SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 434 September 2007

2007 EXHIBIT — Ron Post

The Society faces a welcome, but difficult, challenge this year as we move back to the Center for Urban Horticulture for the 44th Annual Wild Mushroom Show.

We have targeted the UW community with publicity, and my thanks go out to our featured speaker, Taylor Lockwood, and also to the UW Bookstore and longtime publicity chair Emily Routledge for their aid getting the word out, now and in previous years. Thank you also to board members Molly and Kevin Bernstein for their work on this year's poster, which features an image by the late Dr. Daniel Stuntz. Also, one of our chefs this year will be local celebrity Kathy Casey.

A few committee chair positions remain unfilled, so I will list just the names of the main committees, but no chairs, at the end of this article. We need dozens of bodies to fill the committee time slots in October, so **please attend the September and October meetings to sign up for the exhibit**; it takes nearly 20 committees and up to 100 volunteers, but most need little or no expertise in identifying mushrooms. This year, I am happy to say, our parking and security problems should be resolved, as we are returning to the UW. More about that at the September meeting, where you will get a detailed floor plan. If you have questions, my number is (206) 370–4487. Reaching me by e-mail is slower (ronp46@hotmail.com).

Please, plan on collecting mushroom specimens on Thursday, October 11, and Friday, October 12, if you can. Drop-off for the show will begin at 4 PM Friday, October 12. Tray arranging and transport begin at 7 AM. on Saturday, October 13. We hope to open the exhibit on time.

My special thanks to PSMS identifiers and to the board for voting to move the exhibit back to CUH this year. Perhaps I should add that the club would benefit greatly from anyone who wishes to learn all aspects of the exhibit chair position, as I may be living elsewhere at this time next year, and unavailable to chair. However, I plan to stay heavily involved in all educational efforts of this club, and this year I am very excited about the exhibit. The weather is cooperating thus far, so good collecting!

Exhibit Committees
Exhibit Chair: Ron Post, (206) 370–4487

Arts & Crafts
Book Sales
Cooking & Tasting
Construction & Cleanup: Decoration
Duff & Moss Collection
Feel & Smell
Hospitality
Kid's Table
Membership
Mushroom Collection
Poster Distribution
Publicity
Ticket Sales
Tray Arrangement

CALL FOR ENTRIES – JURIED ART SHOW

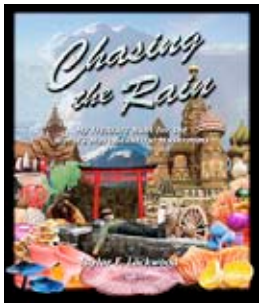
The PSMS Art Committee is pleased to announce that this year in addition to Arts & Crafts, we will be having a juried art exhibit in conjunction with our Wild Mushroom Show October 13 and 14. The open-category juried art show will be the first in the society's history. Prospectus and entry forms will be available on the website at www.psms.org or by contacting PSMS beginning June 20. *Entry deadline is September 15, 2007.*

TAYLOR LOCKWOOD HAS A NEW BOOK

Taylor Lockwood, mushroom photographer extraordinaire, has just released a new book—*Chasing the Rain: My Treasure Hunt for the World's Most Beautiful Mushrooms.*

It's loaded with

- new mushroom photos
- photos of people and places
- stories of his mushroom-hunting expeditions around the world



It also includes

- the story of how he got his start
- insights into his photo techniques

If you liked *Treasures from the Kingdom of Fung*i, you'll really enjoy *Chasing the Rain.* You can order a copy at http://www.kingdomoffungi.com/a.pages/CTR.Book1.php

NOT SO PREPARED

Of the 132 people documented by the North American Mycological Association as poisoned by mushrooms in 2006, one was a 13-year-old Boy Scout in New York State who was learning about mushrooms with his mother's encouragement. After ingesting 12 different mushrooms (he did have enough sense to cook them first), he was beset by diarrhea, dizziness, cramps, spasms, nausea, vomiting, a headache, and weakness. He recovered after being given a charcoal drink and IV fluids.

We are sad to report that John Wesley (Jack) Orth passed away of complications from a stroke on May 7, 2007. A member since 1972, Jack served as president of PSMS from 1976–1978.

Spore Prints

is published monthly, September through June by the

PUGET SOUND MYCOLOGICAL SOCIETY
Center for Urban Horticulture, Box 354115
University of Washington, Seattle, Washington 98195
(206) 522-6031 http://www.psms.org
User name: Password:

OFFICERS: Patrice Benson, President
Milton Tam, Vice President
John Goldman, Treasurer
Dennis Oliver, Secretary

TRUSTEES: Molly Bernstein, Kevin Bernstein, Colleen Compton, Marilyn Droege, Brenda Fong, Jamie Notman, Cynthia Nuzzi, Lynn Phillips, Kim Traverse, Doug Ward
Ron Post (Immed. Past Pres.)

ALTERNATE:

SCI. ADVISOR: Dr. Joseph F. Ammirati

EDITOR: Agnes A. Sieger, 271 Harmony Lane, Port Angeles, WA 98362
sieger@att.net

Annual dues $25; full-time students $15

CALENDAR

Sept. 11	Membership Meeting, 7:30 PM, CUH *Spore Prints* deadline (**early**)
Sept. 17	Master Gardeners ID, CUH
Sept. 24	Master Gardeners ID, CUH
Sept. 29	Squire Creek Field Trip
Oct. 5–6	Chatter Creek Field Trip
Oct. 1	Master Gardeners ID, CUH
Oct. 8	Master Gardeners ID, CUH
Oct. 13–14	PSMS Annual Wild Mushroom Exhibit, CUH

PSMS DISCUSSION GROUP — John Goldman

The PSMS e-mail discussion group maintained by Yahoo Groups is an easy way to keep in contact with other members, circulate information about PSMS events, and post general mushroom information. By signing up, you can send a message using only one address (psms-members@groups.yahoo.com) and have it reach everyone who also has registered, with no need to maintain individual e-mail addresses for all PSMS members!

There are two ways to sign up. The simplest way is to e-mail psms-members-subscibe@groups.yahoo.com and you will be added to the list and only get e-mail. If you also want to have access to the Web-based features of Yahoo Groups, go to http://groups.yahoo.com/group/psms-members. Follow the link that says "Join this Group." (You will need to sign up for a free Yahoo Groups membership.) This way, you can access the e-mail from any computer (not just your computer), search messages, and have access to the photo section and the "file" section where other documents are stored (recipes, PSMS bylaws, etc.).

MEMBERSHIP MEETING

Tuesday, September 11, 2007 at 7:30 PM at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

We are especially fortunate to have Dr. Bryce Kendrick as our guest this month. He is a great speaker, has a wide range of interests, and is knowledgeable in many areas. He will talk on the rare and unusual fungi of Vancouver Island and also discuss house-invading molds, presenting some facts and myths surrounding them. He specifically requests that you come prepared with all your questions about fungi that you have ever wanted to ask, and he will do his best to answer them. A Fellow of the Royal Society of Canada, Bryce has studied fungi for over 50 years and has authored over 300 mycological publications, including several books. Please come and say hello to Bryce.

Your attendance at this month's meeting is especially important because we will spend some time discussing the annual fall show, hand out the posters for distribution (if they're ready), and have the first round of sign ups for volunteers.

Would people with last names beginning with the letters A–K please bring a plate of refreshments for the social hour?

FALL FIELD TRIPS — Colleen Compton

Fall is here, and it looks like it's shaping up to be a great season for pot hunters. We're planning five hosted field trips with identifiers. Field trips begin at 9 AM. Potlucks will be held around 1 PM. We are always looking for hosts for field trips. Hosting is a great way to get to know people and especially fun if there are co-hosts. You don't have to have special knowledge to do this. With more than one host, there is plenty of time for everyone to get in some hunting. To host, contact Colleen at (206) 417–4540.

September 29 — **Squire Creek**
(elev. 350 ft, 65 miles NE of Seattle)

This is a day-only field trip at this Snohomish County campground near Darrington. There is a shelter located on the Salmon River. The potluck will begin around 1 PM. You may see the salmon spawning. Harold Schnarre and Colleen Compton will be co-hosts. Identifier to be announced.

Driving Directions: Head north on I-5, take exit # 208 and follow Hwy. 530 east through Arlington. Continue east about 25 miles toward Darrington. Just past Oso, you will go through a series of curves and across a bridge (you can see a railroad trestle on your left). Immediately watch for signs to Squire Creek Campground and turn left into the park.

October 5–6 — **Chatter Creek**
(elev. 2400 ft., 150 miles east of Seattle)

This lovely spot is reserved for the whole weekend, including camping and Saturday night in the group sites. Trailhead passes are required within ¼ mile of established trails.

Driving Directions: Take Hwy. 2 over Stevens Pass and proceed 34 miles to the first Leavenworth intersection. Turn right and proceed 16 miles up Icicle Road to Chatter Creek Campground. Follow the PSMS signs to the group site. You can also take I-90

over Snoqualmie Pass to exit #85 and travel over Swauk Pass to Hwy. 2. Turn left, go through Leavenworth to the north side, turn left on Icicle Road for 16 miles and follow PSMS signs.

October 20 — **Twanoh State Park** (Hood Canal)

October 27–28 — **PSMS-Mountaineers joint Field Trip** (Meany Lodge-Crystal Springs)

November 3 — **Deception Pass State Park** (elev. near sea level, 80 miles north of Seattle)

MUSHROOMING BASKET TIPS

Maggie Iadanza
editor, *Mushrumors*, Oregon Myco. Soc., May/June 2006

OMS members are a clever and resourceful lot. On trips and forays, I've noticed the creative things that some OMS members do to make their foraging more comfortable and efficient, and to help bring home cleaner mushrooms.

► Most of us carry the traditional woven basket of varying sizes. My personal favorite basket has a woven lid that lifts off for access to the mushrooms but keeps those mushrooms from escaping when I trip and dump my basket—something I do on a regular basis. I've noticed some members have small collapsible fabric or mesh totes for collecting. These are easy to store and can be kept in the car at all times should the opportunity to forage present itself.

► Consider attaching an old adjustable strap to your basket. You probably have one hanging around the house from a briefcase or luggage, or you can pick one up at a yard sale. A wider, padded strap will be more comfortable. Attach the strap to the ends of your basket with a couple of metal rings, or anything that will create a sturdy attachment on the ends of your basket.

► Have you seen those half-size dish towels designed to attach to a stove or refrigerator door handle? You can attach one to your basket for the occasional hand or tool cleaning.

► A knife and brush duct-taped together provides a single efficient tool with a dual function.

► One Christmas, my cash-challenged son stained two medium-size paint brushes, attached leather laces and voila…mushroom brushes perfect for attaching to our baskets.

► Squirrel away those plastic baskets that berries come in and also the cardboard trays that hold six baskets. They are perfect for sorting mushrooms when you get back to the car.

► Don't forget to save those large sturdy trays with handles that you often get at Costco when you tote home your mega-size groceries. They are perfect for storing mushrooms after a particularly good day. I fondly remember hauling two such trays filled with chanterelles into the house…but that is a story for another day!

PRESIDENT'S MESSAGE

Patrice Benson

I sit here watching a beautiful West Virginia sunset over mountains covered with green cloaks changing to the colors of pumpkins and red wine. The 47th NAMA (North American Mycological Association) conference is filled with people from mycological societies from all over North America. The cumulative knowledge is awesome, and I am inspired by the excitement here. I have been exchanging information with members and leaders of other clubs and I am left with the impression that our club is on the right path.

Our endeavors at this point are many; some are new and some are traditional. I feel that the things that our group is working toward are worthwhile, and that's why I spend energy and time serving our mushroom community. I do hope that you will find the right places for you to join in these activities and have a fun and rewarding experience. I will try to bring y'all up to date on the upcoming activities.

Our most exciting activity is our 44th annual Wild Mushroom Exhibit, scheduled for October 13–14, 2007. Our chairman, Ron Post, will tell you more in this issue of *Spore Prints,* but I would like to encourage everyone, especially new members, to volunteer time for some part or parts of the preparations and during the actual exhibit. You need not know anything about mushrooms to help with this really fun and rewarding part of our mushroom year. Call Ron to volunteer! Call me to volunteer! (206) 819-4842.

I have two new projects to talk about and hope for your participation in!

One is a very interesting opportunity to both help the community and learn at the same time! For years, the Master Gardeners have had public times for plant ID and problem solving for gardeners and plant fanciers. We will be joining them in the atrium of CUH each Monday from approximately 4–7 PM during fall and spring/early summer to ID mushrooms as well as plants. Board member Cynthia Nuzzi will be coordinating our volunteer identifiers. Her instructions for you are also contained in this issue. You should be at least an intermediate level identifier who can help key out mushrooms to participate in these sessions. I spent a couple times this spring doing this and it was fun! You will also learn a lot about plants working beside the Master Gardners.

The other activity is very exciting! We will be putting on a Mushroom Mayhem (or Mushroom Maynia) day at the Burke Museum on May 4, 2008. Please save the date and be prepared for more information about this. We will need your help and time/expertise to pull this off. It will be different than our mushroom exhibit and very educational! Joanne Young and Jean Zatochill are co-chairs for this event. It will be sponsored by The Daniel E. Stuntz Memorial Foundation and PSMS, and will not be possible without the support of the members. This event will help raise public awareness about the Daniel E. Stuntz Memorial Endowment fund, and probably will result in a few new PSMS members as well!

This endowment fund began in March of this year with an initial gift of $25,000 from the Stuntz foundation and $2500 from PSMS.

The hope is that in the near future we will be able to support a curatorship in mycology at the UW through the Burke Museum. A professorship chair in mycology is the eventual goal. To fully fund a chair at the UW costs about $2.5 million. We have a good start! You can visit the website of the Stuntz Foundation (there is

cont. on page 4

President's Message, *cont. from page 4*

a link to donate under the donations heading on the website) to find out more about this foundation.

Mushroom identification classes will again be held this fall for beginners and intermediate level students. Dates and registration information will be posted later on the www.PSMS.org website and in this newsletter.

I would like to recognize and thank a few members who are working behind the scenes for the benefit of all members as well as to help fulfill our mission of supporting the study of mushrooms as a science and hobby.

Colin Meyer, our webmaster and education chair, spends a lot of his time for the common good. He organizes the classes and lines up the lecturers as well as works on the educational content. He keeps our website technically fine tuned, too. Our web designer and editor, Molly Bernstein, keeps the content of our website up to date as well as keeping it looking stylish and smooth and continues to add new information. Our library is been preened and tended to by Kim Traverse; Kim is also working on the computer database of the contents of the library which was originally put together by Lorraine Dod. Lorraine was the 2006 recipient of the club's only service award, The Golden Mushroom. Another job which has great impact on members, planning the field trips, is chaired by Cathy and Don Lennebacker, who find and reserve field trip sites. Their work is made complete when Colleen Compton finds hosts for these trips and Brian Luther assigns one of his team of identifiers (often himself!). I will never be able to thank Agnes Sieger enough for editing the *Spore Prints* for more than 22 years, nor Dick Sieger enough for being techie to Agnes. There are lots more, and you will hear more about them in subsequent issues of this publication.

WHERE HAVE ALL THE *COPRINUS* GONE?

Gene Yetter

NJMAnews, New Jersey Myco. Assoc., July–Aug. 2007

Coprinus comatus

Twenty-first century bioscience techniques—DNA sequencing, cladistics, systematics, etc.—are taking their toll on popular mushroom books, outdating them in forcing nomenclatural changes as a result of discoveries about old, assumed taxonomic relationships. One recent name in the fungal lexicon to be torpedoed involves the famous "inky caps," the group beloved (or abhorred!) by mycophiles for the bizarre habit of several of its members of turning to a messy black liquid as they mature.

The "inkies," agaric genus *Coprinus* and its type species, *Coprinus comatus* (O. F. Müll.*)* Pers., appear throughout the mycological literature. The basionym of *C. comatus* is *Agaricus comatus,* named by Otto Friedrich Müller in 1767. Historically, the genus has been positioned in the taxonomic family, Coprinaceae, which also included *Lacrymaria* and *Psathyrella. Coprinus* was first described as a genus by Christiaan Hendrik Persoon in 1797. The Coprinaceae was erected as a family by French mycologist Ernest Roze in 1876; it was re-interpreted by Casper Van Overeem and Josef Karl Weese in 1924. Thus "*Coprinus*" and "Coprinaceae" have been common labels applied to many mushrooms and mushroom groups by authors going back to Persoon.

Coprinus comatus

But, as of a relatively recent article—*"Coprinus* Persoon and the disposition of *Coprinus* species *sensu lato"*—coauthored by several scholars, DNA study has confirmed that the familiar taxonomy of the Coprinaceae no longer applies. The article was published in the journal, *Taxon* 50(1) in 2001. Authors include Scott A. Redhead, Rytas Vigalys, Jean-Marc Moncalvo, Jacqui Johnson, and John S. Hopple, Jr.

Only *Coprinus comatus* and two similar species remain in genus *Coprinus,* which has been repositioned to the family Agaricaceae. In studies cited in the article by Redhead et al., *Coprinus comatus* turned out to be more closely related to Agaricus species than to its former siblings in the Coprinaceae. Technically that renders the family name Coprinaceae a synonym of Agaricaceae.

Other former *Coprinus* species have become "*Coprinopsis," "Coprinellus,"* or "*Parasola." "Coprinellus"* and *"Coprinopsis"* are names published originally by Karsten in 1879 and 1881, respectively. As previously published names, they come to the fore once the decision was made that the name *Coprinus* does not apply to most species that the genus was previously thought to contain. Tom Volk's website presents a summary of the basic morphological distinctions between the newly resurrected genera. The URL is http://botit.botany.wisc.edu/toms_fungi/ may2004.html.

These changes did not happen without controversy. In fact, it had been suggested that changes could have been avoided by just changing the type species of *Coprinus* to *C. atramentarius,* while also changing the name of *Coprinus comatus* to another genus in the Agaricaceae, the genus *Annularius,* named by Francois Anne de Rousell in 1806. Then the Coprinaceae species now displaced to other genera *could* have remained in *Coprinus.*

At least for the time being, it was agreed among concerned mycologists that to change the name of such a well-known mushroom as *C. comatus*—the venerable "shaggy mane"; the "lawyer's wig!"—would have been more destabilizing than changing the name of a few hundred less well known coprinoid species. It may be that the issue comes up again in the year 2011, when the next International Botanical Congress convenes. That's where such issues are discussed and possibly settled.

For now, most of the members of the former Coprinaceae *(Coprinellus, Coprinopsis, Parasola)* and including *Psathyrella* and *Lacrymaria lacrymabunda* are now assigned to a new family, "Psathyrellaceae." Pardon me for injecting my personal slant into this report, but isn't that great? *Psathyrella* is one of my favorite genera because its limits are famously unclear. Now it gets its own family moniker. I wonder if Alexander Smith (1904–1986), author of the only monograph on North American *Psathyrella* to date, would be proud.

Panaeolina foenisecii (Psathyrella foenisecii in Smith's monograph) has been moved to the Bolbitiaceae, the family including *Bolbitius, Agrocybe, Conocybe,* and *Hebeloma.*

Many folks, including some authors of field guides, may ignore the new names for a time but transition is inevitable.

The 30-year record of the Northeast Foray includes 10 former *Coprinus* species, 13 *Psathyrella, Lacrymaria lacrymabunda,* and *Panaeolina foenisecii.* The following list shows new Psathyrellaceae nomenclature to be applied to NEMF records when the database is next updated. (In other words, when it is re-released: a 31-year record after the 2007 foray in Maine in August) Some additional names from the NJMA database follow the NEMF list names. *Coprinus comatus* will be moved to the Agaricaceae.

Coprinaceae Revisions
(names now grouped in Psathyrellaceae)

NEMF Nomenclature

Coprinellus:	*micaceus*
Coprinopsis:	*acuminata*
	cinerea
	lagopides
	lagopus
	narcotica
	variegata (= Coprinus quadrifidus)
Lacrymaria:	*lacrymabunda*
Parasola:	*plicatilis*
Psathyrella:	*atomata*
	camptopoda
	candolleana
	conissans
	cotonea
	deliniata
	gracilis
	piluliformis (=Psathyrella hydrophila)
	rugocephala
	septentrionalis
	spadicea

RARE EVENT

Dick Sieger


Bryce Kendrick

Spring mushrooming was largely disappointing for the folks who count morels. But the season was truly memorable for Agnes and me. When we attended the Eagle Creek field trip on Memorial Day, we were treated to a spectacular abundance of *Caloscypha fulgens*.

Driving along the Chiwawa River Road (Wenatchee N.F. #6200), we saw the beautiful green-tinted orange cups carpeting the forest floor and roadside in numbers and sizes greater than we have seen in 35 years of mushroom hunting. There were numerous places where dozens, and sometimes scores, of cups were mutually compressed. Some of these compound fruitings were in hard packed campground soil that were unlikely sites for cone caches. A Forest Service ecologist estimated that 10–20% of the forest floor was covered by the cups in a 5–10 acre site. He described the fruiting as phenomenal. Other mushrooms were scarce.

Caloscypha fulgens, in its asexual form (*Geniculodendron pyriforme*), is a mold that is a parasite of conifer seeds. Also, it is a symbiotic partner of squirrels. Squirrels provide for their future by storing conifer cones in caches. These caches provide places where the mold can prosper. The mold, in turn, prevents germination of the seeds and thus helps preserve the squirrels' food supply.

DELUGE BRINGS BUMPER CROP OF BRITISH SUMMER TRUFFLES

Patrick Phelvin

Daily Telegraph, 2 August 2007

The early summer deluge may have proved a dampener for British holiday-makers, but the wet weather has guaranteed a bumper harvest of one of the world's culinary delights—summer truffles (*Tuber aestivum*). British hunters of the rare fungi have collected record numbers of the highly prized specimens, which can fetch hundreds of pounds a kilo (2.2 lb).

Summer truffles are a dark, charcoal grey on the outside and hazelnut brown throughout. They can survive in dry conditions but sink below ground level to find water. This year's wet June and July have been perfect for encouraging them to grow closer to the surface, making them easier to find.

Nigel Hadden-Paton, who runs Truffle UK Ltd, Britain's first commercial truffle-growing company, expects this year's crop to be a record-breaker. "The wet weather has been a godsend for us, and it's very nearly time to harvest our native British summer truffle," he said. "The ones we have seen so far this year bubbling to the surface are looking bigger, and they are in greater numbers. "We harvested 35–40 kg (77–88 lb) in 2005, and 80 kg last year, but expect to exceed that number this year."

Roger Jones, a chef, has already returned from a successful truffle hunt at a secret location close to his Michelin-starred restaurant, the Harrow at Little Bedwyn, near Hungerford, Berks. He found 2 kg (4.4 lb) of truffles in 20 minutes, with the help of his son Richard.


Richard Jones, 11, can feel truffles with his feet.

The 11-year-old is nicknamed Piglet because of his ability to feel around for the valuable ingredients with his feet. Mr Jones said: "There are enormous quantities out there at the moment if you know where to look. We barely had to move around to collect them and we could have found even more if we had tried harder.'' The chef added: "A truffle can grow from nothing to 60 or 70 ounces in a matter of days. Some were white in the middle, which means they had been brought on too early.

"We are very selective about the ones we keep and sell and we were left with only 200 g or so which were of real quality."

The most sought-after varieties of European truffles can be priced astronomically. A 1.9 lb Italian white truffle was bought at auction for a record £28,000 in 2004 by clients of London's Zafferano restaurant, rumored to include actress Gwyneth Paltrow.

The British truffle—also known as the summer or Burgundy truffle—thrives among the roots of beech, hazel, oak, and birch trees and in non-acidic soil. Traditionally the best counties for truffle hunters are Wiltshire, Gloucestershire, and Dorset.

Mr Hadden-Paton hunts for the rare delicacy all over southwest England using his trained truffle dog, Teaser, a chocolate-colored Labrador.

Mr Hadden-Paton said: "Dogs can be trained to hunt for anything, from drugs to bodies, and they certainly can make good truffle hunters.

"Pigs are used in Europe, but you have to be very careful as they get very excited when they find the truffles and tend to eat them themselves. "I have never seen a truffle-hunter who uses a pig who has still got all his fingers."

MOREL DOG

Shirley Andersen
Olympic Peninsula Mycological Society
via PSMS e-groups, June 28, 2007

[I] must tell you about Lorna and Jack Zahala's little year-and-a-half old English spaniel. Lorna found one morel, and the dog was curious so she let the dog smell it and then pretended to throw it into the, woods. To make a long story shorter, the dog put her nose to the ground and ran after the errant morel, and every time she stopped, Lorna would go to the spot and find a mushroom—for a total of 31. Not bad, huh! I told her she needs to keep working with her so she will be ready for next spring.

RADIATION-EATING FUNGI

from Dan Winkler on PSMS e-groups

Researchers at the Albert Einstein College of Medicine have discovered fungi that have the ability to use radioactivity as an energy source for making food and spurring their growth.

"The fungal kingdom comprises more species than any other plant or animal kingdom, so finding that they're making food in addition to breaking it down means that Earth's energetics—in particular, the amount of radiation energy being converted to biological energy—may need to be recalculated," says Dr.Arturo Casadevall, Chair of Microbiology & Immunology at Einstein.

The finding could trigger recalculation of Earth's energy balance and the scientists say the ability of fungi to live off radiation could prove useful to venturing into outer space. "Since ionizing radiation is prevalent in outer space, astronauts might be able to rely on fungi as an inexhaustible food source on long missions or for colonizing other planets," says Dr. Ekaterina Dadachova, Associate Professor of Nuclear Medicine and Microbiology & Immunology at Einstein and lead author of the study.

Those fungi able to "eat" radiation must possess melanin, the pigment found in many if not most fungal species. But up until now, melanin's biological role in fungi—if any—has been a mystery.

"Just as the pigment chlorophyll converts sunlight into chemical energy that allows green plants to live and grow, our research suggests that melanin can use a different portion of the electromagnetic spectrum—ionizing radiation—to benefit the fungi containing it," says Dr. Dadachova.

The research began five years ago when Dr. Casadevall read on the Web that a robot sent into the still-highly-radioactive damaged reactor at Chernobyl had returned with samples of black, melanin-rich fungi that were growing on the reactor's walls. "I found that very interesting and began discussing with colleagues whether these fungi might be using the radiation emissions as an energy source," says Dr. Casadevall.

To test this idea, the Einstein researchers performed a variety of *in vivo* tests using three genetically diverse fungi and four measures of cell growth. The studies consistently showed that ionizing radiation significantly enhances the growth of fungi that contain melanin.

For example, two types of fungi—one that was induced to make melanin (*Crytococcus neoformans*) and another that naturally contains it (*Wangiella dermatitidis*)—were exposed to levels of ionizing radiation approximately 500 times higher than background levels. Both species grew significantly faster (as measured by the number of colony-forming units and dry weight) than when exposed to standard background radiation.

The researchers also carried out physico-chemical studies into melanin's ability to capture radiation. By measuring the electron-spin resonance signal after melanin was exposed to ionizing radiation, they showed that radiation interacts with melanin to alter its electron structure. This is an essential step for capturing radiation and converting it into a different form of energy to make food.

Dr. Casadevall notes that the melanin in fungi is no different chemically from the melanin in our skin. "It's pure speculation but not outside the realm of possibility that melanin could be providing energy to skin cells," he says. "While it wouldn't be enough energy to fuel a run on the beach, maybe it could help you to open an eyelid."

Note: The full article is available online at the PLoS ONE website: http://www.plosone.org/doi/pone.0000457.

OMNIVORE'S DILEMMA

Michael Pollan
Omnivore's Dilemma (A Natural History of Four Meals)
via *Mushroomer*, Snohomish Co. Myco. Soc., July 2007

Hiking in the Berkeley Hills one afternoon in January I noticed a narrow shady path dropping off the main trail into the woods, and I followed it down into a grove of big oaks and bay laurel trees. I'd read that chanterelles came up this time of year around old live oak trees, so I kept an eye out. The only place I'd seen a chanterelle before was over pasta or in the market, but I knew I was looking for a yellowish-orange and thickly built trumpet. I scanned the leaf litter around a couple of oaks but saw nothing. Just when I'd given up and turned to head back, however, I noticed a bright, yolky glimmer of something pushing up the carpet of leaves and there it was, this big, fleshy vase-shaped mushroom that I was dead certain had to be a chanterelle. Or was it?

I took the mushroom home, brushed off the soil, and put it on a plate, then pulled out my field guides to see if I could confirm the identification. Everything matched up: the color, the faint apricot smell, the asymmetrical trumpet shape on top, the underside etched in a shallow pattern of "false" gills. I felt fairly confident. But confident enough to eat it? Not quite.

The field guide mentioned something called a "false chanterelle" that had slightly "thinner" gills. Uh oh. Thinner, thicker: These were relative terms; how could I tell if the gills I was looking at were thin or thick ones? Compared to what? My mother's mycophobic warnings rang in my ears. I couldn't trust my eyes. I couldn't quite trust the field guide. So whom could I trust? Angelo! But that meant driving my lone mushroom across the bridge to San Francisco, which seemed excessive.

My desire to sauté and eat my first-found chanterelle squabbled with my doubts about it, slender as they were. But by now I had passed the point of being able to enjoy this putative chanterelle without anxiety, so I threw it out.

I didn't realize it at the time, but I had impaled myself that afternoon on the horns of the omnivore's dilemma.

As the Lewis and Clark Expedition made its way across the Rockies heading east toward Great Falls, Montana, in June 1806, one of the men found some black morel mushrooms which Meriwether Lewis roasted and ate without salt, pepper, and grease. "In this way I had for the first time the true taste of the morel which is truly insipid tasteless food."

—from *Undaunted Courage* by Stephen Ambrose

BACTERIA "SURF" UNDERGROUND FUNGAL MYCELIUM

The Mushroom Log, Ohio Mushroom Soc., May/June 2007

Leipzig, Germany - Fungal hyphae play a greater role in the spread of bacteria in the soil than was previously suspected. This is the finding reported by scientists from the Helmholtz Centre for Environmental Research (UFZ) in the scientific journal *Environmental Science & Technology*. For the first time, scientists have been able to prove that bacteria are able to travel through the soil on the mucous membrane of living fungi.

The experiments could help speed up the remediation of contaminated land using bacteria that break down harmful substances. Air and a lack of moisture create a barrier to the mobility of bacteria in the soil, preventing them from spreading and delaying the breakdown of pollutants.

Everything is Just a Question of Contacts

It looks like a giant green ball of wool. With a bit of imagination the mycelium could also be likened to a huge motorway interchange with countless roads and junctions passing over and under each other on different levels. But what Leipzig-based microbiologist Dr. Lukas Y. Wick is observing so intently on his screen is in fact a photograph of a mycelium taken with a confocal laser scanning microscope.

The thread-like hyphae have a diameter of just 10 micrometers—one-seventh the diameter of a human hair. Nevertheless, fungi are some of the world's greatest biomass producers. A single gram (1 tsp) of field soil can contain up to 100 meters [1/20 of a mile] of mycelium.

Wick's actual research objects are much smaller still. He is interested in soil bacteria. Bacteria can weaken the human organism, but they can also be useful, e.g., by breaking down pollutants. "For the bacterium a harmful substance is not harmful," explains Wick. "It simply breaks down the carbon compounds, producing the energy and substances that it needs to live." But before it can do this it has to get at its "food".

Air and lack of moisture present insurmountable obstacles. "This is why certain pollutants are broken down so slowly in the soil. Often it is not a lack of biochemical capacity, but rather a lack of contacts." The scientists at the UFZ are therefore studying the paths followed by the bacteria.

Probably the World's Largest Motorway Network

Mycelia appear to act as a kind of underground highway for bacteria. This is the conclusion reached by Lukas Wick and his team. In the lab experiment they succeeded in demonstrating that the bacteria move through the soil on the mycelium. The ingredients: one pollutant [phenanthrene], separating layers made of glass pellets, uncontaminated soil, and a bacterium called *Pseudomonas putida.* The bacteria have to fight their way through all these layers to reach the phenanthrene, their "food." Phenanthrene is a widespread pollutant produced during every combustion process: at gas stations, in car exhausts, during forest fires, in cigarette smoke, and in old municipal gas works.

"We deliberately make the bacteria work their way upwards against gravity so that people can't say there could be a small amount of water trickling down and carrying the bacteria with it," says Wick. "We have tried to rule out any doubts and objections from potential critics." The bacteria made it to the top only in places where there was a mycelium running through the soil. In the identical parallel experiment without a mycelium the bacteria were unable to surmount the barriers. "With this paper we have shown that there is an infrastructure."

Just Follow Your Nose

The bacteria in this lab experiment are so-called chemotactic bacteria. This means that they measure the concentration of their "target chemical" and then move toward where the concentration is higher—as if on autopilot. "A bacterium is not a stupid creature—it has adapted to its environment and goes where there is food."

Only one type of bacterium was used in the model experiment. In nature, however, there are countless different bacteria, which give rise to new questions: for which of them is it an advantage to be mobile and for which is it not? It will, therefore, be some time before the processes in the soil are fully understood.

The future aim of the Helmholtz researchers is to model microbial landscapes and to investigate what happens under the influence of different factors. For this they will make use of a tool that has already helped to predict the spread of resettled animal species—ecological modeling, which in future will also be able to provide forecasts about the spread of bacteria. This knowledge will make it easier to remediate contaminated soil, perhaps making the "fungal highway" not only the largest in the world, but also the only one to help return nature to its original state.

2007, www.ufz.de

CALL FOR VOLUNTEERS FOR THE PSMS/ MASTER GARDENER ID CLINICS

Cynthia Nuzzi

Last June PSMS started a great collaboration with the Master Gardener clinics on Monday afternoons at CUH. For a few weeks in the Fall and Spring, one of our members will be available to help the public in mushroom identification and with mushroom information.

We need some of you to step up and volunteer for sitting during the clinic hours to help with this project. The dates for this Fall are

September 17, 24
October 1, 8, 15, 22, 29
November 5, 12, 19, 26

For next spring they are

April 28
May 5, 12, 19, 26
June 2, 9, 16, 23

The clinics are held from 4 to 7 PM, usually in the atrium of CUH. Normally two Master Gardeners are there for all gardening enquires, and now one or two people from PSMS will also be available for people to drop in with their mushroom findings and ask questions. All our literature will be there for consultation. For more information and to sign up, contact Cynthia Nuzzi at (206) 232–1320 or idclinics@psms.org.

This year should be great for this new program. I look forward to seeing it mushrooming.

Choose a date and sign up as soon as you can. Thank you all.

CHANTERELLE POTSTICKERS **Mary J. Taylor**

I've found the following recipe works equally well with fresh or canned mushrooms. The potstickers easily freeze for a month or so and can be brought to the table in various ways. Experiment with cooking. For example, try baking or steaming or frying and dropping into clear soups. Experiment with dipping sauces, although I always think that the traditional seasoned soy sauce blend works well.

6 slices	bacon (or ¼ lb chopped ham and 2 TBs butter)
1 lb	fresh chanterelles, chopped OR 1 pint canned chanterelles, drained (reserving liquid) and chopped
1	onion, chopped
1	clove garlic, minced
¼ cup	sherry
2 TBs	flour
1 package	gzoya wrappers

1. Fry bacon in large skillet until crisp over medium heat. Drain, reserving the drippings. Crumble the bacon and set aside.

2. If using fresh mushrooms, add them to drippings along with onions and garlic. Cook until all juices have evaporated. Stir in sherry and flour and cook, stirring, until thick. Remove from heat and cool.

3. If using canned mushrooms, add onions and garlic and drained juices from the mushrooms to the drippings. Cook until all juices have evaporated. Stir in mushrooms, sherry, and flour and cook, stirring, until thick. Remove from heat and cool.

4. Place about 2 teaspoons of the filling in the center of each wrapper. Fold dough in half to form a half moon shape. Pinch closed along curved edge. Set on plastic wrap, seam side up, and keep lightly covered while preparing remaining potstickers.

5. To cook in the Oriental fashion: Set a large frying pan over medium high heat and brush with oil. Add potstickers and fry until golden brown on the bottom, about 5–10 minutes. Add ¼ cup beef broth to the pan, cover with lid and steam 10 minutes. Serve with dipping sauce.

6. Traditional dipping sauce: For each serving, blend ¼ cup each soy sauce and beef broth, 1 tablespoon vinegar, and ¼ teaspoon hot liquid pepper seasoning.

Puget Sound Mycological Society
Center for Urban Horticulture
Box 354115, University of Washington
Seattle, Washington 98195

RETURN SERVICE REQUESTED

Non-Profit Org.
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO. 6545