Potomac Sporophore

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MAW DUES

MAW dues are paid each year in January. Send check to:

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4509 Windom Place, NW
Washington, DC, 20016

Singles $20.00/Households $30.00.

FORAYS

Check the MAW Voice Mail at 301-907-3053

FALL TASTING

The Fall Tasting will take place on October 2nd at the Chevy Chase library, which is our regular meeting place.

Non-members must become members in order to participate because MAW is not permitted to serve food to the general public.

Members who do not bring a dish (50 tastings) will pay $10.00 on admission.

Anyone who brings a wild food must cook it at the tasting, after it has been approved by our staff.

Stoves will be provided but we need tables for the stoves so please bring one.

The success of the tasting is related to members' cooking wild mushrooms but you can cook commercial mushrooms that you buy and you may cook the mushrooms provided by Phillips Mushroom Farm.

It is also possible for you to bring your wild mushrooms to Ray or Jon for identification before the tasting-then you can cook them at home. Call them for directions to their home.

A few prizes will be given for the most popular dishes.

PROGRAMS

The program schedule for guest speakers at the monthly MAW meetings for the remainder of 2007 is as follows:

October 2 - Fall tasting meeting

November 6 - Prior to the presentation by our guest speaker the nominations for the 2008 MAW board will be heard.

John Jemionek will then give a presentation on Mushroom toxicology. There are several basic types of toxicity associated with different fungi that range from the deadly Amanitas to those that cause gastrointestinal distress such as the Jack-O-Lantern. The program will provide some of the symptoms of ingestion of toxic mushrooms and the various possible treatments by which the symptoms may be alleviated. John is a member of MAW and is a retired Navy Medical Service

Officer. He will discuss some to the practical case history applications of fungal poisoning.

December 4 – The election for the 2008 MAW officers and board members will be held. Afterwards members will snack and socialize.

THE 2007 MAW MUSHROOM FAIR

On October 7th the sixth annual MAW mushroom fair will take place at Brookside Gardens, at 12:00 p.m. Brookside Gardens is located at 1800 Glenallen Ave. in Wheaton Park, MD.

A number of members have volunteered to help at the fair and we look forward to seeing you there. Please arrive before 12:00 p.m.

SEQUANOTA

Camp Sequanota 2007

Our annual Camp Sequanota foray weekend (the 20th?) is Friday evening, September 28, to early Sunday afternoon, September 30. The cost is only $100 per adult, which covers two nights' (double occupancy) comfortable lodging in the camp's Enrichment Center, five meals from Saturday breakfast through Sunday lunch, forays on the 600-acre campgrounds and in nearby state parks, and the identification expertise and a program by our guest mycologist, Bill Russell, author of the recently-published Field Guide to Wild Mushrooms of Pennsylvania and the Mid-Atlantic. Past foray weekends have resulted in finds of up to 260 species and, in some years, large quantities of choice edibles such as black chanterelles, Boletus separans, Boletus bicolor, hen of the woods, and horse mushrooms. If we find sufficient good edibles we might have a mushroom dish or two to accompany the Saturday evening meal. Since participants trickle in over several hours on Friday, we encourage them to bring snacks and beverages, simple or complex, to share as we enjoy a social evening.

Please send your checks or money orders, made out to MAW, to me as follows: Camp Sequanota Weekend, c/o Jon Ellifritz, 1903 Powhatan Road, Hyattsville, MD 20782. Try to get them to me by September 22. If you have any questions, please e-mail me at ellijon@earthlink.net, or call me at (301)422-7517, for example, if you can only come for part of the weekend, would like to know the costs for children, or are interested in more rustic accommodations in a cabin (bring your own sleeping bag, linens, etc.).

Camp Sequanota is in the Laurel Highlands of Pennsylvania, about a 3-½-hour drive from Washington. It's also less than an hour away from the Frank Lloyd Wright house, "Fallingwater," near Ohiopyle, PA, which you might like to visit Sunday afternoon before heading home.

Ray LaSala and William Needham with Bill Russell

Bill Russell spoke at our July meeting He is the author of the popular mushroom book: *Field Guide to Wild Mushrooms of Pennsylvania and the Mid-Atlantic*, which was published within the year.

Bill is a physics professor at Penn State University and when the University Press wanted to publish a field guide its representative came to him rather than to a member of the mycology department because there is a great difference between knowing wild mushrooms and knowing about mushrooms. Bill knows his wild mushrooms and has been eating and talking about them for over fifty years.

MAW has invited Bill to be the guest mycologist at our Sequanota foray in late September. (It has been reported by a member who lives in western Pennsylvania that the Sequanota area has had plenty of rain recently). J.S.

Waldemar Poppe serving up the remains of his delicious dish at the July meeting.

Waldemar has been preparing mushroom delights for our generals meeting for years. His main interest is in sharing his recipes and method of cooking with our members. He is one of those people who love to cook and to talk about food-like many of our members.

Karen Adams, who brings us our food snacks each month and who does a wonderful job on a very limited budget, will not be in attendance in the next few months because of family matters. Thanks Karen-we look forward to your return. J.S.

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Rain, Rain Go Away and Come Again -Tomorrow.

It seems that the entire northeast has had a poor mushroom season. Everywhere there are complaints about the lack of rain.

My backyard has yielded two green russulas only and the front yard yielded a number of agaricus.

The Baltimore Sun reported that as of Sept. 9th the rainfall was, on the average, 6 and 1/2 inches below what would be expected for Maryland on that date. The Washington Post, on the same date, reported that the rainfall for Reagan National and BWI was about 6 inches below the expected average for Sept. 9th but surprisingly, Dulles was an astounding 11 and ½ inches below average.

Dulles is about 20 miles west of DC and its rainfall deficit was twice that of the other two airports. This is due to scattered rainfall.

We all have a friend who lives a mile from us who has had no rain on a particular day when we were drenched. Is this the effect of "scattered showers," that mush used phrase that the TV weatherman loves - which generally means that we will get no rain.

The point is that it may be that we should focus on pockets of rain; perhaps some areas get lots of mushroom-picking rain while other areas are dry. General averages may not be useful and some areas may get lots of scattered rain in a particular year while other area get little J.S.

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The Mushroom Chronicles
William Needham

Mycorrhizas

During the Devonian Period some 400 million years ago, land plants first evolved from their aquatic origins. This required adaptations to the terrestrial environment. Although the plants produced their own photosynthetic nutrients from the sun they lacked the means to readily extract necessary mineral constituents from the land, as they had no true roots. The fungi had preceded them ashore by about 100 million years and had evolved to extract minerals by using root-like tendrils called hyphae to penetrate the primordial soil. However, as the fungi could not produce their own food, they needed carbon-based nutrients to absorb. It is hypothesized that this engendered a necessary relationship between the plants and the fungi to enabled them to live together on the land. This theory is bolstered by the observation that fossils from the Devonian have been discovered that clearly show the commingling of fungal hyphae and plant roots. The ability of plants and fungi to exploit diverse large habitats consequent to the breakup of Pangaea during the Mesozoic Era (225 to 65 million years ago) is considered to have been facilitated by the root-hypha association.

The mutualistic relationship that resulted was the mycorrhiza; the word originated in the late 19th Century when botanists discovered that plant roots, though infested with fungi, were not in any way damaged or dysfunctional. They described the condition quite simply as "fungus root" and gave it a name derived from the Greek words *mykos* for fungus and *rhizon* for root. The mycorrhiza is the mutualistic symbiosis of a plant and a fungus: both organisms benefit, and, in some cases, the association is obligatory if the populations of either are to increase. The fungal partner is called the mycobiont and the plant partner the phytobiont, either is referred to as mycorrhizal. In the current

Holocene Epoch, it is estimated that over 90 percent of all plants are mycorrhizal.

The mutualistic mycorrhizal relationship between a plant and a fungus is in essence a sharing of the resources that are both necessary and sufficient for life. The plant supplies the fungus with hexose (having 6 carbon atoms) sugars. Since it is not "normal" for plants to exude nutrients to their surroundings, it is evident that one of the key mechanisms involved in the symbiosis is for the fungus to stimulate the permeability of the plant's cell membranes. The fungus converts the sugars into what are generally termed reserve materials, as they are used as a means to store energy. The primary energy repository is glycogen, which is a polymer of glucose molecules; it is sometimes called animal starch as it is one of the primary means of storing carbohydrates. It is in the form of insoluble granules that can constitute as much as 10 percent of the dry weight of the fungus. Mycorrhizal fungi also generally produce the disaccharide trehalose which can be converted directly back to glucose and polyhydric alcohols or polyols; where present, these constituents can comprise an additional 15 percent of the fungal dry weight. Some of the plant's nutrients are thus essentially stored in their associated "fungus roots," an energy reservoir with some intriguing implications that are manifest in the behavior of forest ecosystems.

The fungus supplies the plant with minerals from the soil, primarily phosphorous and nitrogen. Phosphorous is one of the key constituents of adenosine triphosphate (ATP), which, when hydrolyzed to adenosine diphosphate (ADP) is the primary mechanism of plant cell energy generation. One mole of hydrolyzed ATP yields about 10,000 calories (10kcal in common parlance) of energy as heat. Nitrogen is needed for nucleic acids and chitin, the primary fungal cell wall material; proteins are about 15 percent nitrogen. Phosphorous and nitrogen are accessed by the fungus through the creation of an extensive branching underground network of filamentous thread-like hyphae. The soil nutrients are scavenged by the hyphae, which are capable of storing soil minerals against a significant concentration gradient. Thus the fungus serves two functions; it searches out critical mineral nutrients over a wide geographic area; and it builds up a reservoir of the minerals for release to the plant when needed. It is this storage and release capability that makes the mycorrhizal relationship critical for plants growing in the middle latitudes which are subject to significant seasonal variations and their concomitant nutrient fluctuations; the fungi provide the surge capacity. A mycorrhizal fungus can store enough phosphorus to provide a reserve for the tree for about ten days.

There are seven types of mycorrhizas of which two predominate: endomychoriza and ectomycorrhiza. The prefixes accentuate the fundamental difference between them: "endo" is from the Greek *endon*, meaning within and "ecto" is from the Greek word *ektos*, meaning outside or external. In terms of mycorrhizal morphology, this means that endomycorrhizas penetrate within the root and ectomycorrhizas extend outside of the root. They are also distinctly different in their populations. Endomycorrhizas are much more common; there are estimated to be over 300,000 plant species in association with about 130 species of fungi. Ectomycorrhizas only involve about 2,000 mostly arboreal plant species; however, some 5,000 different fungi are involved.

Endomycorrhizas are frequently called vesicular-arbuscular mycorrhizas or VAM due to their structure. When a spore from an endomycorrhizal fungus germinates in the vicinity of a receptive plant root, it sends specialized hyphal tendrils that extend in between the root cells to form an arbuscule, meaning "little tree" to indicate its branching structure. Each arbuscule persists for a period that ranges from several days to about 2 weeks during which time it is believed to actively transfer phosphorus to the plant through its many branches. The fungus also forms vesicles, which are membranous cavities typically filled with lipids. In addition to the arbuscules and vesicles that are internal to the root, the fungus also produces an extensive network of hyphae that extend several inches away from the root. This "fungus-root" provides the plant with a vastly expanded volume of soil from which nutrients can be extracted.

Endomychorrhizal fungi are taxonomically distinct enough

from all other fungi to warrant their own family; Glomaceae is in the order Glomales, of the Phylum Zygomycota that belongs to the Kingdom Eumycota (formerly Fungi). They are obligately biotopic, which means that they only survive in association with their mutualistic plant associate and that they cannot be grown in an axenic environment in the laboratory. They do not reproduce like the traditional fruiting mushrooms, but rather produce a large, thick skinned spores that typically form spore agglomerations called sporocarps that can be as large as one inch in diameter. All of these features are intended to promote long term survival of the fungus in a subterranean dormant stage, since they do not create a mushroom-like fruiting body to dispense millions of relatively evanescent airborne spores.

Endomycorrhizal plants are much more ubiquitous, numbering in the hundreds of thousands. It is easier to list the exceptions. Aside from the 2,000 woody plants that are ectomycorrhizal, the majority of those that do not associate with the fungi are what are generally characterized as weeds. That is, they are exploitive pioneer plants that germinate quickly in deficient soils with rapidly spreading, finely branched roots that can absorb adequate nutrients without assistance from VAM fungi. Examples include the cyperaceous sedge family and the juncaceous grasses and rushes. The association of fungi with plants across the broad spectrum of species is an additional insight into the nature of their co-evolution; the diversity is indicative many branches from an early common ancestor some 400 million years ago.

Ectomycorrhizas are not as ubiquitous as endomycorrhizas; however, they have a profound effect on the health of forests as they engage the fungi and the trees in an inter-related network of mutual association. The ectomycorrhizal fungus covers the outside of the roots of its associated photobiont with a mantle of hyphae that is called the Hartig net (Robert Hartig was a 19th-century German plant pathologist). The net consists of the hyphae that penetrate and surround the root, excreting hormones that promote root growth and suppress root hair growth; 30 percent of the root's volume is actually fungal. The overall effect is that the roots of an ectomycorrhizal plant are thicker and much more branched than the roots of a plant without a mycorrhizal fungus. What this means is the ectomycorrhizal plants have a much better root system that has a surge capacity to provide extra nutrients during periods of adversity and a extended reach to pull in nutrients from a greater volume.

The plants that enter into ectomycorrhizal relationships are limited in number but significant in size and importance. This includes all trees in the families of the Pinaceae (pines, firs, spruces, hemlocks and larches), the Fagaceae (oaks, beeches, and chestnuts), the Betulaceae (birches, alders and hophornbeams) and the Salicaceae (willows and poplars) in addition to most myrtles and legumes. In general, the roughly 2,000 plant species from 130 genera in 43 families that enter into ectomycorrhizal relationships with fungi are perennial and woody trees and shrubs. While some of ectomycorrhizal trees are obligately mycotrophic like the pines, most are facultatively mycotrophic, they can survive without the fungi but assume a mycorrhizal relationship in response to stressful environmental conditions. It is this association that promotes the long-term health of the trees; it is these trees that make up the dense stands of trees that comprise the boreal forests and play a significant role in the ecologically balanced habitats. Fungi provide the anastomosis of the root systems, the interconnections and branches that allow the pure stands of trees to predominate. Laboratory and field experiments have demonstrated the trees share carbon resources through their mycorrhizal root systems.

The fungi that enter into ectomycorrhizal relationships extend across a broad range of species that include 45 genera gilled Basidiomycetes and 18 genera of the Ascomycetes. These include many from the ubiquitous agaric genera such as *Russula, Lactarius, Cortinarius* and *Amanita* in addition to the chanterelles and the boletes. Some ascomycetes are also mycorrhizal; the truffles are all thought to rely on tree roots for their sustaining nutrients. Most of the fungi can associate with a number of trees, though there is a preferential relationship between some mushrooms and certain host trees; chanterelles prefer oaks and

confers while yellow morels prefer dead elm trees and yellow poplars. Mycorrhizal trees can have many fungal partners; the Douglas fir, among the most studied of the pines due to its importance in the timber industry, is thought to be able to form ectomycorrhizas with over 2,000 different fungi.

Of the other five types of mycorrhizas, three are of some interest, the ericaceous, the monotropoid and orchidaceous mycorrhizas. Ericaceous mycorrhizas are with plants of the family Ericaceae, which includes the heathers, rhododendrons and azaleas. That these plants are able to thrive in marginal acidic soil at high altitudes and colder latitudes is due to the exploitation of these habitats by their associated fungi. The colorless, flowering plants of the genus *Monotropa* such as the Indian Pipe have an unusual life cycle. As they are achlorophyllus, they cannot make their own food. They get it from a fungus via monotropoid mycorrhizal relationship, though no one knows if the plant provides anything to the fungus in return. The key to this unusual relationship is that it is tripartite; the fungus is in an ectomycorrhizal relationship with a nearby tree. The *Monotropa* thus gets its nutrients from the fungus which in turn gets it from the tree.

Orchidaceous mycorrhizas are necessary for orchids to survive; they are obligately mycorrhizal. The unusual thing about the relationship is that the fungus provides carbon to the orchid, carbon that it has extracted saprophytically from the soil. So far as is known, the fungus gets nothing in return; like the monotropoid mycorrhiza, it is not a mutualistic association. This is of prime importance when the orchid is a seedling, as the seeds of the orchid are very small and have inadequate resources for development. Without the colonizing fungi, the orchid perishes. The provisioning of the orchid plant with carbon by the fungus can be a long term proposition, as some orchids do not produce their first chlorophyll bearing leaf for over ten years. That this is a successful relationship is manifest in the ubiquity of orchids, there are tens of thousands of species.

Fungi are fundamental to the health of natural ecosystems. The mycorrhizal relationship between the food absorbing species of the Kingdom Eumycota and the food producing species of the Kingdom Plantae is critical to the survival of many of the species of both. The hyphae of mycorrhizal fungi permeate the soil and form extensive networks through which nutrients are shared among the associative trees, a relationship that has been facetiously called the "wood wide web." Some carry this even further; Paul Stamets in "Mycelium Running" asserts that the mycelia is "the neurological network of nature." Perhaps not, but it is abundantly clear that fungi are key to the restoration of healthy ecosystems damaged by human activities associated with timber and mining resource extraction. … To say nothing of the potential gains that could be made in agriculture to feed a hungry planet.

DON'T TOUCH THAT MUSHROOM

The spring issue of *McIlvainea*, the Journal published by NAMA, has an article by Dr. Michael Beug, who chairs the NAMA toxicology committee.

The article reports on mushroom poisoning in North America and among other things, it reported on a Washington man who carried a large *Sparasis crispa* in his bare arms for a couple of miles and broke out in a head- to- toe rash the next day, yet he never ate a bit of the mushroom.

Another person merely carried three *Amanita muscaria* in his hand and started itching and later became confused and paranoid.

I always thought that it was perfectly safe to touch mushrooms, even poisonous ones, and usually it is, but one never knows. I remember hearing that someone was affected adversely by shrimp when she just handled them.

Dr. Beug also reported that: "Morels poisoned the usual number of people who have eaten them before and then became sensitive from eating them one too many times."

Dr.Beug's main intention was to report on the mushroom poisoning for the past year. The number of poisonings (and subsequent deaths) has gone up substantially, though many happened in Mexico or to people from another land who misidentified the mushroom that caused the poisoning.

A majority of the poisonings was due to the consumption of an amanita. Many Maw members do not eat any species of amanita,

though some species are quite safe to eat.

When poisoned by an amanita one is very likely to recover if treated promptly.

There were a number of dogs who died eating amanitas. There is apparently no way of preventing this if a dog is allowed to wander in woods that grows amanitas. A suggestion made was to muzzle your dog whenever he goes outdoors in order to prevent mushroom poisoning. J.S.

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The Chicken Mushroom

We haven't found many mushrooms this year; in fact, we haven't forayed much. The weather wasn't inspiring and some medical problems discouraged me.

We did, however, drive up to Pennsylvania one day to foray, with little hope but with a desire to get out of the house. I have to say that the keystone state rarely disappoints us and this day was no exception.

We found lots of mushrooms and some were edible but have you noticed that whenever you have a bad mushroom year finding an amanita or a russula can provide a small thrill.

Perhaps Maria's favorite mushroom is the parasol mushroom and we found three edible ones. And we found a number of boletes and ate the bicolors.

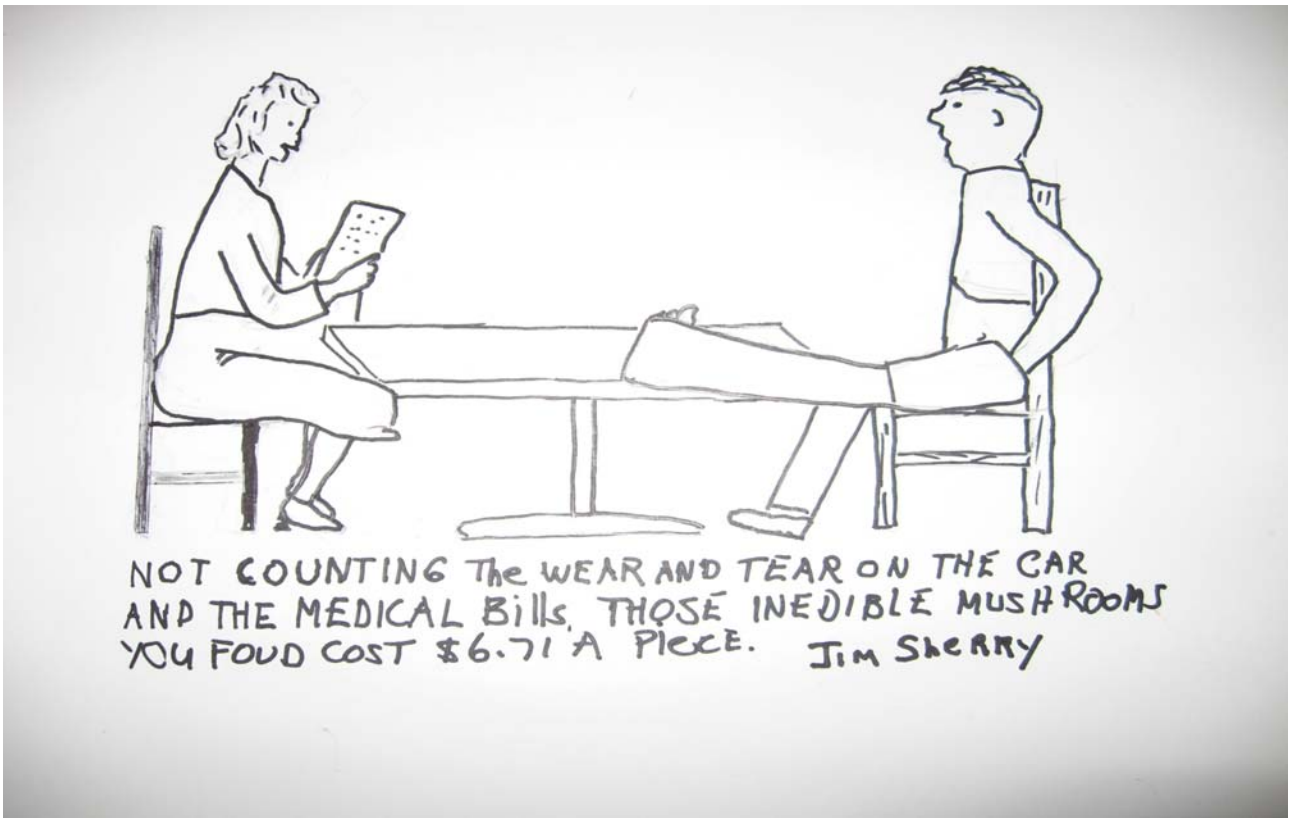
But our special delight was in finding both a cincinnatus and a sulphureus chicken mushroom. I was delighted to find the cincinnatus because it was pink-my first, though I noticed that it turned to the more usual yellow color the following day.

But the real delight was the sulphureus because it turned out to be to tastiest chicken mushroom that we ever eat.

Both mushrooms were found on roadside stumps (we were doing a drive-by foray) and both stumps were old and about two feet high. And both mushrooms were found atop the stump, though usually the cincinnatus is found at the foot of its host.

I am surprised that one can find a chicken mushroom in very dry weather on trees that have dried out many years ago.
It is said that the dead trees are a reservoir for fallen rain but I have found chicken on trees that have had no water for five weeks or so I thought, but perhaps there was a scattered rain that fell when I wasn't there. J.S.

The Sulphureus Mushroom


NOT COUNTING The WEAR AND TEAR ON THE CAR
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YOU FOUD COST $6.71 A PIECE. JIM SHERRY