

Mysterious mushrooms and fanciful fungi

by

tom sampliner

Mushrooms are both feared because of their poisoning potential and loved when it comes to use as a food substance. Fungi in modern times have been placed taxonomically into their own, the fifth, kingdom. Thus they are separated from both plants and animals. Their colors, life cycles, historical uses, myths and anecdotes enchant us. Hopefully some light can be shed through this show on perhaps the least known kingdom.



What roles and jobs are performed by mushrooms?



Mushrooms recycling Yak dung

Both terrestrial and bracket fungi have edibles and some are highly prized as food items.



Some mushrooms used for food as well as for a health supplement or even as medicine



(*Cordyceps sinensis*) from western China

Bracket or shelf fungi are great decomposers and recyclers of lignin which is the toughest part of woody vegetation



There are also mushrooms with nefarious purpose. These black shoe-string like growths are the mycelium as runners on the outside of a fallen tree trunk representing it's demise due to attack of the honey mushrooms.



There are some mushrooms capable of providing mankind and critters psychotropic (mind altering) drugs. You are looking at (*Amanita muscaria*)



There are mushrooms such as the slime molds that can move considerable distance; they flow in certain stages.



There are mushrooms that can be used to combat pollution and chemical spills. Still others can be used to create ink or dye.



There are two main divisions to the Fungi based upon the structure that produces and contains the spores. Respectively, they are the Ascomycetes and the Basidiomycetes.

The former is the grouping that contains mushrooms shaped like a cup, disc, tongue, piece of coral, puffballs, morels and false morels, and the world famous underground truffles. For those with a saucer, disc, or otherwise open concave shaped surface, their interior is lined with very tiny, (for our eyes almost microscopic) stalks holding aloft packets of spores.

The second grouping, the Basidiomycetes, have their spore packets underneath the cap. Depending upon whether the species has gills, pores or teeth, these spore packets are upon tiny branches that are within the gills, pores or teeth. In part, the grouping arrangement as well as spore features helps determine the species.

ASCOMYCETES

THE CUP AND BIRD'S NEST FUNGI: Another group are the cup fungi. These have a concave smooth surface (looking like a shallow saucer).

THE PUFFBALLS AND EARTHSTARS: Still another group would be the fully enclosed fungi resembling a melon or other fruit within which the spores are developed.

CORAL AND TUNING FORK FUNGI: Yet another group would be stalked fungi that look like tiny stems in a cluster or singly emerging from the substrate.

TOOTHED FUNGI: Have dangling icicle-like projections hanging downward from beneath the cap upon which the spores are created.

SLIME MOLDS, JELLIES AND CRUST-LIKE FUNGI: This group is a catchall for some very unusual and different fungi. Slime molds have both moving and stationary phases and change color and structure in each. Jellies are soft sticky colorful species that do look a lot like spilled jelly. The crust fungi are partial to growing on wood and seem to sheath or cover portions of dead or dying woody plants.

SHELF OR BRACKET FUNGI: Grow upon wood extending outward from the wood as if they were some type of attached arm reaching into space. Underneath they can be gilled, pored or bearing thin downward projections of tissue called teeth.

All of these groupings are artificial. Species can fit into several of these categories. For our purposes we use these categories to get a handle of overall distinguishing traits.

BASIDIOMYCETES

THE GILLED FUNGI: There are several main divisions among the fungi. First, there is a large group that has folds of tissue that hang downward vertically from underneath the cap of the mushroom. These downward hanging folds of tissue are called the gills. These are where the spores, the next generation, are developed.

THE PORED FUNGI: The next group has rounded open tubes that descend vertically from underneath the cap. These tiny tubes are called pores. They appear to our eye as if a sponge covers the entire under cap surface of species belonging to this group. Members of this group develop their spores deep up in the pores

THE BRACKET OR SHELF FUNGI

These fungi are usually tough fleshy growths that start out looking as if they were coating a portion of a limb or trunk of a tree then grow outward making a horizontal angle with the supporting wood. Depending upon genus or species, they may have gills, pores or teeth underneath the cap. Some are edible. Others have a long tradition for medicinal or herbal purposes. Some of these have been carried by indigenous ancient people for use as kindling or fire starting fuel. Others have been found in the possession of preserved human ancestors who were carrying them for use to cauterize or stuff wounds or to boost immunity or counter infection.

The next slide will depict the hemlock varnish shelf which is a story unto itself. It's scientific name is *Ganoderma tsugae*, and it has a long colorful history in oriental herbal medicine. It has been used as an important energy tonic as well as for a number of ailment cures and for various other health benefits. It has relatives that grown on other wood; this species is partial to hemlocks in both the new and old world.

Growing as if it were some type of bracket right out of the side of the tree, it makes a colorful representation for a group that has come to be known as the bracket or shelf fungi.

This species has pores underneath the cap rather than either gills or teeth.

It certainly looks like some artist can use the underneath portion to engrave upon.



The scaly caps depicted in the next two slides are tell-tale indicators of the pholiotas which can be brackets growing as shelf fungi, or growing upon fallen timber almost terrestrial-like. Classification as a bracket is not always clear since some species may be capable of doing different growth styles. Most pholiotas are earthy tone colors many of which favor the tawny browns or yellows, but all with the scaly flecks of flesh on the cap and often the stem.





This slide shows colorful yellow and orange shelf fungus growing horizontally out of a tree trunk is called “chicken of the woods”, *Laetiporus sulphureus*, a desirable edible. Yet who can selfishly think of picking something so pretty to deprive the rest of us of such an eye catching sight.

Underneath the cap are pores rather than either gills or teeth. As with all collectable edibles, they are best when fresh and young; this helps avoid insects and attack by other creatures and growths.



The tawny soft earth tones of the previous slide show another bracket fungus, the “Dryads Saddle”, *Polyporus squamosus*, which fruits both in spring and then again in cooler wetter weather in autumn. This bracket may be found on many hardwood trees in our eastern forests. It has some other fairly common nick names that reflect upon the tawny colors of the cap. They can form impressive colonies of overlapping shelves; indeed many of the brackets can do so.



This slide shows one of the brackets that is very leathery and tough. It is the “violet toothed polypore” , *Polyporous violaceus*. It is named both for the violet color upon the tough cap as well as the rim underneath the cap that duplicates this color. Pores rather than either gills or teeth are found underneath the cap. These brackets are very tough, though pliable. They seem to revive with moisture. Edibility for these types of brackets becomes irrelevant as they are so very tough.



This slide is the Turkey Tail polypore or shelf fungus, *Trametes versicolor*. The obvious reference is to the tawny earth tones that do vaguely resemble the spread tail feathers of a male turkey displaying. There are a number of similar looking shelf fungi. In fact, one is called the false turkey tail. That species differs visibly not so much in colors but underneath, rather than tiny round openings called pores, it has teeth. Also, the cap is fuzzy in texture.



The striking colors of this slide are of the cinnabar-red polypore or shelf fungi. I notice them growing especially upon rotting or fallen beach trees and usually alongside creeks or on escarpments. Their unique bright colors call out like a beacon in the forest.



GILLED TERRESTRIAL FUNGI

These fungi emerge from the substrate and show folds of tissue called gills beneath the cap. These look like flat sheets hanging from the underside of the cap. They can take various shapes and configurations. They should leave a diagnostic color imprint on plain paper if left underneath the pores at a stage when the spores are ripe enough to drop down. Gills can be widely or closely spaced. They can be quite straight or wavy. Their texture can be the same or different than the flesh of the cap. They can change color with age. Some species even have gills that fork at their point of attachment with the edges of the cap; true Chanterelles are one such example. Sizes and colors vary greatly. It is helpful to discern if the gills attach to the stalk of the mushroom directly in a straight line or if they descend down the stalk or if they stop before attaching to the stalk and instead attach short of the stalk.

The hot white stunning terrestrial mushrooms of the last slide are from a well-known genus containing both edible as well as some of the most hazardous mushrooms we know of. I refer to the genus *Amanita*, depicted is *Amanita virosa*, the destroying angel. Fresh they are pure white including the gills. So too is the spore print. All the amanitas emerge from a sack-like structure which looks much like the lower portion of an egg. In fact, prior to emerging, the mushroom was fully encased in an egg and upon expansion, blew off the top half by pressure leaving only flecks of white flesh decorate the top of the cap of some amanita species. In this one there are remnant flecks of white flesh upon the smooth white cap. Therefore an obvious caution; always dig below the substrate to see if the lower half of the egg is present.



Notice that the immediate past slide is also white and emerges from a white sack or egg and is a gilled fungus. It is an amanita just like the destroying angel is. However, we can observe that this amanita has scales affixed to both the cap and stem. It is also a different shade of white than the hot bright white of the angel. It will produce the same white spore print that the dangerous species does. The gills of both as a rule will extend from the edge of the cap and end just before hitting the stipe or central stalk; a condition called free gills. The edibility or toxicity of this last species, *Amanita rhopolepous*, is not currently known with certainty.



This slide demonstrates terrestrial stalked mushrooms can have ridges, striations, and other features on either the cap or stalk. There can also be the presence or absence of a ring just below the cap but on the stalk. This feature and its visible properties can also be helpful in determining what mushroom you have.

It is also helpful to observe what the mushroom is growing upon and what type of plants are companions. Many fungi have special niches within an ecosystem. Fruiting time is also important as you could eliminate species that would not be fruiting in your area at the time of your observations. Fruiting in reference to fungus refers to the production of a visible cap



Some gilled terrestrial fungi are quite small as are these members of the witch's hat group, the *Entoloma*. Often they have fragile pliable colorful caps with striations or lines, stems that are fragile and of similar color to the cap. They are known from a number of different habitats. These like associations with club mosses, true mosses, grasses and ferns. A number of species in this group prefer wet substrate. The hat reference is due to the conical pointed dome of the cap center giving some visual support for the commonly portrayed version of what a witch's hat should look like.



Unfortunately, common names lead to trouble. Here is a member of another genus of mushrooms that are also referred to by the common name of witch's hat. This is in the genus *Hygrophorus*



Not all cap or saucer like growth are fungi. These pixie cups are actually lichens, which are the combination of a blue-green algae and a fungus in a symbiotic relationship. The two partners create a completely new life form independent of either parent.

Lichens are thought to be indicators of clean ecosystems fairly free of pollutants because they are extremely vulnerable to pollution. Thus, the more lichens the better the apparent health of the observed ecosystem.



This image gives an idea how wide an array of shapes and colors there are in the lichens. We see the aforementioned pixie cups in green as well as the “British soldier” lichens sporting their bright red caps atop the same green stalks as the pixie cups.

For size notice how they run along right through and between the tiny hair cap moss plants making the lowest understory.



When it comes to identification, edibility, or even medicinal and herbal applications, not all things that many lay folks presume are fungi actually are. Here looks can be confusing. Many think this flowering plant called Indian Pipe, a saprophytic plant, *Monotropa uniflora*, is a fungus or just as incorrectly that it is a parasite. Having no chlorophyll it does not perform photosynthesis. Instead, it feeds off decaying vegetation taking what is needed that it can not gather via it's own roots. In effect it is on plant welfare sort of sponging off organic matter that is decomposing.



The next two slides demonstrate something puzzling for layfolks. The first picture is of a species of bolete, a large group of pored rather than gilled fungi. It is *Boletus rhodosanguineus*. It was found growing on the grassy meadow at Squire's Castle in the North Chagrin . The second slide will show one of these boletes completely engulfed in a white solid substance coating the entire cap as if it were a different species. This is a manifestation of a genus of mushrooms that attack other fungi. This attacking genus is the Hypomyces. This particular one specializes in attacking boletes.





As stated earlier, the last slide shows one of the pored fungi, *Boletus rhodosanguineus* under attack by another fungus. Various things attack fungus besides other fungus. Rusts, molds, and various infections as well as some of the critters enjoy a tasty mushroom just like most of us. Therefore, the altered appearance of a mushroom from what normal specimens present can be a misleading pathway away from correct identification.

In this picture, the bolete being attacked by a member of a group called Hypomyces viewed in isolation would give us an improper identification. Believe it or not, a couple of these are edible. One is colored like and is said to taste like seafood and is called the lobster mushroom.

THE PORED MUSHROOMS GROUPED UNDER THE BOLETE FAMILY

Underneath the cap of a terrestrial mushroom, some have a sponge-like surface with tiny openings called pores, rather than the curtain-like folds of tissue called gills that would otherwise descend from underneath the cap. Whether a mushroom is gilled or pored, the next generation of genetic material, the spores are created inside those structures.

In both group there are prized edible species. Some of the most highly desired are found within the pored group of mushrooms known collectively as the Boletes. A number have beautiful striking colors.

Some of the ways to identify species requires noticing how the flesh damages with age or stimulation; ie. Any color change. Another technique is to apply certain chemicals to the flesh to see color change reactions.



The beautiful color combinations of the last slide show off the pored mushroom in the bolete group called the two colored bolete. In boletes, flesh color changes due to cutting or bruising or the employment of chemical reagents can be helpful in determining identity. This is important if you are one of those gathering to eat.



The preceding slide shows that striking color combination of the Lilac-brown bolete. This was taken from the Columbia Run region in the Cuyahoga Valley National Park.

I'll guess most of you would turn up your nose at eating this specimen. Yet, despite appearance, this Old Man Of The Woods, *Strobilomyces floccopus*, is a highly prized edible within the bolete group.



Having caused you some concern with my last species, let me show you a more aesthetically pleasing one with a delightful cap that is as soft as any fine leather you have encountered. Meet the kid-skin bolete and it's cap feels just as the name implies.



We leave the boletes with one last species. This is Frost's bolete which is immediately identifiable by the red thick stem latticed with strings of tissue running up and down.



This slide is to demonstrate that ground dwelling creatures often feast upon the bounty of nature including the fungi. What is digestible or even delectable to the critters may not mean we can also follow suit. In fact, digestive systems vary greatly and it is myth to think that creature nibbles out of fungi mean the specimen is good for us to eat too. In fact, human digestion is so unique, what your sibling can eat may cause you problems.



Normally gem studded puffballs are edible for us; but would you like to follow whatever creatures were munching on these? Clean well my friends.



This mass of white tissue is the most common phase of what is known as the Aborted Entoloma, *Entoloma abortivus*, which believe it or not is a desired edible species. You will want to open one up and make sure it is marshmallow white throughout with no insects. I guess folks sauté it as one method of preparation.



The depicted dark stalks emerged from the earth like fingers from a dead man; hence, the common name of “Dead Man’s Fingers”, *Xylaria polymorpha*. They are in the ascomycete division of fungi. When young and fresh they are pure white. At that stage they are edible. They have flask shaped bodies holding their spores. As the flesh changes from white to dark colors, the spores become mature. Their group is one called pyrenomycetes which may not mean much to lay folks, but other group members sure do since they include: the source of Dutch elm disease, the chestnut blight and ergot; the latter a purple colored growth upon rye and other grains that caused the insanity outbreak during the middle ages in Europe as peasants black breads made from infected grains became the vehicle for the problem.



These are scarlet cup fungus, *Sarcoscypha coccinea*, has to be a visual hit with just about any observer. They hide in the rich deep leaf litter usually upon well rotted wood. They are seen early in spring, as is usual for many of the other highly sought after ascomycetes; mostly before the fruiting of the gilled fungi. Certainly these have to be among the most photogenic of the fungi.

Some other highly sought after ascomycetes that fruit in the spring are the morels.

This shot was taken at my secret site in the South Chagrin.



Coral, earth tongue, and other strap shaped fungi emerge as terrestrials from different substrates. Some like it very wet. Others prefer lots of dead, dying or otherwise decaying organic material. Often these are very colorful mushrooms. They are small and certainly not enough even in colonies to consider collecting as edibles, even if the species is. Enjoyment from an aesthetic standpoint of their fanciful shapes and growth patterns should be sufficient for our purposes. The next couple slides will give you a small sample.







White coral, *Ramariaiopsis kunzii*



This slide shows colorful orange lichens covering a limestone rock face from up north. This tells several stories. First lichens, the marriage of a blue-green algae and a fungus to form an independent new life form, are prolific in pristine ecosystems. Thus, the less polluted the more lichens we see.

Next, this life form is also a great recycler. It grows into little nooks and crannies and helps weather and breakdown into simpler substances.

Textures, growth patterns and even substrate preference all indicate what types of lichens we are looking at.



Not all coverings over rocks, fallen timber concrete, stone or other substrate are lichens, liverworts, mosses or non-fungi. Some very tiny closely packed coverings over substrate such as any type of garden mulch are actually fungi. One charming example is the very tiny little discs or saucers called splash cups. Among them, I particularly enjoy the bird's nest fungi type of splash cups. These little saucers in tawny colors contain rounded packets of spores. Raindrops falling into the cup splash out the spore packets which hopefully travel to a successful new home.



Laying upon a mossy substrate we see mushrooms, little tiny orange cups fringed with a rim of hairs looking up at us. Meet the eye-lash cups.





Geaster hygromaticus, the hygromatic earthstar fungus is a fascinating mushroom that lives on dunes and sandy blowouts in the Great lakes region. It has a rounded domed puffball spore storage container sitting atop what appear to be tentacles. During wet times, these tentacles swell and expand and hold aloft the water-tower spore storing container. This will have an opening at the top which when struck with water or debris will puff out spores when mature and the opening is ready. In dry times, everything shrivels up and the now spent structure tumbles like western tumbleweed across the sandy domain.

EAT ME

The next couple slides will show popular edible species. There is no easy way to determine what is edible and what is not. You must learn to observe and fully test out each potential specimen for edibility. This should include, especially for the novice, making a spore print to assure you are correct in identification. Dig deeply below one specimen at least if not all, to determine whether or not there is a tell-tale sack below the fruiting body. Do not mix species together. Try only a small portion of any species the first time. Do not rely on one lone specimen as you could have one lacking in some important trait or one that manifests unusual traits. Do not rely upon seeing bite marks made by critters. Their digestive systems are different than ours.

This mushroom is the half-free morel; named because the cap is attached to the stalk only half way up the stalk. In appearance, it is really a miniature version of larger cousins, the highly prized black as well as the yellow morels. The genus for the three mentioned is morchella. The half free morels would require a large quantity before they would qualify as a side dish or adequate addition to any meal.



Big brother to the half free; this is the highly prized collectible yellow morel, *Morchella esculenta*



These guys are very young and still tiny puffballs. When young and the interior is completely uniform as a pure marshmallow white texture and color, puffballs are edible. Once they begin turning dark, this conveys the maturing of the spores. The puffballs are no longer palatable. It is important to always cut open one specimen because you could have picked the immature button stage of an amanita. The halving of a puffball will reveal if you have an amanita which would appear as an outline of a mushroom embedded in the white flesh. This means the amanita has yet to burst off the top of the egg or universal veil.



These are in grass and center strips and are a close relative of the small white button mushrooms you buy in the grocery. It is in the genus *Agaricus*. The two species, the common field and the meadow mushroom. *Agaricus arvensis*, *Agaricus campestris*. They are highly collected for food.

When young, the gills are pink. With age they turn chocolate brown. The latter is also the color of their mature spore print.

Basic traits are: thick stiff white stem with or without a ring remnant. Texture of cap can have some color wash on the white as well as white tissue fragments; usually a bald uniform white cap prevails.



Honey mushrooms, the genus *Armillaria*, are common usually upon roots or downed wood. They are especially known as the killers of trees. An edible pair, their tell-tale black shoestring rhizomes permeate wood and eventually starve the host tree. The two most common are the ringed and ringless honey mushrooms; *Armillaria mellea* and *Armillaria tabescens*. This slide shows some young honey mushrooms in my front yard following a recent rain—they grew on roots of a departed maple.



Finally, one more edible species in the genus, *Coprinus*. These fascinating specimens auto-deliquesce. That is they turn from their mature fresh tawny colors into black tissue then liquid. The black liquid transports the spores along the substrate to a brand new home.

Depicted in the last slide is one of the larger species, the “Shaggy Mane” or “Lawyer’s wig”, *Coprinus comatus*. This is an edible widely collected species and one should look for it in our grassy center strips, tree lawns, and other grassy open spaces. They fruit in spring and again in autumn. They can be quite prolific.



Since the beginning of time man has sought mind-altering drugs. Fungi have played an important role in lending mankind their psychoactive chemical compounds for vision quests and other mind-altering ventures. The previous slide gives but one example of a fungus that provides just such an out of body or mind altering condition. We see a past prime Big Laughing Gym, the common name for a species that inebriates and causes a hysterical condition. From the police blotter, here is an anecdote about three elderly ladies in Texas who caused quite a stir.



Early in man's recorded history, mind-altering drugs were employed to achieve visions or contact with spirits or some other world. The handsome bright orange cap (in our region) liberally sprinkled with white flesh, free gills, stout white stem and spore print, emergent from an egg, all point to the fly agaric mushroom, *Amanita muscaria*. This mushroom has chemical compounds that produce the desired effects. We previously covered the references in Lewis Carroll's "Alice in Wonderland" as well as the mystical works of the Mad Russian Monk, Rasputin. Many other references are known such as the possibility of this being the ancient Soma, the practices of northern people using these compounds for mind alteration as well as attracting animals that use the fungus, and many more.



Finally, what would fall be without a mushroom bearing a name and color scheme of a late fall holiday we call Halloween. Meet *Omphalotus illudens*, the Jack O Lantern mushroom.



Real close up the Jack O Lantern has the interesting feature of liquid appearing up and down the stem. Happy collecting or observing everyone.



**THIS FUNGI PRESENTATION BY
TOM SAMPLINER
FREELANCE NATURE GUIDE**

Tom may be contacted for slide shows, classes, local nature walks, articles, photographic prints up to poster sizes, and extended nature trips throughout: North, Central and South America.

tomsam2651@hotmail.com

216-371-4454