MYCOLOGICAL ASSOCIATION OF WASHINGTON, INC.

The Potomac Sporophore

Autumn | December 2017 Volume No. 32 | Issue No. 4

The quarterly publication of the Mycological Association of Washington, Inc. (MAW) | http://mawdc.org

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In This Issue:

The Mushroom Chronicles: Toxicity, Part 2: Non-Lethal Mushrooms

William Needham
MAW President

Editor's Note: This is the second part of a two-part series on mushroom toxicity. The history of mushroom poisoning and deadly toxins were discussed in the July Sporophore.

Mushroom poisoning is generally categorized into four types according to the symptoms that result. It is not practical to use the type of toxin as a basis for classification, since there is a paucity of knowledge about the nature and chemistry of fungal toxins in general; this is particularly true for fungi whose consumption may yield an unpleasant though not fatal result. Additionally, the identification of the mushroom that caused the condition under evaluation is usually a matter of conjecture since the victim has succumbed to disease after having destroyed the evidence by eating it. The four types are protoplasmic poisons, neurotoxins, gastrointestinal irritants, and those that are toxic only in combination with other substances, notably alcohol.

Neurotoxins

The neurotoxins, as the name suggests, cause neurological problems which can produce symptoms that range from convulsions, hallucinations, anxiety, depression, and coma to profuse sweating and spastic colon. The most well-known of the mushrooms that produce neurotoxins is *Amanita muscaria*, commonly known as the Fly Agaric for its traditional use as a pesticide against the insect. In most of the Northern Hemisphere, it is bright red with white cottony patches on the cap, the epitome of the forest fungus. In eastern North America, however, it is less conspicuous, typically with a yellow-orange hue. It has long been noted for its mind-altering properties, having been ostensibly used for this purpose by the Koryak tribesmen of the Kamchatka peninsula and by the Norse warriors known as the berserkers. The active ingredient is ibotenic acid and its derivative muscimol (named for *A. muscaria*), the latter having about five times the potency of the former.

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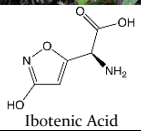
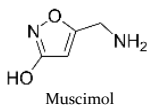


Ibotenic Acid



Muscimol

The two main toxins in *Amanita muscaria* (left) are ibotenic acid and muscimol. They cause symptoms that cycle between dizziness/drowsiness and activity/excitement, sometimes with hallucinations. Some cultures intentionally ingested these toxins to alter their mental state. *Left photo: William Needham. Bottom photos: public domain.*

The Two Best Yields of Hedgehog Mushrooms

Larry Goldschmidt and Jon Ellifritz
MAW Members

This article is about two great years, 1994 and 2017, for harvesting *Hydnum repandum*, the Hedgehog (or Sweet Tooth) mushroom. Mycologists and taxonomists have determined through DNA sequencing in recent years that the Hedgehog mushroom belongs to the Genus *Hydnum* and is closely related to chanterelles. At one time it was in the Genus *Dentinum*. The Hedgehog is one of my favorite edible wild mushrooms. It has a mild, meaty, but somewhat sweet taste.

The Hedgehog is one of the best edible wild mushrooms in the Mid-Eastern United States. In my wife's and my own experience this year it can be recognized easily by its pale orange color and its tooth-like hymenium on the underside of the cap. The color can vary from white to orange. Its cap is slightly depressed in the center as seen in the above photo. Its stalk is generally short. It can be found in the ground in quantities under deciduous or coniferous trees during September and October.

Here is a summary of an email I received from Jon Ellifritz on 5 Jan 2005 where he explained his great find of Hedgehogs (about 15 pounds) during 1994. He found them on a hillside of oaks with scattered beech and a few

Larry Goldschmidt

Hedgehog mushrooms are very chanterelle-like in appearance, but have teeth hanging down underneath their caps.

Continued on Page 11

Continued from Page 1 Ibotenic acid is an excitatory amino acid; it simulates the effects of natural transmitters on neurons in the central nervous system. The symptoms occur about an hour after ingestion and are characterized by an initial period of dizziness that may succeed to drowsiness followed by intense activity, excitement, hallucinations, and delirium. The depression-mania sequence may repeat several times in cyclic fashion before abating in a few hours. It is almost never fatal unless large quantities are ingested, as may be the case with young children infatuated with its aesthetic appeal.

Amanita muscaria also lends its name to the other major neurotoxin, muscarine; it was first discovered incident to investigations into the chemical constituency of its namesake mushroom. Muscarine is found at levels as much as one hundred times the level in the Fly Agaric in mushrooms from the genera *Inocybe* (e.g. *I. geophylla*, or White Fiber Head) and Clitocybe (e.g. *C. dealbata*, or Sweating Mushroom, which often grows near and can be mistakaken for the edible Fairy Ring Mushroom, *Marasmius oreades*). This compound activates (and led to the discovery of) a class of cell signaling receptors called muscarinic acetylcholine receptors, which control the automatic processes associated with feeding, rest, and digestion. Consequently, the initial symptoms of muscarine poisoning are fluid related, manifest in increased perspiration, salivation, lacrimation, and urination about 15 minutes after ingestion. Follow-on symptoms include vomiting and diarrhea that continue for up to 24 hours; the administration of the antidote atropine results in rapid remission and complete recovery. Though fatalities are rare, severe cases can cause cardiac and/or respiratory arrest.

Gastrointestinal Irritants

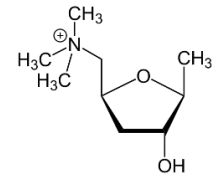
The gastrointestinal irritants are the least defined and most widespread of the mushroom toxins. Their virulence ranges from mild, short-lived stomach discomfort to vomiting and diarrhea that can last for several days. Fatalities are very rare and are usually associated with dehydration of already debilitated individuals, typically the very young or the very old. The specific toxins are generally unknown as the need for detailed chemical analysis is mitigated by the ubiquity of the potential causes and the by the non-fatal nature of the affliction. What is known is largely anecdotal, as few cases are reported relative to the numbers that occur. This is exacerbated by the degree to which susceptibility to specific toxins varies from one individual to the next; some people become mildly ill after eating almost any wild mushroom. Therefore, the mushrooms that are unequivocally identified with gastrointestinal distress are those that are relatively widespread and which resemble an edible species; as such, they are mistakenly consumed with some regularity. Examples include the Jack-O-Lantern (*Omphalotus illudens*) that closely resembles the Chanterelle (*Cantharellus cibarius*) and the Green-spored Lepiota (*Chlorophyllum molybdites*) that closely resembles the Parasol Mushroom (*Macrolepiota procera*).

Toxic in Combination

The most peculiar of the mushroom toxins is coprine, an amino acid produced by mushrooms of the genus *Coprinus*, notably *C. atramenarius*, the Alcohol Inky. Coprine is converted to 1-aminocyclopropanol in the human body. This compound interferes with the breakdown of alcohol; because of its similarity to Antabuse in blocking the oxidation of alcohol in the acetaldehyde stage, it is sometimes called a disulfiram-like toxin. The symptoms are generally mild, consisting of flushing of the head and neck, tingling of the extremities, cardiovascular disturbances such as heart palpitations, headache and nausea. It is listed in field guides as edible, with caution; it has no adverse side effects if alcohol is not consumed for about three days.

Summary and Conclusions

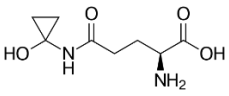
Mushroom poisoning is a complex phenomenon, the complexity a result of the variation in fungi according to geography, genetics and local environmental fluctuations; the toxic content of an individual mushroom can



Muscarine

Muscarine is found mainly in *Inocybe* and *Clitocybe* mushrooms, such as *C. dealbata* (top). The toxin stimulates neurons that increase perspiration, salivation, lacrimation, and urination. *Top photo: Dick Culbert, CC BY 2.0. Left photo: public domain.*

Many mushrooms produce gastrointestinal irritants. The most notorious of these are *Chlorophyllum molybdites* (top) and *Omphalotus illudens* (left), since both resemble edible species. The toxins involved are largely unknown. *Top and left photos: Thomas Roehl*



Coprine

Coprine is an unusual toxin produced by certain *Coprinus* mushrooms and some close relatives, most notably *C. atramentarius* (top). The toxin prevents the body from breaking down alcohol. *Top photo: Rob Hille, CC BY-SA 3.0. Left photo: Public Domain.*

vary from non-existent to virulent, even within a species. A contributing and no less perplexing dilemma is the variability of susceptibility; the idiosyncratic response of different individuals who consume the same mushroom can range from gustatory pleasure to violent purging. The more extreme reactions do not tend to follow the typical vectors of age or general health of the victim, but seem rather to correlate to something analogous to an allergic reaction; this is thought to be attributable to certain constituents of wild mushrooms that are not found in other foods, such as the sugar trehalose.

The only safeguard against mushroom poisoning is knowledge and caution; the only other option is abstinence. In order to safely eat wild mushrooms, it is necessary to be able to recognize those which are edible. But this knowledge is not sufficient to prevent a potentially unpleasant, if not life-threatening event. One must also be able to recognize the poisonous species and have the knowledge of the subtleties of taxonomy that can lead to improper identification (as was the case the composer Schobert). Perhaps no one has summarized this better than Michael Pollan who wrote of his problems identifying his first chanterelle in the wild. His conclusion was this: "I didn't realize it at the time, but I had impaled myself that afternoon on the horns of the omnivore's dilemma" which is that eating can be dangerous; "The curse of the omnivore when it comes to figuring out which of those things are safe to eat, he's pretty much on his own." One may therefore conclude that eating wild mushrooms is the quintessential Omnivore's Dilemma (which is the title of his book).

Caution is necessary in consumption; only a small portion should be eaten on the first occasion of any individual's sampling of a wild mushroom. Since an adverse reaction is always possible, a smaller dose will yield a less harmful result. It is both safe and rewarding to eat wild mushrooms, if only a little care is exercised.

In Memoriam: Paul Goland

Bruce Boyer, MAW NAMA Liaison

Paul Goland, a long-time member of MAW, the West Virginia Mushroom Club, NAMA, and other organizations devoted to mushrooms, died peacefully at his home in Franklin, West Virginia on November 21, 2017. He was 89. Born May 1, 1928, and raised in Los Angeles, Paul earned a Bachelor of Science in Business from the University of California at Berkeley with a specialty in weather and forecasting. He worked for the federal government, doing administration at weather stations in St. Louis and Washington, DC, and retired in the '70s from the agency that eventually became NOAA. His retirement plan included acreage in the mountains of West Virginia, which he purchased on Snowy Mountain in Pendelton County. There, he and his wife, Nan, built and lived in their log home without electricity or running water for several years.

Paul read an article ("Organic Gardening") in 1972, contacted the author, and learned the process of growing shiitake mushrooms first-hand. Harvesting logs from the property at Snowy Mountain, he inoculated the logs with purchased spawn and began selling fresh and dried shiitake locally in Pendelton County. Although he was a "come here," he was fondly known by everyone as "the Mushroom Man." Hardscrabble Enterprises, with its two employees – Paul and Nan – was incorporated in 1985. Paul brought and sold Hardscrabble mushroom products – ranging from dried soup and mushroom playing cards to inoculated logs, mushroom extracts, prepared spawn, and field guides – to MAW monthly meetings, farmers markets, and fairs in surrounding states for nearly four decades.

William Needham

Paul Goland selling mushroom products during a MAW meeting.

Nan and Paul had been married 51 years when she tried to rouse him from his routine afternoon nap on that sunny Tuesday in November. There will be a Celebration of his Life at the Antler Room, 53 S. Main Street in Franklin, West Virginia, from 3 to 6 pm on Sunday, December 17, 2017.

Book Review

Book Review: *Field Guide to Wild Mushrooms of Pennsylvania and the Mid-Atlantic: Revised and Expanded Edition*

John Plischke III

Bill Russell is at it again. He is responsible for *Wild Mushrooms of Pennsylvania and the Mid Atlantic*. In this 270-page book are 125 mushrooms that you need to know.

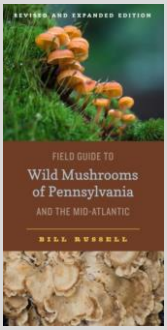
I first met Bill Russell about 40 years ago at the behest of Emily Johnson, which some of you may have known. He was a professor at Penn State University; he was good then, and is even better now.

Besides the normal Preface and Acknowledgements, this book is broken down into Mushroom Basics; Spring, Summer, Fall, Winter Mushrooms; Edible and non-Edible Mushrooms; and Mushrooms in the Kitchen. Of course, it has an Appendix; Gill/Pore and Spore Print Guide; References; and Index. When I was first presented the book, it reminded me of the *Mushroom Hunter's Field Guide* by Alexander Smith. It is 4 ¾" wide, 9 ¼" tall, and ¾" thick, and full of color photographs, although they could be bigger.

Many edible mushrooms are Covered, among my favorites is the horse mushroom, *Agaricus arvensis*. After a rather long narrative, there are descriptions of the cap, gill, spore print, stem, habitat, edibility, copy-cats, and a tips statement. There is a segment on spore printing, which I consider an essential in any book. This segment gives the basic characteristics of various poisonous members of the Amanita family. There is a rather small section on how to prepare mushrooms and some recipes.

The book has a feature I have never seen before, a loose laminated black & white spore print card. It could keep you from making a drastic mistake. The book is published by Penn State University Press. ISBN 978-0-271-07780-2 It is $24.95, but can be bought at Amazon for a few cents less, including shipping. I consider this book a must-have for the beginner and intermediate mushroomer.

Field Guide to Wild Mushrooms of Pennsylvania and the Mid-Atlantic: Revised and Expanded Edition



By Bill Russell

Publisher
Penn State University Press

Paperback
$24.95
2017
ISBN: 978-0-271-07780-2

Erratum

Gary Emberger is a professor at Messiah College. The July Meeting Files article in the July 2017 *Sporophore* stated incorrectly that he taught at Temple University.

Mushroom Farm for Sale

North Cove Mushrooms Farm, in Madison County, Virginia is for sale as a fully functioning turn key business. The farm currently produces 500 pounds per week of Shiitake, Oyster, Lions Mane, and Pioppino mushrooms, and sells at 6 farmers markets for $16 to $20 per pound. The property includes 10 acres of forest with hiking trails, a 30x60 custom greenhouse built for year-round production, walk in cooler, new HVAC system, whole house generator, and more. Plus, all branding, logo, market gear, and prepared foods recipes are included. Business includes 3 full time workers who have each been with the business for 3+ years and require almost no supervision at all.

The current owners of North Cove Mushrooms are willing to work with the buyer during the 2018 season for a smooth transition. Full details are available at **http://northcovemushrooms.com/?page_id=738**.

Email **northcovemushrooms@gmail.com** for more information.

Fungi in the News

Thomas Roehl
MAW Newsletter Editor

Editor's Note: This article contains summaries of the biggest fungus-related news stories from July through November 2017. Visit the link following each topic below for a closer look.

Physics of Ballistospores

Researchers from Duke University recently used an inkjet printer and glass beads to examine the physics of sexual spore discharge in basidiomycetes. These fungi produce spores externally and launch them using energy stored in the surface tension of a water droplet, a process known as "ballistospory." The droplet forms next to the spore and the two eventually touch. When that happens, the droplet flows onto the surface of the spore, launching it into the air. This happens too quickly to catch on camera, so Duke scientists modeled ballistospory using a tiny glass bead. An inkjet printer was modified to drop water next to the bead until the water touched the bead. When this happened, the bead jumped into the air, just as scientists expected it to do. Because the bead was much larger than a spore, this process was much slower and could be captured on camera. Read more and watch the video at: **https://www.nytimes.com/2017/07/27/science/fungi-mushrooms-spores.html**

Can Genetic Engineering Save Bananas from Fusarium Wilt?

A field trial is underway in Australia to test a genetically engineered banana that will hopefully be resistant to the TR4 strain of Fusarium Wilt. The Cavendish banana – the variety found in nearly every grocery store – is the best banana for consumers but also is very susceptible to TR4. The engineered bananas were created by adding a few genes from another variety of banana that is resistant to TR4. Researchers hope that the new strain will be both resistant to the fungus and as tasty and portable as the normal Cavendish. Creating such a banana is likely the only way to save the world's favorite fruit. Read more at: **https://www.washingtonpost.com/national/health-science/bananapocalypse-the-race-to-save-the-worlds-most-popular-fruit/2017/10/06/bf1635ac-7d28-11e7-83c7-5bd5460f0d7e_story.html**

Magic Mushrooms & Depression

Researchers at the Imperial College London conducted a small study examining the effects of psilocybin on brain activity in depressed patients. This was one of the first studies to use MRI technology to visualize the effects of psilocybin on brain activity. In general, the researchers found that psilocybin "reset" the brain, reducing activity in the amygdala and stabilizing activity in a group of neurons called the "default-mode network." Since this study used a small sample size and researchers are just beginning to examine how psilocybin affects the brain, it cannot be used to support recreational use of the drug. Read more at: **http://www.bbc.com/news/health-41608984**

Sex Chromosome Evolution in *Cryptococcus*

Using detailed DNA analysis, scientists at Duke University have described the evolution that changed *Cryptococcus* from an organism with many sexes into an organism with only two. Originally, *Cryptococcus* had multiple sex genes spread across many chromosomes. Over time, these genes became concentrated onto just two – analogous to the X and Y chromosomes in humans. This happened through a process called "translocation," where two different chromosomes swap large parts of their DNA. In *Cryptococcus*, most of these translocations occurred at the "centromere," a dense area of the chromosome that helps keep chromosome pairs together during cell division. This is the first time that scientists have found evidence of translocation happening at the centromere in any organism; previously, scientists assumed the centromere was too dense for this kind of mutation. Read more at: **https://today.duke.edu/2017/08/scientists-map-sex-chromosome-evolution-fungi**

Computer Game Helps Fight Aflatoxin

One of the most difficult things for biologists to do is predict the structures of proteins. To make this easier, scientists developed a computer game called Foldit. This game lets the public solve puzzles relating to protein shapes. The solutions players come up with are then used to predict how proteins will fold. Currently, the game is being used to design enzymes that could neutralize aflatoxin, one of the most common and most dangerous mycotoxins found in food. Read more at: **https://www.washingtonpost.com/national/health-science/you-can-try-to-destroy-a-killer-in-the-food-system-by-playing-a-computer-game/2017/10/27/ab2e8b32-b989-11e7-9e58-e6288544af98_story.html**

White Blood Cells Tell Fungi to Self-Destruct

Researchers investigating fungal infections found that immune cells in mice kill fungal cells by activating the fungus' "programmed cell death" pathway. White blood cells in the lungs detect and then engulf inhaled fungal cells such as spores. The white blood cell then releases proteins that instruct the fungus to kill itself. Understanding how this works is important for treating people with suppressed immune systems. These patients often develop fungal infections in the mouth or respiratory tract that are easily kept at bay in healthy people. Read more at: **https://www.sciencenews.org/article/when-fungus-invades-lungs-immune-cells-can-tell-it-self-destruct**

Meetings

Meeting Files

Editor's Note: Because of all the wonderful events MAW has had in the past few months, the meetings of October 3 (Rick Kerrigan on Agaricus*) and November 7 (Elinoar Shavit on desert truffles) will be covered in the next edition of the* Sporophore.

August 1: Noah Siegel On Redwood Coast Mushrooms

Thomas Roehl
MAW Newsletter Editor

The August 1 meeting featured Noah Siegel, a self-described "myco-bum" who recently co-authored the book *Mushrooms of the Redwood Coast*. His book is 608 pages long and covers 768 species, most of which do not grow on the East Coast.

The Redwood Coast stretches for 500 miles from southern Oregon down through northern California to south of San Francisco. The forests of redwood trees in this region vary in climate and age, both of which impact the mushrooms present in any given forest.

Noah's talk reviewed the process of publishing his book and took listeners on a visual safari through the mycoflora of the Redwood Coast. This included gilled mushrooms such as *Amanita* spp. (the East Coast has many more species) and *Agaricus* spp. (the Redwood Coast has the greatest diversity of *Agaricus* that Noah has ever seen), boletes, polypores, crusts, toothed fungi, corals, clubs, puffballs, stinkhorns, truffles, jellies, morels, and cups.

Many of the mushrooms Noah and his colleagues found had not been described before; the authors described 11 new species in the genus *Pseudobaeospora* alone! These new fungi seem to have limited ranges. *Pseudobaeospora*, for example, grows only under Monterey cypress. That tree's range is steadily decreasing due to deforestation and climate change, so Noah worries that they may not last long.

Thomas Roehl

Noah Siegel shares some pictures of Redwood Coast mushrooms from his book with MAW members attending the August meeting.

September 5: ID Workshop

Thomas Roehl
MAW Newsletter Editor

At the September 5 meeting, MAW members brought in mushrooms and got hands-on experience identifying them. Experienced MAW members helped others through the process of using field guides to identify mushrooms.

MAW Forays Chair Jared Urchek (second from left) guides members through the process of mushroom identification during the September meeting. *Photo: Thomas Roehl*

Upcoming Events

The events listed below may change due to weather, speaker availability, etc., so read MAW emails and check our website at **http://mawdc.org** for up-to-date information on events. Exact foray dates and locations will be set closer to the event in order to take weather conditions into account.

Dec 5 **Monthly Meeting** featuring a presentation by **Lynnaun Johnson** on the interactions between orchids and fungi. Lynnaun will focus on the Ghost Orchid but will also discuss local orchids. At this meeting, members will vote on the 2018 MAW Board of Directors.

Save These Dates in 2018!

There will not be a monthly meeting in January.

Feb 6 **Monthly Meeting** featuring a presentation by **William Needham** on the history of hallucinogenic mushrooms.

Mar 6 **Monthly Meeting** featuring a presentation on mushroom cultivation by MAW Foray Chair **Jared Urchek** and MAW member **Danny Barizo**.

Apr 3 **Monthly Meeting**

Early April through mid-May: **Morel Forays!**

Unless otherwise noted, monthly meetings will be held on the first Tuesday of the month at 7:00 PM in the ***Kensington Park Library, 4201 Knowles Avenue, Kensington, MD****. Attendees are encouraged to bring mushrooms for sharing and identification. Members of the public are welcome to drop in.*

Special thanks to MAW member Ray LaSala for proofreading this newsletter!

Is 13 a Lucky Number? MAW Mushroom Tasting, Sept. 17, 2017

Michael Dong
MAW Member

Many superstitions and myths surround our love of mushrooms and mushroom hunting, some valid, some not. How about sneaking in the notion of the "unlucky number 13"? At the recent MAW Fall Mushroom Tasting, this number proved to be especially auspicious, as the cook entrants were thirteen in number. With such a grouping of fine cooks and splendid dishes that included appetizers, mains, sides, and even a dessert, the roughly 40 MAW members attending were treated to a lucky day indeed.

As I recount the event, we'll stroll the venue clockwise starting at the rotunda entrance at Sandy Spring Museum, and experience the offerings as they are presented hot off the butane stoves and prep tables.

The first dish encountered had the visual impact of a fireworks display, as it featured high quality Chicken of the Woods harvested by Elliot and Heather Billian. The bright orange of the Chicken glowing through the light jacket of fried batter was splendid enough to earn Heather 2nd Place for the "Italian Chicken of the Woods." Congratulations Heather.

Teresa Chen then treated us to a visit to the Far East, as she presented "Taiwanese Rice Noodle with Flower Shiitake." As a full-blooded Chinese, I'm rabid about getting noodles correct, and Teresa came through wonderfully with a balanced dish with the sublime flavors associated with that style of Oriental cuisine. Chinese comfort food at its best.

Lia Dakhia and Gregory as assistant, offered a fabulous "Frittata" of Beech mushrooms, reflecting influences of Eastern Europe. I was treated to being present at the start of Lia's process of making the dish, comprising many steps that required timing and precision to develop the finished texture and taste. The care and love that went into this main course dish conveyed much delight to the tasters. *Spasibo!* This was a dish so good that I went back for seconds.

A surprise dish that caught me off-guard was Rebecca Pham's "Bacon-Wrapped Scallops" made with carrot ribbon-wrapped King Trumpet. Delicious to look at, and screaming "make 3 trays of these for the ballgame," it proved to be a great contender for best appetizer, especially when paired with the side sauce. Self-restraint kept me from hanging out at her table and nibbling away at more.

Many have a weakness for Thai, and what a treat it was to sample the complex medley of flavors in Dora Ramakomud's "Tom Kha Mushroom Soup" with oyster mushrooms and portabellas. The mushrooms' flavors emerged like blooms from the notes of coconut, lemongrass, kaffir lime, and spices. Well done, and refreshing. Yes, I had seconds of this too.

Traveling to the next table took us to another favorite of mine, Cantonese style. Ron and Yuping Burr brought their "A" game to this event, with a "Shiitake Stir Fry" (Ron) and a "King Trumpet Stir Fry" (Yuping). Mind you, getting stir-fry right is difficult while pushing huge BTUs on a gas cooktop, and the Burrs did it on teeny, single burner, butane camp units provided to the cooks. The smooth delivery of Yuping's dish was amazing and second only to the incredible mouth-feel of Ron's preparation. These dishes reminded me of family gatherings in San Francisco.

A culinary leap away to the next table found Veronica Velasquez with Jose as helper, setting a beautiful backdrop to present "Chipotle Oyster Street Tacos." I spoke at length with Veronica (I have traveled extensively in Baja and know a good roadside taco) and discovered her love of cooking and sharing her culture through food. This caring emerged from the tacos with flavor, texture, presentation, and – let's admit it – the fun of folding 4-inch soft tacos and gobbling them down with a slice of lime as a kick. Veronica's taco was so good that one taste, with the aroma and experience, made it a standout amongst the field of fabulous cook competitors. In fact, Veronica was awarded First Place by popular vote, and will have her name engraved on the Waldemar Poppe Culinary Award trophy cup! (See the recipe on page 11!) *Felicitaciones por su premio!*

John Harper had the experiential effect down to a T. With a cog-driven nutcracker, assorted mushroom varieties collected

Continued on Page 8





September Mushroom Tasting photos, from left to right: 1) MAW Second Vice President Mitch Fournet identifies mushrooms. 2) Lia and Gregory Dakhia prepare mushrooms. 3) Elliot and Heather Billian cook up some fresh Chicken of the Woods. 4) Yuping Burr stir-fries some King Trumpets. 5) Attendees sample the many dishes prepared for the tasting. *Photos: Michael Dong.*

Events





September Mushroom Tasting Photos, from left to right: 1) MAW First Vice President John Harper cracks some walnuts for his risotto... or maybe just for fun! 2) Ray Lasala's dish, "Portabellas in Peking Sauce." 3) Marina Needham shows off her final product: "Buckwheat with Wild Mushrooms." 4) Rebecca Pham's "Bacon-Wrapped Scallops." 5) Veronica Velasquez and Jose Perez pose with the Waldemar Poppe Culinary Award trophy, after winning first place for their "Chipotle Oyster Street Tacos." *Photos: Michael Dong*.

Continued from Page 7

on display, and his wisdom to share, his dish "Barley Risotto with *Grifola frondosa*" brought the crowds, but they stayed to chat while enjoying the nutty dish. Cracking the walnuts proved to be a bonus activity while sampling the risotto.

Adjacent to John was Marina Needham and an absolutely delightful rustic dish of "Buckwheat with Wild Mushrooms", incorporating Hen of the Woods, King Bolete (*Boletus edulis*), and Russian Yellow. With William as support, it was a privilege to watch the making of this dish, much as I would imagine it would be made in, say, Ukraine. The aroma, taste and texture all spoke to cool evenings at a wood table amongst friends.

Stella North and Michael Bellen teamed up to bring us a true double-header surprise with "Paw Paw Ice Cream" and "Mushroom Veloute." Growing up in the Shenandoah Valley, Paw Paws were a prized fruit, and transforming it to an iced dessert was a treat to savor. Paired with the Veloute, which certainly stood on its own, it was a keen moment of "Wow, that's cool." Cool enough to earn the duo 3rd Place for the Veloute. Congratulations Stella and Michael.

Neighboring close by, Ray LaSala presented a nicely plated "Portabellas in Peking Sauce." A gentle and inviting dish that would be perfectly at home on a bed of jasmine or basmati rice. The sauce was not overpowering, allowing the portabella to whisper "psst, I'm still here." This would make a great main dish to build around.

The final dish of the event on this tour brought us back here to Maryland. Holly Poole-Kavana extended a wonderful, heaping plate of "Lion's Mane Crab Cakes." Deceptively moist with a delicate crusting that blended in a superb fashion for what I believe is what the mouth-feel of a crab cake should be. In short, I could've eaten the entire platter while watching the Singapore Formula One race on TV today, with a Dead Rise Old Bay Summer Ale close by.

The culinary event provided a diverse tasting, and more than a few ideas to build on regarding cooking techniques and mushroom use. Kudos to MAW's very capable Culinary Chair Corinne Weible for her handling of the organization and logistics of this event and her coordination with the Sandy Spring Museum. Corinne's ability to direct the set-up and brief the valued volunteers on their duties while maintaining a calm composure was as balanced and splendid as the medley of dishes we experienced. Thank you, Corinne, you are a star.

The 2017 NAMA Foray: A Mushroom Paradise

Danny Barizo
MAW Member

I have been to five NAMA forays. The recent NAMA Northwoods Foray in Wisconsin, ranks among the best. It was well organized, the break-out sessions had a variety of interesting topics, and mushrooms were plentiful. A record number of 524 species were found and identified. The confluence of weather and geography made for ideal mushroom fruiting and hunting. There were heavy rains the previous weeks and the presence of bodies of water ranging from lakes to conifer bogs to swamps provided additional moisture. The foray area produced a wide diversity of fungal specimens because it was located at the juncture where the Laurentian mixed forest and the boreal forest of the North meet. The early fall weather was comfortable, neither too hot nor too cold, and the woods were free from pesky insects and other nasty creatures. The hikes were generally flat with only slight inclines. Wildlife such as turkeys and birds were abundant. There were also very few cars on the road and no traffic lights at all.

Britt Bunyard, editor of Fungi Magazine, was the main organizer of the event. Because of his extensive connections, he was able to invite a stellar line-up of speakers including: Emily Stone, the foray coordinator and the director of the Cable Natural History Museum, who explained how and why the geologic history contributed to mushroom diversity in the region; Robert Blanchette of the University of Minnesota, who spoke on the historic uses of forest fungi; Heather Hallen-Adams from the University of Nebraska, who spoke on "The Significance of Fungi in the Human Gut"; Nicholas Money, who made a hilarious and philosophical presentation on "The Meaning of Life in

MAW 2018 Board

During the December 8 Monthly Meeting, members will vote on the Board of Directors for 2018. At the November meeting, the Nominating Committee – which consisted of William Needham, Martin Livezy, and David Smallwood – proposed the following slate of candidates: William Needham (President), John Harper (First Vice President), Mitch Fournet (Second Vice President), Connie Durnan (Programs), Tom McCoy (Membership), Bruce Boyer (NAMA Liaison), Elizabeth Hargrave (Treasurer), Agnes Demianski (Secretary), Thomas Roehl (Newsletter), Jared Urchek (Forays), and **Michael Dong (Culinary)**. Most Board members will keep the positions they held last year, with one exception (highlighted in bold).

Ten Mushrooms"; Danny Newman, an independent mycologist, who spoke on the tropical fungi of the Andean and Amazonian rain forests; Tom Volk of the University of Wisconsin, who elaborated on the effects of timely rainfall on mushrooms; and Michael Beug, who made a case for hallucinogenic mushrooms as entheogens. Several awards were also given: The Presidential award given by NAMA president, David Rust, to Ursula Pohl for her 30 years of mycophagy service for NAMA. John Plischke III was given an award as an amateur mycologist. The Foragers, a local musical group, provided the entertainment during the evening socials.

The staff of the Lakewood Resort were very courteous and attentive to our needs. The meals were delicious and included a variety of dishes which catered to different dietary requirements. The resort also made available the use of canoes, kayaks etc. Overall, the accommodations were also outstanding. There were two bedrooms in our unit with individual baths, a large shared living room with a gas fireplace and a furnished kitchen with stove and a microwave.

MAW members and their works were also recognized. Connie Durnan was elected vice president of NAMA. The photos of Danny Barizo and Thomas Roehl were also highlighted. Bruce Boyer also represented MAW as the NAMA trustee.

We enjoyed striking new and renewing old acquaintances, and exploring the great outdoors of northern Wisconsin. One of the unforgettable highlights of our trip was collecting chanterelles for mycophagy. We went to a meadow lined with red pines in a national forest about an hour away from Cable. When we entered the pine grove we found hordes of beautiful, worm-free chanterelles, with ridges lining the bottom of the caps. In a matter of about two hours each of us had collected, at least, an average of about ten pounds of these brightly colored, fresh, choice edibles.

Since we missed the all-day foray organized by NAMA, we decided to stay another day at the Lakewood Resort to explore the fungi at Madeline Island, the largest of the Apostle Islands on Lake Superior. Francesca Macchiarini, a MAW member, together with my wife Ophelia Barizo, and I, drove for about an hour to the town of Bayfield where we took a 25-minute ferry to Madeline Island. From there, we proceeded to the Big Bay State Park where we found the ground carpeted with black trumpets. In about two hours we filled half a garbage bag. To make room in our luggage we dried the black trumpets in our condo's oven with an electric fan pointed at the partially opened door of the oven to circulate the air.

Next year's foray will be in Oregon, which is considered another mushroom paradise. For those who have not been to a NAMA foray, I encourage you join next year's foray. It will be an eye opening, and wonderful learning experience you will never forget.

Mycology Vocabulary

Miscellaneous Words

Many taxonomic names seek to describe the thing they name; understanding root words can help you remember both the name and the organism. Mycologists use a great variety of Greek and Latin words when coming up with taxonomic names. Below are some of the most common ones that relate to neither color nor shape.

Word	Meaning	Example
-aceus	resembling	*Tylopilus plumbeoviol<u>aceus</u>*
edulis	edible	*Boletus <u>edulis</u>*
-ensis	of or from, as a place	*Crepidotus appalachi<u>ensis</u>*
esculentus	edible	*Morchella <u>esculenta</u>*
fallax	false	*Craterellus <u>fallax</u>*
geo-	earth	*<u>Geo</u>glossum nigritium*
-oides	Resembling	*Pholiota squarros<u>oides</u>*
-opsis	Resembling	*Daedale<u>opsis</u> confragosa*
graveolens	strong-smelling	*Russula <u>graveolens</u>*
poly-	many	*<u>Poly</u>porus badius*
praecox	early	*Agrocybe <u>praecox</u>*
pseudo	false/fake	*<u>Pseudo</u>hydnum gelatinosum*
tinctorius	for dyeing	*Pisolithus <u>tinctorius</u>*
vernus, vernalis	springtime	*Entoloma <u>vernum</u>*
virosus	poisonous	*Amanita <u>virosa</u>*
vulgaris	common	*Crepidotus <u>vulgaris</u>*

In addition to these, you often find derivatives of plant or animal nomenclature in mushroom names. This usually indicates that the two species are associated with each another. For example, *Daedalea <u>querc</u>ina* grows on oak wood (*Quercus* sp.) and *Amanita <u>musc</u>aria* was used to kill houseflies (*Musca domestica*).

Camp Sequanota Foray. From left to right: 1) A member shows off a Red Salamander. 2)Foray attendees practice juggling. 3) Shannon Nix (left) gives a presentation on using microscopes for mushroom ID. 4) MAW members examine mushrooms from morning forays. 5) MAW Second Vice President Mitch Fournet extracts DNA from mushroom samples. *Photos: Agnes Demianski (1-3) and Thomas Roehl (4, 5)*

30th Annual Camp Sequanota Foray

Thomas Roehl
MAW Newsletter Editor

During the weekend of September 29 through October 1, MAW held its annual foray at Camp Sequanota in Jennerstown, Pennsylvania. This was the 30th year that MAW has held a weekend foray at Camp Sequanota and about 40 members turned out to find mushrooms and celebrate the milestone.

Rain had been scarce during the weeks leading up to the foray, so members returned from forays with relatively few mushrooms, most of which were inedible. However, some lucky people did manage to find a handful or two of hedgehog mushrooms. Because the conditions were less than ideal, attendees had to brush up on their mushroom hunting and identification skills.

With fewer mushrooms brought back, the ones that were found received some special attention. MAW members were able to identify down to species some severely dehydrated specimens, little brown mushrooms, and mushrooms in species groups – all things that would normally have been discarded as "unidentifiable."

MAW's Science Advisor, Shannon Nix, gave a presentation on Saturday describing microscopy techniques. For most people, the prospect of using a microscope for mushroom identification sounds like more trouble than it is worth. However, Shannon explained that if you know what to look at, using a microscope can actually make identification easier.

One of the simplest things to look at under the microscope are spores. Many have unique shapes or textures that help assign them to a certain genus. Entolomatoid mushrooms, for example, have distinctly angular spores. That feature alone won't allow you to ID a mushroom to species, but it can get you to the right section even if you can't decide whether your spore print is pink or brownish.

At the end of the foray, MAW's Mycoflora Committee selected 13 specimens to submit for DNA testing. Those species were: *Lactarius hibbardae, Hypholoma tuberosa, Agaricus cretacellus, Calostoma cinnabarina, Hypholoma fasciculare, Ganoderma tsugae, Amanita* sp. B8, *Ganoderma lucidum, Daldinia childiae, Hydnum rufescens, Trametes pubescens, Trametes hirsuta*, and *Trametes velutina*. These were chosen because the committee was reasonably confident in their identification but wanted to double-check or because they were rare species without much data. Results of the DNA analysis will be available in 2018.

Danny Barizo

Danny Barizo (left) and Connie Durnan (right) introduce students at the Highland View Academy to the amazing world of mycology during the school's 2017 STEMFest.

STEMFest 2017

Danny Barizo
MAW Member

For three years in a row, members of MAW participated in STEMFest by displaying cultivated and wild mushrooms, distributing literature, promoting membership to MAW, and answering many questions people ask about mycology, mycophagy and the world of fungi.

As in the past, STEMFest 2017 was held on October 15 at Highland View Academy, a private school located in Hagerstown, MD. Many government agencies such as National Institute of Health, National Aeronautics and Space Administration (NASA), National Security Agency, National Science Foundation, National Oceanic and Atmospheric Administration, as well as many local companies had booths promoting the study of Science, Technology, Engineering, and Mathematics. Hundreds of students and their parents turned out to see the displays and participated in the various activities and workshops. The annual STEMFest was organized by MAW member Ophelia Barizo, who is the STEM Coordinator for her school district.

The MAW booth was staffed by MAW member and former board member Daniel Barizo and Connie Durnan, Second Vice President of MAW. Phillips Mushroom Farms in Kennett Square in Pennsylvania, the largest producer of exotic mushrooms in the USA, donated oyster, shiitake, maitake, and king oyster mushroom growing kits and well as literature for the event.

Hedgehogs (Cont'd)

Continued from Page 1 pines at the top of the hill. Most were found in woods of mostly pine trees with a considerable amount of Mountain Laurel, but some were found in oak woods. His best spot was in flat-bottomed, descending gullies with mountain Laurel in them. He collected about 3 pounds of them in early October and about 12 pounds in mid-October.

During the last 18 years my wife and I found a total of only about 4 ounces of Hedgehog mushrooms and considered them a rare find. But we had a great year during September 2017, finding about 11 pounds. We found Hedgehogs on several hillsides of oaks with some beech trees here and there and some pine trees. There were very few mountain laurels at this site. My wife and I also found them in gullies. The ground cover was mostly leaves with spongy ground and some broken branches from trees. The forest had plenty of rainfall during the previous three or four weeks. We picked about 2 pounds during early September. Then during mid-September, we picked about 8 pounds of them. We picked the rest during late-September.

Based on our experience this year, I've concluded that in order to find Hedgehogs, you must look in the proper habitat with the right conditions and ample rainfall. It is also possible that in some good years they might be found in habitats with mountain laurels and other good years in habitats without mountain laurels.

Opk

Veronica's Chipotle Oyster Mushroom Street Tacos

Editor's Note: This recipe was contributed by MAW member Veronica Velasquez. Veronica won first place at this fall's Mushroom Tasting for this dish.

Michael Dong

Sauces

Recaito Base Sauce

(this works wonders in other recipes like rice, stews, and slow-cooker meals)

Ingredients: 1 Yellow Onion, 8 cloves of garlic, 5 sweet peppers, 1 cubanelle pepper, 1 bunch cilantro, 1 whole red pepper, 1tsp of olive oil

Instructions: BLEND everything raw in blender.

Pearl Onion Sauce

Ingredients: 1 bag of pearl onions, oyster mushroom stalks, 1 tbsp of salt.

Instructions: Boil 4 cups of water, add veggie bouillon, pearl onions and oyster stalks and set that baby on to medium, once the liquid has reduced by half, take off heat and puree on high in blender. Cool, and bottle up

Tomatillo Sauce

Ingredients: A bunch of tomatillos, green tomatoes, salt, 1tsp of olive oil, small Jalapeño, handful of cilantro, salt to taste

Instructions: I like to blend first then simmer, cool and bottle. P.S.: great on anything!

Ingredients for Filling

- 2 Tbsp Earth Balance Soy-Free Butter
- 1 large white onion- minced
- 6 mini sweet orange peppers (thin slices)
- 1 large green pepper, minced
- 2 Lb oyster mushrooms- caps only (save stalk for onion sauce)
- 1 can of chipotle peppers in adobo sauce (use adobo sauce only for milder flavor)
- sea salt
- optional: rinsed banana leaves (found in frozen area of the Latin food section in Shoppers Food Warehouse)
- tortillas: look for street taco, mini tortillas, or just use any corn tortilla you can find
- 1 bunch of cilantro or flat parsley
- a few radishes- sliced paper thin
- lime wedges

Instructions

1. On a medium high temperature, add 2 tbsp of butter to a wok. As the butter starts to melt, add the orange peppers, onion, green pepper, adobo sauce and pieces of chipotle peppers (chipotle peppers will make this recipe spicier) and mix well to coat everything evenly.
2. Once the peppers begin to release glorious smells and the butter starts to consume, add the mushrooms and add 4 big Tbsp of Recaito Sauce and mix well. Bring the temperature to a to medium low and let it do it's magic for about 15 minutes uncovered and make sure to stir everything once before serving. (If you want to replicate exactly, add some banana leaves to the top and let that be your "lid" for the mushrooms; like a bay leaf, aroma will be released but please don't eat! Add sea salt to taste.

Serves 4

Tales of the Fun Guy