The Boston Mycological Club

Bulletin

Summer 2026 Volume 80 Issue 2

CONTENTS

In This Bulletin

The front cover photo was taken by Simon Gurvets and shows *Lachnum* growing from dead hardwood in Alewife Reservation, Cambridge MA. Back cover photo of *Bulgaria inquinans,* "poor man's licorice," by Jess Evans.

Contribute to The BMC Bulletin!

The Bulletin is a place for our members to share their creativity and experiences. Our editorial team encourages you to submit stories, articles, experiences, artwork, poetry, and photos of your finds. Please send all questions, concerns, comments, and contributions to editor@bostonmyco.org

A Tour of the Farlow Herbarium

PAM CHAMBERLAIN

Last winter, staff members at The Farlow Herbarium at Harvard invited members of the BMC to tour the facility. A number of veterans jumped at the chance and signed up at the earliest opportunity while newer members were intrigued. What was all the fuss? A private tour at Harvard has a certain cachet, and the tour filled up in a flash.

At the cul-de-sac of Divinity Avenue in Cambridge sits a hybrid new/old building: the Harvard University Herbaria. The newer wing has been the "clubhouse" of the BMC, hosting our meetings, workshops, ID sessions, and parties. The older building once housed parts of the Divinity School, including its library. Nowadays you need a Harvard ID to enter, but this tour gave our members a chance to go beyond locked doors to view samples from the Farlow Herbarium collection of over 1.5 million (!) dried and archived items of fungi, from across the world. It also houses specimens of bryophytes, lichens, and algae.

In the days before molecular identification and DNA sequencing, amateurs and professional mycologists alike depended on morphological identifiers, or what the fungus looked like to the naked eye or through a microscope. As the study of fungi became more recognized by the scientific community, written and illustrated descriptions of species were augmented by actual dried specimens. These were collected and catalogued into a "library" or herbarium. The Farlow Herbarium of Cryptogamic Botany contains 1.5 million specimens from across the globe, including items almost 200 years old. (The term "cryptogamic" refers to organisms that reproduce without seeds, like fungi, algae, lichens, and mosses.) The herbarium is still actively used by mycologists from around the world who request to study its collections. A core of the herbarium is Farlow's own collection. So who was this Farlow, and why are these dried up samples still important?

FARLOW TOUR

The BMC's beloved friend and scientific advisor Professor Emeritus Don Pfister has an amazing ability to teach about the people behind the science. He has helped the BMC realize the important scientific contributions William Gilson Farlow made to the study of fungi and encouraged us to be proud of our association with Harvard and the Farlow Herbarium. For instance:

- Farlow was the first Professor of Cryptogamic Botany in North America, hired by Harvard's famous Asa Gray after learning the trade from European scholars.
- He taught at Harvard for 45 years, never using teaching assistants.
- His wit, insatiable curiosity, impressive memory, and dogged work ethic impressed scholars and students worldwide.
- Farlow was a life-long forager, collecting in many of the places BMC members go.
- He amassed his own library and private collection of fungi and bought herbaria collections from others, beginning when he was a student.
- He wrote over 100 scientific papers, published 4 books, and contributed 250 chapters and articles to both scientific and general audience publications.
- Farlow bequeathed his library and herbarium to Harvard.
- He left behind an unpublished, beautifully illustrated folio of American fungi his widow brought to print that sells today for $1500 on the rare book market.

In 2024, the Farlow Herbarium marked its 100th anniversary under Pfister's leadership. True to his humility, he reminded us that the real work is done by those who cultivate, curate, and study the collections. Two of those researchers, Rachel Swenie and Genevieve Tocci, led our tour of the facility.

Rachel, a Postdoctoral Fellow at the Farlow who studies chanterelles and *Hydnum*, explained how working with the herbarium supports her research. Because the old building's narrow spaces could not accommodate all sixteen of us at once, our group split in two. Rachel walked my group upstairs to her office and showed us how she uses specimens as vouchers: records of identified species that document when and where a fungus was collected. She passed around a specimen borrowed from another herbarium and explained that DNA can be extracted from such specimens and compared with other vouchers of the same or related species. This helps refine our understanding of fungi, many of

which remain unidentified, while some known specimens turn out to split into entirely new genera and species. Research like this advances our taxonomic understanding of the fungal kingdom, even though it frustrates us amateurs trying to relearn names.

The Farlow continues to welcome qualified researchers to visit and study at Harvard, and it lends specimens to other scholars worldwide.

We know from our BMC member Professor Dave Hibbett and his research at Clark University that we can now trace the evolution of a species through time, thanks in part from DNA samples from herbaria specimens. Thanks to his leadership, mycologists can now construct an evolutionary tree that has rewritten how we understand the development of fungi over time. Because the herbaria specimens are archived with time and place information, we can also study environmental issues such as global warming, and loss of habitat, key issues of current importance to the world's climate crisis.

Next, our group walked through another section of the herbarium with Genevieve Tocci, the Senior Curatorial Technician. Genevieve had unpacked and displayed an array of fascinating examples from the archives. Unfolded packets, trays, and folders of archival paper revealed type specimens from across the globe, mounted with common pins and accompanied by citations of the name of the collector, date, location, and habitat description. The herbarium's dried, brittle specimens were oddly coming to life!

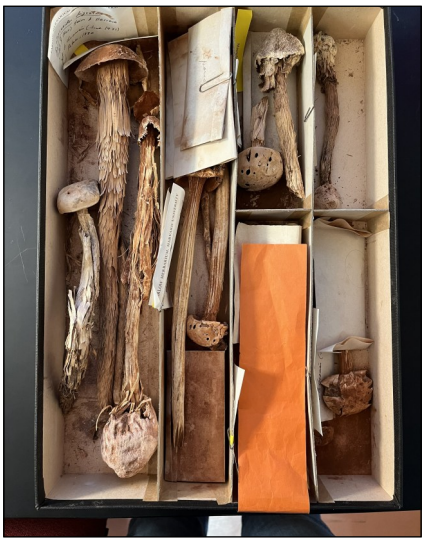
Our conclusion: the Farlow Herbarium, on the surface looking a little ordinary and static in its metal cabinets, is a crucial resource for scholars worldwide. Although it may appear outdated next to online resources such as GenBank and MyCoPortal, It is not just an archive but a laboratory for basic and applied sciences.

Although Farlow left money to Harvard to set up his library and herbarium a century ago, Pfister recognized that these resources needed ongoing support. In 1980 he founded the Friends of the Farlow, a membership group that included many BMC members as well as scholars worldwide that helped generate funds for over 40 visiting Fellows, such as its most recent beneficiary, Rachel Swenie. You may have heard about its annual Clara Cummings Walk, named after a 19th century BMC member and Wellesley professor of lichens and mosses. Like many volunteer organizations, though, its membership has dwindled, and with Don's retirement and no permanent

mycology professor on Harvard's staff, the herbarium and library cannot depend on this small but supportive structure from the mycological community. It remains to be seen if anyone will hoist the Friends flag again soon.

Taking a tour like this one opened our eyes to the value of the Farlow Herbarium and helped the BMC recognize the amazing resource hidden in plain sight next door to our clubhouse meeting room. Be sure to sign up at the next opportunity!

Photos courtesy of Julie Duncan



INTERVIEW

The Complete Fungi: An Interview with Editor/ Author David Hibbett

JONATHAN KRANZ

In spring 2026, Princeton University Press published The Complete Fungi, a unique approach to the subject that bridges the gap between peer-reviewed literature for mycology professionals and popular science for lay mushroom enthusiasts. In May, Jonathan Kranz interviewed the book's editor and overall project director, David Hibbett, who is also the Boston Mycological Club's affiliated mycologist.

Who is *The Complete Fungi* for?

We wrote it for a fairly diverse audience, but primarily for people who are not professional biologists, but are in interested in nature, specifically, fungi. It's not written as a textbook per se, but it could be used as one. I'm proud of the group [of contributing authors] we assembled. They're really good mycologists, and they run the gamut from graduate students to senior scientists.

There are a lot of mushroom-related books in print. What's new here?

It's such a broad book, I don't think there's anyone who would consider themselves an expert on all the subjects we cover. Every chapter has new information. For example, in the chapter about fruiting bodies, we wanted to make the connection between the mechanics of spore dispersal and the shape of the fruiting body.

One of the things that sold me on the idea of doing the book was a phylogenetic tree diagram I found in a book about plants. I thought that I'd like to have something like that. That's why we have several tree figures in the book. It's not a systematics book, but we wanted to present the phylogenetic perspective in a way people can relate to.

That would explain the strong graphics-to-text ratio.

Complete Fungi is meant to be seductive and appealing. We want people to look inside and get hooked – that comes from the images. There was a lot of back-and-forth with the

illustrator, and I sourced many of the photos by going to colleagues and asking for images. Many come from my colleagues' personal research. For instance, on page 57, there's a transmission electron micrograph of a hyphal tip, and it's superb! You're never in a million years going to get that from Getty Images. We got it from Robbie Roberson, an outstanding electron microscopist.

Another example: on pages 274-275, we illustrate the life of a bizarre entomopathogen [insect parasite], *Coelomyces psorophorae*. It has the craziest life cycle, infecting two hosts, mosquito larvae and copepods [planktonic crustaceans]. The really strange thing is if an infected female mosquito larva isn't killed, it can become an adult that, instead of laying eggs, lays fungal sporangia through its ovipositor – a strange life cycle that not only will be new to many mycophiles, but to many professional mycologists as well.

In recent years, genetics has replaced morphology as the foundation for identifying species. We lay people are really struggling to keep up. Any thoughts on how to help the confused?

Most fungi that look alike are closely related. But what the phylogenetic work has shown is that there's a lot of convergence [similar forms arrived through different ancestral lineages], so it's not the case that everything in the same clade will have the same form.

The concept of "species" is a huge general problem in biology. When you sequence whole genomes, you can see patterns of relationships in greater detail than ever before. But when you have genome sequences you can group into clusters, at which point are you seeing different species as opposed to different populations of the same species? Different evolutionary biologists will look at the same data and draw different conclusions.

How do we close the gap between what the mycologists know and what the mycophiles feel?

Sometimes, the unhappiness with name changes reflects a misunderstanding of what mycologists are trying to do. But it can also reflect a lack of ability or willingness on the part of professionals to communicate with the broader community. That's a very big problem because the professional community is really tiny – we need to communicate clearly with the rest of the planet. That's one of the reasons I took on this book project.

Let's tackle one of the most basic questions people ask all the time: how many fungi are there?

We have documented about 175,000 species so far – and know that there could be millions more.

It's a moving target; we're identifying roughly 3,000 new species each year. We would like to know how many species there are, but do we really need to know? Is that a critical piece of information that would somehow influence our behavior? We know there are lots. And at the current rate of description, it'll take a thousand years to get them all.

You and your co-authors have been bold enough to burst two mycology bubbles: the idea of a carbon "marketplace" and the even more popular idea of the "wood wide web." Tell us more.

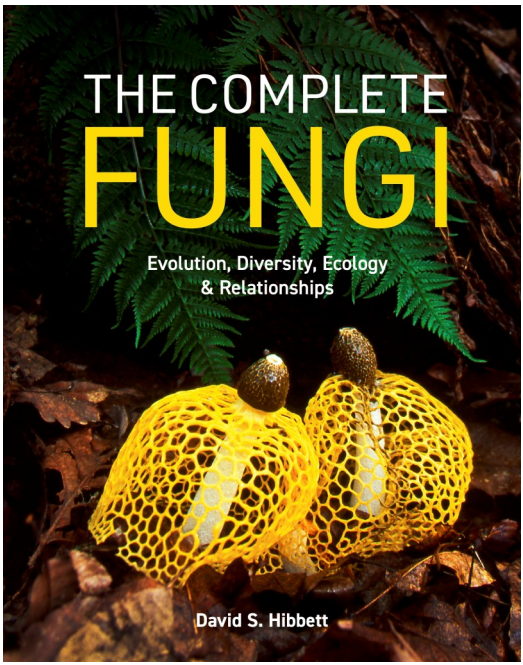
One of the co-authors, Justine Karst, worked with her colleagues in 2023 to publish a very scholarly review of the scientific literature on common mycorrhizal networks, CMN, the technical term for the "wood wide web." They showed that the vast majority of studies had not included the controls necessary to rule out alternative explanations. Specifically, they found no evidence of preferential carbon transfer from parent trees to their offspring – the "mother tree" hypothesis. Karst pointed out that not only was there weakness in the science, but there was bias in the pattern of citations, neglecting contradictory evidence. She's not saying that the ideas are all wrong; it's just the work done to date has been limited in its scope and the appropriate controls have not been applied. She's putting on the brakes and saying we should consider alternative hypotheses.

Karst got real hate mail for her work because people have fallen in love with the "collaborative networks" idea. But to me, she's a hero of science – she's doing exactly what a scientist is supposed to do, which is to question received wisdom.

In conclusion, where might a deeper understanding of the underlying science take us?

I have this idea that, if you could conceptualize and hold in your head for just a second an understanding of the actual diversity of life and history of life, wouldn't that seem more miraculous than anything you could invent? That's why I hope more of my colleagues write books aimed for the general public.

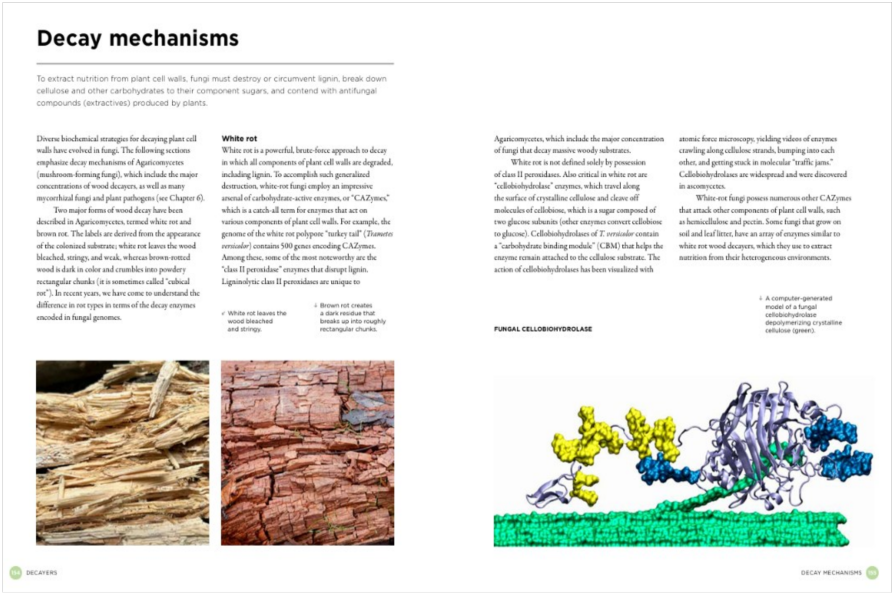
The Complete Fungi
Princeton University Press, 2026, 367 pp.
Editor: David S. Hibbett, PhD
Authors (in order of appearance): David Hibbett, Timothy Y. James PhD, Nicholas P. Money PhD, Anne Pringle PhD, Soleil Young PhD, Justine Karst PhD, Jana M. U'Ren PhD, Marc A. Cubeta PhD, Lindsey Becker PhD, Robert Lücking PhD, Manuela Dal Forno PhD, João P.M. Araújo PhD, Allison Walker PhD



Left: cover of *The Complete Fungi*

Below: A view of pages 154-155 of *The Complete Fungi*, Chapter 5: Decayers. As noted by David Hibbett, the proportion of text to images was done deliberately to help people "look inside and get hooked."

The Complete Fungi can be ordered through the Princeton University Press or found at your local bookseller.



Decay mechanisms

To extract nutrition from plant cell walls, fungi must destroy or circumvent lignin, break down cellulose and other carbohydrates to their component sugars, and contend with antifungal compounds (extractives) produced by plants.

Diverse biochemical strategies for decaying plant cell walls have evolved in fungi. The following sections emphasize decay mechanisms of Agaricomycetes (mushroom-forming fungi), which include the major concentrations of wood decayers, as well as many mycorrhizal fungi and plant pathogens (see Chapter 6).

Two major forms of wood decay have been described in Agaricomycetes, termed white rot and brown rot. The labels are derived from the appearance of the colonized substrate; white rot leaves the wood bleached, stringy, and weak, whereas brown-rotted wood is dark in color and crumbles into powdery rectangular chunks (it is sometimes called "cubical rot"). In recent years, we have come to understand the difference in rot types in terms of the decay enzymes encoded in fungal genomes.

White rot

White rot is a powerful, brute-force approach to decay in which all components of plant cell walls are degraded, including lignin. To accomplish such generalized destruction, white-rot fungi employ an impressive arsenal of carbohydrate-active enzymes, or "CAZymes," which is a catch-all term for enzymes that act on various components of plant cell walls. For example, the genome of the white rot polypore "turkey tail" (*Trametes versicolor*) contains 500 genes encoding CAZymes. Among these, some of the most noteworthy are the "class II peroxidase" enzymes that disrupt lignin. Lignin-lytic class II peroxidases are unique to Agaricomycetes, which include the major concentration of fungi that decay massive woody substrates.

White rot is not defined solely by possession of class II peroxidases. Also critical in white rot are "cellobiohydrolase" enzymes, which travel along the surface of crystalline cellulose and cleave off molecules of cellobiose, which is a sugar composed of two glucose subunits (other enzymes convert cellobiose to glucose). Cellobiohydrolases of *T. versicolor* contain a "carbohydrate binding module" (CBM) that helps the enzyme remain attached to the cellulose substrate. The action of cellobiohydrolases has been visualized with atomic force microscopy, yielding videos of enzymes crawling along cellulose strands, bumping into each other, and getting stuck in molecular "traffic jams." Cellobiohydrolases are widespread and were discovered in ascomycetes.

White-rot fungi possess numerous other CAZymes that attack other components of plant cell walls, such as hemicellulose and pectin. Some fungi that grow on soil and leaf litter, have an array of enzymes similar to white rot wood decayers, which they use to extract nutrition from their heterogeneous environments.

↑ White rot leaves the wood bleached and stringy.

↓ Brown rot creates a dark residue that breaks up into roughly rectangular chunks.

FUNGAL CELLOBIOHYDROLASE

↓ A computer-generated model of a fungal cellobiohydrolase depolymerizing crystalline cellulose (green).

SPECIES SPOTLIGHT

Poor Man's Licorice

JESS EVANS

As fans of fungi, none of us are surprised by all of the weird and wild ways that fungi present themselves in the world. However, this beautiful ascomycete, *Bulgaria inquinans,* has truly surprised me both times I've spotted it.

B. inquinans is a May-October saprobe, commonly observed in clusters on oak and ash. Fruiting bodies are small in size when young, 1-4 cm, starting out as a cup shape with a rough exterior and tightly inrolled rim and maturing to have a flat, shiny top. Mature specimens become "flabby," eventually resembling black jelly fungi.

This species is also known as "black jelly drops" or "black bulgar," and Michael Kuo of Mushroom Expert notes that these "are what Uncle Fester would produce if he were CEO of the gummy factory." Yes, I have to agree with that assessment! These are truly weird...and truly wonderful.

Another view of this gorgeous species can be seen on the back cover.

Upper Right: Young specimens

Lower Right: Mature fruiting bodies flattening out

An Oddball Mycological Destination

LAWRENCE MILLMAN

Imagine that you've traveled to a certain subtropical British Overseas Territory. "What, no *Russulas*?" you might say after foraging around for a while. An astonished look appears on your face, since there would seem to be hardly any place in the world other than Antarctica where you can't find Russulas. But you won't encounter any *Amanitas*, *Lactarius*, chanterelles, matsutakes, *Hebelomas*, *Clavariaceae*, boletes, *Tricholomas*, truffles, or Corts, either. All are ectomycorrhizal, and all are absent in these parts. Welcome to Bermuda.

Rumor has it that the 21-square-mile archipelago's early English colonizers disposed of every mushroom in sight in order to protect the new settlement from a deluge of mushroom poisonings. No doubt they believed that every species was poisonous. But geology rather than mycophobia (or the Bermuda Triangle) is the reason why ectomycorrhizal species aren't found in these parts. Approximately 900,000 years ago, a carbonate platform of coral reef sediments began piling up in the Atlantic Ocean some 700 miles from the nearest landmass (North Carolina). That pile, named after the 16th century Spanish sailor Juan de Bermúdez and informally called "The Isle of Devils" because of the shrill calls of its seabirds, has since become a popular playground for tourists. But it isn't a playground for mycologists, especially those who specialize in ECM species.

Pardon my temporary anthropomorphism, but let's say you are an ECM fungus, perhaps even a *Russula*, and you're searching around for a suitable substrate. You arrive in Bermuda, a landscape of soft aeolian limestone made from the aforementioned coral reef sediments. When rain falls, you won't benefit from it, as the limestone is extremely porous… so porous that there aren't any rivers or even streams anywhere in the archipelago, just a few ponds. The pH of the soil is 7.5-7-9, which makes it quite alkaline… and alkaline soil is usually inappropriate for an ECM species like yourself.

Also, hardly any species fructify at a high salinity level. You say to yourself, "how much better would the comfy acidic soil of New England be?"

Even if the soil had a lower pH, it would be difficult for an ECM species to acquire any partners here. The national tree, the Bermuda cedar (*Juniperus bermudinia*), is actually a juniper and is typical of other junipers as well as cedars in its refusal to form ECM relationships. Endomycorrhizal ones, yes; but not ectos. The same with other endemic trees like the Bermuda palmetto (*Sabal bermudana*), the southern hackberry (*Celtis laevigata*), and olivewood (*Elaeodendron laneanum*) as well as introduced trees such as the Casuarina (*Casuarina equisetifolia*), Chinese fan palm (*Livistonia chinensis*), and Brazil pepper (*Schinus terebinthefolia*). Yet once such trees have bought the proverbial farm, they provide fine dining opportunities for crusts, polypores, and jellies. *Auricularia* species tend to be especially common diners.

Lest you think otherwise, a number of fleshy fungi do occur in Bermuda. There are *Coprinopsis* and *Psathyrella* species in mulch, *Conocybes* in grassland areas, and *Hygrocybes* in moss, along with *Crinipellis zonata*, several *Gymnopilus* species, *Marasmius*, and *Mycenas* on dead wood. Not surprisingly, none of the recently described ECM *Mycenas* has been found in these parts. If you want to collect a porcini or two (or three), you can do so only by going to the Supermart in Bermuda's capital, Hamilton, and purchasing dried specimens.

I've indicated there aren't any ECM species in Bermuda, but now I'm going to correct myself. There is exactly one such species, and it's in the genus… well, try to guess it, and I suspect you won't succeed. Here's a hint: don't think charisma. And here's another hint: there are probably other members of the same genus lurking in the vicinity of wherever you happen to live.

So there I was, wandering around Nonsuch Island, a somewhat boomerang-shaped hump of land at the far eastern end of Bermuda. Revived from the dead — i.e., from human desecration — by local conservationist David Wingate, Nonsuch is Bermuda's most significant nature reserve. It hosts the formerly endangered bird called the Bermuda petrel or cahow (*Pterodroma cahow*), the endemic Bermuda skink (*Plestiodon longirostris*), and endemic plants such as the Bermuda bean (*Phaseolus lignosus*) and the Bermuda shield fern (*Thelypteris bermudiana)*, all of which were meticulously hand planted by Wingate himself.

Shortly after I stepped ashore, I encountered specimens of

Trichoglossum wrightii (recently re-identified as *T. hirsutum var. wrightii*) fruiting in moss. This is a short, squat earth tongue that I hadn't encountered on Bermuda's mainland, although it was originally described from there and Cuba.

All at once I saw what looked like several defunct earthstars in a quite sandy area on the island. Upon closer inspection, they seemed to be time-worn specimens of the so-called star earthball (*Scleroderma polyrhizon*). And on even closer inspection, they turned out to be the corpses of *Scleroderma bermudense*, the one and only ECM fungus that's been documented in Bermuda. If they'd been in decent shape, the specimens would have been 1.8-2.8 cm. thick and covered with delicate brown arachnoid fibers.

In the words of mycologist W.H. Coker, who described the species in Mycologia in 1939, it's "entirely subterranean until dehiscence [rupture], the entire body covered with delicate brown arachnoid fibers which hold fine particles of sandy soil and from which flocculent strands extend into the soil." The specimens I observed had long since dehisced, and thus no longer had a peridium or anything akin to a spore-laden interior. They were scattered in a way that suggested either the wind had blown them around a bit or one of the rare visitors to Nonsuch had decided to play kickball with them. *S. bermudense* doesn't have a common name, so I'll now provide it with a seemingly appropriate one — "Oddball."

Given currently rising sea levels due both to melting polar ice and also the fact that seawater expands as it gets warmer, *S. bermudense* may not be dehiscing much longer. For its exclusive habitat is sand dune areas adjacent to the ocean in Bermuda as well as other more or less tropical locations. If Coker had written his description of the species today, he might have included the word "drowning." But Mexican mycologist Julia Alvarez-Manjarrez is well aware of the situation, and she recently proposed that the species be placed on the Global Fungal Red List as Endangered because, she wrote, "its ecosystem is in severe risk." I second the motion…

You may wonder what *S. bermudense* partners with. The botanical entity in question is *Coccoloba uvifera*, otherwise known as the sea or bay grape. This is a species of tree and/or shrub in the buckwheat family native to coastal beaches and dune areas in subtropical America and the Caribbean. It can grow upwards of 50

feet high, or it can be a quite modest shrub, one that produces racemes of delicate white flowers. But whichever growth habit it chooses, *S. bermudense* helps to alleviate salt uptake in its seedlings, an act that allows it to survive extremely sandy areas. Thus it's not surprising that *C. uvifera* decided to go mycorrhizal with *S. bermudense*, nor is it surprising that I witnessed several *C. uviferas* growing in the vicinity of the somewhat compromised fruiting bodies I just mentioned. What might be surprising is that neither botanical entity or the fungus seems to partner with any other species. Talk about monogamy!

But just as with us human beings, monogamy among fungi might actually be difficult to determine. *S. bermudense* may or may not have other as-yet undetermined partners. After all, below ground ECM fungal diversity can be different from the realm of aboveground fruiting bodies. So might the oddball in question have other partners which have thus far kept themselves in the dark? In answer to this as well as any number of other mycological questions, let me quote the celebrated jazz pianist Fats Waller: "One never knows, do one?"

Thanks to Struan Smith, Scott LaGreca, Jeremy Medeiros, and Mary Sears for their assistance with this article.

Editor's Note: This article originally appeared in Fungi Magazine*, summer 2025.*

The Bermudan jungle

POTLUCK PHOTOS

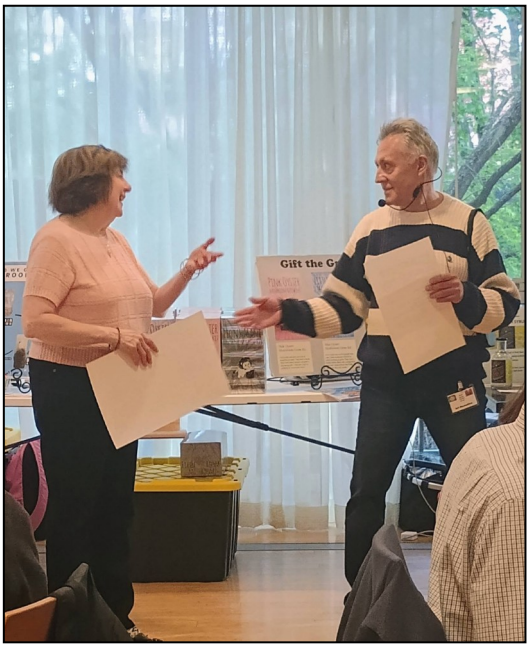
Club members enjoyed the annual potluck gathering this past May; lots of food, fun, and friends!

Above: delicious pinwheels by Robert Gergulics (The 3 Foragers)

Above: Member J. Sun with former BMC President, Susan Goldhor

POTLUCK PHOTOS

Photos from the annual potluck courtesy of Jana Harris.



Members attend the annual potluck.

Below: Delicious mushroom-themed potluck dishes by members

FUNGAL FUN

Below you will find the newest Fungal Fun puzzle. As always, many thanks to Léna Sanentz for this regular Bulletin feature!

What is the FIRST myco word you see? **Now, find 28 others**

Léna Sanentz

X C A L A S C O M
M G R I F O L A K X W P
J G Z X C O B H G R U S S U L A Z
Q Y D J H G F D I O D E S M Z C V Q W
S J N M S E T E M A R T R A M E T E S Y X
L D I M K I A M A N I T A Q R T Y G Y B R H
S D F C O R T I N A R I U S K P O I U Y T W Z
O G D S O S U I L L U S P O Y V F S P O R E G T
M X M O R E L G R P O R C I N I W Q X Z F H K
W E P H A L L U S M R T Y U I O P C V B N L D R
I W A R M I L L A R I A Q M L A E T I P O R U S B
J D X V C V B T R I C H A P T U M Z U S H R Y T P
W D K C O P R I N U S Y K T P L E U R O T U S M J
L P N K O B J I V H U B M C X F T Z D R S E W A Q
V S T E R E U M Z X G C P Y U I O C D E R T Y X W
Q R L E L E P I S T A G E R T Y T R E M E L L A T
C T R Y D L Y C O P E R D O N G R D R F R A U I
W Z S E N X D R C T V F O M I T O P S I S O X
A M F M S U L O E A H P P H A E O L U S N C D
Z L M B C P L U T E U S V G T Y U I O Z G T
M K D V C A N T H A R E L L U S M K I M P
Z B N D R G A N G A N O D E R M A G
M O M P H A L O T U S A C D C T D
T U F T H Y P H O L O M A
K Z N B V C X Z A

Morel Banquet in British Columbia

GARY GILBERT

The North American Mycological Association (NAMA) just concluded an exquisite epicurean event: a Morel-focused regional culinary foray in southern British Columbia. Around 130 happy hunters came from all parts of North America to experience, many for the first time, hunting forest-fire burn morels and then eating them in all sorts of ways. What's not to like?

The infinitely delightful culinary coordinator for NAMA, Julie Schreiber, coordinated other chefs including Robert Courteau, Jen Levine, Raeanna Layfield, and Paul Moran to produce 3 nights of fabulous meals. Paul Moran is the owner of The Sixty-Forty restaurant on Vancouver Island and won a Top Chef award some years ago. Julie Schreiber was the lead chef for many years of Sonoma County Mycological Association's "SOMA Camp," an annual event known very well throughout the country for truly exceptional food. She was the reason why.

The first evening, "Italian Harvest," began with appetizers including Crab Stuffed Morels, Spot Prawns and Morel Bisque. These tasty tidbits were followed by a main course of Bison and Porcini Lasagne and desserts of Candy Cap Budino and Agaricus Shortbread. Stuffing morels is a bit tricky unless you have moderate to large caps to work with and know how to make the filling at just the right consistency so that it doesn't

Crab Stuffed Morels

ooze out, nor too thick to fill the caps. One trick chef Alan Bergo does, if you ever want to serve this, is to briefly roll the caps in flour, then singe them at the end over a very hot pan to create a crisp, maillard-rich bite to them.

The second evening, "Forager's Feast", began with a panoply of patés including: Black Trumpet Jam, Mushroom Paté, Chicken Liver Mousse with fungi, and Rabbit Rillette: a hippity-hop winner. The main course was Chinook Salmon en Papillote which is the PNW's most famous salmon species served in parchment paper with leeks, fennel, parsnips and turnips. A solid and filling plate with excellent flavors. After the salads were served, dessert was a "Burnt Stump" cake with Candy Cap Ganache. An incredibly appropriate sculptural dessert considering many of us were tripping over so many burnt stumps and fallen trees all day long in the burnt forests about half an hour away: at least at this point we got to eat them. Jen Levine shines with her sculptural and tasty desserts and she did it all again here.

The third evening, "British Columbia Bounty", began with Kelp and Ramson Butter Toasts and NW Albacore Tuna over native Saskatchewan wild rice. These flavors were followed by a main course of Chicken and Morel Fricassee, a name that underplays what a famous dish it was. This was their version of the famous French dish "Morilles au Vin Jaune." This rare wine, vin jaune, is a yellow-colored sherry that is not sweet, but full of a unique flavor. That sauce was a show stealer, which is hard to say considering there were so many fine dishes being served. The dessert was a Wild Mushroom Tiramisu whose name does not do it justice.

"Burn Stump" Cake

It contained all sorts of special ingredients such as mascarpone, amaro, espresso, cacao, orange essence and, of course, dried wild mushroom powders. When we speak of wild mushrooms at NAMA, we're never talking about just Agaricus or Oyster mushrooms.

One of the beauties of this event was that we got to stay in very modern, recently renovated and well-appointed cabins seriously deep in the British Columbia forests. We were far from any cities and populated with mycophiles as well as zillions of incredibly cute Prairie Dogs running around the grounds, seemingly unafraid of nature-loving mycologists.

The majesty of the lands we were in was hard to put words to. The native peoples there, the Similkameen, among other groups, have lived there for many centuries and still do so. We remain grateful to share their land with them and enjoy, and respect, all of their inhabitants. NAMA, once again, has succeeded in its efforts to offer more frequent events in all parts of North America. This has included many recent events in Mexico, which I highly recommend, as well as this one in BC, Canada. Mark your calendars because next year's big annual event will again be in Canada, in the rugged mountains of Alberta.

Above photos: Freshly harvested-morels, morels in the pan

Gary Gilbert gives lectures thoughout the country, is author of four editions of "Mycocards", flashcards for learning mushroom identification (mycocards@gmail.com), is a member of the NAMA Culinary committee and has mushroom recipes published in various publications including the Fantastic Fungi Community Cookbook. All photos in this article by Gary.

Lanmaoa asiatica: The Strange World of Lilliputian Hallucinations

ARI STAMATIOU

Of the approximately 900 species of edible mushrooms consumed in China, 90% come from the Yunnan Province and account for 36-45% of edible mushrooms worldwide.

Deep in the pine forests of Yunnan Province, in southwestern China, grows one of the most unusual mushrooms known to modern mycology: *Lanmaoa asiatica* (兰茂牛肝菌); known locally as Jiàn Shǒu Qīng (见手青 - translation: blue-upon-seeing-the-hand; a reference to how quickly this mushroom discolors.)

Lanmaoa is named after the Chinese botanist, Lan Mao (1397-1476) of the Ming Dynasty. This genus does have representatives in North America and Europe, but they are generally distinct species, e.g., *L. pseudosensibilis, L. carminipes, L. pallidorosea* and others.

As I have come to realize, *L. asiatica* is famous not only for its culinary value, but also for the bizarre neurological symptoms it can trigger when eaten raw or insufficiently cooked.

Unlike most hallucinogenic fungi, *L. asiatica* does not appear to contain psilocybin (C12H17N204P) or muscimol (C4H6N2O2), the psychoactive compounds associated with "magic mushrooms" and *Amanita muscaria*. Yet hundreds of poisoning cases have been documented in Yunnan during mushroom season, many involving vivid and remarkably consistent hallucinations of tiny humanoid beings, a phenomenon known as "Lilliputian Hallucinations."

A mushroom rooted in culture, L. asiatica is an ectomycorrhizal bolete associated with Yunnan pine forests; primarily with *Pinus yunnanensis* and *Pinus armandii*. It bruises blue almost instantly, within seconds, when handled. This family of naturally occurring pigments are biosynthesized from the amino acids, tyrosine and phenylalanine. The chemical reaction is caused by oxidizing pulvinic acid

(C18H12O5) into its derivatives.

L. asiatica has a reddish stem and yellow-brown cap resembling certain porcini species, and it is widely sold in local markets and restaurants throughout Yunnan.

In local cuisine, this mushroom is considered a delicacy with strong umami flavor. However, experienced cooks treat it with caution. Restaurants frequently warn diners not to eat the mushroom before it has been cooked thoroughly, sometimes even using timers to ensure adequate preparation. Some establishments reportedly forbid alcohol consumption alongside the dish to reduce poisoning risks. Despite these precautions, hospitals in the region still encounter numerous seasonal poisoning cases.

The Lilliputian Syndrome

For me, the most fascinating aspect of *L. asiatica* intoxication is the emergence of Lilliputian Hallucinations, a rare neuropsychiatric phenomenon in which people perceive miniature humans, animals, or fantastical creatures.

Victims commonly report seeing tiny people marching across tables, small figures climbing walls, miniature beings hanging from furniture, and/or crowds of "little people" emerging from corners or doorways.

These visions are often detailed, animated, emotionally vivid and long lasting (up to 12 hours). What is remarkable is the uniformity of these experiences reported across different regions that are separated not just by geography but also cultural norms, where many unrelated patients describe highly similar imagery.

As you may know, the term "Lilliputian" originates from Jonathan Swift's *Gulliver's Travels* (1726) in which the protagonist encounters the tiny inhabitants of Lilliput. In neurology and psychiatry, the phrase describes a rare class of visual hallucinations involving miniature figures.

Neurological Effects Beyond Hallucinations

The symptoms of undercooked *L. asiatica* ingestion that give rise to hallucinations of tiny beings vary in severity. Some patients remain aware that the hallucinations are not real, while others temporarily lose the ability to distinguish fantasy from reality. Researchers suspect that the mushroom affects perceptual processing regions of the brain involved in spatial scaling and visual interpretation. Yet, the precise neurochemical mechanism remains unknown.

The Mystery of the Unknown Compound

One of the greatest scientific mysteries surrounding *L. asiatica* is that chemical analyses have not yet identified any known hallucinogenic agents.

Investigators have ruled out many classic psychedelic compounds, suggesting the mushroom may contain an entirely undiscovered neuroactive substance.

Genomic and metabolomic studies are now attempting to isolate the responsible molecule. This mushroom may provide new insights into human visual perception, hallucination pathways, neural scaling mechanisms, novel psychoactive chemistry, and brain interpretation of spatial dimensions.

Recent microbiome research has also revealed that the mushroom hosts complex bacterial communities that may influence toxin production or biochemical activity. Geographic origin appears to also strongly affect its microbial ecology.

A Rare Intersection of Cuisine, Folklore, and Neuroscience

Very few organisms occupy the strange cultural niche of *L. asiatica*. It is simultaneously a prized culinary mushroom, medically significant toxic species, subject of neurological research, modern internet phenomenon, and a source of folklore-like hallucinations.

In Yunnan, stories of tiny people appearing after improper preparation have become part-cautionary tales and part-regional folklore. Yet beneath the mythology lies a legitimate scientific puzzle that continues to challenge toxicologists and mycologists alike.

As research progresses, *L. asiatica* may ultimately reveal entirely new classes of neuroactive chemistry hidden within the fungal kingdom and perhaps explain why the human brain sometimes populates its hallucinations with tiny marching worlds.

One interesting observation that I made during the research of this paper is that when I searched via Google "*L. asiatica* for sale," the number one search result was the Amazon website. The website directed me to a host of mushroom products, but not *L. asiatica*. I tried it again with different mushroom types and the same thing happened; for example, I searched "Amanita phalloides for sale," and Amazon came up at the top. It is as if Amazon's pursuit is to create a binomial database on fungi so that any name along with the keyword "sale" will direct individuals to their website. I also searched the internet for edible availabilities for *L. asiatica*; no luck.

My plan is to visit the Chinatown stores in Boston (MA), for in-person conversations with shop/restaurant owners. I will keep you all informed. Stay tuned!

LILLIPUTIANS

Lanmaoa asiatica, photo courtesy of Colin Domnaeur

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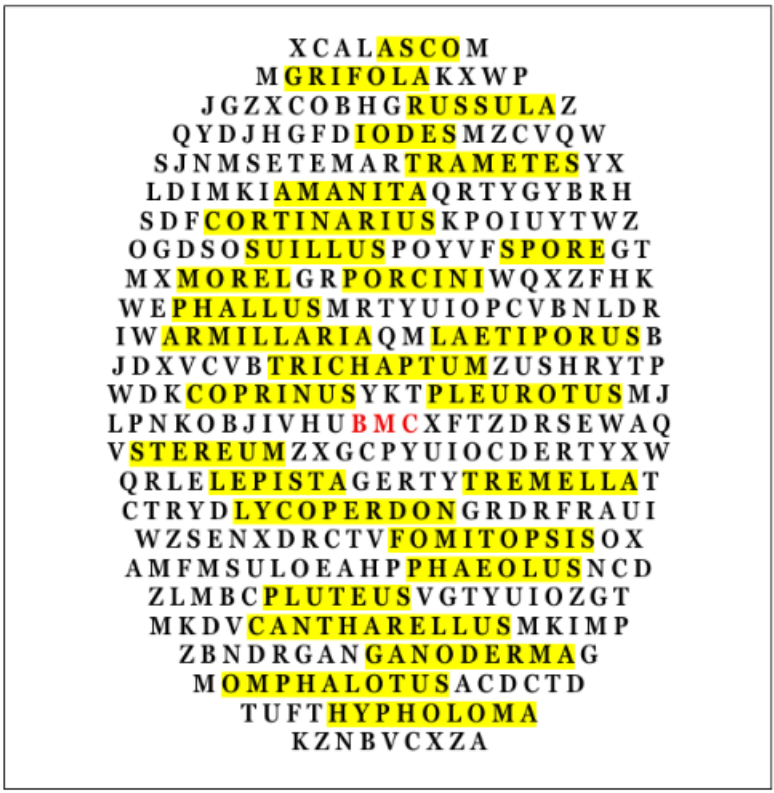
FUNGAL FUN

Below you will find the solution to the puzzle on page 15. Thanks, Léna!



Amanita	Ganoderma	Morel	Russula
Armillaria	Grifola	Omphalotus	Spore
Asco	Hypholoma	Phaeolus	Stereum
Cantharellus	Iodes	Phallus	Suillus
Coprinus	Laetiporus	Pleurotus	Trametes
Cortinarius	Lepista	Pluteus	Tremella
Fomitopsis	Lycoperdon	Porcini	Trichaptum

MEMBER PHOTOS

Clockwise from upper left: *Laetiporus cinncinatus* by Lauren Gallaway, *Neofavolus suavissimus* spotted by Jess Evans, *Psathyrella delineata* by Ari Stamatiou.