

## MUSHROOM IDENTIFICATION WORKSHOP FUNGI – PARTICULARLY MUSHROOMS

It is estimated that there are 100,000 or so various fungi, worldwide. Most of the mushrooms to be encountered in this workshop will most likely be the gilled type. This means a series of gills or spokes will characterize the underside of the cap. This series of mushrooms are referred to as Basidiomycetes. Mushrooms which you may recognize from the grocery store that fall into this category include: shitake, oyster, portobello, crimini and the ubiquitous white button mushroom. Though these are all classified as basidiomycetes, shitake has the name: *Lentinus edodes*, the oyster mushroom the name *Pleurotus ostreatus*, while the portobello, crimini and white button all fall under the *Agaricus* genus.

Other mushrooms bearing spores on an ascus, usually cylindrical, include the cups, ears, peziza, helvella, and both the false and the delightfully edible true morel mushroom. Still others bear their spores within tubes or holes in a spongy mass. These are referred to as polypores such as porcini or *Boletus*, *Leccinum* and *Suillus*.

Mushrooms, often called members of the third kingdom have some evocative names as:

- The train wrecker, (*Lentinus lepideus*)
- The sickener, (*Russula emetica*)
- The corpse finder, (*Hebeloma seriense*)
- Imperial cat, (*Catathelesma imperialis*)
- The deceiver, (*Laccaria lacata*) aka the hoax fungus.
- Destroying angel. (*Amanita virosa*)

Other popular names, perhaps less challenging to the imagination include: goats foot, the sheep polypore, black trumpet, hen-of-the-woods, coral, and velvet foot.

### SEVERAL WORDS OF ADVICE

When looking for mushrooms, a quote from a SETI investigator may be appropriate:

**“ABSENCE OF EVIDENCE DOES NOT MEAN EVIDENCE OF ABSENCE”.**

Mushrooms are seasonal, tend to like particular locations and altitudes and furthermore are perverse and do what they damn well please.

Do not trust any one mushroom book. One book may declare a mushroom edible, one non-edible, yet another will say edibility unknown, still another may say suspect or even poisonous.

The first thing you wish to know about a mushroom is usually the last thing you find out about the mushroom..

## MUSHROOM IDENTIFICATION CHECKLIST

For proper identification it is essential that a mushroom be carefully removed or dug out and not be broken off. This is especially true of mushrooms growing in earth. Mis-identification can readily occur when all of the mushroom is not available for inspection. So before disturbing the mushroom ask:

<u>WHERE IS IT GROWING?</u>	<u>WHAT IS ITS SHAPE?</u>	<u>WHAT IS ITS SIZE</u>
<input type="checkbox"/> in grass	<input type="checkbox"/> flat	<input type="checkbox"/> cap diameter
<input type="checkbox"/> in leaves	<input type="checkbox"/> convex	<input type="checkbox"/> cap thickness
<input type="checkbox"/> on earth	<input type="checkbox"/> concave	<input type="checkbox"/> stem diameter
<input type="checkbox"/> on wood	<input type="checkbox"/> umbonate	<input type="checkbox"/> stem length
<input type="checkbox"/> on fallen cone, _____ type?	<input type="checkbox"/> conical	<input type="checkbox"/> puffball diam
<input type="checkbox"/> on tree live dead type?	<input type="checkbox"/> coral/antler	
<input type="checkbox"/> on dung _____ kind?	<input type="checkbox"/> club	
<input type="checkbox"/> on a carcass _____ kind?	<input type="checkbox"/> phallic	
<input type="checkbox"/> on another mushroom	<input type="checkbox"/> ball, _____ fan, _____ trumpet	
<input type="checkbox"/> at what altitude?	<input type="checkbox"/> cup, _____ ear, _____ star	
<u>COLOR OF CAP(PILEUS)</u>	<u>CAP CHARACTERISTICS</u>	<u>IS STEM (STIPE)</u>
<input type="checkbox"/> white	<input type="checkbox"/> smooth	<input type="checkbox"/> straight
<input type="checkbox"/> cream	<input type="checkbox"/> hairy	<input type="checkbox"/> cupped at base
<input type="checkbox"/> tan	<input type="checkbox"/> scaly	<input type="checkbox"/> bulbous/clavate
<input type="checkbox"/> pink	<input type="checkbox"/> cracked	<input type="checkbox"/> tapered
<input type="checkbox"/> red	<input type="checkbox"/> worted	<input type="checkbox"/> ringed
<input type="checkbox"/> orange	<input type="checkbox"/> shiny/varnished	<input type="checkbox"/> rooted
<input type="checkbox"/> yellow	<input type="checkbox"/> slimy	<input type="checkbox"/> hollow
<input type="checkbox"/> green	<input type="checkbox"/> brainlike/folded	<input type="checkbox"/> solid
<input type="checkbox"/> blue	<input type="checkbox"/> chambered	<input type="checkbox"/> fibrous
<input type="checkbox"/> purple	<input type="checkbox"/> sinuate edged	<input type="checkbox"/> hairy/scaly
<input type="checkbox"/> hairy/scaly	<input type="checkbox"/> tough	<input type="checkbox"/> tough
<input type="checkbox"/> black	<input type="checkbox"/> fragile/crumbly	<input type="checkbox"/> fragile
<input type="checkbox"/> other		

IF A GILLED MUSHROOM ARE GILLS      DOES IT HAVE AN ODOR LIKE

- adnate (broadly attached)
- adnexed (narrowly attached)
- free (not attached at stem)
- notched (indented at stem)
- sinuate (curved, sinusoidal)
- decurrent (gills run down stem)
- distant
- close
- crowded

- anise/licorice
- apples     apricots
- coconut     tangerine
- cabbage     fresh/rotton
- meal/farinaceous
- seafood/lobster/crabmeat
- rotting flesh/sewer gas
- mice     phenol

DOES UNDERSIDE LOOK LIKE

- a wheel with spokes (gills)
- a sponge (pores or tubes)
- a series of teeth or spines
- a smooth to rough surface with none of the above characteristics

WHAT COLOR IS UNDERSIDE?

- white to cream
- yellow to orange
- pink to red
- green     blue     violet
- brown     gray     black

DOES THE MUSHROOM

(cap or stem) BRUISE

- red
- yellow
- green
- blue
- brown
- gray
- black

WHAT COLOR IS SPORE PRINT?

- white to cream
- pinkish to red
- ochre to clay
- rust to brown
- green
- purple to black
- black turning to ink

Botanists and mycologists use the hierarchical classification which goes:

**CLASSES, ORDERS, FAMILIES, GENERA, SPECIES.** The common practice is to give mushrooms two Latin names; the first applies to the genus, the second to the species.

These mushroom characteristics are about as far as identification can proceed in the field. It is usually possible to define the mushroom as to genus, however even experts may disagree on the particular species within a genus. Further determination can include microscopic analysis of spore color, size and shape and color reaction of the mushroom to particular chemical reagents.

## MUSHROOM RECIPES

It is recommended that mushrooms be cooked before eating them. To quote Andrew Weil, M.D. a holistic physician and botanist/mycologist:

**"COOKING BREAKS DOWN THE MUSHROOM CELL WALLS"**

**"COOKING BREAKS DOWN ANTI-ENZYMES"**

**"MUSHROOMS TASTE BETTER WHEN COOKED"**

### STUFFED MUSHROOM CAPS

About 12 to 20 small button mushroom caps, (Agaricus, Shitake, edible Russula), one half cup of goat cheese, one half cup grated crabmeat, dill tarragon, dry sherry.

Mix equal parts goat cheese and crabmeat, add about ½ teaspoon dill and tarragon add dry sherry as needed to make mixture cling together. Scrape out gills from cap and fill inverted caps with mixture. Brush with olive oil and dust with grated romano cheese. Broil on cookie sheet til browned and cheese has softened, about 5 minutes. Serve hot.

### MORE STUFFED MUSHROOM CAPS

Six to eight medium sized portobello, shitake or agaricus with stems removed.

Half cup grated swiss or sharp cheddar cheese.

¼ cup chopped walnuts, ¼ cup peeled & chopped granny smith apple.

¼ cup chopped lean bacon sauteed crisply, and drained (optional addition).

Dry sherry, nutmeg or mace.

Mix all ingredients, adding about a pinch or two of nutmeg and dry sherry as needed to make ingredients cling, then pack into the inverted mushroom caps. Place on cookie sheet under broiler until cheese melts and ingredients are hot; about 5 minutes or so, then serve hot.

### BOLETUS MUSROOM PATE

2 cups Boletus edulis mushrooms slices, sauteed in butter til soft, then drained.  
¼ to ½ cup shallots chopped.  
4 or 5 cloves garlic, dry sherry, Romano cheese, Hungarian paprika.

In food processor or blender, blend ingredients. If too dry add sherry, if too liquid add grated Romano cheese as required to obtain a pourable thick paste. Remove from blender to soufflé or pate' cups. Dust with paprika and chill for several hours, Serve with toast points or crackers

### A FEAST FOR IRISH UNITY

Orange chanterelles and green pasta

Two dozen golden chanterelles (*Cantherellus cibarius*)  
½ cup chopped walnuts  
1 cup mascarpone cheese, cream fraise or sour cream  
½ cup chopped green onions  
Green pasta, (spinach or artichoke angel hair pasta) for 3 to 4 servings  
Dill weed, nutmeg for sprinkling over each portion before serving

Brush dirt from chanterelles, slice in half and place in frying pan over low to medium heat. The hydrophylic chanterelles' excess moisture will be driven off by the heat.

When moisture has evaporated, reduce heat and add chopped walnuts, green onions and the mascarpone cheese or cream fraise or sour cream. Stir and cook slowly until the chanterelles are softened and mixture is warmed throughout. reduce heat to warm, while cooking pasta in boiling water to an al dente texture. Remove pasta, drain and portion to plates. Ladle chanterelle mixture over pasta and serve hot.

## PUMPKIN AND SHITAKE MUSHROOM SOUP

(Halloween Special)

- One medium pumpkin with seeds & pulp discarded.
- One cup chopped onions.
- Two cups dried Shitake mushrooms.
- 1 teaspoon dill weed, ½ teaspoon nutmeg or mace.
- Six or more cloves garlic cut sliced or pressed.
- ½ cup dry white wine, ¼ cup dry sherry.
- 2 cups chicken broth, two tablespoons butter, sour cream for garnish.

Place chunked pumpkin in large pot with about a quart of water. Boil until pumpkin is soft enough that the normally tough skin can be peeled away. Run chunks through food processor or blender. Place pumpkin, chicken stock dry white wine and mushrooms in crockpot and cook for several hours, stirring occasionally. Add the chopped onions, dill, garlic, butter, nutmeg and continue cooking until satisfied with the flavor and texture. Add the dry sherry and serve in black bowls with a dollop of sour cream floating on top.

## ART'S BOLETUS EDULIS SOUP

- 3 cups chicken stock, 3 cups fresh Boletes or 1 and ½ cups dried.
- 1 cup good dry white wine, (Chardonnay, Semillon, Viognier).
- 1 teaspoon dried dill weed.
- 1 teaspoon dried rosemary, crushed.
- ¼ teaspoon nutmeg.
- 5 or so garlic cloves pressed.
- 1 medium yellow or white onion chopped.
- ½ cup cream or half & half.

In crockpot combine chicken stock, boletes, onions, herbs. Simmer for a few hours on low, stirring occasionally. Taste to desired result. If soup is too thin, remove top and simmer to evaporate more moisture. If desired, add cream or half and half, simmer a bit longer before serving.

## CHICKEN STOCK

Obtain a whole chicken broiler or fryer. Dissect and place in stock pot, skin intact, with water. Simmer on low heat until skin tends to separate from meat. Remove large pieces, breast, thighs, and legs. Remove skin from large pieces and return skin to pot. With carcass, skin and bones in pot continue simmering on low heat for a few hours. Remove bones and skin from pot and chill stock overnight. When stock has gelled, remove chicken fat from top and use remaining stock for soups. The unused stock may be frozen for a few weeks.

AEJ,MIDWS

## **MUSHROOM GROUPS TO AVOID**

- Never eat a white-capped mushroom that hasn't been absolutely positively identified. Some, such as *Amanita virosa*, are deadly.
- Be careful in identifying mushrooms with a ring on the stalk. Some are deadly (*Amanita*); some are delicious (*Agaricus campestris*).
- Avoid little brown mushrooms. They are difficult to identify, poorly known, and often poisonous.
- Be careful to check the base of the stalk (dig it up, don't break it off). Deadly *Amanita* species have a sac-like cup at the base.
- Carefully identify mushrooms that have warts, scales, or patches on the cap. Some are edible, some are poisonous.
- Be careful of mushrooms with a swollen stalk base. Some could be poisonous species of *Amanita*.
- Avoid all mushrooms with saddle shaped caps (*Helvella*) or brain-like to irregularly lobed caps (*Gyromitra*).
- Cut all puffballs in half. Eat only those that are pure white and undifferentiated inside. A deadly *Amanita* button can look like a puffball on the outside but it will have the outline of a little mushroom on the inside.
- Avoid *Boletus* species with blue stain or red pore mouths until you know how to identify them.
- These broad guidelines will exclude a few edible species but that is better than suffering or death.

## WHERE DO WE GO FROM HERE??

OK, so we've found a mushroom. We have clues as to its habitat, its appearance, its aroma, etc. We even did a spore print. David Arora in his book, "Mushrooms Demystified" provides the following key for particular mushrooms. In this case, the family of Strophariaceae is depicted. The pages referred to are corresponding pages in the book, Mushrooms Demystified. Many mushroom books rely on such keys to key out a particular genus and species of mushroom.

### KEY TO THE STROPHARIACEA

- Spore print dull brown to cinnamon brown or rusty brown.....Pholiota, pg 384*
1. *Spore print purple-brown, to purple-gray, purple-black or black* ..... 2
  2. *Lower portion of stalk and/or other parts of fruiting body bruise blue or green when handled (though sometimes slowly)..... Psilocybe, pg 368*
  2. *Not as above, but cap may be blue or blue-green to begin with.....3*
  3. *Growing on dung or manure.....4*
  3. *Not as above, but may grow in grass.....6*
  4. *Cap white to yellow, yellow-brown, or pale tan.....5*
  4. *Cap darker (orange-brown to reddish-brown, grayish-brown, dark brown).....5*  
*Psilocybe, pg 368*
  5. *Spore print black: cap white to buff or very pale tan..... Panaeolus, pg 353*
  5. *Spore print purple-brown to purple-black: cap usually yellowish or darker,.....8*  
*Stropharia, pg 374*
  6. *Veil membranous or cottony-membranous, usually forming a distinct ring (annulus) on stalk.....Stropharia, pg 374*
  6. *Veil absent, or if present then fibrillose and disappearing or merely forming a fibrillose zone on stalk which may be darkened by falling spores.....7*
  7. *Cap small, usually less than 4 cm, viscid when moist, some shade of brown, gray, dull olive, buff, or if whitish, then conical or bell shaped.....Psilocybe, pg 368*
  7. *Not as above: cap white or brightly colored (yellow, red, green, etc) or if dull colored, then not viscid even when wet: cap usually 2 cm broad or more.....8*
  8. *Cap viscid or slimy when moist: veil present when young: growing solitary to scattered or gregarious, but not usually clustered.....Stropharia, pg 374*
  8. *Cap usually not viscid; veil absent or present: often, but not always growing in tufts or clusters.....Noematoloma, pg 381*

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- A Field Guide to Western Mushrooms*, Alexander Smith, (1975) Univ. of Michigan Press, Ann Arbor.
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- All That The Rain Promises and More*, David Arora, Ten speed Press, Berkeley, California
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- The Alpine Plants of China*, Zhang Jingwei, Science Press, Beijing, China, Gordon & Breach, New York
- A Handbook of Mushrooms*, A. Pilat & O. Usak, Spring Books, London, NW-5

## Selected Links to Fungi Web Sites

**North Idaho Mushroom Association:** <http://www.nicon.org/nima/>

**Fungus of the Month:** [http://botit.botany.wisc.edu/toms\\_fungi.html](http://botit.botany.wisc.edu/toms_fungi.html)

**Muller Web Site, Germany:** <http://www.pilzepilze.de>

**Poison Mushrooms:**

[http://wellness.ucdavis.edu/safety\\_info/poison\\_prevention/poison\\_book/mushroom.html](http://wellness.ucdavis.edu/safety_info/poison_prevention/poison_book/mushroom.html)

**Mushroom Toxins:** [http://www.cfsan.fda.gov/\\_mowchop40.html](http://www.cfsan.fda.gov/_mowchop40.html)

**Self Healing:** [www.drweil.com](http://www.drweil.com)

**Fungi Pictures:** <http://www.nrm.se/kbo/saml/fries/a/agaaen.html.en>

**Microfungi of Costa Rica:** <http://www.nybg.org/bsci/res/hall/main.html>  
<http://aolsearch.aol.com/dirsearch.adp?knf=1&query=fungi%2c%20costa%20rica>

**Foreign Language Index:**

[http://gmr.landfood.unimelb.edu.au/plantnames/sorting/mushrooms\\_intro.html](http://gmr.landfood.unimelb.edu.au/plantnames/sorting/mushrooms_intro.html)

**Fungi Fotos:** <http://www.chilton.u-net.com/fungi.htm>

**Morels:** <http://www.bright.net/~wildwood/>

**North American Mushroom Basics:** <http://members.aol.com/xerula/basics.html>

**Natural Perspectives:** <http://www.perspective.com/nature/fungi/index.html>

**Matusuke:** [http://www.matsiman.com/booklet/matsutake\\_mushroomhandout.htm](http://www.matsiman.com/booklet/matsutake_mushroomhandout.htm)

**Medicinal Mushrooms/Growing supplies:** [www.fungiperfecti.com](http://www.fungiperfecti.com)

**Telluride Mushroom Festival** [www.shroomfestival.com](http://www.shroomfestival.com)

**Tom Volk's Fungus of the Month** [http://botit.botany.wisc.edu/toms\\_fungi.html](http://botit.botany.wisc.edu/toms_fungi.html)

**Tom Volk home page** [TomVolkfungi.net](http://TomVolkfungi.net)