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May is Morel Month in Michigan

Identifying the edible morels

MICHIGAN STATE
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Morchella esculenta

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Acknowledgement

This bulletin was created by Ingrid Bartelli, district consumer marketing agent for Michigan State University Extension, Marquette. She expressed gratitude for the mentoring and other contributions of Prof. Alexander H. Smith of the University of Michigan, arguably America's most renowned authority on the identification of mushrooms. The great popularity of her bulletin led to many reprintings spanning three decades. We have kept the format the same and have striven to match the excellence of the original.

THIS BULLETIN IS FURNISHED to help those wishing to learn about mushrooms and to help ensure the safe collection of edible morel mushrooms. The morel is one of the safest mushrooms to collect for eating. Notice how the morels in the photographs look different from standard mushrooms with gills. Beginners will find that morels are so distinctive that they have little difficulty in accurately identifying them. You should be able to distinguish the edible morels from the similar but poisonous false morels with the help of this bulletin. You must teach yourself and make your own decisions.

What is a morel?

Morels are often called mushrooms, a common name for large, fleshy fungi. Morels are fungi, and for many years fungi were classified as plants. Fungi are similar to plants in growth habit: they are immobile organisms. Fungi notably differ from plants in lacking chlorophyll, the chemical that green plants employ to absorb sunlight and transform carbon dioxide and water into carbohydrates. Fungi obtain carbohydrates by decomposing organic matter such as wood and leaf litter or by obtaining them directly from plants as parasites or mutualists. When a mushroom is lifted out of the soil or rotting wood substrate, whitish-brown cobweblike filaments are visible. The filaments are the vegetative body, the structures through which they absorb food from the substrate. The individual filaments are called hyphae and the mass of filaments is called the mycelium. The hyphae secrete enzymes to break down organic matter and then absorb the nutrients. Since the 1970s scientists have considered fungi to be distinct enough from plants to be placed in their own kingdom, the *Mycota*. DNA-based research has revealed that fungi are actually more closely related to animals than to plants.

Mushrooms produce spores rather than seeds for reproduction. Mycologists (scientists who study fungi) separate fungi into classes on the basis of the way the spores are produced. Morels produce their spores inside a microscopic structure resembling a cylindrical sack called an *ascus* (plural *asci*). The asci stand on end and line the interior of the pits on the head of the morel. The mature spores are shot out of the terminal ends of the asci into the surrounding breeze to be carried great distances. Because the spores are in an ascus, morels are classified as *Ascomycetes*.

Most other mushrooms — including the common white button mushroom, the portobello, the shiitake and the porcini - produce their spores on the top of a microscopic club-shaped structure called a *basidium*; these mushrooms are *Basidiomycetes*. The spores are also shot into the breeze. We can sometimes see the microscopic spores when the cap of a mushroom deposits thousands on a nearby leaf or mushroom cap. They appear as a fine, colored dust.

Most fungi are called by their scientific names. Relatively few fungi possess common names, and these common names are notoriously unreliable. “Beefsteak,” for instance, can refer to either the false morel *Gyromitra esculenta* or the wood-rotting shelf fungus *Fistulina hepatica*. This booklet lists some of the common names with which you may be familiar, but we do not pretend to have a comprehensive listing. You are encouraged to learn the scientific names. Scientific names consist of two parts. The first part is the name of the genus: *Morchella* in the case of the true morels, *Gyromitra* and *Verpa* for the false

morels. The second part is the name of the species, the specific epithet. The specific epithet never appears alone but is always preceded by the genus name or abbreviation: thus the black morel is *Morchella elata* or *M. elata*. Because scientific names come from Latin or Greek, they are always italicized or underlined. They are used the world over, so a scientist in Israel or Russia will know what you mean when you say "*Morchella elata*."

Where do I find morels?

Morels, like all fungi, must absorb their food from their surroundings. Knowing what sort of habitat a morel prefers gives us a better chance of finding it. Morels are less finicky than many mushrooms, with the consequence that one might run across a morel just about anywhere. Morels are believed to occur in every county of Michigan. Usually morels are found in forests and areas with scattered trees. Beech-maple or oak forests with a variety of spring wildflowers and wild leeks growing on the forest floor are good locations for morels. Forests where aspen, ash, tulip poplar or elms are present may yield large crops. MSU Extension bulletin E-2332, *Identifying Trees of Michigan*, is available to aid in your morel hunting. Often old orchards of fruit trees (especially apple, pear or peach) that are not being sprayed with fungicides have reliable crops of morels. Burned areas of all sizes from a campfire to a forest fire frequently produce abundant crops. Occasionally morels fruit in the first year after fresh fir-bark mulch has been placed in a landscape. Morels even occur in the sand

dunes and open grassy meadows along the Great Lakes, but such morels remain gritty after cleaning and cooking. Recently logged areas are not reliable collecting locations in Michigan.

Advice from successful morel hunters includes the following: "look first for a stand of aspen," "in young second-growth hardwood forests," "near a dead or dying elm," "in old orchards," "in the charred ash of last year's forest fire," "in a stand of ash trees," "wherever bracken fern grows," "follow the ravines" or "near spruce stumps." The truth is that morels are where you find them. If this list seems discouragingly broad, you could do worse than to start your investigations with elms. Recent research has shown that morels frequently can form *mycorrhizae* with elm trees. In other words, the morel and the elm are capable of forming a mutually beneficial relationship, in which the fungus receives nutrients from the roots of the tree and, in turn, helps the roots obtain minerals from the soil.

When should I look for morels?

Morels are one of the few edible mushrooms to fruit in the spring. Most other edible mushrooms are found in the late summer to late fall until the snow flies. Start to look for morels in the early spring as the soil warms up. The morel season generally begins in the south and progresses 100 miles or more north per week. In any region, look earliest in the year on south-facing slopes, then west-facing slopes, then east-facing slopes, then

north-facing slopes. Ridgetops and flatlands are scattered in here and there, depending on the weather. Individual species differ in their time of fruiting as noted below. In general, the black morels show up first, then the gray and yellow morels, with the half-free morels mixed in the middle.

The most important factor is probably rainfall amount, followed by temperature. It must be wet enough and warm enough for the morels to emerge. Mushrooms are about 90 percent water, so if there's no rain at the right times, there are not likely to be many morels. However, too wet or too hot can be just as bad for fruiting.

Most veteran morel hunters have specific signs of nature (phenology) they look for to know when to start hunting morels. Some look for "oak leaves the size of a squirrel's ear" or "maple leaves the size of a mouse's ear." Others look for blooming of serviceberry or wild plums. Many look for morels as the asparagus begins to pop up in their gardens. Still others look to wildflowers — when the hepatica, arbutus or white violets are flowering.

Where and when should I look for morels the next year?

Keep careful notes about when and where you find morels; they will often occur in the same spots at the same time (or under the same conditions) in later years. The most reliable place to find abundant morel fruitings is under elm trees the spring after a tree has been killed by Dutch elm disease. The second year

after the tree dies, the yield may decrease to 10 to 30 percent of the first year's yield. The third year's yield may be 10 to 30 percent of that. There are exceptions to this rule, of course. Yields under living apple trees, ash, cottonwood or other trees are usually lower than under elms but are fairly consistent from year to year and are more dependent on moisture than on the condition of the trees.

Does it damage future morel crops when I pick morels?

Any mushroom, the morel included, is only the reproductive structure of the living organism. Most of the fungus is underground, and the mushroom is only a small portion of that colony, analogous to the fruit of a plant. It will not kill or harm the fungus to pick the morel. For mushrooms with gills, an important step in verifying that they are not poisonous species requires lifting the entire mushroom stalk out of the soil for inspection. A higher yield of morels may occur during the next few days at a spot if the morel stalk is cut at the ground when picked rather than pulled from the ground, if the weather is conducive. However, this phenomenon influences only the area immediately near the individual stalk. Reduction of the total morel crop following years of harvesting has not been demonstrated.

Is it safe to pick mushrooms?

No fungi are dangerous to touch, not even the deadly poisonous species. You will want to take some precautions, the same precautions you would take any time you go into the woods. It is important to:

1. Bring a compass and a map. Learn how to use the compass and take your bearings before entering the forest. Morels rarely cooperate by growing right along the trail and, if they do, someone else probably picked them already. You will probably need to leave the paths and plunge into the woods.
2. Prepare for ticks, mosquitoes, blackflies and other biting insects. In Michigan, the odds of encountering deer ticks that can carry Lyme disease are slight in the Lower Peninsula. In Michigan's Upper Peninsula, the odds increase as you travel east to west. Deer ticks must feed for 24 hours to transfer enough of the Lyme bacteria to cause an infection. Deer ticks are very small, have eight legs and do not have white markings. The most important areas for application of a tick repellent are the tops of the shoes, socks and pant cuffs. Check yourself, children and pets for ticks after being outdoors.
3. Learn how to identify poison ivy and carefully avoid touching it while collecting mushrooms.
4. Keep track of time. Allow for enough time to get out of the forest before dark.

5. Carry some water and do not drink from streams or lakes - such water is often contaminated with potentially harmful microorganisms such as *Giardia*.

6. Dress for the weather; springtime weather in Michigan can be unpredictable.

7. Michigan has only one venomous snake in the Lower Peninsula, the eastern massasauga rattlesnake. This snake does not occur in the Upper Peninsula. This rattlesnake is not as dangerous as its western relatives because of its small size and short fangs. It is a shy, secretive snake that avoids human contact. It occurs in low numbers in certain swamps and marshes. Bites to humans are rare.

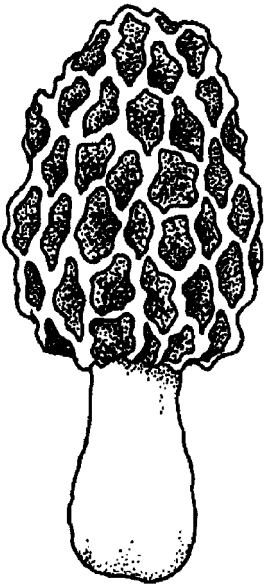
It is often difficult to determine which lands are private property and which are public. One way to find out which parcels are private is to use a plat map. Plat maps can be obtained from county MSU Extension offices, Farm Bureaus and county clerks' offices.

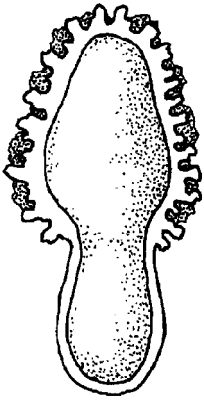
You cannot be harmed by picking fungi but you *can* be harmed by *eating* fungi. ***Never*** eat a mushroom unless you are absolutely positive of its identity. Relatively few mushrooms can actually kill you. Approximately eight species are lethal out of more than 2,000 species in Michigan, but a poisonous species may be locally abundant. Mushroom poisoning is a decidedly unpleasant experience and never worth risking for the sake of a meal. Spend some time looking closely at each mushroom you pick, and compare it with the pictures in this booklet and a field

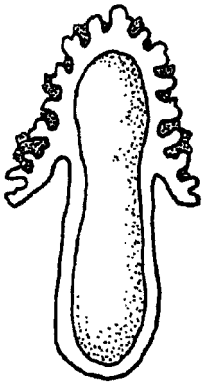
guide. **If you are in any doubt, do not eat the mushroom.** Do not eat mushrooms raw, particularly morels. Additionally, **we do not recommend eating any species of false morel or lorchel.** The beefsteak false morel, *Gyromitra esculenta*, has been responsible for several deaths in the United States and Europe, and must not be eaten.

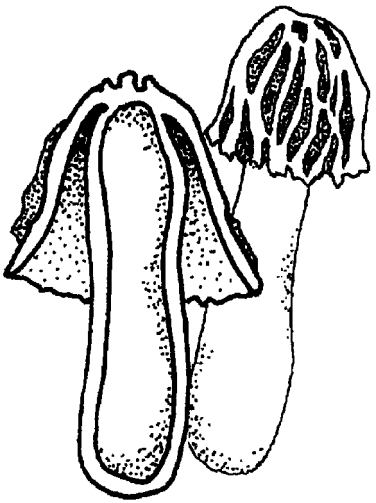
Identifying True Morels

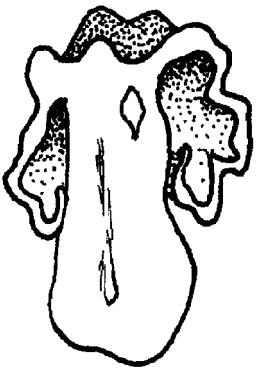
The morels and their close allies can be divided into two broad categories, the *true morels* (edible) and *false morels* (poisonous). True morels are distinguished by a hollow, cone-shaped to cylindrical cap connected at the base to the hollow stalk. The cap is distinctly pitted (not wavy, wrinkled or folded), and, in most species, there is no break between the cap and the stalk (see figures). *Morchella semilibra*, the half-free morel, is just that - it has a cap that is half-free from the stalk, with the connection occurring partway up the cap. The lower portion of the cap hangs free like a skirt (see figures). True morels are usually 2 to 6 inches in height with a cream-colored stalk and a cream, tan, gray-brown or black cap. The record size for a true morel in Michigan approaches 17.5 inches tall, 15 inches in circumference and 20 ounces. Annual festival records in Michigan usually reach approximately 9 inches tall. The European record from Sweden is 31.5 inches tall (80 cm). Let's hope we can break the records this year.











Identifying False Morels, the Lorchels

False morels (sometimes called *lorchels*) differ from morels in the attachment and ornamentation of the cap. The stalk is attached to the cap at the very top of the cap (not at the base or partway up the cap, as in true morels) (see figures). The cap may be smooth, wrinkled, wavy, ridged or folded, but it is never pitted. There are two principal false morel genera, *Gyromitra* and *Verpa*. You are likely to encounter these fungi while hunting for morels, so we have included the common species of Michigan in this booklet, but we remind you that fungi in these genera are probably dangerous and should not be eaten.

Poisoning by the False Morels, Especially the Beefsteak and Related Species

Despite well-publicized warnings of poisonings by *Gyromitra esculenta*, *Gyromitra infula* and related species, they are still widely consumed by many people who have failed to be impressed by evidence of their toxicity. *Verpa bohemica* and *Verpa conica* are also reported to cause poisoning but are widely consumed. We provide some details about the evidence on poisoning here.

Verpa bohemica and *Verpa conica* have been proven to occasionally cause gastrointestinal upset and a loss of coordination (such as problems with writing) for as long as 5 hours after eating. Never overindulge.

Gyromitra esculenta, the beefsteak, is recognized as an edible mushroom that sometimes kills. It contains the poison gyromitrin, a hydrazone that is changed in the acid stomach into a rocket fuel, monomethylhydrazine. Fresh specimens normally contain a lot of the toxin, although individual mushrooms differ in the amount of toxin. A wide variation in sensitivity to the toxin exists among people. Children have an enhanced sensitivity to the toxin. Gyromitrin is unstable and volatile, and drying greatly reduces the amount of the volatile hydrazines. Well-dried specimens will contain toxin below the level that could cause acute toxicity. Boiling can eliminate much of the toxin, which moves into the cooking water and even the water vapors (steam). These vapors alone can poison the cook in a poorly ventilated kitchen. Also, the poison in the cooking water can be directly absorbed through the cook's unbroken skin. We never recommend eating the false morels, especially without drying. However, if fresh specimens are cooked, turn the stove fan on high and open the windows, or cook outside. If you decide to take the significant gamble of eating these mushrooms (which we do not recommend), boil fresh specimens for at least 10 minutes, then discard the cooking water, add fresh water and boil for another 10 minutes. Discard the cooking water and dry the mushrooms on a dry cloth or paper.

Regardless of the method of preparation, these false morels are potentially dangerous and may still cause symptoms. Even if symptoms do not show up right away, the toxin accumulates in the body so that a day of eating the mushrooms without poisoning symptoms may be followed by a day with poisoning if a person eats the false morels on consecutive days. Long-term mutagenic and carcinogenic effects are reported in laboratory tests, so children and pregnant women should never consume the false morels.

In the majority of poisonings, the symptoms begin about 1 to 6 hours after eating. Symptoms are gastrointestinal bloating and pain, vomiting, severe headache, and sometimes diarrhea and fever lasting from one day to a week. Some rare poisonings (usually following overindulgence) are reported in the medical literature in which the above symptoms were followed by jaundice, hemolysis, methemoglobinemia, delirium, coma and occasionally death after 24 to 48 hours. We believe that eating these mushrooms is not worth the risk.

Characteristics of Individual Morel Species

It should not be too difficult to match your find with one of the pictures and descriptions included in this bulletin if you are collecting morels in the spring in Michigan. The common species of true and false morels in Michigan have been included for your benefit. There are also many mushroom field guides available at

bookstores that will have descriptions and pictures of these and other species. Be aware that field guides are often sold in regions of the world that are different from the region that the guide was written to cover, and other similar species may be included. Always be wary when collecting in unfamiliar locations.

Note that the classification of morel species is changing as we learn more about the morel. There is controversy over exactly what constitutes a species and where the limits of each species should be drawn. Species of fungi are usually based on macroscopic and microscopic characteristics, as well as potential to mate with one another. Are there three species of morels in North America, as some say, or are there 25, as others say? Morels are extremely variable in their color and shape, depending on the conditions under which they form. More than 100 species have been described on the basis of these color and shape variations. We have taken a conservative approach here and may have lumped some species together. For example, no one really knows what *Morchella deliciosa* is; is it possibly a young form of *M. esculenta*? And should we consider the forms that grow under tulip poplar or under hickory as separate, undescribed species? These questions remain unanswered for now.

We have also included the false morels in this booklet for comparison. We do not recommend any of them for eating. However, they're fun to find, and it's good to know what's out there in the woods.

Morchella esculenta

Excellent for eating after cooking. "Esculenta" means "deliciously edible".

Look for these distinguishing features: gray to yellow coloration, usually 2 to 6, but up to 12 to 18, inches high. The color generally lightens as specimens expand and mature or as they are exposed to the sun. The ridges, unlike those in black morels, are the same color as the pits. The lower part of the cap is directly attached to the hollow stalk, without a sterile "depression" or "moat" as in the black morels. The shape of the cap is extremely variable, from narrow and pointed to short and rotund. The ratio of the length of the cap to the length of the stalk, also used in times past to delineate species, is very variable in this single species. There may be some "hidden" species within this group, but no one has yet found a

Morchella esculenta — [Common morel, yellow morel, gray morel]

consistent way to divide these into good species. More work needs to be done.

Some people consider the large yellow morel a different species and call it *M. crassipes* (the big-footed morel), but studies have shown a complete intergradation between *M. esculenta* and *M. crassipes*, so there is no good point at which to draw a separation line. Moreover, the two "species" will mate with one another in culture, making them part of the same biological species. The large yellow morel tends to appear later in the season. Although it takes fewer of the large morels to fill a basket, they are often tougher and not as flavorful as the small earlier morels.

When to look: Begin to look "when the oak leaves are the size of a squirrel's ear" or late April into early June. The larger morels are generally found later in the season.

Where to look: Usually under dead elm trees, especially along the roots of trees killed by Dutch elm disease within the past few years. Also, they are found often in very old apple orchards that haven't been sprayed for 10 years or more. Sometimes they occur under living ash or tulip poplar and occasionally under dead or live cottonwood or aspen. In the north they may occur under conifers. This morel will sometimes appear on burned land and "wherever else the mushroom feels like fruiting." In good morel, years they can be found where the soil is moist in a wider variety of places.

NOTE: Never eat raw. Generally not as abundant in the Upper Peninsula as in lower Michigan.

Morchella elata - [black morel]

Morchella elata

Look for these distinguishing features: *M. elata* is the darkest of Michigan's morels. Its cap is usually more narrow and conical than that of most morels ("*elata*" means "high"). It has sometimes been called *M. angusticeps* (narrow-headed morel), but this name is not scientifically accurate. Mushrooms may be 2 to 9 inches tall. In young specimens, the ridges may be the same color as the pits, but the ridges always become quite dark upon maturity, with the pits usually remaining tan colored. There is usually a sterile "moat" between the lower part of the cap and the hollow stalk, rather than a direct attachment of the fertile portion as in *M. esculenta*. Excellent for eating after cooking. Considered by most to have a stronger flavor than *M. esculenta*.

When to look: These are among the earliest of the morels, sometimes earlier by a week or more than *M. esculenta*. The ground must have

warmed up, so start on the south-facing slopes and progress as noted above.

Where to look: Look under living spruce or near spruce stumps and sometimes under other conifers; also under living aspen. In some areas this morel is abundant under large, living black cherry. It is often more difficult to see against the background of dried leaves and soil on the ground than other morels because of its darker color.

NOTE: Never eat raw. Even cooked, some people have reported gastro-intestinal upset after consuming this species with alcohol. This is the most common species of morel in the U.P. and northern L.P.

Morchella elata - [black morel]

Morchella semilibra-[Half-free morel]

Morchella semilibra

Tasty for eating after cooking but not considered as delicious or flavorful as *M. esculenta* or *M. elata*. The texture is often slightly more mealy as well, especially in older specimens.

Look for these distinguishing features: The specific term "*semilibera*," meaning "half-free," is an accurate description of the attachment of the cap to the stalk. Unlike the other species of morels, in which the cap is fused to the stalk for its entire length, the half-free morel has the top half of its cap attached and the bottom half free from the hollow stalk. The ridges are often darker than the pits. It is usually 1 to 4 inches tall, although sometimes monstrosities nearly a foot tall can be found. These generally have a very small cap on a very wide and fragile stalk.

When to look: Look about the same time as you would look for *M. esculenta*,

although the *M. semilibra* season tends to start and end slightly earlier.

Where to look: This species tends to be more scattered than *M. esculenta* and *M. elata* and is not usually found in huge abundance under any one tree. It's found mostly in the same habitats as *M. esculenta*.

NOTE: Never eat raw. Although the flavor is not as strong as that of the other morels, the texture is usually good, and this species makes a fine "morel helper" when cooked with other species of morels. Called *Mitrophora semilibra* in some older literature.

Morchella semilibra-[Half-free morel]

Verpa bohemica

Suspected of causing gastrointestinal upset and loss of coordination lasting up to 5 hours. NOT RECOMMENDED FOR EATING. Although it's eaten by some after drying and cooking, individual reactions may vary from no reaction to severe gastrointestinal upset to temporary loss of coordination to convulsions.

Verpa bohemica-[Early false morel]

Look for these distinguishing features: Like other false morels, the cap is attached to the stalk only at the very top, and the cap hangs around the stalk like a skirt. The stalk appears "stuffed" with cottony material; true morels have hollow stalks. The underside of the cap is smooth, unlike the cap of *M. semilibera*, in which the underside is roughened with flakes of tissue. The cap is pitted but less deeply than *Morchella* species. *V. conica's* cap is not pitted. If you have access to a microscope, you will find only two large ascospores in each ascus in this species, whereas all other morels and false morels have eight ascospores per ascus.

When to look: *V. bohemica* usually fruits about the same time as the black morels.

Where to look: Look for *V. bohemica* scattered along edges of swamps and areas wet from spring drainage; also under cottonwood, balsam poplar and aspen.

NOTE: NOT RECOMMENDED FOR EATING. Never eat *Verpa* species raw. If you must eat them, never overindulge when eating cooked *Verpa* species. Avoid eating on consecutive days.

Verpa conica

Suspected of causing gastrointestinal upset and loss of coordination lasting up to 5 hours. Edible after drying and cooking. Individual reactions may vary, but the flavor is mediocre at best anyway.

Look for these distinguishing features: Like other false morels, the cap is attached to the stalk only at the very top, and the cap hangs around the stalk like a skirt. The outside of the cap is smooth or only slightly wrinkled.

When to look: *V. conica* fruits about the same time as the common morel.

Where to look: *V. conica* is often found in the same areas as true morels and about the same time. It may be found under aspen and white cedar in boggy areas, mixed hardwood forests, old apple orchards or under black cherry. It is not usually found in great abundance in any one area.

Verpa conica-[Bell morel, thimble-cap]

NOTE: Never eat *Verpa* species raw. Never overindulge when eating cooked *Verpa* species. Avoid eating on consecutive days.

Gyromitra esculenta

Poisonous and sometimes fatal.

Gyromitra esculenta — [Beefsteak lorchel]

Look for these distinguishing features: Look for a large lorchel, 2 to 8 inches high with a pale grayish tan to deep, dark liver-colored cap attached to the stalk only at very top. Slice through the mushroom from top to bottom to see the attachment. There is great variation in this species and in all *Gyromitra* species. The cap varies from smooth to very wrinkled to almost pitted. The margin of the cap usually rolls inward.

When to look: *G. esculenta* can be found from shortly after the snow melts until the early part of the *Morchella esculenta* season.

Where to look: This species grows in rich organic soil and is not normally associated with any particular trees. It is often found in conifer or aspen areas, sometimes on wastelands where scattered pines remain.

NOTE: NOT RECOMMENDED FOR EATING. Although "*esculenta*" means "deliciously edible", this mushroom was named before researchers knew about the toxin it produced. Not recommended for eating. Never eat raw. Never eat if pregnant. If you must insist on eating it, we will not be held responsible, but you must dry or cook thoroughly before eating. Boil twice for 10 minutes and change the cooking water twice. Discard cooking water and remove any water remaining on the cooked mushrooms (pat dry with dry paper or cloth). Avoid eating on consecutive days. Children are especially sensitive to the toxins in this mushroom. See also "Poisoning by False Morels", above.

Gyromitra brunnea - [Elephant ear lorchel] (a.k.a. *Gyromitra fastigiata*)

Suspected of causing poisoning.

Not recommended for eating. Some people eat them after drying and cooking, but it's a game of Russian roulette.

Gyromitra brunnea - [Elephant ear lorchel] (a.k.a. *Gyromitra fastigiata*)

Look for these distinguishing features: *G. brunnea* possesses a white stalk with a convoluted cap. The cap is not as deeply pitted as that of *G. esculenta*.

When to look: *G. brunnea* fruits about the same time as *Morchella esculenta*, sometimes a little earlier.

Where to look: Look in rich woods, often along the edges and in the shadows of logs.

NOTE: Never eat raw.

Guidelines for Collecting

To protect your collections from deterioration:

1. Keep each mushroom species collected separate from other species by wrapping them in wax paper or paper bags. Plastic bags are unsuitable because the respiring morel will "sweat" and deterioration and bacterial contamination will occur rapidly in the moisture.
2. Collect young, fresh specimens and inspect them for insects to avoid infested specimens.
3. Carry your mushrooms in a shallow, rigid container such as a basket to prevent them from becoming crushed. Some people use mesh bags.
4. "Field-clean" your morels: trim off or clean dirt from the stalk before placing morels in your basket. The irregular shape of the morel cap makes it difficult to clean dirt that falls into the pits and crevices during transport. For

mushrooms with gills, an important step in verifying that they are not poisonous species requires lifting the entire mushroom stalk out of the soil for inspection.

5. Take notes on mushroom color and habitat, such as on wood or on soil, to help with accurate identification after transport. Note if the mushroom is associated with a particular tree species.

6. Keep mushrooms in the shade and as cool and well aired as possible until you can refrigerate, dry or freeze them.

8. Clean, process and cook mushrooms as soon as possible. Most mushrooms deteriorate very rapidly after they are picked. Split the caps lengthwise to check for insect infestation and spoilage.

Guidelines for Safe Eating

Mushroom collecting can be an enthralling outdoor activity that can introduce you to the wonder, beauty and mystery of forests and nature. You will be amazed at the numbers and variety of mushrooms you will find in Michigan's great outdoors. A dozen kinds of mushrooms may grow on the same log, stump or patch of lawn. This makes it essential that you be absolutely certain which mushrooms are edible before you collect them. There is no way to determine whether a mushroom is poisonous or edible other than to accurately identify the species and learn its history as a food item.

You should observe certain precautions in eating mushrooms:

1. Know how to accurately identify the species that you are planning to collect and eat.
2. Avoid eating wild mushrooms raw, especially morels and false morels.
3. Do not overindulge, especially the first time you try a new species. You never know how your body may react, especially if alcohol is involved.
4. Do not eat old specimens, especially those that have evidence of insect damage.
5. Avoid eating any mushrooms that became slimy during transport.

If you decide to eat an unfamiliar mushroom species that you have identified as edible, eat sparingly the first day and save the remainder as fresh specimens. You should observe your reaction to it over 24 hours before cooking and consuming the remaining specimens. Saving a few fresh specimens is important for accurate identification in case you become ill. Should you become ill, empty your stomach, take some activated charcoal and call your doctor. For the best chance of accurately identifying the culprit, have your doctor contact one of the poison centers listed in this bulletin.

Cooking and Preparing Mushrooms

Morels are preferred over other wild mushrooms by many mushroom enthusiasts and gourmet chefs. The famous morel flavor is described as meaty, nutty and unique, whether cooked fresh or

dried. Try to avoid water in cleaning morels - even a brief soaking will reduce the flavor. If you wish to wash morels, run water over them rapidly and cook them immediately. Do not discard the stems. Cook whole specimens (split lengthwise) for maximum flavor.

The USDA recommends a serving size of 3 ounces of cooked mushrooms. Ten servings require about 3 pounds of fresh morels. Fresh mushrooms yield about 70 percent by weight in cooked mushrooms, and 1 pound of fresh morels equals about 1⅓ cups sautéed or 4 cups sliced. Dried morels may be quickly reconstituted by barely covering the morels with water, microwaving on high for one minute, then allowing them to stand for 10 minutes. Another method involves simmering the dried morels in cream or butter until soft, about 15 minutes, not allowing the cream to boil. Three ounces of dried morels is equivalent to 1 pound of fresh ones for recipes. Once dried morels are reconstituted, they should be equal in volume to fresh morels. Always add the rehydrating liquid into the dish being prepared — much of the flavor remains in the liquid. Morels should be sautÈed separately and added to stews and casseroles just before serving.

Several books of recipes for preparing wild mushrooms are readily available. Morels may be sautéed in butter with or without onions, cooked in a marinade, added to a meat sauce smothering a steak, scrambled with eggs, or chopped or ground in a pasta sauce. Large specimens may be stuffed through the hollow base of the stalk. Alternatively, you can split them lengthwise and stuff the hollow with filling.

Here are two recipes for the delectable wild morel.

Sautéed Morels

20 to 25 morels halved lengthwise

Sauté in an open skillet in **2 Tbsp. olive oil** and **1 Tbsp. butter**. Cover with ¼ **cup water**. Cover and simmer until water evaporates. Remove cover and sauté lightly on each side over relatively high heat. Cook thoroughly. Do not pack them tightly or they will steam instead of sauté. Avoid adding extra butter or covering the skillet. Add salt, pepper and additional spices to taste (some people recommend adding garlic powder, paprika, turmeric or onion powder).

Morel Sauce

1 ounce (1 cup) dried or 6 ounces (1½ cups) fresh **morels**

(Reconstitute dried morels as suggested above. Drain and save the rehydrating liquid. Scissors work better than a knife for cutting dried reconstituted morels.)

Coarsely chop the morels.

Sauté lightly in **1 Tbsp. butter**.

Add **1 Tbsp. flour** and cook until lightly brown.

Gradually stir in the liquid used for rehydration.

Cook until the liquid is thickened.

Add dash of **salt** and **pepper** to taste.

Add **1 cup dairy sour cream**, stir in and heat through but do not boil.

Add **lemon juice** to taste.

Morels Can Be Preserved for Future Use

Morels can be dried, frozen or canned for future use. The intensity and character of the flavor is not lost during drying. Drying is said to increase the flavor of the morel and many enthusiasts prefer dried morels over fresh. Morels should be well dried because they are prone to decay. Drying morels on a string in the sun is unpredictable. It is a simple process to place the morels on oven racks covered with nylon screening over a low temperature regulated heating source to dry. Devise a protective wall around the sides of the racks. Allow space for air to enter at the bottom of the dryer and moist air to escape from the top. A fan hastens the drying process but is not essential. MSU Extension bulletin E-1768, *Drying Foods at Home*, is available as a guide. Various inexpensive fruit dryers and meat (jerky) dehydrators are available among the kitchen appliances in many stores. The heat should be warm, not hot, and constant until the morels are completely dry. If an oven is used, preheat the oven to about 150 degrees F, add the loaded racks, prop the oven door open at least 4 inches to let moisture escape during drying, and place a fan outside the oven so that air is directed through the opening and across the oven. When drying is complete, store the morels in a cool, dark, dry environment sealed in a jar or sealable bags. They should be packed into the container as tightly as possible without crushing to prevent them from absorbing moisture from air of high humidity.

Morels are one of the few mushrooms that can be frozen without detrimental effects on the texture and consistency of the flesh. Before freezing, sautÈ them in butter until they are covered in their own juice. Then cool and pack in airtight freezer containers, leaving no headspace. Or after sautÈing, freeze individual morels on trays and transfer the frozen mushrooms to freezer bags, remove air, seal, label and place in the freezer. Morels can be canned in the same manner as non-acidic vegetables, but results are less than ideal. A pressure cooker is necessary to reach appropriate temperatures for safe canning of such vegetables and mushrooms.

Report Poisonings

It is important to report any case of distress from eating a mushroom, particularly if you can describe or identify the mushroom. In Michigan, report to the DeVos Children's Hospital, Regional Poison Center, 1840 Wealthy Street, S.E., Grand Rapids, MI 49506; (800) 764-7661.

HUMAN POISONING CENTERS

Statewide and Western Michigan
1-800-764-7661

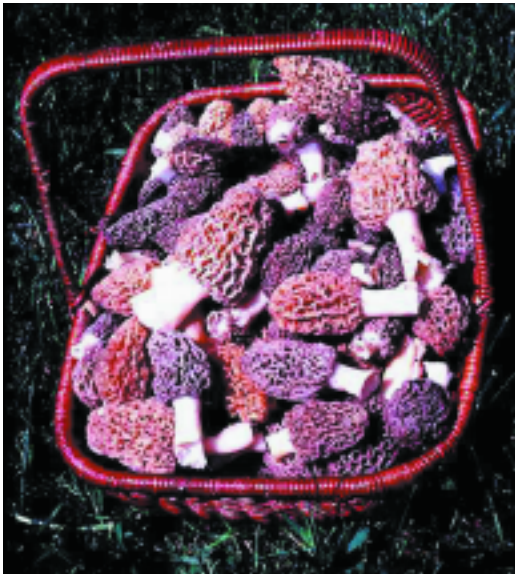
DeVos Children's Hospital
Regional Poison Center
1840 Wealthy Street, S.E.
Grand Rapids, MI 49506

Upper Peninsula
1-800-562-9781
U.P. Poison Crisis Center
Marquette General Hospital
420 West Magnetic Street
Marquette, MI 48955

Eastern Michigan
1-800-764-7661
Poison Control Center
Children's Hospital of Michigan
3901 Beaubien
Detroit, MI 48201

A Trophy Collection

This picture illustrates a collection of morels gathered for eating. They are all young, fresh, sound and firm specimens. Though these were picked over a period of 6 hours and transported 50 miles by car, they show no sign of deterioration. That is because they were gathered in a shallow, **rigid basket** and kept in a cool and airy place out of the sun. Also, they were not placed in plastic bags that allow moisture and heat to build up, encouraging the growth of spoilage bacteria. The dirt on the stalks of the morels was removed to keep the mushrooms clean, and then the morels were wrapped in **wax paper** that



kept them moist, fresh and clean. The next step will be to split each cap lengthwise to verify that they are true morels and to inspect for insect damage.

It is not unusual in Michigan to gather several bushels of morels in a day when the season is good. It might be prudent to bring along some **equipment for drying** to preserve your abundant collections.

Michigan is Famous for Its Morel Lands

The rich farmlands of southern Michigan and the extensive aspen groves and mixed stands of trees of northern Michigan ordinarily abound with morels. State and federal governments have provided numerous public land areas, parks and recreation areas for our use and enjoyment.

Morels are plentiful in the northern Lower Peninsula. Mid-May morel festivals are traditional in northern communities such as Mesick, Boyne City and Lewiston, and morel hunting is promoted in Gaylord, Grayling, Harrison, Walloon Lake and many other locations. Lists and maps of suggested hunting grounds may be available. Sometimes organized hunts, guide services, cooking classes and prizes are part of the festivals. Many of these communities have Web pages providing dates and details of their morel festivals. Information can be found on the Web page of the Michigan Festivals and Events Association, <http://www.mfea.org>. In the Upper Peninsula, morels are known to be plentiful in the hills of Chippewa County near Brimley (near Sault Sainte

Marie), the highlands in Marquette County, the Porcupine Mountain Wilderness Park and many other locations. You, too, can learn to find, identify, collect and indulge in Michigan morels.

Many other Extension publications are available. Call, write or visit the MSU Extension office in your county or write the MSU Bulletin Office, P.O. Box 6640, East Lansing, MI 48824-6640.

Some related bulletins are E-926, *Best of the Boletes*, E-924, *Mushrooms Grow on Stumps*, E-2578, *Selling Food for Fun and Profit*.

Additional Resources

Lonik, Larry. *The Curious Morel: Mushroom Hunters' Recipes, Lore and Advice*. 2001. Stackpole Books.

Weber, Nancy Smith. *A Morel Hunter's Companion: A Guide to the True and False Morels*. 1995. Lansing, Mich.: Thunder Bay Press.

Volk, Thomas J. Tom Volk's Fungi. **www.wisc.edu/botany/fungi/volkmyco.html**.

Amateur mycological societies provide a setting in which you can meet and learn from others who share your interest in mushrooms. The Michigan Mushroom Hunters' Club has forays nearly weekly throughout the mushroom season.

Michigan Mushroom Hunters' Club. **www.sph.umich.edu/~kwcee/mmhc/**

North American Mycological Society. **www.namyco.org/**

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