



Summer 2019

# Fungi Kingdom News

The newsletter of the Pioneer Valley Mycological Association



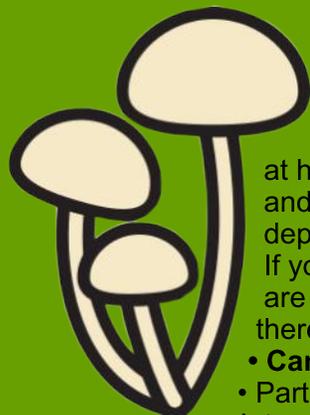
Dianna Smith shares her wisdom with PVMA members and guests on a group walk earlier this summer.

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## PVMA White Mountain Foray (Free!)



There are still one or two slots available for our **free** Foray/Vacation for current PVMA members in the White Mountains with Dianna Smith in Bethlehem, NH, Monday, August 19 at noon to Friday August 23 at noon. Join Dianna and other enthusiastic mycophiles for the week to participate in walks on White Mountain trails to collect fungi and identify them back at her NH home. You need only bring food to share, wine, beer, juice, snacks, fruit, etc., cereal, and help make meals and clean up afterward. Bring a sleeping bag if you have one, although depending on how many people decide to participate, we may have enough beds for everyone. If you are interested, please email [Dianna.smith@comcast.net](mailto:Dianna.smith@comcast.net) **right away** to explain why you are interested in attending. The following criteria will be used to prioritize who can attend if there are more applicants than spaces available:

- **Can stay all four nights**
- Participates in our club locally (attends our walks, workshops, or other events)
- Interested in learning about all fungi, and not just the edibles



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#### OUR MISSION STATEMENT

The Pioneer Valley Mycological Association is dedicated to enhancing the public's knowledge and appreciation of the fungal kingdom by providing ongoing educational programming in the form of guided mushroom walks, lectures, newsletters, information on multi-day regional and national forays, and citizen science projects. Because fungi are integral components of complex ecosystems, we are committed to advocating for responsible and sustainable study and collection methods. We focus on, but are not limited to, the three counties of the Pioneer Valley in western Massachusetts (Franklin, Hampshire and Hampden).

PVMA is a member of the Northeast Mycological Federation ([www.nemf.org](http://www.nemf.org)) and the North American Mycological Association ([www.namyc.org](http://www.namyc.org)).

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

#### We Welcome Your Submissions!

This is your newsletter; we'd love to have you contribute to it!  
Prose, verse, photos, drawings, recipes, scientific observations – send them all to:

[jessicabensonevans@gmail.com](mailto:jessicabensonevans@gmail.com)  
[sue.lancelle@gmail.com](mailto:sue.lancelle@gmail.com)

## From the President...

Happy Summer! As many of you have noted, the fungi seem to be off to a sporadic start this season. We've spotted many of the usual spring standbys: *Megacollybia rodmanii*, *Pluteus cervinus*, and tons of the slime mold *Ceratiomyxa fruticulosa*. A few lucky members have even collected *Laetiporus sulphureus*, as was the case on our recent club walk in Huntington. However, we are not seeing large quantities of any particular mushroom. Perhaps it's the weather; we had a wet spring but the past month has been dry, and nights have remained cool until recently. Clubs all across New England are noting the same conditions ... but we remain hopeful!

The abundance of last summer makes this slow start seem a bit disheartening, but there are plenty of mushrooms if you're willing to make every hike a treasure hunt. Every *Russula*, every LBM becomes exciting in a forest dotted just here and there with mushrooms. Hope you join us soon for a walk to take part in one of our hunts for treasure!



- Jessica

## Fungi Kingdom University 2019 Summaries of the Workshops

### EDIBLE MUSHROOMS AND POISONOUS LOOK-ALIKES

#### Presented by Jessica Evans

It imprinted on me: foraging for mushrooms in the long summers, every year as a young child in the deep woods in Styria, Austria with my grandfather Otto. He walked slowly and with intention and he knew the trees and the animals and the weather, each mushroom we found and their local names. And I walked with him, comfortably contained in his certainty. I remember eierschwammerl (chanterelles) and steinpilze (king bolete) and those are the ones he made into his famous soup, with potatoes cut into small chunks. Always with sour cream on top. There were taublinge (*Russula*) that we observed but never picked or ate. When we were very lucky we found parasols on wide green meadows and I remember his cautions and strict instructions on how to differentiate this from its deadly *Amanita* brother.

I have lived in the beautiful Pioneer Valley on and off since the 1980's and have made it my home. Our woods feel not so unlike the forests of my summer childhoods and when I walk I always look (and sniff) for mushrooms, and I am full of excitement and joy whenever I find some. And yet, these feelings are closely bound also to my frustration at not knowing their names or not knowing for sure if they are edible, and I invariably feel some sadness, missing my grandfather, not being able to rely on his knowledge and certainty.

This is why I decided I wanted more than a couple of books on local species and this winter became a member of the Pioneer Valley

*Continued on next page...*

Mycological Association, was delighted to join the group's Facebook page, and to sign up quickly for Fungi Kingdom University, a series of three-hour seminars. The first of these was PVMA's President Jess Evans presentation on Edible Mushrooms and Poisonous Look-Alikes. I so very much enjoyed those hours, sitting with 30 or so others, a pretty diverse group all having come together because of our various interest in fungi – gathered in the lovely hillside home of PVMA's founder and mycology expert Dianna Smith. And so I began to learn: about the different spore bearing structures: gills, pores and teeth; about habit, habitat and substrate; and the three deadly poisonous mushrooms found in our woods. On we journeyed to study choice edibles – including my beloved chanterelles. And I also learned about cinnabars and black trumpets – mushrooms that I do not remember from Austria, and that I can't wait to find and cook –



© J Benson Evans



Can you tell these two mushrooms apart? The top photo is "angel wings," *Pleurocybella porrigens*, which is now considered possibly toxic. The bottom photo is of the delicious oyster, *Pleurotus ostreatus*.

viewed and discuss oysters and honey mushrooms, maitake, cauliflower mushrooms and hen of the woods. So much passion all around that we ran out of time, and I couldn't wait to return the next week.

Soon I will be as old as my grandfather was when we made those trips into the woods. I am so grateful for PVMA and for their expert support as I begin to learn. I hope that soon I can walk with my own daughter, and that she too will learn, and rely on her mother's growing knowledge and certainty.

– Anat Weisenfreund

## THE HIDDEN FOREST Presented by Susan Goldhor

During Susan's lecture, we learned all kinds of interesting things about the interconnectedness of fungi and plants, as well as the importance of wood rotting fungi.

First we learned about how mycorrhizal fungi partner with plants to provide numerous benefits. Mycorrhizal fungi evolved with their woody plant partners and are thought to have allowed plant colonization of land. A single tree has access to 100's or 1000's of fungal partners.



© S Goldhor

Susan Goldhor enjoying a large haul of chanterelles!

Ectomycorrhizal fungal hyphae cover the root tip with what is called a mantle, making it difficult for the plant to forage for itself. Ectomycorrhizae can digest dead organic matter and share the nutrients with plants. They can find water and even free up phosphorus and other minerals from rocks. One fungus, *Laccaria bicolor*, even hunts! It uses a venom-like substance to kill springtails and then shares the nutrients with its plant partners.

Mature trees can share nutrients provided by connected mycorrhizal fungal mycelia with surrounding young trees whose leaves are often shaded by the canopy above. With limited means of converting sunlight to chlorophyll, they are not sufficiently vigorous to pass sugars on to fungi until an opening appears in the forest allowing them to grow and replace parent trees.

While mycorrhizal fungi are associated with roots, endophytes are fungi that live within the leaves or stems of plants. Most species of plants have endophytic partners. While most are beneficial, a very few are pathogenic, and some even have the ability to switch from one to the other. There may be 100 endophytic species on a single plant. It is quite a challenge to determine though, since these fungi are not easy to culture for identification purposes.

We also learned about the two types of wood rot fungi, brown and white. Fungi digest wood, leaving behind either cellulose, in a process called stringy white rot, or lignin, in a process called cubicle brown rot. The

remaining cellulose and lignin break down further to become soil.

During the sixty million years of the Carboniferous Period, wood rotting fungi appear to have been absent from swampy riparian and coastal regions of earth's tectonic continental land masses. As a result, these regions developed extensive seams of coal, especially in the northern temperate zone.

The next time you are in the woods, take a moment to appreciate the amazing work of fungi!

– Stephanie Reitman

## TRICHOLOMAS AND HEBELOMAS

### Presented by Noah Siegel

The first part of Noah's talk was on "Taking the Trickiness out of *Tricholoma*." Noah began by describing identification features. Tricholomas are mycorrhizal, with white spore prints and gills that are attached to fleshy stems, often with a slight "notch." As with other mushrooms, it is important to note both physical characteristics as well as associated trees and habits when trying to identify a *Tricholoma*. Another key identifying feature for many mushrooms in this genus is odor; it can range from cucumber to coal tar to spicy cinnamon!

The most well-known *Tricholoma* is *Tricholoma magnivelare*, which is also commonly known as "matsutake." This *Tricholoma* is a large white species with a prominent partial veil which covers the gills when young. It is mycorrhizal with conifers in our area. This is one *Tricholoma* species that has a very distinct odor; people describe it as smelling like somewhere between "red hots and dirty gym socks!" While this particular species is edible, there are many other *Tricholoma* species that are either non-edible or poisonous.

these deaths have not yet been found, it would be wise for mushroom hunters to avoid eating this particular species.

There are many *Tricholoma* species that are either poorly documented or rarely found. One such species that Noah described was *Tricholoma grave*. This is a rare species found in old growth forests. It is very large, with its brown cap ranging up to 25 cm wide, with salmon-colored gills. This kind of specimen would be a great find for our club's Citizen Science Project!

Noah also spent some time discussing *Hebeloma*, which is another genus that is not well-known or frequently studied. These are gilled mushrooms that have a brown or pinkish-brown spore print. They have a wide range of physical characteristics, including some species with veils and some without. Many times, a *Hebeloma* must be identified using microscopic characteristics, such as warty spores.

As Noah discussed, there is really only one species of *Hebeloma* that people are familiar with. This species is *Hebeloma crustuliniforme*, also commonly known as "Poison Pie." It has a buff to tan cap, and white gills that turn brown but retain their white edges. A characteristic identifying feature of *H. crustuliniforme* is its radish-like odor. Beyond this species, however, there are many more out there waiting to be studied.

Noah also noted that *Hebeloma* specialist Henry Beker is always looking for more specimens and observations of *Hebeloma*. His book, *Hebeloma*, published in 2016 and covering the European species, lists 84 species and over 1200 photos. He and his colleagues are now undertaking a study of the North American species. Please see Henry's article on page 7 for an update on this project and how we can help.

I enjoyed hearing about Noah's personal journey in mycology, which began when he was a young boy attending forays with his father. Noah was a very informative and inspiring speaker.

– Mary Obrzut

## RESISTANCE IS FUTILE: THE ALLURE OF THE CORTICIOID FUNGI

### Presented by Tom Bigelow

Tom Bigelow of the New York Mycological Society joined us this past spring to present a fascinating overview of corticioid fungi as part of the Fungi Kingdom University workshop series. What exactly are corticioid fungi? The term actually refers to a broad category of non-gilled, flat/resupinate fungi often known as crusts, and is an artificial assemblage of broadly related fungi, rather than a scientific categorization.

Corticioid fungi serve a crucial role in the environment as decomposers of wood and woody debris; while most are white-rotters, there are a few that cause a brown



*Tricholoma grave*

For example, *Tricholoma equestre*, a yellow-capped species, is frequently collected and eaten. However, this species has been suspected in fatal mushroom poisoning cases in Europe. Because the reasons for

rot. Some are pathogens, while others form a biotrophic parasitic relationships with their hosts which means they don't actually kill the wood they inhabit.

To make identifications of corticoid fungi, it is important to note first the macro characteristics and morphology, such as textures, colors, odors, and habit. Beyond that, many fungi in this group require microscopic examination to determine genus and species. While this may seem daunting to the amateur, corticoid fungi can be really exciting, especially in the winter months when they can still be found on the undersides of fallen logs and branches.

The genus *Peniophora* has several wintertime species that we may spot in our area. *Peniophora albobadia*, commonly known as "giraffe spots," is a mostly flat, circular crust with brown centers and white margins. It looks very much like its common name! *Peniophora rufa* forms bright red to red-orange, cushion-shaped



*Xenasmatella vaga*

fruiting bodies on the bark of aspens in the winter. Both of these can be identified without microscopy.

In the summer, a common corticoid fungus we might encounter is *Xenasmatella vaga*, which is entirely flat and consists of bright yellow hyphae arranged in a fan-like manner. This can be found on the underside of both conifers and hardwoods and causes a white rot.

While corticoid fungi are not often studied, they represent a diverse and under-appreciated group! Tom's presentation was well-researched and encouraged me to keep going with my own study of the mushrooms in this category.

Tom generously shared the slide show of his presentation with us. It is on our club website and is available by clicking [here](#).

– Jessica Evans

## INTRODUCTION TO THE GENUS AMANITA Presented by Bill Yule

Bill's goal with his talk was to introduce a very eager audience to the exploration of *Amanita* by section for field identification. First, he explained that all *Amanitas*



*Amanita muscaria* var. *guessowii*



*Amanita jacksonii*

develop from inside an enclosed universal veil, which is an egg-shaped membrane. When they are in this membrane, all of the fleshy parts of the mushroom are "squished" together. As *Amanitas* develop and emerge from this universal veil, the individual parts

separate and leave characteristic features to help us make identifications of mushrooms in this genus.

The first section within *Amanita* is the aptly named Section *Amanita*, which features a basal bulb at the base of the stem and a ring on the upper portion of the stem. These are remnants of the universal veil. An example is *A. muscaria*.

Bill next described Section *Vaginata*, which lacks both a ring and a basal bulb. An example of a mushroom in this section is *A. rhacopus*, which has a fragile volva or cup-like structure at the base.

The third section is *Caesareae*, and mushrooms in this group do not have a bulb but do have a membranous volva at the base. They also have a persistent ring, or annulus, on the upper portion of the stem. A beautiful example of this group is *A. jacksonii*, or the American Caesar's mushroom.

We also learned about Section *Validae*, which contains *Amanitas* featuring a basal bulb and a friable or easily breakable universal veil which leaves remnants at the base of the stem. An example in this section is *A. rubescens*, or the "blusher."

Finally, it is important to know about Section *Phalloidiae* as this section contains the two deadly species: *A. phalloides* and *A. bisporigera* (see article by Bill Bakaitis on page 10). *Amanitas* in this group have a basal bulb inside of a cup-like volva and a thick, membranous partial veil.

Bill led us through a detailed tutelage of these sections



*Amanita rhacopus*



*Amanita rubescens*

and quizzed us on each! Bill Yule is a must see facilitator and it was my extreme pleasure to attend his lecture at Fungi Kingdom University PVMA style. For more information on Amanita, [Rod Tulloss' website](#) is an invaluable resource.

– Lloyd Hubbard

## MYCOSPEAK

### Presented by Dianna Smith

When I was six years old, I lived in Germany with my parents, and like a lot of Europeans we often spent weekends foraging in the woods for mushrooms. My "instructions" from my parents were pretty simple and eminently practical for a 6 year old - they said: "You pick this kind, this other kind, and this third kind, and NOTHING ELSE!" I mean, they didn't even tell me the names, all they did was point at them!

Fast forward 54 years, I'm 60 now, and my interest in mushrooms has rekindled. Being a beginner, I didn't even have good language to describe the mushrooms I was seeing. What's an umbo? What's a partial veil?



Dianna Smith

What are adnate gills? For wanna-be mushroomers, this isn't just idle talk, it's the difference between eating the right mushroom and the wrong one! Dianna did a superb job of illustrating all this and more, and she brought along great slides – nearly all of which she took herself – and a really engaging and lively presentation.

Once the class was over, I finally felt I had the required vocabulary and the tools to relate what I was seeing in real life with what I was saw in the reference books. Regarding those three kinds of mushrooms my parents taught me, I now know them to be bay boletes, porcinis, and chanterelles. How do I know that? Mostly because I now have what it takes to look them up!

– Claus Schlund

# 2019 PVMA Scholarship Winner

## By Jessica Benson Evans

Each year, PVMA offers scholarships to its members to support their attendance at any of the local or regional forays or enrollment in educational opportunities to advance understanding of mushroom topics. Our scholarship fund comes from membership fees, guest contributions collected at walks, and honorariums earned by club members who give presentations to other clubs or the public. This year, we had several scholarships available for this purpose, as noted in the Spring newsletter. I want to encourage everyone to keep an eye on next Spring's newsletter and consider applying for a scholarship if you think attending a foray might be in your future!

As the sole applicant for a scholarship this year, I'll be attending two major forays this summer and will use the scholarship to offset the cost of attending one of these. In just a few weeks, I'll be heading to the Adirondacks to take part in the North American Mycological Association's Paul Smith's College Foray. And, over Labor Day Weekend, I'll head to the Connecticut-Westchester Mycological Association's Clark Rogerson Foray. Forays such as these bring together many professional and amateur mycologists along with citizen scientists to collect and document local fungi, offer presentations and classes on fungi, and share in the camaraderie of mushroom enthusiasts!

As a full-time single parent of a young child, attending mushroom forays is often the only vacation time I take each year. Taking just a few days away from my regular life to immerse myself in fungi and surround myself with mushroom people is just what I need to re-energize and advance my knowledge.

As your club president, I thank you whole-heartedly for the opportunity to attend such forays. I am excited to bring back new information to all of you in the coming months and will continue to do my best to share my energy with you. In the meantime, stay tuned for photos and more from my attendance at the NAMA and COMA forays in the coming weeks.



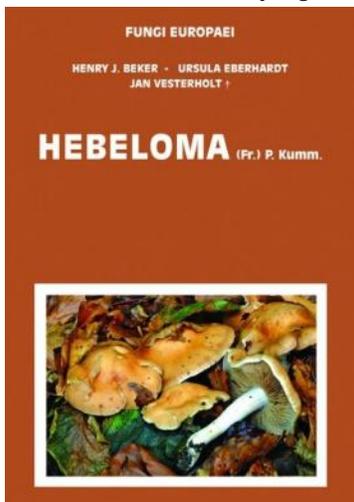
Jess and Ella

North America Update, July 2019

# The *Hebeloma* Project Progresses: Citizen Science at Work

By Henry Beker, Ursula Eberhardt, Nicole Schütz,  
and Linda Davies

For the last two decades we have been studying the genus *Hebeloma*. Our European monograph put to bed (published in 2016 as *Fungi Europaei Volume 14: Hebeloma*; see reviews in the reference list), we began to extend this work to the rest of the world. The next major area we chose to address was North America. As well as understanding the North American taxonomy, we wanted to understand the species overlap between North America and Europe.



This genus has long been regarded as difficult and consequently *Hebeloma* are rarely recorded. Within Europe there are some 300 published names and in



*Hebeloma australe* from Cape Cod. Image ©Henry Beker

North America there are over 200 additional published names. In Europe the list of published names boiled down to 54 species, and, during the course of our studies, 30 species new to science were discovered. In order to unravel the taxonomy and phylogeny of this difficult group, we developed a methodology combining

molecular analysis with the functionality provided by a powerful database, allowing the comparison of numerous morphological characters (macroscopic and microscopic) and molecular characters from several loci.



*Hebeloma excedens* from Royalston, MA. Image ©Noah Siegel

Our monograph describes in detail the 84 species of *Hebeloma* that we recognized within Europe at the time of publication; it provides keys based on morphological characters and also extensive molecular data as well as more than 500 pages of color photographs, both macroscopic and microscopic, plus a commentary on all the existing European names, their synonymies and their various interpretations. We were certain that there were still more new species to be described from



*Hebeloma velutipes* from Cape Cod. Image ©Henry Beker

Europe and we hoped that our monograph would act as a catalyst for such discoveries. Since publication,

we are delighted to have received many more collections of some of the rarer (fewer recorded collections) species described in the monograph, as well as four additional species that were not included in our monograph.



*Hebeloma brunneifolium* from Warwick, MA. Image ©Noah Siegel

As of today (July 2019), our database has details of more than 9300 collections, of which over 5200 are European and already over 3000 are from North America. The database also contains details of all the European holotypes, isotypes, lectotypes, epitypes and neotypes that we have been able to locate. We are also working on the North American types, although the analysis of many of these is still incomplete.

At the last count, the collections from Northern America represent 98 taxa (this is up from 82 at the previous count in May 2018). Of these, 37 are already known from Europe (and included in our monograph) and we can give names to a further 28 of these taxa, 26 of which are not currently recorded from Europe (the other two have been recorded in Europe since publication of the monograph). This means we still have 33 taxa, only known from North America, for which we do not yet have names. As a caveat, there may be a small overestimate here as further study may reveal that some of these "taxa" are genetic variation within a species rather than being distinct species.

When we first began our North American study, many people told us that *Hebeloma* were very rare in North America. And indeed when we looked at foray reports they were rarely recorded. Having collected *Hebeloma* in North America for the last five years, we now know that they are in fact common throughout the region. We believe the lack of recording (and probably collecting) is more down to the difficulty of determination. We hope our study will make this important mycorrhizal genus more accessible to a wide mycological community. In order to make this study meaningful we needed (and continue to need)

collections from throughout North America.

We are grateful to all who have already submitted collections. But we need further help to assemble a more representative sample, across the whole continent. To date, we have only 18 collections from Massachusetts, so we would greatly appreciate your help in finding more. This will be Citizen Science at its best! Ideally we need good collections, carefully dried and with good photographs; also good macroscopic descriptions particularly of any characters that may disappear with drying, such as odor. We can attend to the microscopic descriptions. We have developed a recording sheet for the macroscopic description (see next page).

Our goal is a future monograph on the *Hebeloma* of North America, although this is probably still several years away. However, we will of course send information regarding our determinations to contributors of material, and all such contributions will be fully acknowledged. In due course we will establish a website so that all contributors will be able to see their collections on a map of North America.

Joel Horman of the Long Island Mycological Club kindly acts as receiver for North American collections which he then packages together to send on to us. We have set up a FedEx system so that the sender should incur no cost and as little inconvenience as we can manage. Contact Joel at [jlhorman@optonline.net](mailto:jlhorman@optonline.net) and he will provide delivery instructions. Please include a copy of the completed form with your specimens.

We appreciate any help we can get with this project!  
**Henry Beker ([henry@hjbeker.com](mailto:henry@hjbeker.com)) &**  
**Ursula Eberhardt ([ursula.eberhardt@smns-bw.de](mailto:ursula.eberhardt@smns-bw.de))**

## Further Resources

Reviews of *Fungi Europaei* Volume 14: *Hebeloma*:

Vellinga, E. 2017. *Mycotaxon* 132: 993-995.

Voitk, A. 2016. *Omphalina* 7 (6): 16-17.

Issue of the newsletter *Omphalina* dedicated to *Hebeloma*: <http://www.nlmushrooms.ca/omphaline/O-VII-5.pdf>

Cripps, C., Eberhardt, U., Schütz, N., Beker, H.J., Evenson, V. S., Horak, E. 2019. The genus *Hebeloma* in the Rocky Mountain alpine zone. *MycKeys* 46: 1-54.

## Hebeloma Recording Sheet

Species	Section	Subsection	Collector	Record ID
Place Name	County/Region	GPS	Altitude	Date
Habitat Descriptor	Habitat Qualifier	Special Habitat	Special Soil Conditions	Growth Habit
Associated Organism	Substrate Descriptor	Substrate Qualifier	Smell	Taste (if recorded)

### Pileus

Shape?	<input style="width: 100%;" type="text"/>	Unicolour or 2-colour?	<input style="width: 100%;" type="text"/>	Margin?	<input style="width: 100%;" type="text"/>
Spotted?	<input type="checkbox"/>	Colour in Centre?	<input style="width: 100%;" type="text"/>	Hygrophanous?	<input type="checkbox"/>
With remains of Universal Veil?	<input type="checkbox"/>	Colour at Margin?	<input style="width: 100%;" type="text"/>	Rugulose?	<input type="checkbox"/>

### Lamellae

Tears?	<input style="width: 100%;" type="text"/>	Attachment?	<input style="width: 100%;" type="text"/>
White Fimbriate Edge?	<input type="checkbox"/>	Depth of Lamella?	<input style="width: 100%;" type="text"/>

### Stipe

Basal Shape?	<input style="width: 100%;" type="text"/>	Discolouring?	<input type="checkbox"/>	Mycelial Cords?	<input type="checkbox"/>
Interior?	<input style="width: 100%;" type="text"/>	Rooting?	<input type="checkbox"/>	Cortina?	<input type="checkbox"/>
Floccosity?	<input style="width: 100%;" type="text"/>	With remains of Universal Veil?	<input type="checkbox"/>		

### Basidiome Dimensions

Pileus Width	Length of Stipe	Stipe Width Mid	Stipe Width Base	L: # of Full Length Lamellae

*Add further description, sketches or notes on reverse*

# Amanita phalloides not spreading wildly in the Northeast

By Bill Bakaitis

In February 2019, *The Atlantic* published an article by Craig Childs entitled [Death Cap Mushrooms are Spreading Across America](#). The article relies heavily upon the expertise and concerns of the eminent West Coast Mycologist, Paul Kroeger, who has documented and is alarmed by the rapid and widespread occurrence of the introduced toxic European "death cap mushroom," *Amanita phalloides*, along the West Coast, from California northward through Washington, Oregon, Vancouver and British Columbia. The article has been widely circulated and discussed, and several people have contacted me about it. I am hoping here to respond to some of their concerns.

In each case the writers expressed alarm, I suspect in part because of the explosion of mushrooms which occurred here in the Hudson Valley last summer. Unlike the situation on the West Coast as described by Kroeger and others, I think that for mycologists in the Catskills/Mid-Hudson area this fear is largely unwarranted.

Most field guides will illustrate a dozen or two *Amanita*, usually the most common in the area they seek to represent. Rod Tulloss, arguably the most knowledgeable *Amanita* expert in North America, cites 1,072 published names of *Amanita* species, 624 of which are accepted as distinct species. Of these perhaps 170 or so have been documented in North America. In my 50 years of serious collecting, I have documented some 70-80 species of *Amanita* fruiting from NY to Maine. Many are rarely collected, several were state records.

During this time of serious dedicated collecting, I have documented *A. phalloides* only twice. In the 1980's Peter Katsaros and I collected it under a Norway spruce (*Picea abies*) in Westchester County, NY, at the Irvington Reservoir, next to Sleepy Hollow road, in the exact spot originally discovered by Sam Ristich some twenty years prior. A long careful search of the area did not reveal any other fruitings. They were not to be found on any of the other Norway spruce planted there during the mid-1930's as part of the CCC (Civilian Conservation Corps) program, nor on any of the other mycorrhizal trees in the area. A return trip to the area in 2015 failed to find it at all.

A second time, in late October 2015, at the request of Rod Tulloss, I was able to confirm a site in Dutchess County originally discovered by Steve Rock two years prior. These specimens also were collected under Norway spruce brought there in the mid-1930's. And again *A. phalloides* was found only under one specific Norway spruce. There are records of a few poisonings reliably attributed to *A. phalloides* in other Westchester County locations, but always, if memory serves me correctly, under Norway spruce plantations, which were

in public parks, likely constructed in the mid-1930's.

From New Jersey and the Mid-Atlantic states there are records of *A. phalloides* becoming mycorrhizal with other vascular species. Rod Tulloss lists several of these in his website <http://www.amanitaceae.org/> New Jersey, in particular, is well documented. In addition, Dennis Aita from the New York Mycological Society tells me he and the NYMS have been able to document it under white pine and oaks but only in a few specific sites on the north shore of Long Island and the Bronx. Likewise Dianna Smith has found it at a reservoir in Cornwall, NY, but only twice, in 2006 and 2007. A collecting partner of Gary Lincoff recalls that Gary had found it in the NY area only once, in the Bronx. In these, and other private correspondences, pine, oak, hornbeam, and Norway spruce were mentioned as the likely host trees.

In my personal experience I could find no evidence that it had spread beyond the specific tree onto which it had formed mycorrhizal attachment prior to transplantation into North America. It could not be found even on adjoining sister Norway spruce brought over at the same time. Steve Rock confirms that this is also his experience with the Dutchess County site we both have investigated.

The spread of *A. phalloides* from the original to new mycorrhizal hosts, especially in California, has been well documented but, in the experiences cited above, *A. phalloides* is spreading grudgingly – if at all – in the Mid-Hudson region north of Westchester County (roughly I84). Serious collectors I know also confirm they have never or rarely found it despite years of searching.

## Sketchy speculations and possible hypotheses

OK, then. Here is the conundrum: If *A. phalloides* was introduced to both the East and West Coasts during the same mid 1930's window of time, what might account for the current differential rate of colonization and expansion between the East and West Coast populations? There are undoubtedly many interconnected factors, with three broad categories of possibilities: differences in the habitats, in the inoculant specimens, or in the activity of the collectors.

THE HABITAT: Innumerable interrelated variables comprise what we might call "habitat": climate, weather, rainfall, substrate, soil-borne micro fauna and flora, host plant options, etc. The difficulty mycorrhizal species have in attaching to new hosts stands out as an interacting variable. Whereas saprobic species can easily move from one substrate/habitat to another – presumably because of the similarity of the sugar based carbon substrate – mycorrhizal attachment is difficult to achieve, both in the laboratory and in the field. As West Coast mushroom collectors are quick to assert, there is something in their habitats which facilitates more

aggressive growth and mycorrhizal attachment. Many competing hypotheses might explain this phenomenon, but applying Occam's razor, one might suggest a relatively simple one: Perhaps a coincidence, caused by the winter-time fruiting season of the fungus allows its freshly discharged spores an increased chance to meet with newly sprouted seeds, seeds free of the hegemony of established mycorrhiza. In the mild, rainy, West Coast winter newly fallen acorns with their unsheathed root sprouts should have a longer time to establish symbiotic relationships with fresh hyphae before frost or drought closes that virgin window (once hegemony has been established by a competing mycelium, mycorrhizal attachment is reported to become more difficult). On the East Coast, by contrast, there is often a deep freeze shortly after *A. phalloides* fruits, often pushing frost and ice several inches into the ground, effectively ending the growing season for good.

**THE INNOCULATING SPECIMENS:** A second line of inquiry may be extracted from an article appearing the [Newsletter of the Bay Area Mycological Society](#). From the article, we learn that *A. phalloides* was introduced into California not attached to the roots of Norway spruce, but on an ornamental cork oak (*Quercus suber*), again from European stock around 1938. If these two members of the same species of fungus have subtly different preferences/needs/abilities for optimal symbiotic partnerships, this would likely enable the West Coast specimens to more rapidly colonize the oaks of the area. Interestingly, if correct, this hypothesis would seem to implicate genetic factors between oak and spruce symbiotic strains of *A. phalloides*. And if so, this might also underline differences between the biological and genetic concepts of "species." As in the first hypothesis, these possible "causes" are conjecture on my part; both are offered primarily to stimulate discussion and also to set the stage for the third possibility which follows.

**THE COLLECTORS:** A third hypothesis as to why *A. phalloides* is so rarely reported in the Northeast might be because mushroom collectors here have not looked for it hard enough. *A. phalloides* is not edible, fruits late, and is not on any back-to-the-earth, paleo or trendy medicinal list. In this hypothesis, *A. phalloides* might in fact be more common than we think. It is around, but not sought or collected. If so, this is a factor easily rectified.

Several years ago Gary Lincoff was interested in enlisting local mycological associations in an attempt to document the spread of *A. phalloides* in the Northeast. Lincoff's interest still seems to be a worthwhile project, one which could involve mycological associations with meaningful field work, which was once the *raison d'être* of amateur mycology. In addition, during those delightful days of autumn when fungi are often hard to find, even sheer taxonomic beginners could delight in the joys of being outdoors, tromping through the woods, searching for the rare and unusual, having meaningful collaboration with more seasoned and experienced local

experts and interpreters of the habitat.

### Finding *A. phalloides*

*A. phalloides*, the "death cap" (or "cup") is often confused by the lay person with *A. bisporigera*, the "destroying angel." Both of these *Amanitas* contain the same lethal amatoxins and should never be eaten. Whereas the common *A. bisporigera* is usually tall, gleaming white and fruits most likely in the heat of summer, in our area, the rarely collected *A. phalloides* tends to be more squat, at times being described as "stringy," fruits late in the season, and is of a brassy yellow-green color.



Forms of *A. citrina*, because of the yellowish tinge of the cap, the large bulb at the base of the stipe, and the tendency to fruit late in the season, have at times been mistakenly identified as *A. phalloides*. A sniff test might help in making a discrimination: *A. citrina* has a potato-like odor, whereas *A. phalloides*, especially when mature, has the sickeningly sweet, chlorine-like odor of the common *A. bisporigera*.



After bringing your collection home, you will, of course, want to consult credible literature to make your final determination. A good user friendly on-line site is that of Michael Kuo's Mushroom Expert. [Here](#) is his page for *A. phalloides*. For more technical information you can

easily navigate through the sidebar directory of Rod Tulloss' [Amanitaceae website](#).

**A small addendum of sorts:** Upon returning from the persistently dry Maine last fall, and between fishing trips to the shore, I did go out several times to see what was still fruiting in the Mid-Hudson area after the rains of summer 2018. In particular I visited the site where in the past Steve Rock and I had individually collected *A. phalloides*, but look as I might, I could find no evidence of it.

Of the eight to ten separate attempts by at least two teams of experienced mycologists, *A. phalloides* had been found there on only four occasions of which I am aware – six specimens in all. I now check for it there annually. Eighty years after introduction into this location, and after repeated attempts to find it among this and other stands of Norway spruce on this large, diverse, and well documented plantation which was established in the mid-1930's – and with the original maps to guide us – *A. phalloides* here appears to be confined to only one living-room sized plot of land surrounding one particular tree, and even on this tree fruiting only sporadically. Neither Steve nor I could find any evidence of it fruiting under any other Norway spruce, white pine, birch, oak, poplar, willow or shrub in the area.



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## Medicinal Mushrooms and the Scientific Evidence

Dianna Smith has been hard at work the last couple of years, reading the scientific literature to assess the efficacy of using various fungi as medicinal treatments for a variety of conditions. While using a whole variety of fungi and fungal supplements as medicine has a long traditional history and has seen a more recent surge in interest, what is the scientific evidence that they actually work? Beyond the very effective and wide use of fungal-derived antibiotics, are there other promising avenues of treatment using fungi that are undergoing serious clinical trials? Several articles on these topics are now available on NAMA's web site, including three by Dianna (with one more coming in the near future). Follow the links below to access these carefully researched works:

Medicinal Fungi: Introduction

By Dianna Smith

[https://www.namyco.org/medicinal\\_fungi\\_introduction.php](https://www.namyco.org/medicinal_fungi_introduction.php)

Scientific Research & Medicinal Fungi

By Dianna Smith

[https://www.namyco.org/scientific\\_research\\_and\\_medici.php](https://www.namyco.org/scientific_research_and_medici.php)

LING ZHI, *Ganoderma ling zhi* (Curtis) P. Karst (1881), the Chinese Mushroom of Immortality

By Dianna Smith

[https://namyco.org/docs/Ling-zhi\\_G.\\_lucidum\\_1\\_3\\_19.pdf](https://namyco.org/docs/Ling-zhi_G._lucidum_1_3_19.pdf)

Three Popular Medicinal Mushroom Supplements: A Review of Human Clinical Trials

By Megan Frost, M.Ed., MLS

[https://www.namyco.org/three\\_medicinal\\_mushroom\\_supplements.php](https://www.namyco.org/three_medicinal_mushroom_supplements.php)



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# Biodiversity and the Bioblitz!

By Jessica Evans

On a steamy hot Saturday in early July, I joined over a hundred specialists in the woods surrounding Walden Pond in Concord, MA as part of the Great Walden BioBlitz. The goal: to observe and document as many different species as possible within that geographic area. This is the primary objective of a BioBlitz; scientists across many disciplines gather to record the biodiversity, or the variety of life in a particular habitat or ecosystem. Beyond our small team of mushroom specialists, the event was attended by experts on trees, plants, invertebrates, birds, and many more.

BioBlitz events generate vital data for scientists while providing opportunities for citizen scientists to learn how to observe and document elements of the natural world. In this case, the Great Walden BioBlitz offered guided walks for non-experts that incorporated observation and documentation of species using the iNaturalist app for mobile devices. Attendees were taught to upload photographs of their finds directly to iNaturalist, where specialists can access the observations and make definitive identifications. Unfortunately, this method does not always work well for fungi, as low-quality photographs or observations missing key features such as gills or stem bases can make it difficult or impossible to identify specimens properly.

Larry Millman and I worked as a team at two distinct locations within a five-mile radius of Walden Pond to identify a wide variety of crusts, ascomycetes,



basidiomycetes, and slime molds. The dry conditions and high temperatures made for a challenging full day of treasure hunting, but we managed to compile a list of 100 species of fungi and slime molds! While many of our finds were fairly common, we also spotted several less frequently encountered species such as *Inocybe*

*tahquamenonensis* and a beautiful *Otidea* sp.



Our list will go to the Blitz's organizers, along with the observations of all the other specialists who attended the event. Then, the data collected will be compared with lists compiled at previous BioBlitz events held in 1999 and 2009 at this same location. Such



comparisons can be invaluable in documenting trends or species loss, as well as vital in documenting the biodiversity of the greater Walden Woods area. Overall, this BioBlitz garnered over 4,250 observations of 1,112 species of plants, animals, birds, fungi, and more. Pictures and observations can be seen here: <https://www.inaturalist.org/projects/great-walden-bioblitz-2019>.

This summer, the North American Mycoflora project will be hosting a similar event called the Continental MycoBlitz. With support from National Geographic and iNaturalist, this project is an online mushroom foray that encourages participants to document all of their mushroom finds during the week of August 12-19, 2019. If you're interested in learning more about this MycoBlitz, information is available online at: <https://bit.ly/31KsCT5>.



Photo ©Alexey Sergeev

## A mushroom in peril? The Ash Tree Bolete

**By Sue Lancelle**

Most people are aware that many fungi form mycorrhizal associations directly with tree roots, a symbiosis that involves about 90% of vascular land plants<sup>1</sup>. But there are several other interesting types of interspecies relationships involving fungi that you may not know about. One of these is the ash tree bolete, *Boletinellus meruloides*.

*B. meruloides* is in the order Boletales and is a member of the Boletinellaceae family. DNA sequencing indicates that *B. meruloides* is a very ancient member of the bolete order<sup>2</sup>, and thus probably most closely resembles the ancestors of this fungal group.

The ash tree bolete<sup>3,4</sup> occurs singly or in scattered groups near ash trees. The cap is 5-20 cm in diameter and is typically yellowish brown with yellowish flesh that may bruise bluish or brown (figure above). The edges of the cap may become wavy or lobed. The pores are *meruloid*, meaning they are shallow and elongated, developing ridges and crossveins (Fig. 1), and usually bruise bluish to brownish. The stipe is short and eccentric (off center) or even lateral (attached at the edge of the cap), so the fruiting bodies often appear flattened and close to the soil surface (figure above).

As in some other fungi, ash tree boletes form sclerotia –

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**Figure 1.** Meruloid pores of *Boletinellus meruloides*.

underground knots of hyphal tissue that can lie dormant and then grow when conditions are right; for example, in the ash tree bolete the sclerotia may overwinter and serve as propagules in the spring<sup>5</sup>.

As the common name of this fungus makes clear, it associates with ash trees, so for a long time people assumed that it was a mycorrhizal association. But in 1987, Brundrett and Kendrick<sup>6</sup> described the true nature of the relationship between the fungus and the trees. They discovered that some of the sclerotia were

attached to ash tree roots, and when they examined more closely, they discovered that there were aphids living inside the sclerotia (Fig. 2)! It seems that in

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**Figure 2.** Sclerotia of *Boletinus merulioides*, attached to ash root and opened to see the ash aphids inside.

exchange for a nice safe place to live while feeding on the ash roots, the native woolly ash aphid, also called the leaf curl ash aphid, *Prociphilus* (or *Meliarhizophagus*) *fraxinifolii*, supplies sugary excretions called honeydew that the fungus can feed on. Thus the aphid/fungus association is mutualistic (both benefit) but together they parasitize the tree, although the fungus does so indirectly. Note that this aphid does not typically do serious harm to the tree.

The ash tree bolete has recently been common in our

area. However, its future is uncertain, given the rapid demise of the ash population across the eastern U.S. Just this spring, we discovered in our own woods that about 90% of the ash trees had perished. Ash trees of all species are being attacked by a variety of diseases, introduced insects, and environmental stresses. Sadly, we are in real danger of losing these trees entirely. It is not clear if *Boletinus merulioides* (and the ash aphid) will be able to survive the loss of the ash trees. Get out and find these fascinating mushrooms while you still can.

### Citations

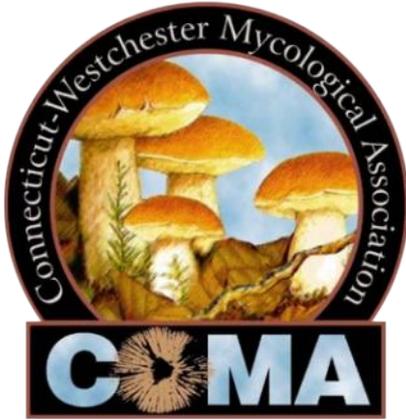
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## Happy Club Members!



Folks were pretty happy to come across an early *Laetiporus sulphureus*, or "chicken of the woods" during a club walk earlier this summer. Since then, the weather hasn't been very cooperative for the appearance of a wide variety of mushrooms, but keep your hopes up! Last July was dry as well, and we ended up with a fungal bonanza later in the summer!

# Upcoming regional forays and gatherings



## August 30 to Sept 2. COMA's Clark Rogerson Foray

The foray will once again be in Hebron, Connecticut, at Camp Hemlocks, an accessible facility located on 100 acres of unspoiled woodlands surrounding Jones Pond. A convenient, one-story building contains sleeping quarters and all the facilities we need – dining room, auditorium, lounges, pool, and mushroom display room. Foraging on the campus and in nearby state parks is reliably outstanding. We usually harvest over 300 species, and baskets of choice edibles. Enjoy our wonderful potluck on Saturday, and (weather permitting) outdoor mycophagy on Sunday. So far, our roster of invited mycologists include:

Alan Bessette, internationally-known mycologist and author  
Dr. Roz Lowen, ascomycete expert and professor of mycology  
Bill Yule, Connecticut River naturalist and bolete expert  
Leon Shernoff, editor of Mushroom, the Journal of Wild Mushrooming  
John Plischke III, author of Good Mushroom, Bad Mushroom  
Dianna Smith, past president of NEMF and co-founder of PVMA  
Featuring Julie O'Grady, Chief Mycophagy Chef.  
For more information and to register, click [here](#).

## Monadnock Mushroomers Unlimited Mushroom Show

**September 21 10:00-4:00 Jaffrey Civic Center 40 Main St. Jaffrey, NH.**

A fun-gi filled day with forays and talks on fungi identification and other topics. From Rt 101 in Marlborough, NH, turn right on Rt 124 E. Go 12.3 miles to Civic Center on the left. Park on road, in small Civic Center parking lot or in town lot (right at 2nd light past Civic Center).

## Sat., Sept. 21 The Western Pennsylvania Mushroom Club's Annual Gary Lincoff Foray

Walks, presentations, auction, book signing, sales, table-walk, mushroom feast. Rose Barn, Pearce Mill Rd, North Park, McCandless Township, PA, 15101. We plan to combine this with a walk and mushroom collection in Cook Forest State Park on Friday. Guest speakers are: Adam Haritan, Bill Russell and Rick Kerrigan. For more information, click [here](#).

