

NJMA NEWS

THE OFFICIAL NEWSLETTER OF THE NEW JERSEY MYCOLOGICAL ASSOCIATION

VOLUME 43-2 MARCH-APRIL 2013

NJMA OFFICERS

President - Phil Layton
Vice-President - Patricia McNaught
Secretary - Igor Safonov
Treasurer - Bob Peabody

DUES

Payable for calendar year
Individual: \$10.00 (online newsletter)
\$20.00 (hardcopy newsletter)
Family: \$15.00 (online newsletter)
\$25.00 (hardcopy newsletter)
Mail checks (payable to NJMA) to:
Igor Safonov
115 E. King's Hwy., Unit #348
Maple Shade, NJ 08052-3478

NJMA WEBSITE

www.njmyco.org

Bob Hosh, Jim Barg

NJMA NEWS

Editor:

Jim Richards
211 Washington Street
Hackettstown, NJ 07840-2145
njmaeditor@gmail.com

Associate editor:

Patricia McNaught
pjmчнаught@gmail.com

Art director:

Jim Barg
jimbarg@bssmedia.com

Print circulation: Mike Rubin

Deadline for submissions:
10th of even-numbered months.

Send ONLY newsletter submissions to the Editor. All other correspondence should be sent to the Secretary:

Igor Safonov
115 E. King's Hwy., Unit #348
Maple Shade, NJ 08052-3478
igs109@yahoo.com

NJMA EVENTS HOTLINE

908-227-0872 for information on NJMA events or cancellations due to bad weather. It is NOT for general inquiries or to contact officers!

CALENDAR OF UPCOMING EVENTS

SATURDAY, March 9
1:30 pm

MEETING & LECTURE

Frelinghuysen Arboretum, Morristown, NJ

Guest speaker: Dr. Allison Brown

Topic: "Mycorrhizal Fungi: the Good, the Bad, and the Delicious!"

SATURDAY, April 13
1:30 pm

FIRST-EVER NJMA GENERAL MEETING

Frelinghuysen Arboretum, Morristown, NJ

President Phil Layton's topic will largely be the new NJMA by-laws

Sunday, May 5
10:00 am

FIRST FORAY OF THE 2013 SEASON

Institute Woods, Princeton (formerly known to veteran NJMA members as "Princeton Water Works")

Friday - Sunday,
August 2 - 4, 2013

Eastern Penn Mushroomers'

ANNUAL HELEN MIKNIS MEMORIAL FORAY

Mont Alto Campus, Pennsylvania State University

(details on the EPM website, www.epennmushroomers.org)

August (6) 7-10, 2013

(Regular foray runs Wednesday through Saturday, Foray PLUS runs Tuesday through Saturday)

NEMF ANNUAL SAMUEL RISTICH FORAY

Université du Québec à Rimouski, Rimouski, Quebec

(Go to <http://tinyurl.com/aa6jjof> for more details.)

Thursday - Sunday,
October 24 - 27, 2013

NAMA ANNUAL FORAY 2013

Shepherd of the Ozarks, Arkansas

Save the date! Mushroom collecting in the heart of the Ozark National Forest, Arkansas.

Hosted by the Arkansas Mycological Society.

More details coming in the spring at namyco.org.



Directions to the Frelinghuysen Arboretum, Morristown

Traveling from the South: I-287 Northbound to Exit 36A (Morris Ave.). Proceed East approx. 1/2 mile in the center lane, past Washington Headquarters (on left). Take left fork onto Whippany Road. Turn left at 2nd traffic light onto East Hanover Avenue. Proceed for about 1/4 mile. Entrance is on left, opposite the Morris County Library.

Traveling from the North: I-287 Southbound to Exit 36, following signs for Ridgedale Avenue (bear right in exit ramp). Proceed to traffic light, then turn right onto Ridgedale Avenue. At 2nd traffic light, turn right onto East Hanover Avenue. Proceed for about 1/4 mile. The Arboretum entrance is on the right just past the traffic light at the Morris County Library.

Traveling on New Route 24: New 24 West to Exit 1A, (also labeled as Rt. 511 South, Morristown) onto Whippany Road. Stay in right lane. Turn right at 1st traffic light onto East Hanover Avenue. Proceed for about 1/4 mile. Entrance is on left, opposite the Morris County Library.

Directions to the Unitarian Society, Tices Lane, East Brunswick

From New Brunswick via Route 18: Take U.S. Highway 1 south, exit at Ryders Lane toward East Brunswick, continue to the second light, and turn left onto Tices Lane. The Unitarian Society is the 2nd drive on the right before you go under the NJ Turnpike.

From the south via the Garden State Parkway: Take Route 18 north toward New Brunswick to Tices Lane exit (take jughandle from right lane of Route 18 across to Tices Lane). Follow Tices Lane until you pass under the Turnpike. The entrance is in the woods on the left just after you leave the underpass.

From the NJ Turnpike: take Exit 9 to Route 18. Take Rt 18 South into East Brunswick. From Route 18, turn right onto Tices Lane at the third traffic light. Follow Tices Lane until you pass under the Turnpike. The entrance is in the woods on the left just after you leave the underpass.



PRESIDENT'S MESSAGE

It is really hard to think about mushrooms in early February, with the possible exception of the ones that will alter my connection with reality. Fungi are about the furthest thing from my mind. In the past forty-eight hours it has rained, sleeted, snowed – and not always one at a time.

I have been busy since my last message. We had the annual Executive Committee meeting in January. Most activities and committees were represented and reported on last year's events and upcoming issues. The 2013 foray schedule was hammered into shape without too much chaos (unlike some previous years). The status of the library and what should be done with it was discussed. There was a report on the new by-laws, including the goals and an approximate schedule for completion and implementation.

There was also a meeting of the Board of Trustees, which was the first in over a decade. The meeting was to discuss decisions that will affect club activities and its direction for the future.

Our first lecture of the year was presented by Dr. James White of Rutgers University. He spoke about some brand new (really brand new) research on the interaction between plants and fungi and plants and bacteria and how that interaction produces nitrogen useable by the plants.

Finally, we had a meeting of the Herbarium group at the Chrysler Herbarium, where we worked on cataloging and filing some new specimens into our collection. It was actually a lot more fun than it sounds.

There's one last (unpleasant) item on my list. A significant number of members signed up for the Mycophagy meeting on the 24th of February and did not show up – nor did they call or e-mail a cancellation. For popular events such as Mycophagy, we have a waiting list, and by not cancelling you kept members who wanted to attend and could have attended from doing so. Please be more considerate in the future. Thank you.

Well, that is about all the news from my perspective. Don't despair, soon it will be time to dig out your basket from the bottom of your closet where it has been become buried over the winter and head out to the woods.

– Phil Layton



MUSHROOM ILLUSTRATORS WANTED

Thank you to all who have submitted mushroom illustrations which have allowed us to enhance *NJMA News* for our members.

We are always interested in receiving accurate hand drawings, sketches, or artwork in any variety of media to grace our pages. While we cannot guarantee that your work will be published, we do file each submission and consider it for use either in conjunction with specific articles or for use as backgrounds or supplemental art when needed. You retain your copyrights and you'll be credited in all cases.

Contact our Art Director Jim Barg at jimbarg@bssmedia.com for more information or to submit your work.

2013 Officers & Trustees

PRESIDENT: Philip Layton

VICE-PRESIDENT: Patricia McNaught

SECRETARY: Igor Safonov

TREASURER: Robert Peabody

John Horvath

Robert Peabody

Eugene Varney

Dorothy Smullen

Glenn Boyd

WELCOME TO THE ONLINE EDITION OF NJMA NEWS

For the great majority of you who are viewing the online PDF of this newsletter, please note that **most web links and email addresses are clickable**. Clicking on a web or email address will launch your web browser and take you to the specified page or open your email software so you can send us an instant email. Just look for the "click finger" when you hover your mouse over these items.

**No more clumsy "writing it down"
or copying and pasting!**

ENDOPHYTIC FUNGI: DEFENDERS OF PLANTS

DR. JAMES F. WHITE'S JANUARY PRESENTATION

by Patricia McNaught

NJMA members are generally pretty familiar with the mycorrhizal fungi that have a mutualistic (symbiotic) relationship with plants, by providing water and minerals to the plant roots in exchange for carbohydrates. At the January NJMA meeting, Dr. James F. White, a professor in the Rutgers University Department of Plant Biology and Pathology, gave a presentation that briefly summarized some of the research that he and others have conducted over the last three decades. Their research is on two additional types of organisms that have a mutualistic relationship with plants: microscopic endophytes (fungi) and bacteria.

Dr. White started by reminding us that there is ongoing research to document all the microorganisms that live in, or on, humans: The Human Microbiome Project. Dr. White's research relates to understanding the microorganisms that live on or in plants; the plant microbiome (fungi and bacteria), starting when the seed germinates and continuing through maturity. He described how a single leaf of greenbrier (*Smilax*) can have hundreds of species of fungi living on it.

Dr. White's presentation focused on the fungi that have a relationship of "defensive mutualism" with their plant host. The fungus produces secondary metabolites (chemicals) that deter grazing by herbivores or insects, or enhance the hardiness of the plant by increasing its resistance to oxidative stress. Thus, plants with these fungi have been shown to grow better under unfavorable conditions such as drought. Reproduction of the fungus occurs on or in the plant. (Flies can spread spores of different mating types.) Many of these fungi are not seen on the outside of the plant; they are inside – in every part of the plant, including inside the seeds. This type of fungus is called an endophyte.

He described the different classes of chemicals produced by the endophytes, and how they function as neurotoxins, insect deterrents, and even insecticides. From the human point of view, these chemicals can be problematic, causing foot gangrene in cattle that graze on the plant, or horses to fall asleep for two to three days after eating the plant. One neurotoxin can cause sheep to have such violent tremors that they fall into a ravine or into a pond and drown after eating the plant. Not unsurprisingly, if the animal survives, it learns from the experience and subsequently avoids eating the plant.

There are other benefits to the plant from the chemicals produced by the endophytes, besides deterring grazing animals. Some of these chemicals confer resistance to fungal disease or to insect attack. In addition to drought resistance, they can cause the plant to become

more tolerant to heavy metals, salt, high temperatures (up to 122°F) or freezing temperatures.

In the second part of his presentation, Dr. White shifted to bacterial members of the plant microbiome. He presented some new research suggesting that there are bacteria living in the aerial roots of such plants as poison ivy or English ivy that can "fix" nitrogen from the air, that is, changing it to a form that can be used as a nutrient by the plant. This is of particular importance because corn forms "prop" roots that may function as air roots. The possibility of having bacteria living in the corn and making nitrogen fertilizer for the corn is an exciting one.

The type of research that Dr. White has done has been utilized mainly by the turf grass industry. (Rutgers has a Center of Turfgrass Science). But as the need to feed the world's growing population collides with an environment that is under stress from rapid climate change, there is talk of the need to bring under cultivation additional land that is now only marginal. Perhaps endophytic fungi could help us out, by helping the plants to be productive in these under-used areas.



DR. ALLISON BROWN: GUEST SPEAKER ON MARCH 9TH



At our meeting on Sunday, March 9th at the Frelinghuysen Arboretum, Dr. Allison Brown will present her lecture entitled "Mycorrhizal Fungi: the Good, the Bad, and the Delicious!" We are going to explore one of the most significant ecological phenomena uncovered in the 19th

and 20th centuries which is still on the front page of research efforts worldwide: The fungal-plant root associations called "mycorrhizae." Dr. Brown will be introducing you to some of the basics of mycorrhizal structure and function on a microscopic and macroscopic level. Then we will look primarily at examples of ectomycorrhizal fungi, learn about their roles in the ecosystem, and what plants they occur with. We will focus on a few favorite ectomycorrhizal fungal characters and their culinary potential (or lack there of, as the case may be!).



Once knew a hunter named Sven
He only picked now and then
He would pick without thinking
Then think without picking
His approach was totally Zen

– Charmoon Richardson



EDITOR'S NOTES

I would like to thank the one percent of our membership that replied to my “request” for feedback in the last issue of *NJMA News*. Those of you who took the time to respond are very happy with what we are doing. You like the mix of articles and suggest that we continue doing what we have been doing. A couple of you that we have talked to had a very different opinion. Not of what we are doing, but of how we are doing it. You just don't like getting the newsletter online. You say you have problems printing it out. You don't like sitting in front of a computer reading it. For those of you who feel that way, we really don't have any good news. As explained in the last newsletter, there are just too many advantages to “going electronic” to ever go back to a “hard copy” publication – cost, number of pages, color, “live links”, etc. We have told you that eventually the hard copies of the newsletter are likely to disappear completely – not something you really wanted to hear. There are no easy answers, and certainly, none that are going to please everyone. But, unless you “talk” to us we can't know what your ideas are. If we can help in any way to make *NJMA News* more useful to you, please let us know.

There are actually a few of you who think we should become more “computer-savvy” and put the newsletter on one of the social media like Facebook. Over the years, there have been a number of people willing to “manage a page”. There has been a *NJMA Yahoo Group* for a number of years, but it has only very limited usage by our membership. And of course, there is our website www.njmyco.org for updated information between newsletters. One topic that has arisen over the years is how big do we want *NJMA* to be, and how much information about club events do we want to “share”. I can remember, many years ago, having rather serious discussions with members about limiting the size of *NJMA*. At one point, we seriously discussed whether having fifty members was going to be too much. As you know, those restrictions were never implemented. But, there are still discussions as to how much information about foray dates and locations should be made public. These could be some of the things that need to get “hashed out” at the first-ever General Meeting of *NJMA* on April 13th.

One really good thing about contributing photos and articles to *NJMA News* is that it can make you a better “mushroomer”. One really great example is Paul Funk. See “Member's Contributions” and his article “Déjà vu” in this issue. I would like to thank Paul for his continuing contributions to the newsletter, and for learning the importance of good collecting techniques. He will be making the taxonomists a lot happier now. And a special word of thanks has to go to Patricia McNaught. Without her record number of contributions to this

issue, we would have had to rely on articles from other newsletters. I particularly like her latest addition to her series of “Tyromycologist” articles. And, John Dawson has to be thanked once again for his amazing “Who's in a Name” series.

Again (for better or worse) this is YOUR newsletter and we depend on YOU for contributions – articles, reviews, photos, drawings, poetry, whatever turns you on – as long as it is FUNgal!

– Jim Richards

WOULD YOU EAT A MUSHROOM NAMED STINKHORN?

by Danny Henley, *Hannibal Courier-Post*, Nov. 9, 2012

HANNIBAL—Offices of the Missouri Department of Conservation have been receiving this fall phone calls from residents who are convinced they have found morel mushrooms, which appear each spring across the state. What many have found, according to Becky Matney of the MDC, are stinkhorn mushrooms, which she stresses are deserving of their name.

“Stinkhorns stink to high heaven. You can actually smell them from several feet away if you're walking a trail or hiking,” she said.

Earlier this week an estimated 50 to 60 of the fungi were discovered in a yard on Broadway in Hannibal. “My wife spotted them in our daughter's yard. She was claiming they were morels and they actually look like one,” said Bob Burditt. As for the smell, Burditt likened it to a morel, only a “little stronger.”

Burditt took the mushroom his wife found to the local MDC office because “I'm curious about things like this.” “I'm a farm boy and I'd never seen anything like this before,” he said. “I was a surveyor and I never saw them, although I saw everything else. This just must be an unusual year with the amount of moisture we've gotten. The conditions must be right for them to pop.”

The stinkhorns first appear as “little pink eggs.” A day later they are slimy and sticky. “Flies will land on the top of it where it's real sticky. That's how they (mushrooms) spread their spores,” said Matney. After the sticky stage, the mushroom's head and stem begin to stiffen. “Then you pluck it like you would a morel mushroom,” said Burditt.

During his visit to the local MDC office, Burditt learned that stinkhorns are edible. Will he try one? “I'll try anything once,” he said. “I'm a poor man. I'll eat what I can find. Besides, it's cheaper than going to the grocery store.”

Burditt plans to prepare them like he would morels, by washing them and soaking them in salt water. After that he'll fry them up.

THE TYROMYCOLOGIST FIELD GUIDES

by Patricia McNaught

What to do during those months when the only fungi out there are some faded polypores? Here's a hint: Consider the best-used field guide of an expert identifier. I don't mean the field guide that they recommend to new mushroomers, or even the one that they now use the most. I mean the field guide that they used when first learning mushrooms. Invariably, that field guide is dog-eared, with either lots of little sticky notes inserted among the pages or lots of notations in the margins. Words are underlined, highlighted or circled, and there may be references to other field guides. The marked-up pages are evidence of the work and study that went into the acquisition of their expertise.

Some of this work (rewarding though it may be, it is still work) of learning fungi can be done in the off-season. Good thing, because it is a long off-season. (When I started mushrooming, I assumed that once the trees leafed out, there would be lots of mushrooms. Hah!) The approach I describe is probably of most benefit for the person who has been going to forays for a couple of years. That person has the advantage of having at least seen a lot of fungi and having a mental picture of them. Their familiarity with these species then "anchors" their work with a guide book.

Here's an example. I really like the Gilled Boletus (*Phylloporus rhodoxanthus*) – it's beautiful, unique-looking, delicious, and fairly common. But I once mistook another mushroom for it: *Chroogomphus rutilus*. So, in my guidebook, on the entry for the gilled bolete I wrote "if knob, see p. 199" and I underlined the "dry" description of the cap. On the *Chroogomphus* page I underlined "slimy when wet" and also noted the page for the Gilled Boletus. There are other differences, but they are more ones of degree. For instance, yellow versus buff gill color. I'm highlighting the differences that I consider most unambiguous. Here's another example: The common Violet-toothed Polypore (*Trichaptum biformis*) can be easily confused with *Cerrena unicolor*, and they both grow on hardwoods. In my book, I've entered "check for black" layer in the entry for both of these fungi, since that is the distinguishing characteristic. (There is a thin black layer in between the surface and the flesh of the *Cerrena unicolor*. You have to cut it or tear the fungus in two and then the layer appears as a thin black line in the cross-section.) *Cerrena's* pores are variable: elongated, labyrinthiform or tooth-like. When they are tooth-like, it's easy to confuse the two species. Start with a familiar fungus and move out from there. I review the species descriptions and then "compare and contrast," noting the differences between similar-looking species.

So, if you know the oyster mushroom (*Pleurotus ostreatus*), mark in your guidebook its differences from

the similar-appearing Angel's Wings (*Pleurocybella porrigens*). Angel's Wings, which is listed as an edible in many guidebooks, was implicated in eighteen deaths in Japan in 2004, so it's probably a good idea to avoid eating it. Now there's a motivation for your effort.

For reading before turning out the light at night, a guidebook is perfect; it will never keep anyone up until 3:00 AM. My guidebook has become the book I take with me to waiting rooms and on airplanes. (It's a great conversation starter! My seat-mate on the flight back from NAMA told me about some good places to hike. I went to one on December 23rd and came home with some mushrooms) I write in pencil in my book, rather than pen (which might smear).

Guidebook suggestions: If you use a Northeast guidebook for this work, there will be less distraction from fungi that you're unlikely to see in the field. Within the Northeast, you might want a guide that focuses on the type of area where you foray. If you primarily foray in the Pine Barrens, Arleen Bessette's *Mushrooms of Cape Cod and the National Seashore* describes a similar ecosystem. If you primarily foray in upland mixed forests, William Roody's *Mushrooms of West Virginia and the Central Appalachians* is a lovely book, with a very easy-to-use key for gilled mushrooms which sends you to the right section. Another choice for upland mixed forests is Russell's *Field Guide to Mushrooms of Western Pennsylvania and the Mid-Atlantic*. This guide is arranged by seasons, and emphasizes the edible species. My favorite is Barron's *Mushrooms of Northeast North America*. This guide covers a wider variety of species than most guidebooks: lots of ascomycetes, slime molds, and bracket fungi. I like the feature of keys by spore color for gilled mushrooms, and the quick guide on the back cover. I own two copies: a copy stained with mushroom goo for my basket, and a "clean" copy for the house.

There are many good reasons to hang out with NJMA, and not everyone is interested in developing identification skills. But if you are, a little work in the off-season will give you a head start. Some study in the off-season has an additional advantage: You won't arrive at an early summer foray feeling like you've forgotten everything you learned in the previous season.

NOTEWORTHY TIPS relating to this article

- Choose a good field guide for your area and review the descriptions of species that are familiar to you. Then compare and contrast their characteristics with those of similar-looking species. Cross-reference the page numbers and make notes or underline the key distinguishing characteristics in your guidebook.

– Patricia McNaught, Associate Editor

MAYBE PAUL STAMETS IS RIGHT? ...AND "MUSHROOMS CAN HELP SAVE THE WORLD"

submitted by Patricia McNaught

Editor's note: This article is based largely on an article by Danil Baril published online in the University of Montreal's Journal Forum. The original article came to our attention after it was republished in the July 2012 issue of Le Mycologue - the newsletter of Le Cercle des mycologues de Montréal.

Phosphorus is an essential element to life, both plant and animal. Due to its role as a nutrient for plants, it is widely used in the production of fertilizers, in the form of phosphates. Phosphates occur in rock, and the supply is a non-renewable resource. Projections of the world supply of phosphorus range from a 40-year (worst case) to a 100-year supply.



Mohamed Hijri

"This is a global crisis, but an invisible global crisis, because nobody talks about it," said Mohamed Hijri, an associate professor in the Department of Biological Sciences, University of Montreal, at a symposium last April.

Phosphorus is present in everything we eat. Phosphorus from human consumption can be recovered by water treatment plants. But phosphorus from fertilizers used in agriculture trickles into groundwater and waterways. According to a recent statement by the US Department of the Interior, "nutrient transport from agricultural fields, including nitrogen and phosphorus compounds, is one of the most serious environmental problems in the world, due to its adverse effects on aquatic ecosystems and drinking water supplies". Phosphorus and nitrogen from fertilizer run-off in the Mississippi River Basin are responsible for the Dead Zone in the Gulf of Mexico. In the next 40 years, the world population is projected to increase by 2 billion people. The FAO projects a need to double our agricultural production by 2050, about the time the phosphate fertilizers may "run out".



A field of onions fertilized traditional way, left; and right with mycorrhizal fungi.

The contamination of ground water by phosphorus happens because the phosphorus fertilizer (soluble when applied) quickly reacts with the soil and becomes unavailable. Only 5% to 15% of phosphorus in fertilizer is absorbed by the plant. "The rest binds to metals from the soil and then cannot be absorbed by the plant," says Professor Hijri. Because the phosphorus is no longer available, it must be reapplied regularly.



Carrot root colonized by a mycorrhizal fungus visible form filaments that penetrate the roots and extend far beyond. The circles on the filaments are spores.

However, as the amount of "fixed" (unavailable) phosphorus builds up in the soil, more phosphorus eventually dissolves in soil moisture. This is why high levels of soil phosphorus will lead to increased phosphorus movement to nearby bodies of water.

Solution: Mycorrhiza

Mycorrhiza is a symbiotic association between a fungus and the roots of a plant. This phenomenon is very common in nature and it is estimated that 80 to 90% of the trees and plants live in symbiosis with a fungus. Mycorrhizal fungi provide extra nutrients to the plant, including phosphorus, nitrogen and other minerals, and the plant in turn provides sugars to the fungi.

Because so much of the phosphorus is relatively insoluble, the root of a plant can absorb phosphorus only if the phosphorus is within a millimeter of the rootlet. However, a mycorrhizal fungus can absorb phosphorus that is several meters from the root and transfer it to the plant. The fungus can even use "bound" phosphorus that plants cannot use directly. Nearly 90% of the phosphorus present in the soil can be absorbed by plants when mycorrhizal fungi are present, leading to a doubling of the rate of photosynthesis, according to Professor Hijri.

Field studies done with corn in Mexico showed that

(continued on page 9)

"A ROSE IS A ROSE IS A ROSE"... BUT WHAT ABOUT A MUSHROOM?"

by Patricia McNaught

Tom Volk waded into the splitters vs. lumpers debate with the workshop he gave at the Scott's Valley NAMA Foray last December, which was titled "Cryptic Species: The Hidden Gems of Mycology". He engaged his audience immediately by projecting images of a variety of gilled mushroom. For each one, he asked, "Is this an *Agaricus*?" People called out "No!" in somewhat insulted tones of voice – after all, many who were present were competent identifiers. "Ahh," said Tom, "It depends who you ask." He explained that for Elias Fries, the father of mycology, they were all *Agaricus* specimens; in fact at one time (before Fries) there was only one genus for all gilled mushrooms, *Agaricus*. The genus *Agaricus* as defined by Fries was subsequently split into about 150 genera. (If it hadn't been, *Agaricus* would now contain more than 4,000 species!) "None of you here would argue against that," said Tom. He went on to explain that what was done in the 1800's at the genus level is now being done at the species level. While the "lumpers" in the audience considered this view, the "splitters" sat there looking smug.

Tom reminded us that of the estimated 1.5 million fungus species, 95% are yet unnamed. Most of these are probably in the tropics, because the greater host diversity (plants) leads to greater fungal diversity. In the temperate zone, the unnamed species are mostly cryptic or hidden species. Tom gave the example of *Laetiporus sulphureus*. If you ask East Coast mushroomers for their favorite ten edible species, *L. sulphureus* generally makes the list. If you ask West Coast mushroomers, almost none of them list it as a favored edible. Can tastes be so different?

According to Tom, it turns out that there are six species of the mushroom formerly known as *Laetiporus sulphureus* in North America, two in California and four in the East. And while most are brown rot fungi, *L. cinncinatus* (the one we see a lot in NJ) is the only one among the six that is a brown root rot fungus.

Tom went on to discuss the basis of defining a species. There are three types of considera-

tions, based on morphology (macro and micro characteristics of the fruiting body), biology (mating studies) and evolution (based on DNA analysis to show that all members of a genus share a common ancestor). All three approaches feed into the determination of what constitutes a new species. According to Tom, it is no longer possible to publish a claim of a new species based solely on DNA analysis. There must be additional justification based on morphology or mating studies.

Tom reviewed several cases of new species being discovered which may be "hidden" in an existing species. He reviewed the work that led to the acceptance of ten North American species of *Armillaria mellea*. The original work predated DNA analysis, and included compatibility studies of different mating strains. He also reviewed similar work that is ongoing in morels and in chanterelles. (Of course, mating studies cannot be done in chanterelles or any other mycorrhizal species.)

For those of us interested in being able to identify mushrooms, Tom made a case for the need to be aware of which species, in reality, represent groups of species. Our challenge is to see how we can use habitat and macro or microscopic characteristics to identify the cryptic species hidden in plain sight.



PHOTO BY STEVE STERLING

WHO'S IN A NAME?

Clathrus archeri

by John Dawson (thirty-fifth of a series)

The spectacular octopus stinkhorn *Clathrus archeri* (Berk.) Dring was first found in the United States by David Arora in 1981.¹ Reported from various locations in Europe and Kazakhstan during the 1960s and 1970s, it is native to Tasmania and was first described by Miles Joseph Berkeley in 1859 in Joseph Hooker's *Flora Tasmaniae* — one of many fungi there to which Berkeley gave the epithet *archeri*, in honor of the Tasmanian (or rather, Van Diemanian) botanist, architect and politician William Archer (1820–1874).²

Archer was born in Launceston, Van Dieman's Land (then part of the British colony New South Wales), the second of the six surviving children of Thomas and Susannah Archer. His father had emigrated to New South Wales from England in 1811, had married five years later, and by 1825, had become the owner of a 6000-acre estate in (what is now) northern Tasmania. The following year, Thomas was elected to the Upper House of the Legislative Council, where he took an active part in political affairs until ill health forced him to resign in 1845. He was especially known for his opposition to the continued transport of felons to New South Wales, which finally ceased in 1853 (at which time Van Diemen's Land was renamed Tasmania and became self-governing.)

The Archer family was devoutly Anglican and Thomas's three sons all received their higher education in England. William, in particular, studied architecture and surveying in London under William Rogers from 1836–40, and then spent two further years in Newcastle-upon-Tyne under the tutelage of the engineer Robert Stephenson. In 1842, he returned home and began his career as an architect. In 1844, however, his older brother Thomas William died suddenly of scarlet fever, and that same year a banking establishment in which his father was a partner failed. Consequently, William was obliged to take time away from his profession to manage his father's lands.

On 7 April 1846, William married Ann Hortle, who bore him thirteen children, all but one of whom

survived to adulthood. During the following decade, he designed a number of notable buildings, and in 1851, like his father before him, entered into politics. In 1856, however, he travelled once again to England, where he pursued botanical studies for two years and was elected a member of the Linnean Society.

Oddly, the principal sources I have found on Archer's life³ say nothing about when his interest in botany developed. On the Australian Fungi Website,⁴ however, it is stated that:

Joseph Hooker ... visited Tasmania in 1840–41 as part of the Erebus and Terror expedition and undertook some collecting trips [there] with [Ronald] Gunn. Berkeley wrote the fungal section of Joseph Hooker's 1859 *Flora Tasmaniae* ... [but though] he used the collections of Gunn, [Robert] Lawrence and Joseph Hooker in th[at] work, most of the new species recorded there were collected by William Archer. Gunn and Archer were prolific collectors over many years and as recognition of their efforts, Berkeley named several species in their honor.

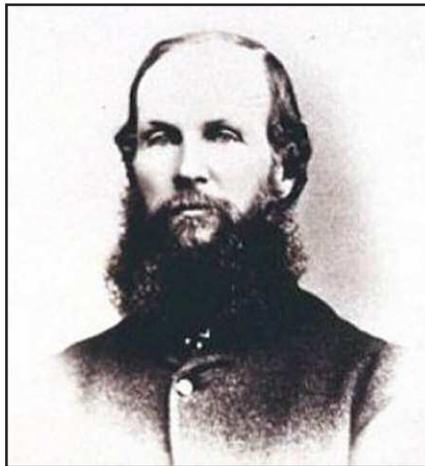
At first glance, that seems puzzling, since Archer was in England at the time of the Erebus and Terror expedition and was only sixteen when he went there; so it seems unlikely that Hooker or Gunn would have brought back specimens he had collected before that. The explanation seems to be that Archer donated specimens to Hooker (as well as drawings of Tasmanian orchids) when he went back to England in 1856, three years before the publication of Hooker's book (jointly dedicated to Archer and Gunn). He must thus have begun collecting some time before that.

On his return to Tasmania, Archer moved to Hobart and resumed his political activities.

He also served as secretary of the Royal Society of Tasmania during 1860–61 and contributed a number of botanical articles to the Society's Papers and Proceedings. He resigned from public office in 1867 and spent his last years on his estate at Cheshunt, "each year with greater financial difficulty, until he left it a broken and poor man."⁵ He died in Cressy, Tasmania, on 15 October 1874.

Historical Postscript

The names *Erebus* and *Terror* are likely familiar to readers in other contexts. The two vessels were built as



William Archer

¹ David Arora and William R. Burk, "Clathrus archeri, a stinkhorn new to North America", *Mycologia* 74 (1982), 501–504.

² Not to be confused with his grandfather or one of his uncles, both also named William, with the Irish naturalist of that name (who lived from 1830–1897 and specialized in desmids rather than fungi), nor with the American economic botanist and plant collector William Andrew Archer (1894–1973).

³ The entries on Archer and his father by G.T. Stillwell in the Australian Dictionary of Biography (available online at <http://adb.anu.edu.au/biography/archer-william-1460> and at <http://adb.anu.edu.au/biography/archer-thomas-1475>), and that by G.J. McCarthy in the *Encyclopedia of Australian Science* <http://www.eoas.info/biogs/P000023b.htm>.

⁴ <http://www.anbg.gov.au/fungi/history-pre-20-cent.html>

⁵ Stillwell, *loc.cit.* The portrait of Archer reproduced here, by J.W. Beattie, is also taken from that site.

warships, and the *Terror* took part in the bombardment of Fort McHenry during the War of 1812. Later they were refitted for polar exploration, and James Clark Ross, who in 1831 had located the north magnetic pole, was placed in charge of a voyage to Antarctica, whose principal purpose was to determine the location of the south magnetic pole. It was this expedition, which took place from 1839–43, that visited Tasmania and brought back botanical samples from there; and it was then, too, that Ross named two Antarctic volcanoes after his ships.⁶

After their return to England, the ships were refitted once again and placed under the command of Sir John Franklin, who set out in 1845 to search for a Northwest Passage. Later that year, the two ships became trapped in the ice and both crews perished from exposure and starvation. Numerous voyages have subsequently been undertaken to try to locate the wreckage of the ships, but no trace of them has yet been found. Nonetheless, searches continue.⁷



⁶ http://www.coolantarctica.com/Antarctica%20fact%20file/History/antarctic_ships/erebus_terror_antarctica.htm

⁷ See http://www.coolantarctica.com/Antarctica%20fact%20file/History/antarctic_ships/erebus_terror_Franklin.htm, <http://www.pc.gc.ca/eng/culture/expeditions/erebus-terror.aspx>, and <http://www.thestar.com/news/canada/article/1246167--arctic-search-renewed-for-erebus-and-terror-lost-ships-of-franklin-expedition>.

THE DISTINCTIVE FLAVORS OF MUSHROOMS

from Harold McGees *On Food and Cooking: The Science and Lore of the Kitchen*, reprinted from the newsletter of the New York Mycological Society, Summer 2012.

We prize fungi for their rich, almost meaty flavor and their ability to intensify the flavor of many dishes. These qualities are largely due to a high content of free amino acids, including glutamic acid, which makes mushrooms – like seaweeds – a concentrated natural source of monosodium glutamate. Another taste enhancer that’s synergistic with glutamate. GMP (guanosine monophosphate), was first discovered in shiitake mushrooms, and contributes to the rich taste.

The characteristic aroma of fresh common mushrooms is mainly due to octenol (an 8-carbon alcohol), which is produced by enzymes from polyunsaturated fats when the tissue is damaged, and which helps deter attack by some snails and insects. More octenol is generated from the gill tissues than from other parts, and this is one reason that common mushrooms with immature, unopened caps are less flavorful than the mature version with prominent gills. Brown and field mushrooms have more flavor than the white mushrooms, and the “Portobello,” a brown mushroom allowed to mature for an additional five or six days until its about 6 in/15 cm across, is especially intense.

Other mushrooms offer a wide range of aromas. A close relative of the common mushroom produces the essence

of almond extract, while more exotic species are valued for such flavor notes as cinnamon, pepper, garlic, pine needles, butterscotch, and shellfish. Shiitake mushrooms owe their distinctive aroma to an unusual molecule called lenthionine, a ring of carbon and sulfur atoms, which is created by enzymes when the tissue is damaged. Lenthionine production is maximized by the common practice of drying and the rehydrating shiitakes in warm water fits minimized by rapid cooking of the fresh or dried mushroom, which destroys the enzymes before they have a chance to act. With a few exceptions (chanterelles, oysters, matsutakes), drying intensifies mushroom flavor by a combination of heightened enzyme activities and browning reactions between amino acids and sugars. Shiitakes and boletes, or porcini, are familiar examples. And especially flavorful because they’re endowed with sulfur compounds that generate meaty aromas. Even home-dried button mushrooms are far more flavorful than the fresh originals, though they lose their fresh mushroom octenol.



MAYBE PAUL STAMETS IS RIGHT? ...AND “MUSHROOMS CAN HELP SAVE THE WORLD”

(continued from page 6)

field “mycorrhization” made it possible to reduce chemical fertilizers by three quarters, thus lowering the cost of fertilization.

Tests of large-scale planting of soybeans, potatoes and onions with mycorrhizal fertilizers have been very positive. One test showed that sorghum yields increased from 7.5 to 9.3 tons per hectare when phosphate fertilizer was reduced by 50% from the control, if the test plot was inoculated with mycorrhizal fungi. And because some soils are naturally rich in phosphate, it is projected that mycorrhization of agricultural fields could eliminate the need for phosphate fertilizers.

If the solution to better phosphorus utilization is known, why is it not being widely practiced? One reason is because the mycorrhizal fertilizer producers also manufacture phosphate fertilizer and phosphate fertilizers are more profitable. Additionally, it is difficult to change agricultural practices. In Western Canada, the soil is naturally rich in phosphorus. After years of phosphate fertilization, continuing to apply phosphates has no benefit, yet that is still the recommendation of government agricultural agents (at a cost of \$1,600 Canadian per acre). And according to Professor Hijri, “too much phosphorus inhibits mycorrhiza”.

Clearly it’s time to get serious about using mycorrhizal fungi in agriculture. A solution that feeds people and results in cleaner rivers and streams? Let’s do it.

Google Mohamed Hajri to see a short lecture by him on YouTube. Don’t forget to press the CC button for English subtitles if your French is rusty.





BYTES, BITS, & BITES
TASTY LITTLE TIDBITS FROM OUR MEMBERS

from Judy Glattstein:

Mushroom Recipes from the New York Times:

<http://www.nytimes.com/recipes/1014474/Wild-Mushroom-Stock.html>

<http://www.nytimes.com/recipes/1014475/Wild-Mushroom-Soup.html>

from Pete Bohan:

While I'm at it, check this story out: New Girl Scout cookie uses Shiitake mushrooms (among other things):

http://gothamist.com/2013/01/16/meet_the_new_healthy_girl_scout_coo.php

from Pat Bogue:

Subject: New Zombie-Creating Fungi Discovered (VIDEO)

It started in Home Depot, go figure. I happened to spot an attractive young woman who had a remarkable resemblance to, well, a zombie! When I first glanced at her, I thought she had a commonly seen disability but upon a second look, I truly was surprised, same rolling/shuffling gait, same white-eyed look. As she seemed to see where she was going, I don't think she was blind. She wasn't acting for a film since there were no camera crews around. I did not know what to think, so I went on the internet to see if I could be enlightened somehow as to what her affliction might be. Instead, what I did find was a very scary condition that affects many in the insect world caused by our good friend(s) the fungi *Cordyceps* (evidently there are many species of *Cordyceps* that cause insect disease). Eeek! View the linked video! Actually I think I saw portions of this video previously, because it was aired on the BBC network, but I don't remember seeing all of this! I guess it's one of nature's checks and balances to keep any one species from getting overpopulated as the video infers.

Still don't know what to think about the woman though. :(

http://www.huffingtonpost.com/2011/03/02/zombie-creating-fungi-cordyceps_n_830558.html?view=print&comm_ref=false

from Pete Bohan:

Hey Jim,

Have you seen this? Great article about Oyster mushrooms in the *Huffington Post*:

http://www.huffingtonpost.com/mobileweb/paul-stamets/oyster-mushroom_b_2522084.html

Enjoy!

from Gene Varney:

Thanks for passing this on. It is a good summary for future use. Did you send the reference to AJ?



from Paul Funk (in reference to above photo):

Hi Jim,

I believe this is *Aleuria rhenana*. From what I can find out, this might be a special find. Barron's says it is rare west of the Mississippi and David Arora has only seen it twice; once in Washington state! This photo was made January 15, 2013 in Mercer County.

from Dorothy Smullen:

Hi Jim.....thanks for the photo. From the pictures online this species is orange. I don't see any orange in this photo. (and I didn't see anywhere that the orange turns brown). Also the new genus name is *Sowerbyella*. It could be a different species in the genus more common in the east coast. I have to check. I would hold off on naming it for a while.

from Nina Burghardt:

Hello Jim,

I had the same problem as Dorothy, but the second picture came through OK. I do not know this mushroom. It had only been recorded once before – at 2011 Fungus Fest. According to *Mushrooms of Northeastern North America* by Bessette, it should have ribbing on the stalk, but the picture does not show the stalk. *Sowerbyella rhenana* is synonymous. The herbarium has no specimen so Paul should hold onto the mushroom if he has dried it.

from Jim Richards:

From *Specialty Food News* Blog 1/19/13:

US Mushroom & Truffle Market Explored in New Topical Research Report by BAC Recently Published at MarketPublishers.com

LONDON – (BUSINESS WIRE)–The United States is the second largest mushroom and truffle producer worldwide, giving the pass only to China. The country's use of mushrooms has been steadily going up over the past several decades. The greatest per capita mushroom consumption is in the West and Midwest. Fresh mushrooms are in the highest demand, which is mainly attributed to major pizza chains shifting from using canned to fresh mushrooms. Looking forward, the industry is anticipated to witness fresh use upsurge as fresh packaging innovations increase and the demand for specialty

(continues on page 14)

CALIFORNIA MUSHROOM DREAMIN' NAMA 2012

by Patricia McNaught

Scotts Valley, where the NAMA 2012 Foray was held in mid-December, is a few miles inland from the Coast, just north of Santa Cruz. The Mission Springs Conference Center, where we stayed, has several miles of hiking trails through redwood and mixed forest. It was an ideal location for foraging on the spur of the moment. The first evening's presentation highlighted the factors that created the unique ecosystem that encompasses much of California. In addition, the particular habitats that different walks were going to visit were described. The presentation helped me understand why, a day later, I was struggling up a steep sandy slope while foraging miles away from the coast. (The fault line is close to the shore; periodically the shore area is lifted up. Over the ages, this has led to the creation of inland sand hills.)



An Amanita bustin' up in California

Tree height is limited by the need to convey water to the topmost leaves or needles – the constant mists and drizzle (except for the dry summer) allow the redwoods to make our soaring tulip trees seem short. This moisture leads to prolific fruiting of fungi, and also makes for bone-chilling cold. Fifty degrees felt like twenty, and the cotton shirts I had brought never made it out of my suitcase. In the display area, it was fascinating to see such a different array of species than you would normally find at a Northeast event. It was primarily the mycorrhizal fungi that were enormous compared to ours; the saprobes were similar in stature.



Patricia McNaught, Todd VanGordon, and Tom Volk

The “cultural norms” at the foray were different from my expectations. It seemed that East Coasters were the only ones using scientific names. I was also struck by the emphasis on edibles: it seemed acceptable to collect at the foray for personal use. I was concerned when a walk leader assured an inexperienced mushroomer that she could take home blewits (*Lepista nuda*) and eat them. In New Jersey, it would be foolish to do that without first making a spore print, because of the poisonous *Cortinarius* lookalikes. Later, in conversation with a local mushroomer, I learned that there are no poisonous blewit lookalikes in California. Woe to the unwary Californian who comes to New Jersey and collects blewits.

My primary interest was the walks, but it was hard to pass up the workshops, which covered a broad array of topics. I appreciated the opportunity to hear (and foray with) some of the “big names” in mushrooming who rarely make it to the East Coast. David Arora's presentation on the last evening was particularly inspiring. He used his mushrooming experiences as a springboard for what was almost a meditation on life. David described a conversation with a commercial matsutake picker, who is so attuned to the area where he forays, that he can scoop up a handful of sand and predict from the moisture level that the harvest will be ready in three days. Matsutake are best harvested before they emerge from the ground. When it comes time to harvest, David said, the picker doesn't dig around to find them but goes directly to them, and plucks them out of the ground. David's presentation reminded me that mushrooming isn't all about finding and identifying and maybe eating mushrooms; it is also about being in harmony with nature.

This year's NAMA foray has been scheduled for late October in the northern Ozark Mountains. It's a 19 hour drive from New Jersey, but only about two hours from Little Rock. I've already started keeping an eye on the airfares.

NJMA 2013 COMMITTEE CHAIRS AND ACTIVITY/INTEREST GROUP LEADERS

<i>Archives/Historian</i>	Bob Peabody
<i>Book sales</i>	Herb Pohl
<i>Culinary</i>	Jim Richards
<i>Cultivation</i>	A.J. Bozenmayer
<i>Dyeing</i>	Ursula Pohl
<i>Education</i>	Patricia McNaught
<i>Foray</i>	Bob Hosh
<i>Fungus Fest</i>	Terri Layton
<i>Herbarium/Slide Library</i>	Dorothy Smullen
<i>Holiday Party</i>	Virginia Tomat
<i>Library</i>	Bob Hosh
<i>Membership</i>	Igor Safonov
<i>Mycophagy</i>	Jim Richards
<i>NAMA representative</i>	Ursula Pohl
<i>NEMF representative</i>	Mike Rubin
<i>Newsletter</i>	<i>Editor - Jim Richards</i> <i>Art Director - Jim Barg</i>
<i>Nomination</i>	Glenn Boyd
<i>Photo Contest</i>	Jim Barg
<i>Public Outreach</i>	Terri Layton
<i>Ray Fatto Scholarship</i>	Mike Rubin
<i>Sunshine</i>	<i>[OPEN]</i>
<i>Taxonomy</i>	<i>[OPEN]</i>
<i>Toxicology</i>	Mike Rubin
<i>Victor Gambino Foray</i>	<i>[OPEN]</i>
<i>Website</i>	Jim Barg

DÉJÀ VU, OR BAD SCIENCE?

by Paul Funk

Last April, while checking for early signs of morels at Princeton Waterworks, I found and photographed a gilled mushroom. I identified it as a possible *Marasmius oreades* and submitted photos of it to NJMA. The response I received stated that this species had not been recorded at this location before and could not be verified without a dried specimen. Unfortunately, I had no dehydrator at the time, and no specimen was collected. The photos were published in *NJMA News* 42-3 as an "unidentified gilled mushroom." I was disappointed in myself for not collecting a specimen, as this actually left the story unfinished.

As last year progressed, I photographed mushrooms complacently, being satisfied they would be easy to identify on sight or by a photo, and forgot about the need to collect and dry specimens. In fact, I only managed to dry one specimen from the Pine Barrens this past year. It was dried by the sun on the dashboard of my truck. It is possibly a *Dacrophynax spathularia*. (see photo) I had to go to Bessette's *Mushrooms of the Southeastern United States* to find this one and it is described as being found infrequently. At least, I now have one photo with a dried specimen that should conclusively identify an infrequent find. Perhaps NJMA's Taxonomy Group will show me how to voucher this fungus microscopically.



PHOTO BY PAUL FUNK

Dacrophynax spathularia

Recently, I seem to have started the year off by disappointing myself once again. I returned to Princeton Waterworks on January 15, the last day of an unseasonably warm spell. The previous few days had been so warm that I did not mind mushrooming in the pines for an entire day with soaking-wet feet. I remember thinking of this climatic anomaly as if it were Indian Summer in January. The end of this warm spell was marked by a big drop in temperature and a threat of snow. The cold, along with a snow-laden sunless sky meant that taking good photos would be difficult. The

fungi were few and far between and all on wood. There were some *Galerinas* (stragglers from the fall) and *Pleurotus*, which are typical winter mushrooms. On one log, I noticed three different fungi: two different wood-ears and a stalked orange-cup fungus. (see photos) I photographed them as best I could and called it a day. When I returned home, I began to compare my photos with the literature in order to identify my finds. All the ears were easy enough to identify, they were *Auricularia auricula* and *Auricularia polytricha*.



PHOTO BY PAUL FUNK



↑ *Auricularia auricula*

Auricularia polytricha ↓

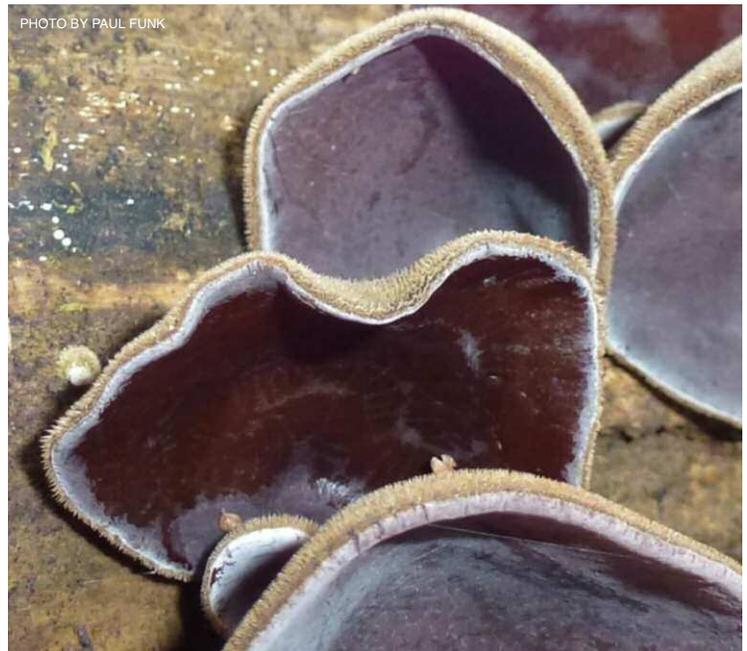


PHOTO BY PAUL FUNK

However, it seemed interesting that the *A. polytricha* was not in any of my Northeastern mushroom books and I ultimately found it in *Mushrooms of the Southeastern United States*.

The orange-cup fungus seemed to fit only one of the descriptions in George Barron's book *Mushrooms of Northeast North America*, and that was *Aleuria rehnana*, the False Orange Peel. Further reading proved this orange cup could actually be a rare mushroom.



years ago, and the business is currently gathering speed. The best conditions for growing these fungi are in the Mid-Atlantic States, such as Tennessee, Kentucky, Virginia, North and South Carolina.

New research report "*Mushrooms and Truffles Market in United States: Business Report 2012*" elaborated by Business Analytic Center (BAC) offers a comprehensive guide to the mushrooms and truffles market in the United States.

Starting with a brief country profile, the report closely investigates the US market for mushrooms and truffles focusing on domestic production and consumption. It identifies the leading market players, including the top producers, wholesalers and distributors. The study delves deeper by examining the foreign trade, evaluating volumes and dynamics of imports/exports within the mushrooms and truffles sector in recent years. Further, a detailed listing of all major US consumers of mushrooms and truffles is also at hand in the research.

Report Details:

Title: *Mushrooms and Truffles Market in United States: Business Report 2012*. Published: January, 2013. Pages: 90. Price: US \$1,160.00

http://marketpublishers.com/report/industry/agriculture/mushrooms_n_truffles_market_in_united_states_business_report_2009.html

Even where it is largely found, west of the Mississippi, In his voluminous text *Mushrooms Demystified*, David Arora says he has only seen it twice; once in Washington State and once near San Fransisco. He also says there is one relative with a close resemblance, but I could find no illustrations of that species. So just like last year, I sent my photos with a possible identification to NJMA. Again the response I received was that my photos did not show enough information and that I should have dried a sample for taxonomy. However, I had thought my photos would suffice and did not bother to obtain a sample.

Because I am still without a dehydrator, I'm left only with some dark photos to show for my encounter with the stalked orange cup, which that could be rare or a new-to-New Jersey fungus. Apparently, I failed once again to collect adequate evidence to make a genuine contribution to science. This recurring disparity in my mushrooming endeavors at the Waterworks seems like déjà vu, but unfortunately, it was just me practicing bad science. I hope that when I can identify, microscopically, the dried *Dacrophyax spathularia* mentioned in this article, I will begin to employ mycology correctly and one day be an amateur mycologist.



BYTES, BITS, & BITES (continued from page 10)

mushrooms continues its upward trajectory.

Mushrooms and Truffles Market in United States: Business Report 2012

Truffle production has expanded to the US some thirty

from Joan Wood:

I am submitting this photo of the most beautiful mushroom I ever saw, never mind took a picture of--and I took the picture because, sad to say, I couldn't identify it



PHOTO BY JOAN WOOD

then and have never been able to positively identify it! Which might disqualify the photo if not me! I found it in a campground in eastern Ohio in the fall. There were about 5 others near it, in moss under some kind of ash and conifer trees.

from Jim Barg:

Laccaria ochropurpurea. GORGEOUS photo!!!!

Jim

from Jim Richards (editor):

I was pretty sure that I knew what it was but just wanted confirmation from one of our better identifiers. The mushroom is *Laccaria ochropurpurea*. With your permission we will use the photo in the next newsletter crediting you for the beautiful photo. Thanks!

from Joan Wood:

O WOW! Thanks for the ID and acceptance! I realize that I should have asked the gang at NJMS before this...duh!

from Igor Safonov:

Based on what I can gather from the picture, I would go with *Laccaria ochropurpurea*, but either Nina or John would give you a more definitive answer. One thing for sure, this is definitely not a *Cortinarius* species.

Yes, it's too robust, and has a wrong stature to be a waxy cap. My recognition of gilled mushroom statures in fairly good shape (at least for a few major/common genera), but when it comes to identification to species, my knowledge is still very superficial, and a wild goose chase through mushroom guides frequently leads to dead ends, too. Apart from *Laccaria trulisata*, I haven't encountered that many *Laccarias* to begin with, which makes identification studies difficult, especially from a single picture.

I went with *L. ochropurpurea* because of the gill color, a thick bulbous stipe, and its association with both conifers and broadleaf trees. Besides, it happens to be a common *Laccaria* to the east of the Great Lakes. Still, I could be 100% wrong. Need to look at the spores.

Igor

from Nina Burghardt:

I agree with Igor. I am sure this is a *Laccaria*. The gills are wide and have a waxy heavy look. The stipe (stem) is fibrous, swollen close to the base, and the cap is silvery-brownish-purple, which is typical of *ochropurpurea*. *L. ochropurpurea* likes a mixed wood and is fairly large compared to other *Laccaria*. *Laccarias* have white spore prints. When looked at under the microscope, the spore is roundish with spikes (*Russula* and *Lactarius* have similar spores). *Laccaria* is a fairly small genus but

hard to identify to species. *Laccaria ochropurpurea* is not toxic, but not very good to eat. It could possibly be mixed up with *Cortinarius*, which has a brown spore print and is very toxic. I think identification would be easier if we knew the size of the mushroom.

Nina

from Joan Wood:

O, if only I had taken a spore print. Well, next time. It was 3-4" in length. None of the pics I have of *Laccaria* are anywhere as deep a purple as this beauty was. Some days out there you just get lucky with purple, I guess.

I fall on my KNEES to Nina B – not only a fabulous identifier but generous with Morel places. I have heard it rumored that she can even find Truffles (!) here in the east. And I know people who would trail along behind her like a row of baby ducks and pay real money to watch!

Thanks to all of you – I am thrilled to have a name and a rumor of edibility.

old, not bold,
joan

from Jim Richards (editor):

I just received the photo below from Paul Funk, and is a perfect follow-up to his previous contributions – the *Sowerbyella* and his "Déjà vu" article. He has learned to take a spore print and to save specimens:

Hi Jim,

Here is one from this month. February 15 after several days of freezing weather the temp rose 57 degrees and I found this on a log. I know you probably don't need it for this issue. Anyway, I thought this mushroom was quite old by the color of the stipe. Then I saw that this was a "velvet stalk" *Flammulina velutipes*. It was easy to key out with a white spore print, a dark velvety stipe, attached gills and it was fruiting in cold weather. Also, I did dry and save it.



PHOTO BY PAUL FUNK

TRUFFLES 101

from various sources, reprinted from *Spore Prints*, the newsletter of the Oregon Mycological Society.

Truffles are the fruiting bodies of underground fungi. They have a strong odor and rely on being eaten by animals for spore dispersal. Truffles grow all over the world and embrace hundreds of species, but the three most highly valued in Western cuisine are the White (Alba) truffle, the Black (Perigord) truffle, and the Summer/Burgundy truffle.

White Truffle

(*Tuber magnatum*)

This is the most rare — and expensive — of the European culinary truffles. The white truffle is at its peak of flavor in October and November and comes from the Langhe and Montferrat areas of the Piedmont region in northern Italy and, most famously, in the countryside around the cities of Alba and Asti.



Winter Black Truffle

(*Tuber melanosporum*)

Although not as expensive as *Tuber magnatum*, *Tuber melanosporum* is called The Black Diamond because of its high price. It is harvested from November to March and is at its peak of flavor right now during the month of January. This truffle is sometimes called the “Perigord” truffle, although only 20% of production comes from Southwest France. The majority of French black truffles are today harvested in the Vaucluse department of Provence. It also grows in Spain, Italy, and the Balkans.



Summer or Burgundy Truffle

(*T. aestivum/uncinatum*)

Molecular analysis showed in 2004 that the burgundy truffle (*Tuber uncinatum*) and the summer truffle (*T. aestivum*) are one species, although differences in appearance and pungency, probably due to environmental factors, result in a difference in price.



Burgundy truffles

The more expensive of the two is the Burgundy truffle, which has an intense, hazelnut-like aroma and is highly prized for its gastronomic qualities. They are used in the haute cuisine of France and Italy, as well as a substitute for the Perigord black truffle (*T. melanosporum*). Like other truffles, they are also canned and bottled for export.

Burgundy truffles are harvested from September to late December, sometimes until late January. They have a wider distribution than any other truffle species. Burgundy truffles are found across Europe, from Spain to eastern Europe, and from Sweden to North Africa. In France they are found mainly in the northeast and in Italy in the north. In the United Kingdom they were

plentiful prior to the 20th century but are now rare.

Summer truffles

The flavor, size, and color of summer truffles are similar to those of burgundy truffles, but their aroma is less intense and the flesh is a paler hazel color. As their name suggests, summer truffles are harvested earlier than burgundy truffles, from May to August. They are most often found in the southern part of their distribution area, notably in the Mediterranean climate areas of France, Italy, and Spain.



GUIDELINES TO REDUCE ERRORS IN DNA SEQUENCES

<http://www.laboratorytalk.com>, November 9, 2012, reprinted from the Puget Sound Mycological Society's newsletter.

DNA sequence data are an indispensable source of research information in biology. But not all data are reliable. Almost 10% of all fungal DNA sequences are, for example, incorrectly identified to species level.

To combat this, a team of researchers at the University of Gothenburg, Sweden, has prepared a guide to assist the scientific community in the quality control process. “Many researchers perceive quality control as difficult,” says Henrik Nilsson at the University of Gothenburg, the lead author of a new scientific article on DNA sequence quality which has been published in the open-access journal *MycoKeys*.

“There are, quite simply, no guidelines that you can hand out to new or established researchers so that everyone is using the same approach. Which is why there are major differences in how, and to what extent, quality control is carried out in the research community.”

One complication is that the software that is available to carry out parts of the quality control is cumbersome and often requires considerable computer capacity.

The research group feels that it is not appropriate to require all biologists to have access to and be able to use such complex computer systems. This is why they have written an article describing how quality control can be carried out manually without any tools beyond an Internet browser.

The article features a number of principles and observations on DNA sequences at different quality stages. Although the guidelines focus on fungi, where DNA sequences have had a particularly significant impact as a research instrument, they are general and can be used for most genes and groups of organisms.

The guidelines relate to traditional DNA sequencing as it is used in systematics, taxonomy, and ecology.

The researchers hope that it will help readers to improve their DNA sequences and so halt the trend of increasing noise in the public DNA sequence databases.



THE LITTLE MUSHROOM THAT CHANGED HISTORY

by Ted Elliott, reprinted from *Mainly Mushrooms*, newsletter of the Maine Mycological Society, October-December 2012.

Michaeline did a great job with the tables Saturday, August 25. She came in with these “Caesar’s” mushrooms. I had to take a shot, and we were off walking. Good thing I had sunglasses on as these dazzle like rainbows in the hands.

Described by Persoon 210 years ago, this is the little mushroom that changed history - some - a little. Caesar was already 62, so Nero probably would have replaced him anyway, but one never knows how chains of events may turn.

The word *Amanita* is Greek, probably from the south coast of Turkey, though it was used in a generic way. *Boletus* was used in the same way by Romans.

You may know the story: In 54 AD, Claudius was victim of a fiendish plot by wife Agrippina who wished to put her biological son Nero on the throne. (Not too far from Congressional hostilities these days.) I like the old name *A. caesaria*, but I can’t change the evidence for reclassification to *Amanita jacksonii*. It is native to N. Africa and S. Europe, and N. America and probably Asia. Claudius was physically weak, suffering from, depending on whom you read, Asperger’s, polio, Tourette’s syndrome, or even cerebral palsy. But he was a scholar! He wrote eight volumes of Carthaginian history (Those horrific wars were already 200 years in the past) plus an Etruscan dictionary, and was the last known Roman to speak Etruscan. Thank the Etruscans for those graceful arches! He was a great builder of roads, bridges, and aqueducts bringing more clean, fresh water into the City.

Eleven years earlier, Claudius successfully invaded England with 40,000 men in 800 ships. Within a dozen years Romans had fanned out and subdued most of Britannia, but he didn’t live to see the most ferocious fighting in the history of the British Isles. The revolt of Boudicca in 61AD saw 80,000-100,000 Celts killed in a day. It was Boudicca’s last fight.

If you’re over there, look for Thorneycroft’s 1902 statue of Boudicca near the Houses of Parliament. Historically inaccurate, but it’s an icon. Boudicca was greatest heroine in history of Britain: and the revolt almost worked. Bored? Read 2007 *Boudicca’s Last Stand* by John Waite.

I find it totally fitting that Caesar’s *Amanita* is found mostly in August, the month of Augustus.



NOW SHOWING: POST-APOCALYPTIC TOXIC FUNGI VERSUS ASIAN SUPER PRINCESS

a DVD review by Ron Post, Puget Sound Mycological Society

It’s one of Hayao Miyazaki’s older and perhaps least-known animated films (if you haven’t seen “My Neighbor Totoro” you’re missing something) yet the story behind “Nausicaa of the Valley of the Wind” is completely familiar to anyone who has thought about the greatest threat to the human race: toxic fungi that start to penetrate the far reaches of the earth 1,000 years after an all-out war has destroyed most of mankind. We all worry about such impending doom, don’t we? Anyway, the first scene of “Nausicaa” shows a seriously sporulating forest of mushrooms and weird, bulbous, fern-like trees casting off their shiny-deadly reproductive structures in the direction of two of the film’s main characters, who must wear special breathing masks so as not to be overcome by the fouled air. And of course, the threat of these spores is spreading, destined to poison the entire, as-yet-unforested planet. So what’s the big deal?

The sweet Princess Nausicaa understands what is going on, and when she doesn’t, she takes her time to assess things: “Oh no, they must have landed and angered the insects!” When she isn’t busy saving the lives of her people, she comes to suspect that the fungi are playing some sort of beneficent role even as they wreak ecological havoc on the remaining humans. She also seems to be in psychic control of evil bugs that can swarm out of the ever-expanding toxic forest (which of course is the prime habitat for the toxic fungi.) The giant insects, for some reason, seem to want to deal harshly with the less-than-intelligent, surviving humans. Shades of Mothra! After all the threats (from ignorant, warring humans as well as toxic fungi and giant bugs) become clear, let’s just say that the plot gets even more involved. But fungi never lose their place of supremacy (underground as it may be) in this 1980s sci-fi fantasy.

“Look at that cloud of spores,” says the princess a few minutes into the film. “It’s the jungle’s poisons taking their toll,” says the wise old man, Lord Yupa, voiced by Patrick Stewart (aka Captain Jean-Luc Picard). But this isn’t “Star Trek.” Go ahead and root for the toxic fungi. I did.

Nausicaa never loses her flair for problem-solving, even though the rest of the planet wants to annihilate everything that lies within the path of the spores (the giant bugs are no saving grace, either). Only the princess sees how stupid people can be in the face of such threats. She convinces people of her vision, though it’s almost too late.

The artistic accomplishments in this film are not quite up to the level of Miyazaki’s other films such as “Totoro” and “Arietty.” But the film is worth the purchase price if you can find a DVD to buy; don’t count on finding a copy to rent. Most of the rental copies have either been appropriated for sale or been stolen. The Disney version, released also on BluRay, is probably easiest to purchase (if \$35 is easy).



NJMA EDUCATION CLASSES for the 2013 SEASON

Highlights: We have four new workshops this year. A **Shiitake Cultivation Workshop** will be offered in addition to the oyster cultivation workshop. In the **Scientists in the Kitchen Workshop**, participants will help cook and then conduct blind taste testing on mushrooms to see how true some of the common “wisdom” about edible mushrooms is. We are offering a **Russula Identification Workshop** which will focus on microscopic characteristics. No more “JAR: Just A Russula”. And in November, we will have a **Tree Fungi Jewelry Workshop** for the first time in many years. None of the workshops would be possible without the generosity of the workshop leaders; many thanks to you all.

Pre-registration is required for all classes, and they are limited to 25 attendees (unless otherwise noted). Until at least April 1st, only registrations from members will be accepted (by mail or on our website, www.njmyco.org/education.html). After that time, registration for most of the workshops will be open to non-members. (A printable registration form is on page 21.) You can also click on the class title to be taken to our website.

Saturday, May 11

10:00 am to 12:30 pm – SHIITAKE CULTIVATION

At the residence of Patricia McNaught in Basking Ridge (directions will be furnished to participants)

Cultivating shiitakes requires almost no labor on an ongoing basis, just patience. Techniques suitable for the home grower will be discussed, and resource lists covering equipment, spawn, and books will be distributed. A.J. Bozenmayer, who is an expert cultivator of many species, will lead the workshop and provide the materials and tools so that participants can bring home a “shiitake log”. **\$15.00 fee.**

Saturday, May 18

2:00pm to 3:30pm – USING KEYS

Scherman Hoffman Learning Center, NJ Audubon Center, Bernardsville, NJ

Dorothy Smullen will teach you the different ways that keys are organized, and show you how to move forward (and backwards) through keys for genera and species. You may think you know how to use a key, but if you can't explain the difference between a dichotomous and a multivariate key, you need this workshop. **\$10.00 fee.**

Saturday, May 25

10:00 am to 1:00 pm – EXPLORING LICHENS

Foran Hall, Rutgers University (Cook Campus)

Lichens represent a partnership between a fungus and a photosynthetic partner. At this workshop, led by Dorothy Smullen, participants will learn about lichen structure, how they have been used by people and other organisms, and how they serve as an indicator of air pollution. Participants will then learn how to identify some of the common lichens of New Jersey. **Bring a loupe, preferably 10x. \$10.00 fee.**

Sunday, June 2 and Saturday, October 12

10:00 am to 12:30 pm – INTRODUCTION TO MUSHROOMS

Frelinghuysen Arboretum (on June 2) or Community Center, Bernards Township (on October 12)

Learn how mushrooms are more like people than like plants, how they mate (the mushrooms, not the people), and how they help trees. Terri Layton and Patricia McNaught will present an overview of fungi that is suitable for the new mushroomer, and for the enthusiast who wants to learn more about the structure, life cycle and ecology of mushrooms. **\$5.00 fee.**

Sunday, June 2 and Saturday, October 12

1:00pm to 3:30pm – COLLECTION AND FIELD IDENTIFICATION OF MUSHROOMS

Frelinghuysen Arboretum (on June 2) or Community Center, Bernards Township (on October 12)

Jim Barg will enable the enthusiast to collect mushrooms safely and learn how to identify fungi through field characteristics and assignment to Friesian type. It is essential for any mushroomer who is tired of flipping through field guides in the hope that a picture will resemble the specimen in question. **\$10.00 fee.**

Saturday, June 8

10:00 am to 1:00 pm – CULTIVATION WORKSHOP (Oysters)

Pleasant Valley Park (Picnic Shelter) Bernards Township

When nature doesn't cooperate by providing mushrooms, you can grow your own. A.J. Bozenmayer will show you how to cultivate mushrooms, with either commercial spawn or a mushroom as the starting material. Techniques suitable for the home grower will be demonstrated, and resource lists covering equipment, spawn, and books will be distributed. Spawn and other materials will be available so that participants can assemble sacks that, held under proper conditions, will yield oyster mushrooms. *\$15.00 fee.*

Sunday, July 14

1:00 pm to 4:00 pm – SCIENTISTS IN THE KITCHEN

Unitarian Society, Tices Lane, East Brunswick

Is it true that *Strobilomyces* is only "fair" as an edible? Is it true that drying mushrooms intensifies flavor? What about the assertion that mushrooms have better texture if they are blanched before sautéing? You will have the opportunity to explore these and other questions at this workshop led by Patricia McNaught and Igor Safonov. Participants will help prepare mushrooms and then conduct blind taste testing.

Limited to 12 registrants. NJMA MEMBERS ONLY. \$15.00 fee.

Sunday, July 28

1:00 pm to 5:00 pm – RUSSULA IDENTIFICATION

Rutgers University, Foran Hall (Cook College campus)

At NJMA forays, we see a lot of Russulas, but most of the specimens get tossed. That's because there only a few species of *Russula* that can be identified in the field. Stop kicking the Russulas and come learn how to ID them. This workshop, led by Glenn Boyd, will emphasize the determination to species of *Russula* by microscopic characteristics. Curious non-microscopists are welcome, and will be assigned a lab partner who has experience with microscopy of fungi. *\$15.00 fee.*

Sunday, November 10

1:00 pm to 4:00 pm – TREE FUNGI JEWELRY

Pleasant Valley Park (Warming Hut) Bernards Township

It's easy to find jewelry made to look like mushrooms, but the beautiful pieces created by Rhoda Roper are made of mushrooms. At this workshop led by Rhoda (with help from Chrissy Dudas), participants will learn which species of fungus are most suitable for jewelry, and how they are prepared. Participants will then craft a piece of jewelry.

Limited to 10 registrants. \$15.00 fee.

MINI WORKSHOPS

Are you the kind of person who learns best by "hands-on" experience? Would you like to move past the beginner stage in mushroom identification skills?

Register for a mini-workshop that will develop your abilities!

The workshops will be held after forays (about 12:15pm) at the foray location. Each workshop will be targeted to a specific group of genera. *\$5.00 fee for each.*

Saturday, August 10: BOLETES, led by Igor Safonov

Saturday, August 17: POLYPORES, led by Terri Layton

INSTRUCTORS

Jim Barg can do everything with mushrooms superbly – find them, identify them, photograph them, and even cook them. He is also one of the people who make enormous contributions to NJMA behind the scenes. He is art director of our newsletter and webmaster of our website.

Glenn Boyd has been mushrooming for 15 years, and has a deep knowledge of many aspects of mycology. He readily shares what he learns from the scientific literature with the rest of us – in terms we can understand. Glenn is an NJMA trustee.

A.J. Bozenmayer heads up the Cultivation Committee at NJMA. He incubates inoculum for spawn and cultivates several types of mushrooms.

Crissie Dudas is our very own “motorcycle mama”, who sometimes arrives at foray sites on her “bike”. Her hobby is making jewelry, and she frequently wears her own designs.

Terri Layton joined NJMA in 2004, and was Foray Chair for NEMF 2012. She is a semi-retired CPA who met some wonderful and welcoming folks at NJMA. She returns the favor by serving as Outreach Coordinator and Fungus Fest Chair for NJMA.

Patricia McNaught is an unapologetic science geek, who finds in fungi a wonderful convergence of her love of science and the outdoors. She worked for years in flavor and product research for a major food company.

Rhoda Roper has been mushrooming most of her adult life, and is a frequent winner of NJMA’s photo contest. You may have noticed a photo of her tree fungi jewelry in *The Complete Mushroom Hunter*. In her non-mushroom life, she has been a textile designer and a set designer.

Igor Safonov is an expert on boletes and a frequent poster to MushroomObserver.org. He started mushrooming as a teenager (in Russia). Igor has a Ph.D. in organic chemistry, and would love to lead a workshop about the chemical structure of mushroom toxins. Failing that opportunity, he serves as registrar for the Education Workshops and as NJMA’s Secretary and Membership Chair.

Dorothy Smullen has more than thirty years’ experience collecting, identifying, and especially, learning about mushrooms, lichens and other creatures of the natural world. She leads workshops at the New Jersey Audubon Society, and serves as an expert fungi identifier at regional (NEMF) and national (NAMA) forays. She is an NJMA trustee.

A printable version of the Education Workshops Registration Form is on page 21.

WILD MUSHROOM & SAUSAGE ROLLS

reprinted from Mycelium #38-4, Mycological Society of Toronto

The addition of mixed edible wild mushroom to the meat filling makes these sausage rolls healthier and more flavourful than the standard version.

2 cups of mixed wild mushrooms or 100 grams of dried wild mushrooms

1/4 cup rolled oats

2 cloves minced garlic

1 tbsp. chopped fresh rosemary

Salt and pepper

1 lb. lean sausage meat

12 sheets phyllo pastry, defrosted

1/4 cup melted butter

1 egg

Dijon mustard

Sesame seeds

If the mushrooms are fresh, coarsely chop them. If dried, cover them with hot water, let sit for 15 to 30 minutes and then drain. In a food processor, mix the mushrooms, oats, garlic, rosemary, salt and pepper. Add the sausage meat to the mushrooms and pulse until the meat is combined. Transfer the mixture into a piping bag with a large round tip and set aside.

Thaw the phyllo pastry and cover with a damp cloth. Whisk the egg with 2 tbsp. water and set aside.

Lightly brush one sheet of phyllo with melted butter. Layer a second sheet, brush with butter and repeat with a third sheet. Cut the stack of phyllo lengthwise and stack them making 6 layers of phyllo.

Brush along one long edge with mustard and brush the opposite long edge with the egg wash. With the piping bag, squeeze a strip of the mushroom mixture over the mustard.

Roll phyllo around filling to form a roll and pinch to seal. Brush outside of roll with egg wash and sprinkle with sesame seeds. Repeat with remaining phyllo until all of the mushroom mixture has been used.

Cut the rolls into 1 inch pieces and arrange on a baking sheet lined with parchment paper. Bake at 425°F for about 20 minutes until filling is cooked and pastry has browned.

This recipe is a modification of a recipe by Chef Jo Lusted, the food producer on the CBC television show “Steven and Chris.”



NJMA News is published bimonthly by the New Jersey Mycological Association.

Annual subscription price is included in NJMA membership annual dues.

Except where noted, articles may be copied or reprinted with credit given to the author(s) and *NJMA News*.

Views expressed herein do not imply New Jersey Mycological Association endorsement.

WELCOME TO ALL OF OUR NEW NJMA MEMBERS!

*We'd like to extend a warm welcome to the following members who joined us between October 27th and December 31st.
We look forward to seeing you at lectures, forays, and other NJMA events. Happy 'shrooming!*

Stacy B. Brody
Michael W. Cheringal
Susan Freeman
Kelsey A. Gustafson
Martin Healy
Eileen W. Kopec

Tinton Falls, NJ
Norwood, NJ
Hampton Twp., NJ
New Brunswick, NJ
Montclair, NJ
Franklin, NJ

Gemma C. Milly
Zig Panek
Nicholas P. Pappas
Joseph J. Scordo
John Squicciarino
Nathan Thorp

Princeton, NJ
Farmingdale, NJ
Oak Ridge, NJ
Bloomfield, NJ
Titusville, NJ
Haverford, PA

REGISTRATION FORM for NJMA EDUCATION CLASSES 2013

You can also register fast and easy ONLINE at www.njmyco.org/education.html using PayPal®

NAME _____
ADDRESS _____
TOWN/ZIP _____
PHONE _____
EMAIL _____

**MARK
YOUR
CALENDAR!**

Please mail your check, along with this completed form, at least 10 days before the **first** class for which you're registering. Remember – some classes are limited in size.

Send check, payable to "NJMA", to:

Igor Safonov, 115 East King's Highway, Unit #348, Maple Shade, NJ 08052-3478

MAY 11	SHIITAKE CULTIVATION	\$15.00	x	_____	persons = total	_____
MAY 18	USING KEYS	\$10.00	x	_____	persons = total	_____
MAY 25	EXPLORING LICHENS	\$10.00	x	_____	persons = total	_____
JUNE 2	INTRODUCTION TO MUSHROOMS	\$5.00	x	_____	persons = total	_____
JUNE 2	COLLECTION / FIELD I.D.	\$10.00	x	_____	persons = total	_____
JUNE 8	CULTIVATION WORKSHOP	\$15.00	x	_____	persons = total	_____
JULY 14	SCIENTISTS IN THE KITCHEN	\$15.00	x	_____	persons = total	_____
JULY 28	RUSSULA IDENTIFICATION	\$10.00	x	_____	persons = total	_____
AUGUST 10	MINI WORKSHOP: BOLETES	\$5.00	x	_____	persons = total	_____
AUGUST 17	MINI WORKSHOP: POLYPORES	\$5.00	x	_____	persons = total	_____
OCTOBER 12	INTRODUCTION TO MUSHROOMS	\$5.00	x	_____	persons = total	_____
OCTOBER 12	COLLECTION / FIELD I.D.	\$10.00	x	_____	persons = total	_____
NOVEMBER 10	TREE FUNGI JEWELRY	\$15.00	x	_____	persons = total	_____

Questions? Call Igor Safonov at 215-716-1989
or Patricia McNaught at 908-766-9565

TOTAL AMOUNT ENCLOSED \$ _____

NOTE: You may wish to copy the other side of this page before clipping and mailing this application.

NJMA NEWS

c/o Jim Richards
211 Washington Street
Hackettstown, New Jersey 07840

FIRST CLASS MAIL

NJMA is a non-profit organization whose aims are to provide a means for sharing ideas, experiences, knowledge, and common interests regarding fungi, and to furnish mycological information and educational materials to those who wish to increase their knowledge about mushrooms.

In this issue:

- **EDUCATION CLASSES 2013**
- **GUIDE TO FIELD GUIDES**
- **WHO'S IN A NAME - PART 35**
- **A ROSE IS A ROSE?**
- **HISTORY CHANGER**
- **2013 COMMITTEE CHAIRS**
- **ERRORS IN DNA SEQUENCES**
- **FUNGI VS. PRINCESS**
- **MUSHROOM SAUSAGE ROLLS**
- **ENDOPHYTIC FUNGI**

...plus more!



SPRING!