Mushrooms of the National Forests in Alaska

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Introduction
The coastal temperate rainforests of the Tongass and Chugach national forests often produce prolific fruitings of mushrooms in late summer and fall. For many Alaskans, mushrooms are a source of food. For others, they are a source of pigments for dyeing wool and other natural fibers. Still others merely enjoy their beauty. However, all Alaskans should appreciate these fungi for, without them, there would be no forests here.

This brochure presents an introduction to mushrooms and illustrates a number of the more common and interesting of our local species to help Alaskans and visitors to better understand and enjoy our magnificent national forests. Unlike most plants, birds, and mammals, very few mushrooms have common names. Thus, while we have used common names where they exist, many of the species in this brochure can be referred to only by their scientific names. But, never fear. If you can talk with your kids about *Tyrannosaurus rex*, you can handle mushroom names!

What is a mushroom?
Mushrooms are produced by some fungi (singular: fungus), and their primary purpose is to make and spread tiny reproductive propagules called spores, which function much like plant seeds. After long being considered primitive plants, fungi now are accepted as their own kingdom. Unlike plants, fungi cannot make their own food, and their cell walls contain chitin rather than cellulose. Interestingly, chitin also is found in insect exoskeletons, providing evidence that the fungi are more closely related to animals (including us!) than they are to plants.

Mushrooms arise from a mycelium (plural: mycelia), which is the actual "body" of the fungus and is comprised of a network of many tube-like microscopic filaments called hyphae (singular: hypha). Hyphae grow at their tips and are able to infiltrate a wide variety of substrates such as wood, leaf litter, soil, and even left-over pizza.

Mushrooms to most people are umbrella-shaped structures with plate-like gills on the underside of their caps. However, besides the gilled mushrooms, there are others in many shapes and sizes, and they produce their spores in a variety of ways. Other major groups include chanterelles, boletes, polypores, spine-fungi, club- and coral-fungi, puffballs, jelly-fungi, cup-fungi, morels, false morels, and elfin saddles. Figure 1 shows the parts of a gilled mushroom. Learning the terminology will make it much easier for you to communicate with others about mushrooms and to make use of tools for identifying them.

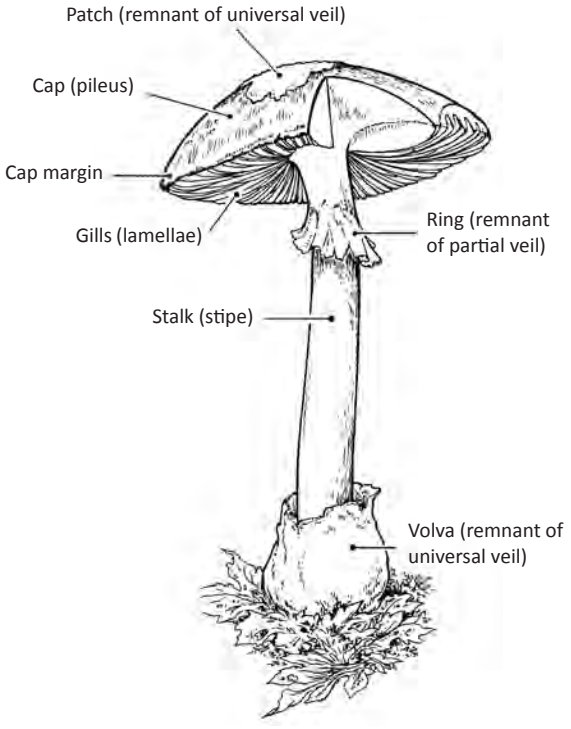

Figure 1. Parts of a gilled mushroom.

How do fungi reproduce?

The primary purpose of a mushroom is to disperse spores into the environment in hopes that they will land in a location with suitable moisture, temperature, and nutrient conditions to germinate and grow into a new mycelium. Each mushroom is capable of producing anywhere from thousands to billions of spores, but only an incredibly tiny fraction of them are successful. Reproduction cannot occur unless the mycelium of one mating type merges with the mycelium of a compatible type. Once this has happened, sexual reproduction, including the formation of mushrooms and production of spores, can occur, completing the life cycle (Figure 2).

Ecological Roles of Fungi

While fungi are found in almost every environment, mushroom-forming species are especially prevalent in forests. There they play critical roles in nutrient cycling, soil aggregation, and water retention, as well as provide a food source for animals large and small. In general, the three main lifestyles of mushroom-producing fungi in forests are decomposer, mycorrhizal partner, and parasite.

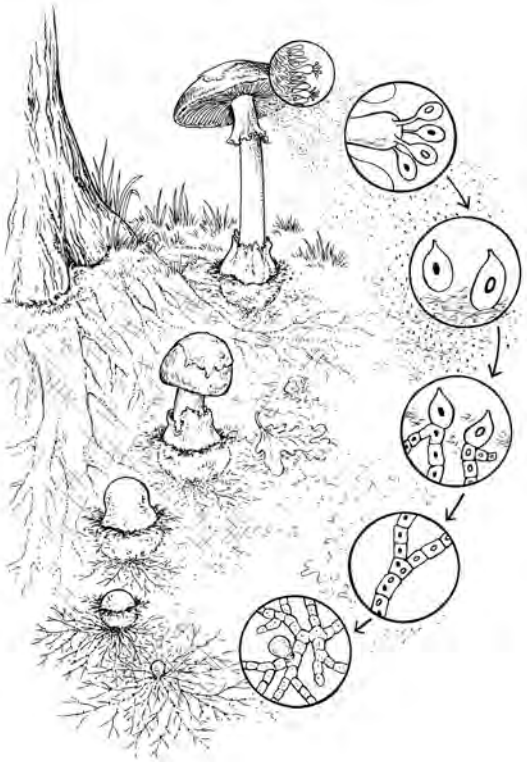

Figure 2. Life cycle of a typical mushroom fungus.

Along with bacteria and other organisms, fungi break down all of the forest's plant, animal, and microbial matter and make its components available for new generations of life. Fungi are particularly important in breaking down tough plant debris, as they are the only organisms capable of decomposing lignin, a major component of wood and other plant tissues.

Many fungi form mycorrhizal ("fungus root") associations with plants (Figure 3). This is mutually beneficial for both fungi and plants, as the plants receive nutrients such as nitrogen and phosphorus, as well as water and protection from soil pathogens, and the fungi get sugars produced by the plants. All of Alaska's trees require mycorrhizal fungi for survival and growth, as do nearly all other plants.

Relatively few parasitic fungi produce mushrooms. Most of them, such as honey mushrooms (genus *Armillaria*) and some polypores (such as *Phaeolus schweinitzii*) are parasitic on trees and are important forest pathogens. Some attack insects, while still others, such as *Collybia cirrhata*, attack other mushrooms. Although detrimental to the affected individuals, parasitic fungi are an essential part of healthy forests.

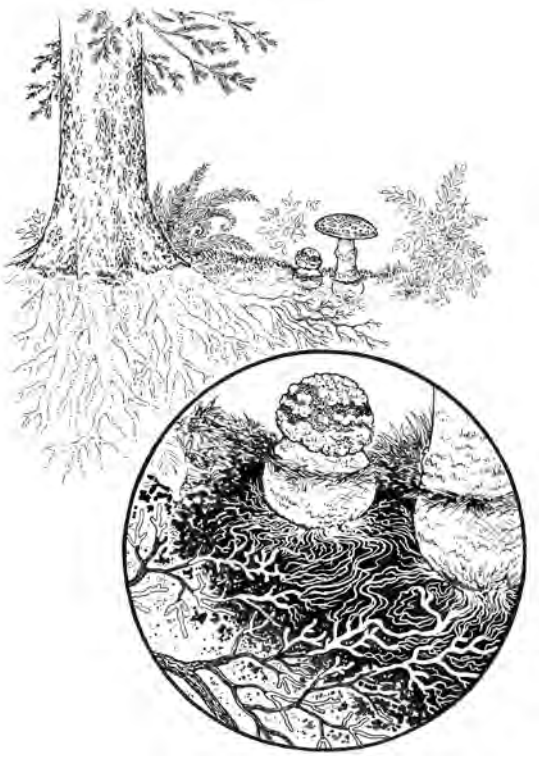

Figure 3. An ectomycorrhizal association between a spruce tree and *Amanita muscaria*, the fly agaric.

Mushroom Diversity and Identification

Fungi are the second most diverse group of organisms (following the insects), with known mushroom-producing species currently totaling around 40–55,000 worldwide (a conservative estimate for the Pacific Northwest is at least 5,000 species). Further, diversity estimates suggest that only 15–40% of all North American mushroom-fungi have been described. Because of this overwhelming diversity and number of undescribed species, no field guide can even begin to include all of the species in an area. It is for this reason and many others that identification of mushrooms can be very difficult.

This brochure highlights 51 species found in southern Alaska, including the most popular edible ones. For those with sufficient experience, many of these species can be recognized from their photographs and short descriptions. However, **this brochure is not intended to serve as a stand-alone identification guide and never should be used as such**. Many of the species you encounter will appear similar and will not be easily identifiable without considerable

experience, technical literature, and tools such as a compound microscope. And keep in mind that comparing specimens to photographs can lead to errors, as important characteristics such as smell, taste, color changes, habitat, and microscopic features cannot or might not be portrayed in a photo. While southern Alaska has a number of choice edibles that nearly anyone can learn to identify with confidence, it is best to learn many other species too. This will broaden your base of experience, strengthen your identification skills, and greatly reduce the chances of a misidentification, which could lead to illness or worse.

Harvesting Edible Species

In most cases, edible mushrooms can be harvested on the Tongass and Chugach national forests for personal or subsistence use without a permit. Persons doing so are expected to exercise reasonable care in protecting resources from damage. Some restrictions apply to quantities allowed for personal or subsistence harvest and areas where harvesting can occur. Commercial harvest of mushrooms on Alaskan national forests requires a permit in ALL cases. Be sure to check with the forest where you will be collecting for the current policies regarding harvesting for commercial or personal use:

- Chugach National Forest Supervisor's Office, 907-743-9500
- Tongass National Forest Supervisor's Office, 907-225-3101

If you wish to harvest on non-national forest lands, contact the land manager or owner for permission and any permit requirements before you head out.

When harvesting mushrooms to identify or eat, there are several things you should keep in mind. First, it is important to collect the entire mushroom and, if possible, to collect several specimens (a "collection") that show a range of variation. Second, keep collections separate to reduce possible confusion when you return home at the end of the day. Third, take note of the surroundings in which you found each collection. Important details to record include tree species present, substrate the mushroom is growing on (wood, soil, moss, other mushrooms, etc.), and habit (e.g., is the mushroom growing singly, in groups, or a cluster?). Also make note of the color and odor of the mushroom and any color changes that may occur when you cut it in half or handle it.

To increase the success of your outing, take along the following items:

- **Safety first:** A map and compass, GPS device with spare batteries, whistle, rain gear, bear spray, extra food, water and a communications plan. Make sure someone knows where you are going and when you plan to be back. Mushroom hunters are notorious for getting lost in the woods!
- A shallow basket or tackle (utility) boxes. If using a basket, take wax paper or aluminum foil for wrapping your collections to keep the different types separated. If it is not wet out, you can also use paper bags, but plastic bags are not recommended as they hasten spoilage of the mushrooms.
- Camera and notebook to document surroundings and mushroom features.
- Small knife or slender garden trowel to excavate specimens.

Finally, when harvesting wild mushrooms:

1. Remember there are no "rules of thumb" when it comes to determining whether a mushroom is poisonous or edible. The only reliable approach is to know EXACTLY what species you have. When in doubt, throw it out!
2. Collect only fresh mushrooms in good condition from uncontaminated environments (e.g., avoid major roadsides and chemically treated lawns).
3. Save two or three specimens in good condition in the refrigerator for later inspection by experienced identifiers in the event of adverse effects.
4. Always cook mushrooms well before eating.
5. When trying a new species, eat only a small amount of that one species and then wait 24-48 hours before eating other mushrooms. People can have reactions to edible species, as with any food. If you have an adverse reaction, please report your experience to the North American Mycological Association poison case registry (www.namyco.org).
6. Eat wild mushrooms in moderation. Some contain toxins that appear to accumulate in our bodies over time to a point where adverse effects manifest themselves. In addition, overeating of even good edible species can make you sick, because mushrooms can be difficult to digest.

Grisette / *Amanita vaginata* group

Yellow patches /
Amanita augusta
Photo by Kate Mohatt

Fly agaric / *Amanita muscaria*

Gilled Mushrooms

The Genus *Amanita*

Amanitas are well-known for a number of reasons. They are mostly large and conspicuous, many are brightly colored, some are choice edibles, others are deadly poisonous, and nearly all have a distinctive elegant look. Amanitas have white (usually) spores, free or nearly free gills, a universal veil that leaves remnants on the stalk base and often on the cap, and usually a partial veil that often leaves a ring on the stalk. The remnants of the universal veil, either those on the lower stalk (the volva) or those on the cap (as warts or a patch), are critical for species identification. Young unopened amanita buttons sometimes are confused with puffballs; however, cutting a "puffball" in half to look for the outline of a developing mushroom versus uniformly marshmallow-like tissue will allow them to be told apart easily.

Grisettes / *Amanita vaginata* group

Grisettes can be very common in southern Alaska. There are several (mostly unnamed) species in this group and *Amanita vaginata* itself, a European species, probably does not occur here. The cap is grayish to gray-brown or brown and often is topped with a patch of tissue. The cap margin is striate. There is no ring, and the volva consists of a very fragile, loose, sac-like cup that will remain in the ground unless carefully excavated. Our grisettes are found primarily with conifers, but some occur with hardwoods. Potentially edible, but not recommended, as several amanitas are deadly poisonous.

Yellow Patches / *Amanita augusta*

Historically, the names *Amanita aspera* and *A. franchetii* have been used for this species. Yellow patches can be recognized by its medium-sized to larger fruitbodies and brown to gray-brown or yellowish brown cap with mealy warts that are yellow then grayish in age. The gills are white to yellowish. The volva consists of loose bits of yellow veil on the stalk base, which often drop off into the surrounding soil. The partial veil leaves a large ring that is bright yellow on the underside. Not edible, probably poisonous.

Fly Agaric / *Amanita muscaria*

With its brightly colored cap and white "polka dots," the fly agaric is the most widely recognized mushroom in Alaska. However, it is highly variable, and cap color ranges from white to yellows and oranges, to deep red, and even brown. Research conducted at the University of Alaska, Fairbanks suggests that the fly agaric actually comprises several different species. All of the forms have striate cap margins, rings that may or may not persist into maturity, and volvas in the form of rings of tissue that extend part-way up the stalk.

Mycena rosella

Mycena aurantiidisca

Mycena strobilinoides

from a swollen base. All contain ibotenic acid and so cause accidental poisonings. However, they also are sought by some who seek their psychoactive effects, and the fly agaric has been used ritualistically in Siberia.

Fairy Bonnet Mushrooms / The Genus *Mycena*

Mycenas are small, fragile mushrooms, many of which fit the common name, fairy bonnets, quite well. They often are produced in large numbers ("troops") over large areas of forest floor and so, in terms of numbers of fruitbodies, probably are the most abundant mushrooms in southern Alaska. They are important decomposers of a wide variety of plant materials, but not dung. The hordes of brown and gray mycenas are especially difficult to identify, but the more brightly colored species often can be named successfully. *Mycena rosella*, with its beautiful pink color and distinctly pink-edged gills is one such species. *Mycena amabilissima* (not pictured) is a very similar pink species but lacks the colored gill edges. Yet another is *Mycena aurantiidisca*, which is brilliant orange at first, but gradually fades, usually at the edge of the cap first, to yellowish or almost whitish. Typically, when found, they are yellowish around the edge and still bright orange in the center. *Mycena strobilinoides* is another brilliant orange species—it differs by having a bright orange gill edge and in fading uniformly. A close relative, *Hemimycena delectabilis*, is pure white and has gills that run part-way down the stalk. There are no important edible mycenas, most being tiny and fleshless, and some could be poisonous.

Hemimycena delectabilis

Catathelasma ventricosum

Lackluster laccaria / *Laccaria laccata*

Angel wings / *Pleurocybella porrigens*

Catathelasma ventricosum* and *C. imperiale
Catathelasmas can be recognized by their large size, strongly inrolled cap margin, tough texture, long decurrent, crowded, narrow gills, and especially by the presence of two veils, an inner one that leaves a conspicuous ring on the upper stalk, and an outer one that leaves an additional narrow ring or ring-zone and patches of tissue below the upper ring. In addition, the flesh has a strong mealy odor and taste. The spores are white. The Alaskan mushrooms can be difficult to assign to species. *Catathelasma ventricosum* is supposed to have a pale to grayish cap and *C. imperiale* a brownish cap and be somewhat larger; however, intermediate-sized mushrooms with grayish brown caps are not uncommon. Considered a good, or even choice, edible by some, worthless by others.

Lackluster Laccaria / *Laccaria laccata*
One of the most commonly encountered gilled mushrooms in southern Alaskan forests, this species can be highly variable in size and appearance. The cap is pinkish orange to cinnamon. The gills are thick, well-spaced, and whitish to pink, and the spores are white. The stalk is very fibrous and often darker than the cap, with whitish fuzz at the base. *Laccaria bicolor* (not pictured) is very similar and also occurs in our area. It differs by having purplish gills and purple fuzz at the base of the stalk. Both species are edible, but aren't often collected.

Angel Wings / *Pleurocybella porrigens*
Angel wings can be found on conifer (especially hemlock) logs and stumps throughout southern Alaska, often occurring in large, exquisite, overlapping masses. Angel wings has spoon- to conch-shaped caps that are translucent-striate when fresh and develop a wavy margin when expanded. The mushrooms are white to ivory, have virtually no stalk, thin, rather tough, elastic flesh, and crowded narrow gills. Although thin-fleshed, angel wings is a fairly popular edible mushroom. However, it has been responsible for several deaths in Japan (under unusual circumstances), so eating it, especially in large amounts, is not recommended until more is known. Oyster mushrooms (genus *Pleurotus*) are similar but most often are found on cottonwoods and are larger, fleshier, and usually have tan caps.

Green russula / *Russula aeruginea*

The sickener / *Russula emetica*

Shrimp russula / *Russula xerampelina*

Brittlegills / The Genus *Russula*
Russula is a particularly easy genus to recognize. However, most of its many species are difficult to identify. Most russulas are medium to large mushrooms with colorful caps, white stalks, and a squatty appearance. The other distinctive characteristic is their brittle texture—a fresh russula thrown against a tree will shatter like automobile safety glass with relatively clean edges on the fragments (we recommend that you not make a habit of destroying russulas in this manner as, when intact and in place, they are a very attractive visual element in our forests). A less violent means of experiencing this is to break a fresh stalk in half—it will break cleanly like a piece of chalk. The spores in different species vary from pure white, through shades of cream and yellow, to fairly dark ocher. The flesh of many species is hot-peppery either immediately or delayed. Very few russulas are considered worth eating.

Green Russula / *Russula aeruginea*
This common russula tends to blend in with southern Alaska's mossy forest floor, usually under spruce. It has a bright green cap, white stalk, white to cream spores, and a mild taste. Considered edible and tasty by some.

The Sickener / *Russula emetica*
Russula emetica is another associate of spruces, often occurring in sphagnum moss. It has a bright cherry red cap and pure white gills, spores, and stalk. The taste is immediately very hot-peppery and the mushroom is considered to be poisonous.

Shrimp Russula / *Russula xerampelina*
Shrimp russula produces large stout fruitbodies with a fishy odor (when mature), whitish stalks that stain brown when handled, dull orange-yellow spores and gills (when mature), and mild taste. The typical form has a reddish, maroon, or deep purple cap and various degrees of pink tinge on the stalk, but the cap also can be green to olive to dark brown or blackish, or brownish purple. The various color forms may actually be different species. This is probably the most frequently eaten russula.

Orange milk-cap / *Lactarius deliciosus* group

Red hot milk-cap / *Lactarius rufus*

Lactarius scrobiculatus

Milk-Caps / The Genus *Lactarius*
Milk-caps are very similar in stature and brittleness to russulas. However, they differ primarily in their usually duller colors and by exuding a watery to milky or colored fluid when the gills or stalk are broken or cut. Some species are collected for food, including the hot-peppery species that generally are said to be poisonous. In Finland, Russia, and other areas, such species are regularly eaten, but only after pickling or other proper preparation.

Orange Milk-Cap / *Lactarius deliciosus* group
The name *Lactarius deliciosus* has been applied to many different mushrooms that have an overall orange color, a tendency to turn greenish when handled or in age, and orange to reddish orange milk. In North America, several varieties occur; however, apparently none are the "real" *L. deliciosus* (a European mushroom). The orange latex usually is scant and may not change or stain the flesh. Orange milk-caps are gathered for food, but ours are not generally considered deserving of the name *deliciosus*.

Red Hot Milk-Cap / *Lactarius rufus*
This is a very common milk-cap in many Alaskan forests. The cap is reddish brown to brick-colored or orange-brown, smooth and dry, and has an inrolled margin when young. The gills are pale orange and the stalk is pinkish brown to brownish orange or reddish orange. The copious milk is white, and the taste is exceedingly, though slowly, hot peppery. Inedible due to its hot taste, and reported to cause gastric upset.

Lactarius scrobiculatus
A number of milk-caps have a bearded cap margin and concentrically zoned caps. *Lactarius scrobiculatus* has whitish to golden yellow caps and gills that are whitish to yellowish and develop brownish stains. The copious latex is white and quickly turns yellow. The stalk is dry, white to yellowish with large shiny sunken spots, and eventually develops yellowish to rusty brown stains. Another common bearded species is *L. repraesentaneus* (not pictured), which has a rich yellow cap, white to pale yellow latex that becomes purplish after drying, and flesh that stains purple when broken. A third is *L. torminosus* (not pictured), with a pinkish to light pinkish orange zoned cap and copious white latex that remains white or slowly changes to yellowish. It occurs with birches. All of these species have a hot peppery to bitter taste and require special procedures to render them edible.

Gypsy / *Cortinarius caperatus*

Cortinarius semisanguineus

Cortinarius croceus

The Genus *Cortinarius*

Cortinarius is by far the largest genus of mushrooms, and it is exceptionally well represented in southern Alaskan forests. The genus presents a colorful, but bewildering, array of red, yellow, orange, blue to violet, and greenish species, plus huge numbers of brownish ones. They come in many sizes and shapes and, except for some smaller species, are relatively fleshy. They typically have cinnamon brown to rust-colored spores. The name *Cortinarius* comes from the cobwebby veil, called a cortina (from the Latin for curtain), that at first covers the developing gills in nearly all species in the genus. *Cortinarius* includes species that are deadly poisonous as well as others that are considered good edibles in Europe. However, because our species are so little known, and sometimes impossible to identify, we have no information on the edibility of most species. In Alaska, only the gypsy is considered choice and eaten by many mushroom hunters.

The Gypsy / *Cortinarius caperatus*

Unlike most species of *Cortinarius*, the gypsy has a skirt-like ring and, because of that, also has been classified in the genus, *Rozites*. It is distinctive among brown-spored mushrooms because of the persistent white membranous ring and the white universal veil that often leaves a thin frost-like coating on the young cap and a slight rim around the base of the stalk. The gypsy is very abundant in southern Alaska and commonly is collected for food, although it is not recommended for beginners because of the difficulty of identification.

Dyers' Delights / *Cortinarius* Subgenus *Dermocybe*

Because of its large size, *Cortinarius* has been split into about a half-dozen more manageable subgroups, one of which is *Dermocybe* with slender fruitbodies and bright red, orange, yellow, or greenish colors. These are among the more highly sought-after mushrooms for their pigments that make them excellent for dyeing wool and other natural fibers. Especially prized are the red-gilled species, such as *Cortinarius semisanguineus* and *C. phoeniceus* (now *C. smithii,* not pictured), because of the difficulty finding natural sources of red dye. *Cortinarius croceus* is a common yellow-gilled species.

Cortinarius traganus

Cortinarius violaceus

Cortinarius evernius

Cortinarius traganus
Cortinarius traganus is widespread and often abundant in Alaska and elsewhere in western North America. Its coloration is peculiar in that the cap, stalk, and veil often are a beautiful lilac to blue-lilac; however, the flesh is mottled saffron to brown-yellow. It has a fruity or somewhat pungent odor, although for some people this is hard to detect. A similar species that is common in southern Alaska is *C. camphoratus* (not pictured), a completely pale blue-violet species with a very strong disagreeable odor, not unlike that of rotting potatoes.

Cortinarius violaceus
Cortinarius violaceus is perhaps the most distinctive species in the genus. It has a dark violet, dry, scaly to wooly cap with a somewhat metallic sheen. The gills also are dark violet (when young) and the stalk is typically broadly club-shaped, dry and violet. *Cortinarius violaceus* is widespread in older forests, but usually in small numbers. Edible, but not common, so picking for the table is not recommended.

Cortinarius evernius
A very common mushroom usually found among mosses under spruce trees. Beautiful violet with the cap margin adorned with whitish veil remnants when young, it soon fades to shades of brown, with little of the violet color left at maturity. Like most cortinariuses, little is known about its edibility so avoidance is recommended.

Cortinarius trivialis
Quite common under aspen, *Cortinarius trivialis* is one of many members of the genus that have a slimy cap and slimy stalk. The banded stalk helps set it apart from similar species. Edibility unknown, so avoidance is recommended.

Cortinarius trivialis

Deadly galerina / *Galerina marginata*

Alaskan gold / *Phaeolepiota aurea*

Shaggy mane / *Coprinus comatus*

Deadly Galerina / *Galerina marginata*
The genus *Galerina* includes very small to almost medium-sized brown mushrooms that often are difficult to identify. Many are mycena-like, but others are larger and fleshier. All galerinas have rich brown to rusty brown spores. Many are associated with mosses; others occur on wood. Deadly galerina is one of the larger species, with a dome-shaped, brown to yellow-brown cap that is smooth, moist-sticky, striate along the edge when fresh, and fades to tan or buff. The gills and stalk are brown, and the veil often leaves a slight ring or fibrous ring-zone on the stalk. The fruitbodies often occur in clusters or groups but can be scattered or solitary as well. It occurs on stumps and logs of conifers and hardwoods, or grows from pieces of buried wood, wood chips, or other woody debris. This mushroom also has been called *G. autumnalis*, *G. venenata*, and *G. unicolor*. However, by any name, it is just as dangerous, containing the same toxins found in the deadly amanitas. Learn to recognize and avoid this mushroom, especially when searching for other small brown mushrooms.

Alaskan Gold / *Phaeolepiota aurea*
If there were a prize for easiest mushroom to identify, Alaskan gold certainly would be a contender. Its large size, golden color, powdery surface, skirt-like ring, brown spores, and tendency to grow in large groups are distinctive. It is fairly common, usually being found in disturbed areas, such as in parks or along roadsides. It is said to be edible for most people but to cause digestive upset in some.

Shaggy Mane / *Coprinus comatus*
The shaggy mane is a frequent forest roadside attraction. When young, the cap is bullet-shaped, white with shaggy light brown scales. In age, the cap and exceedingly close-packed gills liquefy to a black ink-like fluid. The stalk is long and white, with a movable ring that sometimes drops off. Usually found in disturbed areas such as roadsides and yards. Many consider it a choice edible, although it must be found and cooked before it begins to liquefy and it should not be collected from contaminated areas such as chemically treated lawns or near busy roadways.

Pacific golden chanterelle / *Cantharellus formosus*

Winter chanterelle, yellow foot / *Craterellus tubaeformis*

Blue or black chanterelle / *Polyozellus multiplex*

Chanterelles
The chanterelles include mushrooms that are not all closely related but are similar in bearing their spores on thick, shallow, folds with blunt edges and cross-veins instead of true gills. They range from small to large and have a cap and stalk, although there is not always a clear distinction between them. In many cases, they are more or less vase-, funnel-, or trumpet-shaped.

Pacific Golden Chanterelle / *Cantharellus formosus*
Although nearly all of the golden chanterelles in North America have been referred to as *Cantharellus cibarius*, recent studies have confirmed that there actually are many different species. The fruitbodies are often large for a chanterelle and have a dull orange to brownish orange cap that readily bruises brownish and often is finely scaly. The fertile ridges often are deep and relatively thin; they usually are pale orange-yellow but may have a pinkish cast. The odor is pleasant, sometimes like apricots. Golden chanterelles have been reported from southeast Alaska as far north as Haines and Yakutat, but not yet from south-central Alaska. This is a very popular edible mushroom, and large quantities are collected in the Pacific Northwest for sale and home consumption.

Winter Chanterelle or Yellow Foot / *Craterellus tubaeformis*
Winter chanterelle is a small, slender, trumpet-shaped mushroom with a brownish or orange-brown cap, hollow, waxy-looking stalk, and penchant for growing on mossy, rotten wood. It has a long fruiting season and could be the most common mushroom in southern Alaska. Despite its small size, winter chanterelle is edible and considered choice by some. Its tendency to grow in large troops allows it to be gathered in sufficient quantity to be worthwhile.

Blue or Black Chanterelle / *Polyozellus multiplex*
Distinctive and striking, this blue-purplish to blackish mushroom is a rare treat for the eyes. It grows in tight-packed, wavy-edged clusters. Found under spruce at least as far north as Cordova, it seems to be an uncommon to somewhat rare species, often occurring in old-growth stands. Some mushroom hunters consider blue chanterelle to be a good edible, but others are not impressed by it. It also is used as a natural dye but, because of its rarity, restraint is recommended when collecting for the table or dye-pot.

Boletus coniferarum Photo by Michael Beug

King bolete / *Boletus edulis*

Boletus luridiformis

Boletes

"Bolete" refers to mushrooms that usually have a fleshy cap and stalk, have a spongy tube layer that can be cleanly separated from the underside of the cap, and, when old, turn into a mass of mush, seemingly alive with the larvae of small flies that laid their eggs in the mushroom. Originally, nearly all boletes were classified in *Boletus*. Bit by bit, the genus has shrunk as groups have been split out and given new names. Most Alaskan boletes belong either to *Boletus* or to *Leccinum*, the scaber-stalks.

Boletus coniferarum

One of the larger mushrooms you will encounter in southern Alaska, *Boletus coniferarum* is rather attractive and looks like it just has to be good to eat. The cap is dark olive-gray to gray-brown and usually somewhat velvety when young. The tubes are yellow and stain dark blue when cut or injured. The stalk is pale yellow or olivaceous to blackish in age, lacks red, has fine net-like ridges at the apex, is thick, and is sometimes enlarged at the base. The flesh is white to yellowish, stains blue quickly after cutting, and is extremely bitter, which, unfortunately, renders the mushroom inedible despite its tempting looks.

King Bolete / *Boletus edulis*

The king bolete is a popular edible mushroom, also known as porcini, cep, steinpilz, and other names. The cap surface is moist to sticky, and the color ranges from almost white to various shades of brown to reddish brown, often with a paler edge. The pores, when young, are whitish and stuffed with white mycelium. Later, they become yellow to olive and the tubes turn soft-gelatinous with age. The stalk is fleshy and club-shaped with fine net-like ridges in the upper part, usually whitish at the apex, and some shade of brown below. The flesh is white and sometimes discolors slightly reddish brown when cut. Besides being a choice edible, the mushroom's mature tubes can be used as a natural dye.

Boletus luridiformis

Boletus luridiformis is a very striking bolete. Its cap is velvety and bright reddish brown with an olivaceous sheen when young. The pores are bright red-orange and stain dark blue immediately when touched. The stalk is thick, yellow near the apex, and covered with small red dots below. The flesh is firm and yellow but stains blue rapidly when cut. Not recommended for the table, as it has been reported to cause gastric upset, especially when eaten raw.

Admirable bolete / *Boletus mirabilis*

Aspen scaber-stalk / *Leccinum insigne*

Alaskan scaber-stalk / *Leccinum alaskanum*

Admirable Bolete / *Boletus mirabilis*
This species is unusual for a bolete in fruiting on wood, almost always that of hemlock. The cap has a roughened texture, like a reddish brown terrycloth towel. The tubes are yellowish, with rather large, rounded to angular pores. The stalk is usually long and club-shaped, and ridged to uneven or smooth towards the base, brown to reddish brown with some lighter areas, and with yellow mycelium around the base. The cap flesh is white to yellowish and occasionally it will blue slightly when cut. Although not as popular as the king bolete, admirable bolete is a good edible with a lemony taste.

Aspen Scaber-Stalk / *Leccinum insigne*
Scaber-stalks are among the more common and conspicuous of Alaska's mushrooms. They can be identified by the brownish to grayish or blackish scabers (tufts of short stiff "hairs") that decorate their stalks. Many scaber-stalks grow with aspens and cottonwoods or birches, while a smaller number occur with conifers. Historically, all have been considered edible; however, a number of severe gastrointestinal poisonings in the Rocky Mountains, Cascade Range, and interior Alaska indicate that at least some species should be avoided. Unfortunately, uncertainties surrounding species identifications makes it difficult to know which ones are the problem-causers.

There are several scaber-stalks associated with aspen. One is *L. insigne*, an often abundant species with a reddish brown to rust-brown or orange-brown, somewhat fibrous cap, white to olive buff or yellowish tubes that stain brownish, a white stalk with pallid to dark brown or blackish scabers, and white flesh that may change to dark gray, and sometimes with blue in the base.

Alaskan Scaber-Stalk / *Leccinum alaskanum*
Described from Alaska, this small to medium-sized bolete is common under birch. Its caps are grayish brown or darker brown with pale streaks or splotches. The pores are cream to pale tan and stain darker brown. The stalk is club-shaped, long in relation to the diameter of the cap, whitish, and ornamented with small blackish scabers. The flesh is cream-colored and sometimes slowly stains pinkish when cut. The taste is mild, but the flesh is often soft and marshmallow-like, thus limiting its culinary appeal. A very similar mushroom, which lacks the splotched cap, is *L. scabrum*, the birch scaber stalk (not pictured).

Sulfur shelf, chicken of the woods / *Laetiporus conifericola*

Dyers' polypore / *Phaeolus schweinitzii*

Red-belt conk / *Fomitopsis pinicola*

Polypores
"Polypore" means many-pored and, like the boletes, the polypores produce their spores within a multitude of close-packed tubes. However, the polypores differ from the boletes in being tough-fibrous, leathery, or woody in texture and usually having no stalk. Many of these fungi fruit from logs, stumps and snags and form single or multiple, small to large shelf-like caps.

Sulfur Shelf or Chicken of the Woods / *Laetiporus conifericola*
Striking even from a distance, this mushroom usually grows in large clusters of overlapping bright orange and yellow shelves on conifers. Shelves can exceed 12 inches in width, and a cluster can extend over several feet. When fresh, the fruitbodies are soft and somewhat fleshy to fibrous, but later they become tougher, and, eventually, fade and become soft and crumbly. Shelf margins are rounded and plump when young, becoming wavy and lobed with age. The pores are bright yellow when fresh and fade in age. Considered choice by many, but usually only the soft young outer portions of the shelf are worth eating.

Dyers' Polypore / *Phaeolus schweinitzii*
The tough fruitbodies of the dyers' polypore usually are terrestrial, forming circular to irregular caps from a short, thick stalk, or with several caps forming a rosette. The upper surface is wooly to hairy, zoned, light yellowish brown to brownish orange near the margin and deep to dark brown toward the center. The pores are circular to angular or maze-like, and become tooth-like in age. When fresh, they are greenish, yellowish, or orange tinted and bruise brown, then become grayish to brownish in age. Often used for dyeing wool, it yields an array of earth-tones.

Red-Belt Conk / *Fomitopsis pinicola*
The red-belt conk is another exceedingly common mushroom in southern Alaska. It occurs as thick shelves on conifers and has a hard woody consistency. The upper surface is zoned in different shades of brown, the edge is usually white, and next to the edge is an orange to reddish band that gives the species its common name. The pores are whitish when young and become somewhat brownish in age. Much too tough to be edible.

Purple fairy club / *Alloclavaria purpurea*

Clavariadelphus sachalinensis

Crested coral / *Clavulina cristata* group

Club and Coral Fungi
These fungi produce fruitbodies that range from simple unbranched clubs to repeatedly branched coral-like or cauliflower-like forms. The upright orientation separates this group from the spine-fungi in which the spines hang downward like icicles. Despite their overall similarity in appearance, recent DNA studies suggest that the clubs and corals are not all closely related. The edibility of the small clubs is largely unknown, but the larger forms, especially certain species of *Ramaria*, are regularly collected and eaten, although none is particularly renowned. However, some of the species are known to cause digestive distress.

Purple Fairy Club / *Alloclavaria purpurea*
One of the more common and distinctive species of club fungus in southern Alaskan forests. The fragile clubs are unbranched, hollow, and occur in clusters in mossy forest soil. They are purple when young, but become dull watery tan with age. Considered edible, but fleshless and not particularly tasty.

Clavariadelphus sachalinensis
The species of *Clavariadelphus* differ from other clubs by their larger size, stockier stature, and characteristic ocher to yellow-orange color. *Clavariadelphus sachalinensis* is one of several small, slender members of the genus that often form large troops under conifers. The nearly identical-looking *C. ligula* (not pictured) occurs in similar habitats, but differs microscopically. Larger species include *C. truncatus* (not pictured), which produces fruitbodies with a wide flattened cap that makes it look something like a chanterelle, and *C. occidentalis* (not pictured), which lacks the wide flattened top. All are considered edible but are not popular.

Crested Coral / *Clavulina cristata* group
A number of more or less coral-like forms with pointed or toothed branch tips related to *Clavulina cristata* are very common throughout southern Alaska. All are pale-colored (usually whitish) and have white spores. Molecular analyses and microscopic features suggest that *C. cristata* is closely related to the chanterelles. Forms with less developed branching usually are called *C. rugosa*. Edible, but not commonly collected.

Hedgehog, sweet tooth / *Hydnum repandum*

Hawk wing / *Sarcodon imbricatus*

Bear's head / *Hericium abietis*

Spine-Fungi
Many mushrooms produce their spores on down-hanging, icicle-like spines. Although they share this feature, they are not all closely related to one another. Most are too tough and/or unpleasant tasting to eat; however, *Hydnum repandum*, *H. umbilicatum*, and the hericiums are good edibles. Despite their general inedibility, many of the hydnellums and sarcodons are eagerly sought after by Alaskan crafters for use in dyeing wool and other natural fibers.

Hedgehog or Sweet Tooth / *Hydnum repandum*
The hedgehog is a distinctive edible species common in southern Alaskan forests. Its cap is pale cream to creamy orange, sometimes irregularly shaped, and smooth. The underside is hung with small fragile cream-colored spines. The central cream or orangish stalk is generally stout and firm. The flesh is dense and soft, and stains orange or brown when cut or bruised, especially in older specimens. A very similar and equally edible species, *H. umbilicatum* (not pictured), occurs in similar habitats and can be distinguished by its smaller size, thinner stalk, and dimple in the cap.

Hawk Wing / *Sarcodon imbricatus*
Sarcodons have fruitbodies that are medium to darkly colored and a shape somewhat like that of the hedgehog. The stalk is often thick, flesh fairly tough and un-zoned, and the fruitbody does not incorporate surrounding debris. The most noticeable feature of the hawk wing is its very coarse, scaly cap. The background of the cap and stalk is usually buff to medium brown, and the short to moderately long spines are pale grayish brown and darken in age. This mushroom is common in the conifer forests of western North America, including southern Alaska. With a mild odor and taste, it is edible, but opinions differ as to its quality. Also a candidate for the dye pot.

Bear's Head / *Hericium abietis*
Bear's head is a very distinctive fungus, but one not often encountered in Alaskan forests. Its fruitbody is composed of somewhat shrub-like branches that bear cream-colored icicle-like spines that turn yellowish in age. It grows on conifer logs and usually can be spotted from a distance.

Hericium coralloides (page 36) is almost identical to *H. abietis* but grows on hardwood such as birch and usually is more loosely branched. Both are choice edibles with a somewhat crab-like taste and texture.

Bear's head / *Hericium coralloides* Photo by Sherry Bottoms

Strawberries and cream / *Hydnellum peckii*

Hydnellum regium

Strawberries and Cream / *Hydnellum peckii*
Several hydnellums are fairly common in southern Alaska. Their fruitbodies typically are dark-colored, with a short, thick stalk and wide cap, which usually is concentrically zoned and spreads irregularly, often engulfing twigs or other debris. The flesh is very tough and pliable and usually is zoned (like tree rings, cut a fruitbody in half lengthwise). Beaded with brilliant red drops of liquid when young and fresh and with a very sharp throat-grabbing taste at all stages, *Hydnellum peckii* is one of the easier hydnellums to identify. Like other hydnellums, it is too tough to be edible. Another distinctive species is the dark blue to black *H. regium*. Both are good dye fungi.

Gemmed Puffball / *Lycoperdon perlatum*
Puffballs are round and "puff" their spores upward when struck by raindrops or poked with a finger. The medium to large species with a white, marshmallow-like interior often are collected for food. However, many of the similar-looking earthballs are quite poisonous, especially for pets, and so great care must be taken to insure correct identification. The gemmed puffball is common in southern Alaska. Its fruiting bodies are small, round to pear-shaped, cream colored, and have pointy warts. The flesh is soft and pure white when young, turns olive-green and gooey with age, and progresses to an olive-brown powdery mass when mature.

Gemmed puffball / *Lycoperdon perlatum*

Gray fire morel / *Morchella tomentosa*

Early false morel / *Verpa bohemica*

Spring false morel / *Gyromitra esculenta*

Morels and False Morels
Morels are members of the genus *Morchella* and false morels are members of the genera *Gyromitra* and *Verpa*. Edibility runs the gamut from choice to possibly deadly poisonous, so learning to identify these mushrooms accurately is critical. Even the best edibles in this group, the morels, should always be well cooked, as raw or undercooked specimens are responsible for a large number of poisonings every year.

Gray Fire Morel / *Morchella tomentosa*
Morels have a conic to rounded cap with a network of ridges and pits and a whitish hollow stalk with a granular surface. The cap is attached along its entire length to the stalk. Several species of morel are common in western forests, especially following fires when they can fruit in mind-boggling numbers. Morels fruit in spring in most areas but can be found well into summer at cool, moist sites. One of the "fire morels" is *Morchella tomentosa*. It is dark brownish black and covered with small hairs when young, giving it a furry appearance. Its color lightens to golden brown in age, and the hairs become less obvious. Gray fire morel is a choice edible; however, not everyone can tolerate morels even when well cooked.

Early False Morel / *Verpa bohemica*
The early false morel is one of the first mushrooms to emerge in the spring, usually under cottonwoods near rivers. Its cap is brown, bell-shaped, and wrinkled (not ridged and pitted) and is attached only at the top of the stalk. The stalk is thick and white, and the interior appears stuffed with fine cottony threads. Although commonly collected and eaten, the early false morel can cause severe gastric upset, sometimes in persons who have eaten it for years without problem.

Spring False Morel / *Gyromitra esculenta*
The caps of this false morel are irregular to slightly lobed or saddle-shaped, with a brain-like surface that varies from dull red to reddish brown or darker brown. The interior is convoluted to marbled, with one or more chambers. The stalk is hollow at maturity and tinted with cap colors but often also with pinkish or grayish purple tones near the base. It can be common and often is encountered in spring and early summer by morel hunters. Although eaten by many in western North America, the spring false morel is not recommended since it has caused serious illness and deaths in Europe and eastern North America.

The Alaska Region of the Forest Service includes the Tongass National Forest, the nation's largest at 17 million acres, and Chugach National Forest, the nation's second largest at 5 million acres. The Tongass encompasses most of southeastern Alaska (Alaska panhandle) and the Chugach roughly surrounds Prince William Sound.

This brochure was prepared by the Forest Service, Alaska Region Botany Program with funding from the Forest Management Program (Special Forest Products). Text by Kate Mohatt (Chugach National Forest ecologist), Karen Dillman (Tongass National Forest ecologist) and Dr. Steven Trudell. Illustrations by Marsha Mello and photographs by Steven Trudell except where noted otherwise. For information about mushrooms, lichens, and plants of the Alaska Region go to:
www.fs.fed.us/wildflowers/regions/alaska/

Cover photograph: mature clusters of the sulfur shelf (page 31).

Suggested resources for learning more:

Mushrooms of the Pacific Northwest, Steve Trudell and Joe Ammirati, Timber Press, 2009
Common Interior Alaska Cryptogams, Gary A. Laursen and Rodney D. Seppelt, University of Alaska Press, 2009
The Alaskan Mushroom Hunters Guide, Ben Guild, Alaska Northwest Publishing Company, 1977
Mushrooms Demystified, David Arora, Ten Speed Press, 1986
MykoWeb.com
Tom Volk's Fungi / botit.botany.wisc.edu/toms_fungi/
Mushroom Expert / mushroomexpert.com

While the internet can be an excellent source of information, use caution, especially with photographs, as many of them are misidentified, and search engines return many extraneous images.