SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 586 November 2022

2022 PSMS Wild Mushroom Show

Derek Hevel

Our 59th annual Wild Mushroom Show took place October 22 and 23 at a new venue: Shoreline Community College. Our four chairs—Derek Hevel, Marion Richards, Molly Watts, and Milton Tam—were back this year, helping to bring it all together. Even though COVID restrictions were lifted this year, we still had immense challenges: collecting mushrooms in severe draught conditions; holding the show at a new venue; reinventing the mycophagy cooking demo; passing leadership of volunteer coordinating and graphic design for publicity to new folks; and doing everything about month later than usual. But with all those challenges, we had one of our best shows in a while, with an impressive mushroom display despite the dismal collecting prospects all around the region.

We took over the main floor of the student union building, which was bright, clean, and large enough for us to spread out our activities. The venue had ample room for our displays, vendors, dyeing, microscopy, the kids' table, mushroom ID, the cooking demo, and cultivation. This year we welcomed back the lichen folks, led by Dr. Katherine Glew. Our musicians, led by Dustin, played all weekend and set just the right tone in the hall.

Our thanks go out to our collectors, who did an extraordinary job searching high and low for all those great specimens. The Puget Sound was literally dry and crispy until we got rain the Friday before the show, so collectors' efforts were above and beyond this year. Kudos to Gary Lundgren for his massive collection of coastal specimens. You all made the whole show happen.

Thanks to the leaders of the display activities: Wren Hudgins, Danny Miller, Milton Tam, Joe Z, Shannon Adams, and Dennis Oliver. Thanks to Irene and Andy Iwata, and Mike Li, at admissions and volunteer check-in who managed those daunting tasks. Pacita Roberts signed up new folks at membership. Thank you to our great speakers—Daniel Winkler, Christian Schwarz, Shannon Adams, Alana McGee, Dr. Steve Trudell, and Paul Hill. The Amazing Karen Armijo led the delicious cooking demos, assisted by Marcus Sarracino and Molly Watts. Milton Tam bravely led at the cultivation table, taming crowds clambering for oyster kits. Thanks to mushroom IDers Brian Luther, Danny Miller, Wren Hudgins, and Colin Meyer for your time and expertise. Thanks to all the other activity leads, including Marion Richards at the dyeing demonstration, Paolo Assandri at books & merchandise sales, Dory Maubach at the microscopes and touch & feel tables, Kate Turner at the kids' table, Marcus Sarracino and Brenda Fong for leading hospitality, Paul Hill for doing the photo show, and Wren Hudgins for the ASK ME program. Thanks again to Daniel, Colin, Wren and others for leading those informative tray tours, always a favorite with the public. As treasurer, Brenda Fong did a great job, with help from Luise Asif. Thanks to Milt and Molly Watts for organizing the vendors. Thanks again to Randy Richardson for renting and driving the rental truck. This year's graphic design for the poster, post cards, and yard signs was done by me (Derek). A special thanks to Marian Maxwell, who coached me through the harrowing task of volunteer coordination, set up the volunteer shifts online, and helped us all make the show possible, from behind the scenes.

Finally, thanks to all the volunteers who found a couple of hours or devoted their entire weekends to make the show a success. We again enjoyed working with you and we could not have done it without your hard work. A huge thank you to the loaders and unloaders of the truck, and those who set up and took down the show. Two volunteers deserve extra thanks for their tremendous time volunteering and their infectious spirit: Peg and Tom Rutchik.

Great work, everyone! Let's do it again next year!

photos by Fer Sagastume, Derek Hevel and Paul Hill

Spore Prints

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CALENDAR

Nov. 8	Membership meeting, 7:30 pm, in person and via Zoom
Nov. 14	Board meeting, 7:30 pm
Nov. 15	*Spore Prints* deadline (**early)**
Dec. 13	Membership meeting, 7:30 pm, special December celebration

BOARD NEWS — Marcus Sarracino

Board changes: I have humbly stepped into the Secretary role on an interim basis until the elections next March. Wish me luck! Su Fenton will then take up my trustee position with a term expiring in 2024. Thank you, Su, for staying on to support PSMS as a trustee.

Scholarship Program: More time is needed to refine the scholarship guidelines before being submitted to the board for review. It is slated to be voted on next month.

Fall Show: Everyone on the board is excited for this year's annual fall Wild Mushroom Show and breathed a huge sigh of relief as the logistics of hosting in a new venue worked out. Big thanks to the incredible efforts of the Annual Exhibit Committee for organizing this much relished tradition of PSMS.

Library Practices: Currently, members are allowed to borrow two books for up to two months for their perusal. We have about 750 books in our collection which can be reserved and picked up during monthly meetings and Monday ID clinics. It's great we have these mycological resources available to us, but unfortunately some of our beloved books have gone missing. Hence the board will be revamping the library borrowing policies and procedures with help from our master librarian and Education Chair Danny Miller.

Fall Field Trips: There's word on the grapevine about possibly hosting some supplemental field trips in November. Just something a little birdie told me. More to come as plans are hatched…

December Celebration: Mark your calendars with extra mushrooms and stars for December's meeting for it will be a silent auction, cookie bake-off, and social evening with food and drinks hosted the Center for Urban Horticulture. Look to future *Spore Prints* for more info to come!

MEMBERSHIP MEETING — Scott Maxwell

The membership meeting on November 8, 2022, will be both in-person at the Center for Urban Horticulture and virtual on Zoom. We will begin letting people into the meeting hall at about 7:00 pm, and the program will begin at 7:30. The Zoom link will be available on the web at www.psms.org at the beginning of November.

Marian Maxwell

November's speaker will be our own Marian Maxwell. Marian studied mycology under the renowned Dr. Daniel Stuntz and received a Bachelor of Science degree from the University of Washington. She is a past president of the Puget Sound Mycological Society (2010–2015), is currently on the Board of Trustees, and is the PSMS Outreach Chair. She also chaired the scientific display at the PSMS annual mushroom show for many years. She serves as one of our fungi identifiers and educators and has been a PSMS volunteer for 46 years. She is passionate about sharing and educating people about fungi, particularly those that produce mushrooms!

Given we have many new members and the mushrooming season is finally in full swing, Marian's topic will be "Introduction to Fall Mushroom Hunting in the Pacific Northwest." This talk will be primarily for our newer PSMS members! Come and learn about foraging for fall mushrooms in the Pacific Northwest! Marian will explain the basics, including mushroom identification, the seasons for mushroom hunting, the most sought after fall mushrooms, what to do with your harvest, where to forage, and permits required.

A rare specimen,
PSMS Annual Show.
Fruits in morning,
Next nightfall—gone!

—Judith Cederblom

FIELD TRIP REPORT, Oct. 1, 2022 Wren Hudgins

For the first time in my memory, Brian Luther was unable to attend a club field trip. He was missed, but we managed to "carry on" and enjoy the outing that he had planned for us. Park host Bernie had the place clean to the point of manicured. Several people commented on how clean the vault toilets were, and one person said it was the nicest vault toilet she had ever seen.

We had 91 attendees, 47 of which were enjoying their first club field trip. Weather in the Seattle area had been very dry, but the area around where the park is located had experienced at least some rain three days out of the preceding week. Nevertheless, conditions were dry. Thanks to our field trip guides, we were able to take out about 60 members in guided groups. All the beginners who wanted to be in a guided group were able to do that plus a number of others as well.

Not every field trip can boast that it attracted the club president, a past president, the vice president, two board members, and four committee chairs, but this one did. Field trip hosts Paolo Assandri and his wife, Masaki, got us started with coffee and breakfast goodies. Park host Bernie had given us some wood, so we had a small fire in the morning to take off the chill.

The day warmed up such that members were seeking shade in the afternoon. Marian Maxwell and I identified specimens as they came in. Fading memories notwithstanding, we pooled what we thought we knew to do this and figured that, together, we might have made up 5/6 of a Brian Luther.

Wren Hudgins

Field trip co-identifier Marian Maxwell and husband Scott.

Wren Hudgins

Jaime and Carolina Kohler and mushroom dyer Marion Richards, with specimens of Phaeolus schweinitzii.

Dyer extraordinaire Marion Richards was there looking for dye mushrooms. When I learned that the guided groups had already departed, I put out an APB on the radio for guides to be on the lookout for the dyer's polypore, *Phaeolus schweinitzii*. That worked, and Marion ended up with a nice collection.

Fifty-two species came in, fewer than at this site in prior years. Among the edibles were a few oyster mushrooms, perhaps about 15–20 chanterelles total, and one cauliflower about 10 inches in diameter. Sixteen of us stayed for the potluck which we moved from 4 pm to 3 pm only because everyone seemed finished with mushroom hunting early. The paucity of edibles found did not diminish the delight of members to be outside again with old friends and making new ones.

A big Thank-You to field trip guides Dave Weber (Co-chair of the Field Trip Safety Committee), Randy Richardson, Marcus Sarracino, Pamela Young, Tai Warner, Patrick Rice, Melanie Vartanian, Peter Hasegawa, Kim Sing, and Tara Henry. Thanks also to my partner in crime at the ID table, Marian Maxwell. Every day, I feel thankful for those active members who volunteer to help us out in any way from just a few hours to many. That effort drives our club and enables everything we do.

Dave Weber

Field trip potluck, Oct. 1, 2022.

FIELD TRIP REPORT, Oct. 8, 2022 Brian S. Luther

Because of the publicity about the prevailing smoky conditions from the fires near Lake Wenatchee, we didn't get as many attending this event as in the past. Fortunately, on the day of the field trip the smoke was actually not nearly as bad as it has been, and I didn't hear anyone complain about it. We had 42 people sign in, 14 of which were new PSMS members attending their first field trip.

Our facility host was Joshua Schaub, and we're grateful for the use of this delightful location. Our PSMS hosts for this event were Peg & Tom Rutchik. After the breakfast snacks and hot coffee they made for us, we were ready to head out into the woods. As always, thank you, Tom & Peg!

We had only two field trip guides: Dave Weber & Wren Hudgins (thanks, guys!), but all others went out in groups by themselves. Conditions were also very dry. In spite of that, 65 species were found and displayed. Most specimens were smaller than usual and/or deformed or partly dried up. Good edible species collected included *Cantharellus roseocanus*, *C. subalbidus*, Matsutake (*Tricholoma murrillianum*), *Hericium abietis* (Bear's Head), and a single *Boletus edulis*, in perfect condition,; however, nothing was found in abundance. Some of the more interesting finds included *Russula albonigra*, *Postia fragilis*, and the anise-scented polypore *Ischnoderma resinosum*.

Brian S. Luther

Wren Hudgins and some of the group at our morning meeting.

cont. on page 4

Field Trip Oct. 8, *cont. from page 3*


Wren Hudgins

Brian Luther discussing some of the mushrooms found on October 8.

About 15 attended the end-of-day potluck, and some helped afterwards to get everything put back in order and cleaned up.

All in all, an excellent event. Several of the first-time field trippers told me they had a great time.

MAN TAKES MAGIC MUSHROOMS AND THEN ASSAULTS UNITED FLIGHT ATTENDANTS

Jordan Mendoza
USA TODAY, Oct. 9, 2022

A man was arrested on assault charges after authorities say he attacked two United Airlines flight attendants on a trip from Miami to Washington, D.C.—because he had consumed magic mushrooms.

The incident on Oct. 4 began when Cherruy Loghan Sevilla started to cause a disturbance one hour into the flight, according to court documents filed in Virginia last week.

Authorities said Sevilla grabbed the arm of the person sitting next to him before he began "wandering around the plane, running up and down the aisle, clapping loudly near the cockpit, and yelling obscenities." The affidavit said Sevilla also broke off a piece of a bathroom door and opened it when a passenger was inside it.

The flight crew was able to get Sevilla back into his seat, but his "screams and outburst grew louder," according to the affidavit. Sevilla lay on the floor, and when a flight attendant attempted to tell him to get back in his seat, authorities said he refused and grabbed the flight attendant's breast.

Officers on board, along with other members of the flight crew and passengers, attempted to subdue Sevilla, the affidavit said. Officers handcuffed Sevilla, but he twisted the arm of another flight attendant during the struggle.

The affidavit said Sevilla continued "to scream and yell incoherent things" while handcuffed for the remainder of the two-hour flight and yelled when the plane landed as federal officers boarded the flight to arrest him.

When questioned by the FBI hours later, Sevilla told authorities he had taken psilocybin before the flight. The psychedelic drug, [found in so-called] magic mushrooms, produces hallucinogenic effects, according to the Alcohol and Drug Foundation. Authorities said Sevilla told them it wasn't the first time he had taken the drug and remembered "being out of his seat, being loud and touching people."

"Sevilla said that he was not totally surprised that he acted this way after consuming it. Sevilla stated that he was sorry for his actions," the affidavit said.

Sevilla was charged with assault and with interfering with flight crew members and attendants, and he will appear in court next week.

In a statement to *USA TODAY*, United thanked those who helped in handling the situation.

"We also followed up with our crew members to make sure they were ok. We'd like to thank our crew for handling this difficult situation with professionalism," the statement said.

LEUCOAGARICUS BARSSII—A Rarely Found Edible Mushroom to Look for In Washington

Brian S. Luther

This fungus was described by Zeller (1934) as *Lepiota barssii*. He named it after H. P. Barss, Head Professor of Botany and Plant Pathology at Oregon State Agricultural College (now Oregon State Univ.), Corvallis. It was transferred to the genus *Leucoagaricus* by Vellinga (2000). Synonyms in the European literature are *Leucoagaricus macrorhizus* and *Lepiota pinguipes.*

Common names for *Leucoagaricus barssii* in the literature are Smoky Dapperling or Barss Lepiota. It is considered a good edible, unlike its closely related cousin *Leucoagaricus leucothites*, which should never be eaten. Although they can be similar in form and stature and have some overlapping habitats, *L. barssii* has a distinctly scaly cap, the scales darkening with age, whereas *L. leucothites* has a smooth cap lacking pronounced scales and remains mostly white. *L. barssii* is also infrequently found in Washington State, compared to the more common *L. leucothites*. A recent article in *Spore Prints* (Luther, 2021) describes *L. leucothites* in detail and compares it to other look-a-likes, some edible and some more poisonous.


Brian S. Luther

Leucoagaricus barssii, habitat view.

Description of Collection

Leucoagaricus barssii (Zeller) Vellinga

BSL coll. #2022-103-1. Eagle Creek, Chelan Co., WA. Elev. approx. 1,650 ft. Growing in grass in very dry soil. Oct. 3, 2022.

Basidiocarp

Pileus 5.5–7 cm wide, at first convex or hemispheric becoming somewhat plane but usually with a slight to distinct central umbo which is 2–2.5 cm wide, dry, whitish to cream-colored or pale tan at first, becoming grayish and very scaly overall with the radially arranged scales becoming grayish-ashen or darker with age and often somewhat darker yet on the central disc/umbo and showing the lighter pileal context between the scales; context 1–1.5 cm thick, whitish; margin outline somewhat wavy overall, even when young, slightly down turned at the extreme edge and very scaly-squamulose. Lamellae free, crowded, up to 5 mm broad at widest point midway between stipe and margin, whitish at first, with the edge even, becoming dingy-brownish with age, with some lamellulae. Stipe 4.5–6 cm long × 0.8–1.5 cm wide, wider below and tapering toward the pileus, rarely terete or uniform, extreme base in contact with the substrate often abruptly narrower, whitish at first, becoming dingy with age, discoloring darker where handled, smooth overall or very finely fibrous, narrowly fistulose (hollow) when young and more so at maturity; partial veil distinct when young, collar-like, flaring up to 3–4 mm, whitish, membranous and movable with age, often fugacious and seemingly absent on very mature specimens, often superior (higher on the stipe) at first in young specimens but variable in location with age, if still present. Odor nondescript or fungoid. Taste mild to slightly fungoid raw.

Brian S. Luther

Leucoagaricus barssii, immature specimen in longitudinal section showing narrow central hollowed stem.

Brian S. Luther

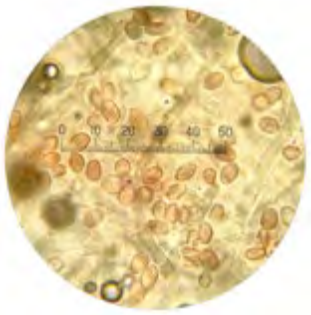
Leucoagaricus barssii.

Brian S. Luther

Leucoagaricus barssii, close up of immature mushroom.

Microstructures

Pileal surface a cuticle of mostly radially arranged or somewhat tangled, long cylindrical cells, up to 170 × 15 µm, thin walled and hyaline, lacking clamp connections, the apices rounded, projecting upward and with brownish pigmentation at maturity. Pileal trama hyphae varying from 5 to 16 µm in diameter, hyaline, thin walled, the septa without clamp connections. Subhymenium subcellular, the cells up to 10 µm in widest dimension. Basidiospores 6–9 × 4–5.5 µm, ellipsoid to ellipsoid-ovoid, slightly thick walled, smooth, hyaline in 3% NH_4OH and KOH, but strongly to weakly dextrinoid,[1] with an obvious apiculus. Basidia 20–30 × 6–7 µm, clavate, thin walled and four sterigmate. Lamellar trama hyphae loosely interwoven 2–5 µm wide, hyaline in 3% NH_4OH, but lightly dextrinoid in Melzer's reagent, thin walled, with frequent septa, without clamp connections. Pleurocystidia none. Cheilocystidia 15–26 × 8–11 µm, clavate to fusoid-ventricose, abundant and tightly congested on the lamellar edge, thin walled and hyaline.



Brian S. Luther

Leucoagaricus barssii, basidiospores showing a dextrinoid reaction to Melzer's reagent @1,000×.

Spore Print pale creamy white.

Discussion

This species grows in a great variety of habitats, including cultivated agricultural fields, meadows, pastures, lawns, various areas of disturbed ground and landscaping. I've personally always found it growing only in grass or grassy patches. It's usually in small groups, scattered, with no more than a few, so its habit is normally gregarious, but Zeller's original description (1934) says it can also be "caespitose," that is, growing united at the stem bases. On our property in Central Washington it shows up only rarely and always near Ponderosa Pine, although it's only known to be saprophytic and nonmycorrhizal with the trees. This mushroom is rare here in Washington State, at least it's rarely collected and brought in for ID. I don't see it except once every several years, even at numerous field trips or the big PSMS annual wild mushroom exhibit. It's more frequently seen in the Willamette Valley of Central Oregon, where it was originally found; at the time Zeller (1934) said it was "Very common throughout the Willamette Valley." According to Sieger (2007), however, it's not as abundant there as it used to be years ago. More recently Siegel & Schwarz (2016) note that it's "Common in the San Francisco Bay Area southward into southern California." If moisture is available it can fruit in late summer, but normally it's a fall mushroom. In North America it's known only from the western coastal areas, but it is also found in Europe. Breitenbach & Kranzlin (1995) have a description, line drawings, and a photo of this species from Switzerland, but as *Leucoagaricus macrorhizus*.

Some early popular accounts I found on this mushroom say that it's "Edible and excellent" (Smith, 1949), "A desirable edible mushroom" (McKenny, 1962), and "Edible and choice" (Smith & Smith & Weber, 1979). I hadn't tried it before, so I sautéed some of this collection and found it to be mild and agreeable.

The microscopic features of the collection I've described here are in complete agreement with those listed in the literature for this species. As is typical for lepiotoid fungi, the basidiospores are irregularly dextrinoid, some reacting strongly to Melzer's reagent and others weakly or not at all. This can be seen in the photomicrograph. In his original description, Zeller (1934) makes no mention of dextrinoid spores.

The collection described here is average in size, but this mushroom can get twice as big, up to 15 cm wide and with a much longer stipe. The specimens discussed here are less robust compared

[1] Dextrinoid is one of two diagnostic color reactions of fungal structures to Iodine solutions such as Melzer's reagent or IKI. An amyloid reaction varies from pale blue to dark violet, and the dextrinoid reaction is a warm or rich red-brown to rusty reddish-brown color.

cont. on page 6

Leucoagaricus barssii, *cont, from page 5*

to some shown in other publications; that makes sense because this collection was growing in extremely dry conditions and the mushrooms would have been larger if the ground had been moist. Site and situation (including availability of moisture) seem to play a role in some of this variability, as well as the specific strain of the fungus. The overall profile of this collection is very low to the ground, similar to that of *Agaricus campestris*. I wanted to see if I could get more to fruit, even though the ground was bone dry, so I threw down 5 gal. buckets of water where I found it and am hoping to be rewarded with more coming up—we'll see.

There's quite a bit of variation in the cap scales, cap colors, and stature of this mushroom in the literature. Some photos show larger scales and more tan-colored caps, while others have more abundant finer scales in various shades of creamy white, gray, or darker. Smith (1949) has an excellent color photo on a reel (Reel 20, #140) using the stereo viewer that this classic publication originally came with. I also found that even in the small collection described here that there was considerable variation in the position of the partial veil (ring) on the stipe, when present. On some specimens the veil was much more superior (higher on the stipe), whereas on others it varied from about the middle, or even being below halfway.

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MICROBES THAT CAUSE CAVITIES CAN FORM SUPERORGANISMS ABLE TO "CRAWL" AND SPREAD ON TEETH

https://www.sciencedaily.com/, Oct. 6, 2022

A cross-kingdom partnership between bacteria and fungi can result in the two joining to form a "superorganism" with unusual strength and resilience. It may sound like the stuff of science fiction, but these microbial groupings are very much part of the here and now.

Found in the saliva of toddlers with severe childhood tooth decay, these assemblages can effectively colonize teeth. They were stickier, more resistant to antimicrobials, and more difficult to remove from teeth than either the bacteria or the fungi alone, according to the research team, led by University of Pennsylvania School of Dental Medicine scientists.

What's more, the assemblages unexpectedly sprout "limbs" that propel them to "walk" and "leap" to quickly spread on the tooth surface, despite each microbe on its own being non-motile, the team reported in the journal *Proceedings of the National Academy of Sciences.*

"This started with a very simple, almost accidental discovery, while looking at saliva samples from toddlers who develop aggressive tooth decay," says Hyun (Michel) Koo, a professor at Penn Dental Medicine and a co-corresponding author on the paper. "Looking under the microscope, we noticed the bacteria and fungi forming these assemblages and developing motions we never thought they would possess: a 'walking-like' and 'leaping-like' mobility. They have a lot of what we call 'emergent functions' that bring new benefits to this assemblage that they could not achieve on their own. It's almost like a new organism—a superorganism—with new functions."

Better (or Worse) Together

In the past, Koo's lab has focused on the dental biofilm, or plaque, present in children with severe tooth decay, discovering that both bacteria (*Streptococcus mutans*) and fungi (*Candida albicans*) contribute to the disease. Caries, commonly known as cavities, arise when sugars in the diet linger to feed bacteria and fungi in the mouth, leading to acid-producing dental plaque that destroys enamel.

The new set of discoveries came about when Zhi Ren, a postdoctoral fellow in Koo's group, was using microscopy that allows scientists to visualize the behavior of living microbes in real time. The technique "opens new possibilities to investigate the dynamics of complex biological processes," says Ren, a first author on the paper and part of the first cohort of the NIDCR T90R90 postdoctoral training program within Penn's Center for Innovation & Precision Dentistry.

After seeing the bacterial-fungal clusters present in the saliva samples, Ren, Koo, and colleagues were curious how the groupings might behave once attached to the surface of a tooth. Thus began a series of experiments using real-time live microscopy to observe the process of attachment and eventual growth.

They created a laboratory system to recreate the formation of these assemblages, using the bacteria, fungi, and a tooth-like material, all incubated in human saliva. The platform enabled the researchers to watch the groupings come together and to analyze the structure of the resulting assemblages. They found a highly organized structure with bacterial clusters attached in a complex network of fungal yeast and filament-like projections called hyphae, all enmeshed in an extracellular polymer, a glue-like material.

Next the team tested the properties of these cross-kingdom assemblages once they had colonized the tooth surface and found

"surprising behaviors and emergent properties," says Ren, "including enhanced surface adhesion, making them very sticky, and increased mechanical and antimicrobial tolerance, making them tough to remove or kill."

Perhaps the most intriguing characteristic of the assemblages, the researchers say, was their mobility. "They displayed 'leaping-like' and 'walking-like' motions while continuously growing," Ren says.

While some bacteria can propel themselves using appendages like flagella, the microbial species in the current study are both non-motile. And differing from any known microbial motility, the assemblages used the fungal hyphae to anchor on the surface and then propel the whole superorganism forward, transporting the attached bacteria across the surface, Koo says, "like bacteria hitchhiking on the fungi."

The microbial groupings moved fast and far, the researchers found. On the tooth-like surface, the team measured velocities of more than 40 microns per hour, similar to the speed of fibroblasts, a type of cell in the human body involved in wound healing. Within the first hours of growth, the scientists observed the assemblages 'leaping' more than 100 microns across the surface. "That is more than 200 times their own body length," says Ren, "making them even better than most vertebrates, relative to body size. For example, tree frogs and grasshoppers can leap forward about 50 times and 20 times their own body length, respectively."

Although the exact mechanisms are unknown, the assemblages' ability to "move as they grow," the researchers say, has one clear consequence: It enables them to quickly colonize and spread to new surfaces. When the research team allowed the assemblages to attach to and grow on real human teeth in a laboratory model, they found more extensive tooth decay as a result of a rapidly spreading biofilm.

Disease Treatment and Biology at Large

Because these assemblages are found in saliva, targeting them early on could be a therapeutic strategy to prevent childhood tooth decay, says Koo. "If you block this binding or disrupt the assemblage before it arrives on the tooth and causes damage, that could be a preventive strategy."

And beyond the applications for treating this specific disease, the researchers say, the new findings might be applicable in microbial biology in general. For example, aggregated organisms found in other biological fluids or aquatic ecosystems may similarly enhance surface colonization and growth to cause infectious diseases or environmental contamination.

"We saw that these two distinct organisms assemble together as a new organismal entity that gave each one additional benefits and functions that single cells did not have on their own," says Koo. The findings could even shed light on the evolution of mutualism and multicellularity that enhances the survival and growth of single organisms when they unite and work together as a unit in a given environment, the team notes.

"This discovery of a 'bad guy' superorganism is really ground-breaking and unanticipated," says Knut Drescher of the University of Basel, a co-corresponding author on the paper. "No one would have predicted this. Zhi accidentally stumbled across this by keeping an open mind."

THAI MUSHROOM HUNTERS TRAPPED BY FLASH FLOOD

https://www.nationmultimedia.com/, Oct 12, 2022

More than 70 locals in Kanchanaburi's Sai Yok National Park were rescued on Wednesday after being stuck in three forests for five long days.

The rescue came after they ventured into the forests to collect "het khone," or termite mushrooms, but could not get out due to a flash flood.

National park chief Supol Khamsano explained that the locals from a number of communities went to collect the mushrooms in three areas—around 30 in Dongsak forest, 20 in Huai Luek forest, and another 20 in Khok Wua forest.

He said some other locals were able to overcome strong tides and exit the forests, but others, who were on motorcycles, had to wait for the floodwater to recede.

The rescue team had been instructed to deploy four-wheel-drive trucks to rescue them and get their motorcycles out, he said.

Even though the operation was difficult, all locals were rescued and were able to return home," he said.

Sai Yok National Park, covers 958 km² (193.1 mi²) on the western edge of Thailand and is known for its waterfalls, caves, historical sites such as remains of the Thai-Burma Death Railway, and raft houses along its main river Khwae Noi.

The park is part of a huge continuous forest complex called Western Forest Complex, about 18,730 km², comprising 19 protected sites in Myanmar and Thailand.

Right: Stranded Thai mushroom hunters and rescuers.

RESEARCHERS GREW CORDYCEPS ON SIX DIFFERENT KINDS OF INSECTS

Annie Lennon

https://www.medicalnewstoday.com/, Oct. 20, 2022

[edited for length and clarity] Preliminary studies show that mushrooms in the genus *Cordyceps* may benefit health via anti-inflammatory, antibacterial, and antifatigue activity.

Cordyceps sinensis.

Cordyceps sinensis are typically collected in the wild and are difficult to find in large quantities. When grown in lab conditions, the closely related *Cordyceps militaris* are typically grown on grains. Methods to increase production and reduce production costs could enable the mushrooms to enter clinical trials for various conditions.

In a study published October 19, 2022, in *Frontiers in Microbiology*, researchers grew *Cordyceps* mushrooms on six different kinds of insects—crickets, mealworms, grasshoppers, white-spotted chafer larvae, and Japanese rhinoceros beetles

While the *Cordyceps* grew on all six insects, the growth and shape of the resulting mushrooms differed.

"The cultivation method of *Cordyceps* suggested in this study will enable the production of cordycepin more effectively and economically," says coauthor Mi Kyeong Lee, of the College of Pharmacy at Chungbuk National University, South Korea.

The researchers noted that after 35 days of growth, mushrooms grew largest on silkworm pupae and mealworms, followed by Japanese rhinoceros beetles and crickets, and lastly, white-spotted chafer larvae and grasshoppers.

However, they noted that mushroom's size did not necessarily correlate with its cordycepin content. Cordycepin content was highest among *Cordyceps* grown on Japanese rhinoceros beetles. Mushrooms grown on these beetles had 34 times more cordycepin than those from silkworm pupae.

Upon further study, the researchers found that different compositions of fat, protein, and carbohydrates correlated with different characteristics of growth. Specifically, higher fat contents correlated with the highest contents of cordycepin.

This finding, they wrote, matches previous research showing that vegetable oils increase cordycepin synthesis by activating genes linked to the cordycepin biosynthesis pathway.

They then investigated whether certain kinds of fats may influence growth. In doing so, they noted that a higher oleic acid content was linked to more cordycepin output.

While Japanese rhinoceros beetles had an oleic fatty acid content of 10.8 percent, silkworm pupae had an oleic acid content of just 0.4 percent..

Cordyceps sinensis.

WHAT ARE MUSHROOM CLUBS ALL ABOUT

President, Col. Mush. Soc

Spores Afield, Colo. Mush. Soc, Oct. 2022

Several years ago, I came across an insightful article written by the late Myco-legend and philosopher Gary Lincoff where he asked the question, "What are mushroom clubs about?"

After reading Mr. Lincoff's article again this year, I was left trying to answer for myself the question he posed. What are mushroom clubs about? Why is it when mushroom people gather for hunting, eating, identification, and so on, the human connections we make are on a level that leaves us energized and often exhausted? My following ramblings might give … some possible replies to Lincoff's question.

Mushroom clubs are about…

Program developing and scheduling,
[newsletter] editing,
membership chairing, and website maintenance, too.

Mushroom clubs are about…

Toxicology briefing, fabulous foray scheduling and leading,
selling books at meetings, and identifying and teaching
about fungi, brought by you.

Mushroom clubs are about…

Cooking food for eating, helping with the cleaning,
arriving early for meetings, inquiring and learning
and keeping our bank account true.

Mushroom clubs are about…

Poetry reciting, helping with the lighting,
emailing out reminding, mushroom fair assisting,
and stacking chairs up, whew!

Mushroom clubs are about…

Mushroom conversing, debating,
and discussing, medicinal mushroom explaining,
and a place to rendezvous.

Mushroom clubs are about…

Herbarium curating, creating displays at mushroom fairs,
cultivating, board meeting minutes maintaining,
and those who ask, "Is there anything I can do?"

Mushroom clubs care about…

Enriching and fulfilling, encouraging, and sharing,
maintaining, and celebrating the love and passion
of mushrooms and fungi with you.

My realization of what mushroom clubs are about incorporates and allows a community of people to connect and get involved. Humans interact with fungi on many different social and cultural levels. We gather to explore special and essential experiences. Whenever and wherever we gather as a club, our bonds get stronger and allow for us all to grow and evolve on a personal level, as well as on a communal level, which would be hard to do in isolation.