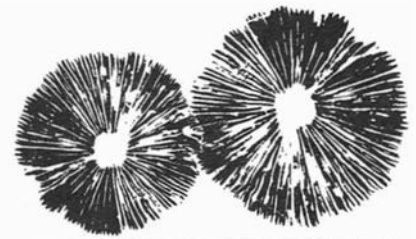


SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY

Number 283

June 1992



PLANTING MORELS ON MT. HOOD

[from an interview with Judy Roger]

Many people think the job of the U.S. Forest Service is selling national timber reserves to private logging companies while, in the meantime, providing outdoor recreation sites for the public. But, as the song says, "The times they are a changin'."

Bryce Smith of the U.S. Forest Service recently came to Mycologist Nancy Smith Weber at Oregon State University for advice on the feasibility of planting morels in clearcuts for use as an additional forest crop.

That is how Nancy and Judy Roger, a former student of Dr. Stuntz who is active in the Oregon Mycological Society, found themselves on Mt. Hood the last weekend in March with 500 lb of morel spawn, clam-gun-type Forest Service shovels in hand. The plan was to plant the spawn (purchased at a discount from Bill Denison of Neogen) in various clearcuts and see how it grew.

The spawn was planted in 6-in deep holes on 1- and 2-ft grids in circular plots roughly 24 ft in diameter. How many 6-in deep holes, at 1 cup per hole, does it take to get rid of 500 lb of spawn? A lot.

Some of the plots were in straight stands of Douglas-fir and some in stands of mixed conifers. (Because of past troubles with straight monoculture stands, the Forest Service is now replanting harvested areas with the same mix of tree species, not monocultures.)

On some of the sites, the slash left over from clearcutting had already been burned. On others, the burn would be done after the spawn was planted while monitoring the temperature of the soil during the burn. On others, the slash had been chipped up and redistributed on the same site, a recent practice designed to cut air pollution and perhaps enrich poor soils.

Planting is just the first part of the project. The real field work will begin next year when the number of morels inside the study plots will be compared with the number outside the plots. As in the Oregon Mycological Society's chanterelle project, one of the objectives of the study is to see how different harvesting practices affect the fungi's growth. Consequently, some of the plots will be control plots, others will be limited to cutting, and still others to picking.

Judy says they expect morels to be growing by next spring, although "sometimes spawn will fruit the first year," and thunderstorms in the mountains in the middle of May may have provided enough moisture to start growth this spring.

"We are also considering doing a planting on some additional sites this fall to see which [spring or fall planting] works out best."

FUNGI DEGRADE PLASTIC [extracted from UP news]

Researcher George Tsao of Purdue University recently announced a new fermentation process that utilizes fungi for making the chief ingredient in polylactic acid plastic, the only plastic that is completely biodegradable. Many plastics purported to be biodegradable are made by mixing non-biodegradable plastic with a little starch. Says Tsao, "what you got was just plastic with a lot of holes in it."

Polylactic acid plastic is made by linking lactic acid molecules into chains, or polymers. When polylactic acid plastic is mixed with water, the chains break up, and the plastic converts back to lactic acid, which is eaten by a variety of organisms.

Lactic acid is a common biological chemical. Humans produce it from milk; it is the substance that makes muscles "burn" during exercise. Producing pure lactic acid commercially, however, is currently too costly to make polylactic acid plastic suitable for everyday use.

Tsao's method of producing lactic acid resembles the bacterial fermentation used to make Oriental rice wine. A bad batch of rice wine "has a lot of lactic acid in it," Tsao said. "In our lab we altered the conditions so that lactic acid is all that is produced." The resulting acid costs about \$0.40/lb to produce, considerably less than the present cost of \$1.20/lb.

Use of fungi instead of bacteria lowers the cost further. "We don't need a sophisticated food...like we do for the bacteria," Tsao said. "We can grow the fungus with urea, which is very cheap." Use of fungi has another advantage. The fungal fermentation process produces a purer form of lactic acid and doesn't require special filtration, unlike the bacterial method.

A big advantage of Tsao's method is that corn and other crops can be used as raw materials instead of nonrenewable resources such as petroleum or natural gas, which are now used for plastics. Widespread use of polylactic acid plastic thus could provide new markets for U.S. agricultural products and reduce the country's dependence on foreign oil.

Non-biodegradable plastics occupy about one-third of the landfill space in this country.

PSMS SUMMER PICNIC

Beth Schnarre

The PSMS Summer Picnic this year will be July 22 at Gasworks Park on the north shore of Lake Union. We will plan to eat at 6:30 p.m. Participants are asked to bring drinks, utensils, and meat or main dish (we have access to the barbecue grills) for themselves and either a salad or a dessert to share (i.e., we will be potlucking the salads and desserts but not the meat). Also bring any outdoor games you have on hand—lawn darts, croquet sets, kites (Gasworks Park is famous for its excellent kite flying)—you name it. For further information call Beth Schnarre at 778-0854. See you there!



Spore Prints

is published monthly, September through June, by the
PUGET SOUND MYCOLOGICAL SOCIETY
Center for Urban Horticulture, Mail Stop GF-15,
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CALENDAR

June 9	Membership meeting, 7:30 p.m., CUH
June 15	Board meeting, 7:30 p.m., CUH
June 28	Cultivation Group, 1:00 p.m., Douglass Classroom, CUH
July 18	PSMS booth, King County Fair, Enumclaw, 10 a.m. - 10 p.m.
July 19	King County Fair, 10 a.m. - 6 p.m.
July 22	PSMS Picnic, Gasworks Park
Aug. 13-16	NAMA Foray, Angel Fire, New Mexico
Aug. 17	Board meeting, 7:30 p.m., CUH
Aug. 21	<i>Spore Prints</i> deadline
Sep. 8	Membership meeting, 7:30 p.m., CUH

BOARD NEWS

Agnes Sieger

We sold \$140.85 worth of books at the May meeting. Beth Schnarre will look into doing T-shirts for the October exhibit. Fourteen people showed up for the first Barlow Pass meeting on May 18; the meeting was taped for those who couldn't make it. A contract has been signed with the Cispus Environmental Center for a PSMS Foray (Cispus IV?) on May 14-16, 1993.

CONGRATULATIONS, PATRICE

Patrice Benson, PSMS Mycophagy Chair, has been chosen as the 26th member of the Seattle chapter of Les Dames D'Escoffier, a national organization of chefs, restaurateurs, and others recognized for their promotion of fine food. Recent examples that may explain why she was honored include a program on "Cultivation and Ecology" for Clark Elementary in Seattle and John Muir Elementary in Issaquah, a lecture for the Wildflower Group at Virginia Mason, and a cooking demonstration at the Oregon Mycological Society's May meeting.

Membership Meeting

Tuesday, June 9, at 7:30 p.m. at the Center for Urban Horticulture, 3501 N.E. 41st Street, Seattle



Our June meeting features Karta Purkh Singh Khalsa. A Master Herbalist, Khalsa has developed his herbal medicine collection to more than 300 formulas, including several using fungi. In addition to being internationally recognized as a leader within the holistic health field, Khalsa is also a teacher, research consultant, and founder of Washington's oldest holistic clinic.

Members with last names beginning A—D are asked to bring a plate of refreshments for the social period.

THE HUMONGOUS FUNGUS (BURGER) Dick Sieger

Armillaria bulbosa, part of the *Armillaria mellea* complex, has brought world-wide attention to the arcane science of mycology. An ancient half-square-mile patch in Michigan was hailed as "the world's largest living organism." The Washington Dept. of Natural Resources and the U.S. Forest Service soon reported two square miles of another honey mushroom, *A. ostoyae*, was attacking pine trees in three counties near Mt. Adams.

Johann Bruhn, who announced the original finding, said of the unexpected attention, "It was quite a rat race for a while, just keeping up with the phone calls, but it was also fun." People didn't understand that, except for some fruit bodies that sprout in the fall, the fungus is a mass of minute strands of mycelia that are hidden underground. A New York City restaurant wanted to add it to their menu. A California health food company wanted to include it in products made from long-lived organisms, hoping to improve the life expectancy of their customers. Someone suggested excavating the fungus to feed starving Third World people; a Florida woman asked for a photo of Bruhn posing beside his "mushroom." A local restaurant started serving "fungus burgers"—hamburgers with mushroom soup and cheese.

Here is our version of "fungus burger," taken from *The Horn of the Moon Cookbook*. You may use well-cooked caps of *A. mellea* (use caution) or try *Agaricus bisporus* or even one of the indifferent boletes.

1 cup uncooked barley	1/3 cup ground walnuts
2 cups water	3/4 cup bread crumbs
3 Tbs oil	1 tsp salt
3/4 cup minced onion	1/8 tsp cayenne
3/4 cup minced bell pepper	whole wheat flour
1 tsp dried thyme	8 slices cheese (optional)
12 oz diced mushrooms	8 whole wheat rolls
1/4 cup minced parsley	greens, tomatoes, dressing

Simmer the barley and water in a covered pot until the water is absorbed and the barley tender. Reserve 1/2 cup of cooked barley and blend the remaining 1-1/2 cups until smooth. Mix the whole barley with the blended barley. Sauté the onions, peppers, and thyme in 1 Tbs oil until the onions begin to brown. Add the mushrooms and continue cooking until they are lightly browned. Drain and mix well in a bowl with the barley, parsley, nuts, bread crumbs, salt, and cayenne. More bread crumbs may be added to stiffen the mixture. Form eight patties and coat them lightly with flour. Fry in the remaining 2 Tbs of oil until brown. Garnish with your choice of melted cheese, lettuce, sprouts, tomato, dressing, mayonnaise, or mustard, and serve on the whole wheat rolls.

CULTIVATION GROUP

Milly Myers



Nineteen attended the meeting April 26 at Bill and Sondra Shira's, including Linelle Eckhart, a visitor from Fall City who is an experienced mushroom hunter and interested cultivator. The meeting started with all the good stuff first—a tour through Bill and Sondra's garden of interesting herbs and plants, followed by a great potluck.

We then got to the business part of the meeting, discussing upcoming events and *Stropharia* cultivation. Chris Greenley and Ann Zimmerman videotaped our meeting.

The upcoming events include no cultivation meeting in May. The June meeting is scheduled for the 28th, from 1:00 to 4:00 p.m. at the CUH Douglass Classroom, and will be on shiitake. Nothing specific is planned for the summer. In September we will prepare for the annual exhibit in October. It was suggested that we explore the possibility of making one or two HEPA filters for group use; this could be in November or January.

Dick Sieger advised that PSMS has a booth for Saturday and Sunday at the Enumclaw Fair in July and asked if the cultivation group would staff this booth with two or three people each day. Several members agreed to participate in this.

Mike Hess reported on the cultivation workshop he attended in Canada. Mike also had *Stropharia* spawn prepared on several different media for members to take home. Mike and Sam Leathers, a PSMS member and cultivator from Bellingham, gave us helpful hints for *Stropharia* cultivation as well as names of sawdust and chip suppliers.

Mike has compiled an extensive list of equipment and suppliers, a copy of which will be in the library. Mary Taylor is checking on the price of purchasing Petri dishes in quantity.

The meeting ended with each member listing the cultures they have at home with the goal of getting a good culture bank started.



FIELD TRIP REPORTS

Mary Lynch

29 Pines, May 2

Hosts were Russ Parker and Mary Lynch. Sixty-nine members and guests showed up, and 22 stayed for the potluck. Larry Baxter and Dick Sieger identified 43 species. In spite of the beautiful summer weather, most people did find mushrooms.

Lake Kachess, May 16

Sixty members turned out on a sunny Saturday at Lake Kachess. Things were a bit dry, but people found some mushrooms. Brian Luther identified. Pat and Sue Mu-rosako, Anne Zimmerman, and Chris Greenland hosted.

CONSERVATION AND ECOLOGY

Ron Post

Beginning this month (June 11), the State of Washington will require permits for picking certain amounts of mushrooms. Even if the mushrooms are on your own land, the permits are required if you take more than three gallons of one species in a day or an aggregate of nine gallons (plus one mushroom) of combined species in a day.

The permit must be signed by the landowner; it is to be issued by the State Department of Natural Resources, which probably means their designee, the land managing agency. It will have to be validated by county sheriffs, whatever that means. More information will become available as the law is publicized (by the DNR) and as enforcement takes effect.

Publicity about the law is likely, because of national interest and the DNR's efforts to publicize the law. Call Ron Post at 362-4374 if you'd like a copy of the bill, which was signed into law this spring.

MEET BRUCE DELORIA

Inga Wilcox

Bruce DeLoria joined PSMS in 1990, having been introduced to the group by a friend. Bruce is "hooked" on PSMS; he loves the forays, the learning experience, and the enthusiasm of the members.

Bruce grew up in Maine and remembers hunting for morels in the Kennebunkport area while an undergraduate. He studied music composition and still enjoys the symphony, chamber concerts, and community theater. In 1979 he joined the Air Force. He was trained to be a navigator on the B-52. Bruce remembers practice flights, a mere 500 to 800 ft off the ground—in the Tetons. After 5 years in the Air Force, he left with the rank of Captain.

Today Bruce is head of the MIS (Management Information Systems) Department for a telecommunications company. He is developing software systems. He has one Masters degree in Computer Science and a second in Business.

When he came to the Northwest, Bruce was amazed and confused by the profusion of fungi to be found here. On top of that, all our mushrooms have Latin first and last names. Looking for mushrooms is always a good excuse to wander in the woods. Bruce enjoys the beauty of the rain forests in the Hoh and Quinault areas and is impressed by the grandeur of our mountains. Conservation is very important to him.

As a newer member, Bruce recommends "Get involved! Find out what is going on! Participate!" Bruce follows his own advice: He is chairing the 1992 Annual Exhibit.

MUSHROOM QUIZ

Match the common name on the left with the Latin name on the right.

- | | |
|------------------------|---------------------------------------|
| 1. Oyster mushroom | () A. <i>Clitocybe nuda</i> |
| 2. The Gypsy | () B. <i>Armillaria mellea</i> |
| 3. Honey mushroom | () C. <i>Amanita muscaria</i> |
| 4. Witches' butter | () D. <i>Coprinus comatus</i> |
| 5. Death cup | () E. <i>Sparassis crispa</i> |
| 6. Fairy ring mushroom | () F. <i>Verpa bohemica</i> |
| 7. Blewit | () G. <i>Candida albicans</i> |
| 8. Early morel | () H. <i>Suillus luteus</i> |
| 9. Human thrush-mouth | () I. <i>Amanita phalloides</i> |
| 10. Cauliflower fungus | () J. <i>Rozites caperata</i> |
| 11. Cêpe | () K. <i>Pleurotus ostreatus</i> |
| 12. Shaggy mane | () L. <i>Dacrymyces palmatus</i> |
| 13. Slippery Jack | () M. <i>Marasmius oreades</i> |
| 14. Fly agaric | () N. <i>Boletus edulis</i> |
| 15. Dry rot fungus | () O. <i>Agaricus campestris</i> |
| 16. Meadow mushroom | () P. <i>Serpula lacrimans</i> |
| 17. Pigs ears | () Q. <i>Pleurocybella porrigens</i> |
| 18. Angel wings | () R. <i>Gomphus clavatus</i> |

OLD GROWTH INVENTORY

Ron Post/Dick Sieger

Barlow Pass Study Group:

The Barlow Pass Study Group has now met three times. With just a few days' notice, 14 people gathered at the study site on Friday, May 1, to meet with Dr. Ammirati, two of his students, and two Forest Service people. We were pleased to see the latter, especially when they expressed interest in a fungal survey of their forest. Dr. Ammirati explained the site's botanical features and then led a collecting trip.

At a general meeting at CUH on May 18, Dr. Ammirati explained to interested members the objectives of the study and the procedures to be used.

The actual study got under way Friday, May 22, with a visit to the study site by Dr. Ammirati and five PSMS members led by Carol Smith, head of the Barlow Pass Study Group. Again, they inventoried the site. Few mushrooms were apparent, but Dr. Ammirati described the various habitats within the study area and talked about the trees and plants that grow there.

Study Plans:

The objectives of the study are twofold:

- inventory all the larger fungi in the study area
- record the fruiting time of each species and its associated vascular plants and mosses.

Groups will go out and collect every 7 to 10 days; most of this collecting would be in the spring and from August to October. On the evening of each field trip, or the evening after, we will meet at the botany laboratory at the University of Washington, where Dr. Ammirati will help us identify and catalog our finds. We expect the lab sessions to attract advanced students, not necessarily those who were in the collecting party.

The first two years, fungi at the site will be collected carefully but at random. After that, study plots will be constructed, and the spatial distribution of sporocarps will be plotted.

After two years, the study should produce a list of characteristic species and their fruiting times. Really, what we are doing is cataloging a major part of the forest biomass, something eagerly awaited by all.

The inventory itself is one of the first systematic fungal studies of an old-growth area in the Northwest (although mycologists such as Smith and Stuntz collected heavily in the area in the 30's, 40's, and 50's). These data can be compared with data from other, similar stands, and with data from study sites in spruce/hemlock old growth and Douglas-fir old growth.

Study Site:

The study site is a triangular area near Barlow Pass between the road and the South Fork of the Stillaguamish River. Because it is in a cold basin, the plants found are typical of those growing at higher elevations. Decay is slow; as a result, old fallen trees are still visible, and the layer of duff is unusually thick. Dr. Ammirati showed us hemlock trees that were shorter, but older, than anyone in our group; they had been stunted by the paucity of light penetrating the dense canopy.

The large trees are Pacific silver fir and western hemlock. There are no western redcedar, although they would be expected in a low wet area. Forest Service personnel speculated that their seedlings may have been eaten by elk and deer. The Forest Service has a name for this kind of forest: "Alaskan silver fir-hemlock-huckleberry-twisted stalk."

Dr. Ammirati has been visiting the site for some years, and takes his students there. Because of that, he was able to show us where particular species could be expected to fruit.

*When the moon is at the full,
Mushrooms you may freely pull;
But when the moon is on the wane
Wait till you think to pluck again.*

—Old Essex saying

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