MYCOLOGICAL ASSOCIATION OF WASHINGTON, INC.

The Potomac Sporophore

Fall | November 2015 Volume No. 30 | Issue No. 4

The quarterly publication of the Mycological Association of Washington (MAW) | www.mawdc.org

In This Issue

Fungus Notebook: Voluminous Cow, Milky Pear? Meet *Lactarius volemus*

William Needham
MAW First Vice President

Common Name: Tawny milkcap, voluminous-latex milky, weeping milkcap, apricot milkcap, fishy milkcap, bradley — The color of the cap ranges from orange-brown to yellow with age. The mushrooms that exude a milky colloidal suspension called latex are commonly called milkcaps.

Scientific Name: *Lactarius volemus* — The generic name Lactarius is Latin for milky, a reference to the latex secretion. The species name volemus is Latin for either "filling the hand" or "a kind of pear," depending on the reference; it may be that it is both — a particularly large pear that fills the hand. While clearly speculative, this may be intended to convey that the amount of latex is enough to fill the hand, as this mushroom produces copious amounts. Another possibility is that the *volemus pira* (Latin for pear) was colored orange-brown or tawny. The common name "voluminous-latex milky" is in essence taking the Latin *volemus* as meaning voluminous, which is derived from volume and referred originally only to books; current usage allows for the notion of it meaning "in great volume." The

Lactarius volemus has an orange-brown color and often leaks a milky fluid called latex after being handled — or sometimes unprovoked. *Photo: William Needham*

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Sturgeon Defines Appalachian Commonalities

Walt Sturgeon shows a Ganoderma sp. during his table walkthrough at the Fourth Joint Appalachian Foray in Syria, Va. *Photo: Willow Nero*

Willow Nero
Sporophore Editor

Members of MAW and the New River Valley Mushroom Club gathered at Graves Mountain Lodge in Syria, Va., Aug. 28-30 for the Fourth Joint Appalachian Foray. Dry weather preceded the foray, making the identification table notably sparse, but cooking demonstrations, varied hiking opportunities, and the picturesque location lifted spirits.

Guest mycologist Walt Sturgeon, a well-known amateur from Ohio, introduced those in attendance to mushrooms commonly found in both the Appalachian region and Canada and was able to show several examples of these mushrooms on the identification table.

Amanita jacksonii has impressive coloration and a distinct volva at its base. *Photo: Nedra*

"When you have the Appalachians, you have altitude, so you get mushrooms 500 miles south of where you expect to see them," he commented on the unique location.

Many of Sturgeon's examples were mushrooms that associate with oak trees, common to both locations. Milk caps in the *Lactarius* genus are one such associate, including the common *Lactarius volemus* (see article, above) with its fishy odor and mild-tasting latex and the brilliant blue *Lactarius indigo*.

"Some of this is going to be hard to talk about," he noted. "We're drying up here."

Even specimens of the bioluminiscent fungi *Panellus stipticus* and *Omphalotus illudens* were a little parched for a dazzling show of their night glow. Sturgeon suggested they could be revived with a damp paper towel or a cup of water.

Many Amanita species also are common in both Canada and the Appalachians. These include the edible *Amanita jacksonii* and the highly poisonous *Amanita bisporigera* associated with oaks and other hardwoods. "It's the reason wyou don't eat a mushroom to see what it will do to you," Sturgeon commented.

Many good boletes appear to have tagged along on the journey from Europe with their plant associates. A few include *Boletus frostii*, which has a great lemony flavor, *Tylopilus alboater*, which has a snail-like texture when cooked, and *Tylopilus fellus*, the bitter bolete.

He also in-

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Science

Continued from page 1 scientific name is in the process of changing to *Lactifluus volemus* due to DNA assessments of the genus.

The genus *Lactarius* is a widely and mnemonically known as "milkcap mushrooms" for their unique characteristic latex emanation. A large grouping of at least 500 known species with some estimates of almost twice that many, the genus belongs to the Russula family. Of all the milkcaps, *L. volemus* is probably of greatest renown, as it is very common in the northern temperate and boreal regions of Eurasia and North America, in the subtropical areas of Central America and Africa and the dipterocarp tropical forests of Southeast Asia. In France, it is known as *vache*, which means cow, likely due to its copious production of milk-like latex. In Germany, it is known as *brätling* which translates roughly as "little roast," which is probably a reference to color; this is sometimes extended to *milch-brätling* to emphasize the production of milk (milch). The American common name bradley is most likely an Anglicized form of the German epithet. The Japanese name is *chichitake*, which means "milk mushroom." It is also arguably the most recognized and collected *Lactarius* mushroom in eastern North America; it is easy to identify and it is edible.

The tawny milkcap has a number of characteristics that facilitate a reliable identification, even though it can be somewhat variable in color and shape according to age and other environmental factors (which is true of most mushrooms). The orange-brown cap or pileus becomes depressed (physically, not mentally) with age so that it has a vase-like shape that is very characteristic of many Russula family mushrooms; the stem or stipe is about the same color. The gills on the underside of the pileus are close with little spacing between; they extend down the stipe in a manner known as decurrent. When the mushroom gets older, it develops a fishy aroma. All of the above characteristics are helpful but not all that distinguishing; what sets this mushroom apart is the latex. The voluminous milky is just that. When the gills are cut, white latex oozes out to form copious droplets that fall to the ground like milky tears. The latex is also noteworthy in that it gradually turns brown, staining anything with which it comes in contact.

There are two other *Lactarius* mushrooms that resemble *L. volemus* and also produce significant amounts of white latex: *L. corrugis*, the corrugated milky, named for its recognizable corrugated or wrinkled cap, and *L. hygrophorus*, which has gills that are more widely spaced. Recent phylogenic research has revealed that *L. volemus* is actually a complex of many species that are closely related, so the presence of look-alike cousins should come as no surprise. As both are as edible as the tawny milkcap is and are typically listed as choice, this poses no problem for the committed (physically, although some would suggest mentally) mycophagist. It may seem counterintuitive that a mushroom filled with a fishy smelling sap-like latex (which, even if you like fish, is generally considered unpleasant) would be a choice edible. The fish smell is volatile and therefore evaporates when the mushroom is heated above its boiling point by the cooking process. This edible mushroom comes with caveats, however. The most common method of preparing wild mushrooms is to sauté them in oil, a process that in this case results in the release of voluminous (literally in this case) quantities of latex into the pan. It is generally recommended that a slow boil be employed to retain the latex within the body of the mushroom, thereby enhancing the taste. Another problem is granularity. While most mushrooms have an elongated fibrous cell structure that will bend but not break, mushrooms in the Russula family have globular cells called sphaerocytes that are intermingled with the elongate cells. This imparts to them a granular texture in contrast to other mushrooms that have a texture similar to the pliability of meaty animal tissue. Charles McIlvaine, coauthor of *One Thousand American Fungi* and a well noted mycophagist, provides that "the rich juices of Lactarii are best retained by baking; the species grow hard and granular if cooked rapidly. This method is preferable to stewing, but no one will despise a properly made stew of them." Like most mushrooms, the gathering and preparing is worth the effort in terms of nutrition. One hundred grams of *Lactarius volemus* contains about 25 grams of protein and only 4 grams of fat, with significant percentages of the U.S. Department of Agriculture's daily recommended amounts of iron, zinc, and man-

MAW Board of Directors

Sequanota Sightings

Participants at this year's Camp Sequanota foray found the mushrooms a bit sparse, but this pitcher plant wowed those who visited the cranberry bog not far from the main camp. *Photo: Connie Durnan*

ganese.

Why is it that some Russula family mushrooms produce latex, specifically those in the *Lactarius* genus, whereas others do not? Latex is a chemically complex colloidal suspension that requires a fairly high investment in energy, something fungi must extract from their environment as they are not autotrophic like plants. Latex is a complex mixture of individual particles or colloids including but not limited to resins, fats, and waxes that are suspended in a liquid medium that contains dissolved hydrocarbons, proteins, sugars, and alkaloids, among other things. Commercially, latex paints utilize this principle to convey coatings to a surface on the evaporation of the water carrier. About 10 percent of all plants produce latex, which corresponds to about 20,000 species in 40 families. Among the more noteworthy latex producing plants are the rubber tree (*Helvea brasiliensis*), from which natural rubber is derived; the gutta-percha tree (*Palaquium gutta*), from which the electrical insulator gutta-percha is extracted; the chicle tree (*Manilkara spp.*), from which the latex was once used as the basis for chewing gum; and milkweed (*Asclepias syriaca*), which is eaten by monarch butterfly larvae but toxic to most other herbivores. It is the consensus among botanists that plants produce latex to forfend insect predators; a preponderance of the empirical observations supports this thesis. For example, the percentage of plants that produce latex in the tropics, where arthropods are ubiquitous, is more than twice the percentage in temperate climates. Latex is released when plants are injured, and harvesters exploit this process when they tap trees to extract latex. Similarly, a feeding insect will seek to penetrate the plant's outer cells, automatically triggering the defensive flow. The latex is generally sticky to the detriment of insect mandible articulation and coagulates into a solid gel to cover the incision and protect the underlying tissues. But most important is that latexes are typically comprised of toxic chemicals that vary from plant to plant. It should really come as no surprise that plants produce latex to protect themselves; they produce thorns for the same reason.

The question is, can the latex-insect defense thesis extend to the fungi of kingdom Eumycota? This will at present remain a hypothesis, as there has been very limited research conducted on the mushrooms in the genus *Lactarius*, even less on their exudate latex. The voluminous quantity of latex from *L. volemus* has elicited some interest from the rubber industry, as the polyisoprene can be used as a low molecular weight model for the more complex commercial rubbers, according to a 1998 Tokyo University paper. As a matter of interest, you could technically make a form of rubber from at least some of the milkcaps, but the quality would be in question and the quantity insufficient for commercial application. Another way to approach the latex etiology question is through exclusion: If latex is not created to ward off predators, then what is it for? In the Darwinian struggle for life, mutations occur when they promote propagation. If the latex does not protect against predators, it must then improve profligacy. In the case of mushrooms, this would mean an ameliorable dispersal of reproductive spores. This is not unheard of in the fungal community as a number of species employ deliquescence (biological melting) in this way. Most notably, the stinkhorns evolved stink to attract flies to their oozing mixture of spores and fluidized thallus and promote reproductive dissemination. However, milkcaps do not deliquesce, and they release extensive latex only when punctured. Another telling observation is that milkcaps are evolved from mushrooms that produce no latex in the Russula family. One frequently encounters a red Russula with evidence of having been nibbled; a milkcap rarely, if ever, shows these signs. My theory is that latex detracts slugs, one of the key nemeses of mushrooms.

Droplets of white latex drip from the injured gill tissue of this *Lactarius volemus*. The latex leaves dark stains on the mushroom and anything it touches. *Photo: William Needham*

Some members of the *Lactarius* genus have a colored, odorous, or acrid latex. The mushroom shown above has a yellow latex. *Photo: William Needham*

The advent of DNA testing has wrought havoc with the traditional Linnaean taxonomies based on morphology; this is especially true among the fungi, and the family Russulaceae is no exception. The family consists of ectomycorrhizal (they enclose plant roots externally for nutrition) basidiomycetes (Basidiomycota is one of two subphyla of fungi) that have a cell structure composed of sphaerocysts, which, as their name implies, are spherical. This cell structure is distinct from that of other mushrooms, which have a fibrous structure and are therefore tough. It is hypothesized that the formation of sphaerocytes occurred due to evolutionary pressures to more rapidly expand the epigeal (aboveground) fruiting body to expedite spore dissemination. Russulas break rather than tear due to the discontinuities that the spheres afford; they are widely called "brittlegills." The taxonomy of the Russulas was thought to be simple. If it had latex, it was in the genus Lactarius; if it lacked latex, it was in the genus Russula. As it turns out, this is incorrect. Recent molecular phylogenic studies have revealed four distinct clades within the Russula family. (A clade is a relatively new term that is used to indicate all of the species evolved from a single ancestor; the relationships are clarified in cladograms, which are what family trees had always intended to be.) Not only is there now a proposed new genus *Multifurca* (characterized by multiple furcations or forks in the gills), which will contain former members of both Continues on page 6

Meeting File

Sept. 1 — Mary Catherine Aime Takes MAW Deep Into the Lost World With Guyana Mycology

Willow Nero
Sporophore Editor

Dr. Mary Catherine Aime, associate professor of Botany and Plant Pathology at Perdue University and a managing editor of the journal *Mycologia*, wowed MAW members Sept. 1 in a presentation that introduced some of her research into previously unknown tropical fungi.

Aime and other mycologists have for more than 15 years been exploring virgin tropical forests western Pakaraima Mountains of Guyana to find new fungi and work toward a better estimate of existant fungi in the world. Aime says when she read an estimate of 1.5 million species of fungi, she wondered how scientists have only discovered 70,000 to 100,000 species, representing only 5 percent of those estimated to exist. She figured the missing fungi had to be in the tropical rainforests known for hyperdiversity of other species.

"It's a really beautiful region to go and there had been absolutely no mycological research out here when we began our research," Aime said.

The journey into her swatch of rainforest is difficult, involving a small airplane, several local guides, and sometimes dangerous travel.

Once at the camp, mycologists deal with extreme rainfall and humidity, nonstop swarms of insects, and other less than hospitable working conditions. "Every year we have to rebuild the camp when we get there because, of course, it's a tropical rainforest — everything rots," Aime said. The team sleeps in hammocks under a shelter they construct with help from their native guides. Samples are stored in plastic containers with dessicant. Sometimes as the mycologists work, the area will flood up to their waists. They've learned to ignore these interruptions for the most part.

"The rain gauge sometimes tops out at 6 inches, so it gets that high and we don't even know how much rain we got that day," Aime said.

The environment itself is very different from those to which Western mycologists are accustomed. The forest is mixed to monodominant Dicymbe, a huge legume that weaves itself into a tree structure. Because of the intense rainfall and temperature, little organic matter or soil persists on the forest floor. Instead, this material tends to collect on the trees themselves, especially the Dicymbe, with its many crevices. Hence, many mushrooms also grow on the sides of trees.

Throughout the years, Aime has made four chief discoveries:

1. She has helped expand ranges and records of many genera previously unknown in South America or not seen for thousands of years.

2. She has expanded taxonomic concepts with the discoveries of pleurotoid lactarius species, for example. (That's a *Lactarius* that looks like an oyster mushroom and grows out of a tree!)

"So basically just this little tiny area just 6 hectares we've almost doubled the known species in the world in this genus [*Clavulina*]."

3. She has discovered remarkable diversity in the region, including 30 new amanitas and many boletes.

4. She has uncovered new higher level lineages. "We're finding new things like new genera — things we can't even with DNA put into a genus," she explained.

Katherine Glew leads a lichen workshop in Rock Creek Park. *Photo: Connie Durnan*

MAW President Mitch Fournet, left, and Mary Catherine Aime review photos of fungi at the Sept. 1 MAW meeting. *Photo: Daniel Barizo*

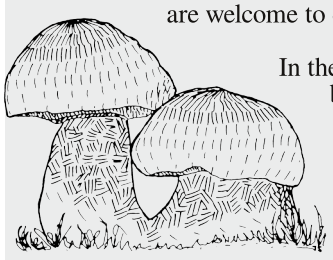
Upcoming Events

Dec. 1 — Monthly Meeting and Election of 2016 Board Members. Guest mycologist: Kevin T. Smith. An expert in forest ecology, Smith will discuss the stress, disease, and benefits that fungi provide for a forest's overall health and productivity.

Jan. 5 — Monthly Meeting. Speaker TBD.

Feb. 2 — Monthly Meeting. Speaker TBD.

Unless otherwise noted, meetings are held at 7 p.m. on the first Tuesday of the month at the Kensington Park Library in Kensington, Maryland. Attendees are encouraged to bring mushrooms for identification. Members of the public are welcome to drop in.



In the winter months mushrooms can be scarce. Many polypores from more fruitful months still can be found and identified. Lucky foragers might stumble upon oyster mushrooms after periods of higher than average warmth.

Volunteer With MAW

Several board positions are open. Help MAW reach new heights and bring the national NAMA foray to Virginia. Volunteer with MAW today. Email any board member or info@mawdc.org.

Glew shows MAW members some of the lichens she collected in the greater Washington area. *Photo: Connie Durnan*

For example, *Guyanagaster necrorhizus* is a fungi that's "hard as a rock" with a thick exoperidium. "You cut it open and it's this beautiful beautiful red color inside," she said. Turns out it's a sequestrate, or truffle-like, relative of the *Armillaria*, commonly known as honey mushrooms!

Aime's research has led to a total of 1,500 species vouchered and 67 publications (with 73 percent of those papers introducing new species). She estimates from her research that there could be 65 million fungi out there.

"We just have to be very very careful about how we make these estimates basing all we know on temperates," she concluded.

Oct. 6 — Katherine Glew Lectures on Lichens

Daniel Barizo
MAW Program Chair

Dr. Katherine Glew, PhD, Associate Curator of lichens at the University of Washington Herbarium was the guest speaker at MAW's Oct. 6 meeting held at the Davis Library. Her topic was on lichens which are fungi that have symbiotic relationships with photobiont organisms such as algae and cyanobacteria.

Photobiont organisms contain chlorophyll and produce food through photosynthesis. Algae is found abundantly in nature and produces 90 percent of the world's oxygen.

Cyanobacteria is a group of blue-green bacteria that live mostly in water, and also on land. Cyanobacteria are important in the ecology of nature since they put a lot of nitrogen in the forest soil, and are also good indicators of clean air. Some lichens contain both algae and cyanobacteria, thus making them members of three kingdoms, fungi, Protista and bacteria.

Except in the depths of the ocean, lichens are ubiquitous in nature. Ninety three percent of lichens are mycobiont, consisting mostly of sac fungi and only 7 percent are photobiont. Lichens are roughly divided into three major growth forms:

1. Crustose are crust-like and grow on the surface of their substrate; 2. Foliose are leaf-like, have a definite top and bottom and are generally two dimensional; 3. Fructose are fruit-like and shaped like bushes, long hairs or stalks. They are three dimensional and are extremely sensitive to changes in air chemistry.

In lieu of doing a workshop at MAW's annual Mushroom Fair which was cancelled this year, Dr. Glew presented a workshop at the Rock Creek Park Nature Center the preceding Sunday, Oct. 3. Members of the public as well as forest rangers were in attendance. At her workshops, Glew brought along several specimens of lichens which she and Connie Durnan, MAW second vice-president, gathered in the area.

Nov. 3 — Jared Introduces MAW to Traditional and Modern Medicinal Mycology

At MAW's Nov. 3 monthly meeting, new member Jared Urchek gave those in attendance a quick overview of medicinal mushrooms through the ages. Urchek has participated in cultivation and mycoremediation courses offered by Paul Stamets and Andy Pilarski and he has spent many hours of research in the field and laboratory.

Urchek focuses on strains of fungi from the local bio-region to help supply people with native foods and medicines and reintroduce native species into the forest. Out of approximately 1.5 million fungi in the world, humans can only cultivate around 100 species, making cultivation a promising field for growth. While some mushrooms are cultivated exclusively in laboratory conditions, it is believed mushrooms growing in the wild have higher nutritional and medicinal content.

Urchek extracts compounds from medicinal mushrooms using hot water, a traditional method, or ethanol.

He finds several species most notable:

—*Ganoderma sp,* also known as Reishi or Ling Zhi is used as an adaptogenic, hepato-protective, anti-histamine, anti-inflammatory, anti-viral, anti-microbial, anti-oxidant, blood pressure and sugar modulator, immune modulator and enhancer, anti-tumoral, nerve tonic, and stress reducer.

—*Lentinula edodes*, also known as shiitake, has anti-viral, anti-microbal, anti-tumor, anti-viral, and cardiovascular properties.

—*Cordyceps sinensis* or "summer plant, winter worm" may be effective against the signs of aging, tumors, diabetes, depression (in diabetics), asthma, auto-immune disorders, cancer, HIV, and liver cirrhosis. It is also a strong antioxidant that is used as a cardio, kidney, and sexual tonic.

—*Grifola frondosa,* commonly known as hen-of-the-woods, shows promise against diabetes and tumors and

Jared Urchek shows off a large specimen of a medicinal mushroom he found near Washington, D.C. *Photo: Daniel Barizo*

is a known antioxidant. It has also been used to fight hepatitis, HIV, and hypertension.

—*Laetiporous sulphureus* or *L. cinncinnatus,* chicken-of-the-woods, has shown activity against MRSA, diabetes, tumors, and HIV.

—*Plurotus sp.*, the oyster mushroom, provides excellent nutrition and is an analgesic with anti-allergy, anti-bacterial, anti-cholesterol, anti-diabetes, anti-oxidant, anti-viral, and anti-carcinogenic properties.

—*Inonotus oblique* or chaga contains Betulinic Acid and can be used to fight diabetes, inflammation, tumors, and viruses.

—*Lenzites betulina* is not commercially marketed but shows promise against bacteria and cancers.

—*Trametes versicolor* or turkey tail is one of the best documented medicinal mushrooms. It has anti-carcinogenic/cancer properties and is effective against microbes and viruses.

Pakistani-Style Shiitake Mushrooms

This is Middle Eastern comfort food at its best. No forks are allowed, even if your beer bottle becomes too slippery to hold.

4 tablespoons vegetable oil
4 crushed garlic cloves, chopped
2 teaspoons ground cardamon
2 teaspoons ground cumin
4 dried hot chilies, crushed, or
4 jalapeno chilies, sliced
2 large onions, sliced
2 large tomatoes, sliced
1 small eggplant, peeled and thinly sliced, then cut crosswise to julienne
15 to 20 fresh shiitake caps, stems removed and caps halved
Salt
Pitas, lightly heated

Heat the oil in a large skillet over medium heat until it begins to smoke. Add the garlic, cardamom, cumin, and chilies. Stir vigorously for half a minute, then add the onions, tomatoes, eggplant, and the shiitake. Stir over high heat, adding more oil if necessary. Sauté until the vegetables are well cooked, limp, and fragrant, about 10 minutes. Salt to taste. Stuff the pitas with the mixture and serve.

(Recipe courtesy of Phillips Mushrooms.)

Cont'd *L. volemus*

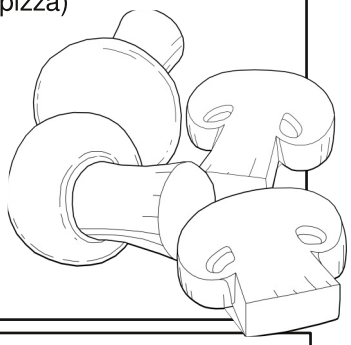
Russula and *Lactarius*, but the former *Lactarius* is now two genera, with the majority of the species in the new genus named *Lactifluus*. While changing to the new genus would have been technically correct, a 2013 *Scripta Botanica* article "Not every milkcap is a Lactarius" captured the emerging zeitgeist of taxonomic overload: "… in an era where we discover that widely accepted and long-known fungal genera and families are artificial, the idea of changing the concept of the two large agaricoid genera in this russuloid clade, is a larger shock to many mycologists than other changes to the Russulales have been." The official decision was fortuitously made by the International Committee of Nomenclature to retain the original genus name *Lactarius*, which would continue to include the majority (about 80 percent) of the milkcaps, while the minority would be banished to *Lactifluus*. To prevent confusion, the new *Lactarius* genus is to be called *Lactarius sensu nova*, which is probably necessary for clarity but adds to the tangled web of taxonomic distinctiveness. One of the unfortunate consequences of this change is that *L. Volemus* is in the smaller genus and will henceforth be known as *Lactifluus volemus*, which will have profound lexicographic impact among fungus aficionados.

As a further complication, the type species of the original genus *Lactarius* was *L. piperatus*, or peppery milk cap, almost as well-known as the tawny milkcap but for a different reason. It is aptly (if euphemistically) named for a pungent spice; the latex is one of the most acrid substances that one is likely to encounter outside a chemical plant. Where it stands on the Scoville scale has not been determined, but one touch to the tongue or lips will be enough to deter any further experimentation. It is quite common. In *One Thousand American Fungi*, Charles McIlvaine avers that he was first attracted to toadstools (a term that he uses for mushrooms in keeping with general Anglo Saxon mycophobia) by the appearance of so many pepper milkcaps after a forest fire in West Virginia in 1881 that the "blackened district was made white." And, in what may be one of the first occurrences of fungal use for fertilization, he "collected it then in quantity and used it, with good results, as a fertilizer to impoverished ground." Surprisingly, pepper milkcaps are considered "edible with caution," the caution being to parboil them extensively to volatize the latex. McIlvaine notes that they are eaten in most countries and that it is "good food when one is hungry and cannot get better. It is best used as an absorbent for gravies." Not an altogether glowing endorsement. David Aurora in *Mushrooms Demystified* is characteristic of most other admonitions: "it is difficult to digest and may even be poisonous if not properly prepared." You only go around once in life; however, the circuit can be significantly shortened by Gadarene rashness.

10 Simple Foods That Are Better With Mushrooms

Not feeling the gourmet inspiration? No time to create a truffle souffle? These old standbys won't let you down. Just add mushrooms.

- Holiday Stuffing
- Pasta (think, mac and cheese)
- Omelets
- Flatbreads (aka: pizza)
- Bruschetta
- Grilled Cheese
- Baked Potatoes
- Steak
- Salad
- Sliders (burgers)



Don't Forget to Vote

If you're receiving this newsletter, you're a voting member of MAW. Attend the Dec. 1 meeting to cast your vote for MAW's Board of Directors and ensure the association has strong leadership in 2016.

MAW Needs You

Encourage your fellow members to volunteer for positions that might suit them well. MAW offers volunteer opportunities of all sizes. We need volunteers to work on our Facebook page, keep abreast of mycology news, staff our Mushroom Fair, interact with the press, serve on our nomination committee, organize our mushroom identification efforts, and more. Just ask!

MAW Hosts STEM Fest Booth at Hagerstown High School

MAW was featured at the STEM (Science, Technology, Engineering, and Math) Fest held at Highland View Academy in Hagerstown, Maryland, Oct. 25. Two board members, Daniel Barizo, MAW program chair, and Connie Durnan, MAW second vice president, staffed the booth.

About 500 students visited the booth and were fascinated by the different varieties of mushrooms at the tables, especially the giant puffballs (*Calvatia gigantica*) that were found by Barizo and Durnan along the Potomac River. On display were edible wild mushrooms, shiitake mushroom logs, growing kits of oyster mushrooms, hens of the woods, king oysters, and cultivated mushrooms donated by Phillips Mushroom farms. Brochures promoting membership in MAW as well as brochures on how to cook various varieties of mushrooms were distributed. Students and parents were also introduced to the science of mycology.

"We hope that our booth will inspire young people to pursue careers in mycology as well as inform them of the important role that fungi play in the ecosystem," Barizo says.

(above) MAW Second Vice President Connie Durnan shows off some oyster mushrooms on display at the STEM Fest. (top) Members of the public and students and their parents learn about mycology. *Photos: Ophelia Barizo*

MAW Launches Club Mycoflora Project

In early October, MAW Mycoflora Chair Martin Livezey finalized and presented his recommendations for formally beginning a club Mycoflora project to the board of directors. The North American Mycoflora Project is a loosely associated project that aims to have amateur mycologists identify, voucher, and sample DNA from samples in order to better understand subtle differences between different fungi.

MAW's local take on the project is to find and document, undocumented or poorly documented macrofungi in three local areas loosely referred to as The National Capitol region, the North Shenandoah region, and the Laurel Highlands. These regions correspond to locations of official MAW forays and are defined by specific counties as recorded later in this report. It is suspected that the use of three areas as opposed to one will give us a greater sense of regional variation and/or consistency across a variety of vegetation types and local microclimates.

Livezey's recommendation, which has been accepted by MAW's board, seeks to obtain DNA sequences of 10 mushrooms as a starting point. In subsequent years, MAW members will be encouraged to make good identifications and document their findings on MushroomObserver.org before having a sample sequenced. The project will also seek support from local herbaria to ensure fungal samples are correctly preserved and available to the scientific community.

The first 10 mushrooms to be squenced are:

—*Piptoporus quercinus*
—*Agaricus pearsonii*
—*Entoloma roseum var. marginatum*
—*Buchwaldoboletus hemichrysus*
—*Postia fragilis*
—*Cordycipitaceae sensu lato*
—*Polyporales sp.*
—*Daldina asphalatum*
—*Multifurca ochricompacta*
—*Mycena haematopus*
—*Inocybe tahquamenonensis*
—*Inocybe lilacina*
—*Pleurotus pulmonarius*

Cont'd Fourth Joint Appalachian Foray

troduced the commonly red-capped russula family, known as the "brittle gills." "If you scratch the gills on 95 percent of them, they will crumble. You'll know you have a russula, and then you might want to identify something else," he said, referencing the genus' reputation for difficult identifications.

Sturgeon helped participants envision the entire mushroom organism and not only the fruiting body. "That whole Robin Hood effect," he said. "Take from the rich and give to the poor. That underground cobweb, the mycelium, that is the body of the fungal organism."

He closed his talk with some tips for beginners to learn their Latin and Greek scientific names. "Cep is cap. Pus is foot," he said, in reference to the suffixes common in many mushroom names.

He encouraged newcomers to be patient with the commonly changing scientific names due to new discoveries.

"The mushrooms don't change," he said. "It's just us humans putting them in books. If anyone corrects you, don't take it personally. Just say OK that's the new name. I know it by another name.

"It's nonsense but necessary nonsense," he added.

He also recommended four top mushroom ID books for the Appalachians: *Mushrooms of West Virginia and the Central Appalachians* by Bill Roody, *Mushrooms of Northeastern North America* by Alan Bessette, his own collection of beginners' books, and Michael Kuo's *100 Edible Mushrooms*.

Dues Reminder

Most MAW members pay dues on a yearly basis beginning with a new calendar year. Dues are $20 for individuals and $30 for families. Don't get left out of exclusive forays in 2016. Pay your dues by Paypal at www.mawdc.org or bring a check made out to MAW to any meeting. Email memberships@mawdc.org to check your membership status.


So, why are the red russulas like the Kardashians
well, they are pretty, they pop up everywhere and they are annoying.
JIM SHERRY