SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 622 May 2026

THE FUNGUS THAT COULD CONTAMINATE MARS: EXPERTS FIND SPORE THAT CAN SURVIVE TRIP TO THE RED PLANET

Xantha Leatham

https://www.msn.com/, Apr. 20, 2026

Scientists have long known that fungi are resilient, but research suggests some strains might even survive the long, brutal trip to Mars.

Experts have put fungal microbes through simulations of the harsh conditions experienced during space travel and on the surface of the Red Planet. The freezing temperatures, ultraviolet rays, ionizing radiation, and low atmospheric pressure are enough to kill most living organisms.

But they found the spores of one fungus, *Aspergillus calidoustus*, survived. And it even managed to get past NASA's cleanrooms—one of the most sterile places on Earth—without issue.

Aspergillus calidoustus is a pathogen that produces gray and brown mold and is already known for its resistance to drugs. It can cause rare but severe and often fatal infections in immunocompromised individuals, such as transplant patients. The findings suggest the unwanted hitchhiker could catch a ride to other planets and become an invasive species.

This study is the first to show that microbes could persist through every part of a mission to Mars, from preparation to space travel to robotic exploration, the researchers warned.

For the study, the team collected fungal microbes from NASA's cleanrooms—facilities used in the assembly, testing, and launch of spacecraft.

These are ultra-sanitized, highly controlled spaces designed to prevent any form of contamination and to stop unwanted microbes hitching a ride to space.

The researchers generated conidia—asexual reproductive spores—from 27 fungal strains that had been isolated from the assembly facilities used in the Mars 2020 program which led to the landing of the rover *Perseverance* on the Red Planet.

The scientists subjected the conidia to the intense conditions of space travel and Mars, including the loose, dusty rock on the Red Planet's surface. And they found the conidia of *A. calidoustus* tolerated these harsh tests.

"This does not mean contamination of Mars is likely, but it helps us better quantify potential microbial survival risks," study leader Kasthuri Venkateswaran, from NASA's Jet Propulsion laboratory, said. "Microorganisms can possess extraordinary resilience to environmental stresses."

NASA

Wiping down hardware is part of the strategy to limit the number of Earth microbes going to other planets. Pictured: Experts working on NASA's Perseverance rover in a cleanroom ahead of its launch in 2020.

JURY SIDES WITH POLICE IN CASE OF MAN WHO BURNED OFF FINGERS

Maxine Bernstein

https://www.oregonlive.com/, Apr. 21, 2026

[abridged] A federal jury on Tuesday rejected claims that the city of West Linn, Oregon, and three of its police officers were negligent for not entering a home to help a man reported to be hallucinating on mushrooms and smelling of burned skin.

The eight-member jury returned the verdict in favor of the city following six days of testimony in U.S. District Court in Portland after Michael A. Relloque IV sued police seeking $18 million in damages.

One juror passed out when shown graphic photos of the severe burns covering Relloque's arms, upper chest, and face, prompting the officers named as defendants in the case to rush to his aid in the jury box in the middle of the trial.

Relloque, now 28, suffered burns on up to 30 percent of his body and lost all but two fingers…after he fell into a fire at his rental home after he combined psychedelic mushrooms and marijuana.

His roommate, Melissa Birdwell, called 911 shortly after midnight on Nov. 14, 2020, while hiding in the bathroom to report that Relloque had kicked in the door to get into her bedroom, was naked, jumped on her bed, and smelled like burned skin. She said he was "acting crazy" and that she had heard him shouting, "I am God!" from the top of a stairwell before he barged into her room. She said he might have ingested mushrooms.

A West Linn police sergeant and two officers went to their house and talked with Birdwell, who had escaped from the home through a back door.

They convinced Birdwell to stay elsewhere that night and tried to call Relloque's cellphone and hailed him from a loudspeaker from outside. One officer climbed up a fire ladder to look inside an upstairs window but never made contact with Relloque, according to testimony.

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Spore Prints

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Center for Urban Horticulture, Box 354115
University of Washington, Seattle, Washington 98195
(206) 522-6031 http://www.psms.org

CALENDAR

May 4	Public ID clinic, 4–7 pm, CUH
May 8	Field trip (see psms.org members page)
May 11	Public ID clinic, 4–7 pm, CUH
May 12	Membership meeting, 7:30 pm, CUH in person & via Zoom
May 18	Public ID clinic, 4–7 pm, CUH Board meeting, 7:30 pm, in person & via Zoom
May 19	*Spore Prints* deadline
May 22	Volunteer appreciation field trip volunteers only; registration required
May 25	Public ID clinic, 4–7 pm, CUH
May 29	Field trip (see psms.org members page)
June 6	Field trip (see psms.org members page)

There are mushrooms that are commonplace,
And some that are incredible.
But the mushrooms that attract me most
Are the species labeled "edible."
—Don Goetz

APRIL BOARD NEWS — Peg Rutchik

The board welcomed the new officers and trustees to their first official meeting in their roles. Marian Maxwell reported the task force looking at setting goals for financial expenditures in alignment with the PSMS mission needs to have their next meeting, adding the new treasurer and two new board members. Marian also reported that planning for the Ben Woo Foray is underway, with speakers being lined up. Scholarships for the foray were discussed. Brenda Fong will be reconvening the policy and work group and plans to post the approved policies on the website. Ron Post reported on the activities of the Conservation Committee. There are nine members who have been working on identifying a state mushroom and plans are proceeding to resurvey fungi in the Barlow Pass area. Laurie Wu reviewed the new website and thanked all who have been involved. A list of proposed improvements is being generated to be implemented over time.

MEMBERSHIP MEETING — Karen Dawson

Tuesday, May 12, 2026
Doors open at 7 pm, program starts at 7:30 pm
Center for Urban Horticulture, UW
Speaker: Landon Cook


Langdon Cook

Spring is here, and you want to taste it! Our speaker for May is Landon Cook and his topic is "Wild Mushroom Puzzles: Solving the Riddles of Where, When, and How to Look for Edible Spring Fungi."

If you are new to spring foraging or are ready to add new locations or a longer season to your existing experience, this month's program is for you. Author Langdon Cook will present a "patch to plate" slideshow with tips for planning a successful foray and cooking your catch. Questions and answers and book signing to follow.

Langdon Cook is a writer, instructor, and lecturer on wild foods and the outdoors. His books include *Upstream: Searching for Wild Salmon, from River to Table* (a finalist for the Washington State Book Award); *The Mushroom Hunters*: *On the Trail of an Underground America* (winner of the 2024 Pacific Northwest Book Award); and *Fat of the Land*: *Adventures of a 21st Century Forager*, which the *Seattle Times* called "lyrical, practical, and quixotic." Cook's work has been nominated for two James Beard Awards, a Society for Environmental Journalists award, and a Pushcart Prize. He has been profiled in *Bon Appetite, WSJ* magazine, *Whole Living,* and on Salon.com. His writing appears in numerous magazines, newspapers, and online journals, including *National Geographic Travel, Outside, Eating Well, Gray's Sporting Journal,* and *Seattle Magazine,* where he was a regular columnist for a decade. Cook lives in Seattle with his wife and two children.

The meeting is free and open to the public. It will be offered both in person and via Zoom for those unable to attend physically. Langdon Cook has graciously agreed to allow PSMS to record this presentation for later viewing on the PSMS website (members only).

FINDING MORELS IN WASHINGTON: WHERE, WHEN, AND HOW TO HUNT THE PACIFIC NORTHWEST'S MOST PRIZED SPRING MUSHROOM

https://salishmushrooms.com/

Morels are the mushroom that gets Pacific Northwest foragers out of winter hibernation. From landscape woodchips in March to high-elevation burn sites in July, morel season in Washington stretches across four months and multiple distinct habitats.

This guide covers the three types of morels you'll find in our region, how to time your hunts, and how to use burn maps and soil data to find productive spots.

Four Types of Morels in Washington

Not all morels are the same. Washington has four distinct types, each with different habitats, timing, and hunting strategies. Understanding which type you're after determines where and when to go.

- ***Landscape Morels***
  Morchella importuna

  

  The easiest morels to find. Fruit in woodchip mulch—garden beds, park paths, commercial landscaping. Check chips that were spread the previous year.
  Season: March–April in urban & suburban habitats

- ***Yellow Morels***
  Morchella americana

  

  Found along rivers and streams near cottonwood and ash trees. Sandy river bottoms are prime habitat in our region. Many spots produce year after year.
  Season: April–June in riparian habitat

- ***Burn Morels***
  Morchella spp.

  

  The big prize. Massive fruitings in forests that burned the previous year. South-facing slopes warm first; north-facing slopes produce later. Can fruit by the thousands in the right conditions.
  Season May–July in fire sites

- ***Natural Morels***
  M. brunnea, M. snyderi, M. norvegiensis

  

  Brian S. Luther

  The least understood group. These fruit with living trees —*M. brunnea* under hardwoods like Oregon white oak, *M. snyderi* with true firs, and *M. norvegiensis* with conifers at higher elevations. Smaller fruitings than burns, but reliable spots produce annually.
  Season: April–June in mountain forests

When to Hunt: Morel Season Timing

Morel season in Washington runs from March through July, but the timing depends on elevation, aspect, and weather. Warmth drives the early season; moisture matters more later on.

Window	*Where to Look*	*What to Find*
March–April	Urban parks, garden beds, neighborhoods	Landscape morels in year-old woodchips
April–May	River valleys, floodplains, low-elevation burns	Yellow morels near cottonwoods; early burn morels on south-facing slopes
May–June	Mid-elevation burns, mountain valleys	Burn morels as snow melts and soil warms above 50°F
June–July	High-elevation burns, north-facing slopes	Late-season burn morels; rain events can trigger new flushes

The 50°F Rule

Morel fruiting is strongly correlated with soil temperature reaching about 50°F (10°C). Early in the season, warmth is the limiting factor. Later, moisture becomes critical—exposed burn areas dry out fast, and a late-spring rain can trigger a whole new flush in ground that's already warm enough.

Morel Safety

Morels are among the safest wild mushrooms to identify— but there are a few things every forager should know.

- False morels exist. *Gyromitra* species grow in similar habitats and can be mistaken for true morels. True morels have a honeycomb cap that's fully attached to the stem and are hollow inside. If it's wrinkled or brain-like rather than pitted, it's not a morel.
- Always cook morels thoroughly. Raw morels contain compounds that can cause gastrointestinal distress. Cook them well before eating.
- Alcohol interaction: Some people report adverse reactions when consuming morels with alcohol. The science is nuanced—read the full breakdown.
- Burn site hazards: Burned forests mean downed trees, unstable ground, falling snags, and no shade. Bring extra water, tell someone where you're going, and download offline maps before you leave cell service.

Morels! Morels!

The musical sound
The more you look
The more will be found
The more you find
The better you feel
So eat more morels
in every meal

—Eva Villanueva

PITHYA CUPRESSINA (ASCOMYCOTA, SARCOSCYPHACEAE)—A FUNGUS DECAYING *JUNIPERUS SABINA*—AND A KEY TO THE SPECIES IN THE GENUS

Brian S. Luther

The genus *Pithya* is characterized by bright yellow to yellow-orange apothecia (cups) and microscopically having globose ascospores, as well as always growing on various conifer branches. We have two species here. One is somewhat inconspicuous and the other is in a habitat and fruiting at a time when most folks would not encounter it. Colors in quotes are from Ridgway (1912).

Key to, and descriptions of, the species of Pithya in Washington State

1. **Apothecia** 4–15 mm in diam., disc bright yellow-orange, as "Capucine Orange" or "Orange Buff," externally paler, as creamy. **Asci** 200–350 × 12–16 µm. **Ascospores** 10–15 µm in diam., globose, hyaline, and smooth, with one large guttule (oil drop) when mature, uniseriate (in one row) in the ascus**. Paraphyses** cylindrical to slightly clavate, septate and forked, with the apices up to 4 µm wide. **Habitat:** few and scattered on living, but recently fallen/broken off true Fir (*Abies* sp.) or rarely Spruce (*Picea* sp.) branches in winter or early spring, at higher elevations in the mountains, frequently where there's still snow on the ground, or just after snow melt ....*Pithya vulgaris*

1. **Apothecia** 1–4 mm in diam., up to 2 mm high, disc usually "Orange-Yellow," at first pulvinate then discoid and then slightly concave with a marginal ridge, somewhat infundibuliform (funnel-shaped) from side view, being narrower at the base and wider above; exterior lighter in color, usually creamy, with fine basal mycelial hairs. **Asci** 200–250 × 12–15 µm. **Ascospores** 9–12 µm in diam., globose, hyaline, smooth, thin-walled and with one central guttule and uniseriate in the ascus. **Paraphyses** similar to those in *P. vulgaris.* **Habitat:** Numerous in a small area on dead *Juniperus*, *Thuja*, *Cupressus,* or *Sequoia sempervirens* branches, fruiting in late fall, winter, and early spring ..... *P. cupressina*

Michael Beug

Pithya vulgaris

Pithya vulgaris is a striking and beautiful cup fungus, but is rarely seen or collected because of its habitat in dense high mountain conifer woods which are often still cloaked in snow, making them not readily accessible. In this situation, with only white snow and some broken off dark green conifer branches on the ground with the fungus on them, it makes for a dazzling splash of brilliant color. It's found throughout our montane areas, and is accessible on our mountain passes here in WA State, but is never abundant and you have to be there just at the right time. Snyder (1938) gives a good description and a b/w photo of this species. He also mentions that the collection he studied was from "Snoqualmie Pass (Stuntz), March 8, 1934." Dr. Stuntz was my first mycological mentor and the first Scientific Advisor to PSMS (1964–1983). So, Dr. Stuntz would have collected this specimen before going to study at Yale University, getting his Ph.D., in 1940. Tylutki (1993) provides a good description of this species, but the b/w photo is incorrectly labeled as "*Pithya cupressina*" on p. 32. This author also states that it's possible this species somehow infects the true Fir branches earlier, and then only forms fruiting bodies on the branches after they fall down. Breitenbach & Kranzlin (1984) show an exceptionally beautiful photo of this species from Switzerland. At least so far, I do not have a personal photo of this species to share.

Brian S. Luther

Pithya cupressina

Pithya cupressina on the other hand is a much smaller fungus, with abundant ascocarps aggregated close together on the branches, being bright yellow and the host is different also. It's quite common, but because it's so small and often somewhat hidden, it's rarely seen or collected.

Many of you may have the common ornamental shrub *Juniperus sabina*, or Juniper Tam, in your yards. In late fall, late winter, and very early spring you might notice some yellowed and dying or dead branch tips on this juniper. It can be inconspicuous, so look carefully, lifting some of the branches where discolored and look beneath—less frequently they're more obvious. Doing so, you just might be surprised to see this colorful little cup fungus, but it dries up quickly. My experience has shown that it's more abundant on flat, low to the ground multi-layered Juniper branches that are on top of each other, never on open airy branches that spread out and upward.

I've found it on both native, as well as cultivated Juniper (*Juniperus*) species and the branchlets or branch ends it mostly fruits on appear to be recently killed, presumably by this fungus. So, it looks like it's a parasite and is actually killing these small branchlets, discoloring them. But, it's also possible that what's happening is the fungus is opportunistically decaying small branchlets that have already naturally died, being only saprophytic not parasitic, but this however seems less likely. I've never seen this fungus kill an entire plant, only widely scattered and very infrequent branch tips here and there. Since the apothecia are already fully matured well before and just as the snow melts away, it's clear that this fungus starts fruiting under snow cover much earlier. This means the two species of *Pithya* discussed here have evolved a very similar cold weather or winter fruiting strategy. I've also seen *P. cupressina* fruiting in cold wet conditions in late fall and not under snow.

Pithya cupressina only decays small branches & leaves of members of the Cupressaceae, the Cypress Family. It can be found on the needles or branches of plants in the genera *Cupressus* (Cyprus), *Thuja*, *Juniperus*, on *Sequoia sempervirens* (Coastal Redwood); according to Beug, et al. (2014) it's also found on "hemlock and some other conifers." Of course here in the PNW we do not have either Cyprus or Sequoia as natural populations. Even though Snyder (1938) focuses on Western WA, he makes no mention of this species in his monograph. Dennis (1968) provides a good description and a color plate (VIIG). Tylutki (1968) says this species "occurs on cedar," but he doesn't specify whether he meant Western Red Cedar (*Thuja plicata*) or Alaska Yellow Cedar (*Callitropsis nootkatensis*) or both, since "cedar" is a common name. At least so far, I've personally never seen it on either Western or Mountain Hemlock. Locally this species is common in both western & eastern Washington and I've personally seen it in both regions, but it's also found widespread in oth-

er north temperate areas of the world. As a practical horticultural matter, if these dead, dying, and discolored branches on your ornamental junipers are unsightly to you, then just prune them off.

The photos of *P. cupressina* shown here were taken on March 28 on our property in the foothills of the Entiat Mountains in the Central Cascades of Washington and shortly after the snow melted, but I first noticed the fungus fruiting a month earlier with snow on the junipers.

Although very different in size and habitat, microscopically these two species of *Pithya* are very similar, but with the asci normally a bit shorter and the ascospores also slightly smaller overall in *P. cupressina*. There's also a very slight average color difference as well, but this overlaps. Refer to the photos.

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THE CONSERVATION AND ECOLOGY COMMITTEE

Ron Post

The Conservation and Ecology Committee is busy planning a new project set to begin next year, and we will attend a monthly meeting late this year to describe this endeavor. Meanwhile, we have created new pages, almost ready, for the revised website, and we successfully proposed speakers on conservation for the October and November PSMS general meetings. Also, we are monitoring and helping to spread word about the introduced species *Pleurotus citrinopileatus*, the golden oyster, which is being studied in the Midwest for its ability to replace native fungi. The move to name an official Washington state mushroom is on hiatus until late summer. Questions or interest in our committee? Call or text Ron Post (206-999-9292, ronpost4@gmail.com) or Dennis Oliver (206-799-1878;oliverdm@msn.com).

Oregon Jury Clears Police, *cont. from page 1*

Police then sent home firefighters and an ambulance waiting nearby at 1:16 am and decided to leave the scene themselves at 1:25 am, according to testimony.

The jurors deliberated for more than four hours. Once they were excused from the courtroom, the judge told the lawyers that the court would be offering the jurors free counseling for sitting through what was an emotionally difficult case.

THIS BOOT IS MADE ENTIRELY FROM MUSHROOMS

Andrew Paul

https://www.popsci.com/, Apr. 22, 2026

The fashion industry is ecologically tacky, to put it mildly. Textile manufacturers guzzle around 200 million liters of water every year, while animal leather generates its own immense environmental burdens. But out of everything we wear on any given day, shoes are some of the most unsustainable accessories. As much as 95 percent of all footwear ends up in landfills, where all that rubber, plastic, and foam takes generations to decompose.

While there is no easy recipe for crafting a greener shoe, researchers at Belgium's Vrije Universiteit Brussel (VUB) hope to find a solution in fungi. Together with La Monnaie/De Munt opera house's head shoemaker, Marie De Ryck, the team unveiled a new experiment ahead of Milan Design Week: the world's first boot crafted entirely from mycelium.

Fungi are most recognizable above ground in the form of spongy mushrooms, but they're only a fraction of the organisms' larger story. Below the soil, fungi are frequently connected by miles of fibrous webs of mycelium. These networks transport vital environmental information between fungi on precipitation, soil health, sunlight access, and more. The communications are so detailed that many mycologists consider these webs a form of intelligence.

Fungi and their mycelial networks are now being applied in some exciting spaces, including organic computing and even mushroom-powered toilets. But according to VUB microbiologists, those fungal roots can also be engineered to form every necessary component in a shoe. This goes beyond previous experiments that utilized mushrooms only for surface materials or leather substitutes.

There is a reason such a project hasn't succeeded in the past—mycelium simply isn't easy to utilize. It took over two years of trial-and-error to find a balance between natural growth and resilience. Ultimately, the biggest issue was figuring out a way to take mycelia grown as flat sheets and transform them into a three-dimensional, supportive sole of a shoe. In the end, designers settled on two types of fungi—one to supply the foamlike, malleable sole, and another for the shoe's leathery upper section.

Lars Dittrich

Boot made from mycelium. Two types of fungi were used to create it.

"This is a conceptual object intended to frame what is currently possible with the material," VUB designer Lars Dittrich explained in a statement. "It reflects … addressing how we grow and craft this material, made from a microorganism, into a functional three-dimensional form."

"While the initial material samples posed a real challenge and did not immediately meet the technical requirements of a complex shoe construction, the progress we have made is truly inspiring," added De Ryck.

While the early prototype may not exactly be ready for a haute couture runway show, it's a certainly promising step forward towards truly sustainable footwear.

IDENTIFICATION OF RARE SLIME MOLD IN SLOCAN VALLEY LEADS TO NAMING OF NEW SPECIES

CBC News

https://www.cbc.ca/, Apr. 25, 2026

By all accounts, Tyson Ehlers is obsessed with slime. He has collected thousands of specimens of slime molds and fungi, which sit in bins and boxes around his house, waiting to be examined, catalogued, and eventually deposited at an herbarium for others to view.

And through that work, the amateur mycologist has helped identify a new species.

Tyson Ehlers

Spiromyxa slocanensis, seen here in a magnified photo, is a slime mold that has only ever been found in B.C.' s Slocan Valley.

It happened back in November 2021 in the Slocan Valley where he lives. He was out in the forest with his research partner when they came across something unusual—a beige slime—in an otherwise familiar area.

"If you spend enough time poking around under logs, you're going to see stuff…You notice patterns," he said. "[I] just found this specimen on a log that I've been walking over for decades. And as I do, I brought it home and looked at it in the microscope and puzzled over it for far too long."

"There wasn't very much of it, just a few sporocarps. Those are the individual little five-millimeter-tall fruiting bodies," he told CBC's *Daybreak South*.

Slime molds are single-celled amoeboid protists, Ehler explained, but sometimes they join together and create a large fruiting mass, creating a visible slime. "These things spend most of their time in the soil, in the logs, and in the detritus of the forest floor…individually they're microscopic, when they join together they form a plasmodium."

He'd never seen anything like the slime mold on this log. "This one has a really unique ornamentation, these annulated rings that go around these threads and it just didn't fit anything else," he said.

Slime molds are found around the world and generally thrive in dark, cool, damp conditions, according to *Britannica*, and their main source of nutrition are bacteria, yeast, molds, and fungi. Despite their abundance, there's not a lot of literature on slime molds, Ehlers said, and he hit a dead end.

Then, in the spring, on the same log, he found "a massive fruiting" of 10 or 20 square centimeters of the same slime mold. His interest was piqued anew.

Eventually, through a Facebook group dedicated to slime mold, he heard about Estonian researcher Iryna Yatsiuk, who was studying the genetics of a group of related slime molds. "We collaborated and she ran the DNA analysis on it and we were blown away," Ehlers said.

And as it turns out, the organism was new to science, having never been identified before.

The species was named *Spiromyxa slocanensis*, according to the rules of binomial nomenclature, and Yatsiuk and Ehlers included its discovery in a scientific paper published in the journal *Fungal Systematics and Evolution*.

"Its entire population is known from a single log in the Slocan Valley," Ehlers said.

But that doesn't come as a surprise. There aren't many slime mold researchers in the world, he said. "It turns out there's really not a lot of us looking for these things…there's two of us, it turns out, in the Slocan Valley."

Despite continuing to be on the lookout, Ehlers hasn't seen *Spiromyxa slocanensis* since 2022. But he's continuing to research slime molds, with a book in the works for 2027.

GRIM UPDATE IN SEARCH FOR MISSING MOTHER LAST SEEN PICKING MUSHROOMS

Jensen Bird

The *Daily Mail* via https://www.msn.com/, Apr. 18, 2026

A missing mother of three who was last heard from before she went picking mushrooms with a "strange man" has been found dead in Washington.

Loved ones last heard from Hailey Athay, 33, just before Thanksgiving in 2024 when she told a friend about her plans to forage in the wilderness. The Longview, Washington, woman was reported missing the following January and has not been seen since.

But earlier this week horrified hikers stumbled upon her body in a remote area of Kelso, the Cowlitz County Sheriff"s Office announced Wednesday. Police identified the spot as "an area of interest" where investigators had previously searched, but "no evidence had been recovered."

Hikers alerted police and sent pictures of the bones to a forensic anthropologist, who identified them as human. Officials compared the skull's teeth to Athay"s dental records and confirmed its identity.

Athay"s remains were turned over to the Cowlitz County Coroner"s Office to determine her cause and manner of death.

There are nearly 70 known species of morels in the world. Around 30 are endemic to North America. They form three sections within the genus—Rufobrunnea, Morchella, and Distantes—with a number of species still unresolved.

—Matthew Kilger

ORANGE GOO WILL SOON INFECT AND DRIP FROM MISSOURI'S TREES, CONSERVATIONISTS WARN **Hunter Bassler**

https://www.ksdk.com/, Apr. 14, 2026

ST. LOUIS - Hikers out among Missouri's trees will soon begin to notice an orange goo encroaching on trunks and even dripping from branches, according to the Missouri Department of Conservation.

Conservationists said the goo is actually a fungus called cedar-apple rust [*Gymnosporangium juniperi-virginianae*]. The fungus uses multiple plants in Missouri as a host, including juniper trees, usually the eastern red cedar in Missouri, in addition to trees and shrubs in the rose family like apple and crab-apple trees.

Missouri Department of Conservation

Two examples of cedar-apple rust.

The inedible fungus looks like hard, brown, abnormal growth on cedar trees until a warm spring rain hits, the department said. Once they're moisturized, the growth explodes into bright orange, gelatinous, and tentacle-shaped goo covered in fungal spores. Warm rain is forecast for the St. Louis region this week.

"The horns swell in wet weather to look like inflated sea anemone tentacles," the department said on its website. "When they dry, they shrivel and shrink to look like rusty, crusty spines or horns."

The fungus is less spectacular looking on apple and crabapple trees, appearing as yellow spots or lesions on leaves before growing larger and darker over time, conservationists said. They then grow into wart-like structures with a crown of tentacles extending downward.

Trees infected with the fungus usually aren't permanently damaged by it, but the fungus, in conjunction with drought, flooding, or other diseases, can stress the trees and contribute to damage or death.

Although the fungus is now found throughout Missouri, that wasn't always the case, the department said. Fires set by Native Americans or ignited by lightning previously prevented eastern red cedar from colonizing Missouri's lands. But when European colonizers suppressed the deliberate lighting of fires by Native Americans, called cultural fire, and worked to put out lightning-caused fires as quickly as possible, cedars were allowed to spread and form large stands, which has conversely heightened the state's risk of catastrophic wildfires.

LONG-TERM EFFECTS OF CLEAR-CUTTING FORESTRY ON ECTOMYCORRHIZAL FUNGI IN BOREAL FOREST REVEALED **Gauri Khanna**

https://www.mycostories.com/, Apr. 23, 2026

The Hidden Cost of a Timber Rotation

Walk through a Swedish boreal forest and the trees tell one story; the soil tells quite another. Beneath the moss and root mats lives a community of ectomycorrhizal fungi, organisms that wrap themselves around tree roots and exchange soil nutrients for the sugars that trees produce through photosynthesis. These fungi are obligate biotrophs, meaning they cannot survive without living host trees and perish rapidly after clear-cutting. What happens to their communities over the following century is the subject of a major new study published in *New Phytologist* by researchers at the Swedish University of Agricultural Sciences.

The team, led by Björn Lindahl, analyzed DNA extracted from soil samples taken across more than 1,500 sites distributed systematically throughout Swedish boreal forests. By treating forests of different ages as snapshots of a single long timeline, a technique known as space-for-time substitution, they tracked how fungal communities changed from freshly harvested clear-cuts to forests over 200 years old.

Species Richness Recovers, but Community Identity Does Not

The headline finding is reassuring in one respect and sobering in another. Species richness, the raw count of how many fungal species are present at a given site, recovers well within a standard rotation period of 60 to 100 years. In fact, it peaks around 30 to 40 years after harvest, likely because soil pH rises after clear-cutting and creates temporarily favorable conditions for a wider range of fungi. In this narrow sense, rotation forestry appears ecologically sustainable.

The more troubling conclusion concerns which species are present, rather than how many. Community composition in secondary forests remained measurably different from that of old continuity forests even in stands approaching 100 years of age. A statistical index the researchers developed to track community maturity suggested that full convergence with old-growth communities was not reached until stands exceeded 100 years, well beyond the point at which most Swedish forests are harvested again.

David R. Frazier

Clear-cutting a forest.

cont. on page 8

Effects of Clear-Cutting, *cont. from page 7*

The species patterns are consistent across such a large dataset that they become hard to dismiss. Pioneer fungi, notably *Thelephora terrestris* and *Laccaria laccata*, colonize recently harvested sites rapidly but fade as stands mature. Several species in the Atheliaceae family, including *Piloderma* and *Tylospora*, proliferate in managed secondary forests and persist for decades. Meanwhile, species from the genera *Cortinarius*, *Russula*, and *Hebeloma*, which are adapted to the acidic, nutrient-poor soils of ancient forests and are capable of extracting nitrogen from particularly tough organic matter, decline steadily across the managed landscape. In Fennoscandia, approximately 15 percent of the roughly 2,000 known ectomycorrhizal fungi are already nationally red-listed, with clear-cutting cited as a primary driver.

What This Means for Forest Management

The practical implications are significant. Because 91 percent of Swedish forest land is managed for timber production and harvesting is almost exclusively by clear-cutting, these community shifts are not localized curiosities but landscape-scale trends. The research suggests that with each successive rotation, the fungi best suited to nutrient-poor old-growth conditions become rarer across the country as a whole.

This matters beyond taxonomy. The species in decline play disproportionate roles in nutrient cycling, particularly in how organic nitrogen is made available to trees in boreal soils. Losing them could have consequences for decomposition rates and carbon storage that are not yet fully understood.

The researchers point to continuous-cover forestry, where enough trees are retained at harvest to prevent the sharp rise in soil pH and fertility that follows clear-cutting, as a partial remedy. The key condition is that retention must be sufficient to maintain the acidic, low-nutrient soil conditions that old-growth fungal specialists require.

Some Morel Common Names

Merkels: Appalachian lore tells of a family surviving a famine by eating morels, causing them to be referred to as "miracles" or "merkels," which later became a common, localized term.

Dryland Fish: They are often called "dryland fish" because they are traditionally sliced lengthwise, breaded, and fried, resembling a fish fillet.

Hickory Chickens & Other Names: Morels are known as "hickory chickens" in Kentucky and "molly moochers" or "muggins" in West Virginia, reflecting deep regional connections.

Snakeheads: In some areas, they are called "snakeheads," leading to myths that they are poisonous or undesirable, while others consider them a delicacy.

FIVE MOREL MYTHS DEBUNKED

Matthew J. L. Kilger

Myth: Morels just appear, full-sized and fully formed, out of the ground.

Truth: Morels, just like everything else on the planet, start out small and grow to their final size. Sometimes that size is large; sometimes it is small. Sometimes they stunt before they reach full size because environmental conditions are not conducive to much growth. However, they do, in fact, grow from primordia to full-sized mushrooms. There are plenty of time-lapse videos to show that, and you can test it yourself, if you like.

Myth: Pulling morels kills the patch, because it takes away the (mythical) roots.

Truth: No. In the first place, morels are not plants and do not have roots; roots are an organ specific to vascular plants. Beyond that, we have over 60 years of empirical data, from two separate and unrelated studies (The Chanterelle Project, Norvell et al.; and a Swiss study), the results of which were published in a paper entitled "Mushroom picking does not impair future harvests—Results of a long-term study in Switzerland," Egli et al., 2006). Both studies, independently, arrived at similar results. Those results show that harvest method has very little impact on future sporocarp production. Whether you pull, pinch, cut, twist, bite, golf-swing, toe-grip, or whatever—you're not harming the mycelia. They will produce as many sporocarps as environmental conditions allow.

Myth: Raw morels are safe to eat.

Truth: This is not true. *Morchella* spp. must be presumed toxic when raw, as they are implicated in a large number of toxic events. Always cook morels. Yes, you might eat one raw and suffer no symptoms, but ... we do not know the toxins presumed to be in morels, so have no idea how much is needed to cause symptoms.

Myth: Morels have to be soaked in salt water.

Truth: Hey, if it floats your boat, go ahead, but insects and dirt can generally be brushed off easily enough. Larvae aren't going to totally vacate; they'll just drown, and you'll be eating dead, brined larvae (tiny bacons). Tiny bacons never hurt anyone, though. But a long soak in salt water does damage the structure of the mushroom, and the flavor and texture are generally better from a brushed, or slightly washed, mushroom than a soaked one. There is a reason that no chef would buy soaked morels.

Myth: Morels are mycorrhizal.

Truth: In fact, we don't know exactly HOW morels relate to plant species. We know that, at least part of the time, they are saprobes, feeding on the dead tissue of the trees and plants around them. Their affinity for certain species, however, indicates that there is a complex relationship between certain plant species and certain *Morchella* species. While they have never been shown to form mycorrhizae (a structure that allows the fungus to interact with the plant) on tree roots, there is undoubtedly some connection that we do not, yet, fully understand.

MAY IS MOREL MONTH!