SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 502 **May 2014**

SEQUENCING 10,000 SPECIES

Bjorn Carey

abridged from *Stanford Report*, April 15, 2014

Pine forests are chock full of wild animals and plant life, but there's an invisible machine underground. Huge populations of fungi are churning away in the soil, decomposing organic matter and releasing carbon into the atmosphere—10 times the amount of carbon as humans release through emissions.

Despite the vital role these fungi play in ecological systems, their identities have only now been revealed. A Stanford-led team of scientists has generated a genetic map of more than 10,000 species of fungi across North America. The work was published this week in the *Proceedings of the National Academy of Sciences*.

The researchers traveled to 26 pine forests across North America and collected 10-centimeter-deep soil cores, more than 600 in all. Within hours of collection, and with the assistance of local scientists and universities, they preserved the samples to extract and isolate the fungal DNA. The researchers then used modern genomic tools to sequence unique stretches of the environmental DNA that can be used as bar codes to identify all of the fungal species present in each sample.

The sequencing revealed more than 10,000 species of fungi, which the researchers then analyzed to determine biodiversity, distribution, and function by geographical location and soil depth.

Interestingly, said Kabir Peay, an assistant professor of biology at Stanford and senior author on the new paper, there was very little overlap in the fungal species from region to region; East Coast fungi didn't show up on the West Coast or Midwest, and vice versa.

"What's more interesting," Peay said, "despite the fact that soil fungal communities in Florida and Alaska might have no fungi in common, you find that many of the processes and the functional rates are convergent. The same jobs exist, just different species are doing them."

The team found this to be particularly true when comparing the functionality of fungi at different strata of the core samples. Even though the samples were collected thousands of miles apart, fungi near the top all performed the same task; similarly, bottom fungi performed very similar functions across the continent.

Peay said that more work is needed to understand fungal dispersal mechanisms and whether they play a role in restricting species to particular regions, but the current finding that each bioregion has its own unique fungal fingerprint indicates that fungi could prove to be powerful forensic markers.

DATA ON INDIAN PAINT FUNGUS NEEDED

Brian S. Luther

When you're out hiking or mushroom hunting this spring, summer, or fall, please let me know if you happen to see any Indian Paint Fungus, *Echinodontium tinctorium*.

Conks of the Indian Paint Fungus vary from ungulate (hoof-shaped) to a typical convex conk form. They're very hard with a dark, almost black pileus, often with fine radial cracks and with a very pronounced and coarse, tough, irregularly hydnoid (toothed) hymenophore on the underside. This feature is unmistakable. You can also confirm that you've found an Indian Paint Fungus by knocking one off the tree to see if the back side of the conk and/or the point of attachment on the tree is a bright rusty reddish color. It usually will be, but sometimes it isn't.

If you are completely familiar with our PNW forest trees, then be sure to note what the host tree is. If not, please either photograph the trunk or branches and/or collect a small branch sample from the tree for me to confirm its ID. I'm especially interested in hearing about any conks found on Douglas Fir, Engelmann Spruce, or Western Larch.

Let me know:

1. Where you were
2. The approx. elevation
3. The tree species you found it on
4. Whether it was common or rare where you were.

The Indian Paint Fungus decomposes a variety of our native conifer trees, mostly true firs (*Abies* spp.) and hemlocks (*Tsuga* spp.). It has also (rarely) been found on Douglas Fir, Western Larch (only in Montana), and Engelmann Spruce. It is never found on Sitka Spruce, Subalpine Larch, all of the true pines, all species in the Cupressaceae (such as Western Red Cedar, Alaska Yellow Cedar, Juniper, etc.), and the Pacific Yew in the Taxaceae. It prefers more inland areas in the mountains or at higher elevations, only rarely occurring in coastal zones.

If you run across any, please call or email me at 206-522-1051 or a2zluther@comcast.net.

Indian Paint Fungus, Echinodontium tinctorium.

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CALENDAR

May 10	Field Trip (see website)
May 13	Membership Meeting, 7:30 pm, CUH
May 19	Board Meeting, 7:30 pm, CUH
May 20	*Spore Prints* deadline (guest editor, Ron Post)
May 23–26	Field Trip (see website)
May 30–June 1	Field Trip (see website)
June 7	Field Trip (see website)

BOARD NEWS

Denise Banaszewski

Survivors' Banquet: The Survivors' Banquet was a success, with good food and fun. PSMS contributed $4,662 (54%) toward the cost of the banquet. Well worth it!

Bylaws Changes: The changes to the bylaws were approved almost unanimously at the last membership meeting. The bylaws will be updated on the website soon. If you were not at the meeting and do not know what changed, it is important that you read the new bylaws because they affect your membership, including the term of membership and who is eligible for the different types of memberships.

Lease at CUH: We have extended the lease for our office space at CUH for another 10 years; however, this lease can be terminated by UW or PSMS by giving one year's notice. The UW has told us they will need the space before the end of the 10 years, so we are looking for affordable, replacement office space centrally located in Seattle. If you know of any, please contact a board member.

NAMA Foray: Planning for the NAMA foray is coming along nicely. PSMS members do not need to be NAMA members to attend. The cost will be $250–300 per person, which includes lodging, food, and the foray fee. Space will be limited, and attendees will be able to sign up starting at 9:00 am on May 12.

Fall Mushroom Show: A proposal has been made to the board to revisit the decision to not hold a public fall show. The board asked Kim Traverse and Milton Tam to provide us with definitive committee chairs and more details at the next board meeting.

Sad News: Finally, on a very sad note, board member Nick Herschberger passed away on April 12. Jeff Stallman will take Nick's place on the board for the first year of Nick's term, and Shannon Adams will take his place for the second year. We will miss Nick a great deal, and our hearts go out to his family and friends.

MEMBERSHIP MEETING

Tuesday, May 13, 2014 at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle


Lawrence Millman

Don't miss this month's meeting! Our May speaker is Dr. Lawrence Millman, a man of many talents. His talk will combine his interests as a mycologist and as a world explorer. Larry has a Ph.D. in Literature from Rutgers University, is a fellow of the prestigious Explorers Club, and has made over 30 trips to the Arctic and Subarctic. He has discovered a previously unknown lake in Borneo, and a mountain is named after him outside Tasiilaq in eastern Greenland. As an author, Larry has written 16 books, including such titles as *Last Places*, *A Kayak Full of Ghosts*, *An Evening Among Headhunters*, *Lost in the Arctic*, and—most recently, *Giant Polypores and Stoned Reindeer.*

As a mycologist, he has studied fungi all over the world, as well as in his own backyard of New England. His mycological work has been in places as diverse as Svalbard, Belize, Western Samoa, the Canadian Arctic, Costa Rica, and Nantucket. His inventory of fungi at Wachusett Meadow Wildlife Sanctuary in Princeton, MA, currently numbers 490 species. With fellow mycologist Bill Neill, he discovered a species of polypore (*Echinodontium ballouii*) in 2005 that hadn't been seen since 1909 and was thought to be extinct. Larry has given presentations about his travels in the Arctic at the Explorers Club, the University of Alaska, Alaska Pacific University, Cornell, Harvard, the Center for Northern Studies, on BBC and CBC Radio, and over 100 other venues.

Would persons with last names beginning with L–Z please bring a snack or treat to share after the meeting.

We are sad to report the death of PSMS Board member **Nick Herschberger** (36) and his wife, **Laurel Hoffman** (33), on April 12. They had been PSMS members since October 2012.

Long-time member **Henry Lingat** passed away in February. He and his wife, Irene, joined PSMS in January 1993, and Henry served a term on the Board from 1997–1999.

APRIL 19 FIELD TRIP REPORT — Brian S. Luther

I was the first to arrive at about 7:50 am, with Wren Hudgins hot on my tail. The detour route to the site was 115 miles, and it took 2 hours and 20 min. from North Seattle. Even so, 37 members signed in, a good turnout considering the circumstances. I started a big fire first thing, and the firewood I brought was also supplemented by some provided by both Bob Myers and Wren. Thanks, guys.

The NOAA forecast predicted it would start raining about 11:00 am, with a 90 percent chance of precipitation. In fact, it ended up being a pretty nice day, with some blue sky and only occasional sprinkles.

Our hosts were Erin and Brady Raymond, who set out a very fine selection of goodies, fresh fruits (the pineapple and strawberries were great!), hot coffee, and juices. Thanks, Brady and Erin, for contributing and taking the time to host. You could see that everybody really appreciated your efforts.

Wren, Josh Powell, and Jeff Stallman all volunteered to be field trip guides, and because of the number of members who came, everybody who wanted to go out with a group was able to.

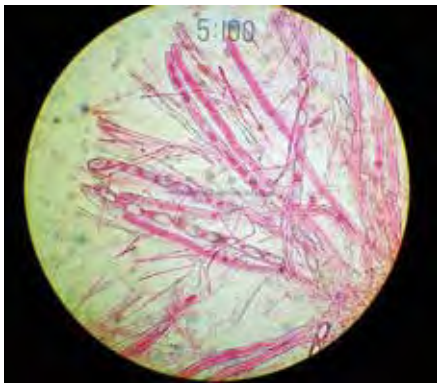
Thirty-five species of fungi were found and displayed, with only a few edibles amongst them. A number of *Verpa* (*Ptychoverpa*) *bohemica* came in along with some small collections of *Pleurotus ostreatus* and some Deer Mushrooms (*Pluteus cervinus*). Some interesting early spring species found were *Plectania nannfeldtii*, *Pseudoplectania melaena*, *Dasyscyphus virgineus*, *Cudoniella aciculare*, and a very nice fruiting of *Cortinarius clandestinus*, which is known for being a "snow bank" fungus in spring. I sent a picture of this collection and a photomicrograph of the spores to Dr. Joe Ammirati; he said that the *C. clandestinus* group is a complex of species and that this particular spring species found is actually undescribed, so far.

The potluck was attended by around 15 members, and we decided to have it early, around 3:00 pm. Because we had power at the shelter, a couple of hot dishes made for the potluck were especially welcome on this cool, damp day. Everybody pitched in to clean up, and we were out of the shelter by around 4:20 pm.

Brian S. Luther

Plectania nannfeldtii.

Brian S. Luther



Plectania nannfeldtii: asci, ellipsoid spores and branched paraphyses - 400x, ammonium hydroxide and phloxine.

REMEMBERING HILDEGARD HENDRICKSON — Ron Post

A ceremony and unveiling of a plaque will take place on the campus of Seattle University Sunday, June 8, the one-year anniversary of Hildegard's disappearance. The plaque will sit next to a fruit tree planted in her memory. If you would like to help offset the cost of the plaque and tree, send a check to PSMS and write "for HH" on the check, Any funds in excess of the cost will be donated to one of Hildegard's favorite causes. Keep an eye on this newsletter for exact time and location of the ceremony. If you have questions call Ron Post at 206-370-4487.

AN APPEAL TO PSMS MEMBERS — Wren Hudgins

PSMS needs experienced or even semi-experienced members to come to field trips and lead groups of beginners. These beginner forays can last 2 or 3 hours (or more if you wish). As we all know, the field trips are mainly attractive to beginners, and they are all pretty hungry for knowledge. I'd say about half of the attendees want some hunting guidance on any given field trip, far more than one person can safely keep track of in the woods. On one trip last Fall, I resorted to a lottery system because I didn't know how else to select group members. First come, first served didn't work because I was approached by 10 at a time.

Please, don't think you need to know a lot to lead one of these beginner groups. You do need to know the main quarry (maybe chanterelles, *B. edulis*, morels, matsutake), but you don't need to know the many other mushrooms you'll find or walk by. That said, the more you do know, the more helpful you can be to new members.

Here are the benefits, as I see them, of doing this.

1. You get to give back to PSMS in a relatively painless, time-limited, and non-continuing fashion. This comes with relief from non-participatory guilt as a bonus.
2. You get to contribute to the welcome we all try to show new members.
3. You get exercise and fresh air.
4. You will be verbally appreciated by those you help.
5. Brian will appreciate you too.
6. Here's the big one—learning. You get to improve your skills mainly by hanging around and listening to Brian. I asked Brian if he'd give a short intermediate level lecture on one genus, just for 15 minutes, aimed at those of us who are there and ready to take out a beginner group. This is a carrot that I hope will be appealing. This lecture would have to take place early because once specimens start coming in, he's too busy.

What I'm asking for is for some of you (members) to commit to leading such a beginner group for one field trip a year. If you are willing to lead one per season, so much the better. You are, of course, welcome to join me coming to all of them. I'd like to organize this, so if you want to let me know which trip you are planning to attend, I'll keep track of everyone's preferences. If you could do one of two field trips, then at least I'll know where you'll be most needed.

Why am I doing this? When I first started learning about and hunting mushrooms, I joined PSMS (in about 1974 or 1975 I think) and I went to a field trip. The seasoned member who took me out was Monte Hendrickson, husband of Hildegard. His kindness and expertise was key to my developing a lifelong love of mushrooms. I'd like our newer members to have that key early experience with mushrooms.

I can be reached at 425-829-2214 or wren.hudgins@gmail.com. Please let me know. Thanks.

LECTURES IN THE BARN, EAGLE CREEK FIELD TRIP, MEMORIAL DAY WEEKEND, 2014

Here's the lecture schedule so far. Other lectures may be presented, and an updated schedule will be posted at Eagle Creek.

Saturday, May 24 **8:00 pm**

A tribute to Hildegard & Monte Hendrickson, with many old photos never seen before, by Brian S. Luther

Sunday, May 25 **7:00 pm**

The 2013 Eagle Creek Fire, by Brian S. Luther

NAMA FORAY

Teddy Basladynski

October 9–12, 2014, Camp Arnold near Eatonville, WA

In October, the Puget Sound Mycological Society would like to welcome NAMA (North American Mycological Association) members to Washington State—the land of lattes, tech companies, grunge music, and of course, mushrooms—to share in our passion for fungi and to celebrate the memory of our friend and past president Patrice Benson.

Known as the "Evergreen State," Washington is rich in stands of Douglas fir, hemlock, ponderosa and white pine, spruce, larch, and cedar, all of which support a wide diversity of fungi. We will explore all the traditional aspects of the annual foray with hunting and collecting, identification and taxonomy, mycophagy, and toxicology, as well as some artistic endeavors with workshops in dyeing with mushroom pigments, mushroom-portrait watercolor painting, and photography.

Dr. Steve Trudell will be the foray mycologist, and he, along with PSMS past Vice President Milton Tam, have arranged an amazing lineup of presenters for 2014. Although the list is not quite finalized, this stellar cast of faculty has already committed: Alissa Allen, Dr. Denis Benjamin, Dr. Michael Beug, Dr. Tom Bruns, Dr. Cathy Cripps, Dr. Jim Ginns, Dr. Bryce Kendrick, Paul Kroeger, Sava Krstic, Dr. Pat Leacock, Dr. Brandon Matheny, Danny Miller, Drew Parker, Dr. Fred Rhoades, Dr. Christine Roberts, Christian Schwarz, Noah Siegel, Dr. Suzanne Simard, Dr. Ann Simpson, Dr. Rob Simpson, Paul Stamets, Dr. Jim Trappe, Dr. Else Vellinga, Sasha Viazmensky, Dr. Rytas Vilgalys, and Dr. Tom Volk.

In addition, a number of current graduate students will be delivering presentations in a student research forum. These include Joshua Birkebak, Vince Hustad, Brian Looney, Marisol Sanchez-Garcia, and Valerie Wong.

Costs for a 3-day foray package that includes lodging, registration, and 8 meals will range from $260 to $300 depending on the level of lodging chosen. Full hookup RV spots are available onsite at Camp Arnold, along with registration and the 8-meal plan, for $250/person. For those staying offsite, registration and the meal plan would be $230/person. Registration will be handled online beginning on May 12th. You must be a PSMS member or a NAMA member to attend. PSMS is an affiliate of NAMA.

Please save the dates October 9–12, 2014, for the annual NAMA foray. We hope to see you there! To read more, and to stay up to date on information, please visit www.psms.org/nama2014.

GOT YEAST? IF NOT, MAKE YOUR OWN

Ewen Callaway

Nature, March 27, 2014

It took geneticist Craig Venter 15 years and US $40 million to synthesize the genome of a bacterial parasite. Today, an academic team made up mostly of undergraduate students reports the next leap in synthetic life: The redesign and production of a fully functional chromosome from the baker's yeast *Saccharomyces cerevisiae.*

The synthetic yeast chromosome—which has been stripped of some DNA sequences and other elements—is 272,871 base pairs long, representing about 2.5% of the 12-million-base-pair *S. cerevisiae* genome.

The project began a few years ago, when Jef Boeke, a yeast geneticist at New York University, set out to synthesize the baker's yeast genome with much more drastic alterations than those demonstrated by Venter and his team in 2010. Venter's group had chemically synthesized short strands of DNA and stitched them together to create a version of the 1.1-million-base-pair DNA genome of the bacterium *Mycoplasma mycoides*, which was then inserted into a recipient cell. But besides a few tweaks the synthetic genome was identical to its blueprint.

By contrast, Boeke and his team thought that by stripping the genome of certain features to test their importance, they could justify the enormous cost and effort of synthesizing whole yeast chromosomes.

The researchers, who report their accomplishment in *Science*, have formed an international consortium to create a synthetic version of the full *S. cerevisiae* genome within 5 years.

SPRING MATSUTAKE FETCH 1 MILLION YEN PER KILOGRAM AT TSUKIJI MARKET

Mitsuko Nagasawa

The Asahi Simbun, April 22, 2014

A pair of highly sought-after small matsutake mushrooms weighing only 120 grams sold for 120,000 yen ($1,170) at the Tsukiji wholesale market in Tokyo on April 21.

That is the equivalent of 1 million yen per kilogram.

Matsutake mushrooms, which are extremely sought after in Japan, are usually shipped in the autumn. However, they are sometimes shipped in the spring when the ground temperatures and humidity in the mountains become similar to what is usually experienced during the fall. The mushrooms are then called "samatsu," which literally means "early matsutake."

"There are cooks who want to buy the first samatsu by any means, and there are customers who want to eat them by any means," said Masahiro Sugimoto, 54, who works for Tsukiji-Kushiya, the wholesaler that bought the mushrooms. It is his job, which he has done for 25 years, to buy the highly desirable fungi for the company.

On April 21, the two small mushrooms arrived at the Tsukiji market from Ehime Prefecture as the first shipment from the area. The auction was conducted based on a price per kilogram. The pair, which were placed in a small box, drew a bid of 1 million yen per kilogram in a second after the auction began.

PRESIDENT'S MESSAGE — Marian Maxwell

Survivor's Banquet

The 50th Anniversary Survivor's Banquet at Kaspar's Special Events and Catering was a truly a memorable event! Banquet Chair Reba Tam planned the perfect event! Thank you, Reba! Chef Kaspar Donier created amazing dishes, and the staff was friendly and very helpful! Milton Tam planned and handled the silent auction with his usual expertise, and the money generated from the sale of the donated items brought in $578 to add to the Ben Woo Scholarship Fund! Danny Miller and the Second Story Repertory Improv group provided some very humorous entertainment that was enjoyed by all. We thank Fremont Brewery for donating the amazing beer for our event—everyone enjoyed it thoroughly! Thank you to PSMS member Jeremy Faber of Foraged and Found Edibles for the donation of beautiful black trumpet mushrooms and hedgehogs! I would also like to thank Teddy Basladynski, Irwin Kleinman, John Goldman & Andrea Rose, Reba & Milton Tam, Jon Hall, Katie Miller, Scott Maxwell, Lynn Phillips, and Patrice Benson's family for their donations of wild mushrooms from their personal harvests.

The Golden Mushroom Award recipients this year are Past President Margaret Dilly and her husband, Claude. Members since 1965, Margaret and Claude have devoted many years of service to PSMS, working on research committees, hosting field trips, teaching mushroom ID, working on the annual show, and much more. We thank them for their years of service and for helping PSMS to blossom into the organization that it is today.

Bylaws Membership Changes

At the conclusion of the April general meeting, the changes that were recommended by the Board of Trustees for the PSMS bylaws were discussed and approved by the membership. PSMS family memberships will include only two adults (we are returning to the way it was originally); children will be listed in the "Notes" section on the primary member's profile (this was suggested by a lawyer we had consulted on privacy issues). Student memberships will include only one adult (which is the way it was originally) who is a full time student. The membership year will be changing from January 1 through December 31 to July 1 through June 30. This change will need to be done in phases.

Members who have paid their dues through December 31 of this year: At the end of 2014, you will be offered two options:

(1) Pay for one-half year—January 1, 2015, to June 30, 2015—($15). If you choose this option, you will need to remember to renew for a full year ($30) on July 1, 2015, to keep your membership current.

(2) Pay for 1½ years—January 1, 2015, to June 30, 2016—($45). Members selecting this option won't have to renew until July 1, 2016.

New members who join after July 1, 2014 ($30) will have their yearly memberships expire in June of 2015. New members who join after January 1, 2015, can pay for one-half year ($15) with the membership expiring June 30, 2015, or pay for 1½ years ($45) with the membership expiring June 30, 2016. By June 30, 2016, we will all be on the new year term. Most of our newer members join in the fall around the time of our show.

After June 2015, we will no longer offer the half year membership. In the future, all people who join PSMS during the year

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LARGEST EDIBLE MUSHROOM SHOWN ON POSTAGE — Brian S. Luther

The largest known fleshy edible mushroom is *Termitomyces titanicus*, native to much of northern west Africa. In an earlier article (Luther, 2012) I mentioned a number of countries that have issued postage stamps with species in this genus, but this is the first time I've shown any stamps with this enormous species.

Brian S. Luther

In 2007 the Guinea Republic issued a souvenir sheet (s/s) titled "Hiboux et Champignons" (owls and mushrooms). The actual stamp on this s/s indeed shows a Barn Owl and an *Amanita muscaria* together. The left portion of the s/s, however, shows a smiling young person holding up a giant mushroom (see photo). But, look carefully. There's an interesting twist: The mushroom is labeled *Boletus edulis*, but it has distinct gills under the cap. It is not a bolete at all, but, in fact, is *Termitomyces titanicus*. This brings to mind other misidentifications on postage stamps with fungi, which unfortunately are somewhat common. (Refer to Luther, 2013). The Guinea Republic is located in west Africa, where this species is widespread growing on termite mounds. The specimen shown here is actually not as big as they can get.

An excellent, up-to-date summary paper on the genus *Termitomyces* was recently published by Karun & Sridhar (2013); if you're at all curious about this interesting genus, you might want to consult it. Even though the focus in the article is on species of *Termitomyces* from India, the authors review a lot of information related to the genus and have a key to all known species, from all continents, as well as useful bibliographic sources. The Indian subcontinent was attached to Africa 250–200 million years ago, during the Permian and Triassic periods, before continental drift separated them and eventually pushed the Indian sub-continent into the Asian continent (where it's still moving). Thus the western portion of India shares many species of *Termitomyces* with those found in Africa.

References

Karun, Namera Chinnappa & Kandikere Ramaiah Sridhar. 2013. Occurrence and distribution of *Termitomyces* (Basidiomycota, *Agaricales*) in the Western Ghats and on the west coast of India. *Czech Mycology 65*(2): 233–254.

Luther, Brian S. 2012. The first African mushroom stamps. *Spore Prints 485* (October), pp. 6–7. Online and in color at www.psms.org.

Luther, Brian S. 2013. Misidentifications on mushroom stamps. *Spore Prints 495* (October), p. 4. Online and in color at www.psms.org.

President's Message, *cont. from page 5*

July 1 – June 30 (at any time) will have their memberships expire on June 30.

Board Change

Owing to the tragic deaths of recently re-elected Board of Trustees member Nicholas Herschberger and his wife, Laurel Hoffman, we have asked alternate Jeff Stallman to serve the first year of Nick's term on the board and Shannon Adams to serve the second year. We will miss Nick's smile and his balanced perspective at the board meetings. We all enjoyed his company. Nick had recently scouted out a great microscope for our club at the surplus store at the UW. He had also volunteered to pick up the kegs of beer for our annual banquet. We are thankful for his service to PSMS and for the time he spent with us, and we were looking forward to having him on the board for two more years. We express our condolences to their families, co-workers, and other friends.

Memorial Tree Planting

Be sure to check the notice on page 3 about Hildegard Hendrickson's memorial tree planting.

NAMA Registration

Be aware that we will begin registration for the PSMS NAMA foray on May 12. Registration for the foray will be handled online. Please consult our homepage on our website at http://www.psms.org/ on May 12 for registration costs, instructions, and information.

FUNGUS MADE FIVE SICK KIDS EVEN SICKER, ALL DIED

Janet McConnaughey

http://www.sfgate.com/**,** April 16, 2014

NEW ORLEANS (AP) - Five very sick children died after a fungus apparently brought into a New Orleans hospital on sheets and other linens made them sicker, federal and state investigators said Wednesday.

The children died in 2008 and 2009, according to the Centers for Disease Control and Prevention. Although an article scheduled for publication in a European medical journal said severe infections are nearly all fatal, officials said the fungus was not the primary cause of any death.

"The deaths were not because of the infection; they were because of the primary diagnosis," said Brian Landry, spokesman for Children's Hospital of New Orleans. The fungal infection would have been noted as a contributing factor, he said.

Investigators say the fungus, identified as *Rhizopus delemar*, is extremely common and dangerous only to people with weak immune systems. In them, it can get into the body through the skin and spread incredibly quickly; infected tissue must be cut away.

I once met a bolete that spoke
It enjoyed surprising the folk
He'd say "Look over here"
Until one day a deer
Ate him up—that's the end of this joke

–Charmoon Richardson
SOMA News, Sonoma Co. Myco. Assoc.

RESUPINATE FUNGUS SHOWN ON A POSTAGE STAMP

Brian S. Luther

Countries around the world issue postage showing a large variety of attractive subjects (called topicals in philately), expecting to sell a lot of them to collectors. Because resupinate fungi are obscure and never collected or even seen by most people, they've never been featured on stamps—until now. In 2013 Macedonia issued a gorgeous four-value set of stamps featuring fungi, one of which is the cobalt blue resupinate *Terana caerulea*. Macedonia (a former Yugoslav republic) is sandwiched between Albania to the west, Kosovo and Serbia to the north, Bulgaria to the east, and Greece to the south.

Terana caerulea, previously put in the genus *Pulcherricium*, is widespread in the Northern Hemisphere on hardwood debris. It's known from eastern North America (I used to find it in the Southern Appalachians), but it's not known from western North America, except for Arizona. The only reason Macedonia illustrated this resupinate on a stamp is that it's a stunning blue color.

As you can see from the photo, the mini-sheet with these stamps is quite colorful, having two sets of the four stamps and also showing the same fungi on the selvage (non-stamp margin).

Brian S. Luther

Macedonia, 2013 - mini-sheet of four values x 2.
Terana caerulea *is the 100-value stamp on the right.*

ANSWERS TO FREQUENTLY ASKED QUESTIONS ABOUT PSMS FIELD TRIPS

Marian Maxwell

Do I need to register for the field trips?

Preregistration is not required for any field trips—just show up at those you're interested in going to. However, please be sure to sign in upon arrival at the field trip site. This helps us keep track of how many members are attending each field trip, whether you're staying for the potluck or not, if you are willing to host in the future, Lost and Found purposes, etc.

Can I bring other people who are not members?

Field trips are for MEMBERS ONLY. Members of your household who wish to attend field trips should be listed as members on your PSMS profile page. It is OK to bring a friend or extended family member once or twice to a field trip. If they wish to attend more regularly, we ask that they join PSMS. You may not bring groups of friends who are nonmembers. If you have any questions regarding these policies please contact Marian Maxwell at president@psms.org.

When are the field trips? Can we camp overnight at the site?

Field trips are usually held on Saturdays, with people available to ID mushrooms. Additional camping times may be available from Friday afternoon to Sunday morning for those field trips that cover the entire weekend (this is noted on the field trip insert and on the calendar). This is complimentary to our membership and is paid for out of our membership dues and the income from our annual mushroom show in the fall.

When should I arrive at the field trip location?

Please arrive early on field trip days (between 8:00 and 9:00 am) if you want to join with others going out in a group or be led by a PSMS field trip guide. Be prepared. Go with a group and dress appropriately. At field trips it is highly recommended that you always go out in the woods with at least one other person in case of an emergency. Be sure to have your cell phone charged and with you. It is also very handy if you have Motorola-like two-way radios for communication in rough terrain or when out of sight with others. Following these simple suggestions could actually save your life.

What about food?

If you are new, be sure to say hello and introduce yourself to our volunteer hosts, who bring and serve up the coffee and snacks as well as set out potluck plates, utensils, etc. Complimentary coffee and breakfast snacks will be provided after 9 am. Potlucks are usually held sometime between 3 and 5 pm.

Remember to bring serving utensils for your potluck dish. The hosts have a limited backup supply available if needed. These are paid for out of our membership dues and Annual Fall Show income. If you would like to host or co-host a future field trip, contact our volunteer host coordinator at host@psms.org. It is a terrific way to meet and get to know many of our interesting membership, and there is still plenty of time to go mushroom foraging. You may even discover a new foraging partner or partners while serving up that morning coffee!

Is there a way we can carpool with other members?

Consider joining the PSMS Yahoo group, and let the group know if you are looking for, or offering to drive, a carpool. If you are a passenger, please remember to offer to help pay for the driver's gas expenses. Drivers, please let your passengers know the terms of your agreement up front, such as if you plan to stay for the potluck, gas money contributions, if you are staying overnight, etc.

To join the PSMS members Yahoo group, first log in to your member profile page at the www.psms.org website using the user name and password assigned to you when you joined PSMS. On top of the profile are instructions and a link for the Yahoo group. Click on the link, then click on "Join This Group." If you are not sure what your username or password is, send an email to membership@psms.org.

Can I bring my dog?

Only friendly, well-behaved dogs are welcome at field trips, and they must be leashed and under your supervision (including cleaning up after them) at all times. You may not leave your dog tethered and unattended at a shelter or campsite, in your car, or for others to have to watch while out collecting. At the field trip on May 23–26, which is on private property, you may bring only your own dog this year. Future decisions about dogs are up to the property owners.

Can we go ahead of time and hunt in the area?

Please do not hunt in the immediate field trip areas up to two weeks prior to the field trip. This is a courtesy to your fellow members and also to our club itself.

Do I need mushroom-hunting permits for the field trips?

Some areas require permits. You are responsible for obtaining your own mushroom-hunting permits for our field trip areas.

For all the remaining field trips this Spring:

If you are parking and hiking at trailheads in the area, you will need a Northwest Trail Pass (one per vehicle). If you are parking in and hunting in any of the state parks in the area, you must have a Discover Pass. Harvesting permits are not required, unless you exceed the personal harvest limit for the area in which you are hunting (you will need to look this up, depending on where you wish to hunt). You can have only one limit in your car per person – you can't combine limits from different areas.

To purchase National Forest or State Park permits please visit this page: http://www.wta.org/hiking-info/passes/what-pass-do-i-need-faq/passes-and-permit-info. Harvesting permits (if required or if you intend to gather more than the personal harvesting limit) must be obtained from the Forest Service office in the area in which you are hunting; they cannot be purchased online. Be sure to check with the Forest Service ahead of time. Many offices are not open weekends to issue permits, but the regulatory office that issues citations does work on the weekends. Harvesting regulations are listed on our website at

http://www.psms.org/WAMushroomRulesNov2012.pdf

Keep in mind that regulations are subject to change in any areas because mushroom harvesting is a managed resource. Always check the federal or state guidelines online for the area in which you will be hunting before you go to see if there have been any changes.

SCIENTISTS MAP DNA OF DEADLY FUNGUS

http://www.genengnews.com/, April 18, 2014

Scientists at Duke University say they have sequenced the entire genome and all the RNA products of the most important pathogenic lineage of *Cryptococcus neoformans*, a strain called H99.

Their study ("Analysis of the Genome and Transcriptome of *Cryptococcus neoformans* var. grubii Reveals Complex RNA Expression and Microevolution Leading to Virulence Attenuation"), which appears in *PLOS Genetics*, also described a number of genetic changes that can occur after laboratory handling of H99 that make it more susceptible to stress, hamper its ability to sexually reproduce, and render it less virulent.

cont. on page 8

Scientists Map DNA of Deadly Fungus, *cont. from page 7*

Cryptococcus neoformans is responsible for a million cases of pneumonia and meningitis every year. The Duke findings provide a playbook that can be used to understand how the pathogen causes disease and to develop methods to keep it from evolving into even deadlier strains, according to the researchers.

"We are beginning to get a grasp on what makes this organism tick. By having a carefully annotated genome of H99, we can investigate how this and similar organisms can change and mutate and begin to understand why they aren't easily killed by antifungal medications," explained study coauthor John Perfect, M.D., a professor of medicine at Duke who first isolated H99 from a patient with cryptococcal meningitis 36 years ago.

Fred Dietrich, Ph.D., senior study author and associate professor of molecular genetics and microbiology at the Duke University School of Medicine, and his colleagues decided that the best way to investigate how the virulence of this pathogen could change over time was to develop a carefully annotated genomic map of the H99 strain, both in its original state as well as after it had been cultured. In an effort that took ten years and dozens of collaborators, the researchers sequenced the original H99 and nine other cultured variants, analyzing both the genome and the transcriptome.

The researchers found that the organism possessed a number of molecular tricks, such as the ability to produce genetic messages from both strands of DNA, that enable it to adapt and survive in changing conditions.

"We sequenced the genome and performed an RNA-Seq-based analysis of the *C. neoformans* var. grubii transcriptome structure. We determined the chromosomal locations, analyzed the sequence/structural features of the centromeres, and identified origins of replication. The genome was annotated based on automated and manual curation," wrote the investigators. "This genome sequence enabled a comparative analysis of strain H99 variants obtained after laboratory passage. The spectrum of mutations identified provides insights into the genetics underlying the micro-evolution of a laboratory strain, and identifies mutations involved in stress responses, mating efficiency, and virulence."

"Our results provide the groundwork needed to understand how this organism causes disease, because the next step will involve mutating every gene one by one to see which ones are required for pathogenesis," added Joseph Heitman, M.D., Ph.D., senior study author and professor and chair of molecular genetics and microbiology at Duke.

Morels! Morels!
The musical sound
The more you look
The more will be found
The more you find
The better you feel
So eat more morels
in every meal!
–Eva Villanueva

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