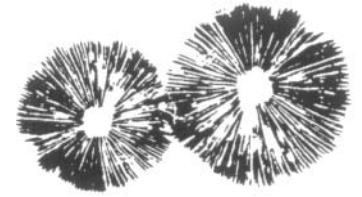


# SPORE PRINTS



BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY  
Number 446 November 2008

## WILD MUSHROOM SHOW

Kim Traverse

The 45th Annual Wild Mushroom Show is now history. If you were there, you've got the memories. If you weren't, here's a recap of what went on.

Members get in free and we only track ticket sales, but this year some 1365 people paid admission to view, smell, and even taste some of the hundreds of mushroom and lichen species on display. One hundred and three new members joined, and 35 current members renewed their membership.

Nearly one hundred volunteers worked collecting, identifying, arranging displays, putting up posters, selling tickets, books, and memberships, conducting tray tours, doing cooking demonstrations, selling art work, and introducing kids to the wonders of the fungal world. That kind of participation by members is what makes for consistently great shows and it's why PSMS is such an incredible organization.

Else Vellinga gave two different lectures each day, and Brian Pace lectured several times per day about how mushrooms are remediating oil spills and dumping in Ecuador. Celebrity chefs showed people how to make the most of what they find, and a cadre of expert identifiers shared their passion for mushrooms and cleared up a few of the mysteries that surround them.

This year, again, the weather cooperated with timely rains before the show and sunny weather during. CUH proved once again to be a wonderful venue for our event and we plan to continue there in coming years.

A giant thank you to all who worked so hard and skillfully to make it all happen, and a special thanks to Ron Post for mentoring the co-chairs and doing publicity.



# Spore Prints

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## PUGET SOUND MYCOLOGICAL SOCIETY

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## CALENDAR

- Nov. 1 Field Trip, Twanoh State Park
- Nov. 3 Master Gardener's ID Clinic. 4-7 pm, CUH Atrium
- Nov. 6 Beginner ID Class, 7-9 pm, Douglass Classroom, CUH
- Nov. 10 Master Gardener's ID Clinic. 4-7 pm, CUH Atrium
- Nov. 11 Membership Meeting, 7:30 pm, CUH
- Nov. 17 Board Meeting, 7:30 pm, Isaacson Boardroom, CUH Master Gardener's ID Clinic. 4-7 pm, CUH Atrium
- Nov. 18 *Spore Prints* deadline
- Dec. 9 Membership Meeting & Holiday Cookie Bash, 7:30 pm, CUH

## BOARD NEWS

Dennis Oliver

The board is still basking in the glow of a very successful show. Congratulations to Kim Traverse and Daniel Winkler, our show co-chairs, and to the volunteers who truly make the show possible. The final figures have not yet been calculated but we had 103 new members and everyone had a wonderful time. In other board news, Brian Luther has volunteered to be our new field trip chair; many thanks to Cathy Lennebacker who has performed this task for many years. We are still looking for a person to sell books at the monthly meetings. The second series of beginner ID classes will begin on October 23. An election committee has been formed to solicit candidates for PSMS Vice President, Secretary, and five board positions. This is a great opportunity to support the club and it's fun too! And we are thinking about a new roster.

## MEMBERSHIP MEETING

Tuesday, November 11, 2008, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

Our speaker this month is Dr. Thomas O'Dell, who will talk on "The Fungi of the Olympic Peninsula." Thom has over 25 years experience collecting, studying, growing, and eating mushrooms. He has many publications, including scholarly papers, books, chapters, and field guides. He received his Ph.D. in Botany and Plant Pathology from Oregon State University in 1992 and has conducted field ecological studies in Olympic National Park as a National Science Foundation Postdoctoral Fellow. Thom was the first regional mycologist for the USDA Forest Service, where he supervised surveys for rare fungi and trained federal botanists in their identification. He currently works for The Remediators Inc., a soil bioremediation company located in Port Angeles, Washington, that specializes in commercializing methods using fungi to clean contaminated soil.



Would people with last names beginning with the letters A to K please bring refreshments for the social hour.

## NOMINATIONS ARE OPEN FOR OFFICERS AND BOARD MEMBERS

Doug Ward

Every year at this time, we begin seeking candidates for PSMS officers and board members whose terms are expiring. This year we need nominations for Vice President, Secretary, and five of the 10 board members.

Please consider putting your name forward as a candidate for one of these important positions. Ideally, we will have a mix of veteran and recently joined members on the board so all viewpoints will be represented.

If you would consider being a candidate, please phone or e-mail Pacita Roberts at (206) 362-2713 ([pacitaroberts@gmail.com](mailto:pacitaroberts@gmail.com)), Brenda Fong at (206) 329-5948 ([bmlfong@gmail.com](mailto:bmlfong@gmail.com)), or Doug Ward at 523-0781 ([deward007@comcast.net](mailto:deward007@comcast.net)).

## FIELD TRIP NEAR LA WIS WIS

Brian Luther

Even though October 4 was a rainy day at this deep woods location 100 miles from Seattle, a surprising 27 members showed up and signed in. The wet conditions didn't dampen the spirits or determination of this dedicated group of mycophiles. Located just a few miles west of Hwy. 12 and very close to Ohanepecosh on FS Road 4900-035, this gorgeous site was just outside Mt. Rainier National Park and barely in the National Forest.

Hosts Don and Cathy Lennebacker and Colleen Compton set up several tents, tarps, and tables which definitely improved our conditions at the field trip site, since it was so wet out. Thanks Colleen, Don, and Cathy for putting out the effort to do such a great job hosting at this remote location!

It was still raining some, but not as hard in the early afternoon when I decided to make a fire in the fire pit with the huge load of firewood I had brought from home. As the afternoon progressed, the rain diminished, and we were all able to enjoy a warm fire, with



only the residual rainwater dripping off the huge conifer branches towering hundreds of feet above us.

We were visited by two US rangers—one from the Forest Service and one from the National Park. Both were fascinated by our mycological endeavor and were very interested in learning about fungi. Julia Pinnix, the ranger from Mt. Rainier National Park, was quite knowledgeable about the common genera and had been studying fungi for years as an interpretive specialist.

We were tripping over mushrooms in the woods, they were so abundant. Ninety-eight species of fungi were identified and displayed. Concerning good edibles, many people found Matsutake (*Tricholoma magnivelare*), yellow chanterelles (confirmed as *Cantharellus cibarius*, not *C. formosus*), and white chanterelles, along with several nice collections of Pig's Ears (*Gomphus clavatus*), quite a few *Boletus mirabilis*, some gorgeous *Boletus edulis*, and *Hericium abietis*. Numerous color forms of the Woodland Russula (*R. xerampelina*) were found.

Rare or unusual species included *Albatrellus pes-caprae* with its beautiful cinnamon brown cap with heavy scales, *Asterophora lycoperdoides* on an old, blackened, mummified *Russula*, a species of the false truffle genus *Melanogaster*, and a small collection of the very peculiar *Gastroboletus subalpinus*. Competing for the most beautiful mushroom were some absolutely brilliant blue specimens of *Cortinarius salor* and several clumps of conifer duff covered with multitudes of the bright orange and saffron colored *Mycena strobilinoides*.

We had an early potluck just after 3:00 pm with lots of great food, which was very welcome in such a damp, cool location. Everybody cleared out between 5:00 and 6:00 pm, except for me. I had gotten up at 3:00 am that Saturday morning to get everything ready and to make a potluck contribution (a big potato salad), so I knew I would be tired and had planned to spend the night in my station wagon. The next morning (Sunday) I got on the road a little after 7:00 am. It was still fairly mild out, but it got cooler and cooler as I climbed toward Hwy. 410 and I was surprised by about an inch of fresh snow on Hwy. 123 about a mile before and after Cayuse Pass (4,675 ft.). It was clearing up and I was hoping to get a few photos of Mt. Rainier with the new snowfall as I came down to the scenic White River view point, but unfortunately the mountain was still entirely shrouded in clouds.



I think it was a very successful and fun field trip, judging by the number of participants, their enthusiasm, and the abundance of fungi.

## DECEPTION PASS FIELD TRIP

Brian Luther

Don't ask me how we lucked out on getting such beautiful weather on October 18, but it sure worked out—it was mild and sunny all day. Located at one of the two shelters at Bowman Bay, we not only had a gorgeous location overlooking the water, but there were lots of picnic tables and a large fireplace that supported a roaring fire all day. Three people, Jamie and Dennis Notman and Lisa Ramey, volunteered as hosts, making the job a lot easier. Colleen Compton, who is chair of the Hosting Committee, also helped all day. Colleen came with her son and grandson. A special thank you to our hosts for all your work !

Since we were at a Washington State Park, I had a meeting at 10:00 am to discuss rules and regulations, distribute a handout, provide data-collection slips, and discuss proper mushroom collecting techniques. Washington State Park field trip sites require more diligence than most because of the requirements of my Washington State Parks and Recreation Commission Scientific Collecting Permit. I was fortunate to have Larry Baxter helping with ID all day, because 66 people showed up and I couldn't have done it without his help.

We had a reporter and photographer from the *Skagit Valley Herald* along for the day. You can access the resulting article about the field trip, which also comes with a brief video, at [http://www.goskagit.com/home/article/fungi\\_finesse\\_expert\\_ids\\_mushrooms\\_for\\_hunters/](http://www.goskagit.com/home/article/fungi_finesse_expert_ids_mushrooms_for_hunters/).

About 130 species were brought in and displayed on four large picnic tables. Good edibles included a few yellow Chanterelles (*Cantharellus formosus*), a handful of Winter Chanterelles (*Cantharellus infundibuliformis*), some Belly Button Hedgehogs (*Dentinum umbilicatum*), one half-alive specimen of *Boletus edulis* (already mostly consumed by slugs and rodents), a few *Boletus mirabilis*, quite a few *Boletus zelleri*, and an impressive and gorgeous 25 to 30 pound *Sparassis crispa*. I hadn't seen one that large in a long time.

Many stayed to enjoy a potluck with several tasty dishes and hearty soups around 3:00 pm. Thanks to all who stayed to help me finish documenting the species found during the day and to clean up the shelter and the all around area.



## BUT IS IT EDIBLE?

Dick Sieger

### To be edible, mushrooms must be

- **identified with certainty.** There aren't any shortcuts. There aren't any general rules. The name of the mushroom must be known.
- **tolerated by most people.** A good field guide passes on the experience of people who have eaten particular species.
- **found in a wholesome environment.** Mushrooms can absorb herbicides and heavy metals.
- **fresh.** Rotten food is never edible.
- **cooked.** Heat softens indigestible mushrooms. It may vaporize some poisons and reduce the potency of others.
- **eaten in reasonable quantities.** Some mushrooms are OK in small portions but troublesome when overeaten. And there's always the risk of a good old-fashioned bellyache.
- **eaten by healthy adults.** Children, old people, and ill people may be sickened by mushrooms that are enjoyed by others.

**Some people get sick anyway.** Alcohol combined with certain species causes illness. A few people are sickened by allergies or unusual sensitivity. Be kind to your doctor—don't confuse him by eating several species at one sitting. Experts can help, but eating mushrooms (or any food) can never be entirely safe.

## HORSE WHISPERER POISONING Neil MacPhail

*The Press and Journal*, Aberdeen, Scotland, October 4, 2008

*Horse Whisperer* author Nicholas Evans and three others left dangerously ill after eating poisonous mushrooms have issued a public thank you in the *Press and Journal* to the medical team who saved them.

Evans, 58, his wife Charlotte, 50, brother-in-law Sir Alastair Gordon-Cumming, 54, and Sir Alastair's wife, Louisa, 46, all fell ill last month after eating wild mushrooms picked at Sir Alastair's Altyre Estate near Forres.

Evans spent three weeks in the hospital being treated for the poisoning, and he and Sir Alastair now need regular kidney dialysis as a result. Evans and his wife have since returned to their home in Devon.

The four said in the *Press and Journal*: "We would like to thank Dr. Govan and staff at Forres Health Centre, Dr. Ronaldson and the staff at A&E and renal unit in Dr Gray's Hospital, also Dr. Fluck, Dr. Brunton, Dr. Millar and all the staff at Aberdeen Royal Infirmary with our eternal gratitude for all you have done for us, your swift response and your outstanding care. Thank you all."

Sir Alastair was recently reported to have said: "I have absolutely no kidney function and neither does my brother-in-law. My wife and sister have not got much. Basically, we are all in a very bad way, except the men came off worse because we ate more mushrooms. It has been absolutely dreadful for all of us. We are all extremely lucky to be alive."

Sir Alastair and his wife have been receiving treatment three days a week at Dr. Gray's Hospital in Elgin. Evans has been receiving dialysis in Devon where his wife had an operation.

Among the mushrooms they ate were examples of a rare and highly toxic fungus called *Cortinarius speciosissimus*, which attacks the kidneys.



*Cortinarius speciosissimus*

## BEETLES GET A LITTLE HELP FROM THEIR FRIENDS

[www.entertainmentandshowbiz.com](http://www.entertainmentandshowbiz.com),

October 10, 2008

Just like humans, Beetles, too, benefit from friendly associations, say researchers.

University of Wisconsin-Madison expert Cameron Currie says that adult beetles have a specialized compartment in their bodies that they use to store two other organisms, a slow-growing beneficial fungus that serves as a food source and a bacterium that produces a unique antibiotic.

Before adult female beetles lay eggs in tree bark, says the researcher, they spread the beneficial fungus and bacteria around the area where they will deposit the eggs.

The researcher adds that the antibiotic from the bacteria prevents growth of fast-growing competitor fungi without harming the slow-growing beneficial fungus, which continues to grow and provide a rich source of nutrition for the developing beetle larvae.

## THREE-WAY SYMBIOSIS

[scienceblogs.com](http://scienceblogs.com)

October 14, 2008

There is a grass called *Dichanthelium lanuginosum* that grows in Yellowstone National Park (among other places). There's nothing much special about it—except that it can grow in soil around thermal vents, soil that has a temperature of about 150°F (65°C).

Actually, it's not the plant itself that's remarkable. If you or I would order seeds of *Dichanthelium lanuginosum* and throw them in a pot, the grass wouldn't be happy outside of a "normal" upper plant temperature range of about 100°F (38°C). The grass has to be infected with a fungus, *Curvularia protuberata*. Grasses that aren't infected with this fungus can't survive in thermal vents.

Actually, it's not the fungus itself that's important. The fungus has to first be infected with a dsRNA virus, "*Curvularia* thermal tolerance virus."

If that virus infects a fungus and that fungus infects a grass, the grass gains the ability to grow in an extreme environment. In other scenarios, with other plants and other viruses, persistently infected plants have an advantage in colder temperatures or drought.

In brief, a three-way symbiosis is required for thermal tolerance.

## NEWLY DISCOVERED FUNGUS STRIPS POLLUTANTS FROM OIL

Colin Barras

[NewScientist.com](http://NewScientist.com) News Service, October 8, 2008

A humble fungus could help oil companies clean up their fuel to meet tightening emissions standards. The fungus, recently discovered in Iran, grows naturally in crude oil and removes the sulphur and nitrogen compounds that lead to acid rain and air pollution.

Worldwide, governments are imposing increasingly severe limits on how much of those compounds fuels can contain. Oil producers are searching for more efficient ways to strip sulphur and nitrogen from their products.

The standard way to "desulphurise" crude oil involves reacting it with hydrogen at temperatures of 455°C and up to 204 times atmospheric pressure (roughly 21 million pascals, or 3000 psi). It achieves less than perfect results.

Micro-organisms able to metabolise sulphur and nitrogen have the potential to achieve the same endpoint under more normal conditions. In recent years a number of researchers have isolated desulphurizing bacteria.

But Jalal Shayegan and his team at the Sharif University of Technology in Tehran, Iran, have now discovered and isolated a fungus that appears able to remove sulphur from oil with greater efficiency.

### Fungus hunting

Shayegan's team went looking for fungus in oil-contaminated soil from a Tehran oil refinery and the Kuhemond oil field in Iran, and isolated a number of new desulphurizing micro-organisms.

Tests revealed that the WS4 strain of *Stachybotrys* fungus was particularly efficient at sulphur removal—the first fungus found to have this ability.

Shayegan's team pitted their new find against several known desulphurizing bacteria. They grew them all for 6 days on heavy

crude oil samples from the Kuhemond and Soroush oil fields, mixed with a water-based growth medium.

### Clear winner

The fungus achieved the best results by far. In one sample it removed 76% of sulphur compounds in just 3 days, a figure only one bacteria could match over the full 6 days.

Robin van Leerdaam at Wageningen University in Bomenweg, Netherlands, says biodesulphurization holds promise as a method to refine oil and that the new contender is a welcome addition.

But he says rematches are required to properly test it against the known bacteria. “The sulphur removal efficiency of the fungus is higher than of the bacterium, but the comparison is not completely fair,” he told *New Scientist*.

The desulphurizing bacteria pitted against the fungus were previously grown on Dibenzothiophene, commonly used to simulate the sulphur compounds in crude oil. But they had not been grown before on crude oil itself. Leerdaam thinks bacteria more used to crude oil would run the fungus closer for efficiency.

### A better bet?

Other researchers are still advancing nonbiological approaches to stripping sulphur from oil.

“If you want to invest in desulphurization technologies then put your money on the chemical route,” Michiel Makkee at Delft University of Technology in Julianalaan, Netherlands told *New Scientist*.

His team recently designed a simple ester capable of removing sulphur from diesel. It works 10 or 20 times faster than a fungus or bacteria, and could be squeezed into much more compact reactors than a biological process, Makkee says.

But he concedes that his new method still requires heat—working at 140°C compared to 30°C (86°F) for the *Stachybotrys* fungus.

## FAMILIES DEMAND INQUIRY INTO MUSHROOM-FARM DEATHS

Doug Ward

*Vancouver Sun*, Canwest News Service, October 18, 2008

LANGLEY, B.C. - Family members of men killed by toxic fumes while working at a Vancouver-area mushroom farm last month called for a public inquiry into the accident Friday.

The daughter of Han Pham, one of five men who died or were severely brain damaged by the lethal gases, said her father had talked about the dangers of his Langley, B.C., workplace—especially of the confined pump house where he was killed.

Gracelynn Pham said her father had almost died in an earlier incident at Farmers' Fresh Mushrooms Inc. and once lost part of his finger during a mishap.

“If it happened once, that is an accident. If it consistently happens over a long period of time then I don't think it is an accident,” she said.

Her father was one of three men who died September 5 when they were exposed to noxious fumes released from mushroom compost. Two other men remain in hospital in comas.

Ms. Pham and B.C. Federation of Labour president Jim Sinclair demanded a public inquiry into safety on B.C. farms at a news conference Friday.

“He was sent to do work he's not trained for, and this time he died because of it,” said Ms. Pham.

Sinclair said that many farm employees do work they believe is unsafe because they are afraid of being fired. “They can't afford to lose their jobs when they are living paycheque to paycheque—and that's why it's a vulnerable industry and why we have to have rules and regulations,” he said. “Let's open the doors on this industry.”

A spokesman for Farmers Fresh Mushrooms could not be reached for comment.

## PRESIDENT'S MESSAGE

Patrice Benson

**Exhibit.** A wonderful 45th Annual Wild Mushroom Exhibit was orchestrated by Kim Traverse and Daniel Winkler. The players were too numerous to mention, but on behalf of the board and many others, we thank you all for your support and participation. Preliminary estimates are that we gained 103 new members sign up and 35 renewals the weekend of the exhibit.

The weather cooperated with blue skies and mild temperatures, and the public responded by coming out in great numbers to view our wonderful display of mushrooms. The identifiers were constantly busy, and the aromas flowed continuously from the cooking and tasting counters in the CUH atrium.

Many thanks to Grand Central Bakery for their donation and support of our efforts to reduce waste by providing bread for “edible plates” upon which to serve the mushroom samples. Thanks also to Kathy Casey and her assistants and to Chef Christian Brown of the Union Square Grill for their donation of professional time to come and cook for the masses of mushroom tasters. Our own professional chefs Michael Blackwell and Jamie and Dennis Notman wowed the mycophagists with their creative preparations of delectable wild mushrooms. Many thanks also to our invited speakers, Else Vellinga and Brian Pace. Their talks were interesting and covered the topics of Mushrooms of Thailand, a beginning mushroom talk, and a description of a mycoremediation project. Everyone enjoyed the thought provoking lectures.

**Beginner ID classes.** Our second beginner mushroom ID series began October 23. This series is full with 40 registrations. Thanks to Brian Luther, Colin Meyer, and Cathy and Don Lennebacker for organizing our fall classes and field trips and providing the support necessary to the Washington State Parks Department.

**Book seller needed.** We are in need of a book seller. This is one or two folks who can bring the books from the office to the meeting room and sell them before the meetings. We have someone to do the ordering, etc., but need some friendly souls to help with sales. Almost half of our financial income is from book sales, so this is a very important volunteer position which can help PSMS without knowing too much about mushrooms! Please start thinking of how you can contribute to the success of our organization. Call me at (206) 819-4842 or e-mail [patrice.benson@comcast.net](mailto:patrice.benson@comcast.net) if you can help.

**Nominations are open.** It is also time to open the floor for nominations to the board of trustees and for the offices of Vice President and Secretary. Call Doug Ward, (206) 523-0781, to volunteer.

**Mushroom gifts.** Do try to make it to the November meeting to meet new friends and to buy some holiday presents of books and our very own club-sponsored mushroom calendars. Happy Hunting!

## RARE BRITISH TRUFFLE FOUND FOR FIRST TIME SINCE 1911

Lucy Bolton

Norwich Evening News, October 8, 2008

A rare truffle never before found in Norfolk and only last seen in the country in 1911 has been discovered just a few miles from Norwich.

The *Tuber macrosporum* was found during a routine tidy-up in a garden near Wymondham during the summer. So rare is the truffle that the exact details of where it was found and by whom cannot be revealed so truffle hunters do not start digging up areas of the county.

Dr. Anne Edwards, a microbiologist from the St John Innes Centre and a member of the Wymondham Nature Group, said: "It has never been found in Norfolk before and not found in Britain since 1911. There were only four sightings prior to 1911. Scientifically, it's quite an important find." Edwards added: "As a scientist it's always exciting to find and study a rare species. The relationship between the fungus or truffle and the tree with which it is associated is fascinating.

"Tree and truffle live in symbiosis with both partners benefiting from the relationship. The truffle gets carbohydrates, proteins, and other organic nutrients from the roots of the tree while the tree benefits from an increased supply of inorganic nutrients like phosphorus that come from the truffle.

"It is important to record all these interesting biological records before the species are lost forever," Edwards noted. "Perhaps with all the extra rain we are getting we should expect to see more truffles in the future, in which case truffles could be the new Norfolk cash crop."

This particular species is not considered a culinary delicacy like some others such as the Summer Truffle (*Tuber Aestivum*), but it can be eaten. "It is very similar to the Summer Truffle," Edwards added, "but has larger spores.

"Fortunately, for the truffle at least, *Tuber macrosporum* is considered to be second-rate in Italy where the Perigord Truffle (*Tuber melanosporum*) is the most highly prized culinary species.

"There are actually over 60 British species [of truffles], but only a few are edible and these are rarely found."



Part of the rare truffle found near Wymondham.

## WOODEN POLES HELP FLYING SQUIRRELS

Nanci Bompey

Citizen Times, Sept. 15, 2008

ROBBINSVILLE, NC - Along with the mountains, drivers on the Cherohala Skyway in Graham County may now spot something else outside their windows—the Carolina northern flying squirrel, an endangered subspecies of the Northern Flying Squirrel, *Glaucomys sabrinus*. This summer, the N.C. Wildlife Resources Commission, with help from Duke Energy, erected three sets of wooden poles, outfitted with launching pads on either side of the scenic road.

The squirrels use folds of skin running from their front to back legs as parachutes to glide from tree to tree. Biologists hope the

endangered squirrel will use the artificial trees to cross the road, a feat that was made difficult by the construction of the 36-mile skyway in 1996.

"The ultimate goal is to reconnect as much habitat as possible so we don't start dealing with the genetic effects of a small population because they are divided," said Chris Kelly, a biologist with the state Wildlife Resources Commission.

The Carolina Northern Flying Squirrel, which is mainly found in western North Carolina, has been listed as an endangered species since 1985 and is one of two flying squirrel species found in North America. The small squirrel population in the Unicoi Mountains, home of the skyway, was discovered in 1988 and is one of the most threatened.

Research performed after the completion of the skyway, which links Nantahala National Forest and Robbinsville to Cherokee National Forest and Tellico Plains, Tenn., found that the road threatens the habitat of the squirrel population.

Kelly said the squirrels could not cross the road because the trees along the shoulder were not mature enough to serve as launch pads and the distance across the skyway was too large. The shoulders along the road are also lined with briars and bedrock, and are used as a passageway by the squirrel's predators, making them unattractive to the gliding mammals.



Kelly said six 10-foot-tall utility poles outfitted with four-by-fours donated by Duke Energy should allow the squirrels to safely glide across the skyway. The utility pole approach was used in a similar situation for a gliding marsupial in Australia.

"As far as I know, this is the first case in the United States where someone has used wooden poles to help a gliding mammal cross the road," Kelly said.

Scientists hope connecting the two sides of the road will increase the areas where the squirrels live and forage, and increase their population. The fractured habitat could have limited the animals' breeding, making them more susceptible to disease and less able to adapt to change.

"Anytime a species is occurring in a small area, they are vulnerable to a catastrophic event," Kelly said. The dwindling squirrel population could also affect the health of the forests.

The 10-inch-long mammal, which weighs 3.5–6 ounces, feeds on fungi that help root systems take up nutrients. The squirrel deposits undigested parts of the fungus in the soil that is then taken up by red spruce and fir trees, one of a rare type of forests found in western North Carolina.

"It's a relic from the last ice age, and it's still here, and it plays an important role, and we're trying to keep the Southern forests for as long as we can," Kelly said.

The launching poles to help the squirrels cross the road are just one part of the research Kelly and others are doing to gain a better understanding of the rarely seen nocturnal squirrels.

Kelly is working to tag squirrels in the Unicois so scientists will be able to tell if they are crossing the road and also to get better estimates of the local population.

This information will help agencies and other groups decide where to focus their attention and resources, along with helping make



decisions about listing and delisting species as endangered, said Ben Prater, conservation director at Wild South.

He also hopes the squirrel situation in Robbinsville will also lead to greater planning when roads are being built.

“When people are doing transportation planning, we would really like to see more attention given to wildlife,” Prater said. “Roads



really do have the most dramatic impact on wildlife. They fragment habitat, isolate populations, and create problems for wildlife.”

*Wooden poles erected to help endangered flying squirrels cross a busy highway..*

## NOVEL FUNGUS HELPS BEETLES TO DIGEST HARD WOOD *Science Daily, Aug. 19, 2008*

A little known fungus tucked away in the gut of Asian longhorned beetles (*Anoplophora glabripennis*) helps the insect munch through the hardest of woods according to a team of entomologists and biochemists. Researchers say the discovery could lead to innovative methods of controlling the invasive pest, and potentially offer more efficient ways of breaking down plant biomass for generating biofuels.

Microbes in the gut of insects are known to break down cellulose, but little is known about how, or whether, insects degrade lignin, a natural polymer that helps plants stay upright and protects them from most forms of microbial attack.

“Lignin is nature’s plastic and any organism that wants to get to the sugars in a plant has to be able to get past this protective barrier,” said Ming Tien, study co-author and Penn State professor of biochemistry and molecular biology. “We suspect that the fungus produces enzymes that help the beetles degrade lignin.”

Before this report, it was thought that insects are unable to extensively break down lignin, and that they get around the problem either by feasting on wood that has already degraded, or by living close to fungi that can degrade the wood for them.

But this theory fails to explain the ability of insects to feed and grow within healthy living trees.

“How these insects are able to circumvent this plastic wall [lignin] and get at the goodies, the sugars, behind it has remained a mystery,” said Tien, who was recruited by Kelli Hoover, co-author and Penn State associate professor of entomology, and Scott Geib, lead author and Penn State doctoral student in entomology, to tease out an explanation.

The Asian longhorned beetle is one such insect that attacks healthy trees and bores through the hard wood to get at the succulent energy-rich matter inside. In the process, this invasive pest from China grows nearly 300-fold from being about the size of a grain of rice to a few inches in length.

Hoover and her colleagues speculated that the beetle could be harboring a community of microbes in the gut, which helps in breaking down lignin.

The researchers compared the chemical structure of non-degraded wood before and after it had passed through the gut of two wood-eating insects. To measure the degree of change in the lignin, they first fed pin oak wood to Asian longhorned beetles. Next they fed ponderosa pine wood to the Pacific dampwood termite, an insect that typically eats only dead wood.

Chemical analyses of feces from the two bugs indicated that they are able to alter the chemical structure of lignin by selectively adding or removing certain groups of molecules from the polymer.

Such alterations, said Geib, make it easier for the insect to break down wood.

“This fungus has genes that then make enzymes,” explained Hoover, whose team’s findings appear today (Aug. 18) in the *Proceedings of the National Academy of Sciences*. “We have been able to detect messages from the [fungal] DNA, which get translated into enzymes.”

While the researchers have identified the fungus residing in the gut of the Asian longhorned beetle, they have yet to find one in the gut of the termite.

“The types of chemical changes we see in the beetle are similar to those seen in the white-rot fungus,” said Geib. “Changes that we see in the termite are similar to those in the brown-rot fungus. The chemical changes to the lignin are similar.”

However, Geib cautions that while the gut-borne fungus is certainly a key player in degrading wood, it may just be part of a bigger picture.

“It is likely that there is an interaction among enzymes produced by the fungus, hundreds of bacteria within the insect gut, and the insect itself,” explained Geib. “It is a consortium that is doing the job.”

Joshua Peter Kaffer



*Larva, Asian longhorned beetle, Anoplophora glabripennis*

If researchers manage to identify some of these key microbes, he says it might be possible to selectively target just those bacteria to impair the growth of Asian longhorned beetles, which have the potential to severely damage the lumber and maple syrup industry.

Both Geib and Hoover, who study Asian longhorned beetles, believe they may have stumbled upon a novel evolutionary adaptation in the insect world.

“This type of fungus [in the Asian longhorned beetle] is known to cause disease in plants,” said Hoover, whose work is funded by the Alphawood Foundation and the Penn State College of Agricultural Sciences. “But this particular strain appears to be unique. It looks like these insects somehow acquired the fungus to live in their gut and help them break down wood.”

She also points out that these fungi are more efficient than their free-ranging counterparts. While those fungi take months, even years, to break down wood, the gut-borne fungi seem to do it much faster.

Researchers say the speedy process could potentially be harnessed to produce biofuel.

*Adult Anoplophora glabripennis*



## MATSUTAKE CHICKEN

Dick Sieger

This recipe is reworked from one by John Owen, the *Intermediate Eater*, that appeared in the *P.I.* on September 23, 1979. Instead of matsutake, John used 12 cloves of parboiled garlic and some grated nutmeg with a whole chicken, and he blended the sauce smooth at the end. I like the sauce better unblended. Try it!



1 fryer cut into 6 pieces  
1 lb onion, sliced and separated into rings  
6 Tbsp butter, divided  
1 large cap *Tricholoma magnivelare* (matsutake), thinly sliced  
3 TBs flour  
1/2 cup chicken broth  
1/2 cup white table wine  
3/4 cup milk  
Salt, pepper  
Italian parsley, coarsely chopped

Scatter the onion in a casserole dish. Dot with 3 TBs of the butter. Add the chicken pieces. In a separate pot, make a roux with the flour and the remaining 3 TBs of butter and cook gently for a few minutes. Stir in the chicken broth, wine, and milk. Continue cooking and stirring until the mixture thickens. Add the mushroom slices and pour the mixture over the chicken. Cook covered in a 300°F oven for 90 minutes or more until the chicken juices are clear. Serve the chicken covered with the sauce and garnished with the parsley.



*Have a Happy Thanksgiving!*



## BOOK SALE

Cathy Lennebacker

Do your Christmas shopping early at the November membership meeting. We've got something for everybody. All books are 10% off. Calendars are marked down to \$8.00. Paul Stamet's *Cultivating Gourmet & Medicinal Mushrooms* will be only \$10. Come see all our great deals. Shop early, shop often.

## GERMANS CONVICTED OF FUNGI SMUGGLING

WAtoday.com.au, October 8, 2008

Two German men have been convicted of trying to smuggle more than 160 endangered fungi and fungus spore samples through Perth International Airport in Australia.

Both men appeared in Perth Magistrates Court yesterday and pleaded guilty to the charges of exporting a regulated native species without a permit under the Environment Protection and Biodiversity Conservation Act.

They were each fined \$3000 and ordered to pay \$260 in court costs.

## YAHOO DISCUSSION GROUP

Want to stay in touch over the winter? 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. To join, follow the directions on the PSMS Website (<http://psms.org/members/index.html>) or on page 40 of the club roster.



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