SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 492 May 2013

UNDERSTANDING PLANTS' RELATIONSHIPS WITH HELPFUL SOIL FUNGI

www.sciencedaily.com, Mar. 8, 2012

About 80 percent of all terrestrial plants enter into a symbiotic relationship with fungi living in the soil. The fungi provide the plant with water, important nutrients like phosphate and nitrate, and certain trace elements like zinc; the plant, on the other hand, supplies the fungi with carbohydrates. It is assumed that plants were only able to migrate onto land 400 million years ago thanks to this symbiosis. Based on the petunia, plant biologists at the University of Zurich have now discovered that a special transport protein is required to establish this symbiotic relationship.

The formation of this symbiosis is a strictly regulated process that the plant activates in low nutrient levels. The roots release the hormone strigolactone, which is detected by the fungi. The fungal hyphae grow toward the roots, penetrate the epidermis and isolated passage cells, and enter the root cortex. There, the fungal hyphae form tiny branch-like networks, which resemble little trees (arbusculum) and gave the symbiotic relationship its name: vesicular-arbuscular mycorrhizal symbiosis.

Until about five years ago, the hormone strigolactone was known to induce parasitic plant seeds in the soil to germinate. At that stage, no one understood why plants produced this substance, which is harmful to them. Only when the new role of strigolactone in mycorrhiza formation was discovered did it become clear that the attraction of the parasites was a harmful side effect of the symbiosis.

How Do Strigolactones Get Into the Soil?

Exactly how strigolactones are released into the soil from the roots and how the fungi find the specialized entry points in the roots was not known until now. The research group headed by Professor Enrico Martinoia from the University of Zurich has now found the answers to these questions in collaboration with Professor Harro Bouwmeester's team from Wageningen in the Netherlands. "Based on the model plant the petunia, we were able to demonstrate that the protein PhPDR1 transports strigolactones," explains Professor Martinoia. The protein belongs to the ABC-transporter family found in simple organisms like bacteria, but also in humans.

The researchers observed that PhPDR1 is expressed more highly in a low nutrient content in order to attract more symbiotic fungi, which then supply more nutrients. But there are also plants like the model plant *Arabidopsis* (mouse-ear cress) that do not form any mycorrhiza. If the researchers added PhPDR1, however, the Arabidopsis roots transported strigolactones again.

Improvements in Yield and Weed Control

"Our results will help to improve the mycorrhization of plants in soils where mycorrhization is delayed," Professor Martinoia is convinced. "Mycorrhization can thus be triggered where it is inhibited due to dryness or flooding of the soils." This would enable the plants to be nourished more effectively and achieve a greater harvest. Moreover, thanks to the discovery of the strigolactone transporter the secretion of strigolactone into the soil can be halted, which prevents parasitic plants that use up the host plants' resources from being attracted. "This is especially important for regions in Africa, where the parasitic weed Striga and other parasitic plants regularly destroy over 60 percent of harvests," says Martinoia.

REVIEW

The Mycophile, NAMA, Mar.–Apr. 2013

The Fungus Files, An Educator's Guide to Fungi K–6
written by terraBrie Stewart (terrabrie@gmail.com)
designed & illustrated by Rost Koval (cyberost@gmail.com)

In September 2012, Martin Osis introduced us to a marvelous document, developed in Canada for basic science instruction on fungi. To say that the NAMA Education Committee embraced this new educational tool would be an understatement. While designed as a teacher's instructional guide, the scope of information about fungi is comprehensive.

The Fungus Files: An Educator's Guide to Fungi K–6 covers biology and classification, reproduction, and non-fleshy fungi (yeasts and molds) and introduces the concepts of mycorrhiza and the role of fungi in nutrient recycling and soil creation. When Bryce Kendrick, author of *The Fifth Kingdom*, read the document, he contacted author, terraBrie Stewart, and suggested some minor changes. A collaboration developed; a new version of *The Fungus Files* will be available on April 1, 2013, in the Education section of the NAMA website [www.namyco.org]. Kendrick recently said this about the document:

> Through her dedicated efforts, Stewart has achieved something extraordinary: a well-illustrated introduction to the fungi that covers many aspects of this numerous and unique group of organisms, while making the information accessible to children in several different grades. Many of the graphics are extremely graceful, and they are in turn enhanced by several different kinds of word puzzle. In many places she has also inserted aids for teachers, and she leads the students on in graduated steps, so that they can be instructed to whatever level they are capable of absorbing. Both teachers and children will learn many new and fascinating things, and this is all the more exciting because the fungi, despite their tremendous importance and ubiquity, are usually almost ignored in the school curriculum. I hope that versions of this presentation can be made available to children far and wide, in addition to those fortunate enough to live in Alberta.

terraBrie Stewart is a freelance writer, researcher, and conceptual artist. She holds a BS with Distinction in biology and English literature from the University of Saskatchewan, and has worked as an environmental educator, college instructor, and field herpetologist. Her two K-6 teachers guides, *The Frog Files* (2002) and *The Fungus Files* (originally published in 2007), are both available as e-books in pdf format.

Spore Prints

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Annual dues: single or family **$30**; full-time students **$20**

CALENDAR

May 10	Paul Stamets talk, 7 pm, 120 Kane Hall, UW
May 11	Mushroom Maynia, 10 am, Burke Museum, UW Field Trip (see PSMS website)
May 14	Membership Meeting, 7:30 pm, CUH
May 17–19	Field Trip (see PSMS website)
May 20	Board Meeting, 7:30 pm, CUH Board Room
May 21	*Spore Prints* deadline
May 24–26	Field Trip (see PSMS website)
May 31–Jun 2	Field Trip (see PSMS website)

BOARD NEWS — Reba Tam

The contract for the 2013 show has been finalized with the Mountaineers. No contract has been signed for 2014 as yet. Debra has hosts for all but the Swauk Campground foray. She would also like to have someone to co-host the Silver Falls foray. Mushroom Maynia will be Saturday, May 11, at the Burke Museum. Volunteers only will get free entry. We still need a chair/co-chair for the Fall Show. Danny Miller has been interviewed by KCTS (channel 9), the segment to air on Thursday, April 18. John Goldman and Milton Tam have started negotiations to extend our lease with CUH. The current lease expires in 2014. A proposal is due by the date of the May board meeting. We will continue to hold Ft. Worden as a possible site for the NAMA Foray in 2014 which PSMS is hosting, but will continue to look at alternate sites.

MEMBERSHIP MEETING

Tuesday, May 14, 2013, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

Our speaker this month is once again our very own PSMS member **Daniel Winkler**. This time the emphasis will be on the "fun" in fungi in his new presentation "Mushroom Forays and Festivals of the West." In recent years Daniel has been invited to and has attended many mushroom events. He has hunted for mushrooms all along the West Coast from Alaska to California and in the Rocky Mountains. Daniel has also visited burn areas in previous years to hunt for morels, and has agreed to give us some tips and share his experiences in light of the great opportunity to hunt morels this season. Come hear Daniel, see where he has been, and be prepared to be entertained, fascinated, and educated!

Daniel is the author of field guides to edible mushrooms of the Pacific Northwest and of California (Harbour Publishing, 2011 and 2012). He grew up in Munich, Germany, and started hunting mushrooms as soon as he could keep up with his family in the forests. He studied geography, botany, and ecology in order to work on environmental issues in the Himalayas and Tibet, where he has researched and consulted for twenty years. As part of his research Daniel has focused on medicinal and edible mushrooms in Tibet, with a special interest in *Cordyceps.* Daniel moved to Seattle and joined PSMS in 1996, which took his love for mushrooms to a whole new level. He is an expert on wild edible mushrooms on three continents and organizes exotic mushroom tours to feed his curiosity and his family (see: www.MushRoaming.com). Along the way he takes pictures and gathers stories to share. He is a popular lecturer at mushroom forays and gatherings.

Would people with last names beginning with the letters L–Z please bring a plate of refreshments to share after the meeting.

FIELD TRIP, APRIL 6 — Hildegard Hendrickson

It was a good decision to hold this educational field trip one week later than usual because this year's spring weather is not quite as cold as the springs have been the past three years. The weather report was not encouraging, and only 58 persons signed in. In Seattle, there was heavy rain all day. At the field trip site, it was dry until 1 pm. We thank Sandy Bartell and Tony Tschanz for hosting in the barn.

Shortly after 9:30 am Brian Luther and Hildegard gave short lectures about proper hunting clothing and equipment, as well as the environment (cottonwood trees) and what kind of mushrooms we were likely to find.

The following experienced members then led groups out to hunt: Adrian and his father, Larry Lee; Danny Miller; Wren Hudgins; Brian, and Hildegard. Wren's group (which hunted across the river) and Brian's group, found the most *Verpa bohemica*. Only a few Oyster mushrooms were found. One member brought a true morel from her yard in Seattle. About 25 different species were collected, displayed, and discussed. After lunch (ca. 1 pm) and cleaning the barn, it started to rain.

This first field trip of the year was a good start to the 2013 spring season.

DYEING WORKSHOP WITH ALISSA ALLEN

On the evening of April 2, twenty very enthusiastic PSMS members attended a workshop taught by our own Alissa Allen and ably assisted by Noah Siegel. The topic: Dyeing with Fungi and Lichens. Eleven species of mushrooms and two of lichens were simmered with wool yarn. Silk scarves were also dyed in one of the pots. Colors produced ranged from yellow/gold to browns, greens, and lavender/purple to near black. Everyone got samples of wool from each dye bath. These were attached to identification cards to keep with their notes and to give inspiration to continue in pursuit of beautiful colors from fungi. A fun, productive learning experience was had by all.

Different colors obtained from Cortinarius semisanguineus *by altering the pH and adding iron or alum.*

MUSHROOM STAMPS FROM ST. PIERRE & MIQUELON

Brian S. Luther

St. Pierre & Miguelon (SP&M) is a French territory located in the Atlantic Ocean near Fortune Bay, just 12 miles off the Canadian maritime province of Newfoundland. The eight islands in the SP&M archipelago (only two are inhabited) have a peculiar relationship with France called an Overseas Collectivity, and the residents are French citizens. Geographically the islands are North American, although their sovereignty is European.

Many people in the United States don't even realize that France still has territory in North America. Stamp collecting is an excellent way to teach children (and adults) world geography. Philately is not just a hobby, it's very educational and keeps you worldly.

Mushroom Stamps from St. Pierre & Miquelon

Cat. #	*Date*	*Value*	*Type*	*Species*
487	2/14/1987	2.50 fr	M	*Hygrophorus pratensis*
488	1/29/1988	"	"	*Russula paludosa*
489	1/28/1989	"	"	*Tricholoma virgatum*
490	1/17/1990	"	"	*Hydnum repandum*

All catalog numbers are from the Scott Postage Stamp Catalogues.
M = mushrooms or fungi as the main illustration.

All four mushroom species listed are typical for North America and, for that matter, of temperate climates in the northern hemisphere in general. They're all mycorrhizal, with the associated hosts varying geographically. *Hydnum repandum*—the Hedgehog mushroom—is an excellent edible species.

It is purely coincidental that the last two digits of the Scott Catalogue numbers are the same as the years the stamps were issued. All four stamps have a value of 2.5 francs, are perforated with gum, and were issued separately and not in booklets. They were printed from exquisitely engraved plates, which is typical for countries of French influence. To really appreciate this feature you have to closely inspect them or observe them under magnification.

SP&M has also issued FDCs (first day covers = envelopes with the stamps cancelled on the first day of the stamp issue) with additional and interesting illustrations of fungi on the envelope cachet; they're all very attractive and collectible. FDCs are not treated in the Scott Catalogues, but I've included photos of three of these from SP&M, all with beautiful cachets.

Please refer to previous articles where I discuss fungus illustrated stamps from North America, including the United States (Luther, 2000; 2005; 2010; 2011) and Mexico (Luther, 2013).

Left:
Scott 487

Right:
Scott 488

Left:
Scott 489

Right:
Scott 490

SP&M FDC
1988

SP&M FDC
1988

SP&M
FDC 1989

All stamp photos by Brian S. Luther.

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Luther, Brian. 2000. First US stamp featuring a fungus as the main illustration. *Spore Prints 358* (Jan.), p. 1. On-line at www.psms.org.

cont. on page 4

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Luther, Brian. 2005. New US Postal Service stamp sheet depicts several mushrooms. *Spore Prints 414* (Sept.), pp. 4–5. On-line and in color at www.psms.org.

Luther, Brian. 2010. New US Postal Service sheet shows a mushroom. *Spore Prints 459* (Feb.), pp. 4–5. On-line and in color at www.psms.org.

Luther, Brian. 2011. Update on US stamp with a mushroom. *Spore Prints 471* (Apr.), p. 7. On-line and in color at www.psms.org.

Luther, Brian S. 2013. Mycophilately in Mexico. *Spore Prints 489* (Feb.), pp. 4–5. On-line and in color at www.psms.org.

INVITATION TO MUSHROOMING AT CAMP DUDLEY

David Weitzman, Olympic Peninsula Myco. Soc.

The Olympic Peninsula Mycological Society invites you to join our annual mushroom hunt (for primarily morels and spring boletes) at YMCA Camp Dudley over Memorial Day weekend. Cost is $100 per adults and $75 for children under 12. Infants are free. To register go to our website, olymushrooms.org, and find "Dudley 13" on left-hand side of the web page Checks should be made out to David Weitzman and mailed to P.O. Box 692, Sequim, WA 98382.

Provide your own linen (sleeping bags, etc.) and toiletries. Sleeping arrangements are male and female cabins or a male and female dorm. There are family cabins available by request. Each cabin has a capacity of 8 and will be assigned prior to the trip. Sorry, couples will have to bunk separately. Cabins will be available after 11:00 am Friday.

All meals are provided. You may bring wine. Please contact me (David Weitzman) if you prefer vegetarian meals. If you have special food needs (other than vegetarian) bring your own food to supplement what we provide.

Pets, campers, RV's, and tents are not allowed on campus. There are campgrounds nearby. If you chose to use them, your cost will be $80/person for the weekend.

Directions: Take Hwy 7 or 508 through Morton and/or Elbe, then go east on Hwy 12 through Packwood and over White Pass. Approximately 9 miles east of the White Pass ski area will be a Forest Service sign pointing right towards Clear Lake. Turn right onto Tieton Rd. The entrance to Camp Dudley is one mile on your left.

ALIEN EGGS FOUND IN ARIZONA DESERT?

http://inserbia.info/news/, April 17, 2013

Nature continues to surprise us with new mysteries. Not long ago an American couple during a weekend trip to a desert in Arizona made a strange if not scary discovery.

Floating in a hole in the sand they saw thousands of transparent shiny violet spheres that looked like fish eggs. Here is how Gerardine Vargas who found the substance recalls the events:

"It was quite an ordinary day. Together with my husband we were planning to make a few pictures of the territory when we noticed unusual violet spheres sparkling in the sand. It was their sparkling that attracted our attention. There were so many of them… Perhaps, several thousand or more. We had never seen anything like that before."

What that something was and, most importantly, how and from where it got to that unpopulated area remains a mystery. The Vargas couple was so perplexed by what they saw that they called reporters from local TV channel TV KGUN-9 in Tucson in hope that together with them they would find out what was it that they found. Gerardine Vargas tells with amazement:

"When the group of TV reporters came with us to the site those strange spheres were still in place. They looked like large fish eggs, sparkled and shone in the sunlight. Could they be eggs of aliens?"

Local experts suggested they might be some kind of slime mold or jelly fungus. However, one of the TV reporters said that she had seen something similar when a spilled bag of air-freshener pellets got wet.

HORSE POOP YIELDS SECRET TO ETHANOL FUEL

Geoffrey Mohan

Los Angeles Times, April 11, 2013

Michelle O'Malley knows good horse poop when she sees it. While at MIT, the chemical engineer scooped up some manure from Finn, a grass-fed horse at a sustainable farm in Concord, Mass. That offal has led to a potential breakthrough in turning grasses and nonfood crops into an alternative fuel in attempts to wean motorists from fossil fuels and stem man-made climate change.

O'Malley, a chemical engineer at UC Santa Barbara, has isolated a fungus that could more easily unlock the sugars used to ferment ethanol.

"It's been known for a long time that the digestive tracts of large herbivores have been good at turning crude cellulose into sugars," said O'Malley, who presented her findings Thursday at the American Chemical Society's annual convention in New Orleans.

Scientists delving into animal guts, however, had previously concentrated on the bacteria that break down cellulose, leaving fungi largely unexplored. It turns out that the fungi, which are not nearly as numerous, have a way of breaking through lignins that are a natural barrier to the cellulose.

That's important, because getting past those lignins is the most expensive and time-consuming part of the ethanol process, and a potential barrier to cellulose-to-ethanol refineries competing with the heavily subsidized corn-ethanol industry.

O'Malley is focusing on the specific enzymes produced by the fungus. The key will be getting those enzymes to work via organisms that are easier to control, such as yeast, or to engineer the fungi to do what they do better and in a way that is compatible with an industrial process.

O'Malley also has continued her unorthodox collection. Her team got the Santa Barbara Zoo to provide more good poop—from an elephant, sheep, goat, and giraffe.

For neat pictures of (and instructions for) knitted fungi, check out

http://unicorn-meat-is-too-mainstream.tumblr.com/post/48281268993/52-forms-of-fungi-knitted-sculptural-work

FAIRY RINGS AND FUNGAL SUPERSTITIONS

Virtual Museum of Canada

via *Mycolog*, Humboldt Bay Myco. Soc., April 2013

For centuries, the sudden and rapid eruption of circles of mushrooms from the soil led people to believe that dark or terrible forces were at work. Lightning strikes, meteorites, shooting stars, earthly vapors, and witches have all been proposed as agents of their origin.

In France fairy rings were called sorcerers' rings and in Austria, witches' rings. A Tyrolean legend claims that the rings were burned into the ground by the fiery tail of a dragon. In Holland they were said to be the marks where the Devil rested his milk churn. In Europe, the belief that fungi were the work of evil spirits or witches persisted well into the 19th century.

In England, as their name suggests, they were places where fairies come to dance. The mushrooms around the perimeter were seats where the sprites could rest after their exertions. People in rural England claimed to have seen fairies dancing at fairy rings as recently as the start of the twentieth century.

One common theme in all these traditions is the belief that dire consequences await anyone foolhardy enough to enter a fairy ring. Trespassers would be struck blind or lame, or even disappear to become slaves in the fairies' underground realm. In Wales the rings were associated with fertility and doom, and anyone foolish enough to plow one up would incur the wrath of the fairies. It was also widely believed that if animals grazed within a fairy ring their milk would putrefy.

On the positive side, fairy rings were said to bring good luck to houses built in fields where they occur. In another tradition, the rings were sites of buried treasure, but there was a catch—the treasure could only be retrieved with the help of fairies or witches.

Many cultures had other weird and wonderful explanations for the fantastical origins of fungi. In parts of Africa, mushrooms were sometimes regarded as souls of the dead, or as symbols of the human soul. In Silesia, morel mushrooms were once believed to be the work of the Devil.

In parts of Central America a children's tale relates that mushrooms are little umbrellas carried by woodland spirits to shelter them from the rain. The spirits leave the mushrooms behind at dawn when it is time to return to their underground world.

Fungi have been the focus of many other superstitious beliefs and traditions. In New England folklore, a fungus called the "death baby" growing in the yard is a harbinger of imminent death in the family. In the district of Norrland in Sweden there is a tradition of throwing toadstools into bonfires on midsummer's eve (June 23) to ward off evil spirits. Look into the folklore of any culture and you're almost sure to find other examples.

SCIENTISTS NAME NEWLY DISCOVERED ORANGE MOLD AFTER DUTCH ROYALS

Bruno Waterfield

http://www.telegraph.co.uk/news, April 12, 2013

At the end of January, Queen Beatrix of Holland announced her surprise abdication in favor of Prince Willem-Alexander as the country prepared to celebrate her 75th birthday.

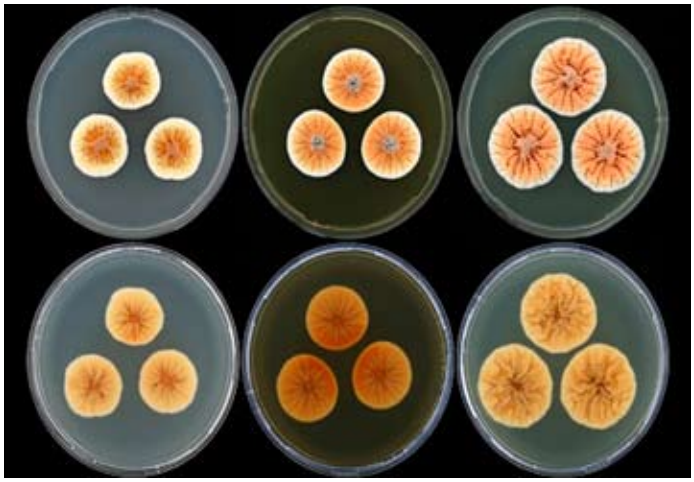
His coronation at the end of the month and his succession to the Dutch throne have coincided with the discovery of new species of the genus *Penicillium* that are, unusually, a bright orange.

Scientists have named the new molds *Penicillium vanoranj*e after the House of Orange, the Dutch royal family whose name has led to orange becoming the national color of Holland.

"It has been named for the Prince of Orange as *Penicillium* is special because of the orange color, a very rare occurrence in the mycological world," said Pedro Crous, the director of the CBS-KNAW scientific institute that made the discovery.

Other molds in the *Penicillium vanoranje* group, *P. maximae*, *P. amaliae, P. alexiae*, and *P. arianeae*, have been named after the Crown Prince's wife, Princess Maxima, and their three daughters, Amalia, Alexia, and Ariane.

It is not the first time that scientific discoveries have been named for Dutch royals. In 2005, a protein used to predict heart failure was named after Queen Beatrix after it was discovered by researchers in Maastricht.



Orange Penicillium *molds named after the Dutch royal family.*

FUNGAL FOLK REMEDIES

Virtual Museum of Canada

via *Mycolog*, Humboldt Bay Myco. Soc., April 2013

Throughout history, folk healers have employed many medicinal qualities of the fungus kingdom—some real and others imagined.

The antibiotic properties of molds have been known for countless generations. In the twelfth and thirteenth centuries, the Knights Templar used mold extracts to treat infected wounds. Fungi have also been used in Europe as remedies for boils and abscesses, in gargles to treat throat infections, as laxatives, as contraceptives, and to remove skin blemishes.

cont. on age 6

Folk Remedies, *cont. from page 5*

stinkhorn

The Stinkhorn (*Phallus impudicus*) has been used in Europe to treat rheumatism, epilepsy, gout, and skin cancer—but it was also blamed for outbreaks of cholera and madness! Puffballs have many uses. Their dried spores were used to staunch the flow of blood from wounds or nosebleeds; smoldering puffballs were once used to transfer fire from place to place; and beekeepers in some places still blow the spores of the giant puffball into hives to narcotize the bees.

puffball

Oriental herbalists have been using Reishi mushrooms (Ling Chi or Ling Zhi: *Ganoderma lucidum*) for some 4,000 years. These mushrooms are claimed to be effective against many ailments, including arthritis, several cancers, heart disease, and hepatitis. In western Africa fungi have been used to treat venereal diseases.

G. lucidum

D. concentrica

Less likely remedies include the wearing of a Cramp Ball (*Daldinia concentrica*) in the armpit to protect oneself from cramps. Other fungi have been claimed as aphrodisiacs—the recipe for one such potion calls for boiling a toad with some mushrooms in spring water. Young men in Lapland would carry a fungus (*Trametes suaveolens*) hanging from their waists when courting. Trametes has an anise-like odor that may work as an attractant, a deodorant, or not at all!

T. suaveolens

ROOT FUNGI STORE A SURPRISING AMOUNT OF THE CARBON SEQUESTERED IN SOIL

Mark Fischetti

*Scientific American***,** March 28, 2013

Falling leaves and branches are important, but roots and their fungi win out.

A forest floor can store lots of atmospheric carbon, helping to limit global warming that results from carbon dioxide emissions. Most of that storage, scientists have thought, is found in tree leaves and branches that absorb carbon, eventually fall to the ground, and slowly decay into soil. A new study in Sweden, however, indicates that 50 to 70 percent of the carbon bound in soil is actually from tree roots and the fungi that grow on them.

This surprising insight comes from Karina Clemmensen at the Swedish University of Agricultural Sciences and colleagues who studied boreal forests on 30 islands in northern Swedish lakes. The forests were consumed by different numbers of fires over the past 5,000 years, providing a broad mix of soil compositions on different forest floors. The comparison revealed that the amount of carbon stored in soil was linked to mycorrhizal fungi that grow along tree-root systems and help to keep them healthy.

"These fungi live in symbiosis with plant roots and transport carbon from plant photosynthesis directly into the soil," Clemmensen wrote in response to e-mail questions. "The prevailing dogma had been that above-ground plant litter (dead needles and wood) is the principal source of carbon storage in boreal forest soils," she explained. But her results show that "a large proportion of the carbon stored in boreal forests instead enters the soil from beneath, via roots and their associated mycorrhizal fungi."

Boreal forest soils are a major sink, holding 16 percent of all carbon sequestered in soils worldwide, according to a paper by Clemmensen's team published March 29 in *Science*. The most immediate implication of the finding is that climate models should be revised to take into account the role that the fungi play. Revised models, Clemmensen wrote, would give more precise predictions of how forest management practices (such as thinning of trees) and environmental changes could influence carbon storage.

More research is also needed to determine if more older trees (so-called old-growth forests) worldwide would mean increased storage. As trees age, they allocate less carbon to root fungi, yet residues from old, dead fungi hang on to carbon more tightly than do dead needles and wood in the soil. Other studies, however, suggest that mycorrhizal fungi decompose organic matter in the soil, thereby releasing carbon. How these factors interact to form stable soil "is a very interesting and intriguing question that we do not yet have the answer to," Clemmensen wrote. What is clear is that mycorrhizal fungi are much more important to carbon sequestration than anyone had realized.

PSILOCYBIN STUDY REVEALS POTENTIAL TO ALLEVIATE PSYCHOLOGICAL AND SPIRITUAL DISTRESS IN CANCER PATIENTS

Elyse Bloom

http://www.healthcanal.com/, April 11, 2013

In addition to the physical pain associated with cancer, many patients also experience psychologically harmful symptoms of anxiety, depression, anger, and denial. Social isolation, in addition to hopelessness, helplessness, and loss of independence, has also been associated with significant psychological suffering in patients coping with advanced-stage cancer.

A recently published book chapter, "Use of the Classic Hallucinogen Psilocybin for Treatment of Existential Distress Associated With Cancer," reviews the potential of a novel psychoactive drug, psilocybin, in alleviating the psychological and spiritual distress that often accompanies a life-threatening cancer diagnosis.

The work, published in *Psychological Aspects of Cancer: A Guide to Emotional and Psychological Consequences of Cancer, Their Causes, and Their Management*, was co-written by Anthony P. Bossis, clinical assistant professor of psychiatry and oral and maxillofacial pathology, radiology, and medicine at the NYU College of Dentistry (NYUCD) and NYU Langone Medical Center.

The hallucinogen treatment model with psilocybin has been shown to induce a mystical or spiritual experience and is a unique therapeutic approach to reduce the anxiety of terminal cancer patients.

Psilocybe semilanceata

"Mystical or peak consciousness states in cancer patients have been associated with a number of benefits including improved psychological, spiritual, and existential wellbeing," says Bossis of the study, which was recently highlighted in the *Journal of the National Cancer Institute*.

Psilocybin (a serotonergic psychoactive agent) is a naturally occurring active component of many species of mushrooms, and is rapidly metabolized to psilocin, a highly potent activator of serotonin receptors. In addition to receiving the psilocybin compound, patients enrolled in the study also receive psychological preparation prior to the psilocybin dosing followed by a brief series of integrative psychotherapeutic sessions.

Stephen Ross, assistant professor of psychiatry and child and adolescent psychiatry at the NYU School of Medicine and clinical assistant professor of psychiatry and oral and maxillofacial pathology, radiology, and medicine at the NYUCD, is the principal investigator for the study; Bossis and Jeffrey Guss, clinical assistant professor of psychiatry, are co-principal investigators.

The co-authors of the chapter were Charles S. Grob, professor at Harbor-UCLA Medical Center, and Roland R. Griffiths, professor at Johns Hopkins University.

NOTES ON *GYROMITRA*

Dick Sieger

When we think of spring, most of us automatically think, "Ah, morels!" But there is another, similar group of fungi that fruit at the same time—the *Gyromitra*. Because some can be confused with morels, I thought I'd give a brief rundown of stalked members of the genus, those that fruit in the spring and in the fall, to keep the scorecard straight.

Six stalked *Gyromitra* species can be found in our Pacific Northwest: *G. esculenta, G. californica, G. montana, G. korfii, G. infula,* and *G. ambigua.* The first four are spring mushrooms and the latter two appear in the fall. Their seasons may overlap, however, and a lucky collector could have fresh specimens of all six at one time.

Species Description


G. esculenta

G. esculenta fruits in forests with the morels. Caps are an inch across with occasional six-inch giants showing up. The cap is brain-like—rounded and covered with little bumps that aren't arranged in any noticeable pattern. If you cut across the stalk near its middle, you will usually see one open chamber; however, if several fused stalks support the cap, there may be more than one chamber. The stalk is clean except for a little dirt right where it is attached to the ground.


G. californica

On *G. californica* (= *Pseudorhizina californica*), the cap margin is remote from the stalk and apparently held open by ridges extending from the stalk. It's shaped like an open umbrella that the puppy chewed. The bottom of the stalk often has a spot with a reddish stain.


G. ambigua / infula

G. ambigua and *G. infula* look alike. Microscopic examination may be the only way to distinguish one from the other. The spores of *G. ambigua* have blunt projections that make the ends somewhat narrow. Most are 22 to 28 µm long, and the L/D (length divided by diameter) is more than 2.5. *G. infula* spores have rounded ends, are mainly 16 to 22 µm long, and have an L/D less than 2.5. Both species have contorted caps that are folded like fortune cookies. (Elves leave messages in them.) *G. ambigua* fruits on bare soil and disturbed ground. Its cap is supposed to have violet tints that are lacking in *G. infula. G. infula* grows on rotting wood, woody debris, and humus.


G. montana

We have two large species of *Gyromitra* with fat stalks, *G. montana* (aka the Snow Mushroom) and *G. korfii. G. montana* often grows near, or right through, melting snow. I'm not very familiar with *G. korfii.* The ones I've seen were darker than *G. montana.* The stalks on *G. korfii* are noticeably narrower than the cap whereas those on *G. montana* are almost as broad as the cap. Slice across the stalk and you will see that both species have stalks with many compressed, sinuous chambers that contain dirt.


G. korfii

The *Gyromitra* cap starts as a regular disc. Soon, different growth rates in different parts of the cap create an irregular shape. If development doesn't proceed normally, an atypical shape is produced, and that can make field identification difficult.

Edibility

All six *Gyromitra* species contain poisons that are carcinogenic for mice. All have poisoned or are suspected to have poisoned people. I think *G. montana* is insipid, but everyone else considers it a "keeper." Those who eat it usually parboil the mushroom before final preparation. Besides removing some toxins, boiling stiffens the flesh and makes dirt removal easier. *G. infula* or *G. ambigua* or both have poisoned people. I know of no one who recommends them for the table, and they should be avoided.

Also avoid *G. californica*, which is probably toxic, and *G. fastigiata,* which may be toxic. *G. esculenta* can be lethal. Some people, including me, eat *G. esculenta* gathered in the Northwest. Northwestern populations may have less poison than populations in eastern North America and Europe, but most experts discourage its ingestion no matter where it is found. Parboiled, it is tasteless. Pan broiled, it tastes much better than morels. I eat fresh, thoroughly cooked small portions once a week and no more than three times a season. I serve them to no one. Please believe that it is dangerous to eat *G. esculenta*.

Recommended Field Guides

The 1972 edition of *How to Know the Non-Gilled Mushrooms* by Smith, Smith, and Weber describes all six species with five of the names used here. (*G. montana* is called *G. Gigas*, a similar species found in Europe.) Older field guides may use other names. The best descriptions, with good keys and fine photos, are in *Poisonous Mushrooms of the Northern U. S. and Canada* by Ammirati, Traquair, and Horgen and *A Morel Hunter's Companion* by Nancy Smith Weber.

Caveats

Some American *Gyromitra* species that were thought to be the same as European ones are now known to be different. What I am calling *Gyromitra korfii* has been known as *Gyromitra fastigiata.* North America does have a *Gyromitra fastigiata,* but it is not known from around here. Confused yet? Just wait. Until recently, the true *Gyromitra fastigiata* was known by two other names, *Gyromitra brunnea* and *Gyromitra underwoodii.* Yes, and *Gyromitra. gigas* has sometimes been called *Gyromitra montana* in Europe. Wow, you can't tell the players without a scorecard!

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Northwest Gyromitra Scorecard

1a. Cap margin remote from the stalk; stalk base often has a reddish stain ..... *G. californica* (=*Pseudorhizina californica*)
1b. Cap margin touching the stalk; stalk base never has a reddish stain 2

2a. Stalk interior contains dirt; stalk interior has many compressed chambers 3
2b. Stalk interior is clean; stalk interior has one or several open chambers 4

3a. Stalk almost as broad as the cap ..... *G. montana*
3b. Stalk half as broad as the cap..... *G. korfii*

4a. Cap wrinkled ..... *G. esculenta*
4b. Cap folded like an unfortunate fortune cookie 5

5a. Ascospores 22–28 µm long with obscurely narrow ends; mushroom grows on soil ..... *G. ambigua*
5b. Ascospores 16–22 µm long with rounded ends; mushroom grows on wood or humus ..... *G. infula*

Some *Helvella* species will fit this key. Use a reliable field guide like *A Morel Hunter's Companion* by Nancy Smith Weber to confirm your identification.

Soft steps into glade,
brush and push the vining maple.
- Hope there are no ticks -
. . .
Last year's pine cone?
No, this year's morel.
—Lilly Chabra

Mike the Meek Truffle

David Glen Larson
http://emg-zine.com/, Sept. 2011

Fat and pink,
That was the best description
Of Herald the Pig.
He had a great big snout
With a perfect sense of smell
Which served him well
As he was a truffle pig.

Black and round,
That was the best description
Of Mike the Truffle.
He'd never left where he grew,
In the ground beneath the oak,
Which served him well
As no pigs had yet found him.

At least none that lived

Once upon a time
Mike had lived a double life
Back when he was known
Not as Mike the Meek Truffle
But as Mike the Butcher,
A name he'd forgotten
Until Herald came sniffing around.

The pig never had a chance.

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