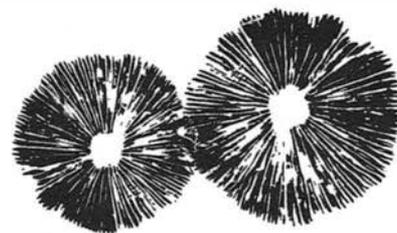


SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY

Number 258

January 1990



MUSHROOM SPORES

Humboldt Bay Mycolog
[from a talk by Dave Largent]

 Contrary to popular belief, soup is not a function of the mushroom. Its sole purpose is the production and dispersal of spores, the fungal "seed," that can survive until conditions are favorable for growth and colonize new areas. The spores themselves are distinct for each species. The purpose of their color, a primary characteristic used for identification, is largely a mystery.

Spore shape, also a primary identification characteristic, might serve to increase the surface area for floating or discourage microbial predation via spines or bizarre shapes that are difficult to swallow. It is known that the structures are very efficient, and the number of spores released is tremendous. These spores are sexually produced (meiosis), haploid (1/2 the chromosomes), and forcibly discharged, and contain an oil sac as an energy source.



 In agarics the entire gill face and often the edge are involved in spore production. In boletes spores grow toward the center of the tube along its entire length. Corals, clubs, and jelly fungi produce spores over the entire upper surface. Ascomycetes (truffles, morels, and cup fungi) differ in that the spores are protected within a sac (ascus), production is on top, not underneath, and, unlike Basidiomycetes, water on the fertile surface doesn't stop spore production.

Some fungi have increased the usable area by "veining" (chanterelles, *Leptoglossum*, and others), by pitting or convolutions (morels, *Sparassis*, etc.) or by filling a sphere (puffballs). The number of spores generated by a single large fruiting body is in the millions. Consider, for example, an 80-year-old conk (*Fomes officinalis*) that produces spores 6 months a year on an average large log that takes 900 years to become humus; this kind of scale requires peak efficiency. Organisms that expend energy inefficiently become extinct.



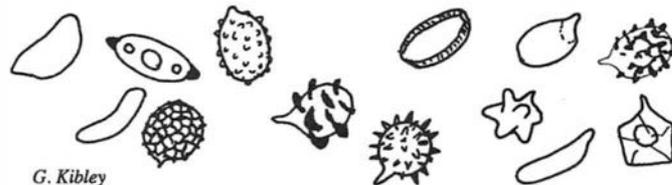
Dispersal mechanisms are even more diverse and fascinating. Most of the fungi we encounter have spores that are forcibly discharged into the wind and must fall free of the fungus, once the partial veil or cortina protective layer opens. Too much force lands them on the facing gill or opposite side of a tube 0.01 in. in diameter (less than 1/64 in.). If the gills are too close, the cell tissue dissolves from the margin inward, opening up more space while the progressively maturing spores drip off. These are the inky caps (*Coprinus*).

Other mushrooms produce chemicals that influence cell growth to keep the gills or tube pointed straight down. Ascomycetes bend in response to light or rotate the placement of the ascus pore if the fertile

area is curved. Those too stout to bend might utilize larva tunnels of attracted flies or, as with stinkhorns, the flies themselves.

Many spores pass through the digestive tract of animals to be deposited elsewhere. Rain can splash the spores out of the cup fungi or "thump" puffballs. Certain fungi resist decay for weeks to prolong production (*Catathelasma*, *Laccaria*) or can dry out and revive when moistened and continue spore development (*Marasmius*, *Schizophyllum*).

And, if all that were not enough, some fungi produce spores asexually at the same time: *Stropharia* in its mycelial mat and *Collybia racemosa* in clusters atop short lateral stems perpendicular to the stipe. One can see from this outline some of the many facets there are to discover about mushrooms. All this, and we can eat them, too!



G. Kibley

NUTRITIONAL VALUE OF MUSHROOMS avid Arora *Mushrooms Demystified*

Mushrooms are esteemed primarily for their flavor, but they can also be a healthy supplement to your diet. Each type, of course, has a different chemical composition. In general their nutritive value compares favorably with that of most vegetables. They are rich in the B vitamins (including choline, which acts as a protective agent for your liver in case of mushroom poisoning), vitamin D, and vitamin K. Some are also high in vitamin A (e.g., chanterelles) and a few (like the beefsteak fungus, *Fistulina hepatica*, contain vitamin C. They are also rich in minerals such as iron and copper, and even contain some trace elements.

Like fruits and vegetables, mushrooms are mostly water (85-95%). They have a low fat and carbohydrate content and as a result almost no calories (unless, of course, they are cooked in oil or butter). Some types are high in protein (especially *Agaricus*, *Lepiota*, and *Calvatia*), and on a dry weight basis *Boletus edulis* contains more protein than any common vegetable except soybeans. However, not all of this protein is digestible, so mushrooms are not a viable substitute for meat, eggs, and other high-protein foods.

* * * * *

Many do fear the goodly mushrooms as poisonous damp weeds; but this doth in no way abate the exceeding excellence of God's Providence, that out of grass and dew where nothing was, and onlie the little worm turned in his sport, came, as at the shaking of bells, these delicate meats.

—Anon

Spore Prints

is published monthly, September through June, by the
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Calendar

- Jan. 9 Beginners' orientation, 6:40 p.m., CUH
Membership meeting, 7:30 p.m., CUH
- Jan. 10 Conservation & Ecology, 7:30 p.m., CUH
- Jan. 15 Board meeting, 7:30 p.m., CUH
- Jan. 21 Cultivation group introduction,
5:00 p.m., CUH
- Jan. 26 *Spore Prints* deadline
- Jan. 28 Cultivation group meeting, 11:00 a.m.,
12625 NE 81st Pl., Kirkland

CULTIVATION GROUP

Lynn Phillips



We're finally getting organized, with dates and locations for our January meetings, so mark your calendars. The introductory meeting will take place at the Center for Urban Horticulture on Sunday, January 21, at 5:00 p.m. We will cover everything you've always wanted to know about growing mushrooms, including the white thumb guide to mushroom cultivation, mushroom cultures for the uncultured, and Mark Jarand's popular talk, "Famous Mushrooms I Have Grown," as seen on the Ed Hume show. If any of the above interests you, please come and find out more.

The second January meeting, for those of us who supposedly know what we are doing, will be at Mark Jarand's house the very next Sunday, January 28, at 11:00 a.m. There are several new mushroom strains to share, so bring your sterile media. We will also be inoculating bulk substrates outside. Bring any grain cultures you wish to inoculate and dress for the weather. If you have any questions, call Mark at 828-0648.



Membership Meeting

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

Our January meeting features mushroom grower Paul Stamets of Fungi Perfecti near Olympia. Commercially grown fungi are no longer limited to the common Safeway button mushroom, and growers are competing to place exotic species on the market. Stamets, co-author of the *The Mushroom Cultivator*, the American textbook on mushroom cultivation, will discuss recent developments and what the future has in store.

BOARD NEWS

Mari Bull

Ingeborg McGuire said she still doesn't have a speaker for the 1990 banquet and requested suggestions. Lynn Phillips got a round of applause for her efforts on the field trips. There was a long discussion on what to do with the posters left over from previous exhibits. The board voted to continue membership in the North American Mycological Association. The Nominating Committee reports the following candidates so far for the 1990 election: President, Kern Hendricks; Treasurer, Harold Schnarre; Board, Bill Bridges, Elizabeth Purser, Beth Schnarre, and Amelia Schultz.

CONSERVATION AND ECOLOGY

Margaret Dilly

On November 21, the Conservation and Ecology Committee met and discussed the ecological issues at hand. The reduction of mushrooms by commercial harvesting is important, and we need to continue our efforts in this pursuit. A more threatening problem we need to focus on, however, is loss of the forests.

Perhaps some of you have read about the newly formed Washington Wildlife and Recreation Coalition (WWRC) co-chaired by Dan Evans and Mike Lowry. While they sometimes differ on public policy issues, both of these distinguished gentlemen share a commitment to protect the special quality of life and environment which we enjoy. WWRC is currently assessing the overall environmental needs of the State. Here are some quotes from a recent letter I have received from them:

"Federal funding for conservation and outdoor recreation has fallen by 80% in the past 10 years, and total funding for all natural resource agencies amounts to less than 2% of the overall budget. We need to buy land, the best we can find, and meet these needs now and into the future. Our goal is to stimulate major funding, perhaps as much as \$500 million over the next 10 years, for the needs we identify."

To succeed in the next legislative session, the coalition needs our support NOW, both with monetary contributions and in getting the message to our legislators to back their recommendations. WWRC's address is 112 4th Ave. East, Suite 202, Olympia, WA 98501-1103 (phone: 754-1898). "It's your best gift to yourself and to our next generation."

If you would like more information about this and other environmental issues, come to the next Conservation and Ecology Committee meeting on Wednesday, January 10, at 7:30 p.m. in the CUH board room or call me at 782-8511.

RUSSIAN FORAY

Dennis Bowman

As some of you might know, I led a small group of people on a wild mushrooming trip to the Soviet Union recently. Following a brief stay in Moscow and three days on the Trans-Siberian Railway, we arrived in Novosibirsk, Siberia, where we stayed with members of the recently formed Novosibirsk Mycological Society. We presented our friends with some 15 boxes of mushroom books, representing many diverse and interesting subjects. Their library grew substantially.

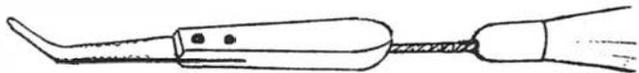
For nearly a week, our little US/USSR foray shared mushroom facts, lore, and fiction. We collected and classified, cultivated and cooked. Coleman Leuthy had a surprise birthday party out in the middle of Siberia. Larry Stickney was awarded a cooking trophy after all three of the hefty Russian cooks in charge of the huge forest camp kitchen tasted his morels in cream sauce. And while stomping through the heavy Siberian brush, I was stung by 20 Russian wasps looking for the same *Boletus edulis* as I.

We became a US/USSR international mushroom society finding ways to combine efforts on joint projects and future ventures. I'm sure that there will be many ongoing discussions, and there has even been some talk of joint publishing. All in all, we met some fascinating people, ate some interesting food, and had some great adventures.

BEGINNER'S TIP

Dick Sieger

You can easily make a good, inexpensive collecting tool from a stainless steel grapefruit knife and a wire-handled basting brush. Cut the handle from the brush, leaving about 3 in. of twisted wire. Drill a 1 in. hole down into the knife handle to receive the wire and glue the two together. Finally, tie on a bright ribbon. You now have a tool with a blade on one end and a brush on the other. The bent blade is convenient for cutting stalks, the blunt end prevents accidents, and the brush is handy for field cleaning. The ribbon makes it visible on the forest floor.



ALUMINUM FOILS DETERIORATION

Dick Sieger

PSMS scientific advisor Joseph Ammirati passes on a tip he acquired from Dr. Moser on preserving fresh mushrooms for later study.

Dr. Ammirati carries a portable Coleman-type cooler in his car. In the bottom he places two reusable ice packs covered with layers of newspaper to keep the mushrooms from freezing. As he gathers each collection, he seals it loosely in aluminum foil and puts the sealed packages into the cooler. They may be packed together firmly as long as the foil isn't crushed into the mushrooms. Minute mushrooms are put into covered plastic boxes instead of being wrapped in foil.

Chilled, foil-wrapped collections keep for 2 or 3 days, longer than those in waxed paper. One roll of aluminum foil may last a whole season because the foil can be reused. Don't leave foil packages in the sun, however, unless you want broiled mushrooms!

ELECTION COMMITTEE

Inga Wilcox

The January membership meeting is the last chance for PSMS members to nominate candidates from the floor for the upcoming election. Any member may be nominated for office, but you must have the nominee's permission. Seven offices are up for election this year: president, treasurer, and five board members. A complete list of candidates will appear in the next *Spore Prints*.

PRESIDENT'S MESSAGE

Gilbert Austin

A Look at 1989 Developments of Note to PSMS

- The Society observed its 25th anniversary, with a special edition of *Spore Prints* and a Survivors' Banquet highlighted by George Rafanelli's rendition of "The Best Things in Life are Free."
- The Cultivation Group, an activity solely the product of Mark Jarand but one in which many members participate, attracted larger participation and began field trips, one to Portland, another to the Twanoh State Park area.
- A first-ever state licensing and recording-keeping law applying to buyers and processors of wild mushrooms took effect in January 1989. PSMS members were asked to help monitor commercial buyers in order to ensure compliance.
- In May the second annual "Special Occasion" field trip was held at Crystal Springs, featuring informal cooking and cultivation demonstrations plus tips on collecting techniques by experts. Sixty attended.
- PSMS met its June 30 commitment of \$25,000 to the Center for Urban Horticulture of the University of Washington, thereby assuring us office, board room, and storage space for 25 years--possibly more.
- It was a morel year to remember! Lasting from mid-April through mid-August, it was one of the most productive on record, particularly in the 1988 burns near Entiat and the Naches Pass/Naches River area.
- Attendance of 1608 and 116 new members spelled success for our first annual exhibit at the CUH. Chairman Coleman Leuthy designed the show to fit the space available in three CUH buildings. It worked well.
- PSMS was granted charitable organization, income-tax-free status by the IRS. This has the potential for helping us a lot in fund raising and for savings on mailing and other activities.
- And, in closing, a disappointing and frustrating note: It was a terrible year for the delectable matsutake--a virtual wipe-out! Let's hope for a major turn-around in matsutake fruiting this fall.

A Look Ahead to 1990

- In 1990 we will seek to expand educational efforts, including beginner classes, intermediate classes, assistance to newly forming clubs in nearby cities, and baseline mushroom information and guidance to interested groups, whether or not their primary focus is on mycology.
- We will continue to broaden the familiarity of the entire PSMS membership with mushrooms of the Northwest through monthly programs, books, field trips, and other means as available.
- And, of course, we will continue our cooperation with the State Department of Agriculture in helping to monitor the commercial harvesting of mushrooms--with the aim of preventing overpicking and ultimate depletion of this wonderful Northwest resource.

Happy New Year!

MOREL PIROG

Kristina Bowman

Dough:

1 pkg yeast	1 Tbs sugar
2 C milk	1/2 tsp salt
100 g (1/2 C) butter	4 C flour
100 g (1/2 C) margarine	morel filling
2 eggs	

Put yeast into 1 C of warm milk and wait for at least 15 min.

Place butter and margarine into a container and melt.

In a large container warm 1 C of milk. When the milk is warm, add 1 egg and beat while continuing to warm, but don't allow milk to boil. Remove from heat, add sugar and salt, and mix. Add the milk with the yeast and the melted butter and margarine to the larger container and mix in the flour.

Place the dough in a warm location and let rise for 20-25 min. Divide the dough in half, place one-half on a floured surface, and roll to a thickness of 4 mm (1/8 in.).

Put rolled dough on a greased tray and cover with the morel filling. Roll out the other piece, place on top, and brush lightly with a beaten egg. Bake 20 min. at 350° F.

Morel Filling:

Morels	5 hard-boiled eggs,
butter	finely chopped
salt	

Cut morels very fine. Put into a pan, cover with water, and add a pinch of salt. When the water has boiled away, add a little butter and fry the morels. (If using dry morels, use the water used for reconstituting.)

Mix fried morels with chopped eggs. Put onto pirog base.

The foregoing recipe was extracted from a 1910 edition of a Russian cookbook entitled *Collection of Recipes for Not So Rich and Not So Experienced Hostesses* by Mogelnetskya. The introduction states that the book is not intended for the poor because they must eat what they can when they can. Nor is it for the rich, as they have cooks and never have to enter the kitchens themselves.

Although the actual recipe for the pirog contains no measurements or numbers, it is quite specific about the necessity for care in the mushroom preparation. You must buy only fresh morels, and you must immediately cut off the roots covered with sand. It is then necessary to carefully break the morels into small pieces by hand and inspect each piece because in the folds of the mushroom you can find dangerous insects that could cause you to be poisoned.

My stepdaughter, Kristina, has worked at translating this old recipe into English, as well as quantifying it to work for others wanting to try making it. Remember that bread-making skills are generally well valued in the Soviet Union, and measurements are as important as ingredients. Some of you may have tasted Kristina's mushroom pirogs at the November membership meeting.

—Dennis Bowman

1964 AUDIO CASSETTES

Elsie Burkman

At the March banquet, we played part of an audio tape recorded in 1964 in which Dr. Dixie Lee Ray, Director of the Pacific Science Center, interviewed PSMS President Ben Woo, Vice-President Charlie Volz, PSMS advisor Dr. Daniel Stuntz, mushroom photographer David Gardner, and painter Elsie Burkman about the first PSMS annual mushroom exhibit that October. Mary Volz has now recorded the original reel-to-reel tape onto audio cassette. Copies can be ordered from her, 363-5465, or Elsie Burkman, 282-6723. It must have been a good talk. Five thousand people attended the exhibit.

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