



# Potomac Sporophore

[www.mawdc.org](http://www.mawdc.org)

The quarterly publication of the Mycological Association of Washington (MAW)

## Fungus Notebook: The Honey Mushroom



**Common Name:** Honey Mushroom, bootlace fungus, stump mushroom — The variegated yellowish brown hues of the cap have areas that are similar in coloration to honey. The bootlace name describes the black, elongated outgrowths called rhizomorphs that extend from the mycelium (the underground body of the fungus) as it propagates vegetatively.

**Scientific Name:** *Armillaria mellea* - The generic name is derived from the Latin words *armilla* which means ring-shaped and *aria* which is a word signifying a connection. This refers to the annular ring on the upper stalk of the mushrooms of this genus that is “ring-shaped” and connected to the stalk. *Mellea* is derived from *mel*, the Latin word for honey. Alternatively named *Armillariella mellea*.

The honey mushroom was once considered to be a singular though

poly-morphic species (polymorphism applies to an organism as an expression of its capability for wide variation) and its genus *Armillaria* once comprised any white-spored mushroom of the agaric family (*Agaricaceae*) with attached gills and an annular ring on the stem, approximately 250 species. Several decades ago *A.*

*mellea* and its generic as-

signation became subject to the tumult in the field of mycology as a better understanding of taxonomy based on experimentation and DNA analysis manifest. The *Armillaria* genus was reduced to only those mushrooms that produced long, stringy root-like structures called rhizomorphs; the other mushrooms that had been in the genus were renamed and reclassified to other genera.

The honey mushroom was originally assigned to a new genus *Armillariella* (which is still in use in some texts). However, owing in part to its polymorphism, it came under scrutiny and research to ascertain the nature of the species was undertaken by mycologists in the 1970's. Since the external features of mushroom morphology are inadequate to distinguish variance, a much more laborious process must be employed. In the case of the honey mushroom, that consisted

## Annual Mushroom Fair

Support MAW at the 11<sup>th</sup> Annual Mushroom Fair Oct. 7 at Brookside Gardens in Wheaton, Md. It's fun for the whole family.

**Location:** 1800 Glenallen Ave., Wheaton, Md.

**Time:** noon to 5 PM

### Events and Features:

- Forays at 1 and 3 PM, plus pre-Fair forays for members
- Lectures on Fungi
- Mushroom Identification
- Mushroom Cooking Demo
- Mushroom Paraphernalia



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## **BOARD OF DIRECTORS**

**Bruce Boyer**, President  
703-863-9633  
[president@mawdc.org](mailto:president@mawdc.org)

**Mitch Fournet**, Vice President  
301-768-6788  
[vicepresident@mawdc.org](mailto:vicepresident@mawdc.org)

**Bobbie Blue Marcoux**, Secretary  
[mawsecretary@mawdc.org](mailto:mawsecretary@mawdc.org)

**John Harper**, Treasurer  
301-589-2830  
[treasurer@mawdc.org](mailto:treasurer@mawdc.org)

**Bruce Eberle**, Programs  
[programs@mawdc.org](mailto:programs@mawdc.org)

**Jon Ellifritz**, Forays  
301-422-7517  
[forays@mawdc.org](mailto:forays@mawdc.org)

**Barbara Karpas**, Memberships  
301-270-4239  
[memberships@mawdc.org](mailto:memberships@mawdc.org)

**Daniel Barizo**, Culinary  
301-332-7112  
[culinary@mawdc.org](mailto:culinary@mawdc.org)

**Connie Durnan**, NAMA Liaison  
202-362-1420  
[namatruster@mawdc.org](mailto:namatruster@mawdc.org)

**William Needham**, Editor  
410-884-9127  
[newsletter@mawdc.org](mailto:newsletter@mawdc.org)

### **Monthly Meeting Location:**

Kensington Public Library  
4201 Knowles Avenue.  
Phone number 240-773-9515

Directions from Beltway: Take Connecticut Avenue north to the third signal after the Beltway. Turn left onto Knowles and go 2½ blocks to the library on the right.

of taking individual spores from different mushrooms and placing them together is a petri dish filled with agar to observe the resultant growth patterns. If the spores were from different species, the resulting growth was white and fluffy indicating no genetic communication; if the spores were from the same species and compatible genetically, the growth was brown and sometimes produced rhizomorphs. Using this method, the honey mushroom was found to consist of five different species native to Europe and ten different species native to North America. The distinctions between the species are generally not manifest in any significant physical differences except one, the presence of a ring on the stalk. The honey mushroom *A. mellea* has a ring on the stalk and a viscid or sticky cap. The “ringless honey mushroom” *A. tabescens* (tabescent means wasting away) does not have a ring and has a dry, scaly cap.

The honey mushroom is one of the most damaging pathogenic fungal species; it can rapidly infest and kill trees over an extended area. The mycelial body of the fungus is underground, subsisting among the roots of plants. Growth occurs by root-like tendrils called hyphae that extend vegetatively to exploit surrounding resources. In the case of the honey fungus, these hyphae intertwine like the strands of rope and form a protective black rind so that the resulting structure is robust and penetrating. This filamentous structure is called a rhizomorph from the Greek *rhiza* meaning root and

*morphus* meaning form; it has a root-like form. Rhizomorphs can grow as much as a meter per year, extending the range of the fungus outward from the original infestation. The rhizomorph hyphae transport nutrients from one location to another; the honey fungus can thus extend its range through an area



*A. tabescens*, the ringless Honey Mushroom

devoid of nutrition to a new food source, such as an adjacent tree or stump.

Rhizomorphs travel just below the surface of the ground until they reach the roots of an adjacent tree. An infected tree will die once the fungus has girdled it; the vascular system of trees depends on a flow of water and minerals up the inner part of the bole called the xylem and the flow of nutrients from the leaves down the outermost layers below the bark called the phloem — when a tree is girdled the outer layer flow of nutrients is curtailed.

Foxfire is a name given to the observed phenomenon of decaying wood that glows in the dark; “fox” connotes not only the woodland habitat of the light (fire) but also confusion: the fox is sly and cunning and foxfire is perplexing. This ethereal nocturnal glow is caused by biolumi-

nescence, the production and emission of light by a living organism in converting chemical energy to light energy. The pigment luciferin (from

phae permeate the wood as it decays. Thus the wood itself appears to glow. Other fungi that glow in the dark like the Jack-O-Lantern (*Omphalotus olearius*) are in the form of a mushroom fruiting body that grows as an entity distinct from the wood. It is thought that the bioluminescence of fungi evolved to attract insects to the fruiting body to assist in spore dispersal.



Rhizomorph of the Honey Mushroom

The honey mushroom is also the “humongous fungus” that has periodically risen to national prominence. It started in Michigan in 1992, when researchers evaluating the



Deadly Galerina (*Galerina autumnalis*), a honey mushroom look-alike

the Latin *lucifer*, meaning light-bearing) reacts with the enzyme luciferase, ATP (adenosine triphosphate) and oxygen to produce light. Though there are a number of fungi that luminesce, the honey fungus is the most extensive and notable (in some references, the glow of *A. melaleuca* is defined as foxfire). This is because the rhizomorphs of the honey fungus extend under the bark of an infested tree and the extending hy-

biological effects of the installation of an extremely low frequency (ELF) transmitter for submarine communication mapped out the geographical dispersion of a type of honey fungus (*A. bulbosa*). They found that it extended over an area of 15 hectares (37 acres) and estimated that it weighed about 100 tons and was about 1,500 years old. Later in 1992 an even larger honey fungus (*A. ostopoyae*) of 600 hectares was found in southwestern Washington. The current record is held by the state of Oregon, where a honey fungus (also *A. ostopoyae*) of 900 hectares (3.4 square miles) was discovered in August 2000. It is estimated that this fungus is at least 2,400 years; at an assumed steady state rate of rhizomorph growth of 1 meter per year, it would take that long for it to reach its current extension. It could be much older. Since it is 60 times larger than the Michigan fungus, its

## 2012 Scheduled Events

### Monthly Meetings/Major Events

Monthly meetings are normally held on the first Tuesday of the month. All monthly meetings start at 7PM and include a brief review by each of the MAW board members and a summary of monthly events and mushroom finds by the President. The program starts at about 8PM. The meeting place is the Kensington Public Library, 4201 Knowles Ave., Kensington, Md.

October 2 – Fall “International Mushroom Food Festival” Tasting meeting

October 7 – Annual Mushroom Fair at Brookside Gardens

November X – Note this is not a Tuesday due to Election Day. Program TBD. Nominations of Board for 2013.

December 4 – Election Night for 2013 Board. Fungi recap of 2012.

December 13-16 – North American Mycological Association Foray Scott’s Valley, California. Register at [www.namyco.org](http://www.namyco.org)

weight by extrapolation is about 6,000 tons, about 5 times the estimated weight of the giant redwood (*Sequoiadendron giganteum*). This gives the honey fungus the dubious distinction of being the largest and oldest living thing on earth.

The honey mushroom is edible and is generally classified in mushroom field guides as “choice, with caution.” The caveat enjoins the mycophagist to cook the raw mushroom thoroughly before eating; even then, it is known to cause gastrointestinal discomfort in some people. But the real caution is that there is a deadly mushroom with very similar characteristics; the *Galerina autumnalis* is commonly known as the Deadly Galerina because it contains the same toxins as the Destroying Angel (*Amanita virosa*).

— William Needham

## Area Clubs Share Love for Mushrooms at First Joint Appalachian Foray

While most everyone in the country wished for a rainy respite from record-breaking drought conditions, mushroom hunters looking forward to the Joint Appalachian Foray in the central highlands of West Virginia July 27-29 almost got too much wa-



Gary Lincoff identifies mushrooms.

ter. Dedicated volunteers from the three mushroom clubs managed to salvage — and even improve — the event after inclement weather interrupted guest mycologist Gary Lincoff’s travel plans and a main water break at Canaan Valley Resort & Conference Center resulted in a last-minute venue change.

Nevertheless, the rain meant great foraging. According to West Virginia Mushroom Club volunteers, the number of black trumpets (*Craterellus cornucopioides*, *C. cenerius*, *C. foetidus*) found even surpassed the previous

Tucker County record.

## Fungal humor

Though Lincoff took a circuitous route from New York to West Virginia, via Washington, D.C. (thanks to the travel flexibility of MAW Treasurer John Harper), his hallmark humor arrived absolutely intact, and his two presentations and final foray table round-up delighted the audience of more than 80.

Lincoff primarily focused on common mushrooms found at the foray, providing beginners with a good rubric for identification. His narrative alternated between cultural reflection, stern warnings, and jokes.

Describing chicken of the woods’ (*Laetiporus sulphureus*) tendency to provoke a nasty side effect in some who eat it, he quipped, “If you have always wanted to have Angelina Jolie lips this is the mushroom to try. If I ever meet her that’s what I’m going to ask her.”

Moving on to various deadly amanitas, Lincoff said you better be sure of what you’re eating, especially in this country. “This is America,” he said. At any hospital, the only response you’ll get is “What? You ate mushrooms? Send him up to psych.” Lincoff clarified he did not mean to critique American medicine. “The reason Europeans are so good at treating mushroom poisoning is because they see it all the time,” he added.

Other big, edible finds included a huge Berkeley’s polypore (*Bondarzewia berkeleyi*) and several cauliflower mushrooms (*Sparassis*).

Lincoff encouraged foray partici-

### Freely forageable

In addition to his talk on wildflowers and fungi, Gary Lincoff also presented on wild edibles and hosted a wild edibles foray and tasting July 29. Here are a few especially good summer edibles:

- Wild apples. These vary from the bitter crabapple to trees likely seeded from a discarded apple core. They’ve been spotted in New York City’s Central Park.
- Beach plums. Lincoff wanted to know how it was possible he could gather pounds of them in New York City.
- Milkweed. Harvest small seed pods and boil them up into an okra-like vegetable dish.
- Cattail. Collect the pollen in the spring to mix with flour for an interesting bread.
- Sumac. Add three to four berry clusters to a jar of water, shake, and you’ve got nicely tart drink.
- Purslane. Look for it in the cracks of the sidewalk (but avoid harvesting it where your dog does his business.)
- Wild grape leaves. Stuff with ground beef and rice fillings.

pants to share their mushroom bonanzas and broaden the myco-community, but he condoned the occasional solo feast, saying, “Pigging out is part of the pleasure of eating mushrooms.”

### **Palate pleaser**

Shelly Conrad, director and treasurer of the West Virginia Mushroom Club (WVMC), coordinated the preparation of an informal banquet on July 28 and especially found the venue change fortuitous. The switch to



Paul Goland demonstrates proper mushroom inoculation techniques.

the Dry Fork Assembly of God Fellowship Hall meant cooks who had prepared to use propane stoves in an open pavilion benefitted from a fully equipped commercial kitchen with an eight-burner gas range, two electric stoves, two refrigerators, a deep freezer, and a commercial-size triple sink.

“It was the best equipped kitchen many of us had ever worked in, including those found at previous [North American Mycological Association] and [Northeast Mycological

Federation] forays,” said Conrad, a Le Cordon Bleu Paris-trained chef.

Among the dishes were a chanterelle corn chowder; shiitake lasagna; penne with oyster mushrooms, bitter greens, and chicken sausage with apples; guest mycologist Donna Mitchell’s marinated chanterelles; and MAW Foray Chair Jon Ellifritz’s spicy Thai green curry and rice and black trumpet omelet.

Find recipes and tips for preparation and preservation that Conrad shared with foray participants in “Cooking Corner,” page 6.

### **The wildflower connection**

Following the first morning foray July 28, Lincoff delivered “Mushrooms and Wildflowers — the Unseen Connection.” Many mushroom hunters, according to Lincoff, are well aware of the mycorrhizal relationships between mushrooms and certain trees, but they overlook wildflowers completely. He says even he took for granted wildflowers for some time.

Wildflowers growing in concert with mushrooms tend to be just plain interesting because some lack chlorophyll completely or undergo incomplete photosynthesis while receiving some or all of their nutrients through a mycorrhizal fungus that is exchanging nutrients with a tree. Common mycoheterotrophs include indian pipe (*Monotropa uniflora*), many orchids such as the dwarf rattlesnake plantain (*Goodyera repens*), the blueberry family (*Ericaceae*), and the eastern teaberry (*Gaultheria procumbens*.) Mycoheterotrophic wildflowers also serve as a sign a forest has a thriving fungal community — and is thriving of its

own accord.

### **Urban surveys**

Concluding his wildflower presentation, Lincoff made a plea to foray participants to help him and other mycologists catalog the diversity of mushrooms, especially in urban areas. “Most of us are urban people, and mainly we come to the woods to get out of the city.” But you might be surprised, he said, by the world of mushrooms under your nose. Such surveys advance ecological data collection, promote awareness and preservation of wilderness — and can help fill your basket with edibles. Plus, to contribute research on meadow mushrooms (*Agaricus campestris*), for example, you might not even have to leave your front lawn.

### **Inoculating interest**

In between the forays, food demos, and other excitement July 28, Paul Goland (above left), a WVMC member, demonstrated how to inoculate a log with shiitake (*Lentinula edodes*) spawn to create a log that will fruit with shiitake mushrooms for years. Several lucky foray participants were able to make their own logs, and others purchased them from Goland.

— Willow Nero

#### **Get Connected**

Share your finds with the scientific community, and give mushrooms their best shot at being recognized and protected.

•  Project Noah:

[www.projectnoah.org](http://www.projectnoah.org)

•  Mushroom Observer:

[www.mushroomobserver](http://www.mushroomobserver.org)

.org

## **Cooking Corner**

Want to see your creations in Cooking Corner? Submit your recipes to newsletter@mawdc.org, and help show off MAW's culinary genius.

The following recipes come from Shelly Conrad, the WVMC's director and treasurer who trained at Le Cordon Bleu, Paris. She whipped up several batches of the wild mushroom dip — with dried, fresh, and frozen chanterelles — so guests at the Joint Appalachian Foray could taste the difference for themselves.

By far, the tastiest chanterelles were fresh. The frozen version was a little tough, but “tough chanterelles taste pretty good in December,” Conrad says.

Following the recipes, find Conrad's tips for preserving different types of mushrooms.

### **WILD MUSHROOM DIP**

- 1 cup diced onion or shallots
- 1 tbsp butter and 1 teaspoon vegetable oil
- 3 cups chanterelles
- 8 ounces cream cheese
- 16 ounces sour cream (use less for thicker dip)
- ½ cup Worcestershire sauce
- 1 tbsp lemon juice
- 1 teaspoon salt

Sauté onions or shallots in butter and oil for about 5 minutes, until they begin to turn translucent. Add chanterelles or other fresh, reconstituted or frozen mushrooms and sauté another 10 minutes or until chanterelles darken from bright yellow to an orange/rust color. Turn off the heat. Add cream cheese, and stir until it melts into the chanterelle/onion

mix. Add the rest of the ingredients, and serve or refrigerate for later.

### **MUSHROOM PRESERVING TIPS**

In general, the more you process mushrooms, the tougher and less flavorful they will be, with the exception of morels and boletes, which improve after dehydration.

NEVER wash delicate mushrooms like chanterelles, black trumpets, oysters, or shaggy manes. Sturdy mushrooms that can be soaked in salty water include: buggy boletes and morels (trim off anything that discolors after soaking), chicken of the woods, hen of the woods, puffballs, shitakes, young lobsters, hydnums, Bradleys and most other lactarius species. Young honey and Agaricus mushrooms can be submerged in a bowl of cold water and rubbed to remove dirt immediately before sautéing. Older specimens of most mushrooms will wilt or fall apart if washed. If making a stew, this might not be a problem.

If in doubt, don't wash them. Just use a mushroom brush or a clean dish towel to remove any traces of soil.

DEHYDRATE: morels, boletes, hens, lactarius, oysters, agaricus, and shitakes. Use a dehydrating machine, which is an excellent investment and can be used for fruit, meats, etc. or place in 100-degree oven, out in sunshine, or string them up in open dry area. Don't dehydrate chanterelles because they toughen and become a little bitter when reconstituting. Oysters toughen a little, too. Morels and boletes are so much better rehydrated that once you try them that way, you might never again eat them fresh.

REHYDRATING: You must use hot, almost boiling liquid to reconstitute mushrooms or they will not soften completely. When choosing a rehydrating liquid, always opt to add flavor. Instead of using water, consider using mushroom, vegetable, chicken, or beef stock as your first choice. Depending on how long they will cook and the type of dish you're making, you can also reconstitute with sherry or red or white wine. For example, reconstitute boletes in beef broth or red wine when making beef bourguignon. It's best to use rehydrated mushrooms for dishes that will require stewing or long cooking and not for quick-cooking dishes like omelets. The exception is stir frying, where a little chewiness in the dish adds texture and flavor.

SAUTE AND FREEZE: polypores (you can parboil tough chicken of the woods mushrooms first), chanterelles, shaggy manes, oysters and honey mushrooms. Always cook mushrooms before freezing, in case somebody finds them in your freezer and tries to use them without adequately cooking them. This also will make it easier when you finally use your mushrooms. Just dump the zip-top bag of frozen mushrooms into the dish.

PICKLE: chanterelles, lobster, honey, and lactarius species. This is a great way to preserve mushrooms since any dirt remaining after cleaning eventually falls off in the marinade and sinks to the bottom of the jar.

SLICE AND BURY IN SALT: boletes. Don't laugh — that's how most things were preserved before the days of refrigeration. Since the juices from the boletes will be absorbed by the salt, save the salt to use in cooking.

## Mushrooms of the West Coast



Noah Siegel demonstrates just how big some West Coast boletes get.

In anticipation of the annual NAMA foray in December, Noah Siegel, a celebrated mycologist and mushroom photographer, visited MAW members at the August meeting and delivered a presentation on some of the mushrooms they might see in California.

While the southern deserts predictably aren't known too well for their mushrooms, you'll find them on the coast, in the "salt spray cypress" habitats north to Mendocino, in scrubby areas, and especially among the Bay area hard wood forests with their "endless fog drip through the summer."

It's not too hard to get out hunting, Siegel noted. "You don't have to go far out of the big urban cities in California to lose people."

Another especially great man-made habitat Siegel mentioned is the woodchip "junkfood to saprophytic mushroom" mulch liberally sprinkled along many a California highway.

Among the mushrooms that might surprise your average East Coaster:

### Tasty treats

The candy cap (*Lactarius rubidus*) has a maple sugar flavor and makes a good dessert flavoring. "There's really nothing else like it in the world," says Siegel, except the much less impressive Eastern version. Those attending the NAMA foray might just get a taste of candy cap ice cream, too. The aromatic and spicy matsutake (*Trich-oloma matsutake*) has an intense cinnamon taste like Red Hots.

### Fun colors

The lime green waxy cap (*Hygroclybe virescens*), which "everyone has seen once" and is worth reporting if you see it twice. Siegel says it was years between his sightings, the second of which coincided with reports from many other prominent mycologists. Is it rare or just overlooked? "Is it going to be 40 to 50 years before we see it again?" he asks. The violet pig's ear (*Gomphus clav-atius*), essentially is a purple chanterelle.

### Invaders

The West Coast also is a new home to some invasive mushroom species. The death cap (*Amanita phalloides*), Siegel says, spread quickly from the Bay area to Sonoma County, the Central Valley, and further south. He has seen more than 10,000 *A. phalloides* in a day, and reports that unfortunately they're crowding out other species. Where Siegel once spotted six to seven species living, *A. phalloides* has taken over and sometimes occupies 60 to 70 percent of oak tree root tips.

### Giant edibles

You'll be talking about 14-inch king boletes (*Boletus edulis*) for years

to come. Unfortunately, 3.5- to 4-pound chanterelles (*Cantherelles californicus*) don't taste so great. "Once again, California has big mushrooms, but size isn't everything. They taste pretty lousy, and I wouldn't even pick this to eat it," Siegel reports.

### Tasty, area-specific chanterelles

*Cantherellus cascadiensis* and *subalbidus* are fairly reliable edibles in California. Just don't mix them up with the jack-o-lantern mushroom (*Omphalotus olivascens*) or you're a real sucker. "It's not the same color [as *Omphalotus illudens* on the East Coast]. So if you make that excuse, I'm not going to feel sorry for you," says Siegel.

### Real weirdos

Moving even further northward, Californians find the novel "snow melt fungi" that grow on the edge of snowbanks. Check out *Clitocybe glacialis*. For another puzzle, stare at *Dendrocollybia racemosa* for a while. It has a trunked stem almost like a tree.

All said, the West Coast has some great mushrooms, but East Coasters can rest assured at least their mushrooms are easy to find. West Coasters evidently have to look for "mush-umps," mound-like disturbances on the ground where mushrooms are emerging and fruiting but invisible to the untrained eye because they are unable to break through a tough layer of duff.

— Willow Nero

