



MCG NEWS

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MUSHROOM CLUB OF GEORGIA

www.gamushroomclub.org

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GENERAL CLUB MEETINGS

Date: Second Wednesday of each month

Location: North Fulton Annex Building

7741 Roswell Road

Atlanta, GA 30350

Time: 6:30 PM Social

7:00 PM Meeting

PRESIDENT'S MESSAGE

By Mary Woehrel, MCG Member

This spring has been a time of FIRST'S for the Mushroom Club of Georgia! For the first time, we offered two mushroom cultivation workshops (thanks to Jean Reber), bringing Tradd Cotter from South Carolina to present them and learning that our club and the city of Atlanta are eager to learn how to grow mushrooms.

We had our first two meetings in a new location (7741 Roswell Road, Sandy Springs, GA 30350, the Annex Building next to Big Trees).

A major first was that we got two permits (thanks to Gerald Gillette and Lee Eltbroth) to study mushrooms in state parks and in federally administered land in the Chattahoochee Recreation Area!

Our first walk in a state park was well attended and we found morels! We made arrangements to hold our first joint Fall Foray with the Asheville Mushroom Club (on September 5 and 6 at Oconee State Park). And we are planning our first ever truffle hunt (Date and location to be announced)!

It's obvious that the Mushroom Club of Georgia is a dynamic club, forging new ground and expanding its territory. We hope you will continue to enjoy the many benefits of membership.

The end of March was the cut-off date for renewing last year's membership unless you renewed in Sept, Oct, Nov or Dec. If you haven't renewed your membership, now is the time to do so in order to continue to receive our newsletter. As one of our amazed club members said recently, "You never know where mushrooms will take you!" Come along as we discover more about what mushrooms can do and what you can do with mushrooms!



ASHEVILLE MUSHROOM CLUB NOTICE OF EVENTS

Place a note on your mushrooming calendar. These events are in response to our members' request for more opportunities for an in-depth study of particular fungi.

Saturday, July 26:

An all day Workshop (foray in the morning) is scheduled with mycologist, Andy Methven (focus on Lactarius) and Jay Justice (focus on bolete) at Pink Beds in Pisgah Forest.

Saturday, October 4:

An all day Workshop is scheduled with mycologist, Coleman McCleneghan at Warren Wilson College.



MUSHROOM CLUB OF GEORGIA 2008 SCHEDULED WALKS JUNE AND JULY

By Suzanne Rief, MCG Member

June 14th at 10am

John Ripley Forbes Big Trees Forest Preserve
Sandy Springs, GA 30350
<http://www.bigtreesforest.com/visit.htm>
Leader: David Dunagan

July 12th at 10am

Bells Ferry Park
2334 Bells Ferry Road
Marietta, GA 30066
Leader: Suzanne Rief

Directions:

Take I-75 North to GA. 268. Take Barrett Parkway Exit 1. Turn right onto Ernest Barrett Parkway. Go to 1st major intersection and turn right onto Bells Ferry Rd. Turn Left into the Park. Drive to the end, past ball fields on the right, and into the parking lot on the left.

July 26th at 10am

George Pierce Park

Leader: Teresa Fortenberry

Directions:

Take I-85 north to Exit 111. Turn left onto Lawrenceville Suwanee Road to Buford Highway. Turn right on Buford Highway to George Pierce Park. Go to sign and turn right into parking lot.



NOTICE: CHANGE OF DATE!

FALL FORAY OCONEE STATE PARK MOUNTAIN REST SOUTH CAROLINA SEPTEMBER 5 & 6, 2008

There's been a change of date for the Oconee State Park Joint Foray weekend with the Mushroom Club of Georgia and the Asheville Mushroom Club to Sept. 5 & 6, 2008. It will be at Oconee State Park in Mountain Rest, South Carolina. This is our chance to have a great time at reasonable prices while learning from our fellow mushroomers in Asheville who have been doing this for decades! Oconee State Park is near Mountain Rest, SC.

Dr. Coleman McCleneghan will be participating to help with the foray, and ID our finds. On Saturday evening her program will be "Mushrooms in the Southern Appalachians". Why are the Southern Appalachians so rich in fungal diversity? Who were Coker and Ravenel? Why are their names on so many southern fungi? This presentation will explore the rich mycological history in the Southern Appalachians in addition to learning about the mushrooms of this area". We will also be able to enjoy fellowship with our famous "pot-luck" that evening.

We have been successful in reserving a block of 13 cabins, some of which have a higher

capacity, so please consider sharing the cabin and the cost. The cabin reservations are being held ONLY until May 8th, and are listed under Jackie Schieb 828-658-8120.

There are also nice campsites available (which are not being held at this time) at the park if you prefer to camp. To make a reservation for a cabin or a campsite, you'll need to call Oconee state park 864-638-5353.

We have also reserved the barracks building, which has 2 bathrooms, and a max sleeping capacity of 16 - the total charge for that facility for 2 nights is \$339 a very economical choice - with just 8 people sharing the barracks it works out to only \$42.38 per person for two nights.

To reserve your spot in the barracks, any AMC member can email Jackie Schieb at bjshyb@gmail.com, and MCG members can email Jean Reber at jeanreber@bellsouth.net. Please let us know of your interest in a spot/spots in the barracks no later than May 8.

Mushroom Club of Georgia members are welcome to call Jean at 770-840-7409 with any additional questions.

Directions are available on the Oconee State Park website:
<http://www.southcarolinaparks.com/park-finder/state-park/750/lodging.aspx>.



MAKE ROOM FOR MUSHROOMS

Wellness Letter
University of California, Berkley
August 2007

Although mushrooms are fungi-neither plant nor animal - they are usually regarded as vegetables and count toward your nine-a-day fruit and vegetable goal. The most common ones are button mushrooms (*Agaricus bisporus*) but specialty mushrooms - chanterelles, enoki, maitake, oyster, and shitake, for example-are increasingly available and affordable, thanks to year-round indoor cultivation.

The best reason to eat mushrooms is for their flavor, which becomes especially savory when

they are cooked. Call umami, and considered the "fifth taste," the flavor comes from glutamic acid, a natural version of the flavor enhancer monosodium glutamate (MSG). But mushrooms are also an overlooked source of nutrients, including B vitamins, copper, iron, potassium, and selenium. They have some fiber too, including cholesterol-lowering beta glucan, yet few calories and virtually no fat or sodium. Fresh cremini (brown button) and portobello (fully grown cremini) mushrooms are similar nutritionally to white button mushrooms but have more flavor. Canned mushrooms, however, lose some nutrients in processing.

Some mushrooms, particularly those with a long history of use in Asia, are thought to have medicinal qualities due to their polysaccharides and other compounds. Shiitake and maitake mushrooms, for example, have shown immune-boosting and anti-tumor activity in lab studies, and white button mushrooms appear to inhibit the activity of enzymes implicated in breast and prostate cancer. It's questionable how much benefit you get simply by eating mushrooms-or by taking capsules of mushroom extract, sold as dietary supplements-but scientists are isolating mushroom compounds for potential use as medicines.

On the other hand, like all plant foods, raw mushrooms also contain natural substances that may have adverse effects. Some mushrooms are of course, poisonous. But even the hydrazines in white button mushrooms can, in large amounts, cause cancer in lab animals. While most people don't eat enough raw mushrooms for this to be a problem, if you do eat mushrooms often or in large amounts, eat them cooked, since cooking destroys the substances (as does drying).

Some rules to follow for raw and cooked mushrooms:

- Unless you are an expert, don't eat mushrooms you find in the wild-it's easy to confuse a highly toxic wild mushroom with an edible one.
- Refrigerate mushrooms in a paper bag or container that allows air to circulate (a plastic bag speeds deterioration). Don't wash them before storing and use them as soon as possible. Dried mushrooms keep up to six months in a cool, dark place, and almost indefinitely if stored in the refrigerator

or freezer wrapped in plastic or in a tightly closed jar.

- When ready to use, wipe mushrooms gently with a damp cloth or soft brush, or wash them quickly under running water; don't soak them. Trim stems if they are woody.
- Cook mushrooms in a little olive oil, water, or broth (you can use the flavorful liquid they yield in a sauce) or broil or grill them. A whole grilled portobello is a meaty substitute for a beef burger. Small amounts of dried mushrooms reconstituted in hot water, add concentrated flavor to soups, stews, and sauces.



MUSHROOM NEWS FROM THE PAST

By E. Lee Eltzroth, MCG Member
(Marietta, GA. Journal 24 May 1912)

Fortune from Mushrooms

To prove his theory preached from the pulpit that success depends on a man's efforts, a Kansas City clergyman has developed a mushroom bed from which he derives an income of \$35 a day. Six years ago the divine began experimenting. Finding an abandoned street railway tunnel with the exact conditions required, he "borrowed" it for experimenting. The tunnel contains 50,000 square feet, every inch of which is utilized. The mushroom bed yielded beyond his hopes. In six months of the year the clergyman has sold an average of from 30 to 100 pounds of the product a day to local hotels at 65 cents a pound.



EASY EDIBLES: OTHER BOLETES

By Bob Sommer

Mushroom the Journal, Fall 2007

(Ed. Note: A humorous look at Kings, Queens, and Princes of the Fungal Kingdom.)

I'm not saying The King is dead, as any suggestion of regicide might cause panic. I can confirm that the King still squats firmly on this throne when it comes to edible and tasty boletes. His stout bulbous base and distinctive smooth cap are marks of royalty. My concern relates to future succession. We should consider the situation if something untoward happened to the King (*Boletus edulis*). This is a Queen Bolete (*Boletus aereus*) but The Prince (*Agaricus augustus*) is in another genus and there aren't any Dukes, Counts, or even Lords available in the Fungal Kingdom. For reasons not well understood, we have a relatively small court. If The Prince became next in succession, we could be eating *Agaricuses* (awkward word; too many syllables) instead of boletes, and not everybody likes the flavor of almond extract. Remember the Hapsburgs? No one talks about them any more. The Fungal Kingdom has a vulnerable royal family and they can get really buggy, perhaps the result of too much inbreeding.

I want to identify legitimate alternatives to The King within the royal family. You probably have encountered them already if you have purchased dried porcini. Identity theft is not unknown among commercial foragers and wholesalers. My opinion of the family resemblance among boletes is supported by the concerted actions of bugs everywhere, who are attracted to all members of the group. If larva doesn't make distinctions between *B. edulis* and *B. appendiculatus*, should you? To obtain your protein on the cheap, eat boletes without looking at the underside for telltale pinholes that are larva tunnels. I never heard of anyone made ill by well-cooked bolete bugs but this isn't aristocratic cuisine, especially from an aesthetic standpoint.

Bugs and people are not the only ones feasting on boletes. The mould *Hypomyces chrysospermum* parasitizes boletes, turning the stout caps into a yellow or white powdery mess. Unlike its cousin, the prized red-orange Lobster Mushroom (*H. lactifluorum*), this mould is inedible and possibly poisonous, so if a yellow/white crust has arrived on the scene before you, look for specimens clad in more natural raiment.

There are too many good edible Boletaceae to attempt to describe the characteristics of each in detail. They are placed in different genera, a splitters dream; besides boletus, Arora ("Mushrooms Demystified") cites

MUSHROOM LOOK-A-LIKES: AGARICUS SPECIES

By Dan Willis, MCG Member

Austroboletus, *Boletellus*, *Boletinellus*, *Boletinus*, *Fuscoboletus*, *Gastroboletus*, *Gyrodon*, *Gyroporus*, *Leccinum*, *Pulveroboletus*, *Strobilomyces*, *Suillus*, and *Tylopilus*. Edibility can differ between Europe and North America. Their distinctive shapes and multicolored hues make them attractive painter's models, much more interesting to sketch than a white *Russula*, for example. I am especially taken with the *Boletus* paintings in Williamsom's celebratory "Reflections on the Fungaloids."

Many of you don't think of *Suillus* as royalty. I understand the reasons for this rejection, as *suilline* means "pertaining to a hog," but of course porcini comes from a word meaning, "pig" and the first American *Boletus* was identified by von Schweinitz in 1822. The swine are all related, although the *Suilli* are considered deficient in finesse and taste. Some courtiers even describe them as slimy and watery. These rabbles are likely to procreate abundantly, a negative sign for an aristocracy. Yet when better or butter *Boletes* are unavailable, I would not hesitate to knight a young *Suillus*, especially if he is firm and unblemished.

Earlier writers attempted to classify boletes by "stuffing." I won't try to explain what or where, other than to quote Coker and Beers' magisterial "The Boleti of North Carolina": "This appearance of being stuffed is further complicated by the fact that often in youth the mouths are so tightly folded together as to obscure the openings and appear stuffed."

In my opinion, boletes are better dried than fried or when sautéed fresh. Drying intensifies the flavor, eliminating the watery texture. (BOLETES FOR DUMMIES: You have to empty the water after the dried mushroom has been reconstituted; otherwise it too will taste watery. Reduce the flavored water down by heating and use it as addition to soups.) With the exception of those with red pores such as *B. Satanus* (whose name alone is scary), or those with an obvious bitter taste (*Tylopilus felleus*), most pored mushrooms are safe to eat, although the fundamental rule prevails of eating only a small amount the first tasting of an unfamiliar species.



In both photographs, the one the left is *Agaricus xanthodermus* (cap and stalk base staining yellow with a phenolic odor); the one in the center is *A. campestris* (tapering stalk with a pleasant odor); and the one on the right is *A. arvensis* (cap has yellowish center disc with an almond or anise odor). You'll need smell-a-vision on your computer to detect the odors.

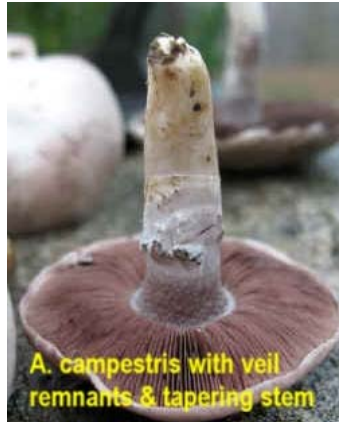
The genus *Agaricus* is very large and includes more than 100 species. The key to the genus is the spore print that can vary from chocolate-brown to purplish-brown or blackish-brown. They all have a central stalk that easily separates from the cap. They have gills that are free from the stalk or nearly so. Some are

edible, others have unknown edibility, and some are poisonous. Some are easily identified while others are very difficult to identify. A spore print is one of the essential identifying criteria.

Agaricus campestris (Linnaeus: Fries)

Common Name: Meadow Mushroom, Common Field Mushroom, Pink Bottom, Agaric champêtre, Feldegerling, Rosé de prés, Weisenchampignon

The Meadow Mushroom, *A. campestris*, is the universal favorite mushroom recognized throughout the States. It occasionally can be found in the spring but mostly in late summer and early fall. It resembles the



A. campestris with veil remnants & tapering stem

champignon of France which is similar to our store-bought button mushroom *Agaricus bisporus*. The Meadow Mushroom has the consistency of the commercially grown button mushroom with the taste of the large brown variety sold as portobello mushrooms. *A. campestris* has more moisture and a softer flesh than the commercially grown variety but compensates with a richer flavor. A mature Meadow Mushroom has brown gills while the buttons have pink gills. It does not stain bright yellow when bruised nor smell of phenolic or creosote like the toxic Yellow-Staining Agarics (*A. xanthodermus*) or have the odor of almond or anise like the edible Horse Mushroom (*A. arvensis*).

Caution: Do not confuse the Meadow Mushroom with the white and deadly destroying angels, *Amanita virosa*, that has white gills, white spores, and a volva at the base. Do not confuse the Meadow Mushroom with the poisonous *Chlorophyllum molybdites* that can grow in fairy rings in lawns and pastures. It has buff colored scales in the center of the cap, a movable ring on the stalk, and greenish spores. Avoid the questionable *Leucoagaricus naucinus* that is an all white mushroom with white gills and spores and a moveable ring on the stalk.

Cap Width: 1-4 inches

Stalk Height: Up to 3 inches

Cap: Convex to broadly convex and then flat; white to off-white to grayish brown with age; smooth or glossy or somewhat scaly.

Flesh: Firm, whitish to pale pink; odor slightly of anise; taste of 'mushrooms.'

Underside (Fertile surface): Gills free from the stalk; pink at first becoming dark chocolate-brown with age.

Stalk: Firm, white; short, stout; smooth surface above the veil; partial veil leaving a fragile and sometimes indistinct ring on the upper stalk that may disappear with age.

Spore Color: Chocolate brown.

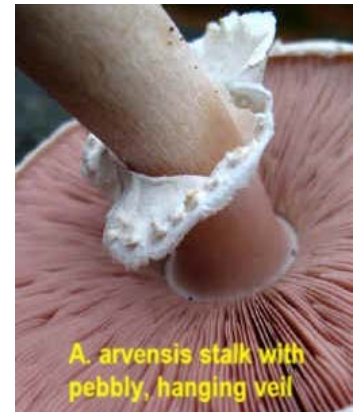
Habitat: Saprobic; a grassland species (*campestris* = 'of the field'); grows in fairy rings or arcs in lawns, pastures, meadows, and golf courses but can also be found solitary; summer but most abundant in fall during cooler weather, sometimes in spring; common.

Edibility: Edible and choice both raw and cooked.

Agaricus arvensis (Schaeffer: Secretan)

Common Name: Horse Mushroom, Anischampignon, Agaric des jachères, Boule de neige.

A. arvensis is a pure white mushroom with chocolate-brown spores, commonly known as the Horse Mushroom. It is often found near stables and in meadows where it may form fairy rings. It has a delicious



A. arvensis stalk with pebbly, hanging veil

rich flavor that some say falls between portobellos and sweet almond. The cap of *A. arvensis* will stain slightly yellow but the base of the stem does not stain yellow like its emetic cousins.

Caution: Be very careful not to confuse this mushroom with *Amanita virosa* that can kill you so be sure to check the base to make sure it has no volva and that the gills are not white with white spores. It can also be confused with *A. xanthodermis* that smells acrid (phenolic), stains bright yellow around the edge of the cap and base, and often has gray shading in the cap.

Cap Width: 2-8 inches

Stalk Height: Up to 6 inches

Cap: Convex to flat in center; margin incurved, decurved at maturity; dry surface smooth to finely scaled; disc yellowish but, shading to cream-colored margin, bruising yellow slowly; often with hanging partial veil remnants (cap yellow with KOH).

Flesh: Thick, firm, white, unchanging or yellowing slightly; odor and taste of anise or almonds when fresh; flesh in stem base not yellowing.

Underside (Fertile surface): Gills free from the stalk; crowded; white at first, then brown at maturity without any pink stage.

Stalk: About ½ to 1.5 inches thick; equal to tapering to an enlarged base, stuffed; smooth surface, white to cream; sometime with scattered scales below; yellowing slowly; veil membranous; cottony patches forming a skirt-like ring.

Spore Color: Chocolate brown.

Habitat: Saprobic; growing alone, scattered, or gregariously in grassy places (lawns, meadows, pastures); summer and fall; common.

Edibility: Edible and choice.

Agaricus xanthodermis (Genev)

Common Name: Yellow-Staining Agaricus;
Yellow Stainer



The Yellow Stainer is the most commonly ingested poisonous mushroom. If eaten, symptoms include abdominal cramps, nausea, vomiting, and diarrhea (usually within 2-3 hours of consumption). Less common symptoms include headache, dizziness, sweating, and

drowsiness. This toxic species grows abundantly in lawns and gardens and looks very similar to edible mushrooms. *A. xanthodermis* is distinguished by its white cap with a pale brown disc at the center and, when the base of the stem is crushed, it has a distinct phenolic odor. When cut or bruised, the cap margin and the base of the stalk stain rapidly to bright yellow eventually turning brownish (this distinguishes it from other mushrooms that bruise yellow and remain yellow). Unfortunately, as it matures, both the staining and odor may disappear leading to confusion with other *Agaricus* species. Hardy souls that have cooked this species report that the phenolic odor intensifies and is a deterrent to eating.

Cap Width: 2-7 inches

Stalk Height: Up to 6 inches

Cap: Broad, convex, expanding to nearly flat; margin incurved, then decurved; yellowing readily when cap margin; surface dry, smooth; color variable: white in shaded locations, more typically buff-brown at the disc shading to white margin; cap surface yellows with KOH.

Flesh: White, firm, thick; odor of phenol, most noticeable in fresh, young material; all parts yellowing in KOH.

Underside (Fertile surface): Gills free from the stalk; crowded; white at first, becoming pink, then blackish-brown at maturity.

Stalk: About ½ to 1.5 inches thick; equal often with basal bulb; hollow to stuffed; surface smooth, white, bruising yellow, especially at the base; large, thick ring on upper portion.

Spore Color: Dark chocolate brown.

Habitat: Saprobic; scattered, or gregariously in grassy places (lawns, meadows, pastures) and occasionally under hardwoods and conifers; summer, fall to mid-winter; common.

Edibility: Poisonous.



MUSHROOM NEWS FROM THE PAST

By E. Lee Eltzroth, MCG Member
(Marietta, GA. Journal 3 Oct. 1907)

"Marietta Matters Column"

A few days ago Mr. Wells Whitmore went to the fields and brought back a basket of mushrooms.

The attracted a good deal of attention. A great many people are afraid to eat mushrooms that grow in the fields, on account of their close resemblance to "toadstools," which are deadly poison. Mr. Whitmore says the difference is quite apparent. He explained this difference, and said that no one need ever mistake one for the other. He took the point of his penknife and lifted up the top. It peeled back, leaving a perfectly smooth under-surface like the beet does after it is boiled and the outer skin removed. The "toad-stool" does not present this smooth under-surface, but scales and breaks up. Mr. Whitmore is very fond of the good things of the table, and is ever on the alert to find them.

(Ed. Note: This is an old wives tale so don't believe it!)



SADDLED WITH A LEGACY OF DIOXINS TOWN CONSIDERS AN ODD ALLY: THE MUSHROOM

By Annie Correal

New York Times, April 27, 2008

FORT BRAGG, Calif. — On a warm April evening, 90 people crowded into the cafeteria of Redwood Elementary School here to meet with representatives of the State Department of Toxic Substances Control.



The substance at issue was dioxin, a pollutant that infests the site of a former lumber mill in this town 130 miles north of San Francisco. And the method of cleanup being proposed was a novel one: mushrooms.

Mushrooms have been used in the cleaning up of oil spills, a process called bioremediation, but they have not been used to treat dioxin.

"I am going to make a heretical suggestion," said Debra Scott, who works at a health food collective and has lived in the area for more than two decades, to whoops and cheers. "We could be the pilot study."

Fort Bragg is in Mendocino County, a stretch of coast known for its grand seascapes, organic wineries and trailblazing politics: the county was the first in the nation to legalize medical marijuana and to ban genetically modified crops and animals.

Fort Bragg, population 7,000, never fit in here. Home to the country's second-largest redwood mill for over a century, it was a working man's town where the only wine tasting was at a row of smoky taverns. But change has come since the mill closed in 2002.

The town already has a Fair Trade coffee company and a raw food cooking school. The City Council is considering a ban on plastic grocery bags. And with the push for mushrooms, the town seems to have officially exchanged its grit for green.

The mill, owned by Georgia-Pacific, took up 420 acres, a space roughly half the size of Central Park, between downtown Fort Bragg and the Pacific Ocean. Among several toxic hot spots discovered here were five plots of soil with high levels of dioxin that Georgia-Pacific says were ash piles from 2001-2, when the mill burned wood from Bay Area landfills to create power and sell it to Pacific Gas & Electric.

Debate remains about how toxic dioxin is to humans, but the Department of Toxic Substances Control says there is no safe level of exposure.

Kimi Klein, a human health toxicologist with the department, said that although the dioxin on the mill site was not the most toxic dioxin out there, there was "very good evidence" that chronic exposure to dioxin caused cancer and "it is our policy to say if any chemical causes cancer there is no safe level."

Fort Bragg must clean the dioxin-contaminated coastline this year or risk losing a \$4.2 million grant from the California Coastal Conservancy for a coastal trail. Its options: haul the soil in a thousand truckloads to a landfill about 200 miles away, or bury it on site in a plastic-lined, 1.3-acre landfill.

Alarmed by the ultimatum, residents called in Paul E. Stamets, author of "Mycelium Running: How Mushrooms Can Help Save the World."

Typically, contaminated soil is hauled off, buried or burned. Using the mushroom method, Mr. Stamets said, it is put in plots, strewn with straw and left alone with mushroom spawn. The spawn release a fine, threadlike web called mycelium that secretes enzymes "like little Pac-Mans that break down molecular bonds," Mr. Stamets said. And presto: toxins fall apart. In January, Mr. Stamets came down from Fungi Perfecti, his mushroom farm in Olympia, Wash. He walked the three-mile coastline at the site, winding around rocky coves on wind-swept bluffs where grass has grown over an airstrip but barely conceals the ash piles. It was "one of the most beautiful places in the world, hands down," he said.

Quick to caution against easy remedies – "I am not a panacea for all their problems" – he said he had hope for cleaning up dioxin and other hazardous substances on the site. "The less recalcitrant toxins could be broken down within 10 years."

At least two dioxin-degrading species of mushroom indigenous to the Northern California coast could work, he said: turkey tail and oyster mushrooms. Turkey tails have ruffled edges and are made into medicinal tea. Oyster mushrooms have domed tops and are frequently found in Asian food.

Local mushroom enthusiasts envision the site as a global center for the study of bioremediation that could even export fungi to other polluted communities.

"Eventually, it could be covered in mushrooms," said Antonio Wuttke, who lives in neighboring Mendocino and describes his occupation as environmental landscape designer, over a cup of organic Sumatra at the Headlands Coffeehouse.

The proposal is not without critics, however.

"There still needs to be further testing on whether it works on dioxin," said Edgardo R. Gillera, a hazardous substances scientist for the State Department of Toxic Substances Control. "There have only been a handful of tests, in labs and field studies on a much smaller scale. I need to see more studies on a larger scale to consider it a viable option."

On April 14, at a packed City Council meeting, an environmental consultant hired by the city voiced skepticism, citing a study finding that mushrooms reduced dioxins by only 50 percent. Jonathan Shepard, a soccer coach, stood up and asked: "Why 'only'? I think we should rephrase that. I think we should give thanks and praise to a merciful God that provided a mushroom that eats the worst possible toxin that man can create."

Jim Tarbell, an author and something of a sociologist of the Mendocino Coast, said the enthusiasm for bioremediation showed a change in the culture at large.

"We are trying to move from the extraction economy to the restoration economy," Mr. Tarbell said. "I think that's a choice that a broad cross-section of the country is going to have to look at."

At the April 14 meeting, Georgia-Pacific promised to finance a pilot project. Roger J. Hilarides, who manages cleanups for the company, offered the city at least one 10-cubic-yard bin of dioxin-laced soil and a 5-year lease on the site's greenhouse and drying sheds for mushroom testing. And the City Council said it would approve the landfill but only if it came with bioremediation experiments.

So, sometime later this year, Mr. Stamets is scheduled to begin testing a dump truck's load of dioxin-laced dirt in Fort Bragg.

"One bin or ten cubic yards. That's a beginning," said Dave Turner, a Council member. "I have hope – I wouldn't bet my house on it – but I have a hope we can bioremediate this."



WHAT'S IN A NAME? SCIENTIFIC NOMENCLATURE AND THE NAMING OF FUNGI

By Bill Light, MCG Member

(Ed. Note: To quote Bill "Pretty nightmarish, isn't it?" so don't read it late at night.)

The following is a discussion of scientific nomenclature as it pertains to organisms covered by the *International Code of Botanical Nomenclature (ICBN)*, which covers the Fungi. A botanical name is a formal scientific name that conforms to the *ICBN*. A similar code, the *International Code of Zoological Nomenclature (ICZN)* exists for the scientific names of animals. I was a practicing systematic zoologist and taxonomist for over 25 years and am very familiar with the *ICZN*. The *ICBN* and the *ICZN* are similar in many respects, but there are also a number of important differences. I think I can provide a good explanation of all the confusion surrounding scientific nomenclature and demystify just what constitutes genus- and species-level groups and higher taxa and why they are named the way they are. Why, for example, do persons' names occasionally appear after a scientific name, sometimes enclosed within parentheses and sometimes not? I will answer that here. But in the discussion that follows, bear in mind that I am a zoologist and not a botanist.

Fungi were once placed in the Kingdom Plantae, along with the bacteria and cyanobacteria ("blue-green algae"), both unicellular and multicellular algae, and everything else that was not considered to be an "animal." The single-celled Protozoa, including those having chlorophyll and were photosynthesizing autotrophs ("self-nourishing"), were also considered to be "animals" and included within the "phylum Protozoa" in the Kingdom Animalia. For this reason, the fungi and fungus-alga/ cyanobacter associations called "lichens" came under the nomenclature jurisdiction of the *ICBN*. Likewise the Myxomycota ("slime molds") and the Oömycota ("water molds") were previously included within the Fungi and studied by botanists. The nomenclature of the slime molds is thus also covered by the *ICBN*, although they are now known to be much more closely related to the amoeba-like protozoa than to fungi and are placed in the Kingdom Protista. To further confuse things, the bacteria were also once included within the plant kingdom, and their nomenclature also falls under the *ICBN*. However, there is also an *International Code of Nomenclature of Prokaryotes* (formerly the *International Code of Nomenclature of Bacteria*) that also claims jurisdiction over all prokaryotic organisms: Bacteria (including the Cyanobacteria) and the Archaea.

The prokaryotic ("lacking a nucleus") Bacteria and Archaea now constitute two quite unrelated *supraregnum* (above the level of kingdom) domains ("empires" of some authors). All other living things possess a membrane-bound nucleus and a complex internal cell structure; they comprise the third domain—the Eucarya. Thus, the Bacteria and Archaea are covered by two competing (and by no means always consistent) nomenclature systems: the *ICBN* and the *ICNB*. Although things are still very much in flux and some workers have proposed as many as 15 kingdoms, the current interim consensus among most biologists acknowledges a three-domain, six-kingdom system: the domains Bacteria (also called the Eubacteria), the Archaea (Archaeobacteria), and the Eukarya. The Bacteria and Archaea each also constitute a kingdom, but there is much disagreement about this and the number of proposed ("candidate") kingdoms in these two domains threatens to become so large as to render the concept meaningless. Domain Eukarya includes four kingdoms: (1) the Protista (mainly single-celled plantlike and animal-like organisms like *Euglena* and *Amoeba*, all the multicellular algae, including the giant kelps, and the slime molds); (2) the Fungi, including the symbiotic lichens; (3) the Plantae; and (4) the Animalia. Other two-domain, eight-kingdom systems have also been proposed which I will not go into here. Are you quite confused now? Believe me, so are the "experts."

OK, to summarize what is important to us: the fungi, the symbiotic fungal-algal-bacterial associations known as lichens, the slime molds, and the water molds are all covered by the *International Code of Botanical Nomenclature*, despite the fact that none of these is now included within the plant kingdom. Fungi are placed in their own kingdom, slime molds are considered to be protozoa related to the amoebas, and lichens are described and categorized according to their mycobiont (fungal, thallus-producing) host. Note that all lichens are symbiotic "super-organismal" associations of two, and often three kingdoms—Fungi, Protista (the algal, photo-synthesizing phycobiont), and Bacteria. Isn't Nature grand? She stubbornly refuses to fit into even our most sophisticated schemes.

I know you all know the basic reason behind scientific names: to provide for a single, unique, and universally understood name for every species we know about, living and

extinct, on the planet. Fat chance! The total number of species estimated to exist on Earth ranges from 5 million to 30 million, of which about 2 million have been formally described and named.

As an example let's take the common Turkeytail Fungus, *Trametes versicolor*. This cosmopolitan polypore has numerous common names, including but not limited to the following:

English: Turkeytail; Many-zoned Polypore; Many-colored Polypore; Varicolored
 Bracket; Rainbow Fungus; White-rot Fungus
 German: *die Schmetterlingstramete* ["butterfly tramete"]
 French: *tramète versicolore* ["varicolored tramete"]
 Spanish: *el yesquero multicolor*; *yesquero de varios colores* ["many-colored fire starter"]¹
 Dutch: *gewoon elfenbankje* ["just an elves' bench"]
 Danish: *Broget Læderporesvamp* ["many-zoned polypore"]
 Slovak: *trúdnikovec pestrý* ["variegated tramete"]
 Polish: *wrośniak różnobarwny* ["turkey tail"]
 Chinese: 云芝 (*yun zhi*) ["cloud mushroom"]
 Japanese: 木口 (kawaratake) ["mushroom by the river"]

You can see the problem immediately. Not only does this one species have many common names, but some of these names also apply to other species.

Well, what about scientific names? One species, one name, right? Wasn't that the whole idea behind Linnaeus' system? Well, that was the idea all right, but it doesn't always (or even usually) work out that way. For example, our Turkeytail Fungus has the following validly published scientific names, *all of which* have been used in the scientific literature (and several of which continue to be used by various authors):

Trametes versicolor (Linnaeus 1753; ex Fries 1821) Lloyd 1920²

SYNONYMY (other scientific names that refer to this species):

Boletus versicolor Linnaeus 1753
Agaricus versicolor (Linnaeus 1753) Lamarck 1783

Poria versicolor (L.) Scopoli 1783
Agaricus versicolor (L.) Paulet 1793
Agarico-suber versicolor (L.) Paulet 1793
Polyporus fuscatus Fries 1818
Polyporus versicolor (L.) Fries 1821
Sistotrema versicolor (L.) Trattinnick 1830
Polystictus versicolor (L.) Fries 1851
Polyporus nigricans Lasch 1859
Polyporus versicolor var. *nigricans* (Lasch 1859) Fries 1874
Hansenia versicolor (L.) Karst 1880
Bjerkandera versicolor (L.) Karst 1881
Coriolus versicolor (L.) Quélet 1886
Microporus fuscatus (Fries 1818) Cooke 1886³
Microporus nigricans (Lasch 1859) Cooke 1886³
Microporus versicolor (L.) Kuntze 1898
Polyporus versicolor var. *fuscatus* (Fries 1818) Rea 1922
Polyporus versicolor var. *nigricans* (Lasch 1859, non Fries 1874) Rea 1922
Xerocomus versicolor (Kuntze 1898) Gilbert 1931
Trametes versicolor (Linnaeus 1753) Lloyd 1920²
Trametes versicolor f. *fuscata* (Fries 1818) Domański, Orłóś, & Skirg 1967
Ochroporus nigricans (Lasch 1859) Fiasson & Niemelä 1984

Pretty nightmarish, isn't it? It's quite a confusing list. "How can this be?" you may ask. "The whole point of the Linnaean system is to achieve nomenclature stability. Why do I still see names like *Coriolis versicolor* and *Polyporus versicolor* appearing in the current scientific and medical literature when they are talking about the same species? And the common Turkeytail at that—a species that was described by Linnaeus himself back in 1753!"

One issue is that not every author agrees with a specific combination of genus and species. Thus, while most authorities currently accept the combination of *Trametes versicolor* as the valid name for the ubiquitous Turkeytail, some holdouts insist that the species is properly referred to the genus *Polyporus* Micheli ex Fries 1821 or *Coriolus* Quélet 1886. (Don't panic! I will explain the use of personal names and dates shortly.) But a major problem stems from geneticists and molecular biologists with no understanding of systematic biology or taxonomy who insist on willy-nilly publishing their own names to fit their imagined (and often imaginary) evolutionary relationships. Mitochondrial DNA nucleotide sequences and certain protein amino acid sequences can

greatly aid our understanding of the phylogenetic relationships between organisms, but they are by no means the whole story. And the practitioners of these molecular “black arts” often fail to recognize that mutation rates are not constant between various groups of organisms.

This Johnnies-come-lately⁴ is responsible for a great deal of confusion, and no one is sure anymore just what is meant by a given scientific name. It is complicated enough when nomenclature experts are involved. The problem has become even more severe since universities have disallowed systematic biology and taxonomy as a valid academic discipline since the 1980s. It is considered to be “intellectually uninteresting” and suitable only for amateur naturalists and “fuzzy caterpillar lovers,” as one particularly arrogant and narrow-minded cell biologist once put it to me. How quickly they condemn that which they do not understand!

The purpose of scientific names is indeed to provide a single and unique name for each species. Binomial nomenclature consists of assigning each species a genus name and a specific epithet. But nomenclature is also intended to reflect our understanding of biological relationships. A genus is a group of related species. But one investigator’s concept of a genus may be wide, and that of another narrow. Thus certain species will be included within a given genus by one worker, but excluded by another. Our Turkeytail is placed in the genus *Trametes* by most authorities today, and it has the specific epithet (species name) of *versicolor*. But some taxonomists disagree, so we still see *Polyporus versicolor* and *Coriolus versicolor* appearing in the literature.

A species name can never be used alone (except in the most informal situations when experts are talking casually), but must always be accompanied by its generic name. However, a genus name can stand-alone. Once a generic name has been introduced, it may thereafter be abbreviated as long as no possible confusion exists (like another genus with the same abbreviation). Thus, once you have presented *Trametes versicolor*, it may thereafter be referred to as *T. versicolor*, except that *an abbreviated genus name cannot begin a sentence!* (I know, some experts who should know better apparently don’t.)

The genus name or its abbreviation is always capitalized *and italicized* (or underlined if in roman typeface). Many journals adamantly refuse to adhere to this mandatory requirement (italics) of all nomenclature codes, but will italicize anything else that suits their fancy. Incidentally, if a scientific name appears in a passage that is itself in italics, then the scientific name must be set in roman typeface to set it off. In nearly all cases a botanical species name is written in lowercase (this is *always* true for animal names—absolutely no exceptions, not even in titles), but there are some botanical specific epithets that may be capitalized under certain circumstances.

The name of the person(s) who first validly publish a name, particularly at the species-, genus-, or family-rank level, is part of the organism’s full, formal scientific name, along with the date of the valid publication. This is to establish priority in case of identical names being applied to more than one taxonomic category (homonymy), or when two or more names (synonyms) are found to refer to the same taxon (i.e., a species, genus, or family). The oldest validly published name takes precedence over the “junior synonyms,” which are said to be “sunk” into synonymy with the oldest valid name. You can see this in the synonymy list I provided above for *Trametes versicolor*.

Let’s look at this briefly to see what it means. Carl Linnaeus⁵ originally described this fungus as *Boletus versicolor* Linnaeus 1753. Lamarck transferred it to the genus *Agaricus* and it became known as *Agaricus versicolor* (Linnaeus 1753) Lamarck 1783. Linnaeus’ name was placed inside parentheses to indicate that he had originally described the species in a genus other than the one it was now in (*viz.*⁶ *Boletus*). Lamarck’s name and the date of publication follow Linnaeus’ name inside parenthesis to indicate that he, Lamarck, was the authority for this nomenclature change. That same year, another reviser (Scopoli) placed Linnaeus’ species into the genus *Poria*, and it became known as *Poria versicolor* (L.) Scopoli 1783. You get the picture. Notice that I am now abbreviating Linnaeus’ name as “L.” This is routinely done in botanical nomenclature with well-known botanists, who have standard abbreviations assigned to them. This is not permissible with animal names, and I find it very onerous and inconvenient when I want to track down the nomenclature history of a botanical name. I am not familiar with many

of the names that are commonly so abbreviated and it takes a great deal of effort to ferret them out. Many workers also leave out the publication dates, and again, I find it difficult to track down the information I need. You have no idea what it took to put together the above synonymy (list of synonyms) for *T. versicolor*. It may not be exhaustive.

Now let's examine the complete scientific name of our fungus:

Trametes versicolor (Linnaeus 1753; ex Fries 1821) Lloyd 1920. What on earth is all this? It means that the name of *Trametes versicolor* comes to us from Linnaeus (as *Boletus versicolor*) through the authority of a defining publication by Fries in 1821, and that the last reviser who transferred the specific epithet to its last and current genus, *Trametes* (after a whole slew of such transfers, as you can see from the synonymy), was Lloyd in 1920 (see the comment under footnote 2).

Well, I think this is plenty for one installment. There is more . . . much, much more. But this is plenty to chew on for now. Whenever you start to feel sorry for yourself, consider that I did this regularly for over a quarter century. In one case, I had to determine which of two generic names, *Asychis* Kinberg, 1867 [Annelida: Polychaeta] or *Asychis* Gray, 1867 [phylum Porifera, the sponges] was the junior homonym and thus the name, which had to be rejected. Both were published in the same month of the year 1867, one in Sweden and the other in the UK. I had to write to the chief librarians at the *Kungliga Vetenskapsakademien* [Royal Swedish Academy of Sciences] and the British Museum (Natural History) for a determination. Under the *ICZN*, the actual date of publication of a scientific name is not what appears on the publication, but "the date it was committed to the mails for distribution to the corresponding intuitions." The chief librarian at the Royal Swedish Academy determined that Kinberg's paper was committed to the mails three weeks before Gray's paper was in London. Thus, I was able to preserve Kinberg's name (in my field of polychaetology) and sink *Asychis* of Gray (in the sponges) into homonymy.

But this brings up a very interesting point. Although homonymy is prohibited *within* a given nomenclature code, it is permissible *between* codes. One of many such examples is the butterfly genus *Pieris* Schrank, 1801 and the plant genus *Pieris* D. Don 1834 [heath

family].⁷ This is permissible; neither name is a homonym of the other and both are valid.

In the next installment I will discuss higher taxonomic categories and their relationships to each other. Subsequent articles will deal with infraspecific categories: subspecies, *varietas*, varieties (*non varietas*), *formas*, cultivars, hybrids, graft-chimaeras, and other botanical monstrosities, some of which apply to fungi.

¹ Dried polypores are commonly used in Latin America as tinder to light fires with sparks struck from flint.

² The combination of Pilát 1939 is superfluous, as this was already published by Lloyd in 1920; however, Pilát 1939 is commonly, but erroneously cited as the authority for this genus and species combination by those workers who have not done their homework.

³ The combinations of Kuntze 1898 commonly cited are superfluous as these names were previously published by Cooke in 1886.

⁴ As a needless complication, Fiasson & Niemelä 1984 resurrected *Polyporus nigricans* Lasch and placed it in the genus *Ochroporus* J. Schröter 1888. However, *Ochroporus* is a junior synonym of *Phellinus* Quélet 1886. The genus *Trametes* belongs to an entirely different order, the Polyporales, than the genus *Phellinus*, which is in the order Hymenochaetales. This is like saying that a cat and an antelope should be placed together in the same genus! [Fiasson JL, Niemelä T. 1984. The Hymenochaetales: a revision of the European poroid taxa. *Karstenia* 24:14-28.]

⁵ That was his original family name—it was *not* Latinized from Linné as is commonly stated; rather, Carl's father, Nils Ingemarsson [Son of Ingemar], upon entering university took on a family name based on the Latin word for the linden tree in his yard: *Linnaeus*. In those days, Scandinavians did not normally have last names. Carl would normally have been called Carl Nilsson {Son of Nils}, but automatically became Carl Linnaeus because his father had formally assumed a surname. Linnaeus published most of his work under the name Carolus Linnaeus. Carl later assumed the name Carl von Linné following his ennoblement

⁶ When was the last time you saw this abbreviation for *videlicet*?

⁷ A very minor difference between the *ICBN* and *ICZN* is that in the former there is no comma between the naming authority's name and date of publication; a comma is required under the rules of the *ICZN*. There are other, much greater differences.



QUOTES FROM BOOKS

**"HEAT" by Bill Buford, Vintage Books
Snohomish County Mycological Society**

"I was making a mushroom sauce that illustrated two things that were characteristic of the station: how to use heat and how to stop it. Like most sauces, this one was prepared in two stages and used only a few ingredients: mushrooms, some fresh thyme leaves, a finely chopped shallot, and a little butter. To begin you need lots of heat. You put your pan on the flattop until it got really hot, until it darkened, until it seemed as though it might start melting, and then you splashed it with olive oil - the pan went smoky very quickly - followed by the mushrooms. Then: nothing. You didn't move the pan until you detected the sweet wood smoke smell of the mushrooms caramelizing. The mushrooms now had a crunchy, sugary crust, not burned but on the verge of burning. You sprinkled the pan with the shallots and thyme, held it until they reacted to the high heat, and then shoveled in enough pasta water to stop the cooking: the pan hissed, steamed, and went quiet. That was Stage One: from high heat to no heat. Stage Two was when the order was fired. You retrieved the pan and made an emulsion: the butter, the swirling-swirling routine, until the mushroom water became a sauce sticky enough to adhere to the pasta."



MUSHROOM COOKBOOK "COOKING WITH THE ASHEVILLE MUSHROOM CLUB"

(From Mushroom the Journal, Fall 2007)

An exciting new cookbook for mushroom lovers is now available just in time for the holidays. Tips for collecting, storing, and preparing wild mushrooms! There are 300+ traditional, vegetarian, and specialty dishes. The cookbook contains favorite mushroom recipes and color photos from club members in the Asheville, NC

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THE MUSHROOM RECIPES FILE

By Dan Willis, MCG Member

MUSHROOM CROUSTADE

Croustade:

4-oz. soft breadcrumbs
4 oz. finely ground almonds or other nuts
2-oz. butter
4-oz. flaked almonds or pine kernels or hazelnuts
1 clove garlic
½ teaspoon mixed herbs

Topping:

1-lb mushrooms cleaned and sliced, can use store bought mushrooms but Horse Mushrooms or Field Mushrooms are best
2-oz butter
2 heaped teaspoon flour
¾-cup milk
Salt and pepper and nutmeg
2-tomatoes, skinned and sliced
1-teasppoon chopped parsley

Croustade:

Mix together the breadcrumbs and ground nuts, and rub in the butter that has been cut into small pieces.

Add flaked almonds, garlic, and herbs, and mix together well and press down into an ovenproof dish making a layer about ½ inch thick. Bake at 450 degrees F. for 15-17 minutes or until golden brown.

Topping:

Wash and slice mushrooms, sauté in butter until tender, add flour and when it froths, remove from heat and stir in milk. Return to heat, stir until thickened and then season. Spoon mixture on top of croustade, top with skinned and sliced tomatoes and a little salt, pepper and nutmeg. Return to oven for 10-15 minutes. Serve decorated with parsley.
Serves 6



JUST IN TIME FOR SUMMER ICE CREAM IN A BAG

By Laura Candler

Ingredients:

1-gal Ziploc bag
1-qt Ziploc bag
4-cups ice
¼-cup salt
1-cup whole milk
1-teaspoon vanilla extract
2-tablespoons sugar
Cups and spoons

Procedure:

1. Pour the milk, vanilla extract, and sugar into the small Ziploc bag (placing the bag in a bowl helps in this step). Squeeze as much air out as possible and seal the bag carefully.
2. Place the small Ziploc bag down into the large bag. Cover with the ice and salt. Seal the large bag tightly.
3. Shake, toss, and flip the ice cream "machine" for 5 to 10 minutes. If the bag gets too cold to handle, wrap it with a towel. Don't open the large bag to check the ice cream because it may not seal properly afterwards.
4. Open both bags and spoon the ice cream into small cups. Enjoy.

Flavor Variations:

1. Substitute other extract flavors for the vanilla.
2. Omit the vanilla and half the sugar. Add strawberry or chocolate syrup to the milk mixture.

Scientific Explanation:

The salt lowers the freezing point of the water, which allows it to get colder than ice (about 28 degrees F.). This super-cold water and ice mixture causes the liquid milk mixture to freeze and become solid.



CREAMY TRIPLE-MUSHROOM BISQUE W/TURKEY

Humboldt Bay Mycological Society

Ingredients:

4 ounces fresh shitake, quartered
6 ounces Portobello, sliced
8 ounces mushrooms, quartered
2-1/2 cups cooked turkey, chopped
¼ cup red wine
1 teaspoon dried thyme
1-teaspoon balsamic vinegar
½ teaspoon salt
1/8 teaspoon ground red pepper
16 ounces chicken broth
½ cup green onions, sliced thin
2 tablespoons chopped parsley
3 tablespoons flour
2 cups lowfat milk
2-1/2 cups cooked rice
½ cup light cream cheese

Procedure:

1. Heat a large saucepan over medium-high heat until hot. Add a little oil, then add mushrooms, cook until tender (about 5 minutes)
2. Add turkey, wine, thyme, vinegar, salt, red pepper, and broth. Bring to a boil, reduce heat, and simmer 20 minutes.
3. Add rice cream cheese, and heat, stirring until cheese melts.

Serve garnished with parsley sprigs.
Serves 8 1-cup dishes.



MUSHROOM CLUB OF GEORGIA

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*Supporting Membership includes a Lifetime Family Membership

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Knowing the risks, I (We) agree to assume the risks, and agree to release, hold harmless, and to indemnify the Mushroom Club of Georgia, and any officer or member thereof, from any and all legal responsibility for injuries or accidents incurred by myself or my family during or as a result of any mushroom identification, walk, foray, field trip, excursion, meeting or dining, sponsored by the club.

Member's Name (please print clearly) _____

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Janet Joiner, Treasurer, P.O. Box 420255, Atlanta, Georgia 30342