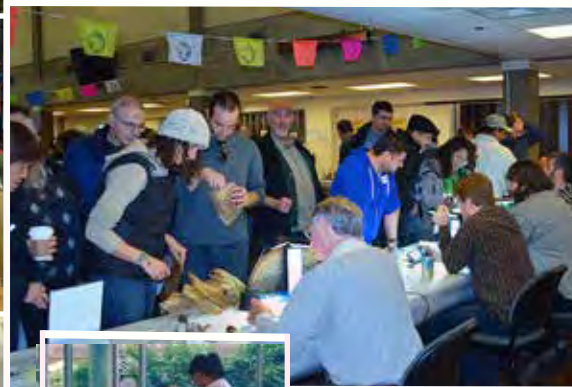


# SPORE PRINTS

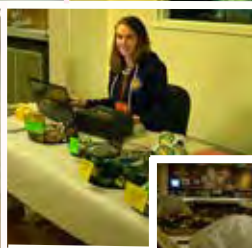
BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY  
Number 527  
December 2016



2016  
Wild  
Mush-  
room  
Show



All photos by Paul A. Hill



# Spore Prints

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## CALENDAR

- Dec. 13 Holiday "Cookie Bash" 7:30 pm, CUH
- Dec. 13 *Spore Prints* deadline
- Dec. 19 Board meeting, CUH board room
- Jan. 10 Membership meeting, 7:30 pm, CUH



## BOARD NEWS

Luise Asif

Having just completed a successful Ben Woo Foray and the Annual Show, the board is working on what went well and how we can improve next year, especially membership and admissions. The Ben Woo Memorial Foray was very popular, and there is a demand for another in 2017. Planning is under way. We need someone to take over book sales. MOHAI's Edible City Exhibit is now open through December and contains a donation from PSMS. It is time to be considering nominations for the board. There will be seven positions opening, five trustees and two officers.



## MEMBERSHIP MEETING

Tuesday, December 13, at 7:30 pm in the Center for Urban Horticulture, 3501 N.E. 41st Street, Seattle



As in the past, the December meeting features a members-only holiday extravaganza (aka the Cookie Bash) hosted by the PSMS Board of Trustees. We encourage you to wear your most festive fungal-themed attire (jewelry, hats, etc.).

**Food:** The entrée will be provided. We ask that everyone bring a contribution (potluck style) for hors d'oeuvres, salads, side dishes, baked goods, desserts, or other treats! When you register for the meeting, sign up for your preferred category.

**Registration and Fee:** As space is limited, *pre-registration is required*. Register on our website at [www.psms.org](http://www.psms.org) under the "Events" heading. Click on "Events Registration." To defray the cost of the entrée, *there is a \$5 registration fee* (no refunds). Doors open at 6:30 pm for socializing. People who do not have reservations will not be seated.

**Door Prizes and Edible Art Contest:** In keeping with our tradition, there will be an edible art contest with winning prizes for the top three entries determined by popular vote! Potluck entries that look most like mushrooms or have a mushroom theme can be entered into this contest. Entries will be consumed after the votes are in! This year's theme is "The Fungus among Us." If you need time to set up your entries in the contest, you can arrive at 6:30 pm. As always in consideration of our members who have allergies, please list your ingredients in your potluck or edible art contribution on a small card. Those over 21 may bring their favorite wine or beer (we will have a banquet permit).

**Photos for the Program:** There is no speaker, and we rely on our members for entertainment! We love to hear new and familiar voices and see your favorite mushroom-related pictures. You are invited to contribute up to five digital photos to share and narrate. The photos will be inserted into a Power Point presentation before the meeting. Short video presentations on DVD format are also welcome. Please email your photos to Paul Hill at [photography@psms.org](mailto:photography@psms.org) by December 7th to be included in the program.



See you at the extravaganza!



In German and other European cultures, the mushroom *Amanita muscaria* is seen as a good-luck symbol—*Glückpilz* (Lucky Mushroom, colloquial "Lucky Duck, Dog, Devil, etc.")—and is "The Mushroom" of Christmas and the New Year, especially as a symbol of a blessing at the turn of the New Year. It honors a reverence of nature and the beauty of the forest. If you find one it is believed to bring you good fortune. It is acknowledged to be the most recognized mushroom on earth. This famous mushroom abounds in Christmas decorations, children's story books, and fairy tales.

As a good-luck symbol and a symbol respecting the beauty of nature, *Amanita muscaria* is a traditional ornament on German Christmas trees.





## HILDEGARD HENDRICKSON WILD MUSHROOM IDENTIFICATION CLINIC. WHAT IS IT?

Wren Hudgins

One service offered to the public by PSMS is wild mushroom identification. We have many club activities, but it's worth stressing that this identification clinic is not for members only; rather, it is for everyone. We have offered this service for many years, but after Hildegard Hendrickson, our friend and mentor, went missing a few years ago, we renamed the clinic in her honor. Brian Luther, chair of our identification and field trip committees and Danny Miller, our education chair, conspired to rename the clinic, a change which was welcomed by everyone involved. In the spring and fall seasons, we staff this clinic between 4 pm and 7 pm on Monday afternoons at the Center for Urban Horticulture. The starting and ending dates are not known in advance because the weather is not known in advance. However, these dates (different every year) are listed on our website and are accessible by everyone (not just members).

### Bringing Specimens

There are a few guidelines which would enable customers to maximize their experience.

#### 1. Identifiers need the entire specimen.

This includes underground parts. We are handicapped if the mushroom is cut off at ground level, or worse, if only the cap is brought in.

#### 2. We always prefer to have the actual specimen.

Increasingly people are bringing in photographs on their cell phones. We can rarely be 100% certain of an identification from a photo, but we're willing to try to identify from photos if there is time and no one with actual specimens is waiting. Our chances of a successful identification are increased if we have a photo of the entire specimen, including stem and underside of cap. Even with complete photos, we don't have an actual specimen we can magnify, test with chemicals, smell, and taste. These are all identification aids, and not having them is one reason photo IDs are problematic.

#### 3. The state of the mushroom is important.

Mushrooms are, on average, about 93% water. Once collected, mushrooms start to dry out. That moisture has to go somewhere. If mushrooms are placed in plastic bags or other non-breathing containers, all that moisture gets turned back on the mushroom and it starts to rot much more quickly than would otherwise be the case. Bring specimens in paper bags, open baskets, or anything that allows them to breathe. Identifiers won't be able to tell much about a rotten specimen, so the trip in to the ID Clinic won't be very satisfying for the customer.

### Who Comes?

Our "customers" come with varying degrees of mushroom knowledge, but basically fall into one of two groups. The first and largest group consists of those folks who are interested mainly in edibility. The second group is more curious, and members of that group want information beyond edibility. Often they have studied their

mushrooms before coming in and have educated guesses about identification. These folks tend to stay after their mushrooms have been identified so that they can learn from others. They take notes. They tend to ask questions. They often take photographs. Some might stay for the entire three hour length of the clinic (or most of it). Often, they return another week and do it again. These are our "regulars," but they are few in number compared to the total customer numbers.

The staff from PSMS usually consists of two or three experts who can identify almost everything that comes in, and then three to five developing or aspiring identifiers who know enough to be helpful to most customers but who need help from the "aces" when something esoteric comes in.

### How it Works

Identifiers set up one to three tables; each is staffed by one or more identifiers, and customers come to any table that is open. If all tables are full, customers simply sit down at the table of their choice and wait for their turn. If the clinic is busy, identifiers work rapidly, identify edible versus nonedible, label each species if desired, and move to the next customer. If the waiting customer seems interested in the process, we (identifiers) might slow down and offer information beyond edibility.

### When it Works Best

This process works best when we have as many customers as we have identification tables. When this happens, there is no rush, because no one is waiting, so we can slow down and actually discuss issues much deeper than edibility. We can discuss why this mushroom differs from its look-alikes and how we arrive at its identification. Customers and identifiers alike have the luxury of floating to other tables or consulting other identifiers for additional information. This is a time of learning for all of us. Speaking just for myself, this is the period of greatest satisfaction; when I maximize learning. I suspect the same is true for our regular customers because many of them have told me so.

### Who Benefits?

Everyone. The public benefits by having their questions answered. Whether they are interested only in edibility or whether they want deeper information, they usually come away satisfied. For identifiers, we have the ability to perform a public service and also to increase our own learning. PSMS needs to develop more identifiers and participating in the identification clinics serves that goal. The club also benefits because identifiers get the opportunity to promote the advantages of club membership and annual show attendance. Customers who come to the clinic undoubtedly talk to others who did not come to the clinic. That said, there are benefits to the larger community, even including those who never come to the clinic. I believe that we increase the safety of mushroom hunting in general because we frequently talk with customers about safety procedures, and hopefully that information gets passed on to non-clinic attendees. Beyond that, I think we increase interest in fungi generally speaking and I think we stimulate curiosity. Mushrooming is a somewhat geeky hobby but one quality that binds us all together is a high level of curiosity. Curiosity is a good thing.



## A LITTLE PLEUROTOID FUNGUS Brian S. Luther

This small, pleurotoid fungus (pleurotoid means having a short lateral stem) was brought in at the first PSMS field trip this fall. I initially identified it as a species of *Arrhenia*, but which one? DNA studies have shown that the genus *Arrhenia* has many species. The specimen turned out to be *Arrhenia acerosa*. Since I had never seen this one before, I thought I'd introduce it to our members.

### *Arrhenia acerosa* - Specimen Description

**Basidiocarp:** solitary or in groups of 2 or 3, pleurotoid; pileus (cap) up to 2 cm wide × 1.5 cm long, reniform (kidney shaped) in outline from above, dark gray-brown (“Drab”)\* when fresh, becoming blackish in old age, rubbery-gelatinous in texture; surface smooth, shiny, and somewhat translucent; margin mostly even to faintly undulate, inrolled and showing lamellae (gills) as striations through the cap context (flesh); context thin; lamellae well developed, narrow, thin, subdistant and concolorous with the pileus, with shorter marginal lamellulae common; stipe (stem) very short, lateral and grayish-white.

**Microstructures:** pileipellis (skin of the cap) a semi-gelatinous cuticle of radially arranged hyphae; hyphae 4–12(15) μm wide, thin-walled, hyaline (colorless in clear mounting media) individually, but brownish in mass due to pigmentation, with septa (crosswalls) and clamp connections abundant, but some have septa and no clamps, occasionally branched, with some of the uppermost (surface) hyphae having distinct spirally arranged pigment or hyphal wall striations, thickenings, or incrustations; contextual hyphae similar but without spiral incrustation, irregularly arranged and more highly gelatinized with abundant irregular refractive crystalline material throughout; cystidia none; lamellar trama (tissue) similar to contextual tissue; basidia 20–30 × 4–6 μm, clavate, and four sterigmate; basidiospores 6–7.5 × 4.5–5 μm, broadly ellipsoid to ellipsoid and lacrimiform (tear-drop shaped), smooth, hyaline (but white in deposit), thin-walled and inamyloid (no color change in Melzer's reagent or IKI).



*Arrhenia acerosa*, hyphae.

*Arrhenia acerosa*, basidiospores.



*A. acerosa*. Basidiospore on basidium at 1000×, mounted in 3% ammonium hydroxide & Congo Red.



*Arrhenia acerosa*, view of cap.



*Arrhenia acerosa*, view of gills.

**Habitat:** On moss in a mixed conifer forest of Douglas Fir (*Pseudotsuga menziesii*), Western Hemlock (*Tsuga heterophylla*), and Western Red Cedar (*Thuja plicata*). Arlington, WA. Sept. 24, 2016.

### Comments

This fungus keys out readily to *Arrhenia acerosa* in Watling & Gregory (1989), but they do not mention varieties. Barrasa & Rico (2003) discuss var. *acerosa* in detail and describe and show a photomicrograph of what they call “parietal encrusting pigment” on the pileal cells, which I mentioned in the description and show in the illustration.

This petite fungus could readily be confused in the field with some species of *Crepidotus* or *Hohenbuehelia*. However, *Crepidotus* has brown spores that are often ornamented and *Hohenbuehelia* has abundant thick-walled cystidia, and both are mostly lignicolous (i.e., growing on wood), unlike this species.

### References

Barrasa, Jose Maria & Victor J. Rico. 2003. The non-omphalinoid species of *Arrhenia* in the Iberian Peninsula. *Mycologia* 95(4): 700–713.

Watling, Roy & Norma M. Gregory. 1989. *British Fungus Flora: Agarics and Boleti*. Vol. 6. Crepidotaceae, Pleurotaceae and other pleurotoid agarics. Royal Botanic Garden, Edinburgh. 157 pp.



## FIELD TRIP REPORT, OCT. 15

Brian S. Luther

For nearly a week before this event, the weather forecasts looked bleak, with heavy rain and severe and potentially dangerous high wind predicted in Western Washington because of the peripheral effect of a powerful Pacific Ocean hurricane that was supposed to brush by us. Well, fortunately the predictions were wrong and the storm never materialized, at least where we were on Hood Canal. But the well publicized dire warnings kept almost everyone from attending except a hardy few.

Carolina Kohler and her husband James (Jamie) Rumbaugh volunteered to host, and all of you who missed this field trip also missed out on one of the best spreads of yummy breakfast snacks, coffee, etc., that I've seen in a long time. Carolina and Jamie also brought home-made oatmeal-pecan cookies as well as homemade grape and apricot jams—yum! Extra special thanks, James and Carolina!

The 10 o'clock meeting was brief. I distributed my information sheet relating to Washington State Parks and had a Q & A session. As usual, we were treated like royalty by the Washington State Park rangers and staff and had the use of the largest of the shelters, with lots of room and a big inside fireplace. Rick (Washington State Park employee) even brought us a big load of firewood to add to the two trips I had already made to bring some down from a house nearby.

With a grand total of 15 attendees, it was the smallest field trip I've ever seen. There were so few members that the field trip guides were actually going out with other field trip guides for collecting!

The park rangers were eagerly involved, finding specimens and asking questions, and they too enjoyed the big fire I kept going in the fireplace all day.

\*Color in quotes is from: Ridgway, Robert. 1912. *Color Standards and Color Nomenclature*. Privately published by the author, Washington, D.C. 43 pp. & 53 color plates.

Good edible fungi were scarce, owing in part to the very early season we had with heavy late spring rains, so the season started and ended earlier. Usually, you'd be tripping over mushrooms everywhere at this location and date, but the woods were quite devoid of mushrooms. Even so, 65 species were put on display. Nothing unusual was found for me to report on. Thanks to Wren Hudgins for helping with ID.

Potluck at 3:00 pm had even fewer attendees, but as always was very satisfying. Sure, it was a really wet day, but you never heard a complaint.

This ended the PSMS fall 2016 field trip season. I hope everyone had a good time, found some good edibles, learned a few mushrooms, and met new friends in the process. I'm working on finalizing the spring 2017 field trips at this moment, so stay tuned. I hope to see many of you next year. Please consider volunteering to help at field trips by hosting—it's very rewarding.

I wish all of you a great holiday season and a happy new year!

*Hosts James and Carolina and the morning snack spread.*



Brian S. Luther



### Field Trip Note:

Evan Bush wrote an excellent outsider's take on a PSMS field trip that was published in the *Seattle Times* October 19, and reprinted later in the *Peninsula Clarion*. If you missed it, try viewing

<http://www.seattletimes.com/life/travel/putting-the-fun-in-fungus-fungi-foragers-find-ways-to-get-out-in-the-fall-forest/>

or <http://peninsulaclarion.com/outdoors/2016-11-03/stalking-the-wild-fungi>



### HUNTING GASTRONOMIC GOLD IN ITALY'S TRUFFLE COUNTRY

<https://www.thelocal.it/>, Oct. 21, 2016

It is the early hours of the morning, and Giovanni Sacchetto is explaining why chilly autumn nights find him trailing by moonlight through the woods around Alba in the Piedmont region of northern Italy.

Sacchetto, 64, and his beloved canine companion Dora, a sprightly Lagotto Romagnolo, are on the hunt for white truffles, the hard-to-find fungi famed amongst foodies for their earthy scent, and their equally heady prices.

"I can go to bed at 11:00 pm and be up again at 3:00 am, ready to go out again," Sacchetto says. "It is not for the money. It is a sickness you have inside."

"A truffle is a strange thing. And it's lovely, because it's so strange. You never know where you might find one. Never."

Now nine, Dora has been Sacchetto's constant companion since she was an eager young puppy learning how to use her sensitive nose to sniff out truffles buried beneath the forest floor.

"I'm not saying it is better than a wife, but for a truffle hunter his dog is something...indefinable," Sacchetto says with a smile.

The Romagnolo breed is known for its acute sense of smell but individual dogs still have to be trained, starting with pieces of Gorgonzola, the whiffy Italian blue cheese, buried underground, before graduating to actual truffles.

Now when Dora locates a truffle, she wags her tail excitedly over the spot where a valuable tuber awaits—usually buried 10–30 cm (4–12 inches) below the surface.

For her it is a game—her efforts rewarded with a treat in the form of a biscuit or a little piece of dry bread.

Sacchetto was 14 when he first went truffle hunting, with his grandfather. At the time, it was about putting food on the table, he recalls. Now it is more of a hobby, but secret spots are still jealously guarded.

"I've been doing this for 50 years, I know all the plants, all the paths."



*Giovanni Sacchetto and Dora. Success!*



### WHITE TRUFFLE PRICES FALL AFTER HEAVY RAIN IN ITALY

**Dave Maclean**

<http://www.independent.co.uk>, Nov. 10, 2016

Heavy rain around Alba, Italy, means their white truffles are in abundance, and the price has been driven down. The season usually runs from November to January, but the perfect conditions this year means that they started sprouting up in September. \$109 will now buy about 72 g of truffles, according to Bloomberg, compared to 52 g in 2015.

Maybe this is the year to indulge yourself.



## FUNGUS CAUSES SLOE GIN DROUGHT

Amy Willis

Metro.co.uk, Nov. 15, 2016

A fungus is threatening to wreak havoc on Britain's crops of sloe berries this Christmas—putting supplies of sloe gin at risk.

*Taphrina pruni* appears to be at the heart of the problem, causing a condition in hedgerows called “pocket plum.” This causes the fruit of sloe, damson, and plum plants to distort and rather than growing into a round berry or fruit, they simply become a shallow cup shape.

George Anderson, for the Woodland Trust, said sloe harvests in Scotland in particular are down more than 80 percent. Affected areas include Buckinghamshire, Yorkshire, and Lancashire.

He wrote on the Woodland Trust website: “Reports have come in from Scotland to as far south as Buckinghamshire with particularly nasty outbreaks in Yorkshire and Lancashire.

“It is possible that weather conditions early in the year may have given the fungus a boost in 2016.

“Cold and damp conditions when the trees are in blossom allow it to enter the tree and take hold.”

One maker of sloe gin, a sweet alcohol made with sugar, gin, and sloe berries, said the crisis was so bad they were considering importing sloe berries from Europe.

Liz Crossley-Davies, at the Gin Bothy in Angus, Scotland, added: “Currently, we couldn't consistently supply sloe gin on a commercial level, unless we imported over from France.

“That's one thing we don't want to do. The hedgerows here used to be full of sloes, now they are still there, but they are more sporadic.”



## THE UNEXPECTED DANGERS OF MUSHROOM HUNTING IN FRANCE

<http://www.thelocal.fr/>, Nov. 14, 2016

Mushroom hunting is a popular pastime in France, particularly in certain parts of the country like Dordogne. But although it sounds like a harmless hobby, it comes with its own unique set of dangers.

### Radioactivity

One of which is radioactivity, believe it or not. A study published on Monday revealed that mushrooms in the Rhône-Alpes region

in southwest France are still contaminated by radiation due to the Chernobyl nuclear disaster 30 years ago.

The news site France Bleu Drôme-Ardèche revealed that scientists had found traces of Cesium 137, a radioactive element, in 36 out of 38 samples.

Julien Syren, who led the study, said levels of Cesium 137 were higher than expected and it was not due to just the Chernobyl disaster but the nuclear tests of the 1950s and 1960s.

Syren said the levels are lower than 30 years ago but added that the levels in some mushrooms tested were so high that if they had been exported from Japan, which experienced the Fukushima disaster in 2011, they would not have been allowed out of the country.

However even if the study appears alarming, the scientist said the chances of someone developing a cancer through eating the mushrooms on an occasional basis are “very minimal,” *Le Parisien* reported.

### Poisonous Mushrooms

There are other forms of toxic mushrooms out there in France, however.

In October nearly 100 people fell ill in just a week after eating poisonous mushrooms.

Hot weather and heavy rain boosted fungi growth and encouraged many people to go out picking, some perhaps without the necessary experience.

The government's health watchdog Anses was forced to issue safety advice that including advising people to avoid picking mushrooms near industrial sites, only pick ones that appear to be in good condition, and never pick ones that cannot be identified.

### Fines and Angry Landlords

And apart from toxins there are the landlords that can cause bother for mushroom enthusiasts in France.

Often pickers do not know that they need permission to hunt for mushrooms in privately owned woodland. If they don't then they could be liable to a €750 fine. Complaining there were no signs is no excuse in court.

And landlords in France are cracking down. In Dordogne security guards or wardens as they are called have been hired to ward off illegal pickers.

### And Then, There's the Hunters

In 2013 near Bertric-Buréé in the Dordogne department, a hunter shot two mushroom pickers who he thought were pheasants. One was shot in the neck and was still in hospital one year later.

The hunter was an 82-year-old deaf man who was not wearing his hearing aid, although it's not clear whether that would have saved the mushroom pickers.

### Getting Lost

And finally mushroom pickers can be their own worst danger.

There were several stories recently of mushroom pickers in the Cévennes and Alsace having to be rescued after getting lost in the forests.





## RADIATION-RESISTANT FUNGI

*Mycena News*, Myco. Soc. of San Francisco, Nov. 2016

It is amazing how often great scientific discoveries arise by accident, and the story behind radiation resistant fungi is no different. About 30 years ago, a routine test led the Chernobyl Atomic Energy Station in the Ukraine to explode radioactive material. Somehow amidst the debris, some fungi not only survived, they seemed to have adapted to the radiation and thrived, as noted by microbiologist Nelli Zhdanova at the Institute of Microbiology and Virology in Kiev. She and her team discovered these fungal oddities using robots to collect the material. Since then, these fungi have been preserved by Tamas Torok of the Lawrence Berkeley National Laboratory, who observed that “once the fungus discovered the radiation source, they grew directionally toward it.”

Upon closer look at the microscopy and morphology of these fungi, including *Wangiella dermatitidis*, *Cryptococcus neoformans*, and *Cladosporium sphaerospermum*, it was observed that the hyphae were particularly melanized, in other words they were black with melanin, suggesting that the presence of melanin could be a benefit to their adaptation to extreme environments (Dadachova et al., 2007; Dadachova and Casadevall, 2008).

Kasthuri Venkateswaran of NASA’s Jet Propulsion Lab and Clay Wang of USC School of Pharmacy decided to test these readily adaptable organisms in space. Their goal is understand how these super fungi might help humans be more resistant to radiation—think radiation therapy for cancer patients.

Venkateswaran is responsible for preventing microbes from contaminating space and other planets. Through his research he knows that gene expression is dramatically altered after persistent time in space. Wang studies how natural organisms could be used in pharma four strains of *Aspergillus nidulans*, and in July they sent some Chernobyl fungi, to the International Space Station (ISS) with a big question—will these fungi change? On August 26th the Dragon space capsule, loaded with space-grown fungi, dropped down in Baja California. The results have yet to be published, but Wang reported that they saw changes in their secondary metabolites (Love, 2016). This has huge implications for protecting people from radiation. This is a small step toward a much larger field of research. Little by little they intend on discovering how these compounds could be miracles amongst us.

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Dadachova E. A. Casadevall. 2008. Ionizing radiation: how fungi cope, adapt, and exploit with the help of melanin. *Current Opinion in Microbiology*, 11(6), 525–531.

Love S. 2016. What radiation-resistant space fungus can do for drug discovery. Web accessed October 21, 2016: <https://www.statnews.com/2016/10/11/space-fungus-drug-discovery/>.



Highly resistant to stresses, black fungi are real champions among microorganisms. With the support of the Austrian Science Fund FWF, a research team in Vienna discovered that the fungi owe their qualities to hitherto unknown proteins and special processes at cellular level.

They are true survival artists, not minding the cold any more than they do heat. Whether their environment offers little or plentiful oxygen, is wet, salty, dry or has contaminated soils, the black fungi keep their cool and feel at home in even the most inhospitable of living conditions. How do they do that?

“To our great surprise, the fungi show almost no stress response at all. This means something in their structure makes them inherently resistant to stress,” relates Katja Sterflinger. With the support of the Austrian Science Fund FWF, the microbiologist used a climate chamber to simulate different stress situations as the fungi encounter them in climatically extreme regions such as the Arctic or deserts. She first observed how the cells of the fungi, or, more precisely, its proteins, react to cold, heat, ozone, or aridity.

### Unique “Protein Tool”

Sterflinger heads the “Extremophile Center” at the Vienna Institute of BioTechnology (VIBT), University of Natural Resources and Life Science. The climate chambers, built specifically for the Institute, and the use of cutting-edge sequencing technologies have made it possible for the first time to identify the proteins of black fungi. “This was very difficult, because they are not like or even comparable to anything else we have seen so far,” notes Sterflinger. The researchers have now learned that the “microcolonial fungi,” as the technical term goes, have a unique protein system that enables them to grow both at 0°C and at 45°C. The microbes even survived a simulated trip to Mars. All it takes them to achieve that is some minor molecular adjustment. “Depending on whether it is hot or cold, the fungi will change a little. But that is just fine-tuning,” notes Sterflinger. This is actually a very smart move on the part of the fungi, because any dramatic changes would consume energy. The fungi have no need for that and therefore remain active even in low-nutrient environments such as glaciers or stone.

### Understanding Cellular Processes

In a next step, the team headed by Sterflinger matched the protein data yield with the transcriptome data, i.e., they analyzed the sequence of cellular processes. The researchers discovered that the cellular secret seems to be less related to the proteins than to the non-coding RNA (ribonucleic acid). These molecules are active in the cell without being translated into proteins. While their biological functions had been largely undetermined until recently, it is now known that they have an important role in regulating a variety of cellular processes. After all, only two percent of the genetic material that is actively read is translated into proteins.

### The Exceptional Talent of *Exophiala dermatitidis*

Among the hundreds of fungal strains the Viennese researchers have investigated to date, *Exophiala dermatitidis* has turned out to be a particularly versatile extremophile. This microfungus, also known as “black yeast,” is found across all temperature ranges from cold to warm and withstands simply everything. “It

*cont. on page 8*

**Black Fungi, cont. from page 7**

grows on glaciers just as in saunas and, unfortunately, also in our dishwashers. And it has the disagreeable property of being a human pathogen,” explains Sterflinger. This is the negative side of the fungus. On the plus side, it has an optimal talent for degrading hydrocarbons, i.e., toxins. This latter quality induced the microbiologists from the Extremophile Center to launch a second FWF-funded project in which they screened more than 200 black yeasts in their search for a biological “cleaner” for exhaust fumes and contaminated soils. Apart from *Exophiala* they found only one other fungus with the ability to degrade environmental toxins. Unfortunately, this second variety is also closely related to human pathogen strains, which meant that plans for using them as biofilters have been shelved for the time being.

**Medical Focus**

Instead, the experts from Vienna’s University of Natural Resources and Life Science now focus on medical issues and have set out to investigate the molecules of the pathogenic *Exophiala dermatitidis* more closely, since the fungus provokes infections not only in people with weak immune systems but also increasingly in individuals of average good health, as Sterflinger notes, underlining the relevance of her research for medical science. According to the microbiologist, the extreme stress tolerance of the fungus is probably related to its pathogenicity. “This is an area we still don’t know enough about. It is our goal to find out more about the virulence factors of the fungus.”

**PRESIDENT’S MESSAGE**

**Kim Traverse**

I took a few moments to look back over the accomplishments of PSMS this past year, and I believe we are doing a dandy job, both continuing to be the friendly, welcoming organization that we have always been while still managing to try out new things and add to our bag of tricks.

This spring’s Mushroom Maynia came close enough to making expenses that it seems clear that will be a sustainable activity and one that reaches out to a different audience than the Fall Show. ID Clinics during the spring and fall mushrooming seasons, now in their sixth or seventh year, continue to educate and keep people safe. Some Mondays we had crowds big enough to keep a half dozen identifiers *very* busy for most of the three hours we are open. The Fall Show, our second year in the new location of Bellevue College, is now running a bit above the past ten year’s average, and since this year was our turn to host the All-Sound Foray, we made it a little more elaborate to honor one of the founders of PSMS—our first president, Ben Woo. That event was so nice that we plan, in some form, to make it an annual event. Regular field trips are well attended, well run, and fun for everyone. We fill our classrooms several times a year. The treasury is stable and sound, membership is high, meetings are well attended, and everything we do continues to be a treat to participate in.

**A Happy Holiday Season to All!**



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