SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 416 November 2005

MONSTER MOLD THREATENS HEALTH IN THE SOUTH

Julia Silverman and Marilynn Marchione
The Sporeprint, L.A. Myco. Soc., October 2005

New Orleans (AP) - Wearing goggles, gloves, galoshes, and a mask, Veronica Randazzo lasted only 10 minutes inside her home in St. Bernard Parish. Her eyes burned, her mouth filled with a salty taste, and she felt nauseous. Her 26-year-old daughter, Alicia, also covered in gear, came out coughing. "That mold," she said. "It smells like death."

Standing water after Hurricane Katrina created ideal growth conditions for mold and allowed it to penetrate so deep that experts fear that even studs of many homes are saturated and unsalvageable. Mold now forms an interior version of kudzu in the soggy South, posing health dangers that will make many homes tear-downs and will force schools and hospitals to do expensive repairs. Don't expect help from insurance companies, either. Most policies were revised in the last decade to exclude mold damage because of "sick building" lawsuits alleging illnesses caused by molds.

Molds are a type of fungus and reproduce by making spores, which travel unseen through the air and grow on any moist surface. For people who have mold allergies, "These are potent allergens," said Dr. Jordan Fink, a Medical College of Wisconsin professor and past president of the American Academy of Allergy, Asthma and Immunology. Even dead mold can provoke asthma in susceptible people. Molds also produce irritants that can provoke coughing, and some make spores that contain toxins, which further irritate airways.

Most people have no problem with this ubiquitous fungus. However, the sheer amount of it in the South could trigger problems for some people who haven't had them before, medical experts say.

Because of mold's potential health problems, places open to the public—restaurants, schools, businesses—must eliminate it. This is most true for hospitals, where mold spores can cause deadly lung diseases in people with weak immune systems or organ transplants. Such concerns have already led Charity Hospital's owners to mothball it, and cleanup of the Tulane University Hospital and Clinic is expected to take months. "The first floor's . . . going to be pretty much a total loss," said Ron Chatagnier, project coordinator for C&B Services, a Texas company hired by the hospital's owner, HCA.

"It might be difficult or impossible to reopen some of these medical centers," said Joe Cappiello, an official with the Joint Commission on Accreditation of Healthcare Organizations. "It's not just the physical destruction that you see," Cappiello said. The ventilation systems and ductwork are full of mold, ready "to seed the rest of the hospital with spores" if the heat or air conditioning were turned on he said.

As for houses, "anything that's been submerged probably will be a tear-down," said Jeffrey May, a Boston-area building inspector, chemist, and book author who has investigated thousands of buildings for mold problems.

Clothes can be washed or dry cleaned, but most furniture is a loss. Ditto for carpeting, insulation, wallpaper, and drywall, which no longer lives up to its name. Mattresses that didn't get wet probably have mold if they were in a room that did. "Anything with a cushion you can forget about," May said.

The general advice is the same as when food is suspected of being spoiled—when in doubt, throw it out.

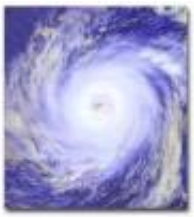
When is professional help needed? "It's simply a matter of extent. If you've got small areas of mold, just a few square feet, it's something a homeowner can clean with 10 percent bleach," said Anu Dixit, a fungus expert at Saint Louis University.

Dixit studied mold after the Mississippi River floods in 1993 and 1994, and found cleaning measures often were ineffective, mainly because people started rebuilding too soon, before the surrounding area was completely dry.

In the New Orleans suburb of Lakeview, Toby Roesler found a water line 7 feet high on his home and mold growing in large black and white colonies from every wall and ceiling on the first floor. Wearing goggles, a mask, and rubber gloves, he sprayed down the stairwell with a bleach solution. A crew will arrive soon to gut the lower floor. "I think it's salvageable," he said, but admitted, "It's going to be some gross work to get it ready."

Others won't try. Dionne Thiel, who lives next door to the Randazzo family, was only 7 when Hurricane Betsy raced through her neighborhood 40 years ago. Returning on Monday, after Hurricane Katrina, something was instantly familiar. "The mold and the water," she said. "It's the exact same smell."

Mold covered her dining room walls, snaked up door frames, and even found its way into the candles she sold for a living. She and her husband salvaged his golf clubs but left the rest. They'll move to Arizona.



"I would never want to live here again," said her husband, Don Thiel. "It's not going to be safe.

NO TRUFFLES ON THE CHRISTMAS TABLE?

The Sporeprint, L.A. Myco. Soc., Oct. 2005

The price of black truffles (*Tuber melanosporum*) is expected to exceed 1,000 euros ($1,430) per kilo for the first time in France after an exceptionally poor harvest. Truffle experts say that none will be left for Christmas, traditionally the busiest season of the year for the pungent ingredient. In Provence Alpes-Cote d'Azur, which produces three-quarters of the country's truffles, only 10 tons of the annual average of around 100 tons are expected to be harvested. Last year, when 40 tons of the fungus the French call "the black diamond" were unearthed, prices reached 600 euros ($850) a kilo in Provence and approached 1,000 euros farther west. Growers say the poor harvest will push prices even higher this year.

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:	Ron Post, President Patrice Benson, Vice President John Goldman, Treasurer Dennis Oliver, Secretary
TRUSTEES:	Molly Bernstein, Colleen Compton, Marilyn Droege, Lynne Elwell, Steve Haynack, Lynn Phillips, Carissa Thornock, Tony Tschanz, Bret Vielbig, Daniel Winkler, Karin Mendell (Immed. Past Pres.)
ALTERNATES:	Steve Bigelow
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

Nov. 8	Membership Meeting, 7:30 PM, CUH
Nov. 8	Beginner Class, "PSMS Member Resources," CUH
Nov. 14	Board Meeting, 7:30 PM, CUH Board Room
Nov. 15	*Spore Prints* Deadline (early)
Nov. 15	Beginner Class, "Collecting & Cooking," CUH
Dec. 13	Membership Meeting & Cookie Bash, 7:30 PM, CUH
Dec. 13	*Spore Print*s Deadline (early)
Dec. 19	Board Meeting, 7:30 PM, CUH Board Room

MUSHROOM MISSIONARIES

In October, **Dick Sieger** assisted with three sessions of a mushroom class at the Peninsula College in Port Angeles, demonstrated mushroom cookery at the Port Angeles Crab Fest, and led a field trip for the IMMC3 medicinal mushroom conference.

PSMS Vice-President Patrice Benson gave a lecture October 1 at Highline Community College and two mushroom workshops at the Islandwood Circle of Friends on the weekend of October 1 and 2; this weekend project raises funds to give scholarships to kids to attend week-long ecology and science trips with their schools . She also chaired the Breitenbush mushroom conference October 6–9.

CUH and WPA Now Under Same Umbrella Name. The Center for Urban Horticulture and the Washington Park Arboretum are now linked under a new umbrella name, "University of Washington Botanic Gardens." CUH and WPA maintain their individual names as they operate administratively under this new common name and identity. See www.uwbotanicgardens.org.

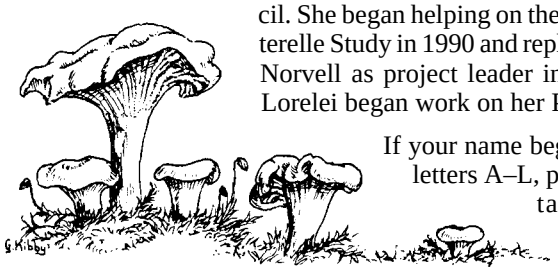
MEMBERSHIP MEETING

Tuesday, November 8, at 7:30 PM at the Center for Urban Horticulture, 3501 N.E. 40th Street, Seattle

The speaker for the November membership meeting is Judy Roger. You may have learned your microscopy skills from this multitalented mycologist.

This time, Judy will be reporting on the findings of the 20-year chanterelle study undertaken by the Oregon Mycological Society. Don't miss the chance to find out whether it is better to pull or cut.

Judy began studying fungi under Dr. Daniel Stuntz during, as she puts it, "the last ice age." She has continued to study mushrooms over the years, with workshops with "Dr. Joe" and others, making mushrooms a major focus in life. She is a longish-time member of PSMS, the Oregon Mycological Society, the North America Truffling Society, and the North America Mycological Association and is a charter member of the Pacific Northwest Key Council. She began helping on the OMS Chanterelle Study in 1990 and replaced Lorelei Norvell as project leader in 1992 when Lorelei began work on her Ph.D.



If your name begins with the letters A–L, please bring a tasty treat to share.

Every lungful of air…is likely to contain a few stray viruses in transit between their hosts, four or five common bacteria, fifty or sixty fungi…one or two minute algae…and possibly a fern or moss spore, or even an encysted protozoan.

— Jacobson's Organ, Lyle Watson,
via *Boston. Myco. Club Bulletin,* Sept. 2000

CRYSTAL SPRINGS FIELD TRIP REPORT

Hildegard Hendrickson

When I left Seattle October 1, it was dry and overcast. From Northbend to the summit, I drove through torrential showers. But on the east side it was dry until about 11 o'clock, when the heavy showers came intermittently, letting the 26 mushroomers who had signed the register (and those who did not sign) hunt in dry and wet weather.

When I arrived at Crystal Springs, host Doug U'Ren had set up his own large, portable shelter and had a fire going. The coffee and goodies were set out. I took a group of new members to the Lake Kachess campground, where we found very little. The hunters going up toward Stampede Pass fared better. When members returned to the shelter, they huddled around the fire to dry out, since many had been drenched by the heavy showers. Because of the wet weather, many participants decided to leave early, and no potluck was held. I would like to remind our members of Brian Luther's suggestion to carry extra clothing in your car, so you can change into something dry.

Remember, it needs to rain, or mushrooms don't fruit. But it does not need to come down in buckets.

When I was identifying fungi, I was very happy to see Josh Birkebak and his Dad. Josh identified the "difficult" ones before

the Birkebaks continued to Ellensburg. Over seventy different mushrooms (listed alphabetically below) were identified.

Agaricus arvensis
Amanita gemmata
Amanita muscaria
Amanita smithiana
Birds Nests fungi
(probably *Nidula candida*)
Boletus chrysenteron
Boletus mirabilis
Boletus (*Chaliciporus*) *piperatus*
Boletus smithii
Boletus zelleri
Cantharellus formosus
Chroogomphus tomentosus
Clavaria rugosa
Clitocybe deceptiva
Clitocybe dilatata
Collybia confluens
Coprinus comatus
Corals (three varieties)
Cortinarius (four varieties)
Cryptoporus volvatus
Cystoderma fallax
Jahnoporus hurtis
(Scutiger hurtis)
Galerina marginata
Gomphidius glutinosus
Gomphidius largus?
(was very large)
Gomphidius subroseus
Gomphus clavatus
Gomphus floccosus
Gymnopilus punctifolius
Hericium abietis
Hydnellum sp.
Hydnum repandum
(*Dentinum repandum*)
Hygrocybe miniata
Hygrophorus bakerensis
Hygrophoropsis aurantiaca
Inocybe calamistrata
Inocybe sp.
Laccaria bicolor
Lactarius deterrimus
Lactarius rubrilactius
Leccinum aurantiacum
Laetiporus sulphureus
(or *conifericola*)
Lentinus ponderosus
(*Neolentinus ponderosus*)
Lepiota magnaspora
Llyophyllum decastes
Lycoperdon perlatum
Mycena elagantula
Mycena epipterygia
Mycena haematopus
Mycena leptocephala
Mycena maculata
Mycena pura
Naematoloma (*Hypholoma*)
fasiculare
Paxillus atrotomentosus
Phaeolus alboluteus
schweinitzii?
Pluteus cervinus
Polyporus elegans
Pseudohydnum gelatinosum
Rozites caperata
Russula bicolor
Russula brevipes
Russula laurocerasi
Russula rosacea
Russula xerampelina
Strobilurus trullisatus
Stropharia ambigua
Suillus cavipes
Suillus granulatus
Suillus lakei
Suillus luteu
Suillus ponderosus
Tremella lutescens
Tricholoma focale
Tricholoma magnivelare
Tricholoma sejunctum
Tricholomopsis decora

SMELLY FUNGUS SPARKS GERMAN POLICE HUNT FOR CORPSE

Berlin (Reuters) - The odor given off by an unusually large fungus in Germany was so foul that it sparked off a police hunt for a corpse, authorities said.

A spokesman for police in the eastern city of Dresden said that following reports from local people about the smell, five officers and a sniffer dog went to investigate in a forest close to the German-Czech border.

Then they discovered this gigantic stinkhorn," he said, referring to the fetid-smelling, oddly-shaped fungus with the Latin name Phallus impudicus. "Those things really do stink."

Police called off the search and retreated from the malodorous fungus, which German media said was over 20 cm long, much bigger than stinkhorns usually grow.

MEDICINAL MUSHROOMS MAY COUNTER SMALLPOX AND SIMILAR VIRUSES **Paul Stamets**

Mycelium, Myco. Soc. of Toronto, Oct./Dec., 2005

Recent *in vitro* tests demonstrate that a specially prepared extract from *Fomitopsis officinalis* is highly selective against viruses. *Fomitopsis officinalis* is a wood conk mushroom, known for thousands of years as "Agarikon." It is extinct or nearly so in Europe and Asia but is still found in the old-growth forests of the American Pacific Northwest. It may provide novel antiviral drugs useful for protecting against pox and other viruses.

That is the forecast of mycologist Paul Stamets, owner and director of the research laboratories of Fungi Perfecti of Kamilche Point, Washington. For the past two years Stamets has prepared more than a hundred strains of medicinal mushroom extracts for testing by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), in their joint bio-defense antiviral screening program. The results to date promise breakthroughs on this biomedical frontier.

Dr. John A. Secrist III, Vice-President of Southern Research Institute's Drug Discovery Division, who oversees an NIAID contract to evaluate potential antiviral drugs, notes that "Several of Stamets's medicinal mushroom extracts have shown very interesting activity against pox viruses in cell culture assays performed through NIAID, and we are hopeful that they will also prove effective in the animal model systems. The number of different classes of compounds that show promising activity is small, so finding something new would be of great benefit to the scientific community."

In fact, of more than 200,000 samples submitted over several years, only a handful are slated for animal testing each year. In the past year, approximately ten samples showed activity warranting approval for animal testing; of these, two are from strains of Agarikon discovered by Stamets. Moreover, Stamets's samples are the only extracts of natural products tested through this program that have demonstrated very active anti-pox activity.

The NIH/USAMRIID screening program tests the mushroom extracts against viruses that could be weaponized, including the viruses causing yellow fever, dengue, SARS, respiratory viruses, and pox viruses. Of the Agarikon samples submitted to date, several showed potent activity for reducing infection from vaccinia and cowpox, which are in the same family as the smallpox virus.* These extracts showed activity against vaccinia and cowpox by two different viral evaluations, demonstrating the reproducibility of the results. Stamets has filed several patents, both U.S. and international, on the antiviral properties of mushrooms in the *Fomitopsis* family. However, only compounds derived using his proprietary, patent-pending methodology for the cell cultures show activity;

Fomitopsis officinalis

cont. on page 5

MUSHROOM OF THE MONTH: *TRICHOLOMA APIUM* (J. Schaeffer) Buck McAdoo

MushRumors, Northwest Mushroomers Assoc., March/April 2005

As do most of these myco adventures, it all started out with a hike along a trail. It turns out that almost every day of the year, Jack Waytz walks his dogs up a dirt road on Galbraith Mountain just west of Sudden Valley. Occasionally I join him on a dog walk for the fungi that abound on the sides of the road. It was in October of last year, a rather grim-light sort of day, and after about an hour we left the road to foray above an embankment. Jack was a little ahead and after a few minutes urged me to look at an interesting *Cortinarius* he had found. But I was thrashing around in thick uneven conifer duff battling with a tangle of downed Doug fir branches. While trying to extricate myself I almost stepped on a cluster of brown capped mushrooms. Turning one over, I discovered copious white mycelium.

"Hold it a sec," I shouted back, "I've got to deal with this odd *Leucopaxillus* before I get over there."

And so the saga began. The specimens had dull brown areolate (fissured) caps, stems that tapered toward the base, and a powerful odor I couldn't identify, possibly some brand of commercial floor detergent. Back at the office the following day, I discovered the spores remained inamyloid in Melzer's solution. This was no *Leucopaxillus*. A key to genera soon landed me on *Tricholoma*. Before trying to key it in Arora I decided to look at the microscopic features. Before embarking on this tack I generally like to peruse the etchings of microscopic characters for the genus at hand in the *Fungi of Switzerland* series. This gives me a better idea of what to look out for. At the very second page of Tricholomas, I stopped in my tracks. There was a fine photo of our specimens staring out at me from the upper right corner.

The microscopic data soon affirmed the connection. We had stumbled across (literally) *Tricholoma apium*, a mushroom so rare that it has been on the endangered species list in Europe. This was the *Tricholoma* Paul Kroeger had advised me to be on the lookout for. He had found it numerous times in the Mount Elphinstone forest in British Columbia, and owing to its rarity, its presence in Elphinstone had spared portions of that forest from being clearcut.

Great collection. Horrendous photo. Despite the wipeout of the gills, you can see the typical areolate brown cap that Dr. Stuntz referred to as "that muddy cracked cap Trich" the several times he found it. The caps range from 4–13 cm wide. They are broadly convex to sometimes shallowly depressed with strongly inrolled margins. The surface is dry, mat, and often has brownish squamules near the disc. The margins are undulate, irregularly lobed, and rarely faintly striate. The most colorful description is that of André Marchand, who described the cap as "charnu, bosselé, la marge enrouleé, onduleé-lobeé, et parfois strieé en partie. Cuticule adneé, sèche, mat, feutreé, presque squamuleuse, trés souvent craqueleé au disque." The gills he described as "bombeés avec l'âge." Only Marchand can transform a technical description into something approaching prose. The cap colors can vary from ochre brown to dull brown or more rarely olive to yellow-green according to Moser. The gill attachment is notched emarginate to nearly free. They are very crowded, white at first, with a yellowish gleam in age. In our specimens, a few were forking halfway to the stem. And Pilát discovered that very rarely the gills will turn black when bruised. The stems measure from 1–2¼ cm thick and 4–8½ cm long. They are white and somewhat scurfy, gradually becoming more ochre brown toward the base. The bases in our specimens were strongly tapered, whereas other authors have described them

as slightly bulbous. Moser described the stems as turning yellowish when bruised. The copious white mycelium is a feature I could not find described in the European literature. The spores were buff in deposit and inamyloid. The odor was very peculiar. Some collections smell strongly of celery ("apium" means celery in Latin), while others remind the various authors of fenugreek, fennel, or toasted chicory.

I found the taste to be mild but peculiar. Umberto Nonis found the species to be edible, the flavor good. Marchand found it edible in reduced quantities and mixed with other mushrooms. And Bruno Cetto wrote "consumed in massive quantities it renders the pasta inedible due to the bitter taste." Lucky fellow. How many of us have the opportunity to dine on an endangered species in quantity?

As for reagents, the cap context supposedly turns gray-green in ferrous sulphate while the gills stain yellow in NH_3.

In Europe *Tricholoma apium* is found under pine and spruce in poor, sandy soils in northern Italy and throughout central Europe. Our specimens were found under old-growth Doug fir. The mycelium appeared to transform the duff at the base into an ashy gray dust.

Microscopically I found smooth-walled, subglobose spores with a prominent apiculus. Most contained oil drops. The spores measured 2.9–3.9 × 4–4.5 µm. The quotient (ratio between length and width) was 1.33. The *Tricholoma* expert Alfredo Riva found slightly more globose spores with a quotient of 1.14. The basidia were 2–4 spored, clavate, and rather thin. They measured 5.1–5.7 × 23–27.2 µm. The gill trama were of parallel hyphae 3.3–14.9 µm wide. No cystidia of any kind were seen, nor were there any connections. The pileipellis consisted of roughly parallel but intertwining hyphae 2.9–12.9 µm wide, with some exerted ends. I found no incrustations, so raised an eyebrow when Gro Gulden wrote "cuticular hyphae uniformly incrusted."

Taxonomically, Marchand placed *Tricholoma apium* in Section Imbricata, Subsection Psammopus, along with other Tricholomas of ochre-brown, nonviscid caps. Moser has it listed under Section Contextocutis. Different mycologist, different system.

Its closest look-alikes include *Tricholoma sulphurescens* which differs in having flesh that turns yellow when cut, *Tricholoma luridum* which has a farinaceous odor and larger ellipsoidal spores, *and Tricholoma impolitum* which has larger spores, a bitter taste, and an odor faintly of radish.

Before proceeding further it is important to realize that there are two versions of *Tricholoma apium*—the brown-capped version you see in the photo here and a yellow-green to olivaceous version attributed to the original description of *Tricholoma apium.*

Both versions share the characteristic cracked-cap look, and both have the same range of odors. Julius Schaeffer first described *Tricholoma apium* from Germany. (This very competent mycologist remains to this day the only professional to have died from mushroom poisoning. He ate *Paxillus involutus,* which is more toxic in Europe than in our area.) Then, in 1946, Pilát & Svrcek introduced the brown-capped version as *Tricholoma helviodor* from Czechoslovakia. They named it "helviodor" because the odor was similar to that of *Lactarius helvus.* These authors maintained that up until 1959 *Tricholoma helviodor* had not been found outside of Czechoslovakia. Eventually Moser discovered that the two species were conspecific microscopically and created the new combination of *Tricholoma apium* var. helviodor. And this is the entity you are looking at here. However, if you are trying to use an endangered fungus to save a forest, trying to explain "var. helviodor" to a room full of timber barons might not get you very far. The lumpers eventually prevailed. I notice that Svengunnar Ryman in Svampar lists *Tricholoma helviodor* as a synonym of *Tricholoma apium.*

And there are other confusions. The German authors Michael, Hennig, & Kreisel list *Tricholoma apium* as a synonym of *Tricholoma luteovirens* (Alb. & Schw. ex Fr.) Ricken. Subsequently, other experts determined that *Tricholoma luteovirens* was a nomen ambiguum and reversed the synonym.

Finally, Alfredo Riva, an expert on European *Tricholoma*, contends that the photo of *Tricholoma apium* in Svampar is really that of *Leucopaxillus tricolor* because the gills are far too yellow. I doubt it. It's not a *Leucopaxillus* because Ryman didn't write "sporer amyloida." It could be another *Tricholoma* with yellower gills, such as *Tricholoma chrysophyllum.*

Enough of this long distance speculation. I now turn to Paul Kroeger, whom we are indebted to for the list of sightings of *Tricholoma apium* in North America. Besides finding it numerous times in Mt. Elphinstone Park, Paul has found the brown-capped variety at Buntzen Lake on the Lower Mainland and in the Cowitchan Valley on Vancouver Island. He has found the olive-green-capped version at Whistler and on Bowen Island, all these finds from B.C. Oluna Ceska has found *Tricholoma apium* twice on Vancouver Island, once at Point No Point near Sooke and once at Wickinninnish Beach near Tofino. Fortunato Armellini found a collection near Hope. And south of the border, Dr. A. H. Smith found it at the Longmire Campground while Dr. Dan Stuntz found it in 1963 at Silver Springs near the White River, and also near Poulsbo. Ben Woo also logged a collection at Greenwater River—presumably all these finds from Washington State. And according to Scott Redhead, Dr. Clark Ovrebo claims to have found a collection in Michigan.

This article ends with an intriguing theory of Kroeger's. Since the only spot on earth where *Tricholoma apium* seems almost common is the Mt. Elphinstone forest, might it not have originated there? In the early days of colonization, exploring biologists often sent back tree and plant samples to their motherlands. Spores might have been transported in this manner to Germany, Czechoslovakia, and other Nordic countries where *Tricholoma apium* has appeared.

Bibliography

Breitenbach & Kranzlin, *Fungi of Switzerland*, Vol. 3, 1991.

Bruno Cetto, *I Funghi dal Vero*, Vol. 2, 1976.

Duhem & Courtecuisse, *Mushrooms and Toadstools of Britain and Europe*, 1994.

Final Report, Forest Practices Board - Complaint 950036, 1996.

Gro Gulden, *Tricholoma in Nordic Macromycetes*, Vol. 2, 1992.

André Marchand, *Champignons du Nord et du Midi*, Vol. 9, 1986.

Michael, Hennig, & Kreisel, *Handbuch für Pllzfreunde*, Vol. 3, 1987.

Meinhard Moser, *Keys to Agarics and Boleti*, 1978.

Umberto Nonis, *Guide des Champignons Gastronomiques*, 1984.

Pilát & Ušák, *Mushrooms and Other Fungi*, 1961.

Alfredo Riva, *Fungi Non Delineati*, Pars 5, 1998.

Svengunnar Ryman, *Svampar*, 1984.

FUNGUS IS NEW TOOL FOR "SUSTAINABLE AGRICULTURE"

Wagdy Sawahel

*The Sporeprint***,** L.A. Myco. Soc., October 2005

Infecting crops with a fungus could be an alternative to genetically modifying them to boost yields, say scientists.

Research published in the *Proceedings of the National Academy of Sciences* showed that barley infected with a fungus called *Piriformospora indica* had three key advantages over uninfected plants. (1) It was able to grow in salty conditions, (2) it yielded up to 11% more grain, mainly because each plant had more seed heads than uninfected barley, and (3) it was also better at resisting infection by two disease-causing fungi, *Fusarium culmorum and Cochliobolus sativus*, that cause considerable economic losses worldwide.

Frank Waller of the University of Giessen in Germany, who led the study, said the research was important because soil salinity and plant diseases are major global causes of crop loss. *Piriformospora indica*, which was recently discovered in India, naturally infects the roots of plants growing in the same environment.

cont. from page 3

simple extracts from the woody conks (such as tea or infusions) are not active. Harvesting these rare conks from the forests will not provide therapeutic benefits and could impair the reproduction of the fungus.

While several strains of extract generated strong anti-pox activity, other strains were less potent. This underscores the importance of conserving mycodiversity. More potent strains may yet be discovered.

As for *F. officinalis*, this mushroom was first described 2000 years ago as an antiinflammatory medicine by Dioscorides, the Greek physician, in his text *Materia Medica.*

"The ecological niche for these unique mushrooms is increasingly jeopardized as humans destroy old-growth habitats," comments Stamets. "As this happens, the pool of available strains will be further reduced. Acquiring as many strains as possible should be an international priority so that preventive or curative medicines against pox and related viruses can be

defense."

*Vaccinia is the virus that was used historically to vaccinate against smallpox, or variola virus; it is the source of the word "vaccine." It was long believed to be cowpox virus ("vacca" comes from the Latin word for "cow"), but it is now thought to actually be a hybrid between the two viruses, cowpox and smallpox. It is also worthwhile to remind everyone that smallpox was eradicated from humanity decades ago—the last case was in 1978—and the only samples known to exist are kept "under tight security" in freezers in the US and Russia. – *NAMA Ed. (as published in* The Mycophile*, the newsletter of the North American Mycological Association, May/June 2005)*].

THE HISTORY OF MYCOLOGY IN THE UNITED STATES

Kelly Ivors

Mycena News via *Mycolog*, Humboldt Bay Myco. Soc. January 2004

When the Mycological Society of America (MSA) presented me with a research award named after a prominent 20th century U.S. mycologist, I realized how little I knew about my professional ancestors. I decided to find out more about the founding fathers of mycology in the United States and thought that many of you would enjoy this synopsis.

The term "mycology" is derived from the Latin *mykes* (mushroom) and *logia* (study). Surprisingly, the systematic study of fungi is only about 275 years old, and predates the study of bacteria.

From the beginning of the 19th century many contributions to American mycology, but not all, were the work of resident botanists. Rev. Lewis David von Schweinitz (1780–1834) is commonly recognized as the founder of American mycology. Although born in Bethlehem, PA, von Schweinitz entered a theological seminary in Germany where he concentrated on botany and mycology. In 1805 he co-authored the most comprehensive book on fungi at the time, entitled *Conspectus Fungorum in Lusatiae Superioris* (*Presentation of Fungi in Northern Lusatia*). In 1812 he returned to the U.S., where he continued his clerical work as well as developing a parallel career in botany and mycology. His work consisted of extensive catalogues and systematic descriptions of fungi, mosses, ferns, lichens, and flowering plants—for which he was recognized as the foremost authority on cryptogamia of his time. (In case you are wondering, the term "cryptogamia" was commonly used during this time, and is a general name for plants and plant-like organisms that lack flowers and are not reproduced by seeds, such as ferns, mosses, algae, and fungi). In his 1832 *Synopsis Fungorum in America Borealis* (*Summary of Fungi that Grow in North America*), he described over 3,000 species of fungi, more than half of which were species new to science. After he died in 1834, his personal herbarium of nearly 23,000 specimens was given to the Academy of Natural Sciences in Philadelphia.

Rev. Moses Ashley Curtis (1808–1872) can be considered the next notable U.S. mycologist. He was known for his collections and is remembered for his conviction of the importance of wild fungi as a food source, particularly during the devastation following the Civil War, during which "he turned his knowledge of them (fungi) to useful account for his family and neighborhood; and he declared that he could have supported a regiment upon excellent and delicious food which was wasting in the fields and woods around him." Currently most of his collections are in British museums, although some are at the Farlow Herbarium at Harvard University.

Another leading authority on fungi of the U.S. was Henry W. Ravenel (1814–1887). As an educated planter operating a South Carolina plantation, Ravenel turned to botany and mycology as avocations. Between 1853 and 1860 he published five volumes of *Fungi Caroliniani Exsiccati*—the first published series of named American fungi. In collaboration with English botanist M. C. Cooke, Ravenel later published a second series, *Fungi Americani Exsiccati*. He collected and classified an extensive herbarium of fungi, mosses, and lichens; his summary of specimens covered a total of some 11,000 species.

Perhaps one of my favorite U.S. mycologists is Charles Horton Peck (1833–1917). He was considered a leading American mycologist from 1868 until 1913, a period referred to as the "professionalization of American mycology" during which intense work in descriptive taxonomy of fungi took place. Peck was self-taught in the identification of fungi and was appointed State Botanist of New York in 1868. His earliest interest was in bryophytes, but he later turned to mycology and described more than 2,700 new species and varieties of North American fungi with monographs of boletes, tooth fungi, and gilled fungi for all of North America. My favorite fact about Peck was that he carried a portable microscope into the field!

William Gilson Farlow (1844–1919) is remembered as a pioneer investigator in plant pathology who helped establish a systematic nomenclature for fungi and directed many of America's leading botanists. He received his M.D. from Harvard Medical School in 1870 and then spent several years in Europe studying under the well-known plant pathologist Heinrich Anton de Bary. In 1874 he was appointed Assistant Professor of Cryptogamic Botany at Harvard University, where his research focused on plant diseases. He published many papers on rusts, fungi, and algae. Some of his larger publications include the *Bibliography of Articles on American Fungi* (1887–1888) and the *Host Index to Fungi in the United States* (1888). During his lifetime Farlow founded and endowed the Harvard Cryptogamic Laboratories and Herbarium.

William Alphonso Murrill (1869–1957) was a mycologist, taxonomist, writer, and authority on the fleshy fungi (Basidiomycetes). He received his Ph.D. from Cornell University in 1897 and started his career with the New York Botanical Garden in 1904 as Assistant Curator. He became Curator and Supervisor of Public Instruction from 1919 to 1924. During this time he collected over 70,000 specimens of fungi from North and South America, Mexico, and the Caribbean, of which the New York Botanical Garden Cryptogamic Herbarium holds about 14,000 specimens. Murrill published important monographs on hymenomycetes during his career. He founded and served as editor of the journal *Mycologia*, as well as contributing to parts of North American Flora (1907–1916). Perhaps he is most remembered as the first scientist to identify and classify *Diaporthe* (*Cryphonectria*) *parasitica*, the Chestnut blight fungus. There are many professional successors to Murrill who have shaped the history of American mycology but have not been mentioned owing to space. Surely the history of American mycology did not end in the early 1900s; in fact, the list gets lengthy as mycology was just starting to mushroom at this time.

WHAT'S NEW WITH PSILOCYBIN?

Psychology Today via *The Mycophile*, North American Myco. Association, July/August 2005

Back in the early sixties Harvard psychologist Timothy Leary snuck lysergic acid diethylamide (LSD) out of campus laboratories and into the mainstream. Soon, tie-dyed hell broke loose in popular culture, and psychedelic drugs were quickly banned. By the decade's end, they had all but vanished from the psychological research scene.

A report in the journal *Psychology Today* (March/April 2005) states that now, for the first time in some 30 years, human studies of such contraband substances are on the upswing. Many researchers say it should have happened sooner. "The banning of psychedelics has been an absolute disaster for consciousness and medical research," says Rick Doblin, head of the Multidisciplinary Association for Psychedelic Studies, a nonprofit pharmaceutical company funding much of this new work.

Many researchers say hallucinogens were kept out of research labs because of fear generated by drugs like methamphetamines

and heroin and the "war on drugs." In fact, there's little evidence that psychedelics are either addictive or more dangerous than, say, alcohol or marijuana, researchers report. Doblin argues that in the intervening decades, advances in everything from disease treatment to consciousness studies to basic psychological research have suffered. "These new studies are just the first steps on a long road to recovery," he says.

The turnaround started in the early 1990s, when the Food and Drug Administration ran out of reasons, political and otherwise, to quash contraband drug research, Doblin says. Scientists hope hallucinogens can make inroads with tough-to-treat conditions, says Charles Grob, chief of adolescent and teen psychiatry at the University of California at Los Angeles. Grob is picking up where another researcher, Eric Kast, left off in the 1960s. Kast had promising results using LSD to relieve anxiety in terminally ill cancer patients. Of course, LSD, or similar naturally occurring chemicals are derived from the Ascomycete fungus *Claviceps purpurea* which is also known as "ergot." To follow up on those results, Grob is currently investigating psilocybin—the magic in "magic" mushrooms—as a treatment for anxiety in late-stage cancer patients.

Researchers hope this is only the beginning of a hallucinogenic data mine. Grob also points out, "People forget, but psychedelics were the cutting edge of science in this country for 50 years." In fact, in the 1940s and '50s, so much money flowed in this direction that quite a few top researchers got their start in this field. Many feel modern psychiatry owes its origins to the study of hallucinogens. After all, it was the discovery of the neurotransmitter serotonin—thanks to LSD—that jump-started the brain chemistry revolution.

Flashback in the lab: Six psychedelic drug studies are under way, all aimed at some of medicine's more intractable problems. The Medical University of South Carolina has a study, directed by Michael Mithoefer, on "DMA (ecstasy) in conjunction with cognitive behavior therapy for the treatment of post-traumatic stress disorder triggered by sexual abuse." A University of Arizona study, under the head of Francisco Moreno, is looking into "Obsessive-compulsive disorder treatment with psilocybin." As mentioned above, a study at UCLA, led by Charles Grob, is examining "Late-stage cancer-related anxiety treated with psilocybin and therapy." Harvard University, the research home of Timothy Leary, has two ongoing studies. The first, led by John Halpern, is looking into "Late-stage cancer-related anxiety treated with MDMA and therapy." A second study, directed by Andrew Sewell, is examining "Treatment of cluster headaches with LSD and psilocybin."

UPDATE ON THE "ALMOND MUSHROOM" *AGARICUS BLAZEI*

Mycologia via *The Mycophile*, North American Myco. Association, July/August 2005

You may recall the "new" cultivated mushroom that burst onto the scene a few years ago. Known as the "almond mushroom," "almond scented mushroom," and "almond *Agaricus*," this mushroom has been heavily touted as the replacement for most varieties of commercial mushrooms. Besides its reported delectability (with a scent of almonds), this mushroom has generated a great deal of interest in its purported medicinal properties. Recently "discovered" and named *Agaricus blazei* (as well as *Agaricus brasiliensis)*, this edible species was found in the deep dark recesses of the Brazilian rain forest. Or was it?

Agaricus subrufescens

According to Dr. Richard Kerrigan of Sylvan Research (the world's largest commercial producer of *Agaricus* spawn—spawn is the "seed" mushroom growers use to inoculate compost for a mushroom crop), it ain't so. In a paper published in the journal *Mycologia* (*97*:12–24), *Agaricus blazei* is shown to be nothing more than *Agaricus subrufescens,* a commercially important species from days gone by.

Agaricus subrufescens was first described in 1893 by C. H. Peck. The species was widely cultivated and eaten in the Atlantic states from the late 1800s until the early 1900s. It was then replaced by the "button mushroom," *Agaricus bisporus,* which became the commercially preferred member of the genus until today. According to Dr. Kerrigan, *Agaricus subrufescens* still can be found growing in the wilds of northeastern North America, as well as in the West.

Dr. Kerrigan, a world authority on the genus *Agaricus*, previously has raised doubts over the identity of *Agaricus blazei /Agaricus brasiliensis.* In this latest paper, he relied on DNA sequence analysis, along with conventional morphological features, to state with absolute certainty the true identity of the almond mushroom.

CZECH MUSHROOM PICKERS BRACE FOR BUMPER CROP

Marketa Fiserova

The Sporeprint, Los Angeles Myco. Soc., October 2005

Millions of Czechs are taking to the countryside after record rainfall in July and August produced a bumper mushroom crop.

This year's season is starting three months earlier than usual, and the crop may be more than double the average of 20,000 tons, according to the Prague-based Czech Mycological Society. About 2 billion Koran ($86.5 million) of mushrooms are gathered annually, says the group, which estimates that as many as six million people, or two thirds of the population, are gathering fungi.

The mushroom-picking season in the Czech Republic normally begins in late September and continues through October. This year, gatherers say they are already scooping up as much as 60 kilos of mushrooms in a few hours in the dense forests that cover about a third of the country.

Owing to measures taken to protect the environment after the collapse of communism in 1989, sulfur dioxide emissions have fallen 90% and traces of nitrogen oxide over 40%, allowing types of mushrooms including chanterelles to re-emerge after a 30-year hiatus.

PECAN TRUFFLES: GEORGIA GOLD MINE

Oliver Schwaner-Albright

The New York Times via *The North American Truffler*
North American Truffling Society, May–June 2005

There are truffles in Georgia—not the chocolates you buy in a gold box, but the earthy fungi you shave over pasta. If it comes as a surprise to you that one of the world's most sought-after delicacies grows wild in the pecan groves of Georgia's coastal plain, it comes as a surprise to Georgia pecan farmers that anybody would take an interest in something that looks like a mangled potato and smells up the whole truck.

The pecan truffle, or *Tuber lyonii*, was first discovered in Texas in 1958, but it wasn't until 1987, when Dr. Tim Brenneman, a plant pathologist at the University of Georgia in Tifton, came across one, that its pasta potential became clear. He had little culinary use for it, but he took an interest in bringing it to the attention of the sort of people who did. Now, a handful of Georgia restaurants use the truffles, but they remain an elusive ingredient.

If you're in the right grove, finding a pecan truffle is about as hard as finding gum on a Manhattan sidewalk. Every 20 steps, there is a dirty, knuckle-shaped tip of a truffle peeking through a circle of earth. It can be as large as a racquetball or as small as a plump raisin; it can be round or gnarled. When you find one, there tend to be more nearby.

"I once went through here with two friends, and we found 20 pounds in two hours," Brenneman said. At $100 a pound, truffle foraging makes for a lucrative hobby. (And for cooks, it's not a bad deal either, since white Italian truffles (*Tuber magnatum*) regularly cost about $1,500 a pound.)

Pecan truffles don't have the overwhelming aroma of their famous European cousins, but slice one open, and you'll see the marbled veining in the beige flesh, followed by that distinctive odor. "They can be vapid," Hugh Acheson, the chef at Five & Ten in Athens, said of the truffles, "and sometimes there are deep pockets of dirt," he added. "But when they're good, they're great."

CHANTERELLE STIR FRY

Dick Sieger

Stir-Fry

1 lb chanterelle mushrooms
1 apple, peeled, cored and cut into ½-in. pieces
Peanut oil or a bland oil
1 large onion, halved and cut into 1/8-in. slices
¼ cup unsalted nuts: cashews, almonds, or peanuts
2 bell peppers (any color), cut into ¾-in. pieces
1 Tbs corn starch mixed with 2 Tbsp water

Seasoning Sauce

2 Tbs Chinese soy sauce
1 Tbs brown sugar
1 Tbs sherry
Finger-tip size knob of ginger, grated
½ Tbs rice vinegar

Instructions

1. Clean the forest debris from the mushrooms by brushing, scraping with a knife, or rubbing with a damp cloth. Cut them into ¼ -in. pieces and reserve.

2. Combine the five seasoning-sauce ingredients and reserve.

3. Add two tablespoons of oil to a wok or frying pan and heat just short of smoking. Add the apples. Stir-fry until the apples are somewhat brown. Add the nuts and continue cooking for a minute until the nuts are slightly browned.

4. Add the chanterelles, onion, and bell peppers. Add more oil as needed. Continue stir-frying until the onion is translucent but not browned.

5. Add the seasoning sauce and stir-fry briefly.

6. If the mushrooms have released a lot of liquid, continue stir-frying and add some of the corn starch mixture, a little at a time, until the liquid is thick and coats the mushrooms and vegetables.

Serves 4. Enjoy with a nice bottle of Alsatian white wine and a side dish of rice or Chinese noodles.

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