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## MYCOMATCH



Previously titled “Matchmaker, Mushrooms of the Pacific Northwest” this free identification program has now been updated to include a total of 4500 species sorted into fifteen form categories such as Gilled, Boletes, Polypores, Cups, Crusts, etc. Each of these categories are searched separately, using suitably appropriate characteristics for the gilled species—such as cap shape & color, gill, stipe & flesh characters, odor & taste, spore deposit color, and habitat. If available, microscopic finding can be entered as well. Other form categories, such as Crusts or Polypores will require a different array of characteristics.

Although this program is addressed to the Pacific Northwest, over 60% of our species may be found here and almost all of our genera, so while you may not be able to arrive at the exact species, you should certainly be able to come up with the correct genus.

This program is designed to operate only in a Windows environment, the previous Mac version having been withdrawn. However, it will work in a Mac running a simulator like Paral-

(Continued on page 4)

## WHAT THE DNA REVEALED: THE SEQUEL

In the Summer 2020 edition of this newsletter we reported the results of sequencing performed under the grant LIMC received from the FunDis (formerly Mycoflora of N.A.) Project. These results were essentially unequivocal, resulting in 99% or better similarity to our specimens of *Tricholoma arvernense*, *Melanoleuca heterocystidiosa* and *Cortinarius laetus*, all first records for the East Coast and generally rare otherwise. Contrariwise, the common *Agrocybe pediades*, was a compelling match, despite its somewhat misleading appearance. Several others, *Tricholoma serratifolium* and *Lactarius (Lactifluus) petersenii*, are not uncommon but had not previously been sequenced.



There were three additional results with high similarity, but to more than one species, so a decision was made based on a combination of morphological (macro & micro) data. Molecular similarity was 100% in the case of *Amanita sp-57* Tulloss nom. prov. despite a strong resemblance to *A. levistriata* Jenkins, apparently its closest relative. Not coincidentally, *Amanita sp-57* was originally collected in the same place, Southaven County Park. Secondly, the sequence for *Pholiota adiposa* had over 99% similarity to three other *Pholiota* species, but superior coverage (number of unique regions in common) to *P. adiposa*. Our last example in this group initially showed over 99% similarity to *Cortinarius parvannulatus*, but



*Amanita sp-57*

was a bad match physically; instead most closely resembling *C. odhinnii*; but after recently rerunning the sequence, a newly entered *C. cistopulchripes* was unearthed, from the West Coast by Prof. Joe Ammirati who was duly informed and is delving into the matter. Apparently all the members of this group, Subgenus *Telemonia*, Section *Parvuli* are quite similar genetically. There are no East Coast records of any of them.



*C. cf. odhinnii*

*Pholiota calvinii* is not represented in

(Continued on page 4)

## PRESIDENT'S MESSAGE

Greetings and a better New Year to you all! (Last year and its trials and tribulations belong in the history books; lets just leave it.)

With all the rain and snow that we've had recently, perhaps it will be a good season ahead of us. I long for the days of plentiful oysters, boletes and other mushrooms that we used to have. With the earth warming up as fast as it is, who knows?

Thank you to Roger and Jim for their interesting articles in this issue. It does help a lot when people contribute to the Sporeprint. It takes some of pressure off Joel who has to come up with newsworthy items to report about.

Many of you have wondered about forays for this year. On occasion, a few members have gotten together to foray. Masks were used and distance kept so it all worked out. However, for the

time being, it does not feel prudent to have a large group outing until we can all feel safe. At this point we do not know when forays will resume this year, but the board will meet to make a decision which we will share in the Spring edition of this newsletter.

This is the start of my 21st year as your President. That is a long time for one person to lead. I think the time is coming when someone else should take over. Please consider thinking about a replacement. I will still be the treasurer which I have been since 1997 unless someone would consider that position, too. Do let me know.

A reminder to all members: no dues are being collected for this year ending December 2021.

So please be safe and I really do hope to see you along the trails this year.

## EDITOR'S NOTE

Our spotty rainfall finally increased in October and November, both months recording above normal levels of over 5 inches, somewhat too late in the season. These months are usually the time when the pine barrens produce prodigiously but that was not the case uniformly, only a minority of sites equaling previous year's harvests. It is unclear if the DEC's ravaging of the Pitch Pine areas, although with the best of intentions, was the sole cause, inasmuch as a few areas surprisingly showed mushroom fruiting even in highly disturbed areas that had been bulldozed for road widening. Those foragers that persevered had a few good harvests, at later dates than usual.

Several mushroom clubs in the northeast did recommence their forays, limiting attendance, observing social distancing and requiring face masks. If we follow suit in 2021, we will not do so until the infection rate declines to acceptable levels. Please let us know your thoughts on this topic.

As you can see by the photos on page 6 sent in by our members as well as members of the public, some of our favorite edibles made their accustomed appearance, as did other species of interest. More of them can be seen on our private Facebook page, where almost half of our membership have a presence. If you don't as yet, email Maria our Facebook coordinator for an invitation. (See email below.)



**MATERIAL FOR THE SPRING EDITION SHOULD REACH THE EDITOR BY MARCH 1ST.**

(Submissions may be forwarded by email in any format or typed.)

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## HOME-GROWN BLEWITS     *by Jim Lampert*

I wanted to grow Morel/Blewit mushrooms in my yard so I built the following....

On the south/east corner of my yard under a maple tree I built a 6'long x 4'wide x 16"deep raised bed made from cedar boards. Bare ground was left exposed but on top of this I layered cardboard to encourage earthworm activity. Worms are always good.

The bed consisted of the first 8" of compost enriched top soil followed by 3" of compost and topped with another 3" of top soil. All organic.

The remaining top area of the bed was covered with organic matter from the yard. This consisted of shredded maple leaves, dried grass clippings, wood ash and pine needles from the front yard.

The inoculate consisted of 2 – 5lb bags of hardwood saw dust. One bag was fully colonized with blewit mycelium and the other with morel mycelium. \*

The bed during the later days of November produced a half a dozen blewits.

The bed during the summer months was used to grow leaf lettuce and ramp bulbs were also planted there in the late spring- so I'm truly looking forward to this coming spring. Keep tuned.....



***Blewit in bed.***



***Blewit Bed***

\*(*Jim is a home cultivator able to grow mycelium in sterile conditions. But Blewit (Lepista nuda) spawn is available commercially or you can try with fresh blewits. Editor.*)

## Roasted Asparagus & Lactarius chelidonium *by Roger Eklund*

I first found these multi colored mushrooms under eastern white pine, on the Stop & Shop property in Smithtown. It was October of 2011 and these beautiful, orange gilled, short stalked Lactarius were in the grass. I collected a few to bring to Mushroom Day at Planting Fields arboretum. Aaron Norerevian identified them as *Lactarius chelidonium* var. *chelidoniodes*, shortly after.

In its button stage the cap is a pastel blue with orange and brown tints. As it matures the cap goes through astounding color changes, chameleonlike, making one think that maybe they are different species. The blue cap color usually fades as it grows, becoming zonate, and can appear in shades or combinations of tan, reddish brown, olive, and bright green. The flesh color of the young cap is a bright blue, that also fades in age. Kuo describes this Lactarius as a cross between *L. indigo* and *L. deliciosus*. This October, one of the collections had indigo centers in the mature, slightly funnel shaped caps. Stalks become hollow in age, not as colorful as the caps. Oddly, the gills stain faster in the older specimens. Spore print: pale buff

In the Bessette field guide: 'Milk Mushrooms of North America', the aroma is described as that of the Yellow Morel (*Morchella americana*), taste slowly becoming slightly acid. Edibility is listed as unknown in Bessette's book, but the other variety, *L. chelidonium* var. *chelidonium* is listed as edible. These Lactarius have also been appearing at Planting Fields Arboretum under white pine, for the past few years. Over the years, a few foragers that have come to our display table on Mushroom Day, have mentioned that they are edible. I've posted pictures of them on the Russula and Lactarius page of Facebook and a forager stated that they are decent. So, I tried them recently with asparagus, and they are good. They dehydrate well, also.



### Roasted Asparagus & Lactarius Recipe

- 1 bunch Asparagus, thin stalked
- 1 cup of Lactarius, sliced thin
- 2 tbsp EV olive oil
- 1/2 tsp garlic powder
- 1/2 tsp dried tarragon
- s+p to taste
- 1/4 cup grated Asiago cheese

Preheat oven to 425 degrees. Cut off woody ends of asparagus and discard. Cut asparagus into 2 inch lengths. Toss in bowl with sliced mushrooms, olive oil, garlic powder, tarragon, and salt and pepper. Place mixture in a small roasting pan and into the hot oven. Roast until mushrooms and asparagus are browned, around 20 min. Remove from oven and sprinkle grated cheese over the top and serve.



***What the DNA Revealed*** (Continued from page 1)

GenBank and there is only one other record in Mycoportal, (the holotype) collected by C.H.Kauffman on 9-16-1924 in PA as *Flammula* nearst *subfulva*, and the record corrected to *Pholiota calvinii* (ortographic variant) by A.H. Smith himself. This is an unusual species in that it occurs on soil, rather than the usual woody substrate. Unfortunately, the sequence was of poor quality and the closest match was to *Pholiota spumosa*, a very dissimilar species.

**L.I. *P.calvinii***

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***P.calvinii* holotype**

Likewise, what we identified as *Gymnopilus pulchrifolius* has no representation in GenBank, but a closely related species *G. brandlei* does, and that had an over 99% match. According to Hesler, (N.A, Species of *Gymnopilus*) a major difference is the absence of pleurocystidea in *G. pulchrifolius*, which is the case in our collection. Kauffman believed them to be the same species.

***G. pulchrifolius***

The next group under consideration displayed low similarity values, from 95% to 97.9%, the latter to a *Cortinarius rubellus* collection from British Columbia identified by Dr. Ammirati.

This degree of similarity plus the physical findings allow us to posit a near relationship, ergo; *Cortinarius* cf. *rubellus*, "cf". being understood as closely related. On the other hand, our *Lepiota* collection, although strikingly similar physically to *L. flammeotincta*, a West Coast species, showed only 95% similarity, so we settled for *Lepiota* aff. *flammeotincta*, aff. meaning having an affinity or somewhat related.

***Cortinarius* cf. *rubellus***

In the case of *Inocybe ericitorum*, (collected by Anthony Sama) the sequence had poor coverage to a number of *Inocybes* and no close similarity. However, since Prof. Brandon Matheny had examined the physical data and concluded it belonged in the *Inocybe ericitorum* group, we are thusly labeling it.

We are left with those specimens where DNA results were ineffective in pinpointing a species and only a genus could be established. These were species of *Agaricus*, *Amanita*, *Cortinarius* and *Ramaria*. The *Ramaria* result was an exception, in that while a close to 100% similarity was attained, it was to a previous collection of ours from Southaven S.P. which remains unidentified as to species.

Not all attempts at sequencing are successful, in my experience with the FunDis Project, in fact the failure rate was high, particularly with the non-gilled mushrooms. In our last batch of 30 there were 12 failures, primarily with *Trichoglossum*, *Ramaria*, *Cantharellus*, *Tpmentella*, *Truffle-form*, and *Toothed Crust*, as well as some gilled mushrooms.

***MYCOMATCH***

(Continued from page 1)

els which creates a separate compartment in which to run a Windows program.

Additionally, there is now a reduced version for iPhone which contains gilled mushrooms only. This is a beta version, which means that it has kinks which must be ironed out. The directions that the originator Ian Gibson has supplied for downloading to iPhone are not applicable to the latest Mac operating systems, Catalina and Big Sur. Instead, download both "Filemaker Go 19" from the App Store and "Mycomatch.fmp12" from the Mycomatch URL below and follow the instructions provided here.

<https://www.mycomatch.com/>

I cannot overly stress what an excellent learning tool Mycomatch is in addition to its identification

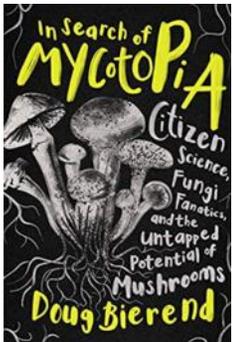
function. There are detailed descriptions, including microscopic data, of each taxon, macro photos and references to research material. Other tabs provide an identification quiz, a glossary of mycological terms, and a dictionary summary of specialized mushroom color terms. If you are sure of the genus, searching can be confined to that genus only. or to a family, say *Strophariaceae*. Lastly, the search can simultaneously be further narrowed by including a word search, for example "pleurocystidea". A pictorial key is also available.

Moreover, if you wish to improve the Desktop version of Mycomatch and adapt it to local usage, it is possible to add species by uploading your own photos and text descriptions. By choosing to use a different font your own additions can be distinguished from the supplied ones.

# GLEANINGS.. *from the research literature*

- **FUNGI SHAPE FORESTS:** A series of studies have demonstrated that fungal associates can help plants survive warmer and drier conditions associated with climate change. By artificially warming and drying plots of boreal forests, EM (ectomycorrhizal) fungi diversity fell and was replaced by AM (arbuscular) fungi, which do not form extensive underground networks, took over. In a different ecosystem, the Pinyon Pine forest in the U.S. southwest, EM fungi, which do form such systems, were shown to play a critical role in drought tolerance, with those trees that were less impacted showing genetic differences that influenced their association with the beneficial EM fungi. Lastly, a vast survey of USFS data found that many plots were dominated by either EM or AM fungi, rather than a mixture of the two. It was found that “dominant mycorrhizae can help lock a forest into a stable state” so that an AM tree was unlikely to root in an EM ecosystem and vice-versa. This might slow forests response to external pressures, with AM trees faring better in hotter temperatures. (*Hidden web of fungi could shape the future of forests, E. Pennisi & W. Cornwall, Science, Vol. 369, Issue 6507, 28 Aug. 2020.*)
  
- **FUNGI ALOFT:** While it is assumed that fungal spores can at least occasionally travel long distances, few studies have documented their presence and composition aloft, a recent research paper does just that. A 13 month metagenomic study investigated the daily patterns of atmospheric organism above Singapore (sea-surface level). 795 air samples were subjected to “ultradeep sequencing” resulting in 9 billion reads of 250 base pairs. Only 9 to 17% (night/day) were identifiable taxa; 82% of the 792 total species were fungi while 14.5 were bacteria and 2.6 plants. A definite daily pattern was observed, with basidiomycetes forming the greatest airborne mass at night, while ascomycetes dominated by day, correlated with rainfall. These patterns prevailed during the entire study, with temperature being the most important parameter, and held steady during the entire year. Basidiomycetes showed a negative correlation with temperature while Ascomycetes displayed a positive one. (*Microbial communities in the tropical air ecosystem follow a precise diel cycle, E.S. Gusareva et al. PNAS Nov. 12, 2019 116 (46).*)

## BOOK REVIEW NOOK



The author was inspired by a TED lecture by Paul Stamets, who he refers to as a “myco-evangelist”, to pursue a pilgrimage among mycologists, citizen scientists, cultivators, consciousness explorers, and other way-out-there fringes of fungal fanatics. His explorations took him from the staid environs of the Royal Botanic Garden at Kew to the riotous annual Telluride Mushroom Festival in

Colorado, to an oil-field in Ecuador, all of which he documents in lucid and absorbing prose.

The book begins with an account of the history, science and ecology of mycology, well presented and accessible, marred only slightly by minor errors, such as referring to the giant fossil fungus Protaxites as a lichen when recent research has established it as an Ascomycete fungus. From there, he wades into the current scene as manifested mostly in the USA but also in Britain, where Kew’s LAFF (Lost & Found Fungi) a collaboration with amateur collectors which after 5 years had turned up 1,400 new records of rarely recorded species. This can be considered the counterpart of the USA’s Fundis Project, in which LIMC is involved.

If mycology is a neglected science and mushrooming a fringe activity (at least in the USA) then there are even more extreme fringes, as their names imply: Radical Mycology, Decolonize Mycology, Mile High Fungi, Fungi for the People. These are well meaning people who are sincere about using fungi to address social issues such as food inequality, perceived gender bias in mycology, inequality in psychedelic research, racial environmental injustice, etc. In many cases this is no more than an over-extended metaphor which can bring people together to address a cause, but which is unlikely to provide a solution.

The author treats them all with profound respect, and gives them their due, never looking down at them. But just when one thinks he may have sipped the fungal Kool-Aid, so to speak, he injects a welcome note of reality at the end, referring to recent fungal applications and innovations that “are compelling, encouraging, and inch closer to everyday reality by the day. They may even be necessary, but I doubt they’re sufficient.”

This book is a fascinating journey, illuminating the current explosion of interest in the fungal world as we travel with the author over 3 continents, and is unreservedly recommended. It is scheduled for publication by Chelsea Green Publishing on March 10, and can be preordered on Amazon for \$24.95.



# From our Members & the Public..



*Calvatia gigantea* by  
Jing Zhang



*Galerina species* by  
Roger Eklund



*Armillaria gemina/gallica*  
by Jessica Powers



*Neofavolus alveolaris* by  
Andy Greller



*Amanita muscaria* var. *guessowii*  
by Andrea & Stefan Rosen



*Agaricus* sp. by  
Nick Sarin



*Tricholoma equestre* &  
*T. niveipes* harvest by  
Andrea Rosen



*Suillus grevillei* by Roger Eklund



Oysters by  
Mindy Silberg

### THE SOCIAL LIFE OF FORESTS

“Five hundred million years ago, as both plants and fungi continued oozing out of the sea and onto land, they encountered wide expanses of barren rock and impoverished soil. Plants could spin sunlight into sugar for energy, but they had trouble extracting mineral nutrients from the earth. Fungi were in the opposite predicament. Had they remained separate, their early attempts at colonization might have faltered or failed. Instead, these two castaways — members of entirely different kingdoms of life — formed an intimate partnership. Together they spread across the continents, transformed rock into rich soil and filled the atmosphere with oxygen.

Eventually, different types of plants and fungi evolved more specialized symbioses. Forests expanded and diversified, both above and below ground. What one tree produced was no longer confined to itself and its symbiotic partners. Shuttled through buried networks of root and fungus, the water, food and information in a forest began traveling greater distances and in more complex patterns than ever before. Over the eons, through the compounded effects of symbiosis and coevolution, forests developed a kind of circulatory system. Trees and fungi were once small, unacquainted ocean expats, still slick with seawater, searching for new opportunities. Together, they became a collective life form of unprecedented might and magnanimity....

An old-growth forest is neither an assemblage of stoic organisms tolerating one another’s presence nor a merciless battle royale: It’s a vast, ancient and intricate society. There is conflict in a forest, but there is also negotiation, reciprocity and perhaps even selflessness. The trees, understory plants, fungi and microbes in a forest are so thoroughly connected, communicative and codependent that some scientists have described them as superorganisms. Recent research suggests that mycorrhizal networks also perfuse prairies, grasslands, chaparral and Arctic tundra — essentially everywhere there is life on land. Together, these symbiotic partners knit Earth’s soils into nearly contiguous living networks of unfathomable scale and complexity...

Mycorrhizal networks are abundant in North America’s forests. Most trees are generalists, forming symbioses with dozens to hundreds of fungal species. In one study of six Douglas fir stands measuring about 10,000 square feet each, almost all the trees were connected underground by no more than three degrees of separation; one especially large and old tree was linked to 47 other trees and projected to be connected to at least 250 more; and seedlings that had full access to the fungal network were 26 percent more likely to survive than those that did not. Depending on the species involved, mycorrhizas supplied trees and other plants with up to 40 percent of the nitrogen they received from the environment and as much as 50 percent of the water they needed to survive. Below ground, trees traded between 10 and 40 percent of the carbon stored in their roots. When Douglas fir seedlings were stripped of their leaves and thus likely to die, they transferred stress signals and a substantial sum of carbon to nearby ponderosa pine, which subsequently accelerated their production of defensive enzymes....“

*(From the NY Times. To read entire article access <https://www.nytimes.com/interactive/2020/12/02/magazine/tree-communication-mycorrhiza.html>)*

#### **Report Spotted Lanternfly Egg Masses this Winter**

New York State could use your help to watch for and report signs of the invasive spotted lanternfly (SLF). This time of year, be on the lookout for SLF egg masses. Freezing temperatures will kill off adult insects, but the egg masses they lay in the fall can be seen throughout the winter. Egg masses tend to be about 1.5 inches long and resemble mud that has dried and cracked. They can be found on just about any flat surface, including vehicles, firewood, outdoor furniture, etc. If you believe you have found a SLF egg mass, take a photo and note the location. Then report it to the NYS Department of Agriculture and Markets by filling out their online reporting form. Together, we can slow the spread of SLF and catch new infestations early.

Photo: Spotted lanternfly egg masses are about 1.5 inches long and resemble dried, cracked mud.

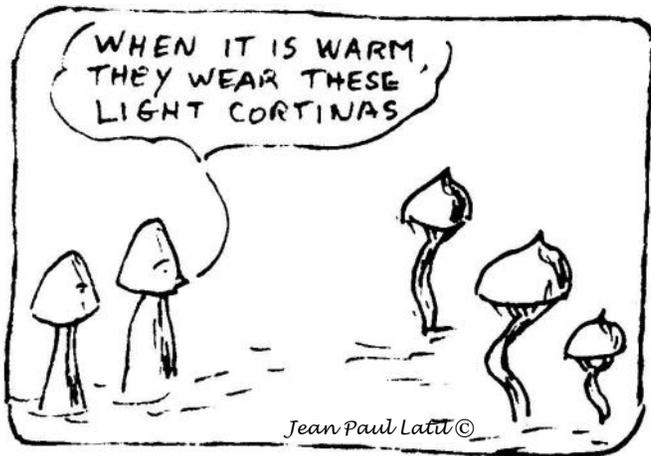


*(Reprinted from NYS DEC Newsletter)*

### WELCOME NEW MEMBERS

Ken & Yolanda Lederer

Greg Iarocci & Kaitlyn Pilleg



<u>IN THIS ISSUE</u>	
<u>Mycomatch</u>	<u>1</u>
<u>What the DNA Revealed: the Sequel</u>	<u>1</u>
<u>President's Message</u>	<u>2</u>
<u>Editor's Note</u>	<u>2</u>
<u>Home-Grown Blewits</u>	<u>3</u>
<u>Roasted Asparagus &amp; Lactarius</u>	<u>4</u>
<u>Book Review Nook</u>	<u>5</u>
<u>Gleanings from the Research Lit.</u>	<u>5</u>
<u>From our Members &amp; the Public</u>	<u>6</u>
<u>Social Life of Forests</u>	<u>7</u>
<u>Report Spotted Lanternfly Egg Masses</u>	<u>7</u>
<u>Welcome, New Members</u>	<u>7</u>

*"Someday the delights of a mushroom hunt among the lush pastures and rich woodlands will take the rank of the gentlest craft among those of hunting..."*  
*Charles McIlvaine, One Thousand American Fungi, 1902*



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