



SPORE ADDICT TIMES

The Newsletter of the Pikes Peak Mycological Society

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PHYLLIS MA

Photographing the humble mushroom



Boletus subvelutipes, Calvatia rubroflava, Amanita vaginata, Lycoperdon marginatum, Scleroderma sp., Xerocomellus chrysenteron, Amanita crenulata. Found in Green-Wood Cemetery, Brooklyn, NY. Photo courtesy of the artist.

In this issue of Spore Addict Times, PPMS co-Editor, Jessica Langley, interviews the artist, Phyllis Ma, and takes a look at her interest in food photography, art, and mycology. PPMS member, Leigh Gaddy, a beekeeper, reports on her research about the interconnectedness of bees and mushrooms, and PPMS Newsletter co-Editor, Mercedes Perez

Whitman, writes about her volunteer work with the Coalition for the Upper South Platte (C.U.S.P.). We are also happy to announce a new foray leader and share photos from recent forays of members with mushrooms! Though we had some recent rain, this summer has been a dry one. We are all hoping for more rain!



**PIKES PEAK
MYCOLOGICAL SOCIETY**

CONTENTS:

News & Events	Pg. 3
Phyllis Ma	Pg. 4
C.U.S.P Volunteer	Pg. 8
Bees	Pg. 11
Foray Pics	Pg. 14

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All statements and opinions written in this newsletter belong solely to the individual author and in no way represent or reflect the opinions of the Pikes Peak Mycological Society. To receive this publication electronically contact Beth Leake at:

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Archived copies of the newsletter are available in the Newsletters section of our website.

Submissions for the next issue of Spore Addict must reach the editors, Mercedes Whitman & Jessica Langley, by May 30, 2020.

editor@pikespeakmyc.org

2020 UPCOMING EVENTS

In non Covid-19 times, meetings are held on the 4th Wednesday of the month, starting at 6:00 pm, at the Bear Creek Nature Center, located at 245 Bear Creek Road, Colorado Springs, CO 80906. Each meeting is approximately 90 minutes long and features a different speaker each month. However, because of social distancing recommendations by the CDC and department of Public Health, we are offering our meetings online LIVE on [YouTube](#)

August 19 (note: 3rd Wednesday)- Giuliana Furci, Founder of Fundación Fungi

Topic: "How to correctly collect and voucher fungi so your encounter is meaningful to science"

Giuliana has been devoted to mycology since 1999. Her inescapable drive to study Chile's fungi has led her to travel the country looking for fungal fruit bodies in different environments and ecosystems. In 2007 she published "Fungi Australia- Field Guide to the Outstanding Fungi of Chile", and later, in 2013, ["Fungi of Chile, the Field Guide"] which is currently the only book on Chilean Fungi with pictures of its species in their natural habitats. She has contributed to various publications such as "Chilean Biodiversity, Heritage and Challenges" (CONAMA, 2006 and 2008) and "Microforests of Altos de Cantillana" (FPA, 2013).

When: 6:00 p.m.

Where: Broadcast LIVE on Youtube

Learn more about Giuliana at ffungi.org

September 23- Zachary Mazi, Chef

October- Date and topic TBD.



MEMBERS CHECKLIST:

Is your email & phone number up to date?



Send contact info to: Beth
treasurer@pikespeakmyc.com

Have you paid your DUES?

If not, please send to:



Treasurer c/o Beth Leake
1370 Golden Hills Road,
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Care to Volunteer?



Reach out to: Alyssa Hartson
info@pikespeakmyc.org

ANNOUNCING: New Foray Leader!!



James Chellin is an avid outdoorsman, and he grew up enjoying the outdoors fishing and camping with his father from a young age. Fascinated with the sciences and all things outdoors, James began studying native plants of the west and one day spotted a beautiful *Amanita muscaria* near his compost bin. That sparked his interest in mycology. That day he collected all of the mushrooms he could find and attempted to identify them. James has always been fascinated with mushrooms since he was a young boy. In 2006 while learning mushrooms he built a database and created coloradomushrooms.com. James now leads forays, helps to identify mushrooms found, and teaches others the various mushrooms of Colorado.

SEEKING VOLUNTEERS

We mean it!! We can't do this without you. Looking ahead to next season, we are seeking volunteers to do a number of things. Please contact Alyssa Hartson, info@pikespeakmyc.org, or Ben Kinsley, president@pikespeakmyc.org if you are interested in:

- coordinating forays
- writing for the newsletter
- hosting an event
- herbarium liason
- record keeping on forays
- leading a foray
- hospitality



The Photography of Phyllis Ma

Interview by Jessica Langley

JL: How did your interest in mycology begin, and what keeps you interested?

PM: After a few years of dabbling in food photography, I shifted my artwork towards sustainability and I naturally gravitated towards mushrooms. Last summer, I visited [Smallhold](#), a mushroom farm in Brooklyn, and I was immediately captivated by the blocks and blocks of mushrooms growing under blue light. It was the first time I had seen anything like it.

The first body of photos were released as a self-published photo magazine called “Mushrooms & Friends.” In the title, “Friends” refer to both the relationships that mushrooms have with other organisms – plants, trees, insects, other fungi – as well as the mycophilic community that I have befriended. It’s through my mushroom friends that I have received unwavering support for my artwork and answers to my mycology questions, no matter how basic. This definitely sustains my interest and inspires me to keep going deeper.

*Above: Bondarzewia berkeleyi. Found in Brooklyn, NY.
Page 5 (top) Chlorophyllum rhacodes, Ramaria sp. Found in Berlin, Germany (bottom) Lepista nuda. Found in Greenwood Cemetery, Brooklyn, NY*





JL: Can you describe your photographic process in the photos we see?

PM: These photos feature foraged mushrooms found in Upstate New York, Brooklyn and Berlin. I'm a self-taught photographer and I like to keep my setup as uncomplicated as possible. I use two strobe lights and a Canon DSLR. For props, I use whatever's around me – vibrant background papers, fruits and vegetables from my kitchen, flowers from the bodega.

When I photograph a mushroom, it's a humbling experience. The mushroom is already so beautiful, what more can I add to it? This is why I keep my setup simple in order to let the mushroom speak for itself.

JL: What are your influences?

PM: Ikebana (Japanese floral arrangement), vintage Betty Crocker cookbooks, Thai fruit carvings, Italian Radical Design, Frida Kahlo's still life paintings, Jan Svankmajer's stop motion films, Olafur Eliasson's light installations, Freddy Mamani's architecture.

JL: What do you think is interesting about the merging of mycology and art?

Above: Baeospora myosura. Found in Berlin, Germany

Page 7: Tolypocladium paradoxum. Found in Sloatsburg, NY

This is the first record of T. paradoxum in North America! Richard Tehan will be publishing a paper about this. I'm excited that I will be listed as one of the collectors.

It is possible that the N. American population is a distinct species but there is not presently sufficient evidence for that. More sampling of the Japanese population would be needed to determine that.



Phyllis Ma is a New York-based artist working in still life photography and animation. Recently, she's developed an obsession for foraging and photographing mushrooms. Jessica Langley interviewed her via email in early August, 2020.

PM: Both are ways of seeing that compliment and amplify each other in a feedback loop. For me, the science inspires the art, and the art inspires me to learn more about the science. When I'm photographing a mushroom still life, it's both a focused study and a playful experiment. As an artist, I get to break some rules of mycology. I rearrange the mushrooms into fantastical landscapes and portraits based on my intuitions. The project reminds me that it's just as important to play and feel as it is to analyze and dissect.

JL: *Where can people see more of your work?*

PM: On my website: www.phyllisma.com

Instagram: [@specialnothing](https://www.instagram.com/specialnothing)

Mushrooms & Friends 1 & 2 are available in independent bookstores.



Slash and Spawn at the Craggs: A Volunteer Day with the Coalition for the Upper South Platte

By Mercedes Perez Whitman



The Coalition for the Upper South Platte (CUSP) is a 501(c)(3) charitable nonprofit focused on protecting the watershed's ecological integrity. They have been studying native wood-rotting mushrooms' ability to degrade woody biomass and transform it into compost material for the past six years. The study arose from the need to deal with forest slash and post-fire landscape restoration more efficiently than current methods.

In June, PPMS member and friend Anna Wermuth and I volunteered for their last session of the series of lab and installation days for the fungal degradation study. The lab days where the spawn bags were made to be used at the installations took place at the Conifer-based mushroom company Mile High Fungi. Due to the coronavirus pandemic the lab days were cancelled for volunteers. The other inoculation was at the Denver Botanic Gardens' Chatfield Farm earlier in the month.

We met in the Craggs at the giant slash piles you see on the left as you drive up to the campgrounds and trails. Myceliated spawn blocks of native wood rotting mushrooms were buried in piles of the leftover slash the Forest Service produced in their fire mitigation endeavors. Jeff Ravage, the North



Fork Watershed Coordinator and lead on the study, noted how slash is not valued economically and is often chipped or hauled to landfills or sold as firewood, which puts carbon into the atmosphere when burned—hence the need to address these leftovers in a novel way.

Each pile was inoculated with many spawn blocks of one type of mushroom: oyster (*Pleurotus ostreatus*), turkey tail (*Trametes versicolor*), chestnut (*Pholiota adiposa*), and woolly velvet polypore (*Onnia tomentosa*). We dug holes a bit bigger than a block and placed the blocks just below the moisture horizon, around 1-4 inches deep where the pile stays moist. We were careful to cut the spawn bags on the very top so that they could be reused a few more times. And we made sure to keep the blocks intact, so that as a unit, they maintained their strong antibacterial and antiviral properties. The slash piles consisted of lodgepole pine, ponderosa, and Douglas fir from the surrounding forest. There were about 100-120 spawn blocks for 5 piles. Each spot where a block was buried was flagged and photographed by Ravage. Throughout the spawn cultivation process, the mycelia was incrementally fed more wood and fewer carbohydrates, which were in this case wheat bran. This helped to prep the mushrooms to readily eat the wood they were then introduced to.

Ravage told us how earlier projects in the study went well and



how they were aided by the animals who ate the masses of mycelium called sclerotia that form in the Fall. Squirrels, deer, elk, bears, and others are trying to eat thousands of calories a day during that time. While digging through a pile for their meal, the animal is helping to break it down.

A regular compost pile's composition is predominantly made up of bacteria. When wood chips are in this environment, they can heat up to the point of spontaneous combustion. However, mushrooms don't release any heat; they're so efficient at using the energy released from breaking the carbon-hydrogen bonds in the wood that it goes to their metabolism. And, like animals, they inhale oxygen and exhale carbon dioxide. There is some CO₂ release in the breakdown process, as the CO binds with the O₂ of the atmospheric oxygen molecule and releases CO₂. There is probably at least two times the amount of carbon sequestered here than in the duff of the forest floor. If piles like these were left on their own, they'd probably take 40-50 years to decompose. Meanwhile, these inoculated piles will take just a fraction of that time.

This method of addressing slash from fire mitigation efforts is not a new concept, but CUSP is one of the first organizations to implement it. It's effective environmentally and economically, making it a particularly appealing alternative to the current standard practices. Not only that, but the installation itself was enjoyable and manageable for a small group of 20 enthusiastic people, like the one we had on this particular volunteer today. Ravage plans to have blocks ready for more installations next spring.



Can Mushrooms Save the Bees? The Waking Dream That Started It All

By Leigh Gaddy

Imagine this: You are a beekeeper. You are intimately familiar with the walk to your beeyard and the flowers that you see your bees forage from. You can tell a happy buzz from an angry buzz. You like to think your bees know and love you. So it sticks out when something unexpected happens. One day you see droves of your bees visiting the wood chips in your mushroom patch. Looking closer, you see the bees are sipping the liquid oozing from mycelium. The bees are actually moving the chips about in order to reach more. You find this behavior interesting but don't read much into it. Bees are smart and know where to find the sugar they need. The bees know what they're doing.

This was Paul Stamets' personal experience one day in 1984.



Drawing by my daughter, Claire, who is 6 years old.

Many of us have already heard of Stamets, the well-known American mycologist, medicinal fungi advocate, and entrepreneur owner of [Fungi Perfecti](#) and [Host Defense Mushrooms](#). He is also, it turns out, a beekeeper. Decades after he witnessed his bees visiting his mushrooms, colony collapse disorder had reared its ugly head and the planet was seeing the honeybee population decimated. Then one morning Stamets had the “waking dream” that finally connected his bees’ possible self-medicating behavior with the antiviral properties of mycelium.

In 2014, Stamets approached Steve Sheppard, a Washington State University entomology professor, with more than a dream: he brought data, and the ability to manufacture a product through his company that could help the bees. The real research began. Then, on October 4, 2018, their study, titled *Extracts of polypore mushroom mycelia reduce viruses in honey bees*, was published in *Nature*.



Paul Stamets from the documentary film [Fantastic Fungi](#)

Bees and Viruses

The story begins with viruses. Colony Collapse Disorder (CCD), as it was coined in 2006, is a complex problem that has resulted in massive population losses of honeybees worldwide. A major variable in the cocktail of problems that is CCD are viruses, many of which are transmitted to bees via the Varroa destructor mite. (In this image you can see the brown button-like mite on the bee's upper abdomen.) Varroa mites are like “dirty hypodermic needles,” according to Dennis



Mite on bee from University of Sussex

vanEngelsdorp, a University of Maryland entomology professor. Specific viruses affiliated with *Varroa* include Deformed Wing Virus (DWV), Lake Sinai Virus, those in the acute bee paralysis virus complex, and the slow bee paralysis virus. No antiviral medications are available anywhere for beekeepers.

So far, one of the only ways to combat viruses in bees is to battle the mites with aggressive methods such as oxalic acid vaporization (see image left), plastic “strips” soaked with miticides, and formic acid or thymol in gel form; or more gentle, organic methods such as powdered sugar dusting, the use of drone foundation sheets, or mint and thyme essential oils. All of these treatments, however, are stressful for bees, and aggressive methods cannot be performed while honey is being produced for human consumption.

Compounding the problem is the fact that these methods only work against the viruses that arrive via the *Varroa* mites. Fighting the mites, therefore, is not the final answer to the overall virus problem or, by extension, Colony Collapse Disorder.

Enter, the mushrooms.

Mushrooms have been used for medicine for a long time, with a particularly long history in Asia. However, it’s only in the past few decades that their use has been studied and used in the West. Their antibacterial and antifungal properties are of interest, but it is their antiviral properties that have the most attention. As antibiotics only fight bacterial-based illness, antiviral medicines are the ones urgently needed. So far, studies of molecular derivatives from various mushrooms have reported antiviral activity against HIV, Influenza A and B, and herpes1. There are even studies showing the medicinal efficacy of mushrooms against cancer, diabetes, and allergic diseases.¹

Knowing what we know about medicinal mushrooms for use in humans, you wouldn’t think it had been a stretch to consider their possible veterinary applications. But apparently Stamets was the first to make that connection.

Stamets’ 2018 research had exciting results.^{2,3} In field trials, bees showed a 79-fold reduction in Deformed Wing Virus (DWV) and a 45,000-fold reduction in Lake Sinai virus, compared to control colonies.

The polypore mushrooms used in the 2018 study were amadou (Fomes, left) and reishi (*Ganoderma*, right) species. In an apparent attempt to mimic what Stamet’s saw in real life, first the mycelial cultures were grown in petri plates for three to four weeks, then a “broth” was made of the colony; this broth was transferred into incubator bags of brown rice for mycofermentation, which was transferred again into bags of sterilized birch sawdust and incubated for another 30-60 days.² Once colonization was deemed sufficient, a crude extract was made. Extracts from these species were suspended in a sugar syrup and fed to the bees in the field, and a decrease in the viral burden was shown in less than two weeks.⁴

Stamets’ mycelium extract for bees, possibly to be named



Oxalic Acid from University of Sussex



Amadou from Wikipedia



Reishi from fieldforest.net

BeeMushroomed Extract, is not yet available for the public (Visit the Fungi Perfecti website here for more information and sign up for email notifications). Further research needs to identify the active ingredient in the mushroom extract and studies of potential side effects on bee's still need to be done.⁴ Indeed, the birch sawdust used in the studies may also have proved beneficial due to the saprophytic and endophytic fungi within the wood itself,² and that variable may need to be isolated. Until then, beekeepers remain excited to see whether a self-medicating tip from the bees themselves has led to a breakthrough in virus control - all thanks to our favorite fungi.

Leigh Gaddy and her family are new members of PPMS. They live out on a rural patch with a veggie garden and a beehive. Leigh writes her own blog, is trying to homestead a bit, and loves to eat mushrooms.

Citations:

1 *The Pharmacological Potential of Mushrooms*, US National Library of Medicine, September 2005, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1193547/>

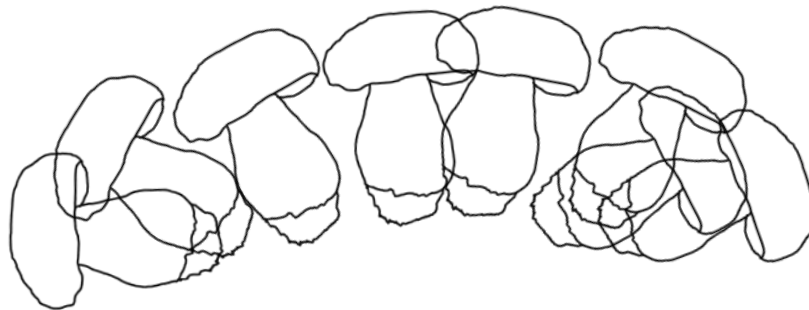
2 *Extracts of polypore mushroom mycelia reduce viruses in bees*, Nature, October 2018, <https://www.nature.com/articles/s41598-018-32194-8>

3 *Fungus provides powerful medicine in fighting honey bee virus*, Science Daily, October 2018, <https://www.sciencedaily.com/releases/2018/10/181004100044.htm#:~:text=Summary%3A,according%20to%20a%20new%20paper.&text=The%20hope%20is%20that%20the,role%20in%20colony%20collapse%20disorder.>

4 *Mycelium Medicine*, American Bee Journal, April 2019, <https://americanbeejournal.com/mycelium->

“We are stuck with the problem of living despite economic and ecological ruination. Neither tales of progress nor of ruin tell us how to think about collaborative survival. It is time to pay attention to mushroom picking. Not that this will save us—but it might open our imaginations.”

- Anna Lowenhaupt Tsing



A SUMMER FOR LOBSTER MUSHROOMS!

On forays in June and July, PPMS members find many of the parasitic *Hypomyces lactifluorum*, a fungus that grows on other species of mushrooms. Considered a choice edible, this fungus is only edible when parasitizing non-poisonous mushrooms. Be sure to see what else is growing nearby!

