SPORE PRINTS

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Spore Prints

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PUGET SOUND MYCOLOGICAL SOCIETY

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Annual dues $20; full-time students $15

CALENDAR

Nov. 11	Membership meeting, 7:30 PM, CUH
Nov. 17	Board meeting, 7:30 PM, CUH Board Room
Nov. 21	*Spore Prints* deadline
Dec. 9	Membership meeting, cookie bash, and slide show, CUH, 7:30 PM.

BROILED MATSUTAKE

Cindy Kerr

Matsutake mushrooms
2 TBs soy sauce
2 TBs mirin
2 TBs water
2 TBs sugar, or to taste
1 tsp flavored sesame oil (optional)
1/4–1/2 tsp fir or pine needles, chopped fine (or substitute rosemary)

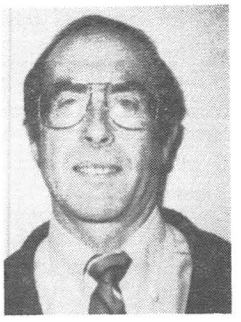
Put soy sauce, mirin (a sweet Japanese cooking wine available in the oriental section of most stores), water, sesame oil (if used), and sugar in a Ziploc bag and shake well to mix. Slice the matsutake 1/4 to 1/3 inch thick and put in Ziploc with marinade. Shake. Put in refrigerator for 1–2 hours, shaking every half hour or so. Remove matsutake, place on aluminum foil under broiler, and sprinkle with chopped needles or rosemary. Broil until done, turning once.

Instead of broiling, you can also bake the matsutake at 400°F on a cookie sheet lightly coated with cooking spray. Check every 5 minutes. The baked matsutake will puff up and can be eaten straight, with dipping sauce, or as croutons in a salad. A good dipping sauce is equal parts soy sauce, mirin, and rice vinegar. Sprinkle on sesame seeds for looks.

MEMBERSHIP MEETING

Tuesday, November 11, at 7:30 PM at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle

Back by popular demand, our speaker this month is physician, author, and PSMS member Dr. Denis Benjamin. Fresh from a trip to Europe, Denis will speak on "Mushroom Hunting and Mycophagy in Italy." Denis is well known in mycological and medical circles for his expertise on mushroom poisoning and is the author of the highly acclaimed *Mushrooms: Poisons and Panaceas.*



Will persons with last names beginning with the letters A–D please bring a plate of refreshments for the social hour?

AMANITA PHALLOIDES IN THE ARBORETUM

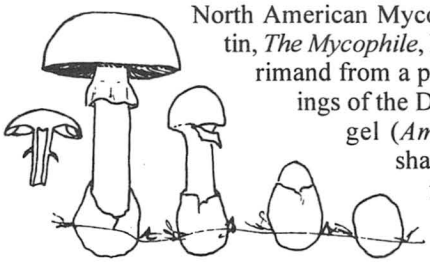
Brandon Matheny

A collection of six or seven specimens of the deadly mushroom *Amanita phalloides* was unearthed by Joy Spurr in the Washington Park Arboretum on October 16, 1997. Joy was in the Arboretum taking photographs when she came across the fruiting under a variety of oaks and rhododendron. Her identification was confirmed at the PSMS exhibit a few days later.

To date this is the first recorded instance of *Amanita phalloides,* called the Death Cap, in the Arboretum. However, a few records of the species do exist from Seattle. In 1966 Dr. Stuntz identified an *A. phalloides* that was growing under a birch tree on Mercer Island, and Ben Woo monitored a patch, probably associated with Northern Red Oak, in his Mt. Baker neighborhood from 1976 until it stopped fruiting in 1986. An unconfirmed sighting is also reported at the Jackson Park golf course. Given that no new oaks have been planted for quite some time in the Arboretum, speculation arises regarding the species' arrival. Has it been fruiting inconspicuously for the past 70 years, or is the fungus a recent immigrant?

Its characteristic features include a smooth, greenish yellow cap, free white gills, ample white ring, and membranous, saclike volva (from *The New Savory Wild Mushroom*). One specimen alone may be enough to kill a human adult. And as the San Francisco area can attest, and as we ourselves are beginning to find here, the geographic distribution of this species is certainly not restricted. *Amanita phalloides* specimens have even shown up in Mission, B.C., for the past two years.

For those mushroom collectors who do not happen to receive the North American Mycological Society's bulletin, *The Mycophile*, I will reiterate a stark reprimand from a poster that features drawings of the Death Cap and Death Angel (*Amanita verna*) against a shadowy and slightly out of focus human skull against a blood-red backdrop:



WARNING!
PICKING AND EATING WILD MUSHROOMS
CAN KILL YOU!

All mushroom collectors, wherever you may be collecting, take heed. Note: Mushroom collecting in the Arboretum is prohibited as a matter of policy.

MOUNTAINEERS/PSMS FIELD TRIP

Russ Kurtz

Saturday, October 11, 55 people assembled at Crystal Springs, divided up into five groups, and took off for a day of pursuing the wild mushroom. Sara Clark, Brandon Matheny, Ron Post, Harold Schnarre, and Russ Kurtz acted as guides and identifiers, one guide for each group. Everyone found some good edibles, much of which was donated to the kitchen at Meany Hall. Saturday evening's dinner featured *Gomphus clavatus* diced in biscuits and chanterelles in beef sauce over fresh-made noodles. Mmmm, good!

Coleman Leuthy gave an excellent slide presentation Saturday night. Sunday, Lorraine Dod talked on how to clean, care for, and preserve mushrooms. Sunday lunch was outstanding, with matsutake soup and small pitas cut in half and filled with a *Leccinum* beef sauce.

One-hundred and twenty species of fungi were identified by Coleman, Brandon, Sara, Harold, Ron, and Russ.

AMERICAN RIVER FIELD TRIP

Larry Baxter

September 27 and 28 was a beautiful weekend to be over on the American River. Although the larch were not changing yet, the vine maples certainly were. It rained hard Friday night, but there was no rain for the rest of the weekend. Only 11 people signed in for this field trip, but you wouldn't have known it from the number of specimens at the ID table. Over 80 species were identified by Sara Clark and Larry Baxter.

Of the most often eaten species, white chanterelles were ubiquitous and in prime condition. There were also several matsutake, *Leccinum scabrum, Hydnum repandum, Agaricus silvicola, Coprinus comatus, Rozites caperata, Gomphus clavatus*, and *Lyophyllum decastes*. Some of the not-so-common species included *Hygrophorus chrysodon, Armillaria albolanaripes, Pholiota humii,* and *Boletus mottii.*

Ed Foy, Mike Lovelady, Al Osborn, Peter Miller, and the Baxters stayed over Saturday night. Ed sautéed several different species of mushrooms during the potluck. Near dark, we got a roaring fire going and enjoyed the camaraderie into the wee hours of the morning. Saturday night, those sleeping outside could hear elk bugling near camp.

NAMA DUES

Lorraine Dod

To join or renew membership in the North American Mycological Association, send a check for $17.00 (it's officially $20, but Society members get a $3 discount) to Lorraine Dod at the PSMS Office, Center for Urban Horticulture, Box 354115, University of Washington, Seattle, WA 98195. Get your money to Lorraine by November 10 to ensure you will receive all the issues of the NAMA newsletter, *Mycophile*. For information about NAMA call Lorraine at (425) 644-0826.

FUNGI & SOIL REMEDIATION

Alfred R. Conklin

adapted from an article appearing in *Soil & Groundwater Cleanup*, July 1997, pp. 37–38, reproduced in *NJMAnews*, Sept.–Oct. 1997

Because of their large diameter and extensive filament network, fungi are a significant part of the soil's microbial biomass. They also have several attributes that make them good candidates for soil remediation work: They grow over a wide pH range; they are particularly adapted to the decomposition of complex organic molecules; they decompose compounds that are present in high concentration; and they are very versatile in adapting to hostile environments.

The fungi in soil consist of thread-like branching cells called hyphae. An intertwined mass of hyphae is called a mycelium. A gram of soil commonly contains fungal filaments from 10 to 100 meters in length. Lengths up to 1000 meters have been reported. The fruiting bodies called mushrooms that appear above the soil are only there to produce spores which, when they settle in an appropriate environment, develop into new hyphae and mycelium. Although the mushroom is the more visible part of the fungus, the hyphae are more important in carrying out reactions in the soil, particularly in relationship to bioremediation.

Because fungi do not contain chlorophyll, they must get all needed cell components from either living or dead plants or animals. Fungi utilizing living matter can be harmful, such as pathogenic fungi, or beneficial, such as mycorrhizal fungi. The most important type involved in bioremediation, however, are the fungi living on decaying organic matter, called saprophytes. They are most abundant during the initial stages in decomposition of organic matter. The addition of organic matter in soil results in an immediate increase in fungi. During early stages of decomposition, organic matter is seen to be permeated with hyphae. As organic matter is decomposed, fungi decrease.

All fungi are aerobic, and all decomposition carried out by fungi is oxidative in nature. However, a fungus can have hyphae in anaerobic environments if some of the organism is in an aerobic environment. Fungi can also survive and grow in environments with a high osmotic pressure that would kill or inhibit other microorganisms if the hyphae live partly in and partly outside of areas of high osmotic potential. Using the same mechanism, they can live and grow in fuels such as gasoline, kerosene, and diesel. The growth of fungi in aviation fuel is quite dangerous because the mycelium can block filters and tubing, preventing the flow of fuel to the engines. They can also foul hydraulic lines.

Fungi often decompose compounds that are very low in nutrients such as nitrogen and phosphorus. Cellulose, cellophane, starches, pectin, fats, chitin, and keratin are examples of complex, low nitrogen compounds commonly attacked by fungi. Lignin, which is very resistant to decomposition, is also attacked by fungi.

In remediating contaminated soil, the importance of fungi is often overlooked. These versatile microorganisms can benefit the remediation effort by breaking down complex organic molecules and compounds.

Not only can hyphae penetrate inhospitable environments, and thereby carry out the decomposition of compounds found in these conditions, but they also benefit the remediation effort by improving physical conditions such as air and water movement. They also produce humus-like molecules that contribute to better soil conditions and may bind organic and inorganic compounds, making them less likely to move off site. Fungi are a group of organisms one should not forget when carrying out a remediation project.

CAN YOU BELIEVE THIS?

Alan Bessette

Arkansas Fungi, via *Fungifile,* via *Mycelium*

Alan Bessette received a call from a local hospital about a year ago to help determine the species of mushroom connected with a case of poisoning. Alan interviewed the patient and various family members. Evidently, the patient, a middle-aged male, had collected and eaten the mushrooms and became ill. No other family members ate any of the fungi. The patient was able to direct family members to his collecting spot, from which they gathered specimens for Alan to identify. They were *Galerina autumnalis.*

The patient stated that he had used *Edible Wild Mushrooms of North America,* by David Fisher and Alan Bessette, to identify the fungus as "honey mushrooms." When asked if he had prepared a spore print, he said, "Yes, it was brown." When further questioned, the patient admitted that the book said the honey mushroom's spore print must be white. When asked why he ate the fungi anyway, knowing that the spore print was brown, he said he thought that the book was wrong!

MUSHROOM MONOCULTURE, ANT STYLE

Mushroom Log, via *Duff*, via *Arizona Fun-Gi*, Fall 1997

Archaeologists think that humans have been farming for about 10,000 years, but according to an item in the weekly magazine *Science,* leaf cutter ants have been growing fungi for some 23 million years. Even more amazing is that there is evidence that they have been tending the same lineage of fungus this whole time. Some 190 species of these ants live mostly in Latin America. The ants cut pieces of leaves, cart them off to their hills, and pull them down into their chambers where they chew the leaves up into a pulp. The ants then pluck a tuft of fungus and plant it in the pulp. Soon fungi grow and the ants eat the new hyphal threads. When queens leave the nest to start a new colony, they take along a little starter culture in the form of pellets. DNA studies reveal that the fungi in leaf cutter colonies throughout Latin America and three southern states of the USA are from the same clone.

INVASION OF THE BODY SNATCHERS

Boston Mycological Club Bulletin, Sept. 1997
Excerpted from *Mr. Wilson's Cabinet of Wonder Pronged Ants, Horned Humans, Mice on Toast and Other Marvels of Jurassic Technology* by Lawrence Weschler
 ISBN 0-679-43998-6, Vintage Books, division of Random House, Inc., NY

Deep in the Cameroonian rain forests of west-central Africa there lives a floor-dwelling ant known as *Megaloponera foetens,* or more commonly, the stink ant. This large ant—indeed, one of the very few capable of emitting a cry audible to the human ear—survives by foraging for food among the fallen leaves and undergrowth of the extraordinarily rich rain-forest floor.

On occasion, while thus foraging, one of these ants will become infected by inhaling the microscopic spore of a fungus from the genus *Tomentella,* millions of which rain down upon the forest floor from somewhere in the canopy above. Upon being inhaled, the spore lodges itself inside the ant's tiny brain and immediately begins to grow, quickly fomenting bizarre behavioral changes in its ant host. The creature appears troubled and confused, and presently, for the first time in its life, it leaves the forest floor and begins an arduous climb up the stalks of vines and ferns.

Driven on and on by the still-growing fungus, the ant finally achieves a seemingly prescribed height whereupon, utterly spent, it impales the plant with its mandibles and, thus affixed, waits to die. Ants that have met their doom in this fashion are quite a common sight in certain sections of the rain forest.

The fungus, for its part, lives on. It continues to consume the brain, moving on through the rest of the nervous system and, eventually, through all the soft tissue that remains of the ant. After approximately two weeks, a spikelike protrusion erupts from out of what had once been the ant's head. Growing to a length of about an inch and a half, the spike features a bright orange tip, heavy-laden with spores, which now begin to rain down onto the forest floor for other unsuspecting ants to inhale.

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