SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 578 January 2022

TRUFFLE HUNTERS STRIKE GOLD IN GEYSERVILLE, CA

Heather Irwin

https://www.sonomamag.com/, Dec. 2021

Nine years is a pretty long time to wait for your first harvest, but not if you're a truffle grower in Sonoma County.

Last Wednesday, after pacing through his family's Geyserville hazelnut orchards with Leo the truffle dog, Seth Angerer finally found a truffle—specifically, a 5.03-oz Sonoma County black *Tubor melanosporum.*

Fran Angerer

Seth Angerer and his dog, Leo.

It's the first cultivated truffle found in Alexander Valley, according to Angerer's father and collaborator, Fran Angerer. The family seek out the rare and valuable culinary fungus with their truffle-hunting Lagotto Romagnolo dogs, a specialized breed with a keen sense of smell and a curly-haired face so cute it's painful.

Fran Angerer

The black truffle found by Angerer.

"We've been waiting nine years and eight months, and we haven't found anything. Every year we get more and more discouraged," said Fran Angerer, who previously worked with Jackson Family Wines on their truffle properties in Sonoma County.

Sonoma County's first cultivated black truffles (called Périgord truffles) were harvested in 2017 by the Jackson Family Wines team after inoculating hazelnut and oak trees in 2011. (Farmers grow truffles by inoculating the roots of saplings with truffle spores. Years later, they harvest the truffles, hopefully.)

The truffle hunting season typically runs from January to March, so an early truffle in November was a particularly exciting find for the Angerers. The fact that black truffles can command up to $95 per ounce is just as exciting.

Upon finding the esteemed fungi, Seth Angerer posted a Facebook video in which he pointed at the still-earthbound truffle with a spade. "It's a big deal for us," he said in the video. "We're waiting for the whole family to show up so we can all (dig it up) together and take it in."

"You just don't dig it up," Fran said by phone. "Seth called me and was shaking. I called my wife and we all hopped in the car."

Fran's other son, Nathan, also chimed in. "The feeling is just unbelievable after all this time. We were all crying and laughing and the dogs were going crazy," he said.

To mark the occasion, the family took the prized truffle to Valette restaurant in Healdsburg, where Chef Dustin Valette prepared a seven-course meal with their truffle as the star of the show.

"It was awesome. We had quite a celebration," Fran said.

Truffle growing is a long game, typically marked by frustration and disappointment. In the 1970s Henry Trione sparked truffle fever in Sonoma County when he staged the first California Truffle Congress in Santa Rosa with hopes that the oaks in Northern California could be hiding the same delicious fungi as their cousins in France and Italy. And while truffles were found, they weren't high quality, or even edible, quashing early enthusiasm. Trione's passion did, however, spark an ongoing interest in truffle growing here.

That enthusiasm spawned the decade-long dream of growing truffles for the Angerers, who own Angerer Family Farm and Alexander Valley Truffle Co. They've have gone at it alone, investing in several hazelnut orchards that are inoculated with *Tuber melanosporum*, a prized strain of truffles from Burgundy. They're also experimenting with white Italian truffles that Fran hopes will come to fruition soon.

"It's a huge investment to maintain with no product for nine or 10 years," Fran said. "Every truffle grower goes through a time when you start asking yourself if you're crazy. You start having a bad attitude going into the hunt, but then all of the sudden, there it is. That's the truffle experience."

A VACCINE AGAINST VALLEY FEVER FINALLY WORKS—FOR DOGS

Maryn McKenna

https://www.wired.com/, Nov. 11, 2021

An experimental vaccine that could protect millions of people living in the American Southwest from valley fever—an infection caused by a soil-dwelling fungus that is difficult to treat and can cause disability and death—has passed its first test of efficacy and is moving toward federal approval, possibly within two years.

The catch: The vaccine was tested in, and will be developed for, dogs. A formula that could be given to humans, if it can be achieved, lies many years and millions of dollars down the road. But researchers say even this first step is notable, a significant milestone on the way to preventing potentially hundreds of thousands of human cases a year.

To be clear, this vaccine is needed for dogs, too. For reasons that are not well understood, they develop the disease and its most severe manifestations at higher rates than humans do. In some Arizona counties, 1 in 10 dogs develops the disease each year, and it is the No. 1 cause of dogs being surrendered to animal control. A vaccine that could protect them would save loved pets from suffering and reduce the costs borne by owners and shelters.

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CALENDAR

Jan. 11 Membership meeting, 7:30 pm, CUH
Jan. 17 Virtual Board of Trustees meeting, 7:30 pm
Jan. 18 *Spore Prints* deadline

BOARD NEWS — Valerie Costa

There is no report from the December Board meeting since it is happening after the deadline for *Spore Prints* this month. But we still have updates for you!

We are seeking Board nominations for five trustees and two officers for two-year terms from April 2022–March 2024. If you're a current PSMS member and would like to serve the organization in a leadership role, please consider running for the Board. If you're interested contact elections@psms.org. We're also looking for volunteers who take on two key roles: chair of the Grants & Scholarships Committee and Book Sales chair. Please email asif@hotmail.com or the Board if you're interested.

On another note, the December general membership meeting, reworked as a COVID-safe event, was a blast. Randy Richardson called the meeting to order with his morel-capped staff, decorated with festive lights. Many thanks to Marian and Scott Maxwell for coordinating the event, procuring door prizes, and sending us off with thank you gifts. Taylor Lockwood's film *In Search of the Holey Veil* entertained the crowd of 100, many who were new members of PSMS. Thank you to everyone who donated silent auction items—we raised $714 for the Ben Woo Scholarship Fund.

MEMBERSHIP MEETING — Scott Maxwell

Our first membership meeting of 2022 will be held on Tuesday, January 11, 2022, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

In line with the mandates provided by the University of Washington and the State of Washington, masks will be required and, by vote of the PSMS Board, proof of vaccination will also be required. We hope that as COVID-19 vaccines become available to people of all ages, we can again include all of our membership, as PSMS has always been a family friendly organization.


Larry Lee.

This month we will again feature a long-standing member of PSMS, Larry Lee. Larry works as a professional in the field of Industrial Hygiene and owns his own business in that field. He will present on the topic of "Mold—A Four Letter Word." He will be discussing these under-appreciated fungi, their benefits, their potential health effects, and mythologies surrounding them.

Larry and his family have been members of PSMS for over 10 years. He has been a two-term board member and has enjoyed working in the sales booth at many of our annual wild mushroom shows. Larry is a certified industrial hygienist who specializes in indoor air quality, infection prevention, and construction for healthcare institutions. In his professional career, he has developed substantial expertise in regard to molds. It should be noted that Larry's family (wife and son) have also volunteered many hours in the support, development, and comradery within our club.

DISCOVERY OF A FUNGUS-EATING WORM WITH 1306 FEET IN AUSTRALIA — various sources

Dec. 17, 2021


Eumillipes persephone.

In a deep hole in the ground in a mine area in Australia, scientists have discovered a blind worm that has the largest number of feet of all known animals—1306. The previous record was a millipede with only 750 feet found in California.

The light-colored, thread-like worm, 95 mm long and about 0.95 mm wide, has a conical head, a crane-shaped mouth, large antennae, and no eyes.

The new worm has been named *Eumillipes persephone*, after the queen of the underworld in ancient Greek mythology. They were found as deep as 60 m (200 ft) underground. The new species lives in complete darkness in a habitat rich in iron and volcanic rocks. Because they do not have eyes, they use other senses such as touch and smell to learn about their environment. They belong to a family of fungus-eating worms, so researchers believe that is their main food.

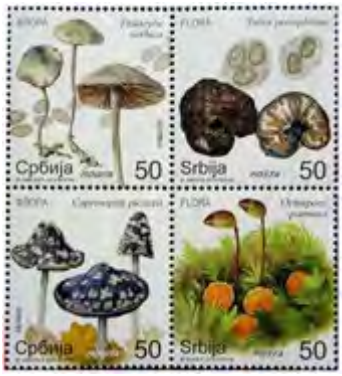
A NEW TRUFFLE STAMP FROM SERBIA

Brian S. Luther

In 2019 the country of Serbia issued a set of four lovely mushroom stamps, one of which is the truffle *Tuber petrophilum*. This species was newly described from Serbia in 2016 (Milenkovic et al.) but was first collected in 2004 and is known only from Tara Mt. in Serbia. All truffles are mycorrhizal, and this one is also unusual in that it forms its ascocarps (fruiting bodies, or truffles) only in cracks in rocks in rocky areas with stones. The species epithet *petrophilum* literally means growing on or having an affinity for rocks or stone.

Brian S. Luther

Close up of Serbia stamp Scott 849b, Tuber petrophilum.



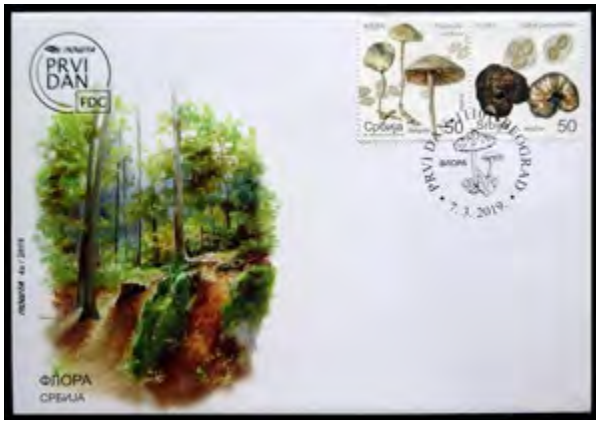
Brian S. Luther

Serbia stamps Scott 849a–849d.

This set of four stamps was issued on 3/7/2019 and has the Scott Catalogue Nos. 849a–849d, with the truffle stamp being Scott 849b. This set also shows *Psilocybe serbica*, *Coprinopsis picacea* and the orange Discomycete *Octospora pannosa*. The first two stamps in this set show a microscopic view of spores for the *Psilocybe* and asci with ascospores for the truffle.

All stamps are perforated with gum and have the same value of 50 (Serbian Dinar).

Two FDCs (first day covers) were issued for this set of four stamps—two on each FDC. The cancel is round and shows two stylized mushrooms, and there are two different cover or envelope illustrations (called cache in philately). The backs of the FDCs briefly tell (in both Serbian & English) what the fungi are, discuss the fungus shown on each, and explain how new species have to be represented by holotype collections.



Brian S. Luther

FDC for Serbia stamps Scott 849a–849b.

This is another truffle stamp that you can add to the earlier article I wrote detailing all the postage stamps showing truffles known at the time (Luther, 2014). I also wrote another article documenting a truffle stamp from Italy which was issued after the 2014 article (Luther, 2016), which you may be interested in reading.

References

Luther, Brian S. 2014. Truffles on Postage Stamps. *Spore Prints 498* (January), pp. 4–6. Online and in color at www.psms.org and also on the PSMS homepage website under "Education."

Luther, Brian S. 2016. Italy's first truffle stamp (and other myco-postal items from Italy). *Spore Prints 521* (April), pp. 4–5. Online and in color at www.psms.org.

Milenkovic, M., Tine Grebenc, Miroslav Markovic & Boris Ivancevic. 2016. *Tuber petrophilum*, a new truffle species from Serbia. *Mycotaxon 130* (4), pp. 1141–1152.

THIS FIRE-LOVING FUNGUS EATS CHARCOAL, IF IT MUST

Ellie Shechet

The New York Times, Nov. 28, 2021

When a wildfire plows through a forest, life underground changes, too. Death comes for many microorganisms. But, like trees, some microbes are adapted to fire.

Certain fungi are known as pyrophilous, or "fire loving." After a fire, pyrophilous fungi "show up from nowhere, basically," said Tom Bruns, a mycologist at the University of California, Berkeley, even in areas that haven't burned for decades. Some sprout in fiery shades of orange and pink. "It's a worldwide phenomenon, but we don't really know much about them," he said.

A new study, published last month in the journal *Frontiers in Microbiology*, aimed to uncover the food source that allows *Pyronema*, a genus of pyrophilous fungi, to appear so quickly in such big numbers after a fire. What they discovered is that the damage left by the fire itself may allow the fungi to thrive. That could affect how the ecosystem recovers, as well as how much carbon gets released into the atmosphere after wildfires.

During a severe wildfire, a lot of carbon in the top layer of soil goes into the atmosphere as carbon dioxide, while some of it stays put as charcoal, or what scientists call pyrolyzed organic matter. Slightly deeper in the soil, it's less hot—but hot enough that any living microbes and insects exploded and died, said the study's lead author, Monika Fischer, a postdoctoral scholar at the University of California, Berkeley.

So, is *Pyronema* just living off this layer of death? "Or can *Pyronema* actually eat charcoal?" Dr. Fischer said.

Charcoal is difficult for many organisms to break down, said Thea Whitman, an associate professor of soil ecology at the University of Wisconsin-Madison and Dr. Fischer's co-author. But, she said, "there are certain microbes that can decompose it."

To find out if *Pyronema* can eat charcoal, the authors grew the fungus from samples collected by Dr. Bruns's team after the Rim fire in California in 2013. The *Pyronema* lived on charcoal, as well as three other nutrient sources for comparison. Then they dunked the fungus in liquid nitrogen and sent it off for RNA sequencing.

"If it's trying to eat the charcoal, we would see a bunch of metabolic genes getting turned on—which is what we saw," Dr. Fischer said. And many were genes involved in breaking down the complex ring structures that make up charcoal.

cont. on page 4

Fire-Loving Fungus Easts Charcoal, *cont. from page 3*

To confirm that the fungus was actually doing what it appeared to be doing, Dr. Whitman's lab grew pine seedlings in an atmosphere with carbon dioxide containing carbon-13, an isotope whose unusual weight makes it easy to trace, and then put the trees in a specialized furnace to form charcoal, which was fed to the *Pyronema*. Like us, fungi take in oxygen and expel carbon dioxide, most of which comes from whatever they are eating. The fungus's carbon-13-labeled emissions, then, suggested that it really was snacking on charcoal.

The researchers also tracked normal carbon dioxide coming out of the fungus, and substantially more of it than the charcoal, suggesting it was eating something else—maybe the agar it was growing on or some carbon that entered during inoculation, Dr. Whitman said.

Dr. Fischer offered this interpretation: "*Pyronema* can eat charcoal, but it really doesn't like to." The fungus may first enjoy that layer of dead organisms, the authors suggested, and then switch to charcoal when it must.

"Fungi are amazing at degrading all sorts of compounds," said Kathleen Treseder, an ecologist at the University of California, Irvine, who was not involved in the study. "It makes sense that they would be able to break down this pyrolyzed material." Aditi Sengupta, a soil microbial ecologist at California Lutheran University who also was not involved, added that it would be useful to confirm the experiment outside the lab and in the wild.

If this fungus is breaking down charcoal after a fire, Dr. Fischer said—even a little bit of it—then that could help open up a food source for the next generation of microbes and other creatures that can't eat charcoal, making *Pyronema* an important player in post-fire recovery. And if *Pyronema* can do it, she said, maybe other fungi can, too.

"We want these kinds of activities in the soil," Dr. Sengupta said. At the same time, she pointed out that "eventually that might lead to us losing the carbon in the soil." As climate change and other human actions drive more frequent and intense wildfires, we need to understand whether carbon stored in the ground as charcoal will stay there," Dr. Treseder said, "or if that's not something we can really count on, because the fungus can degrade it and release it as CO_2."

INVENTORY OF THE WORLD BELOW GROUND: USING DNA TO STUDY FUNGAL COMMUNITIES

https://phys.org/, Dec. 8, 2021

Fungi tend to be absent in conversations regarding climate change, deforestation, and environmental pollution, overlooked in favor of large and conspicuous plants. But plants don't exist in isolation. Beneath the ground, specialized fungi called mycorrhizae form an intricate web in and around roots that is vital to forest health and long-term carbon storage.

A new study published this month in *Applications in Plant Sciences* highlights the negative effects clearcutting has on these symbiotic fungi, showing that even after 17 years of regrowth, formerly deforested areas had less mycorrhizal diversity than intact forests. The study simultaneously offers a road map to researchers for determining the best way to analyze mycorrhizal communities when working with DNA.

Natalie Scott

This Pinus banksiana forest with a rich understory of Arctostaphylos uva-ursi and Vaccinium spp. was a collection site in this study examining how disturbance affects fungal community diversity, while simultaneously testing how sequencing methods compare in characterizing communities of plant root symbionts.

The Wood-Wide Web

In the boreal forests of sub-Arctic Canada, where co-author Greg Pec has studied soil microbes for the past ten years, thousands of mycorrhizal fungi species interlace the roots of trees with slender, threadlike hyphae. "If we were able to, in a sense, peel off the organic layer of soil, we would see hyphae just running rampant below ground," said Pec, an assistant professor of biology at the University of Nebraska.

Between 80 percent and 95 percent of living vascular plant species form a co-dependent relationship with mycorrhizal fungi, which do much of the heavy lifting in soil ecosystems. Mycorrhizae send out tendrils far beyond and below the reach of roots, from which they absorb water and nutrients for their host plants. In return, the symbiotic fungi live entirely on the sugars plants produce.

But mycorrhizae do far more than aid in the acquisition of nutrients. Their hyphae form connections between plants, allowing them to communicate by transmitting hormones and chemical signals. Pec is particularly interested in how mycorrhizae maintain the health of forest communities and how they respond to disturbance. "There have been studies indicating they provide defense against pathogens and can absorb heavy metals, making them an invaluable tool for habitat remediation," he said.

Their effectiveness at restoring forest habitats can be hampered by the type and severity of disturbance. Pec and his colleagues wanted to know how mycorrhizae responded to deforestation and chose two sites in Alberta, Canada—one that had been stripped of its vegetation 17 years prior and allowed to regrow and another that had remained untouched—to carry out their study. Although the two forests looked virtually the same above ground, the number of mycorrhizal species found growing on roots was severely impoverished below.

"When we look at forests from a restoration standpoint, we tend to think that five or ten years is a long time," Pec said. "What we're starting to find out, from a soil's perspective, is that soil turnover can take tens or even hundreds of years."

FEROCIOUS FUNGUS

Vince Horiuchi

https://attheu.utah.edu/, Dec. 7, 2021

It's called *Armillaria ostoyae*, and it's a gnarly parasitic fungus with long black tentacles that spread out and attack vegetation with the ferocity of a movie monster.

Its cordlike structures called rhizomorphs seek out and attack trees by sucking out their nutrients. They are known to infect and kill over 600 types of woody plants, posing a substantial threat to forests and the agriculture industry. From 2000 to 2002, the fungus alone was responsible for causing $1.5 million damage to Georgia's peach trees.

Not much was known about what makes *Armillaria ostoyae* so hard to kill—until now. A team of researchers led by University of Utah mechanical engineering assistant professor Steven Naleway has been studying the defense mechanism of the tree fungus to better understand what makes it so hearty. Their findings were published in the newest edition of the *Journal of the Mechanical Behavior of Biomedical Materials*.

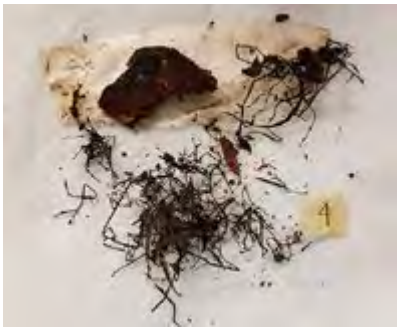
The fungus, which sprouts golden "honey mushrooms" above the surface in the fall, is known to grow just about anywhere. But U. researchers pulled samples of it from what may be the largest specimen known, an enormous growth in the Malheur National Forest in eastern Oregon that is 3.5 square miles in size and weighs 35,000 tons. The specimen, known as the "Humongous Fungus," is possibly the largest living organism on Earth, according to scientists.

The black rhizomorphs use enzymes and pressure to penetrate the root surfaces and under the bark of the trees, said University of Utah mechanical engineering doctoral student Debora Lyn Porter, who is the lead author on the paper. Once inside the tree, it leaves a mycelial fan, white branching filaments that cover the insides of the bark like paint, depriving the tree of water and nutrients.

"Once it gets started, it's very hard to root it out," Porter says. Farmers, she adds, can keep hacking away at the growing tentacles, but they just keep growing back.

Much of the previous and current research into the species has been focused on its biology and ecology, its life cycle, its interactions with the environment, and methods of control—which have not worked well in the past. But Naleway's team wanted to concentrate on the biomechanical structure of the tendrils, or rhizomorphs.

The rhizomorphs have an outer melanized layer that protects the tendrils from chemicals and mechanical forces. "This outer layer is pretty tough," says Naleway. "It's kind of like a tough plastic. For the natural world, it is quite strong."



Armillaria ostoyae rhizomorphs.

They learned that the outer layer of the rhizomorphs is less porous near the surface yet more porous in the inner layer so they can still soak in water and nutrients. Researchers also learned they contain calcium, which can protect itself from the acidic attacks of insects and chemical compounds.

Naleway hopes that farmers, forestry officials, and pest control developers armed with this new knowledge can come up with a more effective method for containing this resilient fungus.

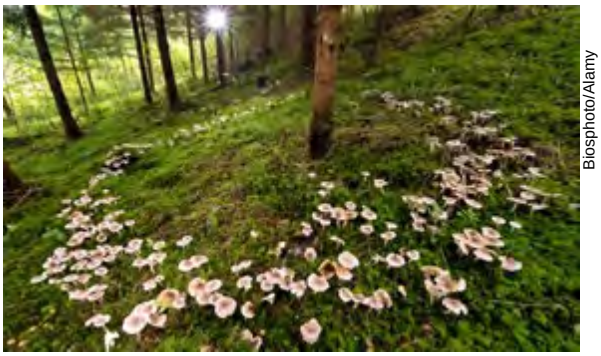
"If you're going to have some kind of human biocontrol, you need to combat this calcium and better penetrate this outer surface," he says.

WORLD'S VAST NETWORKS OF UNDERGROUND FUNGI TO BE MAPPED FOR FIRST TIME

Fiona Harvey

https://www.theguardian.com/, Nov. 30, 2021

Vast networks of underground fungi—the "circulatory system of the planet"—are to be mapped for the first time, in an attempt to protect them from damage and improve their ability to absorb and store carbon dioxide.



Biosphoto/Alamy

Hot spots of mycorrhizal fungi are thought to be under threat, from agriculture, urbanization, pollution, water scarcity, and changes to the climate.

Fungi use carbon to build networks in the soil, which connect to plant roots and act as nutrient "highways," exchanging carbon from plant roots for nutrients. For instance, some fungi are known to supply 80 percent of phosphorus to their host plants.

Underground fungal networks can extend for many miles but are rarely noticed, though trillions of miles of them are thought to exist around the world. These fungi are vital to the biodiversity of soils and soil fertility, but little is known about them.

Many hot spots of mycorrhizal fungi are thought to be under threat, from the expansion of agriculture, urbanization, pollution, water scarcity, and changes to the climate.

The new project, from the Society for the Protection of Underground Networks (SPUN), will involve the collection of 10,000 samples around the world, from hot spots that are being identified through artificial intelligence technology.

Jane Goodall, the conservationist, who is advising the project, said: "An understanding of underground fungal networks is essential to our efforts to protect the soil, on which life depends, before it is too late."

The Society for the Protection of Underground Networks comprises scientists from the Netherlands, Canada, the US, France, Germany, and the University of Manchester in the UK.

The first collections will take place next year in Patagonia, and continue for about 18 months, to create maps of potential underground mycorrhizal fungi that can be used for further research. Using the maps, the scientists hope to pinpoint the ecosystems

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Mapping, *cont. from page 5*

facing the most urgent threats and partner with local conservation organizations to try to create "conservation corridors" for the underground ecosystems.

This is believed to be the first major effort to map an underground ecosystem in this way. Climate science has focused on above-ground ecosystems, and although we know that fungi are essential for soil structure and fertility and the global carbon cycle—as ecosystems with thriving mycorrhizal fungi networks have been shown to store eight times as much carbon as ecosystems without such networks—much of the role of fungi in the soil nutrient cycle remains mysterious.

Mark Tercek, former CEO of the Nature Conservancy and a member of the governing body for SPUN, said: "Fungal networks underpin life on Earth. If trees are the 'lungs' of the planet, fungal networks are the 'circulatory systems.' These networks are largely unexplored."

Mycorrhizal fungi create tough organic compounds that provide structure to the soil and store carbon in their necromass, the networks that are no longer active. Modern industrial agriculture adds vast quantities of chemical fertilizer which interrupts the dynamics of exchange between plants and fungi, scientists warn. Without thriving fungal networks, crops require more chemical inputs and are more vulnerable to drought, soil erosion, pests, and pathogens. Mechanical plowing in modern agriculture also damages the physical integrity of fungal networks.

There is also increasing evidence that some combinations of fungi can enhance productivity more than others, so guarding these is critical, according to soil scientists.

Ten hot spots have been identified by the scientists involved: Canadian tundra; the Mexican plateau; high altitudes in South America; Morocco; the western Sahara; Israel's Negev desert; the steppes of Kazakhstan; the grasslands and high plains of Tibet; and the Russian taiga.

Jeremy Grantham, a billionaire financier and funder of climate research who is funding the project with $3.5m, said: "Just below our feet lies an invaluable ally in mitigating climate change: vast hidden fungal networks. Billions of tons of carbon dioxide flow annually from plants to fungal networks. Yet these carbon sinks are poorly understood. In working to map and harness this threatened but vital resource for life on earth, SPUN is pioneering a new chapter in global conservation."

Hot spots of mycorrhizal fungi are thought to be under threat, from agriculture, urbanization, pollution, water scarcity and changes to the climate.

FIRST NATION IN ONTARIO, CANADA, CONFIRMS 12 CASES OF BLASTOMYCOSIS, MORE THAN 100 UNDER INVESTIGATION

Noushin Ziafati

https://www.theglobeandmail.com/, Dec. 8, 2021

A First Nation in northern Ontario has expanded its search for the source of a lung infection that has killed two people and sickened at least 12 others, the First Nation's chief said Wednesday.

Constance Lake First Nation, a community of over 900 residents, declared a state of emergency on Nov. 22 after probable cases of blastomycosis and three deaths came to light.

Blastomycosis is typically caused by a fungus that grows in moist soil, leaves, and rotting wood. It is spread when a person breathes in small particles of the fungus into their lungs, but does not spread from person to person or animals to people.

Constance Lake First Nation Chief Ramona Sutherland said 29 samples have been taken from various locations in the community so far, but they have all come back as negative for blastomycosis.

Sutherland said the "whole reserve" is now being searched for the source of the lung infection. "We're looking for the source and hopefully we'll locate that," she said in a phone interview.

Indigenous Services Canada said the negative environmental results are "not abnormal due to the difficulty in isolating *Blastomyces dermatitidis* spores from environmental samples," adding that additional test results are "forthcoming."

The federal department noted the cases of blastomycosis in Constance Lake First Nation "have not been linked to residential homes" and that it has consulted a blastomycosis specialist to "review the current approach."

As of Wednesday, Sutherland said there are 12 people who are confirmed to have the lung infection and nine people in hospital with probable cases.

Another 119 people are under investigation for the infection, which Sutherland clarified means that they went to the hospital with symptoms of blastomycosis, such as a cough, fever, chills, fatigue and/or difficulty breathing.

Sutherland said autopsies were done on two people who recently died in the community and "both confirmed blastomycosis."

She encouraged community members to get checked out if they are experiencing any symptoms and said those with cases under investigation should get checked out every two days until they're cleared of symptoms.

Indigenous Services Canada said it's working directly with Sutherland, the Matawa Tribal Council, the Weeneebayko Area Health Authority, the Porcupine Public Health Unit, the Ontario Ministry of Health, and Ministry of Indigenous Affairs, as well as other health partners to "identify and address community needs and ensure those affected have access to the resources they need."

HOW TO TELL IF YOUR MUSHROOM POWDERS ARE GOOD

Ayhan Fletcher

https://amicohoops.net, Nov. 12, 2021

Medicinal mushrooms and supplements are among the latest natural health and wellness trends to attract people's attention. However, using mushroom powders for medicinal purposes is not a new concept. In many Asian cultures, mushrooms have been used for centuries in this way.

In western society, mushrooms have also started to be considered a mainstream supplement. The sudden interest in mushrooms powders and supplements has led to tremendous growth within the medicinal mushroom industry. Mushroom supplements have

become much easier to find as a result and are now standard in most health food stores as well as for sale online.

One of the consequences of the medicinal mushroom industry growing fast is that the quality of products can vary greatly. This is not surprising and often happens when there is a sudden demand for a product. For consumers, it means that a little extra care and attention is required when shopping for mushroom powders in order to find the very best options. Here are our top tips for checking the quality of mushroom powders and ensuring the very best quality.

Compare the Beta-Glucans Content of Different Powders

Beta-glucans are the main compounds found within functional mushrooms; they are responsible for the fungi's health benefits. Research has shown that beta-glucans help modulate the immune system and reduce levels of excessive inflammation within the body. Other benefits that are thought to be linked to beta-glucans include helping to control blood sugar levels, improving energy levels, reducing the feeling of fatigue, and supporting good cardiovascular health.

Therefore, when choosing mushroom powders, it is essential to ensure that they have a high ratio of beta-glucans. Most mushroom powders sold as a supplement should state how much beta-glucans they contain as part of the nutritional information displayed on the label.

Is There Information about the Extraction Methods Used?

The bioavailability of beta-glucans and polysaccharides is essential for ensuring the best possible effects. The bioactive compounds in mushrooms are not accessible to humans, and therefore careful extraction is required to break down the cells, chitin, making them available to the body.

There are several different ways of extracting the critical compounds from mushrooms so that they can be sold in powder form. Each method has its pros and cons, but some produce higher levels of certain compounds found within the fungi.

It is essential to choose products that have been made using an extraction that improves the bioavailability of both beta-glucans and polysaccharides. Methods such as alcohol extraction, dual extraction, and hot water extraction are considered to be some of the better options for this.

How Are Mushrooms Grown and What Quality Checks Have Taken Place?

As medicinal mushrooms have become increasingly popular, the way they are grown has changed to keep up with demand. Most of the mushrooms used to create powders are developed in labs and require careful manipulation.

Growing mushrooms in this way is not necessarily a negative when done correctly and can result in almost identical products to those grown in the wild. Unfortunately, many budget brands use artificially enhanced mushrooms and farming methods to make their products cheaper.

When shopping for mushrooms powders, it is always worth spending a little time researching the different brands that are available. The best brands will give detailed information about how their products are grown and the extraction methods that are used.

Third-party lab checks have also become common, and the result of these can be helpful when trying to determine the best quality products. Most brands will provide complete lab reports for their products either on their website or as part of the product.

Which Parts of the Mushroom Are Used?

There are two parts of the mushroom that can be used to make powders, the fruiting body and the mycelium. Early research has shown that the bioactive compounds linked to many of the health benefits of fungi are found in the fruiting body rather than the mycelium.

This means that to get the best results from mushroom powders, they need to be made using the fruiting body of the fungi. There are still many healthy compounds within the mycelium, meaning that they are often used to make mushroom health supplements.

Finding information as to strictly which parts of the mushroom have been used can be a little tricky. Some brands might display this information on their website, although this is not always the case. Checking the lab reports for mushroom powders is the best way to go.

MYSTERIOUS ART OF HUNTING FOR TRUFFLES IN ITALY RECOGNIZED BY UNESCO

Nick Squires

https://www.telegraph.co.uk/, Dec. 16, 2021

Getty

A truffle hunter and his dog look for truffles in the countryside near Alba in northwestern Italy.

On crisp autumn mornings in the woods and hills of Italy, it is a familiar sight—truffle hunters, their faithful hounds at their side, tramping off in search of the elusive subterranean tuber.

Now, after an eight-year campaign by the Italians, the fine art of searching for truffles has been awarded recognition by Unesco.

It has joined a long list of traditions and practices called Intangible Cultural Heritage, a compendium of customs, ceremonies and traditions from around the globe ranging from competitive grass mowing in the Balkans to the sauna culture of Finland.

Truffle hunting is not just about procuring the aromatic tubers, which are much prized in a wide variety of Italian dishes from risotto to pasta, but a rural tradition with a long history, Unesco said.

cont. on page 8

Unesco Truffles, *cont. from page 7*

"Italian truffle hunting and extraction is a set of knowledge and practices that has been transmitted orally for centuries.

"Today, it still characterizes the rural life of entire communities in the Italian peninsula," the Paris-based organization said.

Mauro Carbone, the director of the National Centre for Truffle Studies, said: "In Italy, the truffle is all about culture. It is about ancient knowledge that brings the magic of nature to the plate."

Truffle hunters in Italy are known as "tartufai," with many preferring to work alone and guarding their best spots jealously.

Specially trained dogs sniff out the underground fungi. Truffle-savvy pigs are rarely used because, although good at scouting out the tubers, they tend to scoff them as soon as they find them.

Hunters then use specially shaped trowels or spades to extract the truffles from the soil.

Knowing where truffles are likely to grow "involves a wide range of skills and knowledge about climate, the environment, and vegetation," Unesco said in its citation.

The knowledge is passed on through "stories, fables, anecdotes and expressions."

The Unesco recognition was welcomed by Coldiretti, Italy's national agricultural association.

Truffle hunting was "marked by a special relationship with nature in a rite that is rich with anthropological and cultural aspects."

There are more than 70,000 "tartufai" or truffle hunters in Italy, Coldiretti said.

There are broadly two types of truffles—the highly-prized white truffle, which mostly comes from the northwest Piedmont region, and the more common black truffle.

The biggest white truffles—nicknamed "white gold" by aficionados—are sold at auction each autumn in the Piedmont town of Alba, which for Italians is synonymous with truffles and truffle hunting.

Italy punches well above its weight when it comes to Unesco listings, with the highest number of any country, ranging from the ancient Roman towns of Herculaneum and Pompeii to Venice, the Amalfi Coast, and the Dolomites.

It also has a long list of Intangible Cultural Heritage, from Sicilian puppet theatre and traditional violin-making in Cremona to the art of making Neapolitan pizza and the Mediterranean diet.

Happpy New Year!

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