

SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 567 December 2020



May however you celebrate the season this year be safe!

COPING UNDER COVID-19 CONDITIONS: As Individuals and as a Group Wren Hudgins, PhD

This is a challenging article to write. As a psychologist who has worked the last 20 years in disaster mental health (Red Cross), I know some things about coping with disasters, but this one is unlike any flood, hurricane, landslide, or other natural disaster I have worked with.

Coping as Individuals

Right now, the American Red Cross (ARC), along with many other agencies, is busy teaching agencies with people on the front lines how to build resiliency in the face of a crisis and, beyond that, how to help others around us who are overly stressed. The base layer of this disaster is, of course, the virus, but there are more layers. We also have the social justice/injustice layer and then the economic fallout from the virus shutdown orders. Further afield we have wildfires all over the west and if we expand further, we have hurricanes and tropical storms. Physical distancing, a more

accurate term than social distancing, is good for physical health but detrimental to mental health, often leading to loneliness. Beyond loneliness we have many uncertainties related to the virus, such as possible mutations, vaccine availability, effectiveness, and more. Uncertainties tend to boost worry and anxiety. Finally, we all have losses now; we are experiencing loss of rituals like coffee with friends, graduations, marriages, and funerals, and tangible losses like jobs and even dwellings.

On an individual level, we all have our favorite coping strategies, and mine has always involved getting out in nature. One benefit of our shared hobby is that it draws us outdoors and into beautiful places. For me at least, there is nothing healthier.

Our club differentiates itself from many other clubs in that we do two things very well. We promote social connections, and we offer education. Unfortunately, for now we have lost many of the functions that served to bind us socially, like in-person meetings, field trips, and special events. We have also lost our most effective

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MEMBERSHIP MEETING

Marion Richards

The December meeting will be held Tuesday, December 8, 2020, at 7:30 pm. As in previous months, it will be via Zoom (online). The link will be available on the PSMS homepage at psms.org.

Our speaker for December will be Chef Chad Hyatt, and his presentation will explain why it is time to question the standard lore about mushroom cookery. Beliefs about how to handle and cook mushrooms, where they fit into a meal, and even what mushrooms are good to eat seem driven more by superstition and tradition than by an understanding of their flavors, aromas, and chemistry. Hyatt's presentation will take a more modern look at their cooking. Learn some useful tools to breathe new life into your mushroom cooking, with the help of some easy, delicious recipes anyone can try at home. If all goes well, this program should change the way you think about cooking mushrooms.



Chef Chad Hyatt

Chad Hyatt is both a highly knowledgeable mushroom hunter and a classically trained chef, based out of the San Francisco Bay Area. He recently released an innovative new wild mushroom cookbook, *The Mushroom Hunter's Kitchen*. Chad frequently teaches wild mushroom cookery at private and public events, does wild mushroom pop-up dinners, and leads mushroom walks. His unique perspective and knowledge base have made him a fixture at wild mushroom related events around the US in recent years.



In mid-December Yahoo will cease to host its group lists. Marian Maxwell and Pacita Roberts have worked with Vieth, our web server, to enable PSMS to use the automated mailing list program ListServ through our Website. Invitations to transfer are being sent out to the membership.

It's time to nominate board and officer candidates for the election in March! Up for election are five trustees and two officers, president and secretary. All positions are for a two-year term from April of 2021 through March of 2023. Requirements for officers are a minimum of 4 years membership and 1 term as a trustee. You can encourage friends or self-nominate. Contact the PSMS Elections Committee at elections@psms.org for any questions regarding the PSMS elections.

A limited number of PSMS cookbooks are left and available to purchase before the end of the year. The cost is \$25/book plus shipping and handling. Requests will be filled in the order received as long as the books last. Contact volunteers@psms.org with questions or requests.

COVID Coping, cont. from page 1

venues for educating, such as field trips, the annual show, and in-person ID clinics.

We have all faced adversity before, such as partner breakups, illnesses, job changes, and physical relocations. Resiliency is the capacity to bounce back from a negative change and make forward progress. We have probably all done this on a personal level. How different is it to be resilient as an organization?

Coping as an Organization

Depending on which studies you look at, there are different components of resiliency. I'll focus on four:

- Accepting change
- Strengthening social connections
- Having a sense of purpose
- Having hope.

Accepting Change

Change usually brings anxiety, and nobody really wants that. We like sameness because we know how to cope with that. But change is inevitable, and the task at hand is not only to figure out to handle the change but, beyond that, to actually make forward progress. If you take a new job that requires new skills, you may be anxious at first, wondering if you can learn the new skills well enough and fast enough. But you do, and then you have not only new skills but also a higher level of self-confidence. You are more resilient than before. Actually, most of our progress occurs in periods of change.

In PSMS, we are adapting to the new virtual world. We just offered two of our 101 classes (Beginning Mushrooming), each with four sessions, all on Zoom. That may not sound like much of an accomplishment to the casual observer, but it required organizing a team of about ten people to teach and assist with technology. Even before that, it required review and revision of four slide decks, the creation of several new videos, and a number of practice sessions. Likewise, we mounted a virtual annual show, doing our best to offer something of value in place of our regular annual show. In addition to interesting lectures, the virtual show resulted in the creation of new videos. These new videos represent net forward progress. The club did not have them before. We now have the chance to use them in creative ways in the future. One example of this is the ability we now have to offer classes at any time of the year, whereas up until now we felt limited to the mushroom season.

Social Connections

There is much research here. Those with strong social connections are more resilient and happier as well. The direction of causation flows both ways. Happy people develop better and stronger social connections. They are good at relationships. Likewise, people who develop strong social networks become happier.

As helpful as Zoom is, it's no substitute for a handshake or a hug or sitting down for coffee with a good friend. A 1999 study at Penn State showed that hugging made people much happier than reading. A follow-up study replicated that finding, went further, and showed lower levels of stress and pain in the hugging group. Strengthening social connection in a virtual world is a challenge.

Virtual connecting on any platform does carry the advantage of connecting with people in faraway places and connecting with

groups of people who live at a distance from each other. In our club, we can now have speakers for our monthly meetings from other states or plausibly from other countries. As a club, we may be able to join meetings of other state clubs or even with NAMA. So, some club level connections, not available before, might be possible now. On an individual level, some club members are self-organizing into small, safe foraging groups, respecting all guidelines.

Sense of Purpose

Without a sense of purpose, one has no sense of direction. The main purpose of PSMS is education. This refers to both inward-facing education (our members) and outward-facing education (the public and the scientific community). While we don't have the usual array of tools available to us, we are nonetheless continuing to do our best at educating.

We are managing to offer classes, interesting lectures monthly, online ID clinics, and some special events like our recent virtual show.

Many members may not be aware, but Danny Miller is conducting extensive DNA research and gradually determining which PNW mushrooms we really have and what the accurate names are. Previous research by others has revealed that several mushrooms we have known and loved for decades do not really fruit in the PNW. Some examples include *Tricholoma magnivelare* (matsutake), *Hydnum repandum* (hedgehog), and *Morchella esculenta* (yellow morel). Many familiar mushrooms, such as *Russula brevipes*, really constitute a group of closely related but different mushrooms. Work such as Danny's isn't aimed at just satisfying curiosity; it also advances science.

Ordinary citizens can aid science by careful observation, recording details, and then submitting the data to websites like iNaturalist. Our Bridle Trails project is an example of this process. I believe our commitment to education is strong.

Hope

If you don't have hope that you can get that job, then you don't apply for it or don't prepare for the interview. If you don't believe that you can run a 10K race, then you never start training. I believe we do have hope that we can continue to execute our mission of educating, possibly even improving the ways we do so by tapping into a huge pool of potential speakers nationwide (or further), by teaching classes at different times of the year, by relying on newly created videos to teach classes without burning out instructors or when key instructors aren't available, and by continuing to produce new education videos. Danny Miller's DNA research continues perhaps more strongly than ever and promises to be a major contribution to science. This research is updated often and can be found at

<http://www.alpental.com/psms/ddd>.

Conclusion and Recommendation

So, looking at what we are doing in the club relative to what the research tells us about resiliency, I think we are doing well. We will certainly survive and hopefully even thrive. These are bold words I know, uttered when there is no end in sight to this crisis. But history shows that all crises end, no matter how endless they might look or feel from a vantage point in the middle.

cont. on page 4

CALENDAR

- Dec. 8 Membership meeting, 7:30 pm, via Zoom
- Dec. 15 *Spore Prints* deadline
- Dec. 21 Board meeting, 7:30 pm, via Zoom

BOARD NEWS

Luise Asif

Wishing you all the best for the upcoming holidays and year end. This has been a year of more downs than ups, but we survived and did much better than anticipated. A reminder that there will be no Holiday Extravaganza this year. Marion Richards is providing an exciting speaker for the membership meeting on December 8.

The board unanimously approved support for the campaign by the Burke Museum to fund an endowment for a PhD level research mycologist at the UW herbarium to oversee the mycology collection, an internationally renowned resource. The Stuntz foundation pledge was matched by PSMS to create a matching fund to encourage donations to double the amount. The Burke Museum is at the halfway point for full funding. The long-term benefits to research, the Pacific Northwest, PSMS, and regional mushroom clubs are limitless. The endowment will honor Prof. Daniel Stuntz and Patrice Benson.

Coping, cont. from page 3

Meanwhile, we are all experiencing some level of stress, even those who think they are not. We are not as patient and kind with each other now as we normally are.

So, borrowing from the research literature on happiness, my recommendation is to make a big effort to practice gratitude and kindness right now.



FOR ASYMBIOTIC GROWTH OF ARBUSCULAR MYCORRHIZAL FUNGI, FEED THEM FATTY ACIDS

<https://phys.org/>, Nov. 9, 2020

Scientists around the world have been working to grow arbuscular mycorrhizal (AM) fungi without their host plants because they can be used as organic fertilizer in agriculture and forestry. AM fungi help plants receive nutrients from the soil through a network that is efficient and far more reaching than their own roots can provide. A group led by graduate students Yuta Sugiura, Rei Akiyama, and Associate Professor Katsuharu Saito of Shinshu University successfully demonstrated that AM fungi can be grown asymbiotically when given myristate as a carbon and energy source.

The history of the relationship between AM fungi and plants growing on land goes back 460 million years. For the first time in their 460 million year history, arbuscular mycorrhizae are about to gain independence from plants, so that they can be used to help plants grow in less fertile soil. Corresponding author Professor Saito states “although it was considered difficult, AM fungi has been successfully grown in a culture medium. With advancements, microbial materials for agricultural use can be produced.”

“The growth speed and efficiency is still low, and we are working on spore formation so the next generation can be grown. We hope to work on a collection of cultures that can be grown independently and be applied for use in agriculture.” Currently, the only way for



Asymbiotic hyphal growth.

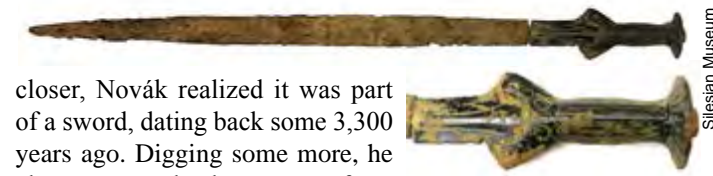
AM fungi to be used in agriculture is with their host plants, making its use as fertilizer expensive and hard to implement. With the advancement in asymbiotic culture, the hope is that less chemical fertilizer will be needed for use in agriculture.

CZECH MUSHROOM HUNTER DISCOVERS BRONZE SWORD DATING BACK 3,300 YEARS

Dan Avery
[Dailymail.com](https://www.dailymail.com/), Nov. 13, 2020

A man hunting for mushrooms came away with more than just a bunch of fungus—he discovered two rare Bronze Age weapons.

Roman Novák was foraging for fungi after a rainstorm in Jesenick, a small town about 150 miles from Prague, when he noticed a piece of metal jutting out of the ground. Examining it



closer, Novák realized it was part of a sword, dating back some 3,300 years ago. Digging some more, he also uncovered a bronze axe from the same era nearby. The discovery has led local archaeologists to plan an excavation in the area.

The sword has an octagonal handle, with a bronze hilt intricately carved with circles and crescents.

Silesian Museum

“It had just rained and I went mushroom-picking,” Novák told Radio Prague International. “As I went, I saw a piece of metal sticking out of some stones. I kicked it and found that it was a blade, part of a sword.”

Archaeologists who examined both pieces say they date to about 1300 BC, when the Central Europe’s Urnfield culture was just emerging and Jeseník would have been sparsely populated.

Unlike later iron swords, which are hammered into shape while still red hot, bronze swords were made by heating the metal until it turned into a liquid and then pouring it into a mold.

The sword has an octagonal handle, with a bronze hilt intricately carved with circles and crescents. The blade, which is broken near the base but otherwise intact, resembles weapons used mainly in what is now Northern Germany.

“They were obviously trying their best, but the quality of the casting was actually pretty low,” said Jiří Juchelka, director of archaeology at the nearby Silesian Museum. “X-ray tests show that there are many small bubbles inside the weapon.”

Because of that, Juchelka believes the sword was more ceremonial than something used in combat. Nevertheless, it’s only the second of its kind found in the region.

When the excavation of the area is complete, all the items will go on display at the two museums.



POLISH VILLAGER FINDS STASH OF 17TH-CENTURY COINS WHILE LOOKING FOR MUSHROOMS

John Beauchamp
<https://www.thefirstnews.com/>, Nov. 6, 2020

A mushroom picker had the shock of his life when he fell off his bike and found himself lying next to a haul of coins dating back to the 17th century.

Boguslaw Rumiński had been looking for mushrooms in woods near his home in the tiny hamlet of Jezuicka Struga when he slipped and went sprawling into the undergrowth.

Putting his hand out to break his fall, he discovered he had grabbed a handful of coins.

Closer inspection revealed the six silver coins dated back to the reign of King Jan II Casimir.

Stunned Rumiński then noticed a further 60 coins spread around him before contacting the regional Conservation Office in Bydgoszcz to report his incredible find.

The following day, he returned with Conservation officers who after sweeping the ground with a metal detector found another seven coins.

With interest in the case rising among heritage conservationists, the following day another group of officials visited the site, this time with an archaeology professor from the Adam Mickiewicz University in Poznań.

They uncovered a further 13 coins; in all, the tally came to 86. Most of the haul consists of six-groszy coins, although a number of higher-valued coins also appear, such as the “orta,” a coin worth 18 groszy.

The coins dated between 1657 and 1667 during the reign of Jan II Casimir, pointing to their minting shortly after the Deluge, a series of wars with Sweden throughout the 17th century which wreaked havoc and destruction throughout the Polish-Lithuanian Commonwealth.

Academics believe that the coins were also hidden shortly after being produced: despite them having a high level of verdigris, some of the coins look as if they are in mint condition.

The coins have been passed on to the regional Conservation Office, which is to appeal to the Ministry of Culture and National Heritage to reward Rumiński for lawfully notifying the authorities.

After restoration work, the coins are to be donated to the Jan Kasprowicz Museum in Inowrocław, in the district where the coins were found.



17th century Polish coins found by a mushroom hunter.

Szołk Rojewo

DEVASTATING COFFEE LEAF RUST CONFIRMED IN KONA, HAWAII

various sources, Nov. 10, 2020

Coffee leaf rust (CLR), the devastating disease known to coffee growers around the world, has been found for the first time in the Kona coffee-growing region on Hawaii island. The U.S. Department of Agriculture National Identification Services confirmed the pathogen in samples that were collected on October 31 by a Kona

coffee grower in Holualoa. Meanwhile, suspected samples from Hilo on the other side of the Big Island mentioned in an earlier news release from Hawaii agriculture officials tested negative for the disease.

A few days before CLR concerns were raised on Hawaii island, the coffee pest was confirmed for the first time in the State of Hawaii, in the Haiku area of Maui.



Leaves showing coffee leaf rust.

Hawaii Dept. of Agriculture

Coffee leaf rust is caused by the fungus *Hemileia vastatrix*. There is no cure at the moment, although farms have managed to reduce their impact by replanting infected areas with hybrids that have a strong genetic resistance.



NEWLY FOUND PROTEINS STOP FUNGAL “BLEEDING”

Viviane Callier

<https://www.the-scientist.com/>, Nov. 12, 2020

Fungi produce thread-like roots called hyphae, which branch and fuse with one another to form a vast, interconnected network—the mycelium. This network allows fungi to grow rapidly, transport nutrients, and even share information about the local environment over long distances. But it is also vulnerable; a wound could lead to catastrophic bleeding of protoplasm that can lead to death. While some fungal species separate their filaments into compartments with septal walls that can limit leakage, other fungi do not make walls, and mycologists haven’t known how they respond to an injury.

Now, a team at the National University of Singapore has discovered their secret—large, mechanosensitive proteins called gellins that have not been described before. When a hyphal filament is injured, the pressurized liquid protoplasm inside the hyphae gushes out. Immediately, gellins inside the hyphae respond to the shear stress of the protoplasm flow by quickly cross linking, unfolding, and sticking to each other and to cell membranes. The cross-linked gellins form a gel plug at the site of injury almost instantaneously, preventing the fungus from losing all of its protoplasm, evolutionary cell biologist Greg Jedd of the National University of Singapore and colleagues report in *Current Biology* on November 12.

“What’s super neat about the gellins is that you’re using a physical cue to drive phase separation,” says cell biologist Amy Gladfelter at the University of North Carolina-Chapel Hill who was not involved in the study. That is, shear stress of the rapid flow of protoplasm at the injured site triggers the gellins to unfold and cross link, creating two distinct phases in the protoplasm—liquid and gel. “There aren’t too many examples of that.”



FINNISH TRUFFLE HUNTERS STRIKE BLACK GOLD WITH FUNGUS HARVEST

<https://newsnowfinland.fi/>, Nov. 7, 2020

When Labradors Noora and Neea put their specially trained noses to work, they're striking black gold in southwest Finland—but this black gold isn't oil, it's truffles.

The dogs are rooting around in the undergrowth to find the latest crop of the luxury fungus, which can take a decade or more to grow.

Truffles, more usually associated with Southern European countries and famously unearthed by pigs, are now also found in some specific farmed areas around Turku, Finland.

"The story of truffle is the same as caviar which used to come from nature and the wild, but now comes from sturgeon farms" explains Lars Ingman from Baltic Truffle.

"It's the same with truffles. Since the 1970s they are planting truffle orchards; you can inoculate oak, hazel, hazelnuts and grow them in a special substrate to develop an inoculated plant. Most truffles come now from these big established truffle orchards in France and Italy" he tells *News Now Finland*.

The earliest efforts to cultivate truffles in the 19th century ended up being wildly successful—by taking seedlings from individual oak trees known to produce truffles in their roots, and re-planting them in large orchards.

However, several factors including the relatively short productive lifespan of the trees; increasing migration away from the countryside; and the loss of labor and agricultural land during WW I in France meant those 19th century orchards were largely lost, making the truffles a more rare and valuable commodity once again.

After a long wait, Lars Ingman has finally hit the jackpot, with his truffle harvest this year producing several kilos.



Martin Ingman with truffle-hunting Labradors Noora and Neea.

The first truffle, weighing just under 60 g, was found by Lars's son Martin Ingman and his truffle dog Neea in early October.

But then came a huge—and unexpected—discovery.

"When Noora, bred as a truffle dog, discovered a giant black Burgundy truffle, it was obvious that the discovery was significant even for Europeans. It's an exhibition or competition class Trophée truffle" explains Lars.

The giant truffle weighs 424 g, a rare size even in traditional truffle-growing areas of continental Europe and worth as much as €2,000.

Ingman decided to sell the truffle and use the proceeds for charity. The sale price of the truffle will be donated to the Apuna Association which works with low-income families—and will help towards the cost of a Christmas meal in a restaurant.



File picture of 424 g Finnish truffle.

The giant truffle might be a once-in-a-lifetime discovery but home-grown Finnish truffles are destined to become more common.

"They will end up in Finnish restaurants for sure. Executive chefs have said they want them because they are excellent quality and very competitive prices" explains Baltic Truffle's Lars Ingman.

"An unripe truffle has not much flavor at all but when it ripens it develops this tantalizing flavor."



Dick Sieger to Paul Kroeger, *Vancouver Myco. Soc.*:

For years I've thought that *A. muscaria* and *B. edulis* frequently fruit together. Now it occurs to me that if one looks often enough for the two fruiting together one will sometimes find the two fruiting together. Do you think there really is a relationship and, if there is, what is it?

Paul Kroeger to Dick Sieger, *PSMS*:

I think there is a very strong association with *Amanita muscaria* and *Boletus edulis*. This is especially evident in the city, every place I find *Boletus edulis* is always very productive of *Amanita muscaria* too. I also saw a stunning and very explicit example in 1998 or a bit later when I visited the Bowron River clearcut, which was cleared in the early 1980s to control spruce budworm infestations. Some 15 years later the plantation of lodgepole pine and Doug fir was absolutely carpeted with both *Amanita muscaria* and *Boletus edulis* as far as the eye could see. The clearcut was about 300 square kilometers in size. Very few other mushrooms were present. The two species like the same host trees and appear at the same age or successional stage of their host trees and I assume like the same soil chemistry and structure too.

"THE TRUFFLE HUNTERS": A STRANGE AND CHARMING ODE TO RARE DOGS

Peter Bradshaw

Theguardian.com, via
The Spore Print, L.A. Myco. Soc., Nov. 2020



A still from *The Truffle Hunters*.

[*Movie Review*] An involving Luca Guadagnino-produced look at the world of truffle hunting doubles as a sweet study of the relationship between old men and their dogs. A strange, funny, mysterious, and rather beautiful film about an activity that's *recherché* to say the least: truffle hunting, and it is a taste on which my palate still needs educating. (A very distinguished French film producer once took me and my colleague Xan Brooks out to lunch at a restaurant renowned for its truffles and when we failed to show the correct ecstasy, his expression of disappointment was almost priestly.)

This film is also a heart-wrenchingly sweet study of the pure love that exists between old men and their dogs. The directors are Michael Dweck and Gregory Kershaw, who made the 2018 award winner "The Last Race" about a stock-car racing track threatened with redevelopment. With that and "The Truffle Hunters," these film-makers are developing a sympathy for arts (and artists) who may be dying out. Luca Guadagnino is the producer.

In the forests of Piedmont in northern Italy there is to be found a certain exquisite form of white truffle prized by connoisseurs and gourmards and restaurateurs the world over—and they are prepared to pay big money. The film shows auctions for these dusty, bulbous fungi with buyers showing the kind of overexcitement more associated with sales of wine or contemporary art.

These truffles can't be farmed or grown in a lab. They can only be found by about half a dozen old, gnarled truffle-divining Italian guys and their dogs who have spent decades of their lives perfecting the art. They often hunt at night so that their rivals can't find out where their top spots are. And notoriously, they are not training any young apprentices or letting anyone in on the secret. So their truffles are getting more and more mind-blowingly expensive because there is a real possibility that the truffles will vanish when the hunters die off. But the rising price and the rising cult of the truffle is keeping these mischievous, fascinating and stubborn old men alive. Scenes of them roaming through the dark forests reminded me of Roald Dahl's descriptions of poaching in England.

Dweck and Kershaw show them in a series of formally composed tableaux, often consisting of two men (and it is a very male world: the only woman present is the aged and exasperated wife of one hunter in his late 80s, and she wants him to quit). Truffle hunters chat and squabble among themselves. A truffle broker sets up a sale with another man on a street corner as if he is doing a drug deal. A priest carries out a blessing on a hunter and his dog and in

another scene reassures him that truffle-hunting will exist in heaven too. One angry old hunter (also a poet) types out an explanation of why he's quitting the business and talks about how young people appreciate nothing—certainly not the challenge that men of his generation faced in undressing young women, a matter of getting past endless layers and then thick black stockings: "... when you arrived at the thighs you found butter."

Another truffle hunter talks about how younger truffle enthusiasts don't want "to play with their dogs or spend time in nature—they just want money."

You don't have to watch this very long to realize that truffles aren't the point—dogs are. I don't think I have seen a movie recently with quite such a passionate devotion to dogs. It's a film to leave you with a smile on your face.

SKUNK ODOR—DEFEAT BY FUNGUS

David Tamblin

Mycofile, Vancouver Myco. Soc., Summer 2020

Skunks are one group among our diminishing wildlife that have had some success with urban living, and many VMS members likely have stories of unfortunate stinking encounters to tell. The malodorous experience comes courtesy of thiols, organosulphur compounds often with offensive smells, e.g., a thiol is introduced into natural gas to give it a sulphuric, rotten egg smell so you can tell when there is a gas leak. In skunk spray there are at least two thiols. Lots of the standard folk remedies for dealing with a spraying just don't cut the mustard, but there is a fungal remedy, not quite at hand but with some potential.



Tolypocladium is a genus of small ascomycetes that was split from *Cordyceps* many years ago. The best known species of *Tolypocladium*, *T. inflatum*, is the producer of cyclosporin, an important immunosuppressant compound. Now another *Tolypocladium* (doesn't have a species name yet), is becoming known for releasing pericosine A.

Pericosine A is a common molecule in nature. The connection with skunks came from discoveries made in the laboratory of Dr. Robert Cickewicz at the University of Oklahoma and published together with his associates in two papers. A longer lay account of the organic chemistry together with diagrams (and video of cavorting skunks) can be found at

www.dailykos.com/stories/2019/8/30/1882255/-Hail-biodiversity-Weird-mushroom-cranks-out-a-chemical-that-neutralizes-the-odor-of-skunk-spray.

The key part of the story is that the researchers found that when a molecule of pericosine A and a thiol meet, the two can spontaneously join up and make a bigger molecule with different properties. In the case of the smelly skunk thiols, and the product is odorless!

Unfortunately, for now it seems there is little prospect of this discovery having a viable commercial application, so readers will still have to rely on their baking soda and peroxide solutions (or whatever) if they have a distressing encounter of the skunk kind.

A POCKET-SIZE DISSECTING MICROSCOPE

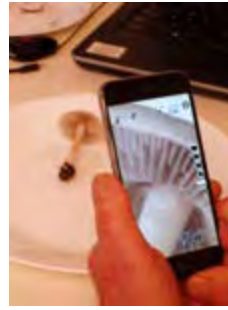
Dick Sieger

I recently discovered that my old iPhone and iPad can be used as a hand lens or even pocket-size dissecting microscope.

A 10× hand lens is a basic tool for mushroom identifiers, but it has some limitations. The lens is close to one eye and the mushroom is close to the lens. That can make it hard for light to get past your head, hand, and the mushroom. Manipulating a mushroom with just one hand can be difficult, and the lens has a narrow field of view.

A dissecting microscope is more useful, giving binocular vision, built-in illumination, greater magnification, and a wide field of view. It does have a few limitations, however. It isn't portable, it needs an electrical outlet and a table to use it, and it's expensive. (iPhones aren't cheap, but they have a few other features you can use when you're finished looking at mushrooms.)

Enter the SuperVision+ Magnifier app. It's free and ad-free and available from the App Store for even older iPhones. It's designed to help folks with visual impairments read, but is also quite useful for looking at mushrooms.



SuperVision+ is friendly and simple. A tap on the *i* icon brings up a concise help screen with all you need to know.

Start the app and move your phone around for various views of your mushroom. Focusing is automatic. Stabilization is automatic. Turn on the light for a better view. Use the sliding bar to adjust magnification. Try the fixed focus mode to bring small areas into sharp focus. When you're ready, freeze the image. Expand and pinch your fingers to change magnification. Move the image around with a finger. Tap an icon to save it in a SuperVision+ album. Make more images and save them. Scroll through the album and work with your images. Admire your mushroom and identify it. Now put a few images in your iPhone album. Voilà!

The late mycologist Walter Sundberg showed that things seen with a 10× hand lens can indicate the presence of microscopic features. For example, a fringe on the edge of a gill may be evidence of diagnostic microscopic cells (cheilocystidia).



Happy Holidays



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