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VOLUME 28, NUMBER 2, SUMMER, 2020

FINDINGS AFIELD

In these dark days any pin-points of light are welcome. And pin-points these miniscule creations are: two species previously unreported on Long Island. The first, *Arrhenia chlorocyanea*, has never been recorded in NY State, and is found mostly in Europe and on the West Coast, except for 3 records in the Southeast. The second, *Cudoniella clavus*, an ascomycete, is widely distributed in both the USA and Europe, and was collected earlier last century in NYS by, among others, Charles N. Peck, the state botanist, and later by his successor, John Haines.



We owe these finds to the sharp eyes and unflagging curiosity of Roger Eklund and Anthony Sama., both of whom have contributed specimens of these species.

Arrhenia chlorocyanea, (formerly *Omphalia*) is a member of the clitocyboid group, with strongly decurrent gills. Its tiny stature, rarely exceeding 2 cm., can be observed in the above photograph. These specimens were collected by Roger on

(Continued on page 4)

WHAT THE DNA REVEALED

LIMC has been involved in molecular sequencing of select species, originally through ALVALAB and lately by way of several grants from the Mycoflora of NA Project (now to be called Funga or Fungi of NA). The first round of sequencing results may be accessed at mycomap.com/projects/longisland and we are now in the process of uploading the current results, which includes several species not previously recorded in the USA.

We will list, in no particular order, the most interesting of these species, beginning with *Melanoleuca heterocystidiosa*, which is similar to *M. cognata* but of smaller stature and with several sorts of gill cystidia, hence the epithet. Our specimen rang up a genetic similarity of 100% to several collections from Turkey and from the Venice Museum collection. [Mycportal lists only one collection from NA, in Quebec.](#) Our collection was found on Nov. 17, 2016, among grasses in the sandy soil of Smith Pt County Park.



M. heterocystidiosa

Not every sequence results in so high a similarity, and there are occasions where even a 99 + percentage can be misleading. That is, the genetic similarity of a particular region of the genome, usually what is referred to as ITS1 & ITS2, (Internal Transcribed Spacer) does not differentiate one species from another in a particular Genus because they are all very similar and one must find a different region which does vary accordingly. Or



T. arvernense

lacking that, we fall back to comparing them microscopically. That was the case with the next example, *Tricholoma arvernense*, where our specimen produced over 99% similarity to several *Tricholomas*, both the former and *T. felschii*, a newly described species from Costa Rica. Comparing the two both grossly and microscopically, *T. felschii* was easily ruled out, since it varied considerably, both in color, stature and in spore size and cystidial composition. It is farinaceous and resembles *T. sejunctum*, but that species is bitter.

(Continued on page 4)

PRESIDENT'S MESSAGE

The arrival of summer has brought high temperatures but alas, little rain, May was more than two inches below normal and June threatens to be even less. Nevertheless, our persistent members have discovered the few fungi that bravely emerged and these may be seen on our club's exclusive Facebook page. (Contact Maria, our Facebook Coordinator, [address below] for an invitation to join and post your finds.)

In this issue there are three reprinted recipes for *Laetiporus* (chicken mushroom) that some of you may not have seen in the past. They are all tasty. (*Laetiporus* is plentiful this season.)

Some names have been purged on our LIMC facebook page because these members have not renewed. If you have renewed and don't see your name, please email me (owls2@optonline.net) and

I'll let Maria know. (The big problem is with aliases.. They should give some clue as to who you are. For instance my name appears as Margaret Anderson . As I am the only Margaret in the group and my picture appears, everyone knows who I am.)

I hope that all of you are faring well and taking precautions to stay safe. I like to go out walking in the many green spaces here (even if there are no mushrooms) or occasionally shopping just to get out of the house. My problem is that I like to talk to people. But it is really difficult to communicate wearing a mask.

This too will pass, hopefully sooner rather than later.

I miss you all and wish that soon I'll see you along the trails.

EDITOR'S NOTE

"Forest Bathing", the latest meme, has taken on an enhanced reality, occasioned by the sense of isolation and claustrophobia felt by many due to the quarantining and distancing weaponized against the Covid-19 pandemic, The existence of a "nature deficit disorder" affecting the behavior of shuttered children has been suggested by research showing that access to "green space" decreases aggression and hyperactivity disorder symptoms. Even a glimpse of the natural world through a window seems to help the physical recovery of convalescents.

There is no doubt, from what we see here on Long Island, that people are flocking to parks and forest areas in unprecedented numbers, so much so

that it is difficult to find unpeopled areas to walk or hike. There has also been a spike in stay-at-home's increased interest in aspects of the natural world they can see in their backyards, with heightened interest in birding particularly. I imagine it will not be long before LIMC is being sought to help identify lawn mushrooms and others.

Meanwhile, this long dry spell has made mushroom hunting unproductive for those of us who have been venturing out into our favorite forested areas, but June is usually a slow month, so do not despair. In lieu of forays, venture out on your own and report back to share your finds via our Facebook page.



MATERIAL FOR THE AUTUMN EDITION SHOULD REACH THE EDITOR BY SEPT. 1ST.

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

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Recipe Box (reprinted from previous issues)

COCONUT SULPHUR SHELF MUSHROOM SOUP

- 1 Tbs. olive oil
- 1/4 c. diced shallots or mild onion
- 3 cloves garlic, minced
- 2 1/2 c. 3/4" cubed sulphur shelf mushroom
- 2 1/2 c. 3/4" cubed potato
- 1 can chicken or vegetable broth
- 1 can coconut milk (unsweetened)
- 1 c. spinach julienned
- 1/4 c. chopped cilantro
- lime wedges



1. Heat the oil over medium heat and add the shallots/onions, cooking until translucent. Add the garlic and cook 1 minute longer.
2. Add the cubed mushroom, and cook until the liquids are evaporated.
3. Add the cubed potato, chicken/vegetable broth, and cook for 6 minutes, or until the potato is tender.
4. Add the coconut milk, 3/4 the spinach and half the cilantro. If the broth is too thick, add up to 1/2 c. water. Cook 2 more minute. Remove the soup from the heat.
5. Serve the soup with lime wedges, along with rest of chopped cilantro and spinach. Salt to taste.

Serves 2 as main dish or 4 sides.

(Note: The above recipe has been adapted from the 3foragers blogspot)

HARJIT BHATTI'S CHICKEN KORMA

Marinade:

- 8 oz. plain yogurt
- 2 tsp. curry powder
- 1 tsp. ground coriander
- 1 tsp. fresh ginger, minced
- 4 cloves garlic, minced
- 1/2 tsp. cayenne pepper
- 1/2 tsp. lemon juice

Ingredients:

- 3 cups chopped sulfur shelf mushrooms
- 2 Tbsp. vegetable oil
- 1 medium onion, chopped
- 1 large tomato, chopped (or can of same)
- 2 bay leaves



Mix marinade. Add sulfur shelf mushrooms coat, cover and let stand at room temp for 1/2 hour (can prepare ahead and refrigerate also). Warm oil in large skillet or wok. Cook onion until brown. Add tomato and bay leaves, cook 5 minutes. Add sulfur shelf mushrooms and marinade, mix well. Cover and simmer for 15 - 20 minutes or until mushrooms are cooked. Remove bay leaves. Serve over hot rice.

4 + servings.

(From the website of Missouri Mycological Society)

Easy Chicken Mushroom for Two

- 1/4 lb. bacon cut into 1/2 " pieces
- 1 Shallot chopped
- 2 gloves garlic minced
- 3 cups very fresh Chicken Mushroom cut into fork size pieces
- Sprigs of fresh thyme or oregano
- Broth (Chicken or Vegetable)
- 1/4 cup of cream
- Salt and pepper.
- Grated Romano cheese



Cook bacon in a skillet until crisp. Remove to paper towel to drain.

Lower heat and add shallot and garlic and sauté until just soft. Add Mushrooms and stir so that nothing browns. Add broth to keep juicy as needed. When mushrooms have turned a nice orange, add thyme or oregano. Then add cream and salt and pepper to taste. Mix in bacon pieces and serve over noodles, pasta, rice etc. Udon noodles recommended.

What the DNA revealed (Continued from page 1)

Usually thought of as a European taxon, in recent years collections from the West Coast have turned up which Alan Bessette referred to in his “Tricholomas of North America (2013), in particular one collection from Idaho that had a 99% similarity to a French collection. Behold! Ours had a 99.83% similarity to the very same collection and a similar degree of similarity to several in Estonia and Austria. This represents the first East Coast record for the species. (Sequencing was performed by Sigrid Jakob of the NYMS.)

Cortinarius laetus was first described by Meinhard Moser in 1968 from specimens in European mountainous conifer zones. There are only 35 specimens on record in the Mycoportal database, so it is infrequently encountered. Most records are from Northern Europe and the West Coast of N.A. with only one record from Ontario. Our collection, made in Oct. 2017 in the Rocky Pt. State Forest under Pitch Pine, exhibited over 99% similarity to specimens from Russia and British Columbia by respected Cortinarius researchers. Assuming that the Ontario record is correct, our collection is the first for the East Coast of the USA, and therefore for NY State as well.

Not every submission returns with clear cut results. Some attempts at sequencing fail entirely, others return with ambiguous or low quality results, etc. Or the results may be of good quality but not



Cortinarius laetus

match closely with any sequence in the database. This may be because the species has never been sequenced before, so if we are confident in our identification, we have contributed to scientific knowledge in a modest regard. This was the case with our sample of *Tricholoma serratifolium*, which came up with many species of Tricholoma, but no close match. A search of the NCBI site determined that *serratifolium* was not represented therein by any sequence, and since Alan Bessette had verified my identification, we had no misgivings about submitting it as that species.



Tricholoma serratifolium

Lactarius (Lactifluus) petersenii is on the other hand well represented in the database and our sample was therefore easily verified by numerous matches as high as 100% from Tennessee and North Carolina. All of these matches were from a single 2010 study of the *Lactifluus gerardii* complex carried out by the University of Ghent, Belgium. Lacking those, ours would have been the only one in GenBank. This represents the northernmost collection in the USA and the first for NY State.



Lactifluus petersenii

FINDINGS AFIELD (Continued from page 1)

March 16 in Heckscher State Park, in soil, among grasses. Not long after, on April 7, Anthony found this specimen in Connetquot State Park where the strongly decurrent gills are clearly visible. These features along with the remarkable coloration make it unmistakable. A member of the Hygrophoraceae family, it is commonly known, at least in Britain, as the “verdigris navel.” Got to love those British names!

To spot the second species, *Cudoniella clavus*, requires laser focused eyesight, as their maximum cap diameter is 1 cm. and this collections found by Roger and Anthony were less than half that. As an ascomycete,



they lack gills and their fertile surface is smooth and unadorned. Since they grow in very damp places, on rotting twigs and leaves, they might be mistaken for a species of *Vibrissea*, but the spores of the that species, which usually grows submerged, are long and threadlike to bolster their aquatic dispersal. The spores of *Cudoniella* are more conventionally shaped, ellipsoidal, measuring 8-15 X 4-5 microns, which are sometimes described as cucumber shaped. The fruiting bodies are gelatinous and the stipe is whitish at the apex and brown at the base. The caps can range in color from white to brown, as shown by another grouping found nearby by Anthony which displayed



Seen through 20X Loupe

Arrhenia chlorocyanea and *Cudoniella clavus* will be added to the LIMC species checklist, and the specimens housed at the NYBG Herbarium.

GLEANINGS.. from the research literature

- **INOCYBE SLICED & DICED:** For those *Inocybe* lovers out there (there must be one or two) here is a major revision and division of a familiar and unitary genus slivered into six new genera so as to challenge us cerebrally. Luckily, two of these proposed new genera do not occur in North America, so be thankful for that. The new genera, based on six-gene data set and applied to a total of 1050 known species, are *Nothocybe*, *Pseudosperma*, *Inosperma*, *Mallocybe*, *Auritella* and *Tubariomyces* (the last two previously described) plus *Inocybe sensu strictu* (850 spp. worldwide). In total, 180 new names are proposed for *Inosperma*, *Mallocybe* and *Pseudosperma*. A key to the genera of the *Inocybaceae* uses microscopic (presence of pleurocystidia, spore shape, etc.) plus macro characters (odor, stipe apex pruinosity, etc.). Note that *Nothocybe* (only one species known), *Tubariomyces* and *Auritella* do not occur in North America. But we will have to become accustomed to such new combinations as *Pseudosperma sororium*, *Inosperma calamistratum*, *Mallocybe subdecurrans*, *Pseudosperma curreyi*, etc. (*Genera of Inocybaceae: New skin for the old ceremony*. P. Brandon Matheny et. al., *Mycologia*, 2020, Vol. 112, No. 1, 83-120)
- **PROTAXITES, ANCIENT GIANT ASCO:** Looming as high as 27 feet and measuring 3 feet wide, these columnar organisms dwarfed all others 400 million years ago and were dominant for 40 million years. Since their discovery in the mid-nineteenth century their exact identity has been debated and variously described as a plant, algae, liverwort or as fungal basidiomycete. A recent (2017) study utilized specialized techniques to prepare petrographic thin sections which were examined by scanning electron microscopy, resulting in extremely sharp and detailed microphotos. These clearly show, as the authors point out, the presence of a hymenial layer of multispored asci, septate paraphyses, and other features related to extant *Taphrinomycota* and *Pezizomycotina*. The nutritional mode of Protaxites (14 species known) could not be identified with certainty but it is conjectured that a mixed lifestyle with “simultaneous saprobic and symbiotic acquisition of fixed carbon” was present. (*Fertile Prototaxites taiti: A basal ascomycete with inoperculate, polysporous asci lacking croziers*. *Philosophical Transactions of The Royal Society B Biological Sciences*, December 2017)
- **THE BIRTHPLACE OF RUSSULA:** This pivotal research rests upon the erection of a new subgenus, *Russula* subg. *Glutinosae*, based upon only two species, *Russula fatooensis* (syn: *glutinosa*) and *Russula glutinosoides* sp. novo having an Eastern North American– East Asian distribution. Both are deemed very rare, the former occurring in Eastern North America and the latter in Yunnan, China. On the basis of intensive molecular sequencing involving five different sections of DNA as well as detailed microscopic examination, subgenus *Glutinosae* is considered to be sister to subgenus *Archaeae* in a fully supported monophyletic clade. Both subgenera share characteristics such as very small spores, and hygrophoroid habit but differ in several microscopic details. The lead author, Bart Buyck, previously entertained the idea of an origin in the tropics for the genus *Russula*, but now regards the Asian– Eastern NA distribution as supportive of a northern temperate origin. Both species are considered so rare as to merit inclusion in some “red list” of endangered fungal species. (*One step closer to unravelling the origin of Russula: subgenus Glutinosae subg. nov.*, B. Buyck et al, *Mycosphere* 11 (1):285-304 (2020).)
- **RUSSULA Subsect. ROSEINAE IN APPALACHIA:** In a study related to the above, additional evidence is presented for the evolution of this particular subsection, consisting of 8 European and NA species: *R. velutipes* & *R. minutula* (Europe); *R. albida*, *R. peckii*, *R. rimosa*, *R. nigroscentipes*, *R. rubellipes* & *R. pseudopeckii* (NA). Collections were made during 5 seasons in NY, FL, MS, TN, & NC. Five nuclear loci were sequenced and used for “phylogeographic and ..ancestral host reconstruction”. The data is interpreted to show that the subsection came into being about 12 million years ago (mya) in a wide area “across eastern NA with a jump migration to the southern Appalachian Mts.” Further diversification took place in mountain “refugia” associated with glaciation, and jump dispersal events to Asia 4.6 mya and subsequent spread to Eurasia about 2.2 mya. (*Miocene and Pliocene speciation of Russula subsect. Roseinae in temperate forests of eastern North America*. B. Looney, S. Adamcik, & P. Matheny Research Gate Sept 2019 preprint)
- (Compiled by editor from above-cited sources)



From our Members & the Public...



Psathyrella species from a resident of Brookhaven



Cryptoporus volvatus interior by Andy Greller



Peziza phyllogena from a homeowner worried about his trees.



Megacollybia rodmanii by Andy Greller



Laetiporus cincinnatus from a Hampton Bays resident. Unusual for growing directly upon a tree.



Serendipitous Morel by our Webmaster Dale



Agroclybe putaminum by a lady angsting about what her pup ate..



Agaricus (bitorquis?) found in Harlem by Tony Mish



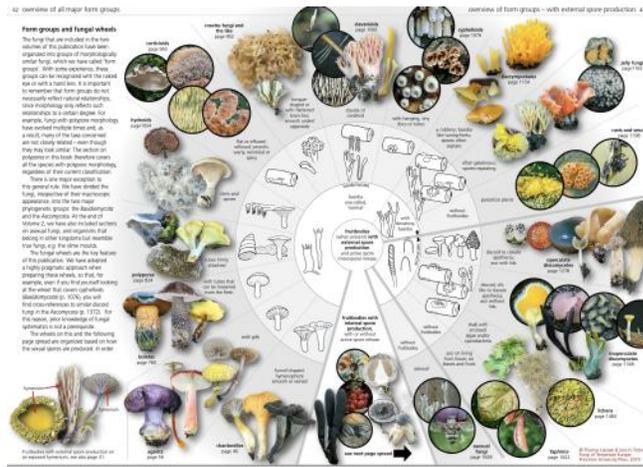
Gymnopus dryophilus by Anthony Sama

THE WHEELS: AN AID TO IDENTIFYING FUNGI TO GENUS

Identifying an unknown mushroom as to genus can be the most difficult first step in the identification process. The authors of the highly praised, recently published “Fungi of Temperate Europe”, Thomas Læssøe and Jens H. Petersen, have generously made their unique method for identifying mushrooms, “The Wheels”, freely available to the community of mushroomers. Their two-volume work, weighs 11.5 lbs and contains 7,000 photographs of 2,800 species which have been described as “superb” particularly the tiny asco’s of Volume 2. While a number of these European species also occur in North America, the majority do not, thus the chances of correctly identifying a NA species (only possible if one purchases the 2 volumes) is small.

However, the pdf of The Wheels does enable one to narrow a fungal specimen down to genus by using a combination of external appearance, habitat, sporeprint color and Iodine reaction, as well some microscopic features, but one can proceed without the latter. Pictured above is the initial page of “form groups” or morphologically similar fungi, e.g: Hydroids (fungi with spines); agarics (fungi with gills); clavarioids (coral-like fungi), and so on. A capsule description of each group is given, e.g., “mycenoids have small, rather fragile, ± bell-shaped fruitbodies and white spores.” And mention is made of similar fungi: “Omphalinoids and hygrocryboids with decurrent gills may look rather similar (pages 128 & 142).

Once one has decided on a major category, clicking on the name will bring one to a page where additional images and details should produce the target genus. For example, if we choose Hydroids, that page has a wheel illustrating 13 genera (e.g., *Bankera*, *Hydnum*, *Herichium*, etc.) plus 2 additional groups of similar fungi— spiny corticioids and clavarioids (with isolated hanging spines). If you already know which group your specimen belongs in, the contents list at the beginning has clickable names which will bring you to the page hosting the desired group: e.g., Boletes which are divided into 29 genera, each with an illustration plus data as to their taste, bluing reaction, stipe reticulation, etc. However, once a choice of genus (*Tylopilus*, *Leccinium*, *Butyriboletus*) is decided upon, the NA



mushroomer must access local guides, such as, in this case, “Boletes of Eastern NA”, Bessette, Roody & Bessette or other appropriate reference.

Volume 2 deals with Polypores and Ascomycetes, the latter in mind-dazzling variety, so much so that you are sure to see many things here that you have never seen before and are unlikely

to see anywhere else. And while not everyone will be willing to spend the approximately \$100 for these volumes, the good news is the authors also make available an online key to gilled mushroom:

<http://www.mycokey.com/>

which is searchable for a photo and description of any species treated in The Wheels.

These volumes are all encompassing, embracing *Mycetezoa* (Slime Molds), Lichens, Mildews, as well, although they are not given extensive treatment; as are other little known families such as *Laboulbeniales* (Insect parasites) and *Taphrinales* (plant parasites). Edibility is given rather short shrift, although poisonous species and well regarded edibles are identified by colored symbols.

If you contemplate purchasing this work, be aware that detailed technical descriptions are lacking, the emphasis being on the magnificent photos themselves, which may prove insufficient in cases of very similar external morphology, such as, for example, *Mycenas* or *Inocybes*, where the emphasis is on microscopic characters.

Access The Wheels at:

http://www.mycokey.com/Downloads/FungiOfTemperateEurope_Wheels.pdf

Be aware that this is a large 180 MB file and can be downloaded to a PC, tablet, or smartphone. It must then be opened using Adobe Acrobat Reader, the default pdf reader, so you will have to install it on your phone or tablet if you don't already have it. There should then be a number of options for sharing it, one of which would be to copy to Acrobat, which you should choose. It will then be fully functional. The file will also be available on our club website under “Identification Aids”, using the same download methods. Any problems, please let us know.





<u>IN THIS ISSUE</u>	
<u>Findings Afield</u>	<u>1</u>
<u>What the DNA Revealed</u>	<u>1</u>
<u>President's Message</u>	<u>2</u>
<u>Editor's Note</u>	<u>2</u>
<u>Peggy's Culinary Corner</u>	<u>3</u>
<u>Gleanings</u>	<u>5</u>
<u>From Our Members & the Public</u>	<u>6</u>
<u>The Wheels: I.D.'ing Fungi to Genus</u>	<u>7</u>

In every walk with nature one receives far more than he seeks....
John Muir



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