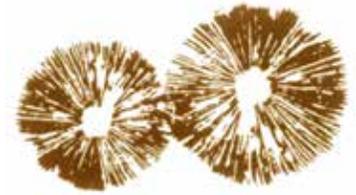


SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 494 September 2013



HAVE YOU SEEN THIS WOMAN?



Joanne Young

On Saturday, June 8, 2013, Hildegard Hendrickson left her car, along with her purse and ID, at the Minnow Creek Trailhead off Chiwawa River Road to pick a few morels in the Chikamin Gulch area near the Basalt Peak trail.

When PSMS member Jeremy Faber noticed that her car hadn't moved in 3 days, he called the Chelan County Sheriff's Office. A massive effort by aircraft, tracking and scent dogs, and searchers on the ground and on horseback produced no clues to her whereabouts, and was called off on June 17. She was last seen with her silver metal collection basket and a blue hiking pole while wearing a tan vest with pockets, a white or light straw hat, and glasses.

Was she a victim of foul play? Did she suffer a medical emergency and wander off confused? We don't know. We only know she has been a long-time, integral part of PSMS, and we miss her.

A retired faculty member and department chair with Seattle University's Albers School of Business and Economics, Hildegard, along with her late husband, Monte, joined PSMS in 1972. In 1997, she and Monte were winners of the PSMS "Golden Mushroom Award" presented to those who have helped shape and strengthen the organization. She was once described in a *Seattle P-I* article in 2004 as "a club legend" who kept detailed notes for decades on where she found choice mushrooms, even identifying the specific tree they were near.

She is perhaps currently best known as the organizer and head identifier of the free Monday evening sessions at the Center for Urban Horticulture in which anyone can bring in mushrooms to have them identified. She also traditionally leads the first PSMS mushroom field trip in the spring

Dr. Hendrickson came to Seattle University in 1967 to help start its MBA degree program, and taught until 1996. According to the SU website, she was born in Yugoslavia to a family of German origin and came to the U.S. to pursue her education,

50th ANNUAL WILD MUSHROOM SHOW

October 12 & 13, 2013

7700 Sand Point Way

Milton Tam

This year will mark our 50th consecutive annual fall mushroom show, where we share our enthusiasm and knowledge of the fungal kingdom with the general public. Randy Richardson and I will serve this year as co-chairs for our show, which will be held at The Mountaineers facility at Magnuson Park on Saturday and Sunday, October 12 and 13.



Our event would not be possible without the help of volunteers. Yes, YOU. If you haven't volunteered yet, you are really missing out! We are able to put on such great shows year after year because of our dedicated volunteers, so please consider joining the team. PSMS has so many fabulous and interesting people to work with and to learn from. There are many different activities and tasks available, so please consider signing up for one or both days. We promise a great experience and access to a not-to-be-missed continuous potluck in the volunteers' hospitality room. Sign-up sheets will be at the September and October membership meetings or you can contact me directly at miltontam@aol.com or Randy at woodsnow4me@yahoo.com. If you prefer to speak to us directly please call 206-525-9556 (Milton) or 206-725-2996 (Randy). You can also contact our volunteer coordinator Debra Lehrberger (host@psms.org).

So here's how it goes: on the afternoon of Friday, October 11, we start setting up. Members and friends who were out all day foraging for the show in different parts of the state then come by to drop off the mushrooms and duff they have collected, and by early evening the place is humming with activity as mushrooms are sorted and everything is brought out of storage and put in its place. On Saturday morning we start very early and finish setting up while the mushrooms are identified, labeled, and artfully arranged in trays. We open to the public at noon on Saturday and run until 7 pm when we put our mushrooms to bed for the night. On Sunday we start again at 10 am and go until 5 pm. After closing, the tear-down and cleanup process is fast and furious, and we leave the facility as clean as we found it.

Our invited speakers this year include Noah Siegel, Dr. Steve Trudell, Daniel Winkler, Marian Maxwell, Dr. Bart Buyck, and Dr. Denis Benjamin. In addition to the mushroom displays we will again include mushroom tastings, educational exhibits, arts/crafts, vendors, book sales, the identification table, and kids' touch and feel table—all the key components that have consistently made our show fun, educational, and recognized as one of the biggest and most well attended in North America. Please volunteer for a job, and become a part of the great tradition we have established.

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MEMBERSHIP MEETING

Tuesday, September 10, 2013, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

We start the fall meetings by welcoming Dr. Jim Johnson from Central Washington University in Ellensburg. The title of his presentation is "Sex and the Single Spore." Jim graduated from Eastern Illinois University with a bachelor's degree in Environmental Biology. While working on his master's thesis in grad school, he became interested in fungal mating and compatibility systems. He received his PhD in Plant Pathology from the University of Tennessee where the research for his dissertation included the use of mating systems and molecular characteristics to study speciation and species boundaries in Xeromphalina species.



After completing his Ph.D., Jim did his postdoctoral research at Duke University, where he was part of a team that looked at large-scale evolutionary relationships within the mushroom-forming fungi. He then taught at Cameron University in Oklahoma before relocating to Central Washington University where he is now Associate Professor in the Biology department. His course offerings include Mycology, Field Mycology, Plant Pathology, Fundamentals of Biology, Introductory Microbiology, Introduction to Evolution, and General Biology. His main research interests include mycology, molecular systematics, molecular ecology, and amphibian diseases. Well-travelled, Jim has been on collecting trips all over the Southeastern United States and to Alaska, the Caucasus Mountains in Russia, and parts of eastern Turkey.

CALENDAR

- Sept. 10 Membership Meeting, 7:30 pm, CUH
- Sept. 16 Board Meeting, 7:30 pm, CUH Board Room
- Sept. 17 *Spore Prints* deadline
- Sept. 27-29 Field Trip (see PSMS website)
- Oct. 4-6 Field Trip (see PSMS website)
- Oct. 8 Membership Meeting, 7:30 pm, CUH
- Oct. 12-13 50th Annual Wild Mushroom Show, The Mountaineers facility, Magnuson Park

BOARD NEWS

Denise Banaszewski

The **Annual Wild Mushroom Show** is coming up, and, as always, we need volunteers to ensure that it is a success. Milton Tam and Randy Richardson are co-hosting the show this year. Thank you, Milt and Randy! Please see the article on page 1 for information on whom to contact to volunteer. The Board received and declined a request for a **Ben Woo Scholarship** for a knapweed study because it was not focused enough on fungi. We have accumulated **lost items** from various events, including field trips. We do not have the room to store them indefinitely, so we will only keep unclaimed items for a few months before donating them. If you have lost an item, please be sure to inquire about it promptly. Our **office lease with CUH** is expiring on June 30, 2014. CUH has agreed to ex-

tend our lease on our current terms, including the right to cancel the lease with one year's advance notice. We plan to renew our lease, but look for other options in case it is terminated. Finally, as everyone probably knows by now, beloved member **Hildegard Hendrickson** disappeared on June 8 on a morel hunt near Lake Wenatchee. She is still missing, and there have been no developments in the investigation. Hildegard contributed to PSMS in many ways, including starting the Monday night ID clinics, which will now be named after her. We are considering other ways to honor Hildegard and her contributions to PSMS, and continue to hope for news on our friend.

NEW RULES ON OREGON'S TRUFFLES: GET PERMITS, KEEP RECORDS

<http://www.kval.com/>, Aug. 16, 2013

Legislation passed earlier this year added truffles to the "edible fungi" category of special forest products. They now join other harvest-regulated products like firewood, salal, wild mushrooms, and tree boughs.

House Bill 2615 requires truffle hunters to get a permit from a landowner before venturing out into the woods. The bill also states that businesses buying Oregon truffles need to make records of their purchases.

While the Oregon Department of Forestry plans on making a permit form available for the fall season next year, temporary forms are available at all local ODF offices.

FACEBOOK GAME TARGETS BEATING ASH DIEBACK

<http://www.theguardian.com/environment/>, Aug. 13, 2013

Saving the ash forests of Britain from the devastation of an emerging fungal menace could actually be fun—if a computer game devised by botanists is a success.

Facebook enthusiasts will be able to log on from Tuesday and take part in one of the biggest experiments to harness computing and brain power to discover genetic variants that could help to counter ash dieback disease, caused by the fungus *Chalara fraxinea*. If thousands of people play the game, which involves matching on-screen patterns that correlate with genetic data amassed by scientists in the field, the results could hasten the process of breeding trees resistant to the disease from 50 years or more to a decade or less.

At present, there is little scientists can do about the disease other than monitor its progress. However, laboratories are on the trail of genetic variants among the ash tree population that exhibit resistance to or tolerance of the disease. If they can isolate the genes responsible for conferring these qualities, they might be able to cross-breed UK ash trees with resistant or tolerant strains, and so save the widespread populations of ash.

Scientists need to sift through tens of thousands of genes to find those most likely to exhibit resistance. This requires vast amounts of data to be crunched by computer, identifying patterns that could show the DNA sequences most likely to be useful. But this pattern-matching can often be done just as well by people as computers, as it involves the recognition and rejection of patterns that people can quickly see.

Scientists have worked with computer games experts to develop a free app that will encourage people to compare patterns in order to highlight the genetic sequences most likely to be of use. The game, called Fraxinus after the Latin for the ash, *Fraxinus excelsior*, works as a puzzle, inviting players to score points by matching colored sequences of leaves on the screen. The best matches score the highest points, and players will be invited to compete to identify the most matches.

“We are at quite an exciting moment,” said Jean Webber, of Forest Research, who has advised on the game. “We have the pathogen to deal with, but we have tools at our disposal that we have never had before.”

The game can be found at www.apps.facebook.fraxinusgame.



John Innes Centre/PA

In the Fraxinus app, players match sequences of colored leaves, which represent strings of genetic information.

LSD AND OTHER PSYCHEDELICS NOT LINKED WITH MENTAL HEALTH PROBLEMS, ANALYSIS SUGGESTS

<http://www.sciencedaily.com/>, Aug. 19, 2013

The use of LSD, magic mushrooms, or peyote does not increase a person's risk of developing mental health problems, according to an analysis of information from more than 130,000 randomly chosen people, including 22,000 people who had used psychedelics at least once.

Researcher Teri Krebs and clinical psychologist Pål-Ørjan Johansen, from the Norwegian University of Science and Technology's Department of Neuroscience, used data from a US national health survey to see what association there was, if any, between psychedelic drug use and mental health problems.

The authors found no link between the use of psychedelic drugs and a range of mental health problems. Instead they found some significant associations between the use of psychedelic drugs and fewer mental health problems.

The results are published in the journal *PLOS ONE* and are freely available online after 19 August.

“Over the past 50 years tens of millions of people have used psychedelics and there just is not much evidence of long-term problems,” she concludes.

Both researchers were supported by the Research Council of Norway.

A POSSIBLE SOLUTION FOR FAIRY RINGS IN LAWNS?

Ciscoe Morris

The Seattle Times, May 15, 2013

Q: I have mushroom growing in circular patterns in my lawn. The grass is dying where the mushrooms are growing. Is there something I can spray to rid the lawn of the mushrooms?

A: The bad news is that you have a fairy ring. The good news is that you get to test out a solution I've always wanted to try, but have never had the opportunity to see if it works.

Fairy rings are mushrooms that almost always grow in an arc or circle. They kill the turf in the arc because the mushrooms grow so thickly, they outcompete and starve the grass for nutrients and water.

No fungicides are effective against fairy ring. According to research at the University of British Columbia, the only method that works is to remove half of one fairy ring; then till it in with half of a neighboring one.

The mushrooms of fairy rings are mutually antagonistic. In other words, mushrooms from one ring hate the guts of mushrooms from another ring, and if you mix them up together, they go to war. Just remember to mix the mushroom-infested soil from both rings well so there's plenty of contact.

If all goes well, the warring mushrooms should wipe each other out. Stay out of the way of cavalry charges, and send me an email to tell me if it really works!



FUNGUS-ILLUSTRATED STAMPS FROM GREENLAND

Brian S. Luther

Greenland is independent but part of the Danish Kingdom. As the world's largest island at 836,300 sq. miles, it is a huge chunk of real estate; in comparison all of Alaska is 663,300 sq. miles. Most of Greenland is located within the Arctic Circle, and more than 75% is covered in ice. The forests are limited to small southern areas and consist primarily of broadleaf (deciduous) plants with only one native conifer, a low shrubby juniper. However, there are much more extensive areas of treeless vegetation in this sub-arctic habitat. Many mycorrhizal fungi are associated with hardy perennial herbs or shrubs, as well as purely saprophytic species. Over 700 species of macro-fungi have been documented from Greenland (Jensen & Christensen, 2003).

In 2005 Greenland issued a set of three different mushrooms and the same in 2006. The Greenland sets come in three forms: as individual perforated stamps with gum, as sheetlets of nine (also with gum), and as booklets of stamps which are die cut and self-adhesive.

The booklets consist of two panes of six stamps each (12 stamps per booklet). The 2005 booklet (Scott Postage Stamp Catalogue No. 451a) has three different species alternating side by side (four stamps of each species). The 2006 booklet (480a) has only two species, thus with six stamps of each species per booklet. (For details see the accompanying table.) The outside of the two different booklet covers are delightfully illustrated with some of the same fungi and are very attractive and collectible.

The Scott Catalogue gives the gummed and self stick (booklet) stamps separate numbers. The full sheets of gummed stamps and the complete booklets have different catalog numbers as well.

The sheetlets of nine each have selvage all around as well as one cinderella (non-denominated, non-postage seal in the middle); thus there are actually only eight postage stamps on each sheetlet. Also, the cinderellas are different species from the actual stamps on the sheetlets: sheetlet 446a (*Leccinum sp.*) has the central cinderella of *Lactarius dryadophilous*; 447a (*Russula subrubens*) has a cinderella of *Rozites caperata*; 476a (*Rozites caperata*) has a cinderella of *Lactarius dryadophilous* also, and finally sheetlet 477a (*Lactarius dryadophilous*) also has a cinderella of *Rozites caperata*. I have not seen sheetlets of either the *Amanita* or *Calvatia*.

Each stamp has the Greenlandic common name, then the binomial, then the Danish common name. All genera are printed on the stamps in lower case, not capitalized. There are two misspelled binomials on these stamps: Scott 476/479 is printed as *Rozites "caperatus."* This ending is correct only if you use the genus *Cortinarius*; if you use *Rozites* it should be *caperata*. Also Scott 478, *Calvatia cretacea*, has the species name misspelled as "*creatacea*" on the stamp. This last mentioned species is the only issue found as an individual stamp with gum but not in a booklet.

Even though geologically Greenland is North American, *Russula subrubens* and *Lactarius dryadophilus* are clearly more European in distribution. *Amanita groenlandica*, originally described from Greenland, is now also known from Alaska and the Rocky Mountains (Colorado & Montana) as well as from the Nordic countries of Europe. These last two species are both mycorrhizal with the arctic-alpine plant *Dryas octopetala* in the Rose Family (Rosaceae). *Russula subrubens* appears to be mycorrhizal with arctic Willows (*Salix sp.*). Three of the six species treated are good edibles: *Leccinum sp.*, *Rozites caperata* (Gypsy Mushroom, now *Cortinarius caperatus*), and *Calvatia cretacea* (as with all puffballs this last species must be pure white inside to be considered

Greenland (Kalaallit Nunaat) Mushroom Stamps

Cat. #	Date of Issue	Value	Type	Species
446 gummed stamp	1/17/2005	5.25 k	M	<i>Leccinum sp.</i>
446a sheetlet	"	"	"	"
449 self stick stamp	"	"	"	"
447 gummed stamp	"	6.00 k	"	<i>Russula subrubens</i>
447a sheetlet	"	"	"	"
450 self-stick stamp	"	"	"	"
448 gummed stamp	"	7.00 k	"	<i>Amanita groenlandica</i>
451 self-stick stamp	"	"	"	"
451a (self-stick booklet)	"	"	"	"
476 gummed stamp	5/22/2006	5.50 k	M	<i>Rozites caperata</i>
476a sheetlet	"	"	"	"
479 self-stick stamp	"	"	"	"
477 gummed stamp	"	7.00 k	"	<i>Lactarius dryadophilus</i>
477a sheetlet	"	"	"	"
480 self-stick stamp	"	"	"	"
480a (self-stick booklet)	"	"	"	"
478 gummed stamp	"	10.00 k	"	<i>Calvatia cretacea</i>

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

edible). Scott 446/449 illustrates a species of *Leccinum*, but several are known from Greenland and it is not certain which is shown.

For additional articles on North American mycophilately (i.e., fungus-illustrated postage stamps), please refer to Luther (2000, 2005, 2010, 2011, and 2013a,b).

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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

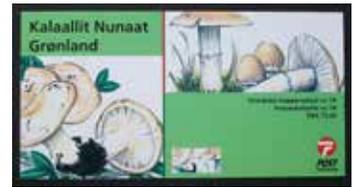
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Luther, Brian S. 2013b. Mushroom stamps from St. Pierre & Miquelon. *Spore Prints* 492 (May), pp. 3–4. On-line and in color at www.psms.org

Scott 480a, booklet cover.



Scott 480a, booklet stamps.



Complete set: 446–448 (top) and 476–478 (bottom).



Scott 446a, *Leccinum* sheetlet with one *Lactarius cinderella*.



Scott 451a, booklet cover.



Scott 451a, booklet stamps.

CHANTERELLES OF HAIDA GWAI

Paul Kroeger

extracted by permission from *The Outer Spores: Mushrooms of Haida Gwaii*® by Paul Kroeger, Bryce Kendrick, Oluna Ceska, and Christine Roberts, Mycologue Publications, 2012

General Characteristics

Chanterelles are an artificial grouping of fleshy mushrooms that have a wrinkled fertile or spore-bearing surface under the cap, or blunt folds and ridges that often are forking and interveined, and take the place of the flat, sharp-edged gills of truly gilled mushrooms.

Fungi grouped as chanterelles include several excellent and much sought-after edible mushrooms and a few toxic species.

Characters that distinguish and unite the chanterelle mushrooms are the fleshy fruit body with a cap that develops from continuous growth of the edges of the stalk.

The under-side of the cap is wrinkled or folded, with gill-like radiating ridges. This is the spore-producing surface (hymenium) which is covered with narrow microscopic cells or basidia which each produce two to eight spores, though usually four to six, at their tips. The chanterelle’s fertile surface grows continuously over a period of time, with new basidia growing through the old and beyond, so it becomes thicker and more folded or wrinkled over time. In this feature the chanterelles differ from regular gilled mushrooms, which have only one crop of basidia, and are generally short-lived.

Individual chanterelle fruit bodies can grow continuously for several weeks. Initial upward growth of a stem nub eventually and gradually tends toward sideways growth, producing the funnel shape characteristic of all chanterelles. The upper nonfertile surface grows outward at a faster rate than the lower tissue,

cont. on page 6

Chanterelles of Haida Gwaii, cont. from page 5

resulting in downward curling of the edge, though eventually, as the hymenium continues to thicken, the edges will straighten out.

An individual chanterelle has been observed developing from a mere nub to a large, frilly, fully mature mushroom over more than a month, and fruit bodies have been reported with a lifespan of up to 100 days. As it matures, the mushroom also develops the characteristic aroma, flavour and texture for which some species are highly prized.

Chanterelles have evolved to disperse spores continuously over a long time. Picking young, small chanterelles removes a great potential spore supply that would help perpetuate the species, and on top of that yields an inferior food without the aroma and flavour of a mature chanterelle. Unfortunately the restaurant trade seems to prefer young button chanterelles, because whole small mushrooms make a more visually attractive presentation.

Old chanterelles are subject to a variety of parasitic and decay organisms. Bacteria and a variety of mould fungi and other living things grow on them, eventually rendering them unsuitable for eating. In central and eastern North America chanterelles often become wormy in the ground with fly larvae, but on the West Coast most species don't.

Species Accounts of Selected Edible Mushrooms

Pacific golden chanterelle, or *Cantharellus formosus*, is a robust chanterelle differing from the European yellow chanterelle, *Cantharellus cibarius*, in having less bright yellow colouring, and a more dull orange to brownish-orange cap and stem. The cap surface is not smooth but suede-like, with a tendency to break into very fine scales. The gill folds are well pronounced and deep, and are pale orangeish-yellow often with a pinkish cast rather than bright yellow as in *Cantharellus cibarius*. Damaged or handled surfaces stain darker yellow, then slowly turn ochre-brownish. The aroma is faint but fruity, like apricot skin. The spore print is pale yellowish-white.



Young Golden chanterelles

Kranabetter *et al.* (2009) described productive *Cantharellus formosus* sites around Skidegate Lake as being: "... consistently located on low elevation, moss-dominated mesic ecosystems with immature stands of Sitka spruce and western hemlock. Microsites with thin forest floors were consistent with productive habitat but not low moss cover ... and ... the association of *C. formosus* with buried wood was not apparent from these study sites. Mesic ecosystems are generally extensive in these landscapes, which, along with large-scale logging operations in the 1950s and 1960s, have led to the wide-spread and abundant fruiting of *C. formosus*."



Older Golden chanterelles.

European mushroom enthusiasts have long commented that our chanterelles seem inferior in flavour and aroma to the European yellow chanterelle. The recognition of *Cantharellus formosus* as the dominant chanterelle on our coast (Redhead *et al.* 1997) helped explain this. In appearance, aroma and flavour *Cantharellus formosus* is not the culinary equal of the European yellow chanterelle, but we do have a chanterelle that is—the Rainbow chanterelle.

Rainbow chanterelle, or *Cantharellus cibarius* variety *roseocanus*, is close to the yellow chanterelle of Europe, but has a distinct pinkish bloom on the cap edges when young. This variety of the yellow chanterelle was first described from the West coast of Vancouver Island near the original location for *Cantharellus formosus*. The rainbow chanterelle has bright orange-yellow, smooth caps and stems, and bright orangeish-yellow hymenium or gill folds lacking pinkish tints. The aroma is pronounced apricot, usually stronger than *Cantharellus formosus*, the taste of the raw flesh is peppery, and the mushrooms do not stain markedly after handling as do the Pacific golden chanterelles. The spore print is orange-yellow rather than pale yellowish-white as in *Cantharellus formosus*.



The rainbow chanterelle appears frequently with Sitka spruce in mature to old-growth forest, and seems most abundant in very moist rich sites along creeks and rivers, and under the stunted "spruce fringe" next to the ocean. It is also found under shore pine.

Young (top) and mature (bottom) Rainbow chanterelles.

The culinary properties; the appearance, aroma and flavour, of *Cantharellus cibarius* var. *roseocanus* are equivalent to the European yellow chanterelle. It appears that most pickers and buyers in Haida Gwaii do not distinguish between Pacific golden chanterelles and Rainbow chanterelles, though a few referred to "Fragrant chanterelles" as a distinct mushroom they collect occasionally.

Rainbow and Pacific golden chanterelles can be distinct when pristine and fresh and under ideal conditions, but are challenging to separate when old or water soaked or after being stored for a while. If they are distinguished, the Rainbow fragrant chanterelle can be marketed as a more valuable gourmet chanterelle.

Winter chanterelle or Yellow Foot or *Craterellus tubaeformis* are small to medium sized, slender, trumpet-shaped chanterelles. The small caps have funnel-shaped openings extending down into the long hollow stems. The colour is variable but yellow dominates in the cap and stem and varying degrees of brown to grey or olive may be present. The gill folds beneath the cap are often greyish to violet-grey or grey-brownish and can be quite deep and pronounced, with repeated irregular forking and interveining.



Winter chanterelles.

The winter chanterelle is usually found in wet sites and is associated with decaying wood. It grows in wet soils with well-rotted wood of mossy logs and stumps, and in peat bogs in Sphagnum moss hummocks. This was the most ubiquitous mushroom in Haida Gwaii during our study.

This small mushroom is sometimes very abundant, especially in the cold late autumn and winter months. It's a very popular edible in northern Europe, especially in Scandinavia, where its crunchy texture is appreciated. The great numbers available to harvest make up for its small size, and large quantities can be gathered in a short time. It is well suited for drying, and rehydrates quite well.

Blue chanterelle or *Polyozellus multiplex* is not closely related to the previously discussed true chanterelles, though it certainly looks as though it should be. The blue chanterelle is a strikingly beautiful fungus that forms a cluster of dark blue to dark violet to blackish fanlike caps, with wrinkled under-sides that are the same colour or slightly paler. This distinctive species is considered to be fairly rare in most of British Columbia, but seems relatively common in Haida Gwaii where some commercial harvest occurs.



Taylor Lockwood

Blue chanterelles.

The blue chanterelle is sometimes also called purple or black chanterelle. It is associated with mature or old-growth forests and in Haida Gwaii is apparently mycorrhizal with Sitka spruce and perhaps with hemlock. The tree species usually associated with this mushroom, true firs (*Abies*) and Douglas fir (*Pseudotsuga*), are both absent from Haida Gwaii.

ROBOT FACE LETS SLIME MOLD SHOW ITS EMOTIONAL SIDE

Celeste Biever

<http://www.newscientist.com/>, August 8, 2013



Slime mold is clever stuff. It finds the quickest path between food and has even shown signs of having memory—despite not having a brain. Now we know what faces it might pull.

A human-like robot face has been hooked up so that its expressions are controlled by the electrical signals produced when yellow slime mold shies away from light or moves eagerly toward food.

It is all part of an experiment aimed at figuring out why these animate puddles of neon goo are so surprisingly smart. *Physarum polycephalum* is a common yellow slime mold which ranges in size from several hundred micrometers to more than one meter. It is an aggregation of hundreds or thousands of identical unicellular organisms that merge together into one huge “cell” containing all their nuclei. This makes it much more interesting than your average unicellular bacteria, says Ella Gale who studies unconventional computing at the University of the West of England in Bristol and at the Bristol Robotics Laboratory.

Slime mold’s remarkable problem-solving capabilities are well-documented and include finding the shortest path between different food sources. It also displays memory, in a similar way to a novel electrical component called a memristor, which has in turn been likened to the functionality of biological brains. “It’s one of the simplest organisms that can learn,” says Gale.

Gale placed slime mold on a forest of 64 micro electrodes, along with some oat flakes. As the mold moved across the electrodes towards the food, it produced electrical signals, which Gale converted into sound frequencies. “I got excited and wondered if you could hear cellular communication,” she says. The result was some strange noises, rather like an airplane taking off, says Gale.

Together with colleagues, Gale then split the sound data into chunks. They gave each one a positive or negative label depending on whether the slime mold was moving toward food or recoiling from light—plus an “arousal” score based on the volume of the chunk.

Using a popular psychological model, the team was then able to assign each sound chunk an emotion—anger would be negative, high arousal, for example, while joy might be positive, low arousal. Finally, the team then used an expressive, female Jules robot made by Hanson Robotics to re-enact the sequence of emotions while the soundtrack was played.

The installation was unveiled at the Living Machines conference in London on 1 August.

It is not the first time a slime mold has controlled a robot. In 2009, a team led by Soichiro Tsuda, then at the University of Southampton, UK, used a slime mold to control a faceless, six-legged, insect-like robot.

But the latest mold robot is a powerful reflection of Gale’s particular interest in *P. polycephalum*. “What is the connection between slime mold and the brain?” she asks. “You have two different systems made of different stuff, yet both can learn.”

MORE THAN 1,700 COMMERCIAL PICKING PERMITS SOLD

Eryn Akers

<http://www.dailyrecordnews.com/>, August 10, 2013

After hiking five miles in the heat and brush with gear strapped to his back and more than a gallon of water swinging in his pack, Dominic Connor of Ellensburg stopped at a hillside in the Okanogan-Wenatchee National Forest. His eyes quickly narrowed in on his target: hundreds and hundreds of morel mushrooms.

Connor spent two hours on the hillside in the late-June heat, plucking 36 pounds of wrinkled, brown morels from their forest-floor homes. After scouring the area, he packed up his things and was done for the day.

Connor was not alone in his success. In the wake of last year’s wildfires, the Okanogan-Wenatchee Forest Service sold 1,776 permits this year, 63 percent of which were sold from the Cle Elum Ranger District, closest to the Table Mountain fire’s burned area.

Some commercial pickers even traveled from as far away as Guatemala, Cambodia, and Canada to get a piece of nature’s fungal fortune, Connor said.

A pound of morels sells for \$10 to \$20, so the incentives are high. Connor said on average serious commercial hunters gather 10 to 50 pounds a day. The money adds up quickly, Connor said.

While commercial harvesters were able to reap the benefits of last year’s fires, Connor said a lot of hard work was involved.

“When you go to the store and you see these morel mushrooms, people don’t realize what it takes to get them,” he said. “They all come from the wild and someone’s out there trudging through the brush to find them.”

Mushroom hunting is strenuous work. Connor hikes five to 10 miles each day mushroom hunting, he said. He approaches it like a job, he said, and clocks six to 10 hours on most business days. Some mushroom hunters hike 15 to 20 miles per day, from dawn to dusk.

IS THIS SQUIRREL'S HEALTH IN DANGER?

www.mushroomthejournal.com/
via *MushRumors*, Ore. Myco. Soc., July/Aug. 2013

NO... “According to Dr. John Rippon, a world expert on fungal diseases, squirrels have an interesting adaptation that allows them to eat mushrooms containing deadly amanita toxins without being affected.”



“There are three important chemicals in the amanitas. Two [of the chemicals] will knock you right off, but are destroyed in cooking. The third one is the interesting one: it consists of the second amanitin, bound tightly to a glycoprotein molecule. When we digest the mushroom, the enzymes in our gut break the bond between the toxin and the glycoprotein, leaving the toxin free to enter our bloodstream, while the glycoprotein is excreted (a glycoprotein is a mucus molecule, in case you don't know).”

“What the squirrels have done is line their gut with a toxin-compatible glycoprotein, so that as soon as it gets split from its original glycoprotein molecule, it gets re-bound to the squirrel glycoprotein, and excreted along with it. Obviously, the squirrels don't cook their food to destroy the first two molecules, but presumably those get bound in exactly the same way. Thus, squirrels and a few other animals (guinea pigs also, I believe) can eat mushrooms that are highly toxic to other animals with no ill effects.”

THANK YOU, SPRING 2013 FIELD TRIP HOSTS

Debra Lehrberger

A gracious and wonderful Thank-You to this Spring's PSMS Field Trip Hosts—Hildegard Hendrickson, Sandy Bartell, Tony Tschanz, Dory Maubach, JoAnn Ireland and her family, Jon Hall, Sue Lynette, Rachel and Greg Arnold, Teri and Robert Stephens, Hans Drabicki, Kitty Loceff, and Jim Boril.

An additional Thank-You to Hildegard Hendrickson and Wren Hudgins who volunteered as field trip guides. Your influence upon those who went out in the field with you is appreciated!

SONG OF THE MUSHROOM KING Joe Lenart

The Sporeprint, Los Angeles Myco. Soc., June 2002

*I am the Cep—the Mushroom King.
My praises mushroom pickers sing.*

*I am so easy to discover.
I look like me—not any other.*

*I'm very tasty fresh or dry
To you and to the mushroom fly*

*So pick me when I'm firm and young.
Just finding me is HALF THE FUN!*

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