SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 541 April 2018

A Giant Has Fallen

Gary Lincoff
1942–2018

It with great sadness that we announce the death of mycological great Gary Lincoff on Friday, March 16, 2018. He was giving talks and active up until the previous Monday, when he had a massive stroke, went into a coma, and died. As aptly summarized by Susan Goldhor of the Boston Mycological Club:

> *"He was 76 years old, with the curiosity and energy of a much much younger person—say, about 11—but with a lot more knowledge and wisdom.…*
>
> *Gary was interested in everything … And he could make everything interesting. I recently announced publicly that if Gary gave a talk about blackboard erasers, I'd go, and I meant it.*
>
> *Gary's knowledge was vast and he was a mesmerizing speaker, able to educate and/or entertain, according to the occasion. Actually, Gary never educated without entertaining and he never entertained without educating.*
>
> *It's an understatement to say Gary will be greatly missed."*

Lincoff was the author and editor of several books and articles on mushrooms, including the iconic *Audubon Society Field Guide to North American Mushrooms*. He taught courses on mushroom identification at the New York Botanical Garden, led mushroom study trips and forays around the world, visiting every continent except Antarctica, and was a featured "myco-visionary" in the award-winning documentary "Know Your Mushrooms." His most recent book was *The Complete Mushroom Hunter*.

Last year, he received the Gordon and Tina Wasson Award "for outstanding contributions to the field of mycology and efforts in educating the public about fungi" by the Mycological Society of America.

Our condolences to his wife, Irene Liberman, and their son, Noah.

Although most people probably think of Gary mainly as a teacher and mycologist, he was also an extremely creative one. Among his other accomplishments, he wrote several songs and even plays on a mycological theme. In his memory, we offer one of his creations here.

"Mushrooms to the Rescue"
a shameless theft from Tom Lehrer's "Irish Ballad"
Gary Lincoff, 2016

About a maid I'll sing a song
Sing rickety tickety tin
About a maid I'll sing a song
Who didn't have her family long
Not only did she do them wrong
She did every one of them in
Them in
She did every one of them in…

Her mother was a bat from hell
Sing rickety tickety tin
Her mother was a bat from hell
And just as blind as you can tell
Because she ate the False Morel
And she died for all her sins
Her sins
She died for all her sins…

Her father was a brutal kind
The very worst of all her kin
Her father was a brutal kinda
Who didn't die from some angina
But from his daughter's Galerina
And that was the end of him.
Of him.
That was the end of him…

Her twin sister was a family spy
The very worst kind of brat
Her twin sister was a wicked spy
But once she ate the mushroom pie
She just lay down and sort of died
And that was the end of that…
Of that,
That was end of that…

Her brother she knew she could never whack
With a bowl of mushroom stew
He was too smart to taste that deadly brew
But she had to do what she had to do
And he died with a knife in his back
His back
He died with a knife in his back…

And when at last the police arrived,
Sing rickety tickety tin,
And when at last the police arrived,
And a mushroom soup they did espy,
After all she'd done what's a little lie,
And she did every one of them in
Them in
She did every one of them in…

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CALENDAR

April 10	Membership meeting, 7:30 pm, CUH
April 11	*Cordyceps militaris* cultivation class
April 16	PSMS board meeting, 7:30 pm, CUH board room
April 18	*Spore Prints* deadline
April 28	Field trip (see PSMS website)

BOARD NEWS

Luise Asif

Thank you, Jeremy Collison and Chi Tran, for stepping up to chair Mushroom MAYnia scheduled for May 20th. A call will go out at the April meeting for volunteers to help. Daniel Winkler and Donna Naruo continue as Vice President and Treasurer. Two new board members, Lauren Re and Chiara DeNeve, begin their term in April. Welcome back Milt Tam, Anne Tarver, Sweta Agrawal, and Paul Hill. The board is working on implementing suggestions the membership provided for the PSMS Planning Retreat, concerning more field trips/forays and classes. The Education Committee under the leadership of Danny Miller is planning exciting new classes for 2018 and other learning opportunities. Shannon Adams has led two excellent microscopy classes and more are being planned. Paul Hill is working on digitizing the PSMS archives. He is also uploading the Bridle Trails survey records to iNaturalist. Thank you, Paul. The Bridle Trails Study is active again after a brief winter break.

MEMBERSHIP MEETING

Tuesday, April 10, 2018, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle

William Padilla Brown

Our speaker for April is William Padilla-Brown, and the title of his talk is "Fungal Fortunes." The field of mycology has never been more accessible to the public, with online forums, books from experts, and workshops in almost all major cities in the U.S. We are seeing more, and more, "amateur mycologists" contributing to our understanding of fungi! William will tell how he went from dropping out of high school to culturing wild mushrooms, starting a farm, and learning how to grow *Cordyceps militaris*. Learn how fungi and mushrooms can be incorporated into whole system designs for the home/farm and community for food, medicine, and remediation.

William Padilla-Brown had the opportunity to grow up traveling. After living in England, Taiwan, Mexico, and New York he now is back in his hometown of New Cumberland, PA. He is a social entrepreneur, citizen scientist, mycologist, amateur psychologist, urban shaman, poet, and father to his beloved 3-year old son, Leo. Leaving high school at age 16, Will pursued a nontraditional, independent approach to learning and actively promotes alternative education. He holds permaculture design certificates from Susquehanna Permaculture and NGOZI. In 2014, he established Community Compassion, a nonprofit focused on radical sustainability, based in New Cumberland, PA. In 2015 he founded MycoSymbiotics LLC, a mycological research and mushroom production business. He has raised over 30 types of mushrooms and six types of algae. He is driving mycological research in the areas of food production, mycoremediation, and medicinal value. Will educates children and adults alike about topics ranging from nutrition to mushroom cultivation, having led workshops and various programs all over the country. Will is proud to be a contributing editor for *Fungi Magazine*, a foremost mycological periodical.

CORDYCEPS CULTIVATION COURSE

On April 11 (7:00–9:30 pm), William Padilla-Brown will conduct a workshop on cultivating *Cordyceps militaris*.

Cordyceps militaris is becoming more popular in North America as more research comes out on its pharmacological activity. At this time North American Cordyceps cultivation is focused on mycelium production for powders and capsules. There is currently a demand for Cordyceps fruit bodies in North America. As more individuals begin to source more of their products locally, there will be a demand for locally grown Cordyceps. If interested please email miltontam@aol.com.

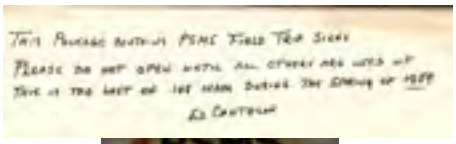
Ed. Note: The more famous *Cordyceps sinensis* is becoming more rare and cannot be easily grown in culture. In contrast, *C. militaris*, which has similar chemical capacities and medicinal properties, can be cultivated successfully. Consequently, *C. militaris* has been increasingly viewed as a substitute for *C. sinensis*.

FOUND: FIELD TRIP NOSTALGIA **Derek Hevel**

After my first run as a co-chair of last year's fall show, and me being an organizer at heart, I went through the PSMS storage shed where we hold items for shows and other events. On one of the lower shelves I found a wood fruit crate full of PSMS field trip signs. You know the ones: stencil-painted in black and cream paint, front and back, the ones posted off of major roads leading up to our field trip locations. They're the ones Brian Luther and other field trip leaders still use and have used for the last 14,000 years. Those.

I decided to dig through and count how many were left—about 70—but I also found an unwrapped bundle at the bottom of the crate with writing on it. It read: "This package contains PSMS field trip signs. Please do not open until after all others are used up. This is the last of 108 made during the spring of 1989. Ed Cantelon." There was even some writing in the side: "Use this bundle last, maybe year 2000?"

So I immediately unwrapped it. Inside were two things: the front page of the *Seattle Times/Post-Intelligencer* from June 4, 1989, and a hand-typed letter. The newspaper was a cool time capsule from the past, but the letter was golden. There was something about this guy's foresight, craftsmanship, and dedication after all these years and long after Ed's passing. I love exploring the little histories and triumphs within the club. Hearing Gwen's recent account to me about what field trips were like in the 70s (multi-night camping and the shenanigans) was a gem moment. It's terrific to see field trip guides and IDers show newbies their first chanterelles, and they get so darn excited. And I am changed for the better when people like Gary Lincoff, one of the masters of mycology, lectures at the most recent Ben Woo Foray, recites a vexing tale of Thelephors and such, and calls us to commit to mycology forever #imallinthanks&adios. Thank you all for the special things you do.



Seattle Wa. 24 July 1989

Dear Field Members

If things have gone the way that I wished, this is the last bundle of field trip signs.

During 1979 I made 108 of these signs. When spring field trips started in 1969, only 2 could be found. Now another 108 of them have been made.

If this new batch are used up at the same rate as the last ones, you should be opening this about 1999.

This will be last of these from this source. I am now 83 years old and I cannot expect to be really enough to make more of them, when these are used up.

Good luck, and happy trouble-shooting

Ed Cantelon

Ed Cantelon

MUSHROOM MAYNIA

Family • Fungi • Fun!

Mushroom MAYnia showcases safe cultivation, hunting, and harvesting methods, art, and crafts—all created from our fungi friends. Educational and fun for the whole family, it includes foraging tips, cultivation info, nature walks, mushroom talks, truffle flavored popcorn, and fungi crafts.

Date: Sunday May 20, 2018

Time: 10 am to 4 pm

Venue: Center for Urban Horticulture
3501 NE 41st St, Seattle

Admission: Tickets available at the door
$5 per family, $3 per individual

THE PURSUIT OF HOPPINESS **Andrew Masterson**

https://cosmosmagazine.com, Mar. 21, 2018

In 1487, the German duchy of Munich adopted a law that insisted the only permissible ingredients for making beer were water, barley, and hops. The law was introduced to the rest of Bavaria in 1516 and then embraced later still by greater Germany.

It is called the *Reinheitsgebot* and has been regarded as a credo by fundamentalist brewers around the world ever since.

Now, however, a team of scientists led by bioscientist Jay Keasling from the University of California, Berkeley, in the U.S. is suggesting that the *Reinheitsgebot* might actually be a bit too complicated and the interests of good beer might be best served by dropping the hops altogether.

This news, of course, will send a collective cry of "mein Gott!" around the globe, but Keasling and coworkers base their argument on the one crucial ingredient on which the German code is silent —yeast.

There is a very good reason for the absence of the world's most useful fungus from the *Reinheitsgebot*. At the time, no one knew of it, much less of its crucial role. As every ale aficionado today knows, brewer's yeast (*Saccharomyces cerevisiae*) gobbles up simple sugars such as glucose and maltose and produces carbon dioxide and alcohol.

In a paper published in the journal *Nature Communications*, Keasling and his colleagues show that with a little tweaking it can also produce the bitterness and flavor long associated with hops.

In beer-making, the word "hops" denotes the flowers of a herbaceous perennial plant called *Humulus lupulus*. There are scores of different varieties, bred obsessively by brewers to impart specific blends of bitterness and flavor to what might be otherwise rather bland drinks.

Hops, however, is energy and water intensive to grow. It is also notoriously troublesome, in that it does not breed "true"—that is, a seed from a plant will not produce an identical offspring, meaning that commercial crops must be effectively cloned from cuttings.

cont. on page 4

The Pursuit of Hoppiness, *cont. from page 3*

Keasling's team has found a way to avoid all these problems by ditching them completely and instead engineering the genome of the yeast to produce hoppy characteristics. They do so by altering commercial *S. cerevisiae* DNA, adding snippets derived from other yeasts and herbs such as mint and basil.

Doing so, they report, involves a "unique challenge" and requires "state-of-the-art engineering techniques."

The result, however, is a yeast that is able to biosynthesis aromatic molecules that impart hoppy flavors—and does so better than hops.

"Beers produced using these strains are perceived as hoppier than traditionally hopped beers by a sensory panel in a double-blind tasting," they conclude.

DENVER, COLORADO, MOVES TO DECRIMINALIZE MAGIC MUSHROOMS

https://nowthisnews.com/, Mar. 15, 2018

A small advocate group in Denver is working to reduce the penalty for possession and cultivation of psychedelic mushrooms.

Denver For Psilocybin argues that psychedelic mushrooms have been clinically proven to treat psychiatric conditions and depression and anxiety.

The group aims to "Decriminalize the use, possession, transportation, cultivation, and transfer of psychedelic mushrooms in Denver."

"I also use it to heal from PTSD from my trauma, and it's the only thing that makes me want to stay on this earth," Front Range Community College student Teresa Egbert stated. "Microdosing has gotten me out of this loop of negative thinking and it's the only thing that helped me not kill myself when I was suicidal."

A small study published by Imperial College London in 2017 found that psilocybin could "reset" the brain, helping people to escape the loop of depression.

Denver For Psilocybin was recently given a green light from the city council to begin collecting signatures. They need 4,726 to make the ballot.

WASHINGTON MUSHROOM FARM GETS STATE AID TO EXIT SUBURBIA

Don Jenkins,
Capital Press, Mar. 16, 2018

A Western Washington mushroom farm will get a million-dollar boost from state lawmakers to move across the Cascades to the Port of Sunnyside in Yakima County.

Lawmakers appropriated $1 million to the port to save Ostrom's Mushrooms the expense of preparing land for a $35 million farm. The port's executive director, Jay Hester, said Wednesday that he expects Ostrom's to bring 200 full-time jobs to the port.

"That's huge for us," he said. "It will be nice to have jobs in agribusiness that are not seasonal."

Ostrom's is the state's largest mushroom farm. The company has grown mushrooms in Lacey for 50 years, but agriculture is no longer compatible with the suburban neighborhood that has developed around the farm, Ostrom's President David Knudsen told a House committee in February.

Sen. Jim Honeyford and Rep. Bruce Chandler, legislators who represent Sunnyside, originally sought to help Ostrom's by introducing bills to exempt the company from paying sales tax on building materials. Ostrom's estimated the exemption would be worth $1.8 million. The company said a move may not be financially possible without the tax break.

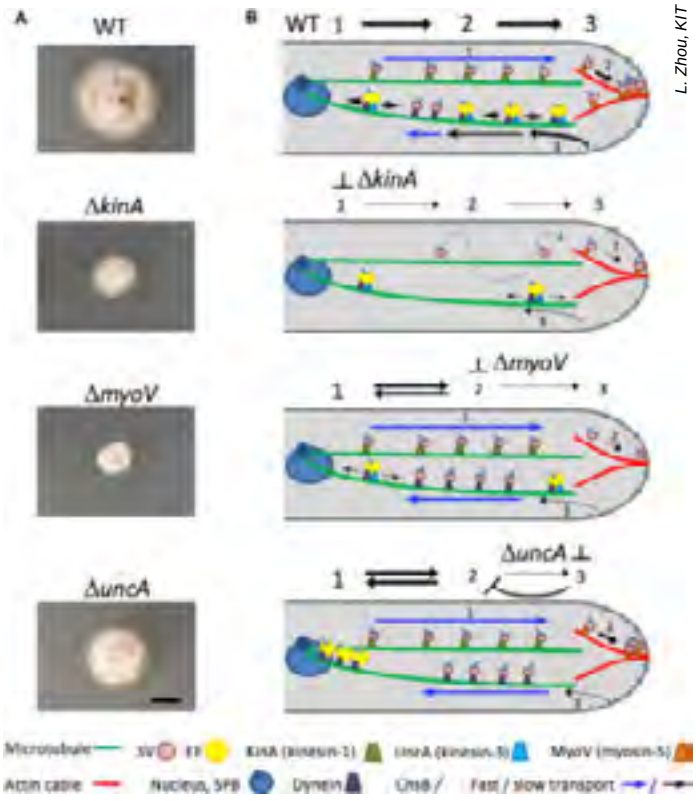
The bills stalled, but the lawmakers were able to get the $1 million in the capital budget passed March 8.

HOW FUNGI GROW: A MOVIE FROM INSIDE THE CELL

Karlsruhe Institute of Technology
via https://www.sciencedaily.com/, Mar. 15, 2018

Fungi forming mold on food are hazardous. Fungi supplying antibiotics are beneficial. Fungi may be harmful pathogens. On the other hand, they are used for the production of food or medicine and in bioengineering. In any case, a precise understanding of their growth mechanism is required. Researchers of the Karlsruhe Institute of Technology (KIT) have made a big step forwards: Using high-performance light microscopy, they watched mold fungi as they grew in the cell. The findings are presented in *Science Advances*.

Like most fungi, mold fungi are hyphal fungi. They consist of filamentous cells, hyphae, which may form large networks, my-



Growth of fungi (left) on the molecular level (right) is in the focus of research conducted by KIT scientists.

celia. The hyphae, about 3 µm thick, grow exclusively by directed extension of their tips. They grow very rapidly, by about 1.5 mm per day. An important objective of biological fundamental research is to understand this growth on the molecular level, as hyphal growth plays an important role in both health-damaging effects and beneficial applications of fungi.

For their studies, the researchers tagged a key enzyme required for building the chitin-containing cell wall with a fluorescent protein and observed the latter in the living cell with the help of high-resolution microscopy (nanoscopy). Use of ultrasensitive cameras in the microscope enabled high-speed imaging of tip growth and of the transport of individual vesicles, allowing precise determination of the transport speed of the vesicles. They revealed how building materials are packed into smallest vesicles and transported along the fiber structures of the cell skeleton to the cell tip by transport vehicles, the motor proteins. Motor proteins are very small nanomotors that dock to the fiber structures with two small "feet" and walk on these structures. Using genetically modified fungi, the scientists also identified the motor proteins responsible for the transports.

From their observations, the researchers of the Institute of Applied Physics and the Institute for Applied Biosciences of KIT derived a first comprehensive model to describe how the rapidly growing hyphal tip is supplied with construction material. This is an important step toward complete molecular understanding of directed cell growth processes. Professor Gerd Ulrich Nienhaus of KIT's Institute of Applied Physics says, "The findings made in hyphal fungi are of general relevance to biology, as they can be transferred to other cells and organisms. On the other hand, they open up new opportunities to specifically influence fungal growth, which is important to the mitigation of pathogenic species in medicine."

"DESERT TRUFFLE" IS THE RARE DELICACY IN THIS SPECIALTY SOUK IN KUWAIT

Salima Lebel

http://www.straitstimes.com/, Mar. 19, 2018

Kuwait City (AFP) - White or beige, but never black, the "desert truffle" is a rare delicacy with a dedicated marketplace in Kuwait, where remnants of the Iraqi invasion and changing weather patterns have decimated local production.

Less prestigious and less expensive than its darker cousin, the Middle Eastern truffle is a prized ingredient for Bedouins, who integrate it into their traditional rice and meat dishes or in sauces, boiled with onions.

AFP/Yasser Al-Zayyat

Kuwaiti truffle seller. Desert truffles—species in the genera Terfezia and Tirmania—come from other countries such as Iran, Saudi Arabia, Morocco or Libya, a trader said.

On the outskirts of Kuwait City, in the Rai industrial district, connoisseurs begin perusing the truffle souk at 9:00 am, surveying the various weights and colors and using their noses to select the best fungus by smell.

Desert ruffles.
First you find a crack. *And there's your truffle.*

Some barter while others go straight for the top shelf, with the "Zebidi" variety especially prized for its use in traditional recipes.

Demand is so high in the Gulf emirate's market that each year hundreds of merchants compete for limited stall space during the cooler winter months.

The market was devised by the municipality of Al-Rai, an industrial zone just northwest of Kuwait City, which oversees quality control and guarantees the traceability of the fungus.

"We decided to build this market in 2006 to organize sales of this product, which you used to find in all sorts of corners in Kuwait," said Faisal al-Jomaa, vice-governor of Kuwait City.

This year, he said, 520 merchants applied for one of the 9-sq.-m stalls. Just 123 vendors secured space.

One of them was Iranian Abdel Ali Said, who has bought and sold truffles since the 1960s. "They come from Iran, Saudi Arabia, Morocco, Tunisia, Libya, and beyond," he said of his truffle selection. Prices range from 7 to 20 Kuwaiti dinars (23 to 66 US dollars) per kilogram depending on the quality, according to Said.

This year, the market is reportedly flooded with truffles from Libya.

"That happens every six years," said Kuwaiti merchant Mohammed al-Shammari on a recent day in the truffle market. "Production is cyclical. You also have a lot coming from Tunisia this year."

To drive home just how popular truffles are among Kuwaitis, Shammari pointed out that "three to four tons are imported daily, and sold fresh."

But for all its love of truffles, Kuwait's own commercial cultivation and harvesting of the fungus has plummeted to zero since Iraq invaded the emirate in 1990. The risk of coming across an unexploded land mine left behind by the Iraqi army keeps Kuwaitis from scouting the desert for wild truffles.

The only remaining production is purely for personal consumption.

Kuwait's truffle crops have also been hit by a changing environment.

Unlike European truffles, which grow under tree roots, desert truffles spring up after rain, which means that volume and quality vary according to the amount of precipitation and the general weather.

"Irregular rainfall, rapid urbanization, and encroachment on the desert are all factors in the disappearance of (local) truffles," explained vice-governor Jomaa.

cont. on page 6

Desert Truffles, *cont. from page 5*

That has only increased desire for the delicacy, especially for making Kabsa, a spiced rice specialty common throughout the Gulf and the most popular dish in Kuwait.

The main ingredients are long grain rice, red meat, and truffles used to flavor the broth while cooking.

"Kuwaitis are addicted to truffles because they are rare and have such a distinct taste," said Yousef Mohammed al-Khaled, a young truffle aficionado, who claims he can distinguish between various sub-varieties.

Khaled said he spends up to 3,000 Kuwaiti dinars (nearly US $10,000) each year on white truffles, which he incorporates into his diet twice a week, including family lunches on Thursdays, the last day of the work week.

Fresh truffles are only available from November to April in Kuwait, but some vendors sell a dried variation of the delicacy during the region's scorching summer months in a bid to meet their customers' cravings all year round.

NEW ZEALAND'S MOST PATRIOTIC MUSHROOM

Jennifer Frazer

https://blogs.scientificamerican.com/, Mar. 16, 2018

A few weeks ago I walked the Milford Track, one of the most famous short through-hikes in the world. It takes you through the wilds of New Zealand's Fiordlands National Park, through ancient stands of southern beech shaggy with clinging plants and past streams so pure the guides assured us they all drink straight from them.

In our case, it also took us to a helicopter rescue after 12 inches of rain in 10 hours. We could hear the boulders dislodged by the thundering waterfalls tumbling from the cliffs around us as we waited hours for the rain to slacken enough for a helicopter to land. I got more adventure than I bargained for!

One of the most startling finds of my journey were several clusters of an all-black, velvety mushroom found nowhere but New Zealand, home of a near cult-like devotion to their national rugby team, the All Blacks

After I peeked under the mushroom's skirt, it became apparent it was a bolete, a group of mushrooms with a sponge-like pore layer where the gills would normally be. Pores, like gills, are about maximizing the surface area for making spores. In this mushroom, they were white when young, becoming golden in the oldest specimens I saw as spore production ratcheted up.

Jennifer Frazer

Tylopilus formosus. There appear to be slug slime trails on the cap

A black bolete—actually, any black mushroom—is a novelty to me. The most famous bolete, the delicious porcini, possesses a lovely rich brick red (or sometimes creamy) cap here in Colorado, but a brown one in other parts of the world. The rest of our boletes come in shades of brown, yellow, orange, and red.

The only other black mushroom-like fungi I know of are deeply weird and in two very unrelated groups—the Black Earth Tongue and the morbid Dead Man's Fingers, so named because the above-ground portion appears to be the work of a shoddy gravedigger.

A quick internet search revealed that this black mushroom is likely *Tylopilus formosus*, a species known to play root footsie with native southern beeches and manuka (source of New Zealand favorite Manuka honey), both abundant in the area I saw the mushrooms. Someone has even previously reported *T. formosus* from the Milford Track, way back on January 25, 1957. And, rather perfectly, it appears to be found exclusively in New Zealand. Might an American humbly suggest a candidate for national fungus?

CAN DOGS AND CATS BE VEGAN? FUNGUS-BASED SCIENCE WEIGHS IN.

Michelle Z. Donahue

https://news.nationalgeographic.com/, Mar. 15, 2018

Quick, name one thing soy sauce, miso, and sake all have in common. If you said, "They're delicious," you're not wrong. But the real answer is koji.

The common name of the fungus *Aspergillus oryzae*, koji is a microorganism at the heart of many traditional Asian flavors and foods. It's also the key ingredient in a new kind of pet food announced today that its creator hopes could change the future of how animal feeds are produced.

Koji is normally cultured directly on grains like rice, which supply the starches the fungus needs to proliferate. Wild Earth co-founder Ryan Bethencourt says they put the koji straight into a beet sugar-based solution. After extraction, they press it like tofu, then slice and bake it into a final product full of protein that's like a cheese cracker in taste and flavor.

The end goal, says Bethencourt, is to create an environmentally friendly, high-quality food for pets that's vegan and tasty. The company plans to release their first product—a pet treat—by June, with a kibble-based food available later in 2018.

EX-GARMENT WORKER MAKES RS 30,000 A MONTH AFTER TURNING HER HOUSE INTO A MUSHROOM FARM

B S Satish Kumar

http://www.thehindu.com/, Mar. 16, 2018

A small house can turn into an urban farm, yielding a tidy income. That is what it did for 40-year-old Kamala, who gave up her job as a garment worker in Bengaluru, India, and turned her house in a 1,200 sq. ft. plot into a mushroom farm.

Two decades of back-breaking work in different garment factories in the city convinced the woman, who has a pre-university education, that it was time to try something less strenuous. "The continuous hard work does not even give you enough time to visit the washroom. It started making me feel as though I was in jail," she recalls.

She quit the garment job that was fetching her Rs 8,000 (US $123) a month and chanced upon an article on mushrooms in a magazine. Inspired, she went to the Indian Institute of Horticultural Research (IIHR), 4 km from her house on Tumakuru road on the city's outskirts, and enrolled in a mushroom cultivation course.

"A short training session by experts was offered, after which I launched cultivation in my house about two years ago. It started with 2–3 kg a month. Now I grow 50–60 kg of oyster mushrooms a month without engaging labor, and earn a profit of about Rs 30,000 (US $462)," she says proudly.

What she cultivates is sold to hotels and vegetable shops regularly. Now that Ms. Kamala has mastered the basics, she has joined a training program at IIHR on value addition: turning leftover mushrooms into *sambar* powder and ready-to-eat products.

Her quest now is to set up a unique hotel that is dedicated to mushroom dishes in her husband's home town of Kushalanagar in Kodagu district. He works as a supervisor in a garment unit, and the couple have a daughter and a son.

"I know I have the potential to increase mushroom production five-fold. But I cannot raise the resources required for such an increase on my own. I am looking for government assistance in any form," she says.

Ms. Kamala has become an example for her former colleagues in the garment industry, and some have adopted her business model. "People from farming families too can add to their incomes with mushrooms," she says. On Thursday, she was honored by the IIHR for her achievements at the inaugural session of its three-day national horticultural fair which attracted farmers from several States.

Kamala.

ZOMBIE APOCALYPSE: ANTS CAN'T TELL WHEN THEIR COLONY IS OVERRUN BY A DEADLY FUNGUS

Kate Sheridan

http://www.newsweek.com/, Mar. 14, 2018

Carpenter ants appear to have a hard time figuring out when one of their own is infected with a parasite that will eventually make it kill itself. Researchers from Pennsylvania State University published their findings February 23 in *PLoS One*.

Turns out ants are really bad at picking up on nest mates infected with this particular fungus. They didn't attack infected ants—in fact, they shared food with them instead. Infected ants did cluster more toward the entrance to the colony, which might have meant that they were being excluded more than usual.

If you don't quite get why this is a problem worth studying, consider a zombie apocalypse. If your entire social structure is built on the idea that you should help people out, but your neighbor is actually a zombie—even a friendly zombie that might not eat your brain—then you're undercutting yourself. You're helping a zombie instead of a non-zombie in your community.

Ideally, you figure out that your neighbor is a zombie and act accordingly. That's what bees do when others in their hive are infected with something called deformed wing virus, the paper notes. The same is true for termites. "A lot of the literature has focused on this idea of social immunity—suggesting that ants are very good at detecting sicknesses in the nest and they act aggressively toward illness and that that's how they maintain healthy and large colonies," behavioral ecologist and study author Emilia Solá Gracia told *Newsweek*.

To test this idea, Solá Gracia and her colleagues took about 100 carpenter ants and created three colonies. About a third of each of the ants were infected with a parasitic fungus called *Ophiocordyceps kimflemingiae* [a recently named species of the *O. unilateralis* complex].

This kind of fungus can infect ants that leave the nest and will linger and grow in an ant's body for up to three weeks. Then it makes the ant go outside the nest again, bite into vegetation, and release the fungus. "The parasite grows out of its head," Solá Gracia said.

A previous study by another Penn State group found that this fungus works by acting on the ants' muscle fibers but leaves the brain alone—so, not truly a zombie-spawning spore. Go with it anyway; after all, it's often called the "zombie ant fungus."

You can't ask an ant if it thinks its nest mate is a potential zombie. But you can watch to see if it attacks a nest mate, doesn't share food with a nest mate, or stays away from a nest mate—so that's what these scientists looked for using an infrared-enabled GoPro camera on top of the colony.

"As soon as the parasite is outside of the ant's body, the ants are very good at detecting the parasite and killing it, for the most part. There, they're very efficient," Solá Gracia noted. "But they're not as efficient when the sickness is developing or the fungus is developing inside of the ant."

However, this experiment is still on the smaller side of things. (That's in part because Solá Gracia watched thousands of hours of videos—by herself.) "In a perfect world, this would be a larger sample size and I would still have the large amount of observations, but I'm only one human." However, she noted, the message from the data is still pretty clear. "We didn't sense, behaviorally, that they can detect infection."

Newsweek

Ant helping a wounded comrade by clearing away dirt and applying antimicrobial chemicals to the injuries.

DESERT TRUFFLES: Traditional recipe

http://www.sauditodayonline.com/

Ingredients

Desert truffle, 800 g
Lean lamb or beef, 400 g, sliced very thin
One large onion
Chicken stock, 200 ml
Water
Salt
Pepper
Ghee clarified butter, 1 TBs

cont. on page 8

Desert Truffle Recipe, *cont. from page 7*

Procedure

Finely chop the onion and fry in ghee on medium heat until soft. Add the meat and fry until brown on all sides. Season well with salt and pepper.

Cut the truffles into bite-size pieces and add them to the pot with chicken stock and some extra hot water as required. Bring to the boil then simmer for about 30 minutes until the meat and truffles are fully cooked. The truffles should keep their dense firm texture.

Serve with Arabic bread or vermicelli rice.

VERMICELLI RICE

Kano

http://syrianfoodie.blogspot.com/, Dec. 6 2009

Ingredients

Rice of your choice, 2 cups
Vermicelli pasta, a good handful
Ghee clarified butter, 2 TBs
Salt
Hot water

Procedure

Wash your rice and soak in cold water for 20–30 minutes.

Start by melting the ghee butter and add the vermicelli pasta. Stir continuously to prevent the pasta burning and get an even browning. You need to fry the pasta till dark brown.

Take the pot off the heat and add the hot water. The amount of water required varies depending on the type of rice. Follow the packet instructions. As a general rule 2 cups of rice will need 3–3½ cups of water. "Easy cook" rice will need less water.

Please be very careful not to burn yourself. Adding water to very hot butter will cause small melted butter droplets to fly out of the pot.

Return the pot on the cooker and add salt. Taste the water and don't worry if it is a bit salty as the rice will absorb the salt. Drain and add the rice to the boiling water and bring back to boil. Turn the heat to medium, cover and cook for 10 minutes. Check the rice at this point and stir it very gently. Add a bit of boiling water if necessary.

Turn down the heat to as low as you can, cover, and let the rice steam and finish cooking for another 10 minutes. Stir for the second time and serve.

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