

SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
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OLD MOLD: FOSSIL OF WORLD'S EARLIEST FUNGUS UNEARTHED IN CANADA Will Dunham

Reuters, May 22, 2019

WASHINGTON - Microfossils of a globular spore connected to a T-shaped filament excavated in an Arctic region of northwestern Canada represent the oldest-known fungus, a discovery that sheds light on the origins of an important branch in Earth's tree of life.



Corentin Loron

Ourasphaira giraldae.

Scientists said on Wednesday the multicellular fungus that they named *Ourasphaira giraldae*—forerunner to an immensely diverse group that today includes the likes of mushrooms, yeasts, and molds—lived in an estuary environment about 900 million to 1 billion years ago. Until now, the oldest-known fungus fossil was one about 410 million years old from Scotland.

Fungi play a crucial role in global ecosystems such as in the organic decomposition process.

Fungi belong to a broad group of organisms, called eukaryotes, that possesses a clearly defined nucleus and also includes animals and plants. A fundamental difference between fungi and plants is that fungi are incapable of photosynthesis, harnessing sunlight to synthesize nutrients.

Because of a close evolutionary relationship between fungi and animals, the researchers suspect that early forms of microscopic animal life may have lived at the same time as *Ourasphaira*. The earliest fossils of rudimentary animals are about 635 million years old.

“Fungi are one of the more diverse groups of eukaryotes known today and, despite this, their ancient fossil record is very scarce,” said paleobiologist Corentin Loron of the University of Liège in Belgium, lead author of the research published in the journal *Nature*.

The microscopic fossils, contained in shale rock from the Northwest Territories of Canada, dated to the Proterozoic era before the advent of complex life forms. The fossil record from that era “is still a mysterious jigsaw puzzle, and we just added a new piece to it,” Loron said.

In determining that the fossils were of fungi, the researchers identified the presence of a fibrous substance called chitin in *Ourasphaira*'s cell walls, a key fungal characteristic. Chitin also is present in the durable exoskeletons of invertebrate animals such as insects and crustaceans.

“Of course, when talking about fungi, we think of poisonous mushrooms or mold that grows on food,” Loron said. “But fungi are also well known to help productivity in cultivated fields, for fermentation purposes like yeast in beer, or for their role in the digestive system—for example, in the rumen of cows—to help cellulose digestion.”

VACCINES MAY HELP BATS FIGHT WHITE NOSE SYNDROME Helen Thompson

<https://www.sciencenews.org/>, May 17, 2019

Oral vaccines could give wild bats a better chance at surviving white nose syndrome, the fungal disease that has ravaged bat colonies in North America. In lab tests conducted on captured little brown bats, vaccination led to fewer infected bats developing lesions and more of the bats surviving, researchers report May 1 in *Scientific Reports*.

White nose syndrome, caused by the fungus *Pseudogymnoascus destructans*, has killed around 7 million bats in the United States since 2006. In some regions, the disease cut some bat colonies by 75 percent. The white fuzz grows across bats' skin when the animals hibernate, eventually making them wake up, fly around, and waste energy needed to survive winter.

“It's just devastating to some bat populations,” says veterinarian Elizabeth Falendysz at the U.S. Geological Survey National Wildlife Health Center in Madison, Wisc.

Falendysz and colleagues made two vaccines against the fungus by implanting raccoon poxviruses with DNA instructions for making one of two fungal proteins, in order to trick the bats' immune system into recognizing and fighting the fungus. (Vaccines that helped in rabies eradication efforts and in fighting plague in prairie dogs rely on the same mechanism.)

Wild little brown bats (*Myotis lucifugus*) were vaccinated before being exposed to the fungus. Of 10 bats given a combination of both vaccines, only one developed lesions within the experiment's 100-day hibernation period. Because little brown bats don't do well in captivity, the team struggled with dwindling sample sizes, so it was hard to compare these numbers to other individual treatments. But 14 of the other 23 bats, or 61 percent, that didn't get this vaccine combo developed lesions.

In a second trial aimed at confirming the results, researchers vaccinated bats both orally and by injection. After 126 days, about 88 percent of bats that received oral versions of both vaccines survived the effects of the fungus, compared with 30 percent of unvaccinated bats (and 80 percent of bats vaccinated by injection). Bats that survived the experiments lost an average of about 34 percent of their body weight, while bats that died had lost about 55 percent.

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MEMBERSHIP MEETING

Tuesday, June 11, 2019, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle

Our speaker this month is Todd Osmundson from the University of Wisconsin – La Crosse, and his topic will be “Burning questions: Exploring the biology of burn morels in the field and laboratory.”



Dr. Osmundson

Burn morels are North American native species that fruit prolifically in the year following a forest fire. Many questions about their biology remain, including which species are found where, which species occur in the second post-fire season and beyond, whether these species also occur in unburned (“natural”) forests, how the morphs recognized by commercial harvesters (“grays,” “greens,” “pinks,” etc.) correspond to species recognized by genetic studies, and why they produce such massive numbers of mushrooms. In this presentation, He will discuss how he is using field biology and genomic science to understand burn morels, and how collaboration with a network of collectors and students is essential to these studies.

Todd Osmundson is a member of the biology faculty at the University of Wisconsin – La Crosse who studies fungal diversity using field and laboratory approaches. Some of the topics currently studied in his lab include fungal diversity of the island of Moorea, French Polynesia, genomic features of fire-associated morel mushrooms, tracking the invasion history of the golden oyster mushroom, taxonomy/classification of *Tylopilus* and other boletes, and using DNA sequencing to understand mushroom diversity in the Driftless Region. His lab is one of three labs conducting DNA sequencing for the initial phase of the North American Mycoflora Project. Prior to coming to UW-L, Todd earned a Masters degree studying alpine *Laccaria* with Dr. Cathy Cripps at Montana State University and a Ph.D. studying bolete taxonomy and evolution with Dr. Roy Halling at Columbia University / New York Botanical Garden, and worked on fungal diversity and forest pathology as a postdoctoral researcher with Dr. Matteo Garbelotto at the University of California – Berkeley.

Would people with last names beginning with the letters A–Z please bring a plate of refreshments to serve after the meeting.



CALENDAR

June 8 Field trip (see PSMS website)
June 11 Membership meeting, 7:30 pm, CUH
June 17 Board meeting, 7:30 pm, CUH board room
Aug. 19 Board meeting, 7:30 pm, CUH board room
Aug. 20 *Spore Prints* deadline
Sept. 10 Membership meeting, 7:30 pm, CUH
Sept. 16 Board meeting, 7:30 pm, CUH board room

BOARD NEWS

Luise Asif

A huge shout out to the 70 plus people who came and volunteered at Mushroom Maynia. We had a very short time to set up, and they made it happen with smiles on their faces. What an awesome crew and well done! Although we cannot list you all individually, thank you to our Exhibit Heads: Marion Richards, Mushroom Dyes; Cath Carine, Admissions; Miguel and Jamie; Popcorn Machine; Milt Tam, Cultivation Kits; Tea McMillan and Kelsey Hudson, Bridle Trails poster; Dorie Maubach, Microscopy; Paul Hill, Photography and iNaturalist display; Paolo Assandri, Book Sales; Youghee Lee, Tasting; Brenda Fong, Volunteer Hospitality, and Kim Traverse, “Ask Me.” A very special thank-you to Kate Turner, who was

amazing with Children’s Activities! Rowena Erhard made sure our new shirts, hoodies, and hats were delivered in time for the show.

Most important, thank-you to Jeremy Collison not only for organizing this event but also for his cultivation display and Kombucha and sourdough exhibits.

Derek Hevel, with the help of Molly Swesey and Brigid Smith, is nearing the completion of the PSMS Cookbook to celebrate the 50-year anniversary when our first cookbook was published. Randy Richardson, Debra Johnson, and Parker Olson are forming a Welcoming Committee for new members.

Bat Vaccine, cont. from page 1

Researchers suspect that slowing the fungus growth or reducing the intensity of infections may have helped vaccinated bats sleep more peacefully and maintain more of their weight and energy.

The team has since combined DNA for both proteins into a single vaccine and hopes to add more proteins for an even stronger jolt to the immune system. “Mortality rates are extremely high for some species that get white nose syndrome, so even modest gains in immunity and survival could make a big difference,” says Winifred Frick, a biologist at the University of California Santa Cruz.

Researchers have also looked at using antifungal compounds from plants and bacteria to control the fungus, but haven’t deployed them in the field over concerns about possibly harming cave ecosystems.

Falendysz says the team hopes to develop a vaccine spray, which bats could lick from their fur as they groom themselves and spread as they nuzzle other bats—a strategy that’s worked with a rabies vaccine in lab tests on big brown bats. Reaching a large enough number of some wild bat species will require creativity, Frick says,

SOME OPERATING ROOMS AT SEATTLE CHILDREN’S CLOSE DUE TO MOLD

Ryan Blethens

Seattle Times, May 21, 2019

Four of the 14 operating rooms at Seattle Children’s are closed after a common mold was detected last weekend. Dozens of surgeries have been rescheduled or moved.

The *Aspergillus* mold was found in the operating rooms after a routine check. Hospital officials don’t know when the rooms could reopen.

“Patient safety is our top priority, and we are taking this situation very seriously,” said Alyse Bernal, Seattle Children’s public-relations manager. “All affected operating rooms have been closed and will remain so until we are confident that the areas are clear of *Aspergillus*.”

About 50 surgeries scheduled for the impacted rooms have either been rescheduled, moved to Children’s Bellevue campus, or will be performed in other rooms on the Seattle campus, such as the cardiac catheterization facility. At least two surgeries are being moved to Harborview Medical Center.

Aspergillus is a mold that can live indoors or outside, and most people breathe *Aspergillus* spores daily without getting sick, according to the Centers for Disease Control and Prevention. But people with weakened immune systems or lung disease are at a higher risk of developing complications from the mold.

The risk to surgical patients is believed to be “extremely low,” Bernal said, but the hospital is contacting about 3,000 patients who had surgical procedures in the past four months.

Children’s is working with an industrial hygienist to determine how the mold got into the operating rooms and has begun testing the air for contaminants weekly instead of quarterly. Once it is clear how the mold found its way into the operating rooms, the hospital will implement measures to ensure the situation is resolved, Bernal said.

Children’s follows strict cleaning protocols along with regular deep cleaning of operating rooms and the equipment in those rooms, including an antimicrobial cleaner after each surgery and at the end of the day, Bernal said. The air is filtered in rooms where surgeries are performed, and those rooms are kept under positive pressure, which makes the air flow out of the operating rooms and helps keep airborne microorganisms at bay, she said.

FIELD TRIP REPORT, April 27

Brian S. Luther

We got a crazy combination of weather for this, our first spring field trip: it frequently alternated between periodic rain showers, cold dark clouds producing hail, and brief bright sunny and warm periods throughout the entire day. But this didn’t deter the 80 members who signed in, with approximately 17 being new and never having experienced a PSMS field trip before.

Dave & Wuqi Weber hosted, and as usual they set tables with an appetizing selection of breakfast goodies along with hot coffee and juices; their spread was so appreciated that there was nothing left over! Thank you, Wuqi & Dave. Special thanks to field trip guides Dan Paull, Andrew White, Randy Richardson (our new PSMS President,) and Shannon Adams for taking out new members.

I like scheduling this early field trip in Western WA so that members can find Oyster Mushrooms (*Pleurotus ostreatus*), and I’m pleased to tell you that many did. Most came back with a few, and some had enormous baskets full. For the most part they were in good condition, but I did spend time all day showing members how to tell the decaying or over-mature specimens that needed to be trimmed or discarded.

I counted 47 different species found on this single-day field trip. Interesting species found included *Plectania nannefeldtii* with its delicate jet-black cups on long, narrow stems; *Arrhenia chlorocyanea*, a little blue-green colored mushroom with decurrent gills; a single off-season *Mycena aurantiidisca*, normally a fall fungus, and an unusual collection of *Gymnopus dryophilus* infected with the parasitic jelly fungus *Syzygospora mycetophila* (formerly the genus *Christiansenia*).

About 20 members stayed for a very enjoyable 4:00 pm potluck. The day ended in a lovely bit of sunshine before we cleaned up and headed out.

FIELD TRIP REPORT, May 3–5

Brian S. Luther

This was the first of two field trips scheduled at this location this season. We had three co-hosts for this event: Mark Dienemann, Katie Ryan, and Mark Boyle. They provided a wonderful spread of breakfast snacks, hot coffee, and juices that everybody enjoyed. Thank you, hosts, for starting the morning off right!

Forty-three members signed in, and we had four field trip guides: Julia Benson, Jesse Clark, and Dave & Wuqi Weber. The weather was wonderful. This was especially good as there’s no shelter at the group camp. Although we were right on the edge of last year’s huge Cougar Creek fire, conditions were already drying out and morels were found only in moister, shadier areas. Many members found

cont. on page 4



Brian S. Luther

Folks gathering around the field trip table, May 4, 2019.

at least some morels, but a few found none. Julia's group found 36 morels all together. I found only four after carefully searching a shaded creek draw for a couple of hours. Only seven species of fungi were brought in for ID, with nothing unusual found.

The evening potluck was very good. A number of members continued to camp Saturday night. Before leaving I helped cut up some firewood that others had gathered, using a chainsaw I'd brought for the evening fire. Although few morels and other fungi were found, everybody seemed to have a good time.

FIELD TRIP REPORT, May 10–12 Brian S. Luther

There had been some snow at this site just two weeks earlier, and in order to take my usual shortcut over Entiat Ridge I had to shovel snow off the logging road for about a half hour and put the car in four-wheel drive. Once at the group campgrounds, however, the weather was very agreeable for camping and mushroom hunting.

A happy group of only 23 people signed in at this beautiful location. Several were brand new members who got to experience a PSMS field trip for the first time.

Ben and Natalya Moore hosted. Besides a wonderful selection of everything for breakfast snacks, they brought a generator for this otherwise powerless location, allowing them to make hot coffee using regular coffee machines. In addition, Ben raked the entire area around the old shelter, clearing it of branches and debris, as well as splitting a big pile of firewood they had accumulated for the campfire he'd kept going all weekend. Wow, the only fitting description I can use is that they were super hosts. Special thanks, Natalya and Ben. You went above and beyond for our members!



Brian S. Luther

Field trip hosts Ben and Natalya Moore.

Dave and Wuqi Weber, Julia Benson, and Erin O'Dell volunteered as field trip guides, so that everyone who wanted to go with a guide had the chance.

Some morels were found, along with only eight other species of fungi, none of which were abundant. Almost as many plants were collected for me to identify as fungi, and I did table tours discussing everything found.

The Saturday evening potluck was a highlight of the weekend. Many delicious dishes were prepared and served, including two big Sockeye Salmon fillets brought and roasted over the campfire by Erin. There were not many mushrooms, but everybody had a great time camping and getting out into the woods searching for mushrooms, and hopefully learning a few things.

FIELD TRIP REPORT, May 17–19 Brian S. Luther

We really lucked out on the weather for this field trip. It had rained consistently for a couple of days prior, but we had a mostly sunny and warm event, at least on Saturday. A number of members camped on both nights, and when I arrived Saturday morning, I was told that morels were found right in the campground—a really good omen.

We had a fantastic threesome for our morning hosts: Cassidy Aquilino-Berg and new members Kathryn Gudsnuk and Katherine Liss provided a great spread of delicious breakfast foods and hot coffee, and what a team they were! Thank you, ladies, for your significant contribution and making the day start out right.



Brian S. Luther

Andrew White shows off his basket of morels.

Thirty-seven members signed in at this remote forest group camp. One of the first things a few of us did Saturday morning was cut some more firewood for the campfire with the chainsaw I'd brought along. Seven members volunteered to be field trip guides, and they formed into only two groups, each with 3 guides. It's a luxury when we have more than enough field trip guides to lead new members. Our field trip guides were Dave & Wuqi Weber, Wren Hudgins, Julia Benson, Dan Stern, Andrew White, and new

PSMS President Randy Richardson. Everybody found at least some morels, but Andrew White had a significant basket full to show for his efforts. Cassidy had the distinction of being the only one on the field trip to find beautiful spring boletes (*Boletus rex-veris*). She found three big ones, two of which didn't have a bug in them. She was all smiles because she had never found this choice edible before. Twenty-eight species of fungi were collected and displayed, with nothing unusual found.



Wren Hudgins

Brian admires Cassidy's Spring Boletes!

Potluck was delightful, with several members preparing their dishes using some of the morels found. If you didn't come on this field trip then you really missed out. All in all, it was a fun trip.

SCIENTISTS CREATE GLOBAL MAP REVEALING THE VAST UNDERGROUND NETWORK THAT CONNECTS TREES, FUNGI AND BACTERIA

Aristos Georgiou

Newsweek, May 16, 2019

In recent years, scientists have begun to understand that trees rely on complex underground networks of fungi and microbes which interact symbiotically with the roots, facilitating the transfer of nutrients.

Now, an international team of scientists has created the first global map of these vast subterranean systems, known as “mycorrhizal fungi networks” or, colloquially, the “wood wide web,” according to a study published in the journal *Nature*.

For their paper, the researchers created a computer algorithm to analyze a database belonging to the Global Forest Initiative, which has information on 1.2 million forest trees, representing 28,000 species in over 70 countries, the BBC reported.

To produce models of these fungal networks around the world, the algorithm took into account local environmental factors, as well as data regarding the different microbes that are most closely associated with each tree species.

For example, the roots of oak and pine trees are often surrounded by ectomycorrhizal (EM) fungi, *Science Magazine* reported. Meanwhile, those of maple and cedar trees tend to found alongside arbuscular mycorrhizae (AM) fungi—which can penetrate the roots. Still others—mostly in the legume tree family—are often associated with “nitrogen fixing” bacteria, which take the gas from the air and turn it into food.

The team’s analysis showed that local climate has a big role to play in the composition of these networks. In regions characterized by a cool temperate climate and boreal forests, EM fungi are more common. In the warmer tropics on the other hand, AM fungi are found in higher proportions. Finally, nitrogen-fixing bacteria tend to be clustered in very hot dry, areas.

“It’s the first time that we’ve been able to understand the world beneath our feet, but at a global scale,” Thomas Crowther, an author of the study from ETH Zurich, told the BBC. “Just like an MRI scan of the brain helps us to understand how the brain works, this global map of the fungi beneath the soil helps us to understand how global ecosystems work.”



“What we find is that certain types of microorganisms live in certain parts of the world, and by understanding that we can figure out how to restore different types of ecosystems and also how the climate is changing,” he said.

The authors say that the latest findings highlight not only the significant role that mycorrhizal networks play in mitigating climate change, but also how vulnerable they are to its effects.

According to the study, AM fungi accelerate the recycling of carbon into the atmosphere, whereas EM fungi help to remove the greenhouse gas and keep it locked away in the ground. The problem is that EM fungi are at greater risk from climate change, thus we could see significant declines in the future—which could increase the “feedback loop of warming temperatures and carbon emissions.”

“The types of fungi that support huge carbon stores in the soil are being lost and are being replaced by the ones that spew out carbon in to the atmosphere,” Crowther told the BBC.

ZOMBIE FUNGUS PROVES DEADLY TO SPOTTED LANTERNFLY

Kyle Bagenstose

<https://www.theintell.com/>, May 10, 2019

The invasive spotted lanternfly has swept through southeast Pennsylvania over the past five years, chomping down on fruits and hops along the way. But scientists are studying whether it may have met its match in the form of a mind-altering fungus.

Heather Leach was driving just east of Reading’s famed Pagoda in Berks County last year when she came upon the massacre.

Leach, a spotted lanternfly specialist with Penn State University, was searching for specimens of the invasive pest, whose rapid spread has frustrated researchers and unnerved the state’s agricultural sector since its arrival in 2014. She pulled her car to the side of the road and walked to an area they’re known to congregate.

What she found was something out of the Twilight Zone.

“The lanternfly were just lined up on the tree ... All dead individuals covered in fuzz,” Leach recalled. “The majority of where I was finding them, everything was dead.”

As the mystery unraveled, the truth proved even more bizarre. What killed the spotted lanternfly? Investigators found it was the fungus *Batkoa major*, on a Tree of Heaven, with, well, mind control.

“This fungus basically has them change their behavior,” Leach said.

Lanternflies infected by the fungus are compelled to work their way high up the tree trunk, where they die and the fungus “basically sews them to the tree,” Leach said. The elevation becomes advantageous when the fungus bursts from the body of the insect and rains down spores on other lanternflies below. Then, it’s their turn to walk the plank.

“It’s pretty cool,” Leach said, as only a bug scientist could.

Zombie Fungus Kills Lanternflies, *cont. from page 5*

If sympathy for the insects is stirring, squash it. The Pennsylvania Department of Agriculture says spotted lanternflies “pose a significant threat” to the state’s \$20.5 million grape, \$134 million apple, and \$24 million stone fruit industries, as well as a hardwood industry that does \$12 billion in annual sales.

Researchers found last year that spotted lanternflies also like hops, meaning the primary ingredients for both beer and wine are on the menu.

Jim Jenks, who co-owns the bucolic Unami Ridge Winery in Milford with his wife Kathy, says his vineyard was hit with a “big time” infestation of spotted lanternfly last year. But researchers say it can take until the following season to see if vines fail to fruit.

Jenks says his vines have yet to do so, but that it’s too early to tell.

“We won’t know the impact until everything comes out this year,” Jenks said. “Up here in Quakertown not everything is out yet. I don’t know whether that’s because of the spotted lanternfly... or just a late bloom.”

Wineries lower in Bucks appear to be in less danger, with just one “lone soldier” appearing at Buckingham Valley Vineyards last year, according to an employee.

But Emelie Swackhamer, a horticulture educator at the Montgomery County Penn State Agricultural Extension, says the quarantine area for the spotted lanternfly continues to grow. What was a 174-square-mile quarantine exploded to 3,000 square miles in 2017 and has now reached 7,482 square miles in Pennsylvania, from Monroe County to Philadelphia to Dauphin County.

Spotted lanternflies have also been found in three New Jersey counties, including Mercer, and quarantined ZIP codes have popped up in Delaware and Maryland.

“All of the states are working to figure out how they’re going to handle this,” Swackhamer said.

Pennsylvania currently requires a permit for any commercial or organizational vehicles traveling from, or even within, a quarantined area. All of Bucks and Montgomery counties are now quarantined, but that still means businesses running vehicles from one end of the county to the other need permits.

There are no costs for permits but they involve an online training and quiz. The state Department of Agriculture has more compliance information on its website, www.agriculture.pa.gov.

Swackhamer said at this time of year, residents can do their part by looking out for spotted lanternflies that have hatched into their



Heather Leach

Botkoa major on spotted lanternflies.

nymph stage. The flightless nymphs are tiny, with black bodies and white dots. According to Swackhamer, they tend to hang out high in trees or are feasting on the underside of leaves, particularly new growth on the Tree of Heaven and black walnut.

“We have a lot of people that first found them on roses,” Swackhamer added. “That’s another early one to be watching.”

Where they’re found, Swackhamer said some people apply a band of sticky tape around the trunk of a tree, to catch the insects climbing back up after the wind blows them off leaves. But that can also trap other insects or even small birds and mammals, so Swackhamer recommends cutting narrow strips or even fashioning a guard around the tape with chicken wire, leaving a small gap where the crawling insects can pass through.

The nymphs start to mature in July, and adults have a striking red, polka-dot appearance. The insects can be killed using a mild insecticide called neem, which can take a day or two to work but is the most environmentally safe. Pyrethrin is the next step up if residents feel something stronger is needed.

But Swackhamer and other experts are under no illusion that vigilant homeowners are going to stop the spread of the lanternfly. That’s where Ann Hajek, a professor of entomology at Cornell University, comes in.

After Leach found the dead lanternflies last year, she called Hajek, who then visited the site with a research team.

“We thought this was exciting,” Hajek said of the discovery.

They then began studying and found that there were actually two fungi that killed the lanternflies: *Botkoa major*, along with the more common *Beauveria bassiana*, which doesn’t have the same mind control-like effects of the first. Their results were just published by the *Proceedings of the National Academy of the Sciences*.

Hajek says there’s a lot of promise, as the second fungus is already used in some commercial insecticides.

“It’s significant,” Hajek said. “Nobody was finding much of anything that was killing the spotted lanternfly.”

But there are complications, too. Leach said the second fungus doesn’t appear to be as deadly to the insects as *Botkoa*, about which less is known. Researchers also have to see if Pennsylvania’s record rainfall in 2018 played an important role.

Finally, Hajek has to study whether there could be collateral damage from widespread use of the fungi, as her team already observed infections in three other insect specimens: a beetle, a stonefly, and an ant.

“There’s always an interest in, are these pathogens that are being so active, are they going to kill other native insects?” Hajek said, placing particular importance on butterflies and bees.

If a safe and effective insecticide can be developed, its application could be dramatic. Swackhamer says the state already runs programs that involve airdropping insecticides to deal with other pests. Could the future hold crop-dustings of Bucks County fields with mind-altering fungi?

“We might be able to do something similar,” Swackhamer said. “But we are far away from that being a reality in Pennsylvania. We need to be super careful that we don’t affect other natural ecosystems.”

DENVER VOTED TO DECRIMINALIZE MAGIC MUSHROOMS. WHAT HAPPENS NEXT?

Lindsay Fendt

<https://www.citylab.com/>, May 10, 2019

When Denver voters approved a measure Tuesday to decriminalize psilocybin, the active ingredient in magic mushrooms [*Psilocybe* spp.], it raised a familiar question: What happens next?

Unconfirmed election results show the ballot initiative, Initiative 301, narrowly passing with 50.5 percent of the vote. Though mushrooms will still be illegal, the initiative instructs city officials to make arrests for the possession or use of psilocybin the “lowest law enforcement priority in the City and County of Denver.”

The move echoes Denver’s 2005 vote to decriminalize cannabis, and once again city officials have to hammer out the details for enforcing new rules that conflict with state and federal drug laws. Psilocybin has been classified as a Schedule I drug for nearly 50 years, and with this first move to challenge that legal status, it’s unclear how the new rules will play out on the ground.

Carolyn Tyler, a spokeswoman for the Denver District Attorney, said the language of the ballot initiative is open-ended, leaving its implementation open to interpretation. “Reasonable minds may disagree on some points,” Tyler said on Thursday.

The main question is whether the city can still pursue prosecution in psilocybin cases under state law. Because psilocybin possession will still be considered a criminal act in Colorado, drug policy experts say it’s possible that city officials will choose to effectively ignore the ballot initiative and proceed with prosecution.

Denver District Attorney Beth McCann was one of the few politicians to speak out against the ballot initiative before the election. McCann said the state still hadn’t fully analyzed the impacts of legal marijuana, and she cited drugged driving and the attraction of more drug users to the state as possible risks of decriminalizing psilocybin.

Though the ballot initiative only passed by a small margin, psilocybin decriminalization proved more popular than any single candidate in Denver’s crowded mayoral race. With a total of 89,320 votes, Initiative 301 received 20,000 more votes than incumbent mayor Michael Hancock, who now faces a runoff. Regarding the psilocybin initiative, the mayor’s office released a statement Thursday.

“Mayor Hancock respects the decision of the voters and the Denver Police Department will enforce the law accordingly,” the statement read.

Whether or not city officials back off psilocybin prosecution completely, the new rules will do little to change the numbers of people in jail for mushrooms. Between 2016 and 2017, only 11 psilocybin cases were referred for prosecution in Denver. Only three of those cases were pursued, each one targeting a distributor of the drug, rather than a user.

Advocates of reform say Denver’s vote is proof of concept that psilocybin’s legal status can be changed elsewhere.

“This means that this is possible,” said Kevin Matthews, the head of Decriminalize Denver, the campaign responsible for getting Initiative 301 on the ballot. “This is a human movement and it’s possible for the whole country.”

Denver’s clerk and recorder is not expected to certify the election results until May 16, at which point the district attorney’s office will likely release more information about how it plans to interpret the law. In the meantime, Matthews says his campaign will continue to work on building support for psilocybin and to spread the word on the drug’s potential medical uses.

“Almost 50 percent of voters in Denver did not support this, and that’s a really big opportunity for us to get out and start educating people,” Matthews said. “We have a lot of work to do.”

SCIENTISTS BREW BEER WITH ANCIENT YEAST

Peninsula Daily News, May 23, 2019

Israeli researchers raised a glass Wednesday to celebrate a long-brewing project to making beer and mead using yeast extracted from ancient clay vessels.

Archaeologists and microbiologists from the Israel Antiquities Authority and four Israeli universities teamed up to study yeast colonies found in microscopic pores in pottery fragments. The shards were found at Egyptian, Philistine, and Judean archaeological sites in Israel spanning from 3000 to 4000 BC.

Genome sequencing of the yeast colonies extracted from the pots showed that the ancient strain of yeast was different from the yeast used in beer-making today, but similar to those still used to make traditional Zimbabwean beer and Ethiopian tej, a type of honey wine.

The researchers said their next aim is to pair the resurrected yeasts with ancient beer recipes to better reproduce drinks from antiquity.

Other researchers of ancient beers, such as University of Pennsylvania archaeologist Patrick McGovern, have concocted drinks based on ancient recipes and residue analysis of ceramics. But the Israeli scientists say this is the first time fermented drinks have been made from revived ancient yeasts.

The scientists are touting the brews made from “resurrected” yeasts as an important step in experimental archaeology.



Sebastian Scheiner

Prof. Aren Maeir, from Bar Ilan University, holds an ancient jar and a glass of beer during a press conference in Jerusalem May 22, 2019.



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Photos by Derek Hevel

Mushroom Maynia

*This will be your last newsletter until Fall.
See you in September!*

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