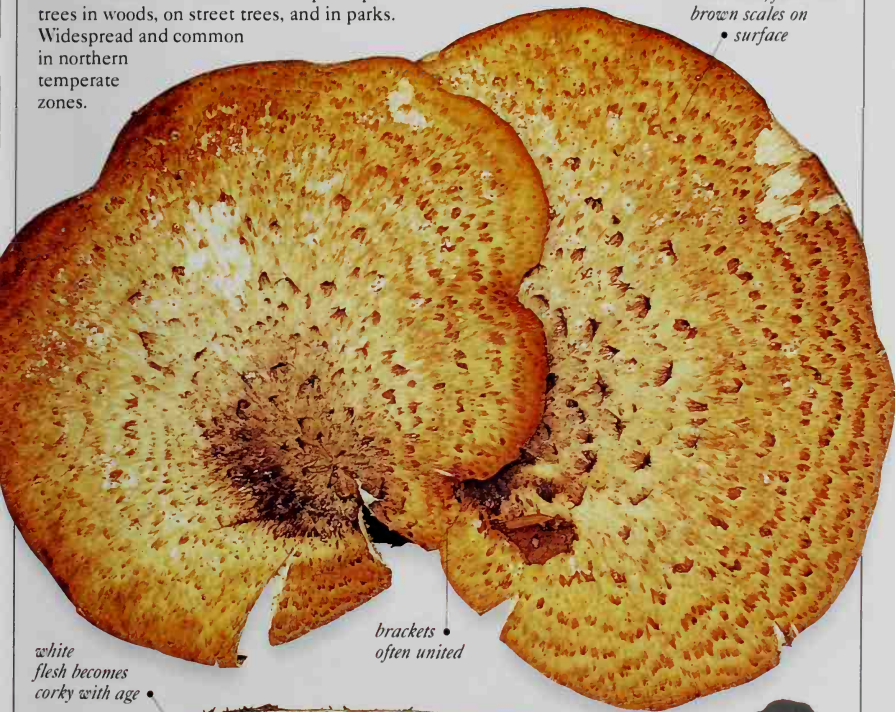
Widespread and common in northern temperate zones.



1cm

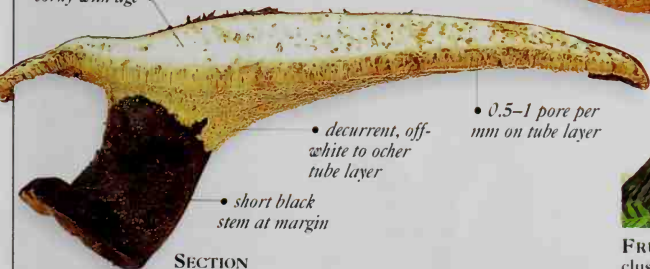
PORE SURFACE

*concentric, flattened brown scales on surface*



*white flesh becomes corky with age*

*brackets often united*

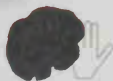


*decurrent, off-white to ochre tube layer*

*0.5–1 pore per mm on tube layer*

*short black stem at margin*

SECTION



**FRUITING** Appears in clusters or singly.

Dimensions BRACKET ⊕ 10–60cm × 10–30cm ⊕ to 5cm

Spores White

Edibility 101

Family POLYPORACEAE

Species *Polyporus tuberaster*

Season Late spring–autumn

### TUBEROUS POLYPORE

This species has a flat cap with a distinct central depression and raised brown scales on a paler background. Its central brown stem may root to large underground storage organs; small forms without such organs can also be found. The flesh is edible but tough. The white tubes are up to 5mm long.

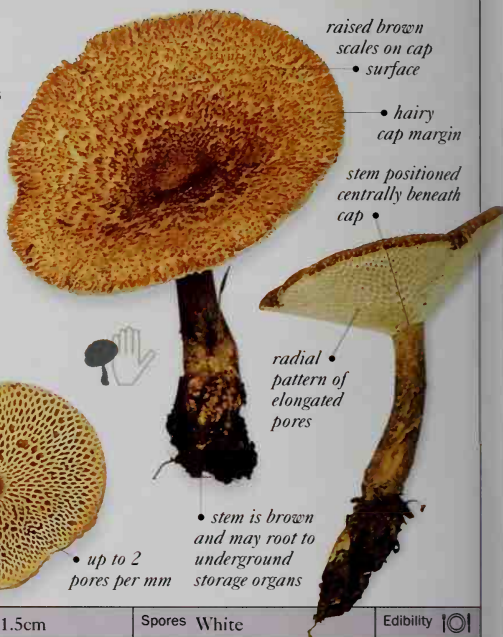
• **OCCURRENCE** In deciduous woods, often on calcareous soil; causes white-rot wood decay. Widespread but local in northern temperate zones; western North American in the aspen zone.



FRUITING Singly, often from underground storage organs.



• up to 2 pores per mm



raised brown scales on cap surface

• hairy cap margin

stem positioned centrally beneath cap

radial pattern of elongated pores

• stem is brown and may root to underground storage organs

Dimensions CAP ⬆️ 5–20cm

STEM ⬆️ to 8cm ↔ 1.5cm

Spores White

Edibility 🍴

Family POLYPORACEAE

Species *Polyporus badius*

Season Late spring–autumn

### LIVER-BROWN POLYPORE

This species has a smooth and shiny funnel-shaped cap, which is pale gray-brown when young, then rich dark chestnut with a bright orange-brown margin; in wet weather it is greasy. The short, gray-black stem is attached off-center or at the margin. There are 4–8 pores per mm, and the decurrent tube layer is 0.5–2mm thick. The white flesh is too tough to be edible.

• **OCCURRENCE**

In damp woods, on deciduous trees causing white rot. Widespread, local to common in northern temperate zones.

• **SIMILAR SPECIES**

*Polyporus melanopus* is rarer and has a felty cap surface. *P. squamosus* (p.203).



tiny, creamy white pores age yellowish brown

short, brown to black stem is off-center

• decurrent tube layer is white to cream



PORE SURFACE

wavy cap margin

• smooth, shiny cap surface, dark chestnut with age



FRUITING Singly or a few fruitbodies together.

Dimensions CAP ⬆️ 5–20cm

STEM ⬆️ 2–4cm ↔ 0.5–2cm

Spores White

Edibility 🍴

Family POLYPORACEAE	Species <i>Polyporus varius</i>	Season Late spring–autumn
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## BLACK-FOOTED POLYPORE

The wavy-margined cap of this species is a uniform golden yellow to cinnamon-brown and smooth. The off-center stem becomes black with age, in contrast to the lighter cap, and the decurrent, white to pale cream tube layer is less than 1mm thick. The inedible, white to pale wood-brown flesh is tough with a faint mushroomy smell. Tiny forms with a central stem may be found.

**• OCCURRENCE**

On a range of deciduous trees in woods and parks, causing a white rot. Widespread and common in northern temperate zones.



margin is wavy  
• and often lobed

• white pores, 4–6 per mm, age ochre-brown

• stem slowly turns black from base

golden yellow to cinnamon-brown cap

• older caps may develop radiating lines

FRUITING A few together on dying deciduous wood.

Dimensions CAP ⬇️➡️ 3–12cm   STEM ⬆️⬆️ to 8cm ⬇️➡️ 0.8–1.5cm	Spores White	Edibility
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Family POLYPORACEAE	Species <i>Polyporus brumalis</i>	Season Late autumn–spring
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## WINTER POLYPORE

The rounded dark gray-brown cap of this tough species has a depressed center and a fringed margin, rolling inward when dry. The centrally placed stem is dark gray-brown, and the flesh is white. The white to cream tube layer, to 2mm thick, has large, circular pores that elongate as they mature. The fruitbodies do not develop until well into autumn; their growth peaks in early winter, and they persist until early spring.

**• OCCURRENCE** In piles of brushwood and on fallen deciduous branches, forming a white rot. Widespread and common in northern temperate zones.

**• SIMILAR SPECIES** *Polyporus arcularius* occurs in the spring, has a circular, brown scaly cap with marginal hairs, and large hexagonal or angular pores.



FRUITING Singly or a few fruitbodies together.



smooth cap margin in older specimen

depressed cap center

dark gray-brown cap

cap margin inrolled when dry

2–4 pores per mm

circular to elongated, white to cream pores

velvety stem is disklike or bulbous at base



Dimensions CAP ⬇️➡️ 3–8cm   STEM ⬆️⬆️ 2–6cm ⬇️➡️ to 5mm	Spores White	Edibility
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Family HYMENOGHAEACEAE

Species *Coltricia perennis*

Season Summer–winter

## FUNNEL POLYPORE

This annual polypore is very unusual in that it grows in the soil rather than on dead wood. The cap is more or less funnel-shaped with fairly tough, rusty brown flesh. Its shiny upper surface has concentric zones in the golden brown shades typical of many Hymenochaetaeaceae. The tubes, 2mm long, are decurrent on the short, felty stem.

• **OCCURRENCE** On the ground, mostly on sandy soil in conifer woods, rarely among deciduous trees. Widespread and rather common in northern temperate zones.

• **SIMILAR SPECIES** Several tooth-fungi (pp.234–39) are similar above but have spiny undersides.



SECTION

• thin, rusty brown flesh

• underside has grayish brown pores

• 2–4 pores per mm

• thin, waxy margin of funnel-shaped cap

• concentric zones in shades of brown, ochre, yellow, and pale gray



FRUITING Appears in small groups of fruitbodies.

Dimensions CAP ⊕ 2–10cm | STEM ⊕ 2–6cm ↔ 3–8mm

Spores Golden brown

Edibility

Family GANODERMACEAE

Species *Ganoderma lucidum*

Season All year

## VARNISHED POLYPORE

This annual species has an oyster-shaped, shiny red and purple-black bracketlike cap with concentric ridges, a paler margin, and a lacquered brown stem to one side. The tube layer is brown with off-white pores, 3–4 per mm. The tough flesh, although off-white at first, also turns brown. Known as *Ling Chih* or *reishi*, it is a popular herbal tea.

• **OCCURRENCE** On the stumps or logs of deciduous trees. Widespread but local in northern temperate zones.

• **SIMILAR SPECIES** There are several closely related species, including *Ganoderma tsugae*, *G. oregonense*, and *G. curtisii*, some of which grow on conifers.

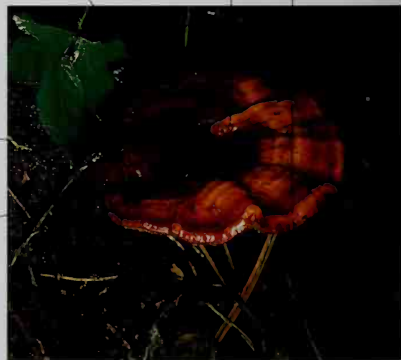
concentric ridges on surface

shiny, lacquered surface of oyster-shaped cap

margin of cap is slightly paler

bracketlike cap is shades of purple and red

distinct lacquered stem



FRUITING Singly or in groups of fruitbodies around the stumps of deciduous trees.

Dimensions CAP ⊕ 10–30cm ⊕ to 3cm | STEM ⊕ 5–20cm ↔ 1–3cm

Spores Brown

Edibility

# HONEYCOMB-, BRAIN-, OR SADDLELIKE CAP

Most of the species in this section are thought to have evolved from cup fungi (see p.264). Their "cup" is heavily folded and is raised on a stem.

The spore-producing surface, or hymenium, is smooth and sited on the folds. The choice morels, with a honeycomb-like structure, are found here.



Family HELVELLACEAE

Species *Helvella crispa*


Season Summer–autumn

## COMMON WHITE SADDLE

This species is easily identified by its furrowed, hollow, and chambered stem, its saddle-shaped cap, and its pale creamy white coloring. It varies in size but is typically large. With its thin flesh, it is not recommended and should be eaten only after being carefully dried until crisp or after boiling in water.

• **OCCURRENCE** In deciduous or coniferous woods on calcareous soil, often along paths and roads. It, and several other *Helvella* species, is frequently found alongside species of *Peziza* (pp.266–67) and *Inocybe* (pp.98–102). Widespread and common in most northern temperate regions.



△ **STEREOOPSIS HUMPHREYI**  
This North American species has a saddle-shaped, dull white cap and a white stem. It is thought to be related to coral fungi (pp.248–51) and appears in large troops. 

smooth, spore-producing surface •



• stem is white with longitudinal grooves

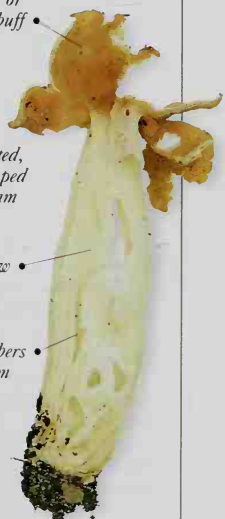
• base is slightly rooting

cap underside is tan or pale buff • SECTION

• convoluted, saddle-shaped cap is cream colored

hollow stem •


chambers in stem •



FRUITING In troops of fruitbodies or singly.

Dimensions CAP ⬆ 2–6cm | STEM ⬆ 3–12cm ↔ 0.5–2.5cm

Spores White


Edibility 

Family <b>HELVELLACEAE</b>	Species <i>Hevelia lacunosa</i>	Season Summer–autumn
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## COMMON GRAY SADDLE


Perhaps the most common *Hevelia* species, this fungus is extremely variable in size, shape, and color. It can be any shade of gray, and its cap is either saddle-shaped or convoluted and lobed. The stem has distinct grooves on the outside and is chambered within. The flesh is thin and gray to dirty white; like *Hevelia crispa* (p.207), it is edible after thorough drying or boiling but is not recommended.

• **OCCURRENCE** In forests and more open areas on calcareous soil and gravel. Widespread in temperate and alpine zones of both the northern and southern hemispheres.




- upper, spore-producing surface
- gray to near black lobes are paler beneath
- deep longitudinal grooves in stem
- stem is any shade of gray


### SECTION



- chambers inside stem



**FRUITING** In troops or singly on disturbed soil.

Dimensions CAP $\oplus$ 1–5cm   STEM $\updownarrow$ 2–8cm $\leftrightarrow$ 0.5–1.5cm	Spores White	Edibility 
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Family <b>HELVELLACEAE</b>	Species <i>Gyromitra esculenta</i>	Season Spring
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## CONIFER FALSE MOREL

A brainlike, dark brown cap with a chambered interior characterizes this easily identified species. The short white stem is almost hollow, with white flesh. Despite being poisonous, in parts of Europe it is eaten after careful drying or repeated boiling in fresh water.

• **OCCURRENCE** Near conifers on sandy soil or on wood chips. Widespread in northern temperate zones.

• **SIMILAR SPECIES**  
*Gyromitra gigas*, *G. brunnea*, *G. caroliniana*, and *G. korffii* are often larger and more vivid orange-brown; common in parts of North America.



- brainlike cap surface
- cap interior is chambered
- white flesh in hollow stem



**Δ GYROMITRA INFULA**  
Appearing in autumn, this species has a lobed brown cap and a chambered, lavender to white stem. ☠

**FRUITING** In troops, often on disturbed soil near pine.

Dimensions CAP $\oplus$ 5–15cm   STEM $\updownarrow$ 1–5cm $\leftrightarrow$ 2–4cm	Spores White	Edibility 
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Family MORCELLACEAE

Species *Verpa conica*

Season Spring

### BELL MOREL

The smooth, hoodlike cap of this species is attached only at the very top of the stem. It is ovoid, becoming bell-shaped with age, and dark brown, paler within. The cylindrical stem is off-white with a mealy surface. Although edible, the flesh is thin; many fruitbodies are needed to make gathering this species worthwhile, and they are so rare in some areas that picking it is discouraged, but see SIMILAR SPECIES.

• **OCCURRENCE** On the ground, in rich soil, in mixed deciduous woods. Widespread in northern temperate zones, locally fairly common; rare in cold regions.

• **SIMILAR SPECIES** Also edible, *Verpa bohemica* has a wrinkled cap and 2-spored asci – those of *V. conica* are 8-spored. It can occur en masse.



**FRUITING** In troops among leaf litter, usually in undergrowth.



narrow point of attachment of cap to stem

• almost smooth cap surface

• mealy surface on cylindrical stem

hollow center

SECTION

Dimensions CAP  $\oplus$  2–3cm  $\downarrow$  2–4cm | STEM  $\downarrow$  3–10cm  $\leftrightarrow$  0.5–1.5cm

Spores Cream

Edibility

Family MORCELLACEAE

Species *Morchella esculenta*

Season Spring

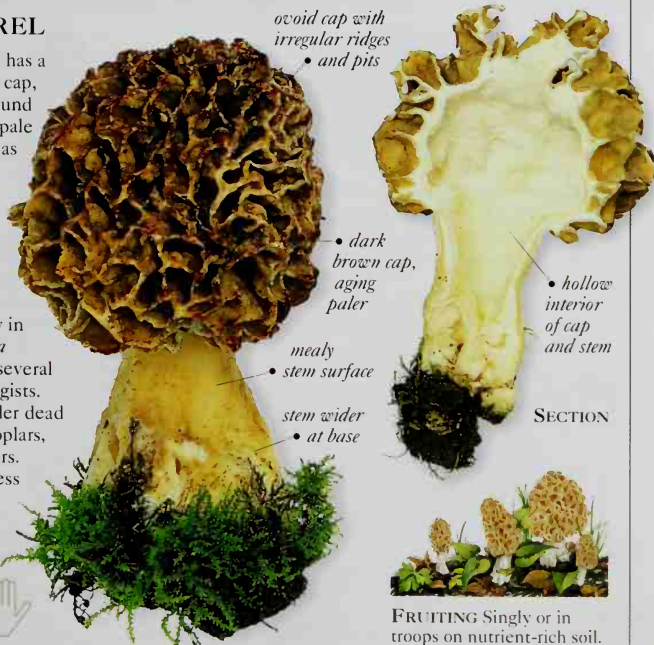
### COMMON MOREL

This distinctive species has a ridged, honeycomb-like cap, ranging from ovoid to round or conical and fading to pale brown from dark brown as the spores mature on its surface. The white to cream stem is wider at the base and has a mealy surface. The off-white to pale brown flesh tastes and smells pleasant. Varying greatly in size and shape, *Morchella esculenta* is divided into several species by some mycologists.

• **OCCURRENCE** Under dead elms, old apple trees, poplars, tulip poplars, and conifers. Almost worldwide but less common in very cold or warm to hot regions.

• **SIMILAR SPECIES**

*Gyromitra esculenta* (p.208) has a brainlike cap and is poisonous.



ovoid cap with irregular ridges and pits

• dark brown cap, aging paler

• hollow interior of cap and stem

mealy stem surface

stem wider at base

SECTION



**FRUITING** Singly or in troops on nutrient-rich soil.

Dimensions CAP  $\oplus$  2–10cm  $\downarrow$  5–12cm | STEM  $\downarrow$  3–15cm  $\leftrightarrow$  1–6cm

Spores Ochre-brown

Edibility

Family MORCELLACEAE	Species <i>Morchella elata</i>	Season Spring
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### BLACK MOREL

This morel has a conical cap with distinct black ridges and brown to smoky-gray pits. The stem is white with a rough, mealy or granular surface and a hollow center. A popular edible with a crunchy texture and nutty flavor, the Black Morel can cause stomach upsets in some people.

• **OCCURRENCE** On the ground, in parks and open woods. Another form can appear in mountainous areas in summer. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Morchella esculenta* (p.209) is yellow and has pale ribs along the length of its cap. *Gyromitra* species (p.208), which are poisonous, lack the pitted cap and have chambered, rather than hollow, stems.

pits on cap are brown to smoky-gray

cap is conical and tapers at top

brown to black cap with longitudinal ridges

white stem with granular surface



**FRUITING** In large numbers under trees, especially in burned areas.

Dimensions CAP ⬆ 5-10cm ⬆ 2.5-5cm	STEM ⬆ 5-10cm ↔ 2.5-5cm	Spores White to cream	Edibility  ⊙
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Family MORCELLACEAE	Species <i>Morchella semilibera</i>	Season Spring
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### HALF-FREE MOREL

The conical, dark gray-brown cap of this small morel is free at the rim, with honeycomb-like ridges and pits. It has a slender, hollow, white to cream stem with a mealy surface. It is edible but the cream flesh is too thin to make it choice.

• **OCCURRENCE** Dense woodland on rich soil, along paths in damp places. Widespread and common; in eastern North America and the Pacific Northwest.

• **SIMILAR SPECIES** *Verpa* species (p.209) have small hood-like caps that are attached only to the very top of the stem.

ridges and pits on cap surface

rim of cap is free of stem

stem has hollow center

cap is conical and taller than it is wide

stem is not very fleshy

slender stem has mealy surface

SECTION

cap is dark gray-brown

stem is cylindrical and white to cream



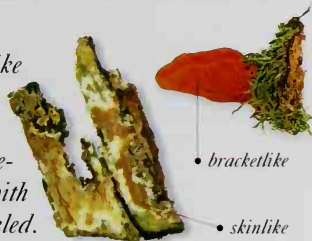
**FRUITING** Often in troops hidden in dense vegetation.



Dimensions CAP ⬆ 1-2.5cm ⬆ 1-4cm	STEM ⬆ 3-10cm ↔ 1-2cm	Spores Cream	Edibility  ⊙
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# BRACKET- OR SKINLIKE

This section features fungi that have shelflike fruitbodies, which grow from trunks or branches, as well as species that grow flat (resupinate) against a woody substrate, forming a skinlike crust. The spore-producing surface (hymenium) may consist of tubes, with pores on the surface, or may be smooth to wrinkled.



## WITH PORES

**T**HE SPECIES in this subsection are known as polypores. Their spores are produced in tubes sited on their undersides and are dispersed through

pores that can be rounded to elongated or mazelike in shape. The fruitbodies can be produced annually or continue to grow as long as the substrate lasts.

Family POLYPORACEAE

Species *Tyromyces stipticus*

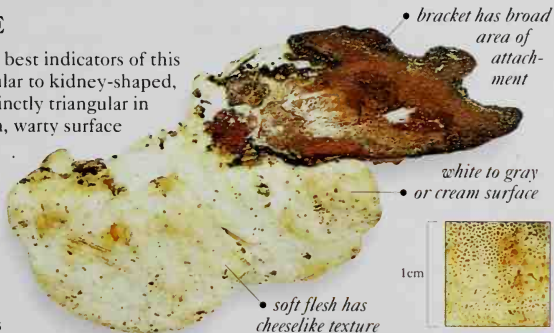
Season Mainly autumn

### BITTER POLYPORE

A very bitter taste is one of the best indicators of this species that produces semicircular to kidney-shaped, off-white annual brackets. Distinctly triangular in cross-section, they have a rough, warty surface and soft white flesh. In humid weather the pores exude an off-white liquid that dries to cream-white. The tube layer is 0.5–1cm thick; there are 4–6 pores per mm.

• **OCCURRENCE** Causes a brown rot on stumps or trunks of conifers; thus it is sometimes placed in the genus *Oligoporus*.

Widespread and common in northern temperate zones, especially in the boreal regions.



PORE SURFACE



**FRUITING** Singly or a few together in woodland.



△ *OLIGOPORUS CAESIUS*  
The semicircular annual brackets of this brown rot polypore are spongy with a felty white surface that ages blue-black. 101

Dimensions BRACKET ⊕ 5–12cm × 3–7cm ⊕ to 2.5cm

Spores White

Edibility 101

Family POLYPORACEAE

Species *Piptoporus betulinus*

Season All year

## BIRCH POLYPORE

This semicircular annual bracket fungus has a skinlike, brownish gray surface. It is stemless or has a rudimentary stemlike attachment. The soft but firm white flesh smells pleasant but is inedible. It was once used for sharpening razors and as a polishing agent in the watchmaking industry. The brackets are often attacked by flask fungi *Hypocrea pulvinata* when on the tree or by the orange *Hypomyces aurantius*, once the tree or polypore has fallen.

• **OCCURRENCE** In damp woods, often alongside *Fomes fomentarius* (p.219). It is parasitic on older birch trees, causing brown rot. The trees eventually die, but the polypore can continue fruiting on them for some time. Widespread and common in northern temperate zones.

• bracket often swollen near attachment point •

• brownish • gray surface may crack to reveal white flesh



SECTION



• white tube layer is up to 1cm thick

• white flesh is soft but tough

• white pore surface with 3-4 pores per mm

• smooth, rounded margin

FRUITING A few together on rotten birch trunks.

Dimensions BRACKET ♂ 5-30cm x 5-20cm ♀ 2-6cm

Spores White

Edibility

Family POLYPORACEAE

Species *Hapalopilus rutilans*

Season All year

## PURPLE-DYE POLYPORE

All parts of this fan-shaped annual bracket fungus are reddish cinnamon in color – the surface, the flesh, and the tube layer, which is up to 1cm thick. It has a remarkable reaction with an alkaline solution, turning brilliant purple, a characteristic that is exploited for dyeing wool. The relatively soft-textured flesh is inedible.

• **OCCURRENCE** On dead deciduous trees, where it produces white rot, in woods. Widespread and common to local in northern temperate zones.

• **SIMILAR SPECIES** *Pycnoporus cinnabarinus* (p.225) is tougher and a brighter cinnabar-red.

broad area of attachment to substrate



• bracket surface is downy when young

SECTION

reddish cinnamon  
• tube layer



2–4 pores per mm •

1cm



PORE SURFACE

FRUITING Singly, in groups, fused, or in tiers, on dead wood.

Dimensions BRACKET ⌀ 2–12cm × 2–8cm Ⓢ 1–4cm

Spores White

Edibility

Family FISTULINACEAE

Species *Fistulina hepatica*

Season Late summer–autumn

## BEEFSTEAK POLYPORE

This species produces a tongue-like annual bracket with red tubes 1–1.5cm long and 2–3 pale red pores per mm. The tubes are easily separated, unusual for a polypore: The bracket is pink- to orange-red then purple-brown and may have a short stem.

The flesh looks like beef or liver. It exudes a blood-red liquid; it smells pleasant and has the texture and flavor of beef tongue seasoned with lemon juice.

• **OCCURRENCE**

Grows on mature living oaks; causes brown heart rot. Widespread but local in northern temperate zones.

tongue-shaped bracket



• upper surface is sticky or moist

flesh with veins and blood-red juice



short stem at side



FRUITING On the lower trunks of mature trees.

Dimensions BRACKET ⌀ 10–25cm × 10–20cm Ⓢ 2–6cm

Spores White

Edibility

Family POLYPORACEAE

Species *Meripilus giganteus*

Season Autumn

## BLACK-STAINING POLYPORE

This massive species produces several densely layered annual brackets from a single short stem; a composite fruitbody can be up to 1m across. Each fan-shaped bracket has a smooth surface with concentric, golden brown zones and a wavy margin. The pleasant smelling white flesh is soft and fibrous; it is edible when young – turning gray to black when cooked – but has a poor flavor. The off-white tube layer is up to 1cm thick.

• **OCCURRENCE** In woods and parks, causing a white rot on dying deciduous trees. Widespread and fairly common in eastern North America.

• surface stains lead-gray when handled

• zones of golden brown on surface  
• flattened, fan-shaped brackets in dense layers



• paler bracket margin

• wavy bracket margin

• single stem bears several brackets

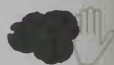


PORE SURFACE



FRUITING In dense tufts of layered brackets.

• cream pores, 3–5 per mm, stain gray or brown



Dimensions | BRACKET ⇄ 10–30cm × 10–30cm ⊕ 1–3cm

Spores White

Edibility | ○ |

Family POLYPORACEAE

Species *Laetiporus sulphureus*

Season Early summer–late autumn

## CHICKEN POLYPORE

This splendid, annual bracket fungus has an almost luminous quality with its large, quick-growing, yellow or yellow-orange fruitbodies. The thick, fleshy brackets are fan-shaped or irregularly semicircular with an uneven, suedelike surface. The flesh is pale yellow with a crumbly texture, especially when old, and smells of fresh lemon.

A choice edible, it requires thorough cooking; some people are allergic to it.

### • OCCURRENCE

On deciduous trees in some regions, conifers in others; mostly attacks the heartwood, causing a brown rot. Widespread and common in eastern North America.



overlapping tiers  
• of brackets

lustrous •  
yellow to  
orange-yellow  
surface dulls  
with age

indistinct  
zones in pale  
• yellow flesh

flesh becomes  
crumbly and  
cheeselike  
with age •

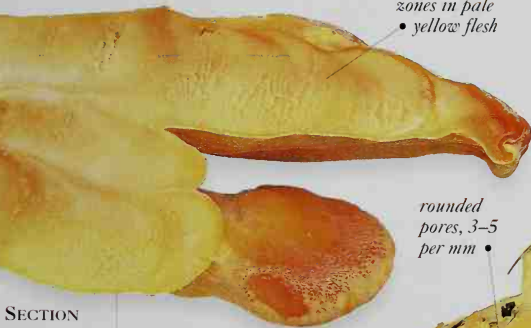


rounded  
pores, 3–5  
per mm •



striking  
yellow pores

bracket •  
margin is  
fairly thick



### SECTION

• tube layer, to  
5mm thick, is  
indistinct in young  
specimens



FRUITING Mostly in tiers,  
often high up in trees.

Dimensions BRACKET ⊕ 10–50cm × 10–30cm ⊕ 1–5cm

Spores White

Edibility | ⊕ |

Family POLYPORACEAE

Species *Grifola frondosa*

Season Summer–autumn

## HEN-OF-THE-WOODS POLYPORE

This species has an annual fruitbody with tongue-shaped brackets branching off a central stem. Leathery with a wavy margin, the upper surface is gray, aging to brown. The decurrent tube layer is up to 5mm thick and off-white. The white flesh smells unpleasant when it ages. It is a choice edible, avidly collected in fall in eastern parks and woods.

• **OCCURRENCE** At the base of oak trees; produces a white rot. Widespread and common in eastern North America.

• **SIMILAR SPECIES** *Meripilus giganteus* (p.214).

wrinkled and streaky upper surface

composite fruitbody, to 50cm wide



small, tongue-shaped bracket

gray upper surface ages to brown



**FRUITING** Clusters of brackets branch off from a thick, central stem near the base of trees.

Dimensions BRACKET 2–6cm × to 7cm 0.2–1cm

Spores White

Edibility

Family GANODERMATACEAE

Species *Ganoderma pfeifferi*

Season All year

## EURO VARNISHED POLYPORE

The upper surface of this hoof-shaped perennial bracket has concentric, orange-brown ridges covered by a thick, copper-colored lacquer that melts when exposed to a flame. The brown tube layer, to 10cm thick, is protected by a thick, waxy yellow substance in winter. The woody brown flesh has a pleasant smell.

• **OCCURRENCE** At the base of living beech trees, rarely other hosts, where it forms white rot. Widespread but local in central and southern Europe.

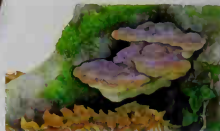
hoof-shaped bracket is orange-brown

5–6 pores per mm

waxy yellow covering on pores in winter

thick lacquer on upper surface

tough, ridged surface



**FRUITING** In tiers near the ground or a few feet up.

Dimensions BRACKET 20–50cm × to 25cm to 15cm

Spores Brown

Edibility

Family GANODERMATACEAE

Species *Ganoderma applanatum*

Season All year

## ARTIST'S POLYPORE

The upper surface of this semicircular perennial bracket is uneven, with concentric ridges and a thin margin. Beginning off-white, it becomes pale ocher-brown and is often covered with a brown spore deposit. The upper surface is easily broken; the pale buff underside can be scratched with a sharp point to produce a brown "artwork," hence the common name. The tube layer is brown and 0.5–4cm deep. The thin, dark brown flesh, often with pockets of white tissue, has a bitter taste and a "mushroomy" smell.

• **OCCURRENCE** On stumps and trunks of trees in parks and woods. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** Other species of *Ganoderma* have a shiny, lacquered upper surface.



bracket has grown around  
• strand of ivy

• pale buff pores, 4–6 per mm



uneven, tough bracket  
• surface



thin layer of lacquer just visible •

### SECTION



flesh is dark brown, typically with pockets of white tissue

• brown tubes



• thick brown spore deposit covers upper surface

**FRUITING** Singly or in groups, mostly on dead trees.

Dimensions BRACKET ⊕ 10–60cm × to 30cm ⊕ 2–8cm

Spores Brown

Edibility

Family HYMENOGHAETACEAE

Species *Phellinus igniarius*

Season All year

## GRAY FIRE POLYPORE

Gray to almost black in color, this perennial bracket is hoof-shaped and extremely woody, with thick margins. The bracket may remain on living host trees for many years. The hard flesh and tubes are rusty brown; new tubes, 1–5mm long, grow annually on the previous year's tubes.

Tiny hairs, called setae, characteristic of the family, are concealed in the hymenium. Experts disagree on the exact identity of this species; a range of forms is covered here.

### • OCCURRENCE

Parasitic on a number of deciduous trees, commonly birch, willow, and apple, causing white rot. Widespread and fairly common in northern

temperate zones.

*moss and lichen grow on the upper surface of older specimens*

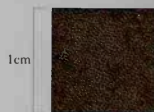


*some cracking often occurs on gray to almost black surface*

*concentric ridges appear with age*



*broad area of attachment*



PORE SURFACE

*gray to gray-brown pores*



FRUITING Singly or a few together on living trees.



*5–6 pores per mm*

Dimensions BRACKET 10–40cm × 10–20cm to 20cm

Spores White

Edibility

Family POLYPORACEAE

Species *Fomes fomentarius*

Season All year

## TINDER POLYPORE

This polypore has a hoof-shaped, woody perennial bracket with zones varying from dark brown in older areas to pale brown at the growing margin, which is downy or felty. A new brown tube layer grows annually. Each year's tube layer is 5mm thick. The pore surface is gray to gray-brown. Existing in several forms, depending on the host, this species has been used as tinder and to make hats and other clothing.

• **OCCURRENCE** Parasitic on deciduous trees, especially beech and birch, and forms white rot. It fruits on fallen wood. Widespread and often common in northern temperate zones.

• **SIMILAR SPECIES** *Fomitopsis pinicola* (inset, right).

△ *FOMITOPSIS PINICOLA*

This gray perennial species has bright yellow and red zones near its margin. The bracket surface feels lacquered and melts under a flame. The pores are pale yellow, and the hard flesh is white to yellow with a characteristic acidic smell. 101

this specimen  
has grown  
• on beech

dark reddish brown  
zone behind pale  
margin •

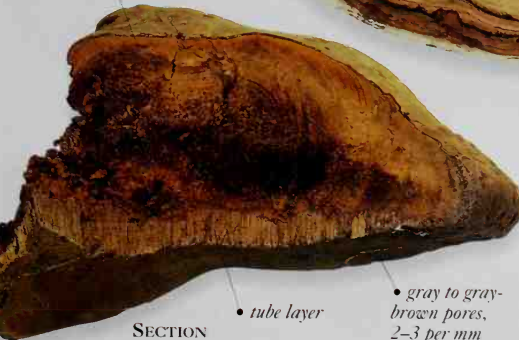
more or less  
distinct zones  
on bracket  
surface •

hard, woody, •  
smooth surface

tough, fibrous,  
wood-brown  
flesh smells  
slightly fruity •



• margin  
is downy  
or felty



SECTION

• tube layer

• gray to gray-  
brown pores,  
2-3 per mm



FRUITING Appears singly  
or in rows of brackets.

Dimensions BRACKET ⊕ 5-30cm × to 25cm ⊕ 5-30cm

Spores White

Edibility 101

Family POLYPORACEAE

Species *Phaeolus schweinitzii*

Season Summer–winter

## PINE DYE POLYPORE

Impressive when actively growing, this annual bracket mushroom arises from a very short, more or less central brown stalk, and has a brilliant sulfur-yellow margin surrounding concentric zones of rusty brown. As the bracket ages, it turns dirty brown then slowly rots away. The sulfur-yellow tube layer is up to 1cm thick with pores, 1–4mm in diameter, that are greenish yellow when young, turning dark brown when touched. The inedible, fibrous, yellow to brown flesh contains a pigment used in dye.

• **OCCURRENCE** Around living or dead conifers and Douglas fir, especially pine, causing brown rot. Widespread and common in northern temperate zones; cosmopolitan.

• sulfur-yellow young specimen

• uneven surface with color zones



• bracket surface is very felty or hairy

• old specimen is dark brown all over



1cm

PORE SURFACE



**FRUITING** Mostly solitary from underground roots.

Dimensions BRACKET ⊕ 15–30cm × 10–25cm ⊕ 1–4cm

Spores White

Edibility

Family HYMENOGHAETACEAE	Species <i>Inonotus hispidus</i>	Season Summer–autumn
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## SHAGGY POLYPORE

The thick-fleshed, fan-shaped annual bracket of this species is distinguished by its shaggy surface. Flame-red when young, it gradually turns brown from the inner part of the fruitbody outward; the pore surface is white to pale brown, becoming darker with age, and often appears shiny.

There are 2–3 pores per mm. The pale brown tube layer is 1–3cm deep. Scattered, short, thick hairs (setae) are enclosed in the spore-bearing tissue (hymenium).  
**• OCCURRENCE** Parasitic on deciduous trees such as ash, pear, apple, and walnut, causing white rot. Widespread and common to rare in northern temperate zones.  
**• SIMILAR SPECIES** *Inonotus cuticularis* has smaller brackets and occurs on beech and oak. *I. rheades* is also smaller and occurs on aspen.

flame-red  
bracket ages  
to brown

white to pale  
brown pore  
surface becomes  
darker with age

bracket surface  
is very shaggy



**FRUITING** Appears singly or in fused groups on living deciduous trees, stumps, and logs.

Dimensions BRACKET ⊕ 15–40cm × 10–20cm ⊕ to 10cm	Spores Yellow	Edibility
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Family HYMENOGHAETACEAE	Species <i>Inonotus radiatus</i>	Season All year
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## ALDER BRACKET POLYPORE

This polypore forms semicircular, wavy-margined annual brackets. The upper surface is bright yellow to orange-red when young, becoming zoned in shades of rusty brown. When young and growing, the pore surface often has yellow drops on it; with age, it reflects the light and appears shiny and silvery. The tubes are 1cm long, and the hymenium encloses tiny, short, curved hairs (setae).

**• OCCURRENCE** Parasitic, mostly on standing alder trunks or on birch trees. On fallen tree trunks it may develop just the tube layer over the bark (resupinate). Widespread and common in northern temperate zones.  
**• SIMILAR SPECIES**

*Inonotus nodulosus* has less distinct brackets and occurs on beech.



**SECTION**

tough flesh is  
zoned with shades  
of rusty brown

tube layer may be decurrent,  
running down the substrate

semicircular  
brackets have  
wavy margins



**FRUITING** Tiers and rows on dead wood.

top surface  
is orange  
when young



2–4  
pores per mm

pore surface looks  
shiny silvery gray  
from some angles

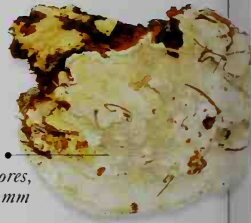
Dimensions BRACKET ⊕ 3–8cm × 1–3cm ⊕ to 3cm	Spores Pale yellow-brown	Edibility
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Family POLYPORACEAE	Species <i>Heterobasidion annosum</i>	Season All year
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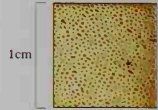
### CONIFER-BASE POLYPORE

The perennial bracket of this species is irregular with a very uneven surface and a corklike texture. The crust darkens with age; the margin is white, often with an orange band just behind it. The white to cream tube layer is up to 1cm thick or more, and the inedible flesh is pale yellow. Occasionally, this species grows against the substrate, without brackets (resupinate).

• **OCCURRENCE** Causes a white rot on conifer stumps, rarely on deciduous trees. In densely planted conifer stands, it can spread underground to infect healthy trees. Widespread in northern temperate zones.



white to cream pores, 2-4 per mm



PORE SURFACE



FRUITING In groups of brackets or singly.



light brown crust darkens with age

corklike, pale yellow flesh



Dimensions BRACKET ⊕ 5-25cm × 3-15cm ⊕ 1-3cm	Spores White	Edibility
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Family POLYPORACEAE	Species <i>Gloeophyllum odoratum</i>	Season All year
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### ANISE-SCENTED POLYPORE

This species develops perennial brackets, which are cushion-shaped and slightly felted. The margin is golden yellow to orange; older parts are almost black. There are 1-2 golden yellow pores per mm and the tube layer is up to 1cm thick. The corklike flesh is rust-brown. Although not edible, it smells pleasantly of fennel and oranges.

• **OCCURRENCE** On conifers, usually spruce; causes brown rot. Widespread in northern temperate zones.  
 • **SIMILAR SPECIES** Widespread and common, *Gloeophyllum abietinum* and *G. sepiarium* have gill-like pores and typically occur on sun-baked conifers.



dark brown to black inner area

golden yellow to orange margin



1cm

PORE SURFACE

golden yellow young specimen



FRUITING Mostly singly or in groups on tree stumps.

Dimensions BRACKET ⊕ 5-20cm × 5-20cm ⊕ 2-5cm	Spores White	Edibility
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Family POLYPORACEAE

Species *Trametes gibbosa*

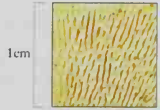
Season All year

# EURO BEECH POLYPORE

Annual or perennial, the large brackets of this species are semicircular with the inner part of the upper surface usually stained green by algae. Concentric color zones occur near the smooth margin. Young specimens are chalk-white with a downy or minutely hairy surface, becoming smooth with age. The white flesh is tough and inedible; the tube layer, to 4mm thick, has elongated cream pores.

• **OCCURRENCE** In woods; typically forms white rot on beech. Widespread and rather common in northern temperate zones.

• **SIMILAR SPECIES** *Trametes hirsuta* (p.224) is thinner and hairier with less elongated, grayer pores.

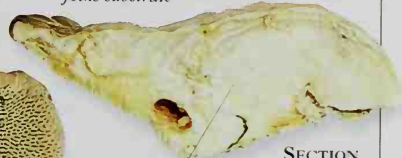


PORE SURFACE



• green algal growth on bracket surface

• characteristic hump where bracket joins substrate



SECTION

• thick, corky white flesh



• cream pores are elongated

• mazelike pore surface with 1-2 pores per mm



FRUITING Singly or in tiers on deciduous stumps.

Dimensions BRACKET ⊕ 10-30cm × 5-20cm ⊕ 1-4cm

Spores White

Edibility

Family POLYPORACEAE

Species *Trametes hirsuta*

Season All year

## HAIRY POLYPORE

This species produces annual brackets with straight surface hairs, which are stiff and upright on the inner areas. The surface has concentric ridges and off-white to yellow-brown zones, which become darker with age. The pores are angular, and the white tube layer is 1–4mm thick. The white flesh is tough.

• **OCCURRENCE** Appears in woodland sites that have been exposed to sun through wood cutting or storm damage. It produces white rot on a range of deciduous trees. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES** *Trametes pubescens*, a more northerly species, has yellow pores. *Cerrena unicolor*, also occurring in more northerly areas, has more irregular pores and a black line above the tube layer.



**FRUITING** In rows and tiers on fallen deciduous trunks.



• off-white pores, 2–4 per mm, become pale gray

short hairs lie flat at smooth margin



• off-white to yellow-brown zones

Dimensions BRACKET 5–12cm × 3–8cm 0.3–1cm

Spores White

Edibility

Family POLYPORACEAE

Species *Trametes versicolor*

Season All year

## TURKEY-TAIL POLYPORE

Thin, layered brackets with alternating zones of either gray or brown shades characterize this familiar fungus. The fruitbody is annual but may develop further in spring. Narrowly attached to the substrate, the brackets are widely fan-shaped. The tube layer, to 3mm thick, is white, drying to pale yellow, and there are 3–4 pores per mm. The tough flesh is white. The smaller specimen shown here is a typical form, zoned gray and dark blue-gray.

• **OCCURRENCE** On deciduous trees, in woods, parks, and gardens; forms white rot. Widespread and very common throughout northern temperate zones.

• **SIMILAR SPECIES** *Trametes ochracea*, a more northerly species, is slightly thicker and browner, with larger pores.

1cm



PORE SURFACE

• narrow attachment area



• wavy, irregular margin



silky surface with dense zones of gray and brown

overlapping, tiered brackets



**FRUITING** In dense rows and tiers on tops or sides of stumps.

Dimensions BRACKET 2–7cm × 1–5cm 1–5mm

Spores White

Edibility

Family POLYPORACEAE	Species <i>Bjerkandera adusta</i>	Season All year
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## SMOKY POLYPORE

Abundant in suitable habitats, this species produces a thin annual bracket with concentric zones of gray-brown, a wavy felted surface, and a lobed margin. The tube layer, which is up to 2mm thick, has distinctive, tiny, ash-gray pores; in cross-section, a thin, dark layer is visible between the off-white flesh and the tube layer. It smells strongly "mushroomy."

- **OCCURRENCE** Parasitic or saprotrophic on deciduous trees, particularly beech, in woods; forms white rot. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *Bjerkandera fumosa*, often on willow or ash, is rarer. It is larger and has paler pores.



PORE SURFACE

- old specimen has dark margin; white when young
- felted surface has zones of gray-brown



FRUITING Grows in rows or tiers of fruitbodies.

Dimensions BRACKET ⊕ 3-7cm × 1-5cm ⊕ to 8mm	Spores White-cream	Edibility
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Family POLYPORACEAE	Species <i>Pycnoporus cinnabarinus</i>	Season All year
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## CINNABAR POLYPORE

The uniform bright cinnabar-red coloring of this species makes it easy to identify. The annual bracket is semicircular to fan-shaped, with fine, silky hairs on the upper surface. It becomes paler as it ages and almost smooth, with a thin, sharp margin. The tube layer is 4-6mm thick. The flesh becomes corky when dried.

- **OCCURRENCE** On dead deciduous trees in warm, sunny, exposed areas; forms a white rot. Widespread and common to rare in northern temperate zones.
- **SIMILAR SPECIES** *Pycnoporus sanguineus* is thinner and is found in similar sites but in warmer climates.



PORE SURFACE

- more or less smooth surface is slightly wrinkled when mature



- fine, rounded to elongated pores, 2-3 per mm

- bracket shape may be almost circular



FRUITING Appears singly or a few together.



- cinnabar-red coloring throughout bracket



Dimensions BRACKET ⊕ 3-10cm × 2-6cm ⊕ 0.5-2cm	Spores White	Edibility
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Family POLYPORACEAE

Species *Trichaptum abietinum*

Season All year

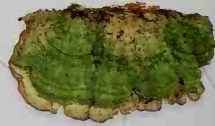
## PURPLE-TOOTH POLYPORE

pale gray  
surface  
is felty •

Tending to be abundant where it occurs, this widely fan-shaped annual bracket fungus has concentric grooves on the felty, pale gray surface, which is often tinged green by algae; the purple margin is typically wavy and lobed. When young, the tube layer, to 5mm thick, is purple, becoming reddish brown. The angular pores often split with age. It has tough, pale brown or purple flesh.

• **OCCURRENCE** On conifers, mostly spruce; it causes white rot. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Trichaptum bifforme* has wider, less resupinate brackets, and grows on deciduous trees. Other *Trichaptum* species found on conifers, such as *T. fusco-violaceum* on pine, are distinguished by teeth or gills on the underside.



• green algal  
growth on  
bracket

• concentric  
grooves

pores tend  
to split  
• with age

• wavy,  
lobed  
bracket  
margin



• 3-6 angular  
pores per mm



FRUITING In rows and tiers, often fused in groups.

Dimensions BRACKET 2-4cm × 2cm 2-3mm

Spores White

Edibility

Family POLYPORACEAE

Species *Daedalea quercina*

Season All year

## THICK-MAZE POLYPORE

This species produces a thick, semicircular perennial bracket with a smooth but uneven surface that is creamy yellow or dull ocher-brown to pale gray. Slightly flexible when fresh, it dries wood-hard. The inedible, pale wood-brown flesh smells faintly "mushroomy." Young pores near the growing margin are rounded but develop into a maze of thick plates radiating from the attachment point; the tube layer is 1-3cm thick, the separating walls 1.5-2mm thick.

• **OCCURRENCE** Parasitic or saprotrophic on oak trees in woods and parks; forms brown rot. Widespread in northern temperate zones; common in eastern North America.

• **SIMILAR SPECIES** Other polypores with maze-like pores, including *Daedaleopsis confragosa* and *Lenzites betulina* (both p.227), have thinner brackets and do not occur on oak heartwood.



• mazelike pores  
with woody walls

• very tough  
and  
woody



bracket is •  
creamy yellow  
to pale gray

smooth to •  
downy surface  
is uneven and furrowed

FRUITING Singly or in tiers; may be in shelved groups.

Dimensions BRACKET 10-30cm × 5-20cm 3-7cm

Spores White

Edibility

Family POLYPORACEAE

Species *Daedaleopsis confragosa*

Season All year

### THIN-MAZE POLYPORE

Broadly fan-shaped with a smooth to warty surface, the annual brackets of this species are thin, thickening only toward the attachment area. The surface is smooth to warty and pale gray to yellow, aging dingy red-brown – overall or in concentric zones. Corklike in texture, the inedible flesh is pale wood-brown, and the pores, which are pale gray when young, turn red when bruised. The tube layer, 0.5–1cm thick, is reddish brown.

• **OCCURRENCE** On a wide range of deciduous trees in some areas, more restricted in others – willow is favored; forms a white rot. Widespread and rather common in northern temperate zones.

gray to cream pores • vary from round to mazelike

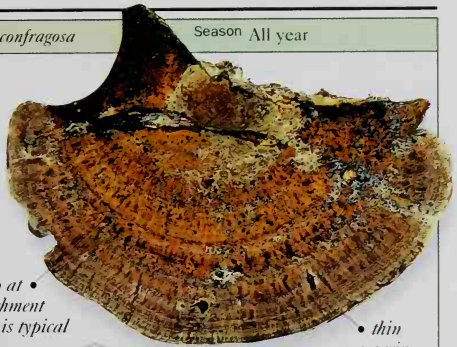


1cm

PORE SURFACE

red bruise • on young pore surface

lump at • attachment area is typical



• thin margin



reddish • brown tube layer

SECTION



FRUITING In vertical rows on dead or dying wood.

Dimensions BRACKET ⊕ 8–15cm × 5–10cm ⊕ 0.5–4cm

Spores White

Edibility

Family POLYPORACEAE

Species *Lenzites betulina*

Season All year

### GILL POLYPORE

This species has a semicircular, leathery annual bracket covered in fine hairs and zoned in shades of brown. The underside has gill-like pores, characteristic of this small genus. The tough, inedible flesh is white and corklike.

• **OCCURRENCE** Mainly on deciduous trees, sometimes on conifers. Favors birch in some areas, oak or beech in others; forms white rot. Widespread and fairly common to locally rare, in northern temperate zones.

• **SIMILAR SPECIES** *Trametes gibbosa* (p.223) has pores that are rounded to slightly elongated.



FRUITING Appears singly or in rows and tiers.



fairly thin margin is paler in color •



• zones of brown on uneven bracket surface



• gill-like, cream to pale gray pores radiate from attachment area

Dimensions BRACKET ⊕ 3–10cm × 1–5cm ⊕ 1–2cm

Spores White

Edibility

## WRINKLED OR SMOOTH UNDERNEATH

**N**OT ALL BRACKETLIKE mushrooms produce fruitbodies with a tube layer and pores on their underside (pp.211–27); some have the spore-producing cells (basidia) sited on a wrinkled, veined, warty, spiny, or completely smooth surface. This type of bracket is featured in this subsection. The other species featured here have tubes and pores but occasionally bear fruitbodies that grow flat against the substrate surface (resupinate). These species have a layer of flesh supporting the spore-producing tissue.

Family CORTICIACEAE

Species *Phlebia tremellosa*

Season Autumn–early winter

## TREMBLING PHLEBIA

Exceptional among *Phlebia* species, which are usually resupinate, this mushroom has well-developed, protruding annual brackets, although part of the spore-producing layer runs down the bark. The upper side is velvety and almost white, while the underside is yellow to orange and covered with dense ridges and veins. The structure is soft and gelatinous.

• **OCCURRENCE** On the stumps of deciduous trees, such as birch and beech; very rarely on conifers. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** The closely related *P. radiata* is common on similar substrates, but is bright orange and thinner; it is fully resupinate, without brackets. The underside has radiating veins and wrinkles.



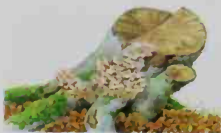
• velvety upper surface is almost white

• brackets have hairy margins and surfaces



• gelatinous, elastic, orange to pink flesh

veins and ridges cover spore-producing underside



**FRUITING** In dense tiers of joined brackets.



• tiered brackets are semicircular

Dimensions JOINED BRACKETS ⊕ 4–15cm × 2–4cm ⊕ 1–3mm

Spores White

Edibility

Family THELEPHORACEAE

Species *Thelephora terrestris*

Season All year

## COMMON THELEPHORA

Similar in appearance to some lichens, the fringed, fan-shaped fruitbodies of this fungus are well camouflaged by their earthlike colors. The upper surface is uneven and fibrous; the spore-producing underside is warty and slightly paler in color. The inedible flesh is thin and brown.

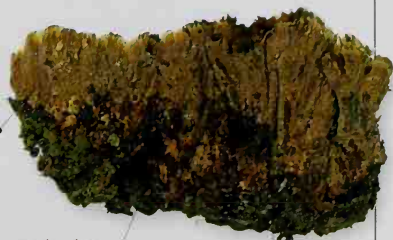
• **OCCURRENCE** Mycorrhizal with trees in woods and waste ground, on acidic soil or decayed stumps; often found along paths and trails. Also found in plant nurseries with conifer seedlings. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

*Thelephora caryophylla* is deeply funnel-shaped and has a less felty surface. An uncommon resupinate form of *T. terrestris* is similar to species of *Tomentella*.



distinctly fibrous structure of fruitbody



underside is paler in color than upper side

warty, spore-producing underside

layers of fan-shaped brackets

often fruits at soil level

uneven, felty upper surface

white to pale brown margin is fringed



**FRUITING** Appears in layered, joined brackets.

Dimensions JOINED BRACKETS ⊕ 4–10cm × 1–6cm ⊕ 2–3mm

Spores Brown

Edibility

Family CONIOPHORACEAE

Species *Serpula lacrymans*

Season All year

## DRY-ROT MUSHROOM

This mushroom is well known for the brown rot it causes, which severely weakens construction lumber inside houses. The semicircular, veined, resupinate or bracket-forming fruitbody is in shades of brown and exudes acidic white droplets from the growing margin. It stains red-brown when touched and is rubbery in texture. The fungus also produces a copious white web of mycelium.

• **OCCURRENCE** Thrives inside poorly ventilated buildings where alkaline substances, such as mortar, neutralize its acidic droplets, which would otherwise make its growing environment too acid. Widespread and common in buildings; in the wild, on the east and west coasts of North America and in the Himalayan foothills of India.



brackets growing from wooden windowsill

acidic white droplets exuded at growing margin



concentric zones in shades of brown

spreading fruitbody is mostly resupinate


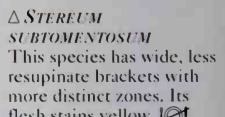


**FRUITING** Fully resupinate or with brackets on wood and walls in houses.

Dimensions FRUITBODY ⊕ to 50cm × to 10cm ⊕ 0.5–2cm

Spores Yellow to olive-brown

Edibility

Family <i>AURICULARIACEAE</i>	Species <i>Auricularia mesenterica</i>	Season All year
<h2>BRACKET JELLY</h2> <p>At first glance, this annual bracket could be mistaken for species of <i>Trametes</i> (pp.223–24) or <i>Stereum</i> (p.232 and below), but it is distinguished by, among other features, its gelatinous flesh. The zonation on the top surface is due to fine velvety hairs. The spore-producing underside of the bracket is wrinkled and veined. Although edible, it is not worth eating.</p> <p>• <b>OCCURRENCE</b> Found on deciduous wood; where there is dead elm, it can be abundant with other elmwood species. Absent in all but the southernmost part of the United States, but it is reported from Mexico south to Argentina.</p>		
 <p><i>rubbery, jelly-like flesh</i> •</p> <p><i>wrinkled and veined spore-producing surface</i> •</p> <p><i>velvety upper side zoned in brown and gray-brown</i> •</p>  <p><i>green coloring due to algae</i> •</p>  <p><b>FRUITING</b> In tiers on trunks and stumps.</p>		
Dimensions BRACKET ⊕ 4–15cm × 1–5cm ⊕ 2–5mm	Spores White	Edibility  ⊕

Family <i>CORTICIACEAE</i>	Species <i>Stereum hirsutum</i>	Season All year
<h2>HAIRY STEREUM</h2> <p>This species produces a long-lived, fan-shaped, bright yellow to tan bracket with a smooth spore-bearing surface that often runs down the substrate. The upper surface is hairy, with indistinct concentric zones; it is paler at the margin. The similarly colored flesh is thin but tough and does not stain. The spores are amyloid.</p> <p>• <b>OCCURRENCE</b> On deciduous trees, especially oak, birch, and beech; often on bark or on the cut surfaces of stored wood. Widespread in northern temperate zones; common in eastern North America.</p> <p>• <b>SIMILAR SPECIES</b> <i>Stereum gausapatum</i> and <i>S. rugosum</i> (p.232) are more resupinate and stain red. <i>S. ochraceo-flavum</i> is smaller with duller undersides.</p>		
 <p><i>brackets can be densely layered</i> •</p>  <p><i>smooth, spore-producing underside</i> •</p>  <p><i>concentric zones in shades of yellow to tan</i> •</p>  <p>△ <b>STEREUM SUBTOMENTOSUM</b> This species has wide, less resupinate brackets with more distinct zones. Its flesh stains yellow. ⊕</p>		
 <p><i>wavy, lobed margin</i> •</p>  <p><i>hairy upper surface</i> •</p> <p><b>FRUITING</b> Appears in abundant linked brackets.</p>		
Dimensions BRACKET ⊕ 2–6cm × to 3cm ⊕ 1–2mm	Spores White	Edibility  ⊕

Family CORTICIACEAE

Species *Chondrostereum purpureum*

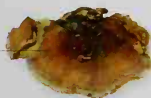
Season All year

## PURPLE SILVER-LEAF STEREUM

This fungus is easy to identify because of its habit of producing a multitude of wavy-margined brackets, which are purple when young. The upper surfaces are white-downy; the undersides are smooth and purple-brown. When dry, they tend to be hornlike in texture. The flesh is waxy and somewhat gelatinous. Unlike *Stereum* species, the spores do not develop a blue coloring with iodine reagents.

• **OCCURRENCE** Parasitic or saprotrophic on many deciduous trees; causes silver-leaf disease on cherry and plum trees, eventually producing white rot in the wood. Widespread in northern temperate zones; common in most regions.

smooth spore-producing surface is purple-brown



fuzzy or downy upper surface often looks almost white

wavulating bracket margin



fused and tiered brackets



tough, leathery flesh is somewhat gelatinous



FRUITING In tiers and rows of linked brackets.

Dimensions LINKED BRACKETS ⊕ 2–5cm × to 4cm ⊕ 1–2.5mm

Spores White

Edibility

Family HYMENOGHAEACEAE

Species *Hymenochaete rubiginosa*

Season All year

## RIGID LEATHER BRACKET

This well-camouflaged, rigid, perennial bracket fungus with wavy margins occurs in abundant tiers. The top surface is marked with concentric brown zones, increasing in number and becoming very dark with age; the cocoa-brown underside seems smooth, but examination with a powerful hand lens reveals a covering of tiny rigid hairs (setae). The flesh is very tough, thin, and cocoa-brown.

• **OCCURRENCE** Grows on the stumps or fallen branches of oak. Widespread and common in eastern North America.

upper surface brown, becoming very dark with age

cocoa-brown underside

zones increase with age

margins wavy and sometimes lobed

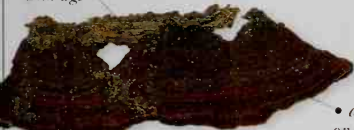


minute, stiff hairs cover underside

underside appears smooth



dark brown zones on upper surface



FRUITING In crowded tiers of brackets.

Dimensions BRACKET ⊕ 1–6cm × 1–4cm ⊕ 1mm

Spores White-cream

Edibility

## SKINLIKE; GROWING FLAT OR CRUSTLIKE

**I**N THIS SUBSECTION are some of the many fungi that produce fully resupinate, skinlike fruitbodies on the underside of fallen wood. They range from white to pink or deep blue. The spore-producing surface (hymenium) of these species can be smooth, warty, spiny, or veined. (See also pp.228–31.)

Family CORTICIACEAE

Species *Stereum rugosum*

Season All year

### RED-STAIN STEREUM

This abundant woodland fungus, which may grow for several seasons, forms a thick, flat, rather featureless, pale gray skin on bark; brackets rarely occur. Scraping the surface of the fungus soon produces blood-red marks. The spores are amyloid.

• **OCCURRENCE** On deciduous trees, often standing dead trunks; frequently found on hazel, birch, and alder. Widespread and common in Europe; probably also in a wider area in northern temperate zones.

• **SIMILAR SPECIES**

*Stereum sanguinolentum* also stains red when damaged, but it is found on bark of conifers and has distinct brackets.



• white growing margin

• blood-red where surface is scratched

• fungus is typically resupinate

• smooth or warty spore-producing surface

fruitbody is smooth or

• warty



**FRUITING** Long, skinlike patches on dead wood.

Dimensions FRUITBODY ⊕ 10–50cm × 1–6cm ⊕ 2–5mm

Spores White

Edibility

Family POLYPORACEAE

Species *Schizopora paradoxa*

Season All year

### SPLIT-PORE POLYPORE

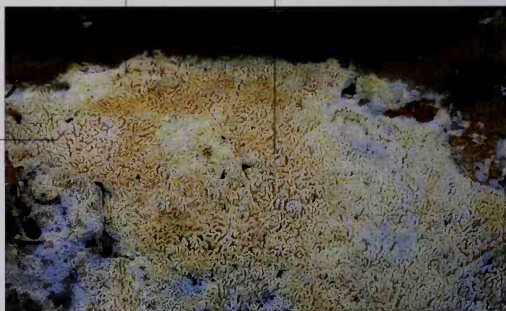
This fungus usually grows flat, but may produce tiny brackets when on vertical surfaces. It is fairly tough and white to creamy brown with cottony white margins and teeth up to 4mm long in the center. The tube layer is 1–4mm thick and has 1–3 pores per mm; when examined under a hand lens, the pores often resemble flattened teeth.

• **OCCURRENCE** Mainly on deciduous trees, particularly beech, in woods; causes white rot. Widespread and common in northern temperate zones; cosmopolitan.

fruitbody usually resupinate

white margins are cottony in texture

white to creamy brown center with toothed surface



**FRUITING** Appears in skinlike, spreading patches on the underside of fallen branches.

Dimensions FRUITBODY ⊕ 5–50cm × 2–10cm ⊕ 3–7mm

Spores White

Edibility

# SKINLIKE; GROWING FLAT OR CRUSTLIKE

Family CONIOPHORACEAE

Species *Coniophora puteana*

Season All year, mainly autumn

## WET-ROT MUSHROOM

The spreading fruitbodies of this wet-rot fungus are soft textured and grow flattened against the substrate, never forming brackets. Maturing spores make the centers yellow to olive-brown, whereas the margins are white and fringed. Typically, the fruitbody surface becomes wrinkly and warty with age. Unlike most resupinate species, which are firmly fixed to the substrate, Wet-rot Mushroom fruitbodies can be lifted gently off.

• **OCCURRENCE** On wet wood indoors, causing wet brown rot, and on all types of wood outdoors. Widespread in the wild and in buildings, in northern temperate zones.

• **SIMILAR SPECIES** *Serpula lacrymans* (p.229) exudes droplets and may form brackets.



FRUITING Resupinate fruitbodies over substrate.

creamy white new growth will turn pale yellow and then darken

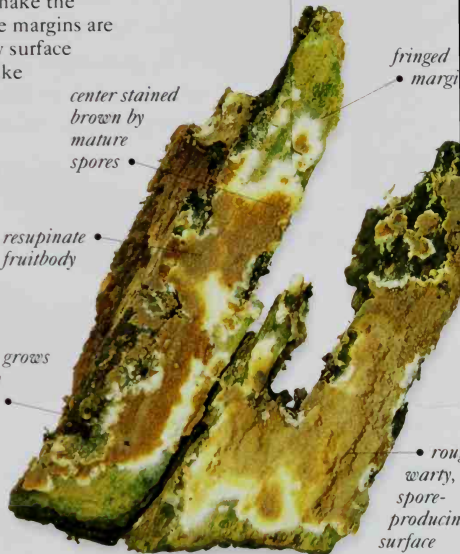
fringed margin

center stained brown by mature spores

resupinate fruitbody

fruitbody grows on woody substrate

rough, warty, spore-producing surface



Dimensions FRUITBODY  $\oplus$  5–100cm  $\times$  2–20cm  $\oplus$  0.5–1mm

Spores Yellow-brown

Edibility

Family POLYPORACEAE

Species *Oligoporus rennyi*

Season Autumn

## POWDER-PUFF POLYPORE

This spreading polypore is most easily recognized by its two growth stages, which occur almost simultaneously, next to each other. The resupinate, crustlike sexual stage is white at the edge, creamy white in the center, with 2–3 pores per mm. The pores become torn with age and release white spores. The asexual stage is puffball-like at first, shredding open at maturity to expose a great mass of powdery, olive-brown spores.

• **OCCURRENCE** Small patches on stumps and fallen branches of conifers; produces a brown rot in the wood. Widespread and rare to common, but usually overlooked, in northern temperate zones.

puffball-like asexual stage

crustlike sexual stage

cream-white with pores in center

fuzzy white periphery



FRUITING Grows in small patches, sometimes many together, along wood.



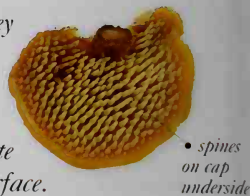
Dimensions PATCHES  $\leftrightarrow$  to 7.5cm | "PUFFBALL"  $\updownarrow$   $\leftrightarrow$  2–4cm

Spores Olive-brown/white

Edibility

# FUNGI WITH SPINES

The fungi in this section are not closely related, but they all have their spore-producing cells (basidia) on a toothed or spiny surface. The spines are found under the cap, on the underside of a bracket, or hanging from the branches of coral-like fruitbodies. Some resupinate species (not featured) have spines all over their surface.

Family *AURISCALPIACEAE*Species *Auriscalpium vulgare*

Season All year

## PINECONE TOOTH

Among the most distinctive of fungi, this mushroom has a characteristic kidney-shaped cap, which has a furry or hairy surface with the stem attached to one side. The cap is brown with a paler margin, and its underside is hung with long, gray spines. The stem is a darker brown than the cap and has a felty covering. It is attached to the substrate by a felted pale brown mycelium. The brown coloring makes this species difficult to spot, despite the fact that it is common. It has tough, inedible flesh.

• **OCCURRENCE** On decaying pine and, to a lesser degree, spruce cones in needle litter, in mature conifer woods or stands. Widespread in pine, spruce, and Douglas fir forests of northern temperate zones.

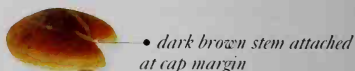
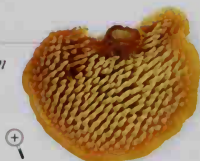
*fine hairs on cap surface*

- 



*attachment point for stem*

- 



*felty brown covering*

- on stem

*pale cap margin*

- 



• *fruitbody springs from buried or half-buried pine cone*



**FRUITING** Appears singly or in pairs of fruitbodies.

Dimensions CAP ↔ 0.5–2cm | STEM ↓ 3–10cm ↔ 2–3mm

Spores White

Edibility

Family TREMELLACEAE	Species <i>Pseudohydnum gelatinosum</i>	Season Autumn–winter
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## TOOTHED JELLY

Varying in color from almost white to dark gray-brown, this bracketlike jelly mushroom has a more or less semicircular cap, with a slightly rough or downy surface, and a short, fat stem, often attached at the side. The underside is covered with pale spines. Although edible, it is not worthwhile.

• **OCCURRENCE** On rotting conifers; rarely on well-rotted deciduous stumps or fallen branches. Widespread in northern temperate zones. Also occurs in warmer regions throughout North America.

gray-white to dark brown cap surface is downy or rough

flesh is gelatinous and semitranslucent

pale spines bear spore-producing tissue

bracketlike fruitbody

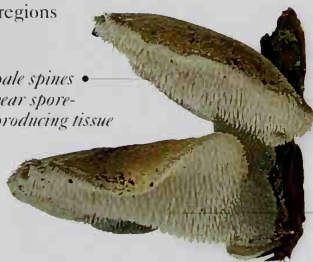
short stem at side of cap

spines are arranged vertically

SPINES



**FRUITING** Typically appears in groups of a few together.



1cm

Dimensions CAP ↔ 1–8cm   STEM ↓ 0.5–3cm ↔ 0.5–1.5cm	Spores White	Edibility
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Family THELEPHORACEAE	Species <i>Bankera fuliginosalba</i>	Season Autumn
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## BLUSHING FRAGRANT TOOTH

Misshapen caps are common in this species because it tends to lift part of the substrate as it emerges. It has a pale brown cap, which becomes red tinged with age; the spore-bearing spines beneath are dense and gray to white. The stem is white to gray toward the top, brown at the base. The relatively soft, unzoned flesh is fragrant and turns pale pink with age.

• **OCCURRENCE** Mycorrhizal with pine. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Bankera violascens* has a clean, regularly shaped cap with lilac tints; it grows with spruce. *Sarcodon* species have colored spores.



cap incorporates debris from substrate

white to gray zone at stem top

brown lower stem

cap develops central depression with age

SECTION



**FRUITING** Singly or in small clusters on dry, sandy soil.



stem central or positioned near margin

gray to white spines, to 5mm long



Dimensions CAP ↔ 5–10cm   STEM ↓ 2–6cm ↔ 1–3cm	Spores White	Edibility
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Family THELEPHORACEAE	Species <i>Phellodon niger</i>	Season Late summer–autumn
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**BLACK TOOTH**

Fruitbodies of this species are often fused together. The cap is flat or has a slightly depressed center and is pale gray to purplish black; in young specimens the margin is a distinct pale blue. The spines are blue-gray at first, turning gray. The leathery black flesh smells of curry.

• **OCCURRENCE** Mycorrhizal with conifers in woods or stands, sometimes among deciduous trees, on calcareous soil. Widespread but local in northern temperate zones.

• **SIMILAR SPECIES** *Phellodon melaleucus* smells similar but is thinner, paler, and less felty. It is found on poor, acidic soil in woods.




*faint zones on cap surface, which is covered in dense felt* •

*blue-gray spines, to 3mm long, darken with age* •


*spines are decurrent* •

*densely felty, dark brown stem* •

• *fused fruitbodies*

FRUITING Singly or in dense clusters among moss.

Dimensions CAP ↔ 3–10cm   STEM ↓ 2–5cm ↔ 0.5–2cm	Spores White	Edibility 
--	--------------	--

Family THELEPHORACEAE	Species <i>Phellodon tomentosus</i>	Season Late summer–autumn
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**FUNNEL TOOTH**

This tooth fungus has a centrally depressed cap with the surface marked in zones of shades of brown, vertical spines on the underside, and a fibrous dark brown stem. The growing margin on the cap is thin and white, and caps are often fused together. The inedible, tough flesh is thin and brown. Dried fruitbodies smell of curry or fenugreek.

• **OCCURRENCE** Mycorrhizal with conifers or, rarely, deciduous trees in woods, on sandy soil. Widespread but local in northern temperate zones.

• **SIMILAR SPECIES** A range of tooth fungi look fairly similar, including some species of *Hydnellum* (see p.237), which have brown spores. *Phellodon confluens* has a more felty surface, has fewer zones, and is paler in color with more irregularly shaped caps.

*spines, to 3mm long, are arranged vertically* •

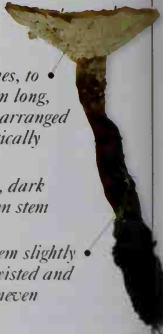
*fibrous, dark brown stem* •

*stem slightly twisted and uneven* •


*thin, sharp cap margin* •

*cap flesh is thin but tough* •

*cap has depressed center and clear zones* •


FRUITING In groups among mosses and lichens.

Dimensions CAP ↔ 2–6cm   STEM ↓ 2–5cm ↔ 4–7mm	Spores White	Edibility 
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Family THELEPORACEAE	Species <i>Hydnellum peckii</i>	Season Autumn
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**BLOODY TOOTH**

The cap of this fleshy species is flat to depressed with a knobby surface and a spiny underside. It is velvety white at first, darkened by blood-red droplets exuded as the fruitbody grows. Later it becomes brown with wine-red tinges. The tapering stem is a similar color. The corky brown flesh has an extremely unpleasant taste.

- **OCCURRENCE** Mycorrhizal with pine and spruce in woods and stands, including sand dunes planted with pine. Widespread but local in northern temperate zones.
- **SIMILAR SPECIES** *Hydnellum ferrugineum* has a mild taste. Other species do not develop the red droplets.

spore-bearing surface has spines 3–4mm long

blood-red droplets in young, growing specimens

dark, knobby surface of mature cap

FRUITING In small clusters in moss or lichen.

Dimensions CAP 3–7cm   STEM 1–6cm ↔ 0.5–2cm	Spores Brown	Edibility
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Family THELEPORACEAE	Species <i>Sarcodon scabrosus</i>	Season Autumn
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**BLUE-FOOTED SCALY TOOTH**

In common with all members of the genus, this species is large and fleshy. Its often centrally depressed cap has an uneven, scaly, dark brown surface, and its stem is dark brown with a steel-blue base. The pale flesh has a cheesy texture and yeasty smell. Most *Sarcodon* species taste bitter, but some, like *S. imbricatum*, can be enjoyed by many people after they are thoroughly cooked.

- **OCCURRENCE** Mycorrhizal with trees in both deciduous and coniferous woodland. Widespread but local to rare in northern temperate zones. *Sarcodon* species are on the decline; several are considered to be endangered.
- **SIMILAR SPECIES** *S. glaucopus* has a smoother cap and a blue stem base.

dark brown scales on cap surface

spines are purple-brown with pale tips

short, thick stem is steel-blue at base

spines to 1cm long

SECTION pale flesh is blue-tinged at stem base

FRUITING Appears in clusters or rings.

Δ **SARCODON IMBRICATUM** This brown species does not have a blue stem base. It has a scaly cap, to 20cm across, and mild to sharp flesh.

Dimensions CAP 4–14cm   STEM 3–8cm ↔ 1–3.5cm	Spores Brown	Edibility
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Family HYDNACEAE	Species <i>Hydnum repandum</i>	Season Autumn
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## COMMON HEDGEHOG TOOTH

This very fleshy fungus has a massive, slightly off-center stem and a large, convex or centrally depressed cap, which is often irregular in shape. It has a smooth or slightly felted upper surface and fragile spines on the underside. Pale cream to ocher in color, the whole fruitbody stains orange with age and when bruised. This is a choice edible; older specimens should be cooked thoroughly, as the flesh can become bitter with age.

• **OCCURRENCE** Mycorrhizal with both deciduous trees and conifers in woods. Widespread in northern temperate zones, including cold regions.

• **SIMILAR SPECIES** *Hydnum albidum* has a white cap, smaller spores, and occurs on alkaline soil. Closely related *H. rufescens* is smaller and orange.



spines, • 4–6mm long, are usually decurrent

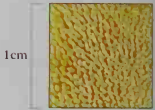
• orange staining



• fruitbody is pale cream to ocher

• closely clustered fruitbodies result in distorted caps

stem is typically thick and slightly off-center



1cm

CAP UNDERSIDE



depressed cap center



firm, white to cream or buff flesh

SECTION



FRUITING Appears in troops and clusters.



### Δ *HYDNUM UMBILICATUM*

This is a choice edible that resembles the Common Hedgehog Tooth, but is smaller, thinner, typically orange, and has a hole or cavity in the center of the cap. Widespread in North America. 101

Dimensions CAP ↔ 5–15cm   STEM ↓ 3–7cm ↔ 1–3cm	Spores White	Edibility 101
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Family **HERICIACEAE**

Species *Hericium coralloides*

Season Late summer–late autumn

## CORAL TOOTH

When it is spotted growing along a fallen trunk or similar substrate, this fungus is a breathtaking sight, with its off-white to dirty yellow fruitbody consisting of numerous brittle, coral-like branches, the lower surfaces of which are densely covered with long, pendent spines. The off-white or cream flesh has the texture of fresh crabmeat and greatly resembles it in appearance and taste when shredded and cooked.

### • OCCURRENCE

Found growing on fallen or standing, dead deciduous trees, such as beech and birch. Widespread in northern temperate zones; locally fairly common.



• *multibranched, coral-like fruitbody*



• *off-white to cream flesh*

• *fruitbody becomes dirty yellow with age*

• *pendent, off-white to dirty yellow spines*



**FRUITING** Singly or in groups along dead trunks.

Dimensions **FRUITBODY** ⬆ 10–40cm × 5–20cm ⬆ 10–30cm

Spores White

Edibility

Family **HERICIACEAE**

Species *Creolophus cirrhatus*

Season Autumn

## LAYERED TOOTH

This species has a layered, fleshy, semicircular fruitbody, which is creamy white and develops in tiers. The underside has long, pendent spines; the upper surface is felty. Although the thick, soft flesh is edible and smells and tastes pleasant, the species is rare so should not be gathered. It belongs to a very small genus, related and similar to *Hericium* (above).

• **OCCURRENCE** Mainly on deciduous trees, in woods. Widespread, in northern temperate zones.

• **SIMILAR SPECIES** The inedible huge *Climacodon septentrionalis* has more regular and larger brackets and finer spines underneath. It is found in northeastern Europe, Japan, Siberia, and northeastern North America to Tennessee.



**FRUITING** Appears in tiers on stumps or, rarely, trunks.



• *irregular layers of bracketlike fruitbodies*



• *spines on underside of fruitbody*

• *felty upper surface*

• *creamy white throughout*

Dimensions **FRUITBODY** ⬆ 10–20cm ⬆ to 10cm thick

Spores White

Edibility

# CLUB-SHAPED FUNGI

The species in this section have more or less club-shaped fruitbodies. In most of those featured, the fruitbody is fertile over its entire surface, or the base may be sterile.

In the flask-fungi (see p.244), the spore-producing surface (hymenium) is in tiny, flask-shaped fruitbodies embedded in a fleshy, club-shaped structure (stroma).



## SMOOTH OR HAIRY

**S**PECIES FEATURED HERE have club-shaped fruitbodies with a smooth or hairy surface. (For species with a pimply or dusty surface, see p.244.) They vary from the very slender

*Typhula* species to the much thicker *Clavariadelphus pistillaris* (p.241). Some, such as *Leotia lubrica* (p.243), have well-defined fertile heads, but in most, the fertile part merges with the stem.

Family CLAVARIACEAE	Species <i>Clavulinopsis helvola</i>	Season Autumn
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### YELLOW SPINDLE CORAL

Just one of several unbranched, club-shaped yellow species in this genus, Yellow Spindle Coral can be correctly identified only by examining the spores under a microscope: they have prominent warts on them, unlike the smooth spores of other members. The pale yellow flesh is rather brittle and odorless.

• **OCCURRENCE** In moss-rich meadows, mature lawns, and some wooded areas. Widespread in temperate regions of south-east Asia; common in Europe and northeastern North America.

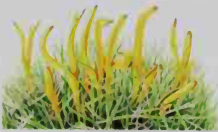
• **SIMILAR SPECIES** *Clavulinopsis fusiformis* has large clubs and tends to grow in dense clusters. *C. laeticolor* is odorless and yellow to orange-yellow. *C. luteoalba* is apricot-orange and has a musty smell.

*Clavaria angillacea* is dull yellow-brown and grows on heathland.



tip may be darker in color

more or less flattened fruitbody



**FRUITING** Appears singly or a few together in small groups.

smooth, spore-producing surface



△ **CLAVARIA VERMICULARIS** This species produces tufts of unbranched, club-shaped white fruitbodies. The tip of the club often dries yellow or tan. Fragile with brittle flesh, the fruitbody is hollow and may flatten as it ages.

Dimensions CLUB ↑ 3–7cm ↔ 2–4mm	Spores White	Edibility
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Family CLAVARIACEAE

Species *Clavariadelphus pistillaris*

Season Autumn

## GIANT CLUB CORAL

An impressive size for a club-fungus, this species is lemon flushed when young but becomes dull tan with age as the spores mature on the fruitbody surface. When bruised it stains reddish brown. Firm at first, becoming soft and spongy with age, the white flesh smells fairly pleasant but has a bitter taste.

• **OCCURRENCE** Found in woodland, often with beech. Widespread in northern temperate regions; local but can be common where habitats are suitable.

• **SIMILAR SPECIES** *Clavariadelphus lignula* and *C. sachalinensis* are smaller and less distinctly club-shaped; both occur with conifers. *C. truncatus* has a flat top and a sweet taste; it occurs in coniferous woods on rich soil.

fruitbody is lemon flushed when young, aging dull tan

large fruitbody is distinctly club-shaped

much of surface is covered with spore-bearing hymenium



**FRUITING** Appears in troops on soil among leaf litter in calcareous woodland.

Dimensions CLUB  $\updownarrow$  10–20cm  $\leftrightarrow$  2–6cm

Spores White to pale yellow

Edibility

Family CLAVARIACEAE

Species *Macrotyphula fistulosa*

Season Late autumn

## PIPE CLUB CORAL

Unmistakable when found, the Pipe Club has a slender, club-shaped, yellow to tawny-brown fruitbody; it looks similar to a leaf stalk so is easily overlooked. A fairly stunted and twisted form is less easy to identify and is sometimes considered an independent species, *Macrotyphula contorta*.

• **OCCURRENCE** On buried deciduous wood in damp leaf litter, especially among beech trees. Widespread in northern temperate regions and subarctic areas; across northern North America.

• **SIMILAR SPECIES** The closely related *M. juncea* has much thinner fruitbodies. It is common in damp woods and grows on leaf litter.



**FRUITING** Appears singly on decaying sticks.

club looks like leaf stalk

club varies considerably in thickness

pointed tip of fruitbody

spores produced all over surface except on stem

club darkens from yellow to tawny brown with age

stem and spore-bearing area merge subtly

club tapers toward base

Dimensions CLUB  $\updownarrow$  5–20cm  $\leftrightarrow$  2–8mm

Spores White

Edibility

Family CLAVARIACEAE

Species *Typhula erythropus*

Season Autumn–early winter

## TUBER CLUB CORAL

This tiny club-fungus has a white fertile head and a long, red-brown stem. The stem base is red where it emerges from an underground sclerotium. *Typhula* species are tiny and often overlooked. Most occur late in autumn and develop from small overwintered sclerotia. Depending on the species, these are often attached to a specific substrate such as bracken. Some can cause severe damage to certain crops.

• **OCCURRENCE** On fallen leaves, mostly of ash, maple, and alder, in damp deciduous woods. Widespread in northern temperate zones; common in eastern North America.



**FRUITING** Appears singly or in small groups.



• smooth, satin-white club-head

red-brown stem is long and thin

fine hairs cover red stem base

sclerotium is brown outside, white inside

club-shaped or cylindrical fertile head  
lens-shaped sclerotium looks flat when viewed from side

many sclerotia attached to leaf stalk

Dimensions CLUB  $\updownarrow$  0.5–3cm  $\leftrightarrow$  1–2mm

Spores White

Edibility

Family GEOGLOSSACEAE

Species *Geoglossum fallax*

Season Autumn

## SCALY EARTH-TONGUE ASCO

The club-shaped fruitbody of the Scaly Earth-tongue is dark brown with a scaly pattern on the upper part of the stem; most *Geoglossum* species have black fruitbodies. The spores are produced in the fertile head of the club, which is lined with the hymenium.

• **OCCURRENCE** On unimproved grassland; the use of fertilizers and planting of conifers on marginal lands are threatening many *Geoglossum* species.

Widespread and quite common throughout Europe and eastern North America, although easily overlooked.

• **SIMILAR SPECIES** *Trichoglossum* species are distinguished by stiff hairs, which are embedded in the flesh and penetrate the surface like bristles.



**FRUITING** In small groups in moss or hidden in tall grass.



minute brown scales are visible at stem top



club-shaped fruitbody is dark brown

swollen fertile head contains spores



### Δ TRICHOGLOSSUM HIRSUTUM

This species has a club-shaped, bristly black fruitbody. The upper part contains asci producing long spores; the stem is sterile.

SECTION

• brown flesh

Dimensions CLUB  $\updownarrow$  3–7cm  $\leftrightarrow$  3–7mm

Spores Dark brown

Edibility

Family LEOTIACEAE

Species *Leotia lubrica*

Season Autumn

## JELLY BABIES ASCO

This distinctive species produces a small, pestle-shaped fruitbody with a rubbery texture and gelatinous flesh. The well-defined, convex, lobed head is greenish yellow with a clear, recurved margin and contains the spore-producing tissue. The orange-yellow stem is covered with minute green scales or dots and is often hollow. *Leotia lubrica* can develop a blackish green hue as a result of a fungal infection, but even healthy specimens often turn olive-green when they are fully mature.

• **OCCURRENCE** Found growing in damp woods among leaf litter and moss. Widespread and common in most northern temperate zones; cosmopolitan.



**FRUITING** Appears in clusters, often in large troops.

convex head • contains spore-producing tissue

minute green • scales or dots cover stem

well-defined fertile head with indistinct lobes •

gelatinous flesh • is sterile in stem

rubbery stem is orange-yellow

fruitbodies appear in clusters

SECTION



Dimensions CLUB ↓ 2–5cm ↔ 0.3–1cm

Spores White

Edibility

Family GEOGLOSSACEAE

Species *Mitrula paludosa*

Season Early summer–autumn

## BOG BEACON ASCO

With its glistening orange head and cylindrical white stem, this attractive, club-shaped mushroom is very aptly named. It has a smooth surface and watery, soft, yellow flesh. The club head contains the spore-bearing hymenium; the stem is sterile.

• **OCCURRENCE** In unpolluted, stagnant water with leaf litter. Prefers northern areas and higher altitudes in northern temperate zones.

• **SIMILAR SPECIES** *Bryoglossum rehmi* is found in drier areas and placed in the Leotiaceae family (above, pp.269, 271–73). *Heyderia* species are smaller and mostly occur on needle litter. *Spathularia flavida*, also found on needle litter, has a very flat, somewhat lobed, head.



**FRUITING** In small or large troops of fruitbodies.

grows in moss or on leaves or twigs •

yellow head contains spore-producing tissue

base of stem is darker than top

shape of head may vary

cylindrical stem is dingy white

fruitbody is club-shaped



Dimensions CLUB ↓ 2–5cm ↔ 0.2–1cm

Spores White

Edibility

# WITH PIMPLES OR A DUSTY SURFACE

**T**HE FUNGI in this subsection are mainly characterized by their pimply surface. The pimples are caused by flask-shaped fruitbodies embedded in the fleshy tissue (stroma). They are visible when the club is cut in half lengthwise. One species featured here, *Paecilomyces farinosus* (below), produces masses of loose, asexual spores on its surface, making it look dusty.

Family CLAVICIPITACEAE

Species *Cordyceps militaris*

Season Summer–autumn

## ORANGE CATERPILLAR ASCO

This parasitic flask-fungus emerges from its host as a club-shaped, orange-red composite fruitbody, called a stroma. The spore-producing asci are contained in flasks seen as spikes breaking through the surface on the upper region of the club, which is slightly swollen. The spores themselves are long and cylindrical and break into segments. The stem is smooth and paler in color.

• **OCCURRENCE** Mycelia invade and kill the larvae and pupae of moths, either in woods or grassland.

Widespread in northern temperate zones. Other *Cordyceps* species parasitize insects, spiders, or *Elaphomyces* truffles (p.259). The majority are tropical.

• **SIMILAR SPECIES** *C. bifusispora*, which is also parasitic on moths, is more yellow and has spores with club-shaped end cells.



**FRUITING** Appear singly or in small groups.

Dimensions CLUB ↓ 2–5cm ↔ 3–8mm

Spores White

Edibility

Family CLAVICIPITACEAE

Species *Paecilomyces farinosus*

Season Summer–autumn

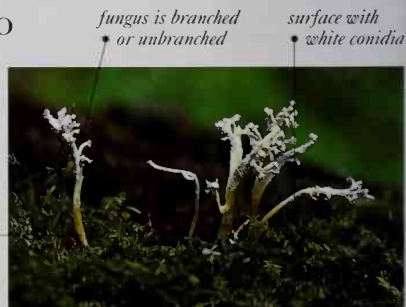
## COTTON CATERPILLAR ASCO

Thought to be the asexual stage of *Cordyceps militaris*, this fungus attacks the larvae and pupae of moths and, after consuming the host, produces erect, club-shaped structures. These may be orange or yellow, but their color is obscured by fluffy white masses of asexual spores (conidia), which are easily detached.

• **OCCURRENCE** Always grows on buried or partially buried larvae and pupae of moths, both in open grassy areas and in woodland.

Widespread and common in northern temperate zones.

orange, yellow, or brown base



**FRUITING** Appears singly or in small groups from the larvae and pupae of moths.

Dimensions CLUB ↓ 2–5cm ↔ 2–5mm

Spores White

Edibility

Family CLAVICIPTACEAE	Species <i>Cordyceps ophioglossoides</i>	Season Autumn—early winter
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## TRUFFLE CATERPILLAR ASCO

Parasitic on *Elaphomyces* truffles (p.259), this flask-fungus is attached to the underground fruitbody of the host by yellow threads that merge to form the stem above ground level.

The head of the club, the stroma, is olive-brown to black; its surface is roughened by tiny flasks embedded in the yellow-brown flesh and containing spore-producing asci.

**• OCCURRENCE**

Parasitic on *Elaphomyces muricatus* or *E. granulatus* in conifer and deciduous woods.

Widespread and locally common in northern temperate zones.

**• SIMILAR SPECIES**

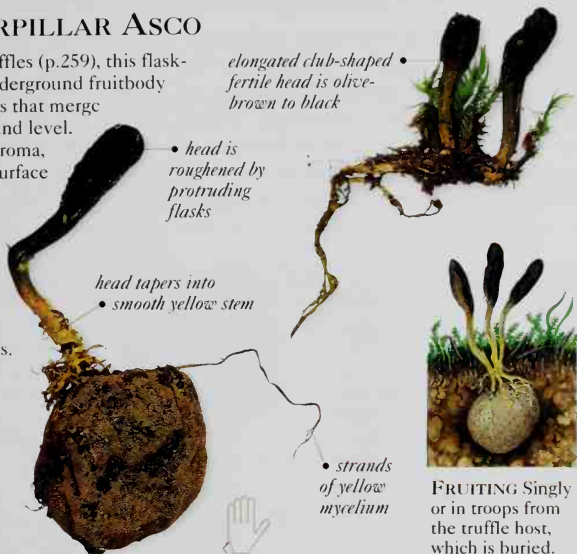
*Cordyceps capitata* and *C. longisegmentatis*, both with rounded heads, can also occur on the same host as *C. ophioglossoides*.

elongated club-shaped • fertile head is olive-brown to black

• head is roughened by protruding flasks

head tapers into • smooth yellow stem

• strands of yellow mycelium



**FRUITING** Singly or in troops from the truffle host, which is buried.

Dimensions CLUB ↓ 5–13cm including root ↔ 0.5–1cm	Spores White	Edibility
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Family XYLARIACEAE	Species <i>Xylaria polymorpha</i>	Season Summer—winter
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## DEAD-MAN'S FINGERS ASCO

This well-known flask-fungus has club-shaped composite fruitbodies, or stromata with thick white flesh. Each has a short, cylindrical stem and a rounded tip. Just below the surface and embedded in the flesh are flask-shaped organs that contain the spore-producing asci. The asci eject the long, mature spores by force through a tiny opening in the top of the flask, the ostiole.

**• OCCURRENCE** Often found at soil level attached to rotten wood such as tree stumps, especially of beech and elm trees but also birch and linden. Widespread and rather common in northern temperate zones, its range extending to the subtropics.

**• SIMILAR SPECIES** The more slender *Xylaria longipes*, which also has shorter spores, is largely confined to dead deciduous wood in northern temperate zones.

rounded • tip

rough white • flesh

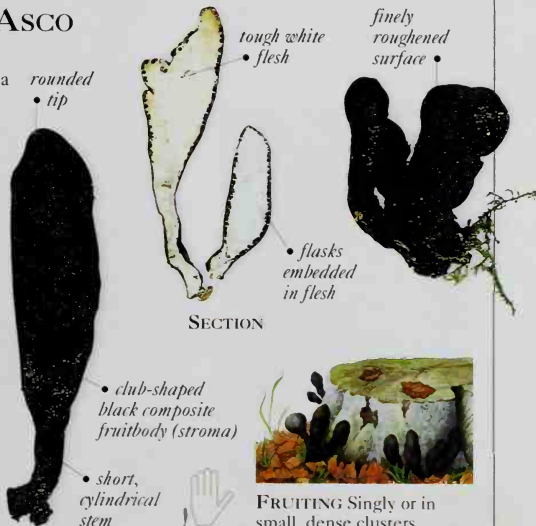
finely roughened surface •

• flasks embedded in flesh

SECTION

• club-shaped black composite fruitbody (stroma)

• short, cylindrical stem



**FRUITING** Singly or in small, dense clusters.

Dimensions CLUB ↓ 3–10cm ↔ 1–4cm	Spores Black	Edibility
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# PHALLUS-SHAPED

**T**HIS SMALL SUBSECTION comprises fungi with phallic fruitbodies, the Stinkhorns, which belong to the genera *Phallus* and *Mutinus*. They bear spores in a sticky, slimy substance, known as the gleba. In *Phallus* the gleba sits on a caplike structure; in *Mutinus* it is part of the top of the stem. When young, the

fruitbodies are egg-shaped and are surrounded by a skinlike structure called the peridium. It has a gelatinous, watery inner layer that protects the maturing gleba.

When mature, all fungi in this group have a penetrating putrid smell. This attracts flies, which aid spore dispersal.

Family PHALLACEAE	Species <i>Mutinus caninus</i>	Season Summer–autumn
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## DOG STINKHORN

The long-stemmed, off-white to dirty orange fruitbody of this species emerges from an egg-shaped structure with a leathery, off-white skin. The orange stem tip merges with the stem. It is covered with a foul-smelling slimy, olive-green spore mass, which attracts insects for dispersal.

• **OCCURRENCE** On thick leaf litter or needle litter, often around rotten stumps, in conifer and deciduous woods. Fairly common in Europe; worldwide distribution unclear.

• **SIMILAR SPECIES** *Mutinus elegans*, from North America but also spreading in Europe, has red stem coloring. It prefers gardens and parks. *Phallus impudicus* (p.247) and its relatives have distinct caps at the stem tip.



**FRUITING** Appears singly or in small troops.

Dimensions FRUITBODY ↑ 6–12cm ↔ 1–1.5cm	Spores Olive-green	Edibility
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Family PHALLACEAE

Species *Phallus impudicus*

Season Summer–autumn

## SHAMELESS STINKHORN

This species is often smelled before it is seen; members of the Phallaceae family are famous for their foul-smelling fruitbodies, which attract insects to disperse the spores. Mature specimens are easy to recognize by their phallic shape, formed by the white stem and the slimy, olive-green cap. Young fruitbodies are enclosed in an egglike structure with a thin, leathery skin that breaks open as the stem emerges. The section that becomes the stem is edible and can be extracted from the egg.

• **OCCURRENCE** In acidic conifer or deciduous woods and in sand dunes. Widespread and common in areas of northern temperate zones.

• **SIMILAR SPECIES** *Phallus ravenellii* is the common eastern North America species, differing by minor characteristics.

*P. duplicatus* (inset, below).

stem just about to emerge from egg



### SECTION

thick white cord anchors egg to substrate

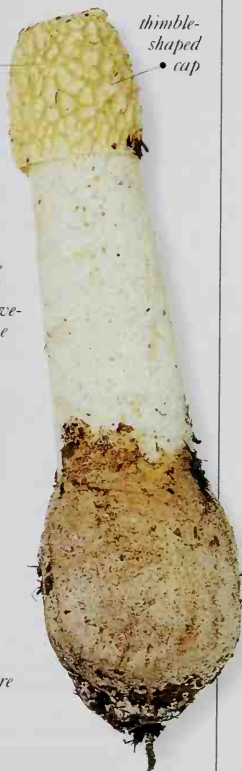


intact egg 4–7cm high and 3–5cm wide



**FRUITING** Appears singly or in small troops on acidic soil.

beneath slime, cap is honeycomb-like and white



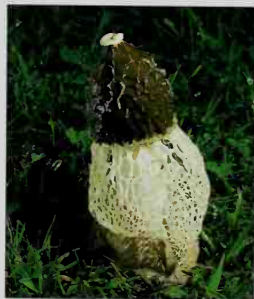
thimble-shaped cap

spores are contained within olive-green slime covering cap



spongy white stem has a cellular structure and is hollow

egg skin around base is thin and leathery



### Δ *PHALLUS DUPLICATUS*

This species has a distinctive, delicate, netted white skirt of tissue that flares out from beneath the base of the slime-covered, dark green cap. ⓘ

Dimensions FRUITBODY  $\updownarrow$  15–20cm  $\leftrightarrow$  1.5–3cm

Spores Olive-brown

Edibility ⓘ

# ANTLER- TO CORAL-LIKE FUNGI

*These species are an elaboration of the club-shaped mushrooms on pp.240–45. Some have only a few branches; others are more complex. In most cases, the branches are entirely covered with spore-bearing tissue, but those of *Sparassis crispa* (p.252) are fertile on one side only, and *Xylaria hypoxylon* is a flask-fungus (see p.244).*



• coral-like fruitbody

Family XYLARIACEAE

Species *Xylaria hypoxylon*

Season All year

## CARBON ANTLER ASCO

The young stromata, or composite fruitbodies, of this flask-fungus are very striking. Antler-shaped and white-powdered from asexual spores (conidia), they stand out strikingly on their deciduous stump substrate. The sexual spores develop within tiny, flask-shaped fruitbodies in the outer part of the stromata. By late autumn they have turned the stromata coal-black, and the tips have withered. The flesh is white, in common with most species of *Xylaria*.

• **OCCURRENCE** On deciduous trees especially on stumps, in parks and forests. Widespread and common throughout northern temperate zones.

• **SIMILAR SPECIES** *X. mellisii* is typically more branched when mature or has smoother stromata. It occurs in greenhouses and subtropical climates.

• mature stroma is uniformly black

• flasks embedded in white flesh

• mature spores are forcibly ejected from within flasks

• sterile part of composite fruitbody

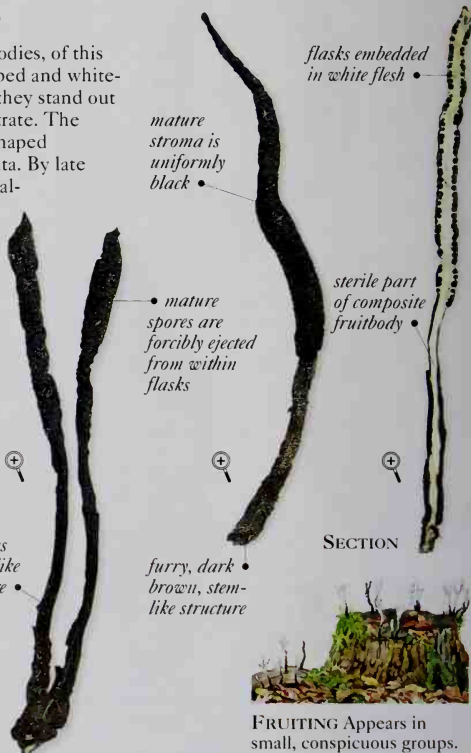


• branches on immature specimen are white from asexual spores

ASEXUAL STATE

• no flasks in stemlike structure

SEXUAL STATE



• furry, dark brown, stem-like structure

SECTION



FRUITING Appears in small, conspicuous groups.

Dimensions COMPOSITE FRUITBODY  $\updownarrow$  1–6cm

BRANCH  $\leftrightarrow$  1–4mm  $\times$  0.5mm

Spores Black

Edibility

Family CLAVARIACEAE	Species <i>Clavulinopsis corniculata</i>	Season Late autumn
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## MEADOW CORAL

One of the more common *Clavulinopsis* species, the Meadow Coral typically has many antlerlike branches, but the shape alters greatly with habitat. The fruitbody varies in color from sulfur-yellow to orange or tan; the base is white and has a feltlike surface, which turns green in contact with either dissolved or solid iron sulfate ( $FeSO_4$ ). The duller, thin, rather fragile flesh has a yeasty smell.

• **OCCURRENCE** In unimproved, moss-rich meadows, in some coastal scrub with hawthorn, and in damp, ash-dominated woods. Widespread in temperate regions.

• **SIMILAR SPECIES** *Ramariopsis crocea* has more pointed tips, is more golden, and does not react with  $FeSO_4$ . It typically occurs in woods.



**FRUITING** Appears singly or in small groups.

fruitbody has numerous branches

base is pale and felty

this specimen is a duller color than is typical

antlerlike branches

spores are borne on fruitbody surface

fruitbody varies from sulfur-yellow to orange or tan

branches have blunt, incurved tips

Dimensions FRUITBODY $\updownarrow$ 2–8cm   BRANCH $\leftrightarrow$ 0.5–2cm	Spores White	Edibility
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Family CLAVULINACEAE	Species <i>Clavulina cristata</i>	Season Summer–early winter
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## CRESTED CORAL

This familiar fungus varies greatly in overall shape and color but is easily recognizable due to its many fairly thick, often fused branches with distinctive crested tips. White and gray forms exist but they can hardly be distinguished from one another since intermediate shades also occur. The rather fragile flesh is white. Members of the very small Clavulinaceae family have relatively large basidia, each usually bearing only two spores on strongly curved, hornlike sterigmata (see pp.10–11).

• **OCCURRENCE** Found in damp places, such as ditch banks in forests, and on roadside shoulders. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Clavulina rugosa* is typically taller, wrinkled, and has fewer branches. *Ramariopsis kunzei* has branch tips that are not crested or fringed.

lower parts may be velvety and black due to fungal attack

off-white form

spores are borne all over fruitbody surface

fringed or crested tips

thick, more or less fused branches at base



**FRUITING** Appears singly or in small groups.

Dimensions FRUITBODY $\updownarrow$ 2–6cm $\leftrightarrow$ 0.5–3cm	Spores White	Edibility
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Family DACRYOMYCETACEAE

Species *Calocera viscosa*

Season Autumn–winter

## ANTLER JELLY

The many-branched fruitbody of this jelly-fungus is bright orange with tough, rubbery flesh. Members of the Dacryomycetaceae family are distinguished under a microscope by their tuning-fork-shaped basidia (see pp.10–11); spores are borne over most of the fruitbody.

• **OCCURRENCE** Only on dead or decayed wood of conifers. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *Calocera cornea* has small, unbranched clubs and grows on deciduous twigs. *C. furcata* is forked and grows on pine wood. Paler *C. pallidospatulata* is flattened and irregular; it can be locally common. *Gymnosporangium clavariiforme*, found on juniper, is less erect and without branches at the tips. Club-fungi (pp.240–47) grow mostly on the ground and are more fragile.



**FRUITING** Appears singly or in small, clustered groups.

decayed conifer substrate



flesh is rubbery and same color as surface

branches are bright orange

forking branches of antlerlike fruitbody

fruitbody is strongly attached to substrate

Dimensions FRUITBODY  $\updownarrow$  3–10cm  $\leftrightarrow$  0.5–4cm

Spores Yellow

Edibility

Family RAMARIACEAE

Species *Ramaria abietina*

Season Autumn

## GREENING CORAL

The verdigris coloring that stains the whole fruitbody of this fungus as it ages makes it easy to identify among the small, less fleshy *Ramaria* species. It is densely branched and dull brown to olive-brown when it first emerges, slowly turning green. The flesh is dull pale brown and fairly firm.

• **OCCURRENCE** On thick needle beds under conifers, especially spruce. Widespread throughout conifer forests of northwestern North America.

• **SIMILAR SPECIES** Larger *R. apiculata* is green on the branch tips only. *R. eumorpha*, *R. flaccida*, and *R. myceliosa*, among others, are similar but do not stain green.



**FRUITING** Almost always found in fairy rings.

verdigris staining appears with age



densely branched upper fruitbody

detached spores collect in branch angles

short, felted, pale stem

Dimensions FRUITBODY  $\updownarrow$  3–8cm  $\leftrightarrow$  1.5–4cm

Spores Ocher

Edibility

Family RAMARIACEAE	Species <i>Ramaria botrytis</i>	Season Autumn
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## PINK-TIPPED CORAL

Dense, white to pale brown branches with purple tips help to identify this fungus, which is typically very fleshy. The lower part of the stem is very thick and stubby. The white flesh is firm with a pleasant, fruity

smell, but eating it cannot be recommended because of identification problems (see SIMILAR SPECIES).

• **OCCURRENCE**

On the ground under conifers, especially fir and spruce. Widespread in northern temperate and warm-temperate zones.

• **SIMILAR SPECIES**

*Ramaria formosa* is a more colorful orange-pink without contrasting tips and is poisonous. There are 20 other similar species.

distinct purple tips on dense branches



Δ *RAMARIA SANGUINEA*  
Rarer than *R. botrytis*, this species has thick yellow branches, the lower surfaces of which develop red spots with age or if bruised.

• numerous crowded branches with 5-7 forks

• white to pale brown fruitbody

• thick, stubby lower stem



FRUITING Appears singly or in fairy rings or lines.

Dimensions FRUITBODY ↔ 7-15cm	Spores Ocher	Edibility
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Family RAMARIACEAE	Species <i>Ramaria stricta</i>	Season Later summer-winter
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## BITTER CORAL

This many-branched fungus is typically erect and taller than it is wide, but size and shape vary greatly. Its branches are pale orange-yellow, aging to ocher-brown, with pale yellow tips. The fairly firm, bitter-tasting flesh stains wine-red and has a spicy smell. Young fruitbodies can be citrus-yellow all over.

• **OCCURRENCE** Usually on half-buried deciduous wood, often beech, but also on sawdust. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES**

*Ramaria gracilis* is paler with a distinct anise smell. It occurs mostly with conifer litter.

older specimens can be fairly dark red-brown

branches have pale yellow tips

detached spores collect in the branch angles

erect fruitbody

firm, comparatively thin base

white mycelial cords attach fruitbody to substrate



FRUITING Singly or in lines on rotten branches.

Dimensions FRUITBODY ↔ 4-12cm ↔ 3-8cm	Spores Ocher	Edibility
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Family SPARASSIDACEAE

Species *Sparassis crispa*

Season Late summer–autumn

## CAULIFLOWER MUSHROOM

A multitude of lobes forming an impressive fleshy, cream to pale yellow-brown fruitbody are characteristic of this species, which is borne on a short, thick, rootlike stem. The lobes are branched, flattened or ribbon-like, and fairly firm; like all members of this small family, the spore-producing layer is on one side only. Although difficult to clean, its pleasant taste and large size make it a very popular edible.

• **OCCURRENCE** Mostly on pine, in stands and native woods; causes brown rot.

Widespread in northern temperate zones; common in western North America.

• **SIMILAR SPECIES** *Sparassis brevipes* is paler and tougher. It grows mostly on oak, beech, or fir. In eastern North America *S. herbstii* (*S. spathulata*) occurs on deciduous trees.



SECTION

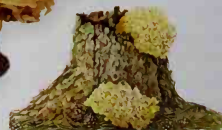
• densely packed, branched lobes

strongly folded, cauliflower-shaped  
• fruitbody

spore-producing layer on one side  
• of lobes only



fruitbodies may weigh up to 30lb; 2–20lb is typical



**FRUITING** Mostly singly on dead or dying conifer stumps.

Dimensions FRUITBODY  $\updownarrow \leftrightarrow$  10–40cm

Spores White to pale yellow

Edibility 

# ROUNDED FUNGI

The fungi in this section are varied, but all produce rounded fruitbodies. With the exception of the Aborted *Entoloma* (below), those that occur above ground are puffballs, earthballs, and some flask-fungi (see p.244). Rounded fungi below ground are the truffles (pp.258–59), some of which are famous for their flavor.



• rounded fruitbody

## ABOVE GROUND

**T**HE FUNGI in this subsection are characterized by their stemless, rounded fruitbodies. (For rounded fruitbodies with stems see pp.260–63.) Some of the species are Basidiomycetes (see pp.10–11). They produce their spores within the fruitbody. The spores

are released when its skin breaks down with age or when a pore develops on its top at maturity. Other species that are featured here are flask-fungi (see p.244). These have tiny, flask-shaped fruitbodies embedded in compound structures known as stromata.

Family ENTOLOMATACEAE	Species <i>Entoloma abortivum</i>	Season Autumn
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### ABORTED ENTOLOMA

A choice edible, the Aborted *Entoloma* normally produces rounded, lumpy white fruitbodies. These are thought to be the result of parasitizing the Honey Mushroom, *Armillaria mellea* (p.80). Cap and stem fruitbodies are occasionally produced, with caps to 10cm across and stems to 10cm high and 1.5cm wide. They are gray with decurrent pink gills. The white flesh smells of cucumber or fresh bread; in aborted forms it is pink-veined.

• **OCCURRENCE** On deciduous trees in open woodland. Widespread and common in eastern North America.  
 • **SIMILAR SPECIES** No other fungus produces aborted forms like this, but the cap and stem fruitbody are similar to other *Entoloma* species. However, they typically occur on the ground and lack decurrent gills. Many are poisonous, so it is unwise to eat isolated un-aborted forms of *Entoloma abortivum*.

cap is convex and gray to gray-brown

decurrent, off-white gills age to grayish white or pink

stem is not always central under cap

firm white aborted form is irregularly rounded

pale yellow patches may be visible



FRUITING Clusters of rounded forms with scattered cap and stem fruitbodies.

Dimensions ABORTED FORM ↑ 2.5–5cm ↔ 2.5–10cm	Spores Pink to salmon-pink	Edibility 101
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Family LYCOPERDACEAE

Species *Calvatia gigantea*

Season Summer-autumn

## GIANT PUFFBALL

This is one of the best-known edible fungi. Its huge, ball-shaped, white or cream fruitbodies regularly weigh above 9lb, and record finds are over 44lb. Most of the interior of the fruitbody consists of a huge number of spores; the lower, sterile part is much reduced.

Its flesh is firm in texture and white when young.

## • OCCURRENCE

Saprotrophic; in disturbed sites with nutrient-rich soil, in fields, woodland edges, and parks. Widespread and locally common in northern temperate zones. Other giant puffball species are common in western North America.



SECTION

• huge, ball-shaped, white or cream fruitbody



leathery, smooth outer skin  
rots away to allow spores  
• to escape

• flesh is edible when white and firm



•

spore-producing tissue becomes yellow then olive-brown with age



FRUITING Mostly appears in small fairy rings.

Dimensions FRUITBODY ↓ ↔ 20–50cm

Spores Olive-brown

Edibility 101

Family LYCOPERDACEAE

Species *Bovista plumbea*

Season Summer–autumn

## COMMON TUMBLING PUFFBALL

The white outer skin of this rounded fungus peels off at maturity, like the shell of a boiled egg, revealing a gray inner layer. Inside the ball is pale yellow tissue, which produces a huge number of spores. At maturity, the fruitbody of this and other *Bovista* species often becomes detached and rolls about, increasing spore dispersal, which occurs from a pore in the top.

This *Bovista* is not of great culinary interest.

• **OCCURRENCE** Saprotrophic; it is confined to grassland, especially dry grassland, and it tolerates fairly high fertilizer levels in the soil. Cosmopolitan except for humid lowland tropics.

• **SIMILAR SPECIES** The inner covering layer of *B. pila* is dark brown to bronze.



• golfball-like in size and shape

distinct pore in top allows spores to escape



• outer skin peels to reveal papery gray inner layer

### SECTION

pale yellow spore-producing tissue

two-layered skin (peridium)

• base is also fertile



**FRUITING** Mostly appears in groups or a few together.

Dimensions FRUITBODY  $\updownarrow$   $\leftrightarrow$  1–3cm

Spores Olive- to sepia-brown

Edibility

Family LYCOPERDACEAE

Species *Vascellum pratense*

Season Summer–autumn

## MEADOW PUFFBALL

The key identification characteristic of this spiny, white to pale brown species can be difficult to see: it is a kind of membrane separating the fertile, globe-shaped top part from the short, sterile stem part. The fruitbody usually has a rather flattened top with a large opening, through which the spores escape; the sterile part often persists until the next spring. Firm, fresh specimens can be eaten but taste bland.

• **OCCURRENCE** Saprotrophic; it is found growing on soil and organic matter in grassy areas such as lawns, parks, golf courses, and pastures. Virtually cosmopolitan, but absent in lowland tropics.

fertile tissue is minutely chambered

### SECTION

very thin, skin-like tissue separating sterile and fertile parts



flattened top of fruitbody

white fruitbody becomes pale yellow then pale brown

short stem

• mealy surface covered in fine spines



**FRUITING** Mostly appears in small groups.

Dimensions FRUITBODY  $\updownarrow$  1.5–3.5cm  $\leftrightarrow$  2–4.5cm

Spores Gray-olive to olive-brown

Edibility



Family SCLERODERMATACEAE

Species *Scleroderma citrinum*

Season Summer–autumn

## COMMON EARTHBALL

This hard, potato-like fungus, which is a familiar sight in damp woodland, has pale yellow skin covered with scales. It has a tough, pale yellow outer skin, which is 2–5mm thick, and its distinctive spore-filled, black interior is somewhat marbled. Inedible and poisonous, it can develop a strong metallic smell.

• **OCCURRENCE** Mycorrhizal with deciduous trees, mostly in damp woodland; it can be found with *Boletus parasiticus* (p.194). Widespread and common in areas of northern temperate zones.

• **SIMILAR SPECIES** Edible *Lycoperdon* species (pp.260–61) and *Tuber* species (pp.258–59) differ in overall shape, color, smell, and spore shape.



• firm black spore-bearing tissue is powdery when mature

SECTION

• tough skin is 2–5mm thick

• surface skin rots away, exposing spores for dispersal

• fruitbody resembles a potato

• brown scales on thick, pale yellow skin



**FRUITING** Often appears in clusters among moss.

Dimensions FRUITBODY 4–10cm

Spores Purplish black

Edibility

Family RUSSULACEAE

Species *Zelleromyces cinnabarinus*

Season Summer–autumn

## RED GASTROID LACTARIUS

Looking like a misshapen puffball, this species has the microscopic characteristics of a member of the *Lactarius* genus (pp.43–55) and, like *Lactarius* species, produces white “milk” when cut. The milk tastes mild and does not change color as it dries.

The spores are produced in chambers in the cinnamon-buff flesh. They are released as the fungus decays or are spread by animals, which eat the rounded fruitbodies.

• **OCCURRENCE**

Mycorrhizal with pine trees in areas of open woodland. Widespread and common in eastern North America, but easily overlooked in its habitat.

• thin skin is cinnamon-red to cinnamon-brown

• chambered, spore-bearing tissue is cinnamon-buff



• surface is smooth and dull

• irregularly rounded to ovoid fruitbody



**FRUITING** Scattered or several fruitbodies under pines, either on the soil surface or just beneath.

Dimensions FRUITBODY 3–5cm

Spores Pale cinnamon-buff

Edibility

Family XYLARIACEAE	Species <i>Daldinia concentrica</i>	Season All year
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## CRAMP BALLS ASCO

The rounded, rusty brown composite fruitbodies, or stromata, of this flask-fungus are large and have flesh that is zoned in dark and light bands. When the spores are mature, they are forcibly ejected from asci inside the spore-producing chambers, or flasks, just beneath the surface. The long-lasting stromata eventually turn black and become crumbly in texture.

• **OCCURRENCE** Mostly on still-standing, dead, or dying trunks of ash trees; also birch and other deciduous trees in parks and forests, especially following fire damage. Widespread in northern temperate zones; most of North America and in the United Kingdom.

• **SIMILAR SPECIES**

*Hypoxylon* species (below) have unzoned flesh.

rounded, stemless composite fruitbody has rough surface

surface is rusty brown when young



minute, spore-producing flasks are found just beneath surface



flesh is silver-gray and black in concentric zones



**FRUITING** Appears singly or in large or small groups.

SECTION

Dimensions COMPOSITE FRUITBODY 2–10cm	Spores Black	Edibility
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Family XYLARIACEAE	Species <i>Hypoxylon fragiforme</i>	Season All year
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## BEECH CUSHION ASCO

The fruitbodies (stromata) of this flask-fungus are stemless and range from pink through brick-red, becoming black when overmature. They have a hard, rough surface, just beneath which are the spore-producing, flask-shaped chambers. The flesh is black and hard.

• **OCCURRENCE** On bark of freshly fallen beech trees in forests. Widespread and common wherever beech occurs in northern temperate zones.

• **SIMILAR SPECIES** *Hypoxylon howeianum* occurs on other deciduous trees.

*H. rubiginosum* is flat, spreading, and reddish brown.

*H. fuscum* is purplish brown.

hemispherical composite fruitbody (stroma)



deposited spores darken surrounding bark



overmature black composite fruitbodies



**FRUITING** Appears in spreading troops on bark.

Dimensions COMPOSITE FRUITBODY 0.5–3cm	Spores Black	Edibility
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## BELOW GROUND

**T**HE MUSHROOMS featured here are among many that have tuberlike fruitbodies, produced below ground. The spore-bearing asci are enclosed in the fruitbodies. The *Tuber* species,

“truffles,” have fairly solid interiors and are related to *Peziza* (pp.266–67). Species of *Elaphomyces*, which are not true truffles, have a powdery interior when they reach maturity.

Family TUBERACEAE	Species <i>Tuber aestivum</i>	Season Summer
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### EURO SUMMER TRUFFLE

The least expensive of the true edible truffles, *Tuber aestivum* has a more or less round fruitbody with a rough surface covered in pyramidal black warts. Within the fungus, the solid flesh is gray-brown with white veins. Like its relatives, this truffle has a distinct aroma, reminiscent of seaweed, and a faint nutty taste. Flies are attracted to *Tuber* fruitbodies, helping collectors to pinpoint truffle sites.

- **OCCURRENCE** Found among roots of beech, birch, and oak trees. Widespread in southern and central Europe and southern Scandinavia.



*white veins run through solid, gray-brown flesh*

**SECTION**



- *fruitbody surface is covered with pyramidal black warts*




**FRUITING** Grows singly or in groups among tree roots.


Dimensions FRUITBODY ➔ 2–5cm	Spores Yellow-brown	Edibility 
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Family TUBERACEAE	Species <i>Tuber melanosporum</i>	Season Late autumn–early spring
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### PERIGORD TRUFFLE



The rough, coal-black surface of the irregularly shaped Perigord Truffle consists of many tiny, polygonal warts. The solid flesh is made brown by the spores and turns black with age; it has white veins and a distinctive smell and taste. Perigord Truffles are collected from the wild by skilled pickers using specially trained dogs or pigs, but inoculated seedlings of host trees are now commercially available.

- **OCCURRENCE** Under species of Mediterranean oaks and other host trees on alkaline, red Mediterranean soils. It is a warmth-loving species, confined to southern Europe where the annual yield is about 330 tons. Other edible *Tuber* species are found in North America.
- **SIMILAR SPECIES** *Tuber brumale* is found farther north. *T. macrosporum* has an almost smooth surface.




- *rough rind is made up of hundreds of polygonal warts*

- *coal-black surface on irregularly shaped fruitbody*


**FRUITING** Grows singly, buried among tree roots.



- *solid brown flesh with white veins*

**SECTION**

**FRUITING** Grows singly, buried among tree roots.

Dimensions FRUITBODY ➔ 2–7cm	Spores Dark brown	Edibility 
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Family TUBERACEAE

Species *Tuber magnatum*

Season Autumn–winter

## EURO WHITE TRUFFLE

The fruitbody of this choice edible is irregularly round in shape, pale ocher to cream, and has a smooth surface. Its cream-colored flesh has a spicy odor and flavor. The spores can be seen as darker cream-brown areas in the flesh. Attempts are being made to cultivate the species on a large scale by inoculating suitable host roots; if this is successful the prevalent high prices may drop.

• **OCCURRENCE** Buried in alkaline soil among the roots of oak, but also found among poplar and willow. Found in the Piemonte region of northwestern Italy and in France.

• **SIMILAR SPECIES** *Tuber gibbosum*, found in North America, also has pale flesh and is edible.



### △ *TUBER CANALICULATUM*

This is a rounded to egg-shaped, warty, reddish brown truffle. Its flesh is tan with white streaks. At maturity, the fruitbodies push up above ground or are uprooted by animals. It is a choice edible of North America. [O]



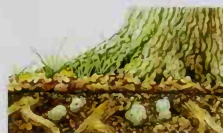
• fruitbody looks somewhat like a potato



cream flesh is marbled with white veins •



SECTION



**FRUITING** Grows singly, or in groups among tree roots.

Dimensions FRUITBODY ⊕ 2–8cm

Spores Brown

Edibility [O]

Family ELAPHOMYCETACEAE

Species *Elaphomyces granulatus*

Season All year

## COMMON FALSE TRUFFLE

This truffle has a thick-fleshed, scaly, warty, uniformly yellow-brown surface. Within the fruitbody, the spores are produced in a powdery mass that disperses when the skin breaks down at maturity.

• **OCCURRENCE** Mycorrhizal with a wide range of conifers and deciduous trees in woods and parks. *Cordyceps ophioglossoides* (p.245) parasitizes it and can be used to locate it. Widespread and common in Europe; also found in North America and Japan.

• **SIMILAR SPECIES**

*E. muricatus* has a marbled outer layer, just beneath the warty, yellow-brown rind.

scaly, warty surface is golden brown



powdery black interior at maturity •

SECTION



• fertile tissue is pale brown when immature



SECTION



**FRUITING** In large or small groups underground.

Dimensions FRUITBODY ⊕ 1.5–4.5cm

Spores Blackish brown

Edibility [O]

# PEAR- TO PESTLE-SHAPED FUNGI

*This section features puffballs and earthballs that typically have a short, stemlike base supporting the rounded, fertile top (see also pp.253–57). At maturity, the spores are released either through a pore in the top or as the outer skin breaks down. Drops of rain or other disturbance of the fruitbody helps to disperse the spores.*



• pestle-shaped fruitbody

Family LYCOPERDACEAE	Species <i>Lycoperdon pyriforme</i>	Season Autumn–winter
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## STUMP PUFFBALL

This is one of the more easily identified *Lycoperdon* species: identification marks include its elongated pear shape, its smooth surface at maturity, white cords at the base, and its occurrence on woody substrates – others in the genus grow on the ground. Young fruitbodies have a warty to spiny skin. They are edible, but not choice, when their flesh is firm and white.

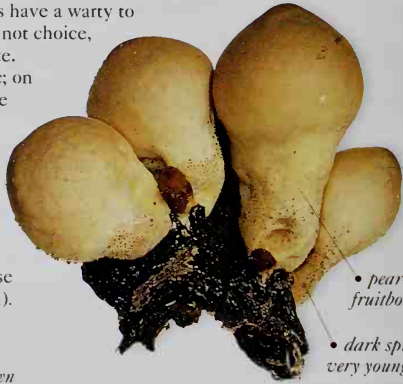
- **OCCURRENCE** Saprotrophic; on rotten deciduous wood and, more rarely, conifers in woods, open parks, and gardens. Almost cosmopolitan; absent in extreme climatic zones.
- **SIMILAR SPECIES** Found in open, wooded areas, *L. lividum* is also smooth, but is grayer and has warty spores (those of *L. pyriforme* are almost smooth).

young specimens have firm white flesh •

SECTION



• skin soon becomes grainy to smooth



• pear-shaped fruitbodies

• dark spines on very young fruitbody



• spore-bearing tissue is olive-brown when mature

• dense white sterile tissue in base

SECTION

rounded pore in mature specimen through which spores escape



skin becomes dark brown and papery when mature



**FRUITING** Typically in large, clustered groups.

Dimensions FRUITBODY ↓ 1.5–5cm ↔ 1–2.5cm	Spores Olive-brown	Edibility
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Family LYCOPERDACEAE

Species *Lycoperdon echinatum*

Season Autumn

## HEDGEHOG PUFFBALL

Long brown spines on the surface of the globe-shaped, tapering fruitbody give the Hedgehog Puffball its name. The spines fall off at maturity, leaving a distinctive net pattern on the dark brown surface. The spore-bearing tissue is white and firm when young, becoming brown at maturity when the lilac-tinted, chocolate-brown spores escape through a pore on the top; the sterile basal flesh also darkens with age.

### • OCCURRENCE

Saprotrophic; on alkaline soil in beech woods. Sometimes found beside the rarer, pink-tinged *Lycoperdon mammiforme*. In warmer parts of Europe and nearby parts of Asia.

### • SIMILAR SPECIES

*L. americanum* is similar in appearance and occurs in North America.

groups of 3 or 4 long spines meet at tips •

pore in top of mature fruitbody •

net pattern left where spines have fallen off

white mycelial cords attach fruitbody to litter



globe-shaped fruitbody tapers at base



FRUITING A few together, often on ditch banks.

Dimensions FRUITBODY  $\updownarrow$  3–7cm  $\leftrightarrow$  1–3cm

Spores Chocolate-brown

Edibility

Family LYCOPERDACEAE

Species *Lycoperdon perlatum*

Season Autumn

## COMMON PUFFBALL

Rounded, typically with a distinct stem, this white to yellowish brown species is covered with short spines, each surrounded by smaller, grainlike scales. A projection on the top marks where the pore, through which the spores escape, will form. At maturity, the spines fall off, leaving a regular pattern on the skin. The firm white flesh is edible when young, becoming darker and unpalatable with age.

• OCCURRENCE Saprotrophic; on soil, mainly in woods but also in grassland. Widespread;

common in northern temperate zones.

### • SIMILAR SPECIES

*Lycoperdon nigrescens* has longer, darker spines in groups, like those of the much longer-spined *L. echinatum* (above). The surface of both has a similar pattern when the spines fall off.

pore •

spore mass brown and powdery when mature •

conelike spines are lost with age

SECTION

spore-producing tissue ages darker

projection where pore will form

SECTION

grainlike spines around conical spines

sterile stem tissue is spongy



FRUITING In dense groups or occasionally singly.

Dimensions FRUITBODY  $\updownarrow$  4–7cm  $\leftrightarrow$  2–4cm

Spores Pale yellow to olive-brown

Edibility

Family LYCOPERDACEAE

Species *Calvatia excipuliformis*

Season Autumn

## PESTLE-SHAPED PUFFBALL

This buff-brown fungus typically has a tall stem with a rounded upper fertile part; short-stemmed specimens also occur. When mature, the outer skin breaks open and the brown spores within are dispersed by wind and rain. When young and firm, the fruitbodies are edible but fairly tasteless. The stem part becomes very tough as it matures and may even persist into the following season.

• **OCCURRENCE** Saprotrophic; on soil or turf in woods or open areas. Widespread and common in most parts of northern temperate zones, extending to subarctic and subtropical zones.

• **SIMILAR SPECIES** *C. elata* is widespread and common in North America. *Lycoperdon molle* resembles a short-stemmed specimen.



• fine-pointed scales on surface of upper part when young



• pale buff-brown immature fruitbody

outer skin breaks at maturity, revealing rich brown spore mass

fairly long stem develops furrows on surface when mature

fairly firm, white, spore-producing tissue in young specimen



• appears among moss or leaf litter

stem flesh is spongy in texture



SECTION

• stem does not produce spores



SECTION



FRUITING Mostly in small groups of fruitbodies.

Dimensions FRUITBODY  $\updownarrow$  5–20cm  $\leftrightarrow$  5–10cm

Spores Olive-brown to brown

Edibility

Family LYCOPERDACEAE

Species *Calvatia utriformis*

Season Summer–autumn

## MOSAIC PUFFBALL

This large species has pear-shaped fruitbodies with coarse scales, which are lost at maturity. The top skin rots away to reveal the powdery brown spore mass.

The lower, sterile part is white, aging to brown. Edible when young but not tasty.

• **OCCURRENCE** Saprotrophic; found growing in open, often coastal, areas.

Widespread in northern temperate zones.

• **SIMILAR SPECIES** *C. cyathiformis* has a lilac-tinted spore mass; common in eastern North America.

spore mass  
visible through  
hole in top

coarse, mealy,  
white scales

pear-shaped  
fruitbody with  
flat top



**FRUITING** Mostly in small groups among grasses, lichens, and low herbs.

Dimensions FRUITBODY  $\updownarrow$  5–10cm  $\leftrightarrow$  5–15cm

Spores Chocolate-brown

Edibility

Family SCLERODERMATACEAE

Species *Scleroderma verrucosum*

Season Autumn

## SCALY EARTHBALL

This fairly large species is pale yellow to brown and covered with irregular brown scales. It has a stemlike projection and thin skin, to 1mm thick. The spore-bearing tissue is white and smells metallic, soon turning dark purple-brown as it matures.

The spores are dispersed by wind as the outer skin of the fruitbody distintegrates.

• **OCCURRENCE** Mycorrhizal with deciduous trees such as oak and beech, growing in wooded areas and open parks.

Widespread and common in both northern and southern temperate zones.

brown scales  
on rounded  
fruitbody

partly buried  
stem under  
main fruitbody

white mycelial  
cords



**FRUITING** Mostly a few together or singly, often on bare soil.

Dimensions FRUITBODY  $\updownarrow$  5–10cm  $\leftrightarrow$  2–5cm

Spores Purple-black

Edibility

Family CALOSTOMATACEAE

Species *Calostoma cinnabarina*

Season Late summer–autumn

## PUFFBALL-IN-ASPIC

This species has a gelatinous outer layer and a red inner layer, breaking up to enclose the stem in a thick jelly, dotted with red pieces. The exposed, ovoid top is coated in a red powder that wears away to reveal a pale yellow ball with a cross-shaped opening for spore release.

• **OCCURRENCE** Found growing on the ground in open woods. Widespread and common in eastern North America.

• **SIMILAR SPECIES** *Calostoma lutescens* is yellow and extremely small. *C. ravenelii* is straw-yellow and not gelatinous.

red powder  
covers  
immature  
spore ball

stem sheathed  
in jelly filled  
with red pieces

red mouth for  
spore release



**FRUITING** Appears in small groups on the ground in open wooded areas.

Dimensions FRUITBODY  $\updownarrow$  2–5cm  $\leftrightarrow$  1–2cm

Spores White to cream

Edibility

# CUP- TO DISK-SHAPED

Although they all produce cup- or disk-shaped fruitbodies, the mushrooms in this section belong to two separate groups. The first group has more or less circular fruitbodies that are shallowly cupped or flat (pp.264–73); the second group has deeply cupped, nestlike fruitbodies containing tiny, lentil-shaped structures (p.274).



## WITHOUT “EGGS”

**T**HIS SUBSECTION features fungi that produce cup- or disk-shaped fruitbodies with a smooth, spore-bearing surface (hymenium) on the inner side of the cup or on the top of the disk. When mature, the spores are discharged violently (see p.16–17). The morels (pp.209–10) evolved from simple cup-fungi, but have distinct stems and are more elaborate in shape.

Family SARCOSYPHACEAE	Species <i>Sarcosypha austriaca</i>	Season Late autumn–early summer
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### CURLY-HAIRED ELF CUP

This fungus has tiny, corkscrewlike white hairs on the outside of the long-lasting, cup-shaped fruitbody, making it appear pale in contrast to the interior, which is bright scarlet. The cup margin is also fairly pale and may be finely toothed. The pale stem is often hidden in the substrate, and the pale red flesh is fairly firm but brittle. There is also a pure white form.

•**OCCURRENCE** Grows on wood substrates in deciduous areas. Widespread throughout Europe and probably in other parts of northern temperate zones.

•**SIMILAR SPECIES** *Sarcosypha coccinea* has straight hairs on the outside of the cup. Other species of *Sarcosypha* have more localized distributions and differ in spore characteristics and germination.



**FRUITING** Appears in troops on moss-covered rotting wood.



outer surface  
is covered with  
curly white hairs

stem is  
variable  
in length

fine serrations  
on pale margin

bright scarlet  
inner surface  
of cup

Dimensions CUP ↔ 1–8cm ↓ 0.5–3cm | STEM ↓ 0–3cm ↔ 3–5mm

Spores White

Edibility

Family OTIDEACEAE

Species *Tarzetta cupularis*

Season Summer–autumn

## DENTATE ELF CUP

The wine goblet-shaped fruitbody of the Dentate Elf Cup has small, triangular teeth at the cup margin and a short stem. Unlike other cup fungi that expand with age, its shape remains the same as the fruitbody matures. The outer surface of the fruitbody has a granular texture and is pale buff; inside the cup, the spore-producing layer (hymenium) is grayish cream.

• **OCCURRENCE** Found growing on nutrient-rich, calcareous or clay soil in parks and conifer forests. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES** Other members of this small genus occur in the same habitat. Size is the major distinguishing feature: *Tarzetta caninus* has the largest cup, reaching 5cm in diameter. Otherwise it is very difficult to differentiate between the species, although stem development and microscopic features can help.



**FRUITING** Appears in small groups, mostly on bare soil.

fruitbody is shaped like a wine goblet



Dimensions CUP ⊕ 0.5–1.5cm ↓ 0.5–2.5cm

STEM ↓ 0.3–1cm ↔ 2–4mm

Spores White

Edibility

Family MORCELLACEAE

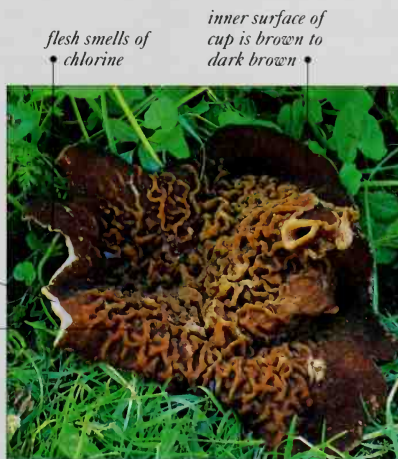
Species *Disciotis venosa*

Season Spring–early summer

## CUPLIKE MOREL

Initially cup-shaped, the rich, dark brown fruitbody of the Cuplike Morel flattens and may become convex as it ages. Its surface is distinctly ribbed and furrowed, particularly in larger specimens; the underside is off-white with a scurfy covering. The reduced stem is thick and off-white; the pale flesh is brittle and thick. Although eaten in parts of Europe, this species is hard to identify in North America; little is known about the edibility of its look-alikes.

• **OCCURRENCE** In parks and woods, often alongside *Morchella semilibera* (p.210). In deciduous woods in eastern North America; under conifers in the West. Widespread in most regions except arctic-alpine and tropical zones; worldwide distribution unclear.



flesh is pale with thick but brittle texture

ribs and furrows on surface of this mature specimen

**FRUITING** Appears singly or in groups on the ground, always growing on nutrient-rich soil.

Dimensions CUP ⊕ 4–10cm | STEM ↓ ↔ 2mm

Spores Cream


Edibility

Family PEZIZACEAE	Species <i>Peziza vesiculosa</i>	Season All year
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**BLADDER CUP**

This fungus has a tightly rolled, curved margin and a distinctive bladder shape with blisterlike pustules developing in cups. The outer surface is pale buff and granular; the inner spore-bearing surface (hymenium) is pale yellow-brown. The opening through which the spores are released is small and, unlike most other *Peziza* species, it barely expands with age.


- **OCCURRENCE** In parks, gardens, and around farm buildings on nutrient-rich substrate such as composted manure, mulch in flower beds, and rotting straw. It is often found near other cup-fungi and ink caps (*Coprinus* species, pp.174–76). Widespread and common in northern temperate zones.



- mealy, granular covering on outer surface
- pale yellow-brown inner surface
- incurved cup margin
- small opening for spore escape
- brittle flesh is comparatively thick



**FRUITING** Appears in dense clusters or singly.


Dimensions CUP 3–10cm ↑ 1–4cm	Spores White	Edibility 
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Family PEZIZACEAE	Species <i>Peziza badia</i>	Season Summer–autumn
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**OLIVE-BROWN CUP**

A liver-brown fruitbody that becomes darker olive-brown inside as it matures is characteristic of this species, although it is positively distinguishable from other brown *Peziza* species only with the use of a microscope. This reveals, among other things, an incomplete net ornament on the spores. The fruitbody is stemless with a granular, reddish brown outer surface and thin, reddish brown flesh.


- **OCCURRENCE** On sandy soil by paths in conifer stands, or banks of ditches in boggy areas close to birch trees. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** Paler brown species, such as *P. micropus*, *P. repando*, and *P. varia*, can be found on rotten trunks.



- inner surface is liver-brown, becoming darker with olive tinges
- cup expands with age
- irregular cup margin
- stemless cup sits on soil surface
- granular, reddish brown outer surface



**FRUITING** Grows in troops and small clusters.

Dimensions CUP 1.5–7cm ↑ 0.5–3cm	Spores White	Edibility 
----------------------------------	--------------	---

Family PEZIZACEAE

Species *Peziza succosa*

Season Summer–autumn

## YELLOW-MILK CUP

Cup-shaped and yellow- to gray-brown, the Yellow-milk Cup is distinguished from most other *Peziza* species by its reaction when cut open: the thin, yellow-brown flesh exudes a milky yellow juice that gradually turns bright yellow. With age, the cup expands and becomes irregular in shape.

• **OCCURRENCE** Along roadsides in deciduous areas; often found with *Hekvella* and *Inocybe* species.

Widespread and common in Europe; also occurs in eastern and central North America.

• **SIMILAR SPECIES** Other *Peziza* species that have yellow juice include *P. micheli*, with its lilac tinges, and *P. succosella*, which has a greenish yellow flesh reaction and smaller spores.



**FRUITING** Singly or in troops on clay-rich soil.



• more or less even margin

• fairly pale specimen

• cup expands with age

gray-brown spore-producing surface •



flesh stains yellow when cut or broken

outer surface is almost smooth •



Dimensions CUP ⬆ 0.5–5cm ⬆ 0.5–2cm

Spores White

Edibility

Family OTIDEACEAE

Species *Geopora arenicola*

Season Summer–autumn

## SANDY EARTH CUP

This species produces a fairly large, cup-shaped brown fruitbody with a hairy outer surface. The smooth interior may contain the tiny flask-fungus parasite *Melanospora brevisporis*. The spores of this mushroom are large compared to those of its similar relatives.

• **OCCURRENCE** Buried in gravel or sand by roads or in gravel pits, it is easily overlooked in its hidden habitat. Widespread and common in Europe. Also found in northeastern United States and in California.

• **SIMILAR SPECIES** All species of *Geopora* are sunk in the soil, some producing only a tiny opening, others splitting in a starlike pattern when very mature. *Humaria hemisphaerica* develops on the soil surface. There is also a range of other similar species, but it is very difficult to distinguish many species in this genus.



**FRUITING** In troops breaking through the soil surface.

fruitbody is buried in mossy, sandy soil •



• cup margin splits into lobes with age

thin, brittle brown flesh



smooth interior is creamy brown

• brown outer surface is hairy



• cup splits open so that spores can be released

Dimensions CUP ⬆ 0.5–2cm ⬆ 1–2cm

Spores White

Edibility

Family OTIDEACEAE

Species *Aleuria aurantia*

Season Summer–autumn

## ORANGE-PEEL CUP

With its vivid orange coloring and downy outer surface, the Orange-peel Cup is one of the most attractive cup-fungi. The cup margin is inrolled when young, becoming wavy. The cup flattens with age. The thin, brittle, white to pale flesh is edible but must be cooked because it is toxic when raw.

• **OCCURRENCE** Found on gravelly soil in disturbed sites, such as on dirt roads and on new lawns. Some *Scutellinia* species (see below) can also be found in similar sites. Widespread and common in European northern temperate zones.

• **SIMILAR SPECIES** Found on similar sites, *Melastiza chateri* is smaller, reddish orange, and has very short, pale brown hairs at the cup margin. Other *Aleuria* species have smaller cups and are rarer; a microscope is required to identify them correctly.



cup becomes wavy and flattened  
• with age



outer surface covered with white down •



• vivid orange inner surface



margin inrolled  
• when young

stemlike base is visible on  
• some specimens



**FRUITING** Appears in large groups and clusters.

Dimensions CUP ⬆ 2–10cm ⬇ 0.2–3cm

Spores White

Edibility

Family OTIDEACEAE

Species *Scutellinia scutellata*

Season Late spring–winter

## COMMON EYELASH CUP

This highly distinctive cup-fungus has conspicuous long black “eyelashes” at the margin of the disk-shaped, vivid orange-red cup; the outer surface is pale orange-brown. The presence of carotene causes the orange-red coloring on this and other orange-colored fungi. There are many similar species in this complex genus; under a microscope, spore shape and ornamentation offer the best clues for positive identification.

• **OCCURRENCE** On wet, mossy wood near ponds, occasionally on organic soil. Widespread and common in northern temperate zones.



inner surface is bright orange-red •

• when fully mature, dark brown hairs point outward



dark brown hairs project inward when young



**FRUITING** Typically appears in dense swarms on wood.



• grows on wet and rotten wood



Dimensions CUP ⬆ 0.5–1cm ⬇ 2mm

Spores White

Edibility

Family OTIDEACEAE	Species <i>Otidea onotica</i>	Season Autumn
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## LEMON-PEEL CUP

A spectacular lemon-yellow to yellow, rosy orange fruitbody makes this species easily identified in a difficult genus. The ear-shaped cup is split down one side and has a stemlike, off-white base. The thin, pale flesh may develop rusty spots with age. *Otidea* species may be edible but are rare so cannot be recommended.

• **OCCURRENCE** Under deciduous trees such as hazel and oak, and conifers, but not strictly associated with any host. Widespread but scattered in northern temperate zones.

• **SIMILAR SPECIES** *O. leporina* is found mostly in conifer forests; *O. smithii*, common in the Rockies, is dark brown; *Wynnea americana*, which grows from a sclerotial mass, is dark brown with a reddish inner surface.



**FRUITING** In small clusters among leaf litter on soil.



cup is slit to base

off-white, stemlike base

very thin, off-white flesh

rust-colored spots may develop with age

smooth inner surface often pink tinged

wavy margin

SECTION



Dimensions CUP ♂ 1–3cm ♀ 3–10cm	Spores White	Edibility
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Family LEOTIACEAE	Species <i>Chlorociboria aeruginascens</i>	Season All year
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## GREEN STAIN CUP

This fungus makes a blue-green stain inside its woody substrate. The fruitbodies are produced seasonally under ideal conditions. A similar blue-green color, they are tough and cup-shaped with a smooth surface and smooth or occasionally wavy margins. The underside and short stem are paler blue-green. The stained wood, known as "green oak," is sometimes used in woodwork.

• **OCCURRENCE** In deciduous woods, often on the fallen branches of oak or hazel trees. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES** Some related species, especially *Chlorociboria aeruginosa*, may also produce a green stain. Spore size helps to distinguish species: those of *C. aeruginosa* are 11.5 x 3µm; those of *C. aeruginascens* are 7.5 x 2µm.



**FRUITING** Scattered or clustered on dead wood.

fruitbodies are scattered on wood

inner, spore-producing surface is smooth and verdigris

smooth or sometimes wavy margin

lighter blue-green underside

green stain within wood substrate



Dimensions CUP ♂ 0.2–1cm   STEM ♀ 1–5mm ↔ 1–3mm	Spores White	Edibility
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Family SCLEROTINIACEAE	Species <i>Dumontinia tuberosa</i>	Season Spring
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## TUBER CUP

This species has a chestnut-brown fruitbody that grows up out of a black underground organ, called a sclerotium. Cup-shaped, with a smooth margin, it has smooth surfaces, both inside the cup and out. The stem is long and black. This species has perhaps the largest fruitbodies in the Sclerotiniaceae.

• **OCCURRENCE** Sclerotia are formed inside the rhizomes of anemone species in Europe; reported on the ground in North America. Widespread; local to very common.



FRUITING In small groups in woodland on bare soil.



Dimensions CUP ↔ 0.5–3cm   STEM ↓ 2–10cm ↔ 2–4mm	Spores White	Edibility
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Family SCLEROTINIACEAE	Species <i>Rutstroemia firma</i>	Season Autumn
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## BROWN OAK CUP

The cup-shaped fruitbodies of this *Rutstroemia* species are brown with a navel-like center, smooth margin, and fine wrinkles on the underside of the disk. A stem attaches it to the woody substrate. Although this species does not form a true sclerotium, it shares other characteristics with the rest of the family. For example, it favors one specific host genus—in this case, oak trees. Smaller than *Dumontinia tuberosa* (above), it is still one of the larger species of Sclerotiniaceae.

• **OCCURRENCE** Found growing on fallen oak branches, turning the wood black.

Widespread and fairly common in Europe.

• **SIMILAR SPECIES** In eastern US, the common species is *Rutstroemia (Ciboria) macropora*, which is smaller and grayer.



FRUITING Appears singly or in small groups.



Dimensions DISK ↔ 0.5–1.5cm   STEM ↓ 0.2–1cm ↔ 0.2–2cm	Spores White	Edibility
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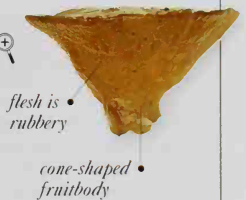
Family LEOTIACEAE	Species <i>Neobulgaria pura</i>	Season Late autumn
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## BEECH JELLY-DROP CUP

The fruitbodies of this fungus are pale pink, gelatinous, and translucent with a flat spore-producing surface and finely toothed margins. Tapering strongly to the base, they are cone-shaped in cross-section. Newly emerged specimens are very firm and rubbery. Exposure to the weather eventually makes them collapse and become much thinner, but they will persist from autumn into winter.

• **OCCURRENCE** On relatively fresh bark of fallen beech trunks and branches, often next to *Hypoxyton fragiforme* (p.257). Northern temperate zones; in most areas where beech occurs.

• **SIMILAR SPECIES** *Bulgaria inquinans* (below) is similar in habit and habitat but is harder and darker brown to black.



flesh is rubbery  
cone-shaped fruitbody



FRUITING In dense clusters on beech bark.



pale pink fruitbody is translucent

disk-shaped surface

top surface is flat and produces spores

Dimensions DISK ⌀ 0.5–3cm ↑ 1cm	Spores White	Edibility
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Family LEOTIACEAE	Species <i>Bulgaria inquinans</i>	Season Autumn–winter
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## BLACK JELLY-DROP CUPS

The disk-shaped mature fruitbodies of this licorice-like fungus are black, sometimes appearing blue. Unusual for the Leotiaceae, the spores here are very conspicuous and jet black; the nearby bark may be black with ejected spores, and touching the fruitbody produces black smudges on the fingers. Of the eight spores formed within each ascus (see pp.10–11), only the top four develop the dark coloring. The staining property of the spores has been used for dyeing wool.

• **OCCURRENCE** On the bark of recently fallen trunks of beech or oak trees; mostly on the upper surface. Widespread and common where host trees occur in northern temperate zones.

• **SIMILAR SPECIES** *Exidia glandulosa* (p.283), a true jelly mushroom, is even more jellylike and can revive after drying out.



black spores collect on upper surface

firm but rubbery fruitbody

disk-shaped fruitbody



SECTION

young specimens are scurfy and brown outside



FRUITING Appears in swarms on beech or oak bark.



Dimensions DISC ⌀ 0.5–4cm ↑ 0.5–2cm	Spores Jet black	Edibility
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Family LEOTIACEAE

Species *Ascocoryne cylichnium*

Season Autumn–winter

## PURPLE JELLY-DROP CUP

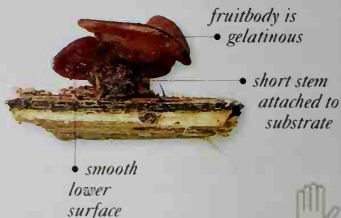
This species produces a disk-shaped, gelatinous, reddish purple fruitbody with a smooth, shiny, spore-producing surface and an often irregularly lobed margin. It has a short stem, which makes the fruitbody appear to be cone-shaped when viewed from the side.

• **OCCURRENCE** Found growing on the bark and exposed wood of deciduous trees. Widespread and fairly common in northern temperate zones.

• **SIMILAR SPECIES** *Ascocoryne sarcoides* (below) has narrower disks and shorter spores. Several other smaller species occur in the northern hemisphere. The best way to distinguish between them is by microscopic examination of such features as the spores.



FRUITING In swarms on tree stumps and branches.



fruitbody is  
• gelatinous

• short stem  
attached to  
substrate

• smooth  
lower  
surface



smooth, spore-  
producing upper  
• surface

reddish purple  
coloring •

specimen  
growing  
on bare  
• wood



fruitbody is  
• disk-shaped



Dimensions Disc  $\leftrightarrow$  0.5–2cm  $\updownarrow$  2–4mm | Stem  $\updownarrow$  to 5mm  $\leftrightarrow$  to 2mm

Spores White

Edibility

Family LEOTIACEAE

Species *Ascocoryne sarcoides*

Season Autumn–winter

## BRAIN JELLY-DROP CUP

The disk-shaped, gelatinous, reddish purple fruitbody of this species may have a rudimentary stem. Along with the disk-shaped fruitbodies, brainlike asexual growths appear. They are paler and grayer.

• **OCCURRENCE** Mostly on bare deciduous stumps or trunks. Widespread and common in parts of northern temperate zones, and probably elsewhere.

• **SIMILAR SPECIES** *Ascocoryne cylichnium* (above) is best distinguished by microscopic examination. Its spores are larger and normally more than 3-septate at maturity. *A. turficola* is much rarer and more colorful and grows on sphagnum moss. *Ascotremella faginea* (p.283) has larger, brainlike fruitbodies.

brainlike, pale  
red-purple  
asexual state •

disk-shaped  
fruitbody is  
gelatinous  
inside •

fruitbodies  
grow on bare  
wood



FRUITING In clusters or singly, often with the asexual and fertile state appearing together.

Dimensions Disc  $\leftrightarrow$  0.2–1cm  $\updownarrow$  1–4mm

Spores White

Edibility

Family LEOТИACEAE	Species <i>Bisporella citrina</i>	Season Autumn–early winter
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## LEMON CUP

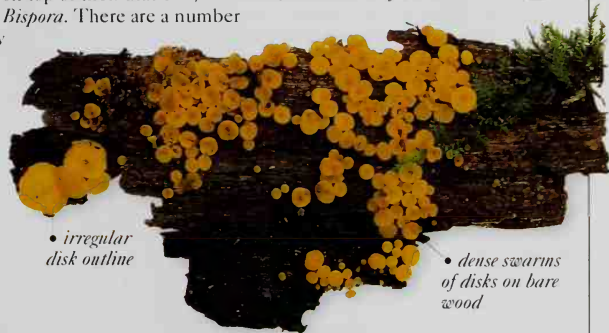
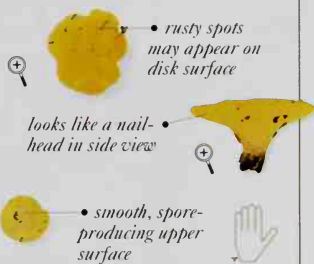
The clustered habit and vivid yellow color of this tiny species enable it to be seen from a distance. The disks have a smooth, flat or slightly concave upper surface and a paler lower surface. White disks may occur. There is no true stem.

• **OCCURRENCE** Found growing on fallen deciduous wood, often beech, oak, and hazel; mostly grows on wood that lacks its bark. Widespread and very common throughout northern temperate zones.

• **SIMILAR SPECIES** Some species of *Bisporella* have fruitbodies that occur near or on top of their blackish, powdery asexual form, called *Bispora*. There are a number of other closely related yellow cup-fungi. Some may have a stem or may differ only in microscopic features.



**FRUITING** Appears in conspicuous swarms on wood.



Dimensions DISC Ⓢ 1–3mm Ⓣ less than 1mm	Spores White	Edibility
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Family CORTICIACEAE	Species <i>Aleurodiscus amorphus</i>	Season All year
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## ORANGE DISCUS MUSHROOM

Although it looks like a cup-fungus, this skin-fungus is tougher and more leathery than many cup-fungi. The disk is pinkish orange with a mealy surface and a fringed white margin.

It is firmly attached to the substrate at a point beneath its center. A gelatinous, transparent or white blob indicates that it has been parasitized by a species of *Tremella* such as *T. simplex*.

• **OCCURRENCE** On bark-clad fir or, more rarely, spruce. Widespread and fairly common across northern North America and Europe.

• **SIMILAR SPECIES** The cup-fungus *Lathrellula subtilissima* is hairier, brighter orange, and has a more distinct stem.

fruitbody is tough and leathery

pale orange or pinkish orange spore-producing surface

sterile, fringed, incurved white margin

gelatinous blob indicates parasite



**FRUITING** Appears in massed, attached fruitings during damp periods.

Dimensions CUP Ⓢ 1–8mm Ⓣ 2–3mm	Spores White	Edibility
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# CUP-SHAPED CONTAINING "EGGS"

**T**HE FUNGI here have unique fruitbodies consisting of a "cup," inside of which are tiny structures called peridioles. These contain the spore-producing hymenium. Initially, a protective skin covers the top of the "cup." It disappears at maturity and the peridioles are dispersed by raindrops.

Family <i>NIDULARIACEAE</i>	Species <i>Crucibulum crucibuliforme</i>	Season Autumn
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## WHITE-EGG BIRD'S NEST

This species is the only member of the *Crucibulum* genus. It has cylindrical, nestlike, ochre-orange fruitbodies within which there are 10–15 (up to 20) lentil-shaped white eggs that contain the spores. Each egg is attached to the nest by a tiny cord. The outer surface of the nest is felty to smooth. Immature nests are covered with a protective ochre-orange skin; when this withers, the eggs are dispersed by raindrops.

- **OCCURRENCE** On litter, mulch, and sawdust, in woods and gardens. Widespread and fairly common in northern temperate zones.
- **SIMILAR SPECIES** *Cyathus* species have cone-shaped fruitbodies and eggs that are darker in color.

- smooth inner surface
- skin covers surface of immature nest
- cylindrical nests contain lentil-shaped eggs
- pale eggs, 1.5–2mm across
- felty to smooth outer surface

**FRUITING** In troops on decaying vegetation.

Dimensions CUP ⬆️ 5–8mm ⬇️ 0.5–1cm	Spores White	Edibility
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Family <i>NIDULARIACEAE</i>	Species <i>Cyathus striatus</i>	Season Throughout autumn
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## FLUTED BIRD'S NEST

Grooved striations inside the nestlike fruitbody are the most distinctive feature of this species. On the outside, the nests are coated in brown fur. A thin skin covers the nest surface until maturity, when it breaks open; the eggs are dispersed by raindrops splashing into the cups. A slimy thread released at the same time enables the eggs to attach to nearby vegetation.

- **OCCURRENCE** In woods, often deep in litter. Widespread and common in northern temperate zones.
- **SIMILAR SPECIES** *Cyathus olla* lacks striations and occurs mainly in open habitats. *C. stercoreus* grows on dung and has very dark eggs and no striations. There are additional species in North America, Japan, and the tropics.

- dark fur covers outside of nest
- cone-shaped fruitbody
- gray interior with distinct striations
- pale gray eggs
- lentil-shaped eggs, 1–2mm across

**FRUITING** In clusters on half-buried wood.

Dimensions CUP ⬆️ 6–8mm ⬇️ 0.8–1.5cm	Spores White	Edibility
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# TRUMPET-SHAPED FUNGI

The fungi featured in this section have trumpet-shaped, hollow fruitbodies with the spore-producing hymenium lining the more or less smooth outer surface. Most of the species here belong to the *Cantharellaceae* family (see also pp.28 and 30). The fruitbodies have fairly tough flesh and may persist for several weeks.



• trumpet-shaped fruitbody

Family CANTHARELLACEAE

Species *Craterellus cornucopioides*

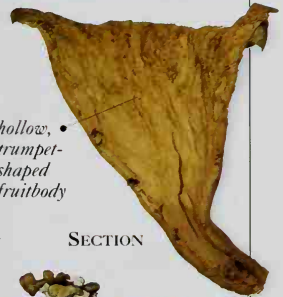
Season Summer–autumn

## BLACK TRUMPET

The fruitbody of this dark brown chanterelle is hollow and trumpet-shaped, tapering toward the base. The outer side has a paler gray spore-bearing layer. The thin gray flesh is mild and pleasant tasting with an aromatic smell. Its dark coloring makes it difficult to spot at first, but where found it typically occurs en masse.

- **OCCURRENCE** Mycorrhizal with deciduous trees in woods, on fairly rich, often calcareous soil; more rarely with conifers. Widespread in northern temperate zones; abundant in some areas, but almost absent in others.
- **SIMILAR SPECIES** *Craterellus fallax*, a North American species, is more fragrant.

dark brown marbling on inner surface •



hollow, • trumpet-shaped fruitbody

• wavy, irregular margin

SECTION



FRUITING Appears in troops and small clusters.

• off-white bloom on fertile outer fruitbody surface

• gray-brown base



Dimensions FRUITBODY ↔ 3–10cm ↓ 5–12cm | BASE ↔ 0.5–2cm

Spores White

Edibility

Family CANTHARELLACEAE

Species *Cantharellus lutescens*

Season Early autumn–early winter

## GOLDEN CHANTERELLE

This chanterelle has a somewhat funnel-shaped, yellow-brown fruitbody. It has a hollow, yellow-orange base, and rather thin, pale yellow flesh with a fruity smell. The pale spore-producing layer on the outer surface is almost smooth, resembling those of *Craterellus* species (above).

- **OCCURRENCE** Mycorrhizal with deciduous trees and conifers in damp, moss-rich woods. Widespread but rather local in temperate and warm-temperate regions, including North America, Europe, and Asia.
- **SIMILAR SPECIES** *C. tubaeformis* var. *lutescens* has distinct, veinlike gills on the outer surface.

yellow–orange stem •

• yellow–brown cap



FRUITING Appears in troops among mosses in damp forests.

Dimensions FRUITBODY ↔ 2–7cm ↓ 3–7cm | BASE ↔ 3–8mm

Spores Pale cream

Edibility

Family CANTHARELLACEAE

Species *Cantharellus lateritius*

Season Summer–autumn

## SMOOTH CHANTERELLE

Trumpet-shaped with a pendent, wavy margin, this orange-yellow species is closely related to *Cantharellus cibarius* (p.28), and differs from it mainly in having a smooth to faintly or partly veined outer surface. It is generally denser and stouter but just as fragrant, with the same taste. It was formerly known as *Craterellus cantharellus*, because it looks like *C. cornucopioides* (p.275) but with chanterelle colors.

## • OCCURRENCE

Under oaks. Widespread and very common in eastern North America.

• SIMILAR SPECIES *C. cibarius* (p.28), has well-formed, forked, gill-like folds on its outer surface. *C. odoratus* appears in dense, flowerlike clusters.

smooth or  
nearly smooth  
undersurface

poorly formed,  
gill-like folds  
sometimes  
occur

cap margin  
is pendent  
and wavy

trumpet-  
shaped,  
orange-yellow  
fruitbody



FRUITING Appears singly or in large numbers on the ground under oak trees in open woods and parks.

Dimensions FRUITBODY ⬆️ 2.5–10cm | BASE ⬆️ 0.5–2.5cm

Spores Pale yellow-orange

Edibility ☹️

Family GOMPHACEAE

Species *Gomphus floccosus*

Season Summer–autumn

## SCALY VASE CHANTERELLE

This large, trumpet-shaped species is brightly colored, making it easy to spot in open woods. It has a variably scaly, red-orange to orange-yellow cap. The flesh has the same strong coloring.

The decurrent veined spore-producing surface is creamy white to ocher. This mushroom and its related look-alikes should not be eaten because they contain an indigestible acid.

• OCCURRENCE On the ground under conifers and in mixed wooded areas.

Widespread and common throughout North America.

## • SIMILAR SPECIES

*Gomphus bonarii* is bright red with a milk-white spore-producing surface. *G. kauffmanii* is larger, more coarsely scaly, and yellowish tan.

scales on cap  
surface are  
red-orange

creamy white  
to ocher  
spore-  
producing  
surface

tapering,  
stemlike base

large, trumpet-  
to vase-shaped  
fruitbody

cap surface  
is red-orange  
to orange-  
yellow



FRUITING Singly or in large groups of fruitbodies on the ground under conifers and in mixed woods.

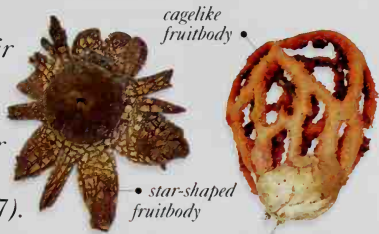
Dimensions FRUITBODY ⬆️ 5–15cm | BASE ⬆️ 1.5cm

Spores Ocher-yellow

Edibility ☹️

# STAR-SHAPED & CAGELIKE FUNGI

These fungi are called gasteroids because their spore-tissue (gleba) is enclosed, stomachlike, in the fruitbody. The earth stars (p.278–80) have fruitbodies that split into a star with an inner spore-ball. The two *Clathrus* species (below and p.280) are related to stinkhorns (pp.246–47).



cagelike fruitbody

star-shaped fruitbody

Family CLATHRACEAE	Species <i>Clathrus archeri</i>	Season Summer–autumn
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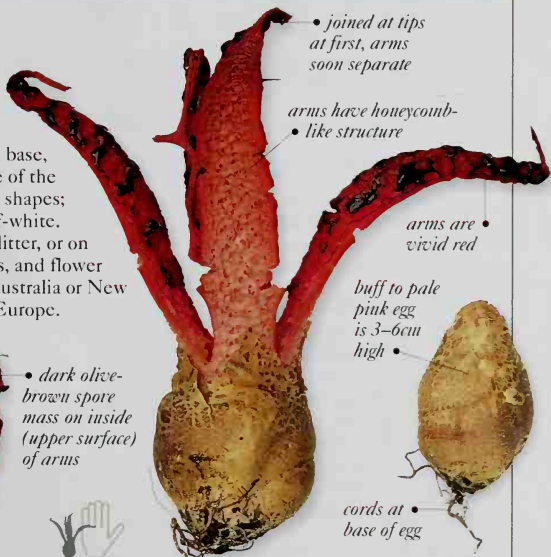
## ARMED STINKHORN

This species produces spores in a foul-smelling slime to attract insects for dispersal. Its very characteristic fruitbody, with four to eight vivid red arms, emerges from a buff to pale pink base, or egg. The spore mass is on the inside of the arms. All Clathraceae have remarkable shapes; almost all are red tinged or white to off-white.

•**OCCURRENCE** Among woodland litter, or on sawdust or wood chips; in woods, parks, and flower beds. Inadvertently introduced from Australia or New Zealand, and now well established in Europe.

•**SIMILAR SPECIES**

*Pseudocolus fusiformis*, found in North America, has only three or four joined arms. *Aseroë* species, for example *A. coccinea* from Japan, have stemlike bases.



• joined at tips at first, arms soon separate

arms have honeycomb-like structure

arms are vivid red

buff to pale pink egg is 3–6cm high

cords at base of egg

• dark olive-brown spore mass on inside (upper surface) of arms

• arms eventually spread out widely

• arms united at base



FRUITING In troops; may appear in mass fruitings.

EGG ⊕ 2.5–4cm   ARMS ↓ 5–10cm	Spores Olive-brown	Edibility
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Family SCLERODERMATACEAE	Species <i>Astraeus hygrometricus</i>	Season All year
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## BAROMETER EARTH STAR

The rounded, reddish brown immature fruitbody of this metallic-smelling species splits open into a star shape on maturity to reveal the skin-clad, gray-brown, spore-ball within. It has amazing hygroscopic properties, even when detached from its mycelium: it curls back into a ball in dry weather and expands its rays in wet weather. Rain splashes are needed to release the spores through the central pore.

- **OCCURRENCE** Mycorrhizal; mostly found growing in dry, open woodland. Virtually cosmopolitan, but absent in cold-temperate to arctic areas.
- **SIMILAR SPECIES** *Gaeastrum* species (below, pp.279–80) differ in such microscopic details as elastic threads in the spore-ball.



*whitish scales on gray- to reddish brown rays* •

*outer skin splits into 6–15 rays*

*tough skin*

*inner ball has rough surface*



*spores released through pore in wet weather*



**FRUITING** In small groups; prefers sandy soil.

Dimensions FRUITBODY ⬆ 5–9cm	INNER BALL ⬆ 1.5–3cm	Spores Brown	Edibility 
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Family GEASTRACEAE	Species <i>Gaeastrum triplex</i>	Season Autumn
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## COLLARED EARTH STAR

A widely distributed *Gaeastrum* species, the Collared Earth Star is large and fleshy. On maturity, the onion-shaped fruitbody splits open, typically in two layers, an outer star shape and an inner collar, around a central ball. A pore on top of the ball allows the spores to be released by splashes of rain.

- **OCCURRENCE** In gardens, parks, and woods. Widespread in warmer regions in the northern temperate zones; almost cosmopolitan.
- **SIMILAR SPECIES** *G. fornicatum* lacks a collar; its ball sits atop arched limbs attached to a partially buried mycelial disk. The ball of *Myriostoma coliforme* has many holes through which the spores are released.



*papery, gray-brown inner ball* •



*turnip- or onion-shaped when immature*

*fleshy outer skin arches back and splits into a star formation*


*smooth inner surface of fruitbody*

*brown to pink-brown collar, papery when dry*

*finely fibrous hole in faint, circular depression*

**FRUITING** In groups or fairy rings on rich soil.

Dimensions FRUITBODY ⬆ 4–12cm	INNER BALL ⬆ 2–4cm	Spores Chocolate-brown	Edibility 
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Family <i>GEASTRACEAE</i>	Species <i>Geastrum fimbriatum</i>	Season Autumn
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## SESSILE EARTH STAR

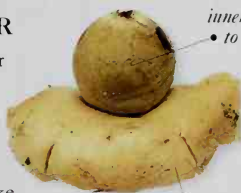
The globe-shaped, yellow-brown or pale brown fruitbody of the Sessile Earth Star opens at maturity, its outer skin splitting into a star shape. Inside is a pale gray to gray-buff ball, which contains the spores.

Raindrops splashing on the ball make it contract, releasing the spores through a hole on the top, which is edged with fine hairs (fimbriate).

• **OCCURRENCE** Mostly on litter on calcareous soil, under trees. Widespread in northern temperate zones; common throughout eastern North America.

• **SIMILAR SPECIES**

*Geastrum triplex* (p.278) is often found on similar sites; its outer skin splits into a star, and a collar surrounds the inner ball. *G. rufescens* is pink hued and develops a stalk on the inner ball when dry.



inner ball is pale gray  
• to gray-buff

fimbriate mouth on  
• top of ball



• 5-9 rays in fully expanded outer skin

papery ball releases spores when compressed  
• by raindrops



• outer skin is yellow-brown or pale brown



**FRUITING** Appears in small groups or fairy rings.

Dimensions FRUITBODY ⊕ 3-6cm   INNER BALL ⊕ 1-2.5cm	Spores Chocolate-brown	Edibility
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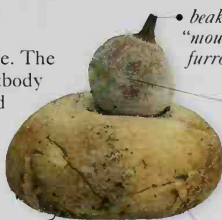
Family <i>GEASTRACEAE</i>	Species <i>Geastrum schmidelii</i>	Season Autumn
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## DWARF EARTH STAR

This earth star is identified by its habitat and size. The inner spore-ball, which is exposed when the fruitbody splits open, has a beaklike, furrowed, and striated mouth. The immature brown fruitbody is nearly spherical and is usually encrusted with sand and debris; the fleshy skin splits open to form five to eight rays, which become papery when mature. The inner ball is gray-brown.

• **OCCURRENCE** On sand in fields and dunes or in open parts of coniferous forests on sandy soil. Widespread in Europe and neighboring parts of Asia; reported in southeastern and midwestern North America.

• **SIMILAR SPECIES** *Geastrum elegans* has a stemless inner ball. *G. pectinatum*, which grows with conifers, is larger; its inner ball has a grainy skin and a more distinct stem.



• beaklike, dark brown "mouth" has distinct furrows and striations

• ball containing spores is mealy when young, smooth in older specimens



• lobes are fleshy when young, papery when mature



**FRUITING** In rings or groups of a few fruitbodies together.

lobes arch right back under fruitbody



when dry, ball is lifted 1-2mm high by stem

• expanding fruitbody forms 5-8 lobes



lobes arch back to reveal inner ball

Dimensions FRUITBODY ⊕ 1.5-3.5cm   INNER BALL ⊕ 0.5-1.5cm	Spores Chocolate-brown	Edibility
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Family <i>GEASTRACEAE</i>	Species <i>Geastrum striatum</i>	Season Autumn
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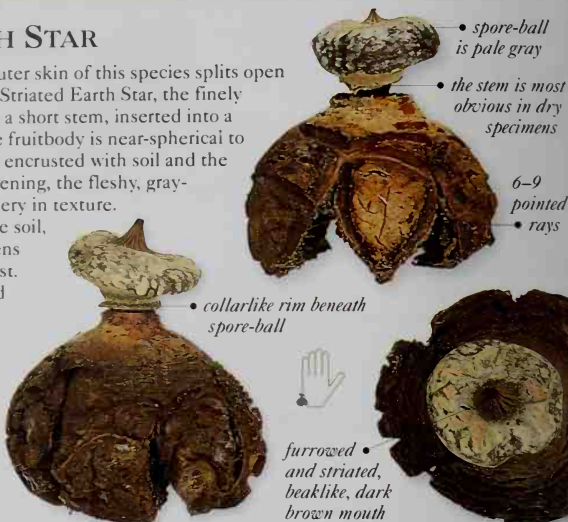
## STRIATED EARTH STAR

Like other earth stars, the outer skin of this species splits open to reveal a spore-ball. In the Striated Earth Star, the finely grainy, grayish white ball has a short stem, inserted into a collarlike rim. The immature fruitbody is near-spherical to onion-shaped and is strongly encrusted with soil and the debris of its habitat. After opening, the fleshy, gray-brown rays soon become papery in texture.

• **OCCURRENCE** On fertile soil, often under conifers in gardens and parks; also in mixed forest. Widespread in Europe; world distribution unclear.



**FRUITING** In lines, rings, or a few together on mixed litter.



Dimensions FRUITBODY ⬆️ 3-6.5cm   INNER BALL ⬆️ 1-2.5cm	Spores Chocolate-brown	Edibility
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Family <i>CLATHRACEAE</i>	Species <i>Clathrus ruber</i>	Season All year
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## CAGED STINKHORN

When mature, this mushroom turns a brilliant red and develops a spherical, cagelike structure. It emerges from a white or buff egg. Inside, the cage bars are smeared with an olive-brown spore mass, the foul smell of which attracts insects for spore dispersal.

• **OCCURRENCE** On leaf and wood litter, in parks and gardens; prefers warmth. Widespread but scattered; mostly in Mediterranean areas.

• **SIMILAR SPECIES** There are about 17 *Clathrus* species. They are mainly tropical. Some are bright red, others are white.



**FRUITING** Appears in small groups or troops.



Dimensions FRUITBODY ⬆️ to 9cm   ⬆️ to 12cm	Spores Olive-brown	Edibility
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# EAR- OR BRAINLIKE, GELATINOUS FUNGI

*Most of the fungi featured in this section have gelatinous flesh. They desiccate in dry weather but rehydrate when wet and then continue to shed spores. Their shape varies from brainlike, with the spore-bearing tissue (hymenium) all over, to pendent and earlike, with the hymenium lining the inside and facing downward.*



Family	AURICULARIACEAE	Species	<i>Auricularia auricula-judae</i>	Season	All year
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## WOOD EAR JELLY

The fruitbody of this species is distinctively ear-shaped. It is gelatinous and smooth when fresh, but becomes hard and folded as it matures and dries out. The outer surface is tan-brown and covered in downy hairs, while the inner, spore-producing surface is more gray in color, veined, and wrinkled. Considered a bland edible in the West, this fungus and related species are valued as both a food and a medicine in China.

- **OCCURRENCE** On deciduous trees, often elder, in damp woods. Widespread in warmer parts of northern temperate zones.
- **SIMILAR SPECIES** *Auricularia polytricha* is the same color or darker, and its upper surface is very velvety. It is found mainly in the tropics.



**FRUITING** Singly or in crowded tiers and rows.

Dimensions	FRUITBODY ↔ 4–12cm ⊕ to 2mm	Spores	White	Edibility	☺
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Family TREMELLACEAE

Species *Tremella mesenterica*

Season Mostly late autumn–winter

## YELLOW BRAIN JELLY

The striking, almost transparent yellow coloring of the Yellow Brain Jelly makes it very easy to see. Prolonged rainfall can turn it white, but occasionally it may also produce true albino forms. In dry weather the fruitbody shrivels up, but it will rehydrate when moist conditions return.

Although the flavor is very bland, this species can be eaten or used in soups.

• **OCCURRENCE** Parasitic on Corticiaceae species; growing on deciduous branches, often in piles of brushwood. Widespread and common in northern temperate zones.

fruitbody consists of soft, flabby lobes



• prolonged wet weather causes color loss

• spores are produced all over surface

dried flesh is brittle



• fruitbody dries to dark orange



FRUITING Mainly in small groups of lobed fruitbodies.

Dimensions JOINED FRUITBODIES ↔ 1–6cm ⊕ 0.5–4cm

Spores White

Edibility

Family TREMELLACEAE

Species *Tremella foliacea*

Season Autumn–winter

## BROWN LEAFY JELLY

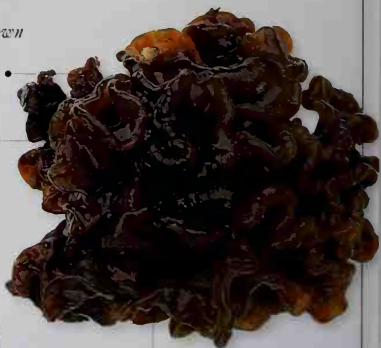
A strongly folded, gelatinous brown fruitbody, attached directly to bark with no stem, make this species easy to identify. The spores, produced on microscopic club-shaped basidia (p.11), cover the surface of the fruitbody.

• **OCCURRENCE** Parasitic on species of *Stereum* and Corticiaceae on deciduous trees, but also on pine, in parks and woods. Widespread in northern temperate zones.

• **SIMILAR SPECIES** *Ascotremella faginea* (p.283) and a folded form of *Neobulgaria pura* (p.271); they are distinguished by more rounded, brainlike lobes and spores in the asci (p.11).

flesh is brown and very gelatinous

fruitbody is strongly folded



fresh specimens are glossy brown

dried-up fruitbody is shrunken and black



• water can reconstitute dried-up specimens



FRUITING Appears singly or a few together.

Dimensions FRUITBODY ↔ 4–12cm ⊕ 3–7cm

Spores White

Edibility

Family TREMELLACEAE

Species *Exidia glandulosa*

Season Late autumn–winter

## BLACK BRAIN JELLY

Looking like blobs of tar, this jelly-fungus is comparatively firm and less gelatinous to touch than *Tremella mesenterica* (p.282). The brainlike surface consists of numerous folds that become deeper and more wrinkled with age. As with most other jelly-fungi, wet weather causes shriveled, dried-up specimens to rehydrate.

• **OCCURRENCE** On bare to bark-clad wood of deciduous trees. Widespread and common in northern temperate zones.

• **SIMILAR SPECIES** *E. truncata* is also common and is found mainly on oak trees.

Its fruitbody is more button-shaped with a fine velvety outer surface and a pimpled fertile surface.

*E. recisa* is yellow-brown.

black surface  
with numerous  
brainlike folds

spores produced  
all over exposed  
surface

mature specimen  
has even more marked  
folds and wrinkles

shriveled specimen  
is revived by moisture

spreading  
fruitbodies  
may fuse  
together

**FRUITING** Appears in linked fruitbodies.

Dimensions JOINED FRUITBODIES ↔ 2–10cm ⊕ 0.5–1.5cm

Spores White

Edibility 

Family LEOTIACEAE

Species *Ascotremella faginea*

Season Summer–autumn

## RAISIN JELLY CUP

This dingy purple fungus is most often seen in large, shiny, jellylike groups, up to 10cm across. The fruitbody consists of a mass of gelatinous, irregularly shaped blobs, the whole effect being almost brainlike. It is attached to the substrate by a short, stemlike point. It looks like a jelly-fungus, but microscopic characteristics, such as spores produced in cylindrical asci (pp.10–11), identify it as a cup-fungus.

• **OCCURRENCE** Typically on dead beech, but also on other deciduous trees.

Widespread and locally common in northeastern North America and most of Europe.

dingy purple  
fruitbodies

spores produced  
all over surface  
of fruitbody

fruitbody has  
jellylike  
texture

brainlike,  
irregular  
fruitbody



**FRUITING** Mostly singly or a few together on branches and trunks of dead deciduous trees.

Dimensions FRUITBODY ↓ 1–2cm ↔ 2–4cm

Spores White

Edibility 

## SPORE CHART

**S**PORES occur in many colors, shapes, surface textures, and sizes, and offer important clues to precise identification of a species. Spore color is included with each species main entry; size and shape

are given in the table below. Spores vary from 2 to 500 microns ( $\mu\text{m}$ ); average sizes are given here. A microscope is necessary to determine size and shape (see p.17). In the table below,  $\odot$  means diameter.

SPECIES	SIZE ( $\mu\text{m}$ )	SHAPE
<i>Agaricus arcensis</i>	7 x 5	broadly ellipsoid
<i>Agaricus augustus</i>	8.5 x 5	ellipsoid
<i>Agaricus bernardii</i>	6.5 x 5.5	broadly ellipsoid
<i>Agaricus bisporus</i>	6 x 5	broadly ellipsoid
<i>Agaricus bitorquis</i>	6 x 4.5	broadly ellipsoid
<i>Agaricus californicus</i>	5.5 x 4.5	ellipsoid
<i>Agaricus campestris</i>	8 x 4.5	ellipsoid
<i>Agaricus hondensis</i>	5 x 3.5	ellipsoid
<i>Agaricus porphyrison</i>	5 x 3.5	ellipsoid
<i>Agaricus praetelaresquamosus</i>	5.5 x 3.5	broadly ellipsoid
<i>Agaricus sylvaticus</i>	5.5 x 3.5	broadly ellipsoid
<i>Agaricus sylvicola</i>	7 x 4.5	ellipsoid
<i>Agaricus xanthoderma</i>	6 x 4	ellipsoid
<i>Agrocybe cylindracea</i>	10 x 5.5	ellipsoid with a pore
<i>Agrocybe pediades</i>	12 x 8	ellipsoid with a pore
<i>Agrocybe praecox</i>	9 x 5.5	ellipsoid with a pore
<i>Albatrellus ovinus</i>	4 x 3.5	near spherical, amyloid
<i>Aleuria aurantia</i>	17.5 x 9	ellipsoid, reticulate, 2 drops inside
<i>Aleurodiscus amorphus</i>	28 x 23	near spherical, spiny
<i>Amanita caesarea</i>	10 x 7	broadly ellipsoid
<i>Amanita citrina</i>	9 x 8	near spherical, amyloid
<i>Amanita crocea</i>	10 $\odot$	near spherical
<i>Amanita fulva</i>	11 $\odot$	near spherical
<i>Amanita gemmata</i>	10 x 7.5	broadly ellipsoid
<i>Amanita muscaria</i> and <i>A. m.</i> var. <i>formosa</i>	9 x 6.5	ellipsoid
<i>Amanita pantherina</i>	11 x 7.5	broadly ellipsoid
<i>Amanita phalloides</i>	8.5 x 7	near spherical to broadly ellipsoid, amyloid
<i>Amanita porphyria</i>	9 $\odot$	near spherical, amyloid
<i>Amanita rubescens</i>	8.5 x 6.5	broadly ellipsoid, amyloid
<i>Amanita smithiana</i>	12 x 7.5	ellipsoid, amyloid
<i>Amanita spissa</i>	9.5 x 7.5	near spherical, amyloid
<i>Amanita vaginata</i>	11 $\odot$	near spherical
<i>Amanita virosa</i>	7.5 $\odot$	near spherical, amyloid
<i>Armillaria cepistipes</i>	8.5 x 5.5	broadly ellipsoid
<i>Armillaria mellea</i>	8.5 x 5.5	broadly ellipsoid
<i>Armillaria tubescens</i>	8 x 6	broadly ellipsoid
<i>Ascocybete cylindrium</i>	24 x 5	narrow ellipsoid, 5-7 septate
<i>Ascocybete saroides</i>	14 x 4	narrow ellipsoid
<i>Ascotremella faginea</i>	8 x 4	ellipsoid, faintly striate
<i>Asterophora parasitica</i>	5.5 x 3.5	broadly ellipsoid
<i>Asteros hygrometricus</i>	9 $\odot$	spherical, spiny
<i>Artivolaria auricula-judae</i>	14 x 5.5	sausage-shaped
<i>Artivolaria mesenterica</i>	16.5 x 6	broadly sausage-shaped
<i>Auricularium vulgare</i>	5 x 4	oval, minutely spiny
<i>Baeocystis myosura</i>	3.5 x 1.5	ellipsoid
<i>Biankera fuliginosa/alba</i>	5 x 3	oval, spiny
<i>Bisporium citrina</i>	12 x 4	ellipsoid, 0-1 septate
<i>Bjerkanderia adusta</i>	5 x 3	ellipsoid

SPECIES	SIZE ( $\mu\text{m}$ )	SHAPE
<i>Boletus aereus</i>	15.5 x 5.5	spindle-shaped
<i>Boletus appendiculatus</i>	14.5 x 4.5	spindle-shaped
<i>Boletus badius</i>	14 x 5	spindle-shaped
<i>Boletus barrowsii</i>	14 x 4.5	spindle-shaped
<i>Boletus bicolor</i>	10 x 4.5	near spindle-shaped
<i>Boletus calopus</i>	14 x 5.5	spindle-shaped
<i>Boletus edulis</i>	15.5 x 5.5	spindle-shaped
<i>Boletus legaliae</i>	13 x 6	spindle-shaped
<i>Boletus luridiformis</i>	15 x 5	spindle-shaped
<i>Boletus luridus</i>	13 x 6	near spindle-shaped
<i>Boletus pascuensis</i>	13 x 5	spindle-shaped
<i>Boletus parasiticus</i>	15 x 5	spindle-shaped
<i>Boletus pinophilus</i>	17 x 5	spindle-shaped
<i>Boletus porosporus</i>	13 x 5	spindle-shaped, some have a pore and appear truncate
<i>Boletus pulcherrimus</i>	14.5 x 6	spindle-shaped
<i>Boletus pulvirentus</i>	13 x 5	spindle-shaped
<i>Boletus reticulatus</i>	15 x 5	spindle-shaped
<i>Boletus rubellus</i>	12.5 x 5	spindle-shaped
<i>Boletus satanas</i>	13 x 6	near spindle-shaped
<i>Boletus subtomentosus</i>	12.5 x 5	spindle-shaped
<i>Bovista plumbea</i>	5.5 x 5	near spherical with a long pedicel, warty
<i>Bulgaria inquinans</i>	12.5 x 6.5	kidney-shaped, in asci top 4 spores are brown, lower 4 (slightly smaller) are hyaline
<i>Calocera viscosa</i>	11.5 x 4	curved with rounded ends
<i>Calocybe carnea</i>	5.5 x 3	egg-shaped
<i>Calocybe gambosa</i>	5.5 x 3.5	egg-shaped
<i>Calocybe ionides</i>	6 x 3	egg-shaped
<i>Calostoma cinnabarinum</i>	17 x 8	ellipsoid, pitted
<i>Calostoma excupuliformis</i>	5 $\odot$	spherical, warty
<i>Calvatia gigantea</i>	4.5 $\odot$	spherical, warty
<i>Calvatia utriformis</i>	4.5 $\odot$	spherical, nearly smooth
<i>Cantharellus cibarius</i>	8.5 x 5	ellipsoid
<i>Cantharellus cinnabarinus</i>	9 x 5	ellipsoid
<i>Cantharellus lateralis</i>	10 x 5.5	ellipsoid
<i>Cantharellus lutescens</i>	10.5 x 7	broadly ellipsoid
<i>Cantharellus subalbidus</i>	8 x 5	ellipsoid
<i>Cantharellus tubaeformis</i>	10 x 8	ellipsoid
<i>Chalciporus piperatus</i>	9.5 x 4.5	oblong
<i>Chlorociboria aeruginascens</i>	7.5 x 2	spindle-shaped
<i>Chlorophyllum molybdites</i>	11 x 7.5	egg-shaped to ellipsoid with a pore
<i>Chondrostereum purpureum</i>	7.5 x 3	ellipsoid
<i>Chroogonophus rutilus</i>	19 x 6.5	spindle-shaped
<i>Clathrus archeri</i>	6.5 x 3	narrowly cylindrical
<i>Clathrus ruber</i>	5 x 2.5	ellipsoid to cylindrical
<i>Clavaria corniculata</i>	7 x 4.5	oval
<i>Clavariadelphus pistillaris</i>	13.5 x 8	broadly ellipsoid
<i>Clavulina cristata</i>	9 x 7.5	broadly ellipsoid

SPECIES	SIZE (µm)	SHAPE
<i>Clavulinopsis corniculata</i>	6 ♂	spherical
<i>Clavulinopsis hehvola</i>	6.5 × 5	spherical to broadly ellipsoid, long warts, irregular outline
<i>Clitocybe clavipes</i>	8 × 4.5	ellipsoid
<i>Clitocybe dealbata</i>	5 × 3	tear-shaped
<i>Clitocybe geotropa</i>	8 × 6	tear-shaped
<i>Clitocybe gibba</i>	7 × 4.5	tear-shaped
<i>Clitocybe metachroa</i>	7 × 4.5	ellipsoid
<i>Clitocybe nebularis</i>	7.5 × 4	ellipsoid
<i>Clitocybe odora</i>	7 × 4.5	ellipsoid
<i>Clitopilus prunulus</i>	10.5 × 5	egg-shaped to ellipsoid, ribbed lengthwise
<i>Collybia butyracea</i>	7 × 3.5	oblong-ellipsoid
<i>Collybia confluens</i>	8 × 3.5	egg-shaped
<i>Collybia dryophila</i>	5.5 × 2.5	egg-shaped to ellipsoid
<i>Collybia erythropus</i>	7 × 3.5	ellipsoid
<i>Collybia fusipes</i>	5 × 3.5	broadly egg-shaped
<i>Collybia maculata</i>	5 × 4.5	near spherical
<i>Collybia peronata</i>	7.5 × 3.5	ellipsoid
<i>Coltricia perennis</i>	7 × 4.5	ellipsoid
<i>Coniophora puteana</i>	13 × 7	ellipsoid
<i>Conocybe arthraei</i>	8 × 4.5	ellipsoid with a pore
<i>Conocybe lactea</i>	12.5 × 8	ellipsoid with a pore
<i>Coprinus atramentarius</i>	9 × 6	ellipsoid with a pore
<i>Coprinus comatus</i>	12 × 8	ellipsoid with a pore
<i>Coprinus disseminatus</i>	8.5 × 4.5	ellipsoid with a pore
<i>Coprinus miceneus</i>	8.5 × 6 × 4.5	flattened ellipsoid with a truncated pore
<i>Coprinus niveus</i>	15 × 10.5 × 8	flattened ellipsoid, slightly hexagonal, with a pore
<i>Coprinus picaceus</i>	16 × 11.5 × 9.5	flattened ellipsoid with a pore
<i>Coprinus plicatilis</i>	12 × 9 × 5	flat, heart-shaped with a pore
<i>Cordyceps militaris</i>	4.5 × 1.5	very long, cylindrical, breaking into part spores
<i>Cordyceps ophioglossoides</i>	4 × 2	very long, cylindrical, breaking into part spores
<i>Cortinarius alboviolaceus</i>	8.5 × 5.5	ellipsoid, rugose
<i>Cortinarius anserinus</i>	10 × 6.5	lemon-shaped, rugose
<i>Cortinarius armillatus</i>	10.5 × 6.5	almond-shaped, rugose
<i>Cortinarius bolaris</i>	6.5 × 4	near spherical, rugose
<i>Cortinarius caeruleus</i>	10 × 5.5	ellipsoid, rugose
<i>Cortinarius calochrous</i>	10 × 6	ellipsoid, rugose
<i>Cortinarius cinauomensis</i>	7.5 × 4.5	almond-shaped, rugose
<i>Cortinarius elegantiissimus</i>	14 × 8.5	lemon-shaped, rugose
<i>Cortinarius mucosus</i>	12.5 × 6.5	narrow lemon-shaped, rugose
<i>Cortinarius orellanus</i>	10.5 × 6	ellipsoid, rugose
<i>Cortinarius paleaceus</i>	8.5 × 5.5	ellipsoid, rugose
<i>Cortinarius pholidens</i>	7.5 × 5.5	near spherical, rugose
<i>Cortinarius rubellus</i>	10 × 7.5	near spherical to broadly ellipsoid, rugose
<i>Cortinarius rufoolivaceus</i>	13 × 7.5	almond- to lemon-shaped, rugose
<i>Cortinarius semisanguineus</i>	7 × 4.5	ellipsoid to lemon-shaped, rugose
<i>Cortinarius sodaginitus</i>	11 × 6	ellipsoid to almond-shaped, rugose
<i>Cortinarius splendens</i>	9.5 × 5.5	almond-shaped, rugose
<i>Cortinarius torvus</i>	9.5 × 6	broadly ellipsoid to egg-shaped, rugose
<i>Cortinarius triumphans</i>	12 × 6.5	almond-shaped, rugose

SPECIES	SIZE (µm)	SHAPE
<i>Cortinarius violaceus</i>	12.5 × 8	near spherical to almond-shaped, rugose
<i>Craterellus cornucopioides</i>	13 × 8	broadly ellipsoid
<i>Creolophus cirrhatus</i>	4 × 3	near spherical, amyloid, hyphae not amyloid
<i>Crepidotus mollis</i>	9 × 6	egg-shaped
<i>Crepidotus variabilis</i>	6.5 × 3	oblong-ellipsoid, warty
<i>Crimpellus stipitaria</i>	7.5 × 5	broadly ellipsoid
<i>Crucibulum crucibuliforme</i>	8 × 4.5	oblong-ellipsoid
<i>Cyathus striatus</i>	17 × 10	oblong-ellipsoid
<i>Cystoderma amianthinum</i>	6 × 3	egg-shaped, amyloid
<i>Cystoderma carcharias</i>	5 × 4	near spherical, amyloid
<i>Cystoderma terrei</i>	4.5 × 2.5	ellipsoid
<i>Daedalea quercina</i>	6.5 × 3	ellipsoid
<i>Daedaleopsis confragosa</i>	7.5 × 2.5	cylindrical, curved
<i>Daldinia concentrica</i>	14.5 × 7	ellipsoid to spindle-shaped, flattened on one side
<i>Disciotis venosa</i>	22 × 13.5	broadly ellipsoid
<i>Dumontinia tuberosa</i>	15 × 7.5	ellipsoid
<i>Elaphomyces granulatus</i>	30 ♂	spherical, spiny
<i>Entoloma abortivum</i>	9 × 5	ellipsoid, angular
<i>Entoloma cetratum</i>	12 × 8	prism-shaped, nodular
<i>Entoloma clypeatum</i>	10 × 9.5	prism-shaped
<i>Entoloma conferendum</i>	10 × 9	cruciform, angular
<i>Entoloma incanum</i>	12.5 × 8.5	angular
<i>Entoloma nitidum</i>	8 × 7	angular
<i>Entoloma porphyrophacum</i>	11 × 7.5	angular
<i>Entoloma rhodopolium</i>	8.5 × 7.5	prism-shaped
<i>Entoloma sericum</i>	9 × 8	angular
<i>Entoloma serrulatum</i>	10.5 × 7.5	angular
<i>Entoloma sinuatum</i>	10 × 9	angular
<i>Exidia glandulosa</i>	13 × 4	sausage-shaped
<i>Fistulina hepatica</i>	5.5 × 4	near spherical
<i>Flammulina velutipes</i>	8.5 × 4	ellipsoid to cylindrical
<i>Fomes fomentarius</i>	17 × 6	cylindrical
<i>Fomitopsis pinicola</i>	7.5 × 4	slender ellipsoid
<i>Galerina cahyrata</i>	11 × 6	broadly spindle-shaped, warty, loosening outer wall
<i>Galerina mutabilis</i>	7.5 × 5	ellipsoid with a pore
<i>Galerina unicolor</i>	12 × 6	almond-shaped, rugose, loosening outer wall
<i>Ganoderma applanatum</i>	7.5 × 5	ellipsoid, truncated, warty
<i>Ganoderma lucidum</i>	10 × 7	ellipsoid, truncated, warty
<i>Ganoderma pfeifferi</i>	10 × 7.5	ellipsoid, truncated, warty
<i>Geastrum fujiantrium</i>	3.5 ♂	spherical, warty
<i>Geastrum schmidlii</i>	5.2 ♂	spherical, warty
<i>Geastrum striatum</i>	4.5 ♂	spherical, warty
<i>Geastrum triplex</i>	4 ♂	spherical, blunt spiny
<i>Geoglossum fallax</i>	75 × 6	near cylindrical, 0-7 septate
<i>Geopora arenicola</i>	25 × 15	ellipsoid, 1-2 drops inside
<i>Gloeophyllum odoratum</i>	8.5 × 4	cylindrical
<i>Gomphidius glutinosus</i>	19 × 5.5	near spindle-shaped
<i>Gomphidius roseus</i>	19 × 5.5	near spindle-shaped
<i>Gomphus floccosus</i>	13 × 7.5	ellipsoid, rugose
<i>Grifola frondosa</i>	5.5 × 4	broadly ellipsoid to near spherical
<i>Gymnopilus penetrans</i>	7.5 × 4.5	ellipsoid, rugose
<i>Gyvaopilus spectabilis</i>	9 × 5.5	ellipsoid, rugose
<i>Gyromitra esculenta</i>	20 × 10	ellipsoid
<i>Gyromitra infula</i>	22 × 8.5	narrowly ellipsoid
<i>Gyroporus castaneus</i>	9.5 × 5.5	ellipsoid
<i>Gyroporus cyanescens</i>	10 × 5	ellipsoid

SPECIES	SIZE (µm)	SHAPE
<i>Haplophilus rutitans</i>	5 × 2.5	ellipsoid
<i>Hebeloma crustuliniforme</i>	11 × 6	almond-shaped, rugose
<i>Hebeloma mesophaeum</i>	9 × 5.5	ellipsoid, finely rugose
<i>Hebeloma radicosum</i>	9 × 5.5	almond-shaped, rugose
<i>Hevelia crispata</i>	20 × 12	ellipsoid
<i>Hevelia lanuosa</i>	19 × 12	ellipsoid
<i>Hericum coralloides</i>	4 × 3	oval, amyloid
<i>Heterobasidium annosum</i>	4.5 × 3.5	broadly ellipsoid to near spherical, warty
<i>Hydnellum peckii</i>	5.5 × 4	oval, warty
<i>Hydnum repandum</i>	7 × 6	oval
<i>Hydnum umbilicatum</i>	8.5 × 7	near spherical
<i>Hygrocybe calyptraeformis</i>	7.5 × 5	broadly ellipsoid
<i>Hygrocybe chlorophana</i>	8.5 × 5	ovoid to ellipsoid
<i>Hygrocybe cocinea</i>	9 × 5	ellipsoid to almond-shaped
<i>Hygrocybe conica</i> (4-spored)	9.5 × 6	ellipsoid or almond- to bean-shaped
<i>Hygrocybe conica</i> (2-spored)	10.5 × 7	
<i>Hygrocybe miniata</i>	7.5 × 5.5	often pear-shaped
<i>Hygrocybe pratensis</i>	6 × 4.5	near spherical to ellipsoid or tear-shaped
<i>Hygrocybe psittarina</i>	8.5 × 5.5	oblong-ellipsoid
<i>Hygrocybe punicea</i>	9.5 × 5	oblong-ellipsoid
<i>Hygrocybe virginea</i>	8 × 5	narrowly ellipsoid
<i>Hygrophorus aurantiava</i>	6.5 × 4	oblong-ellipsoid
<i>Hygrophorus eburneus</i>	8.5 × 4.5	ellipsoid
<i>Hygrophorus hypotheus</i>	8 × 4.5	ellipsoid
<i>Hymenochaete rubiginosa</i>	5.5 × 3	oblong-ellipsoid
<i>Hypoholoma capnoides</i>	8 × 4.5	ellipsoid with a pore
<i>Hypoholoma fasciculare</i>	7 × 4.5	ellipsoid with a pore
<i>Hypoholoma sublateritium</i>	7 × 4	ellipsoid with a pore
<i>Hypomyces hyalinus</i>	19 × 5.5	spindle-shaped, 2-celled, warty
<i>Hypomyces lactifluorum</i>	40 × 4.5	spindle-shaped, 2-celled, warty
<i>Hypoxyton frageforme</i>	13 × 6	ellipsoid to spindle-shaped, flattened
<i>Inocybe asterospora</i>	10.5 × 8.5	star-shaped, nodular
<i>Inocybe erubescens</i>	12 × 6	ellipsoid to bean-shaped
<i>Inocybe gophylla</i>	9.5 × 5.5	ellipsoid
<i>Inocybe godeyi</i>	10.5 × 6.5	almond-shaped
<i>Inocybe griseoillacina</i>	9 × 5.5	almond-shaped
<i>Inocybe haemata</i>	9 × 5.5	ellipsoid to almond-shaped
<i>Inocybe lacera</i>	14 × 5.5	cylindrical
<i>Inocybe rimosa</i>	12 × 6	ellipsoid to bean-shaped
<i>Inonotus hispidus</i>	8.5 × 7	broadly ellipsoid
<i>Inonotus radiatus</i>	6 × 4.5	broadly ellipsoid
<i>Laccaria amethystina</i>	9.5 ♂	spherical or near spherical, spiny
<i>Laccaria lactata</i>	9 × 8	spherical or near spherical, spiny
<i>Lactarius biennis</i>	7.5 × 6	near spherical, warty, veined, amyloid
<i>Lactarius camphoratus</i>	8 × 7	near spherical, spiny-rugose, veined, amyloid
<i>Lactarius controversus</i>	7 × 5	near spherical, rugose, veined, amyloid
<i>Lactarius deliciosus</i>	8.5 × 7	near spherical, warty, veined, amyloid
<i>Lactarius deterrimus</i>	9 × 7	near spherical, warty, veined, amyloid
<i>Lactarius fuliginosus</i>	9 ♀	spherical, reticulate, crested, amyloid

SPECIES	SIZE (µm)	SHAPE
<i>Lactarius glycosmus</i>	8.5 × 7.5	near spherical, rugose, veined, amyloid
<i>Lactarius helvus</i>	8 × 6	near spherical, reticulate, veined, amyloid
<i>Lactarius hepaticus</i>	8 × 6.5	near spherical, reticulate, veined, amyloid
<i>Lactarius hygrophoroides</i>	8.5 × 7	near spherical, warty, veined, amyloid
<i>Lactarius mitissimus</i>	9 × 7	near spherical, rugose, amyloid
<i>Lactarius necator</i>	7 × 6	near spherical, veined, amyloid
<i>Lactarius pallidus</i>	8 × 6.5	near spherical, rugose, veined, amyloid
<i>Lactarius piperatus</i>	8.5 × 6.5	near spherical, warty, with connecting lines, amyloid
<i>Lactarius pyrogalus</i>	7 × 5.5	near spherical, reticulate, veined, amyloid
<i>Lactarius quietus</i>	8.5 × 7.5	near spherical, rugose, veined, amyloid
<i>Lactarius rufus</i>	9 × 6.5	broadly ellipsoid, reticulate, veined, amyloid
<i>Lactarius sanguifluus</i>	8.5 × 7	near spherical, warty, veined
<i>Lactarius subdulcis</i>	7.5 × 6	near spherical, reticulate, veined, amyloid
<i>Lactarius thijogalus</i>	8.5 × 6.5	near spherical, rugose, veined, amyloid
<i>Lactarius torminosus</i>	8.5 × 7	near spherical, rugose, veined, amyloid
<i>Lactarius trivialis</i>	9.5 × 8	near spherical, rugose, veined, amyloid
<i>Lactarius vellereus</i>	10.5 × 8.5	near spherical, warty, with connecting veins, amyloid
<i>Lactarius volemus</i>	8.5 ♂	spherical, reticulate, veined, amyloid
<i>Lactiporus sulphureus</i>	6 × 4	broadly ellipsoid
<i>Lecaninum crocipodium</i>	15 × 6	near spindle-shaped
<i>Lecaninum quercinum</i>	13.5 × 4.5	near spindle-shaped
<i>Lecaninum scabrum</i>	17 × 5.5	near spindle-shaped
<i>Lecaninum varicolor</i>	14.5 × 5	near spindle-shaped
<i>Lecaninum versipelle</i>	14.5 × 4.5	near spindle-shaped
<i>Leninellus cochlearius</i>	4.5 × 4	near spherical, spiny
<i>Leninellus ursinus</i>	4 × 2.5	egg-shaped, spiny, amyloid
<i>Leninus nigrinus</i>	7.5 × 3.5	cylindrical
<i>Lenzites betulina</i>	5.5 × 2.5	more or less ellipsoid
<i>Lepiota lubrica</i>	23 × 6	near cylindrical, somewhat curved, 4-5 septate
<i>Lepiota aspera</i>	8 × 3	ellipsoid
<i>Lepiota brunneoincarnata</i>	8 × 4.5	egg-shaped
<i>Lepiota castanea</i>	11 × 4	projectile-shaped
<i>Lepiota clypeolaria</i>	14 × 6	projectile-shaped
<i>Lepiota cristata</i>	7 × 3.5	projectile-shaped
<i>Lepiota ignivolvata</i>	12 × 6	broadly spindle-shaped
<i>Lepiota oreoformis</i>	12.5 × 5	spindle-shaped
<i>Lepista flaccida</i>	3-4.5 ♀	near spherical, fine spiny
<i>Lepista irina</i>	8 × 4.5	ellipsoid, rugose
<i>Lepista nuda</i>	7.5 × 4.5	ellipsoid, rugose
<i>Lepista personata</i>	7.5 × 5	ellipsoid, rugose
<i>Leucoagaricus leucothites</i>	8.5 × 5.5	broadly egg- to almond-shaped
<i>Leucocoprinus bathmii</i>	6.5 × 4.5	ellipsoid to spindle-shaped
<i>Leucocoprinus luteus</i>	8.5 × 6	almond-shaped with a pore

SPECIES	SIZE (µm)	SHAPE
<i>Leucopaxillus giganteus</i>	7 × 4	tear-shaped
<i>Limacella guttata</i>	5.5 × 4.5	near spherical
<i>Lycoperdon echinatum</i>	4.5 ♂	spherical, warty
<i>Lycoperdon perlatum</i>	3.5 ♂	spherical, warty
<i>Lycoperdon pyriforme</i>	4 ♂	spherical, nearly smooth
<i>Lyophyllum connatum</i>	6 × 3.5	ellipsoid
<i>Lyophyllum decastes</i>	5.5 ♂	spherical
<i>Lyophyllum palustre</i>	7 × 4	ellipsoid
<i>Macrocyrtidia cucumis</i>	9 × 4.5	ellipsoid
<i>Macrolepiota procerca</i>	15 × 10	ellipsoid with a pore
<i>Macrolepiota rhacodes</i>	10 × 6.5	ellipsoid with a pore
<i>Macrotyphula fistulosa</i>	13 × 6.5	ellipsoid
<i>Marasmiellus ramealis</i>	9 × 3	spindle-shaped to ellipsoid
<i>Marasmius alliaceus</i>	9.5 × 7	broadly ellipsoid
<i>Marasmius androsaceus</i>	8 × 4.5	ellipsoid to tear-shaped
<i>Marasmius oreades</i>	9 × 5.5	broadly ellipsoid
<i>Marasmius rotula</i>	8 × 4	ellipsoid or tear-shaped
<i>Megacollybia platyphylla</i>	7.5 × 6.5	near spherical
<i>Melanoleuca cognata</i>	9.5 × 6	ellipsoid, fine spiny, amyloid
<i>Melanoleuca poholeuca</i>	8 × 5.5	ellipsoid, fine spiny, amyloid
<i>Meripilus giganteus</i>	6 × 5	broadly ellipsoid to near spherical
<i>Micromphale foetidum</i>	9 × 4	ellipsoid
<i>Mitrulella patulosa</i>	12.5 × 3	club-shaped to cylindrical
<i>Morchella elata</i>	25 × 14	ellipsoid
<i>Morchella esculenta</i>	20 × 12.5	ellipsoid
<i>Morchella semilibera</i>	26 × 16	ellipsoid
<i>Mutinus caninus</i>	5.5 × 2.5	ellipsoid
<i>Myena acicula</i>	11 × 3.5	near spindle-shaped to near cylindrical
<i>Myena adonis</i>	8.5 × 5	ellipsoid to oblong
<i>Myena arcangeliana</i>	9 × 5.5	ellipsoid
<i>Myena crocata</i>	8.5 × 5	broadly ellipsoid
<i>Myena epipterygia</i>	10 × 5	ellipsoid
<i>Myena filipes</i>	10 × 6	ellipsoid
<i>Myena flavoalba</i>	7.5 × 3.5	ellipsoid to near cylindrical
<i>Myena galericulata</i>	10 × 7.5	egg-shaped to oblong
<i>Myena galopas</i>	12 × 6	ellipsoid to near cylindrical
<i>Myena haematopus</i>	8.5 × 6	ellipsoid
<i>Myena inclinata</i>	10 × 6.5	egg-shaped to ellipsoid
<i>Myena leptocéphala</i>	10 × 5	ellipsoid to near cylindrical
<i>Myena olivaceomarginata</i>	10 × 5.5	ellipsoid
<i>Myena pelianthina</i>	6.5 × 3.5	ellipsoid
<i>Myena polygramma</i>	9.5 × 6.5	ellipsoid
<i>Myena pura</i>	7 × 3.5	ellipsoid
<i>Neobulgaria pura</i>	9 × 4	ellipsoid, striped lengthways
<i>Oligoporus rennyi</i>	4 × 2.5	oblong
<i>Omphalina umbellifera</i>	8.5 × 6	near spherical to broadly ellipsoid
<i>Omphalotus olearius</i>	5.5 × 5	near spherical
<i>Otidea onotica</i>	13 × 7	ellipsoid, 2 drops inside
<i>Oudemansiella mucida</i>	16 × 14	near spherical to spherical, thick-walled
<i>Oudemansiella radicata</i>	13.5 × 10	broadly ellipsoid
<i>Paeclomyces farinosus</i>	2.5 × 1.5	ellipsoid
<i>Panaeolina foeniceci</i>	13.5 × 8	lemon-shaped with a pore, warty
<i>Panaeolus papilionaceus</i>	16 × 9	lemon-shaped with a pore
<i>Panaeolus semiovatius</i>	18 × 10	broadly ellipsoid with a pore
<i>Panellus serotinus</i>	5 × 1.5	sausage-shaped
<i>Panellus srypticus</i>	4.5 × 2	egg-shaped
<i>Paxillus atrotomentosus</i>	5 × 4	broadly ellipsoid

SPECIES	SIZE (µm)	SHAPE
<i>Paxillus corrugatus</i>	3 × 1.75	ellipsoid
<i>Paxillus involutus</i>	9 × 5.5	ellipsoid
<i>Peziza badia</i>	18.5 × 8.5	ellipsoid, 2 drops inside
<i>Peziza sacrosa</i>	20.5 × 11	ellipsoid, 2 drops inside, warty
<i>Peziza vesiculosa</i>	22 × 12	ellipsoid without drops
<i>Phaeolepiota aurea</i>	12 × 5	narrowly ellipsoid
<i>Phaeolepiota schweinitzii</i>	7 × 4	ellipsoid
<i>Phallus duplicatus</i>	4 × 2	ellipsoid
<i>Phallus impudicus</i>	5 × 2.5	ellipsoid
<i>Phellinus igniarius</i>	6 × 5	near spherical
<i>Phellodon niger</i>	4 × 3	oval, spiny
<i>Phellodon tomentosus</i>	4 × 3	oval or spherical, spiny
<i>Phlebia tremulosa</i>	4 × 1	sausage-shaped
<i>Pholiota alnicola</i>	9.5 × 5	ellipsoid with a pore
<i>Pholiota aurivellus</i>	9 × 5.5	ellipsoid with a pore
<i>Pholiota gummosa</i>	7.5 × 4	ellipsoid with a pore
<i>Pholiota highlandensis</i>	7 × 4.5	ellipsoid with a pore
<i>Pholiota lenta</i>	6.5 × 3.5	ellipsoid with a pore
<i>Pholiota squarrosa</i>	7 × 4	ellipsoid with a pore
<i>Phylloporus rhodosanthus</i>	12.5 × 4.5	ellipsoid to spindle-shaped
<i>Pipitoporus betulinus</i>	6 × 2	sausage-shaped
<i>Pleurocybella porrigens</i>	7 × 5	near spherical to broadly ellipsoid
<i>Pleurotus cornucopiae</i>	10 × 4.5	elongated ellipsoid
<i>Pleurotus eryngii</i>	11 × 5	elongated ellipsoid
<i>Pleurotus ostratus</i>	9.5 × 3.5	elongated ellipsoid
<i>Pluteus aurantiorugosus</i>	6 × 4	broadly ellipsoid
<i>Pluteus cervinus</i>	7.5 × 5.5	broadly ellipsoid
<i>Pluteus chrysophaeus</i>	7 × 6	near spherical
<i>Pluteus umbrinus</i>	6.5 × 5	broadly ellipsoid
<i>Polyporus badius</i>	7.5 × 3.5	cylindrical
<i>Polyporus brumalis</i>	5.5 × 2.5	cylindrical
<i>Polyporus squamosus</i>	13 × 5	cylindrical
<i>Polyporus tuberaster</i>	13 × 5	cylindrical
<i>Polyporus umbellatus</i>	9 × 3.5	cylindrical
<i>Polyporus varius</i>	8.5 × 3	cylindrical
<i>Porphyrellus porphyrosporus</i>	14 × 6	near spindle-shaped
<i>Postia caesia</i>	5 × 1.5	sausage-shaped, amyloid
<i>Postia stipitata</i>	4.5 × 2	ellipsoid to cylindrical
<i>Psathyrella candolleana</i>	8 × 4.5	ellipsoid with a pore
<i>Psathyrella conopilus</i>	15.5 × 7.5	ellipsoid with a pore
<i>Psathyrella multipedata</i>	7.5 × 4	ellipsoid with a pore
<i>Psathyrella pilbiliformis</i>	6 × 3.5	ellipsoid with a pore
<i>Psathyrella velutina</i>	9.5 × 6	lemon-shaped with a big pore, warty
<i>Pseudoclitocybe cyathiformis</i>	9 × 5.5	ellipsoid, amyloid
<i>Pseudodyadum gelatinosum</i>	6.5 × 5.5	near spherical to broadly ellipsoid
<i>Psilocybe cubensis</i>	14 × 9	ellipsoid with a pore
<i>Psilocybe cyanescens</i>	11.5 × 7 × 6	ellipsoid to almond-shaped with a pore
<i>Psilocybe semilanceata</i>	13 × 8	ovoid to ellipsoid with a pore
<i>Psilocybe squamosa</i>	14 × 8	ellipsoid with a pore
<i>Pycnoporus cinnabarinus</i>	5 × 2.5	ellipsoid
<i>Ramaria abietina</i>	8 × 4	ellipsoid, short spiny
<i>Ramaria botrytis</i>	15 × 5.5	narrowly ellipsoid, striped
<i>Ramaria sanguinea</i>	10 × 4.5	narrowly ellipsoid, warty
<i>Ramaria stricta</i>	9 × 4.5	ellipsoid, warty
<i>Rickenella fibula</i>	4.5 × 2.5	narrowly ellipsoid
<i>Rickenella setipes</i>	5 × 3	ellipsoid
<i>Rozites caperata</i>	12.5 × 8	almond-shaped, rugose

SPECIES	SIZE (µm)	SHAPE
<i>Russula aeruginea</i>	8 × 6	near spherical, warty, veined, amyloid
<i>Russula atropurpurea</i>	8 × 6.5	near spherical, warty, partially reticulate, amyloid
<i>Russula claroflava</i>	8.5 × 7	near spherical, warty, veined, amyloid
<i>Russula cyanoxantha</i>	8.5 × 7	near spherical, warty, veined, amyloid
<i>Russula delicata</i>	9.5 × 7.5	near spherical, rugose, amyloid
<i>Russula emetica</i>	9.5 × 8	near spherical, warty, veined, amyloid
<i>Russula felles</i>	8.5 × 6.5	near spherical, veined, amyloid
<i>Russula foetens</i>	8.5 × 8	near spherical, warty, amyloid
<i>Russula fragilis</i>	8.5 × 7	near spherical, reticulate, warty, amyloid
<i>Russula integra</i>	10.5 × 8.5	near spherical, spiny, amyloid
<i>Russula mairei</i>	7.5 × 6	near spherical, reticulate, warty, amyloid
<i>Russula nigricans</i>	7 × 6.5	near spherical, reticulate, amyloid
<i>Russula ochroleuca</i>	9 × 7.5	near spherical, partly reticulate, warty, amyloid
<i>Russula paludosa</i>	9.5 × 8	near spherical, warty, some connecting veins, amyloid
<i>Russula paellaris</i>	8 × 6	near spherical, warty-spiny, amyloid
<i>Russula rosea</i>	8.5 × 7.5	near spherical, reticulate, warty, amyloid
<i>Russula sanguinaria</i>	8.5 × 7.5	near spherical, spiny, some connecting veins, amyloid
<i>Russula sardonia</i>	8 × 6.5	near spherical, warty-crested, veined, amyloid
<i>Russula turci</i>	8 × 7	near spherical, warty-crested, veined, amyloid
<i>Russula vesca</i>	7 × 5.5	near spherical, warty, amyloid
<i>Russula virosa</i>	10 × 8	near spherical, spiny, amyloid
<i>Russula virescens</i>	8 × 6.5	near spherical, reticulate, warty, amyloid
<i>Russula xerampelina</i>	9 × 8	near spherical, warty, amyloid
<i>Rutstroemia firma</i>	17 × 5.5	narrow ellipsoid, 3–5 septate
<i>Sarcodon imbricatum</i>	7.5 × 5	near spherical, warty
<i>Sarcodon scabrous</i>	7.5 × 6	spherical with coarse warts
<i>Sarcoscypha austriaca</i>	28 × 13	narrowly ellipsoid
<i>Schizophyllum commune</i>	5 × 2	cylindrical or curved
<i>Sclerospora paradosa</i>	5.5 × 3.5	oval
<i>Scleroderma citrinum</i>	11.5 × 6	spherical, spiny, partially reticulate
<i>Scleroderma cerretusum</i>	10 × 6	spherical, spiny
<i>Scutellinia scutellata</i>	19 × 12	ellipsoid, warty
<i>Sepedonium chrysospermum</i>	20 × 6	spherical, warty
<i>Serpula lacrymans</i>	12 × 7	ellipsoid
<i>Sparassis crispa</i>	7 × 4.5	ellipsoid
<i>Spinellus fusiger</i>	40 × 20	lemon-shaped, variable
<i>Stereopsis hamphreyi</i>	7.5 × 4.5	ellipsoid to egg-shaped
<i>Stereum hirsutum</i>	6 × 2.5	ellipsoid to cylindrical, amyloid
<i>Stereum rugosum</i>	7.5 × 4	ellipsoid to cylindrical, amyloid
<i>Stereum submentanum</i>	6 × 2.5	ellipsoid to cylindrical, amyloid

SPECIES	SIZE (µm)	SHAPE
<i>Strobilomyces strobilaceus</i>	11 × 10	near spherical, reticulate
<i>Strobilurus esculentus</i>	5 × 2	ellipsoid
<i>Stropharia aurantiaca</i>	14 × 7	ellipsoid with a pore
<i>Stropharia coronilla</i>	8.5 × 4.5	ellipsoid with a pore
<i>Stropharia cyanea</i>	8.5 × 4.5	ellipsoid with a pore
<i>Stropharia rugoso-annulata</i>	11.5 × 8	ellipsoid with a pore
<i>Stropharia seniglobata</i>	18 × 9	ellipsoid with a pore
<i>Suillus aeruginascens</i>	11.5 × 5	near spindle-shaped
<i>Suillus bovinus</i>	9 × 3.5	near spindle-shaped
<i>Suillus granulatus</i>	9 × 3	near spindle-shaped
<i>Suillus grevillei</i>	9.5 × 3.5	near spindle-shaped
<i>Suillus luteus</i>	8.5 × 3.5	oblong to spindle-shaped
<i>Suillus plorans</i>	9 × 4.5	ellipsoid
<i>Suillus spraguei</i>	10 × 4	ellipsoid
<i>Suillus variegatus</i>	9 × 3.5	near spindle-shaped
<i>Syzegites megalocarpus</i>	25	globose
<i>Tarsetia capularis</i>	20 × 13	narrowly ellipsoid, 2 drops inside
<i>Thelophora terrestris</i>	9 × 7	oval to ellipsoid, warty-spiny
<i>Trametes gibbosa</i>	5 × 2.5	cylindrical to curved
<i>Trametes hirsuta</i>	6 × 2	cylindrical
<i>Trametes versicolor</i>	6.5 × 2	cylindrical
<i>Tremella foliacea</i>	9.5 × 8	oval
<i>Tremella mesenterica</i>	12.5 × 8.5	oval
<i>Trichaptum abietinum</i>	7.5 × 2.5	cylindrical
<i>Trichoglossum hirsutum</i>	125 × 7	near cylindrical, pointed ends, 15 septate
<i>Tricholoma atrorugosum</i>	6.5 × 4	ellipsoid
<i>Tricholoma auratum</i>	5.5 × 3.5	ellipsoid
<i>Tricholoma caligatum</i>	7 × 5	ellipsoid
<i>Tricholoma flavovirens</i>	7 × 4.5	ellipsoid
<i>Tricholoma fulvum</i>	6.5 × 4.5	broadly ellipsoid
<i>Tricholoma lascivum</i>	7 × 4	ellipsoid to near spindle-shaped
<i>Tricholoma magnivelare</i>	6 × 5	ellipsoid to near spherical
<i>Tricholoma pardunum</i>	10 × 6.5	broadly ellipsoid
<i>Tricholoma portentosum</i>	6.5 × 4.5	ellipsoid
<i>Tricholoma saponaceum</i>	6 × 4	ellipsoid
<i>Tricholoma sculpturatum</i>	5 × 3	ellipsoid
<i>Tricholoma sciodes</i>	7 × 6	broadly ellipsoid
<i>Tricholoma sejunctum</i>	5.5 × 4	ellipsoid
<i>Tricholoma sulphurum</i>	10 × 6	ellipsoid to almond-shaped
<i>Tricholoma terreum</i>	6.5 × 4.5	ellipsoid
<i>Tricholoma ustale</i>	7 × 5	ellipsoid
<i>Tricholomopsis rutilans</i>	6.5 × 5	broadly ellipsoid to near spherical
<i>Tuber aestivum</i>	30 × 24	egg-shaped, reticulate, spiny
<i>Tuber canaliculatum</i>	60 × 50	ellipsoid to near spherical, reticulate
<i>Tuber magnatum</i>	40 × 35	egg-shaped, reticulate
<i>Tuber melanosporum</i>	35 × 25	ellipsoid, curved spiny
<i>Typholius felles</i>	13 × 4.5	near spindle-shaped
<i>Typhula erythropus</i>	6 × 3	ellipsoid
<i>Vascellum pratense</i>	3.5 × 4.3	spherical, warty
<i>Verpa conica</i>	22 × 13	ellipsoid
<i>Volcariella bombycina</i>	9 × 6	ellipsoid
<i>Volcariella gloioscephala</i>	15 × 9	egg-shaped to ellipsoid
<i>Xylaria hypoxylon</i>	12.5 × 5.5	spindle-shaped, flattened
<i>Xylaria polymorpha</i>	25 × 7	spindle-shaped, flattened
<i>Zelleromyces cinnabarinus</i>	15 × 12	ellipsoid, reticulate, amyloid

## GLOSSARY

Many of the terms described here are illustrated in the introduction (pp.6–23). Words in **bold** type are defined elsewhere in the glossary.

• **ADNATE GILLS**

Gills that are broadly attached to the stem.

• **ADNEXED GILLS**

Gills with a narrow attachment to the stem.

• **AGARIC**

Fungus with a cap and stem **fruitbody** with gills under the cap.

• **AMYLOID**

Refers to a reaction with an iodine reagent resulting in a blue stain.

• **ASCUS (pl. ASCI)**

The saclike organ in which ascomyces (see p.11) produce sexual spores.

• **BASIDIUM (pl. BASIDIA)**

The club-shaped organ on which basidiomycetes (see p.11) form sexual spores.

• **BOLETE**

A bolete produces a fleshy cap and stem **fruitbody** with pores and soft tubes under the cap.

• **BOREAL**

Refers to northern conifer region.

• **CORTINA**

A weblike veil, found in the genus *Cortinarius*.

• **CYSTIDIUM (pl. CYSTIDIA)**

Special sterile cells that can be found in various places on **fruitbodies** of basidiomycetes (see p.8). Cystidia on the gill sides and the stem can be important in identifying species of *Conocybe* and *Inocybe*.

• **DECURRENT GILLS**

Gills that run down the stem.

• **DELIQUESCENT GILLS**

Gills that dissolve as they mature, releasing an inky liquid full of black spores. They are peculiar to the genus *Coprinus*.

• **FIBRILLOSE**

With threadlike fibers.

• **FIMBRIATE**

With prominent projecting hairs on the cap margin.

• **FLASK FUNGUS**

Fungus with tiny, flask-shaped **fruitbodies**, sometimes enclosed within a protective stroma.

• **FREE GILLS**

Gills with no stem attachment.

• **FRUITBODY**

A structure that supports the cells required for sexual reproduction in fungi.

• **GILLS**

The bladelike, spore-bearing structures found under the caps of agarics.

• **GLEBA**

The fertile tissue occurring in the group of fungi that includes puffballs, stinkhorns, earth stars, earth balls, and bird's nest fungi.

• **HYALINE**

Colorless.

• **HYGROPHANOUS**

Usually refers to the caps of agarics drying from the center and becoming paler in zones until they are completely dry. When damp, the dark color reappears from the margin inward. Such fungi are typically **striate** at the cap margin.

• **HYPHA (pl. HYPHAE)**

The threadlike structures that make up a fungus, including its **fruitbodies**.

• **KOH**

Potassium hydroxide. This aids identification by producing stains on the flesh of certain fungi.

• **MYCORRHIZAL**

A relationship between plants and fungi that benefits both partners.

• **NOTCHED GILLS**

Gills that are indented just before reaching the stem.

• **OSTIOLE**

The opening or neck of the spore-producing organ in flask fungi.

• **PARTIAL VEIL**

Thin, skin- or threadlike tissue that protects the gills or pores of the immature **fruitbody**. It splits as the fruitbody matures, often leaving traces at the cap margin or as a ring around the stem.

• **PEDICEL**

A cylindrical or tapering appendage on the spores of some fungi, such as *Bovista plumbea*.

• **PORES**

The opening of the tubes through which the spores are released in fungi such as boletes.

• **RESUPINATE**

Refers to a **fruitbody** that grows completely flat against the **substrate** without producing a cap or free margin.

• **RETICULATE**

With a net pattern.

• **RHIZOIDS**

Tightly spun hyphae.

• **RUGOSE**

With a rough surface.

• **SCLEROTIUM (pl. SCLEROTIA)**

A storage organ with a dense pale interior and a black protective rind produced by some fungi. It contains nutrients that will enable the fungus to grow when conditions are favorable.

• **SEPTATE**

Refers to hyphae or spores with transverse partitions or walls.

• **SETA (pl. SETAE)**

Thick-walled hairs (on caps, gills, stems, or in the flesh).

• **SINUATE GILLS**

Curved gills.

• **SPORES**

Microscopic cells produced by fungi for reproduction.

• **STRIATE**

Refers to lines on the cap caused by underlying gills.

• **STROMA (pl. STROMATA)**

A protective tissue, formed by flask fungi for example; it normally contains the tiny **fruitbodies**.

• **SUBSTRATE**

The medium, such as soil or bark, in which a fungus grows.

• **TUBES**

Tubular structures under the caps of fungi such as boletes, where the fertile, spore-producing tissue is found. Tubes are visible as pores on the undersurface.

• **UMBO**

A raised boss in the center of a cap.

• **UNIVERSAL VEIL**

Thin skin- or weblike tissue covering the whole of the immature **fruitbody**. It splits as the fruitbody grows, sometimes leaving a volva at the stem base or loose scales on the cap.

• **VEIL**

Thin skin- or weblike tissue that may protect entire **fruitbodies** (**universal veil**) or just the gills or pores (**partial veil**).

• **VISCID**

Slimy-sticky.

• **VOLVA**

A saclike remnant of the **universal veil** at a stem base.

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## ACKNOWLEDGMENTS

**G**ARY LINGOFF thanks all those amateur mushroom hunting clubs in the United States and Canada that, over the years, have so generously shared with him what they know about their local mushrooms. He also wishes to thank all those mycologists in North America whose passion for taxonomy over the past quarter century has sparked a renaissance in our understanding of fungal relationships.

DK would like to thank Phoebe Todd-Naylor for her constant attention.

**T**HOMAS LÆSSØE would like to thank Colin Walton and Jo Weeks for their work on this book, as well as all those involved in *The Mushroom Book* who did much of the groundwork for this project, including Paul Copsey, Neil Fletcher, Sharon Moore, Joyce Pitt, Bella Pringle, and Jo Weightman.

## PICTURE CREDITS

All photographs are by Neil Fletcher with the exception of those listed below. Dorling Kindersley would like to thank the following illustrators and photographers for permission to reproduce their artwork and photographs.

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Gill Tomblin, Barbara Walker, Debra Woodward.



Photographs by A-Z Botanical Collection Ltd 97tr (J M Staples), 20cl, 38tr, 187bc, 210tr, 219tr (Bjorn Svensson); Harley Barnhart 42cr, 81br, 84tr, 159crb, 237br; Kit Skates Barnhart 28crb, 35br, 43br, 81tr, 146br, 148br, 159bc, 170br, 186br, 191cr, 202cr, 207clb, 208cr; Biofotos 229br (Heather Angel), 32br, 110br, 138tr, 180tr, 272br (Gordon Dickson); Morten Christensen 187br, 275br; Bruce Coleman Collection 216tr (Adrian Davies); Dr. Ewald Gerhardt 36crb, 97br, 192tr, 199bc; Jacob Heilmann-Clausen 163br; Emily Johnson 89tr, 147bl, 178br, 244br, 253br, 263br, 276tr; Peter Katsaras 114crb, 136crb; Thomas Læssøe 11br, 16c, 42tr, 60cra, 62cla, 63br, 72br, 96tr, 110tr, 110c, 128tr, 131br, 132cra, 141br, 150tr, 164br, 167br, 179br, 206br, 221tr, 232br, 242crb, 263tr, 265br, 283br; N W Legon 46bl, 230br; Natural History Photographic Agency 16cr (Stephen Dalton), 19c (Martin Garwood), 179cl, 184br (Yves Lanceau), 21tr (David Woodfall); Natural Image 68bl, 240crb, 263cr (John Roberts), 17c (courtesy of Olympus Microscopes), Alan R. Outen 68tr; Jens H. Petersen 11tr, 11cra, 11cr, 16cl, 17bl, 17bel, 17br, 17br, 18br, 19bc, 124bc, 251tr; Planet Earth Pictures 18c (Wayne Harris); Erik Rald 169crb, 191br; Samuel Ristich 233br, 273br; William Roody 30tr, 42br, 52tr, 54br, 166br, 182br, 190bc, 202br, 238bl, 247br, 256br, 259tr, 276br; Royal Botanic Gardens Kew 8tc; A. Sloth 11crb; Ulrik Søchting 6br, 20cra; Paul Stamets 84tr; Walter Sturgeon 201br; Jan Vesterholt 21cl, 46bc, 70br, 73tr, 74br, 76crb, 80tr, 102br, 116tr, 124crb, 130br, 143br, 153bl, 161tr, 177br, 189cla, 190bl, 191tr, 192cr, 196br, 199bl, 211br, 241tr.

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ISBN 0-7894-3286-2



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DK PUBLISHING, INC.

Printed in Singapore