LONG ISLAND MYCOLOGICAL CLUB

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FINDINGS AFIELD

Mitrula elegans
The Swamp Beacon

Article & Photos by Roger Eklund

Mitrula elegans

I was hiking on May 16th, in Caleb Smith State Park, hoping to find some Wine Caps in the heavily oak chipped paths, at the north end of Willow Pond. Not finding *any Stropharia rugosoannulata*, I continued my hike, heading north by northwest, into the boggy area, hoping to see a Winter wren and other avian varieties. Out of the corner of my eye, I glimpsed tiny, bright yellow club heads, poking above the still water, beneath large skunk cabbage leaves! Excitedly, I called Joel & Peggy, to give them a 'Fungal 911' that I found *Mitrula elegans*, on Long Island! Joel congratulated me and I collected a few specimens to dehydrate for the NYBG. Interestingly, I detected no aroma from them, but when dried they smelled medicinal. Reported only in the late spring in the northeast.

I knew right away what mush-

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THE SLIME MOLDS

(Abridged and edited from, *"Altruism among Amoebas"* by Joan E. Strassman & David C. Queller, published in *Natural History,* Sept. 2007)

Stemonitis splendens

"Social amoebas are also known as "cellular slime molds," but the name is a misnomer. The creatures are not slimy, and they are not molds. They comprise a hundred or so species belonging to the Amoebozoa, an ancient taxon which arose perhaps a billion years ago when it split off from the evolutionary branch that later gave rise to animals and fungi. Thus the cellular slime molds are no more closely related to any fungal mold than they are to your Aunt Alice.

Most of the time social amoebas do what most people think amoebas do: they move through soil by extending their pseudopods, or amorphous "feet" of protoplasm, and engulf prey along the way. We think of them as slow-motion cheetahs on the microbial equivalent of the African plains, feasting on bacteria, the even slower equivalent of gazelles. Each unicellular amoeba eats, grows, and then, as every schoolchild knows, splits down the middle to make two genetically identical cells.

Social amoebas live nearly everywhere there is soil, decaying vegetable matter, and a little bit of moisture. On the abundant bacteria in a deer pellet, social amoebas can persist through many generations of eating and dividing. In that stage of their lives they are nor even particularly social: still, they constantly send out and receive signals that keep them informed about the presence and abun-

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PRESIDENT'S MESSAGE

Summer greetings to all!

So far Spring has not produced much in the macro fungi that we love. The exception was oysters and they were not bountiful as in previous years. Joel and I have been going out at least twice a week in hopes of finding a productive site for a foray. We have had little luck. However, just today I found *Lactarius hygrophoroides*, three species of boletes and trumpets….not in sufficient quantities for a foray but things are looking up. BTW, if any members find a site that appears to have enough for a foray, please let Jacques or Joel know.

Although this year promises to produce above normal rainfall, as did the previous two, rainfall itself is not always sufficient to produce mushroom fruiting. The effects of this new pattern, if it is that, may affect fruiting in unexpected ways.

I think all of you will agree that Roger and Jacques articles are quite interesting. Maybe some of you have something in your head that you want to write about. Please consider doing so. Recipes are also welcome.

The extreme heat (80 degrees and up) keeps me from attending some forays. I'm sure this affects some members too. If so, let me know and I'll bring this up at the next board meeting. (We used to cancel if there was inclement weather but now we play it by ear.)

The NEMF and NAMA forays are coming up in early August and I hope a lot of you will put in an appearance. You will enjoy yourselves I'm sure.

If you haven't done so already, take a look at this edition on the web. The pictures are beautiful! Also, Maria's Facebook page is amazing. Try it.

Hope to see you soon along the trail.

EDITOR'S NOTE

To the many benefits of club membership such as association with like minded persons, access to free sources of gourmet mushrooms, etc., we can add the simple pleasure of being outdoors in natural environments, a proven boon to mental and physical health. Adding to an abundance of studies that showed decreased blood pressure, reduced stress levels, etc., comes the latest research which quantified the minimum amount of time necessary to produce beneficial effects: 2 hours per week, about the average length of our forays.

This British study, which enrolled 20,000 participants, also established that it did not matter how the requisite 120 minutes were accumulated, whether in segments or in one exposure. However, spending more time in nature did not lead to additional benefits. And the benefits derived applied across sexes, age groups, and different ethnicities.

In some areas, physicians are actually prescribing time outdoors to their patients, and governments, such as South Korea, are establishing "therapy forests" to promote citizen's health. The Japanese tradition of "forest bathing" is also receiving widespread attention as preventive medicine. Perhaps this is what Rousseau meant by "*le sentiment de l'existence"* the sensation of simply being.

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

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

(All unsigned articles authored by editor.)

President & Treasurer: Peggy Horman (631) 744-4965 owls2@optonline.net
Vice-president: Jacques Brochard
Recording Secretary: Carol Capaldo
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Science Adviser: Benjamin Wolfe, Asst. Prof., Dept. of Biology,Tufts University
Sporeprint Editor: Joel Horman (631)744-4965 e-mail: jlhorman@optonline.net
Editorial Ass't: Peggy Horman
Facebook Group Coordinator: Maria Saffioti msotolongo@optonline.net
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What's the difference between Russula variata and Russula cyanoxantha?

by Janie Poitras

Originally published in ***Le mycologue*** Décembre 2018. Translated by Jacques Brochard.)

Species of the *Russula* family can often be found in the same environment. In this article, I present two Russulas: *Russula variata* (variable russula) and *Russula cyanoxantha* (charcoal burner mushroom) which are macroscopically very similar but also different from other Russulas.

These two russulas are distinguished from others by their gills, which are greasy or fatty to the touch, and not brittle. Indeed, the majority of Russulas have dry and friable gills which break easily when touched; this is not the case for both species presented here.

Briefly, the principal similarities between *R. variata* and *R. cyanoxantha* are their caps with smooth margins which can vary in tone from pale mauve to a deeper shade to an olive green. Also, their color is rather washed-out, as if the pigmentation has faded. Concerning the cuticle, or pellis, the skin of the cap, it can be peeled to half the radius. Both species can be the same size and both their spore prints are white. Lastly, they are found in association with both oaks and beeches.

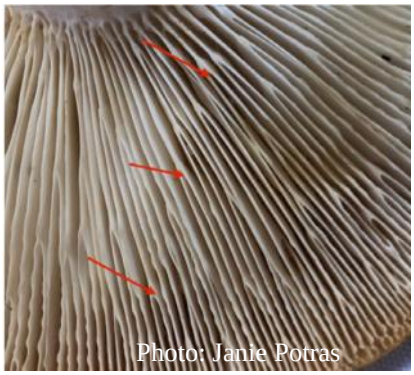


Photo: Janie Potras

At first glance, we cannot differentiate them with certainty. On closer examination, they are easily recognized by their gills. *R. variata* has gills that split at several levels; they are forked near the margin, in the middle and near the stipe. *R. cyanoxantha*, the less common of the two, also has forked gills, but in negligible quantity and closer to the stipe.

In addition, it should be added that by chewing the raw flesh for at least one minute (do not forget to spit it out!) we see that the *R. variata* flesh becomes acrid, unlike that of *R. cyanoxantha*, whose flavor remains sweet.

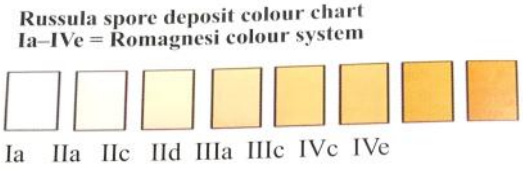
Notice to mycophagists - both species are edible. (Thank you to Pierre Lequin)

References:

www.pvmafungikingdom.org
www.fungikingdom.net
https://www.mushroomexpert.com

EDITORS NOTE:: Not all species of Russula, of which there are an estimated 200 plus in N.A.* can readily be identified, and require input using several sensory modalities, as indicated above. The taste, extent of cap peeling, color staining, forking of the gills, degree of brittleness, and more, must all be taken into account. One important factor, the sporeprint color, may take overnight to determine, since unlike other genera, Russulas have a range of sporeprint colors, ranging from white to deep ochre-orange. For final determinations, microscopic examination is needed, but following a multiphasic macro character key, the resulting choices can often be decided between by assessing accurate images. These may be found at http://nirmi.iun.edu/keys/russula/key.html or http://mycoportal.org/portal/imagelib/search.php Google search results cannot always be trusted.

A good online identification key using the above factors is available at http://www2.muse.it/russulales-news/id_kibby_fatto.asp) You will have to use the color codes below to enter into the key. (For full color chart access the online edition.)



**(Protochecklist of N.A. nonlichenized Fungi, Bates et al, Mycologia, Nov. 2018)*

SLIME MOLDS

(Continued from page 1)

dance of others of their kind, as well as about any nearby herds of bacteria.

Social life gets interesting only when food gets scarce. When *D. discoidium* amoebas begin to starve they release a small molecule known as cAMP, which attracts other amoebas. Chains of hundreds of amoebas move up the cAMP concentration gradient and merge into a mound made up of tens of thousands of individuals. The minute but now visible mound elongates into a "slug," which crawls as one multicellular body across the forest floor toward heat and light, and away from ammonia, a common waste product.

When the slug finds a suitable place, it stops and reorganizes. The individual amoebas that formed the front 20 percent of the slug arrange themselves into a stalk, laying down tough cell walls of cellulose, just as plants do. Individuals from the back 80 percent flow up the stalk, then reorganize at the top into a ball of hardy spores. The amoebas that form the stalk die, but the spores, elevated by the self-sacrificing stalk amoebas, are thereby put in a good position to stick to passing insects or other organisms that can carry them to "greener pastures," richer in bacterial food.

The multicellular fruiting body is not unusual in being cooperative. After all, the cells in your own body cooperate as well, altruistically doing their jobs and dying without getting into the next generation. But that altruism is easy to understand because your body is one big clone of geneticallv identical cells, derived from the division of a single fertilized egg cell. …..

What is unusual about the D. discoidium slug and fruiting body is that they form from dispersed cells that aggregate even though not all of them are genetically identical. Such an aggregate is called a chimera, and in a chimera, one genetic type can gain an evolutionary advantage by outcompeting the others. For example, a clone of genetically identical *D. discoidium* cells can leave more descendants if it cheats and makes more than its share of spores, forcing cells of other clones into the doomed stalk. We wanted to understand how altruism can be a successful strategy in the face of such cheating organisms…. (but) did not yet know whether genetically distinct clones grouped together.

(Our research showed that when) …we mixed cells of two clones together…the resulting fruiting body …included cells from both…yet one of the clones cheated by contributing disproportionally to the spores. …In the wild, however, relatedness is high; most fruiting bodies form from a single clone… We therefore predicted that cheaters whose reproduction depends upon forming mixed aggregates with other amoeba strains would not be present in the wild. Our subsequent searches confirmed that prediction, suggesting that high relatedness does play an important role in limiting cheaters in nature."

(EDITOR'S NOTE: The other major group of Slime Molds (Amoebazoa) is the Plasmodial slime molds, which differ by the individuals merging into one huge cell enclosed in a membrane with thousands of diploid (with two sets of chromosomes) nuclei, rather than the cells retaining their identity, as in the cellular slime molds, which are haploid.)

SWAMP BEACON

(Continued from page 1)

room species I had found. While playing disc golf in Tolland, Ct. last May, I saw them for the first time growing in a shallow pool of water, thinking that they were a type of flower. Picking a couple growing together, they were both attached to a tear drop shaped leaf with toothed edges. In that creek bed pool, there were leopard frogs darting to hide beneath the sunken leaves that this aquatic fungus was breaking down. After googling something like 'yellow headed club mushroom in water, Ct.', the search led me to a great article titled 'Swamp Beacon' from the University of Virginia.

Mitrula elegans is fairly small, but easy to see because of its bright yellow head. Fruitbodies (apothecia) are up to 4 cm tall, with a bright yellow to pinkish-yellow to orange, elongate slimy head .5 cm wide and up to 1 cm long, on top of a translucent white stipe. Growing cespitose to scattered, they are reported from south eastern Canada down to the Mason-Dixon line, the midwestern states and California. Another common name for *Mitrula elegans* is the 'matchstick fungus'. They are also found on muddy stream banks, growing also on pine cones, pine needles, and aquatic plants.

Mitrula do not grow on wood, unlike other ascomycetes (spores are produced inside asci cells). Basidiomycetes (spores are produced on an exterior surface, such as gills) decompose wood and leaf litter. Basidiomycetes require oxygen for wood decaying enzymes to absorb nutrients. Mitrula thrive in

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GLEANINGS.. from the research literature

■**THE GLOBAL WOOD-WIDE-WEB:** Utilizing satellite data and ground based surveys, a 2015 study estimated that Earth had 3 trillion trees, probably half the number that existed before the rise of civilization. Building on that study, researcher have now attempted to map the forest's underground network of the tree's associated fungi and bacteria: the ectomycorhizzal (EM), endomycorrhizal or arbuscular (AM) fungi, and nitrogen fixing bacteria. This was possible since different species of trees are known to be closely associated with particular types of fungi and bacteria. For example, Oak and Pine prefer EM, while Maple and Cedar prefer AM fungi. Accessing a database of over 1.1 million forest inventory plots containing over 28,000 tree species, their analyses indicate that climate variables, in particular "climatically controlled variation in the rate of decomposition are the primary drivers of the global distribution of major symbioses." EM symbiosis dominates seasonally cold and dry climates, while AM dominates in aseasonal tropical environments. Although ectomycorrhizal trees represent only 2% of all plant species, they comprise 60% of trees on Earth. The authors conclude that this study "demonstrates the critical role of microbial mutualisms in shaping the distribution of plant species." (*Climatic controls of decomposition drive the global biogeography of forest-tree symbioses. B.S. Steidinger et al. Nature, 569, 404-408, pub. 15 May 2019)*

■ **A BILLION YEAR OLD FUNGUS:** Until the recent publication of this study, the oldest known fungal fossils dated to the Ordovician period in the Paleozoic era, about 500 million years ago (MA). Now this investigation of microfossils preserved in the shale of the Grassy Bay Formation in Arctic Canada has demonstrated the presence of fungal organisms which date to half a billion years earlier. Using morphological, ultrastructural, and spectroscopic methods established an age of 890 to 1,010 MA, a date consistent with calculations based on the "molecular clock". The fungus has been named *Ourasphaira giraldae,* and consists of a spore-like sphere (about 40 microns wide) sprouting tubular hyphae showing clearly marked branching septa, much resembling modern forms. Characteristic of fungi, they had double walls which were made of chitin. The authors speculate that they colonized the land prior to plants and may have fed on bacteria. (*Early Fungi from the Proterozoic era in Arctic Canada, C.C. Loron et al, Nature, 570, 232-235 (2019).*

■ **MUSHROOM EVOLUTION FROM CRUSTS TO CAPS:** An international project of over 70 taxonomists and phylogeneticists utilized sequence data from 5,284 species of mushroom forming fungi (Agaricomycetes) to construct a phylogenetic tree which was used to infer ages and broad patterns of speciation and morphological change. The class Agaricomycetes started a rapid radiation in the Jurassic period, about 200 MA. during a warming climate and spreading coniferous forests. Only crust like fungi were believed to be present at the beginning of the Jurassic, with more complex forms such as Cantharallales, Auricullariales, and Phallomycetidae arising in the middle of the period. Diversification increased during the Cretaceous and Paleogene (50 to 150 MA) with the development of pileate-stipitate (cap, stalk and gills) morphology, which offers sporal protection and enhanced dissemination. This familiar mushroom form now dominates agaricomycete diversity, with over 21,000 described species. Interestingly, the Russulales, which have a separate line of descent, arose earlier than the Agaricales, The Inocybaceae appear to be the most modern family of gilled fungi. *(Megaphylogeny resolves global patterns of mushroom evolution, T. Varga et al, Nature, Ecology & Evolution,3,668-78, 18 March 2019.)*

(Compiled by editor from above-cited sources.)

SWAMP BEACON ***(Continued from page 4)***

low oxygen areas(like still water bogs), using the enzyme cellulase to decompose plant material. The hyphae live on long after the fruitbodies decompose, to continue breaking down the soggy substrate, for the rest of the year. A close relative *M. paludosa*, known as the 'Bog Beacon', grows in parts of Europe and Asia. *Vibrissea truncorum*, which looks similar, prefers to grow completely submerged in streams, fruits on twigs and branches, also reported in the northeast.

(EDITOR'S NOTE: Apparently rare on Long Island, which has few boggy habitats, these specimens will be accessioned to the NYBG Fungarium, where it will be only the second collection from L.I. The first was collected May 10, 1912 (as *M. phalloides*) "almost submerged in running water" near Smithtown, in which township Roger found them as well!)

FORAY RESULTS SUMMARY

WELWYN PRESERVE, APRIL13: Cancelled.
PLANTING FIELDS, MAY 4: (Rescheduled from April 27.) We collected a total of 25 taxa, 22 of which were identified as to species, among them good amounts of the edible Fairy Ring Mushroom, *Marasmius oreades,* fruiting in the same spot as last year. A first for this time and place was *Morchella angusticeps,* the Black Morel, found by Dan Migliorino. Almost all species found were growing on wood or wood chips.

Morchella angusticeps

An interesting find by Anthony Sama was a small cup fungus with a green interior and fringed with orange tufts, possibly *Dennisiodiscus frasinus.*

Dennisiodiscus sp.

Another first was achieved at nearby Shu Swamp, where we went to gather wild Ramps: a Yellow Morel, found by Roger Eklund.

In the future, following each foray, a full species list will be posted to our private Facebook page. If you would like to access these and are not yet a member, contact our Facebook group coordinator, Maria at msotolongo@optonline.net

BETHPAGE STATE PARK, MAY 11: Cancelled.
ROCKY PT. STATE FOREST, MAY 18:
Originally scheduled for Edgewood Preserve, which was unproductive, this foray was moved to the above site, which had some limited fruiting of the target species, *Pleurotus populinus,* so only a limited number of collectors could be accommodated on a first-come basis.

Other species included *Deconica phyllogena* (formerly *Psilocybe*) and *Pholiota veris.*

Oyster Harvest

MUTTONTOWN EQUESTRIAN, JUNE 8:

Although species totaled only 19 they were quite varied and interesting, and included six slime molds, two of which were new to our checklist, *Enteridium lycoperdon, (*so named for its resemblance to a globular puffball) identified by Anthony Sama. And *Trichia decipiens,* a tiny orange jewel of an organism with a semi-translucent base. Also new was a tiny cup fungus, *Mollisia cinerea,* no larger than a millimeter.

Trichia decipiens

Other slime molds seen were the Coral Slime, (*Ceratiomyxa fruticulosa),* Dog Vomit slime, (*Fuligo septica)* Wolf's Milk, (*Lycogala epidendron),* and a *Stemonitis* sp.

Mollisia cinerea

Again, wood was the substrate for most species, ample rain not having produced many soil dwellers.

WELCOME, NEW MEMBERS!

Christopher Catapano **Daniel & Julie Lynch** **Vadim Izgur & Dana Cohen**

Joseph Cascio & family **Pennie Swartz** **Mariana Rius & family**

Michelle Nitto & Andrew Malmgren **Jhesse James & Ilana Wexler**

Marika Chikvashili & James Byler **Amber Crowley** **Barbara & William Raisch**

From our Members and the Public

Lentinus lepidus
by Rich & Carol Capaldo

Peziza phyllogena
by Vincent in N.Wantagh

Amanita* sp. (*farinosa?)
by Vincent in N. Wantagh

Galerina autumnalis/marginata
by Phillip Gladkov

Nolanea sp.
by Andrea Rosen

Morchella americana
by Mark in E.Hampton

Flower Pot *Copriniopsis* sp.
by Peggy

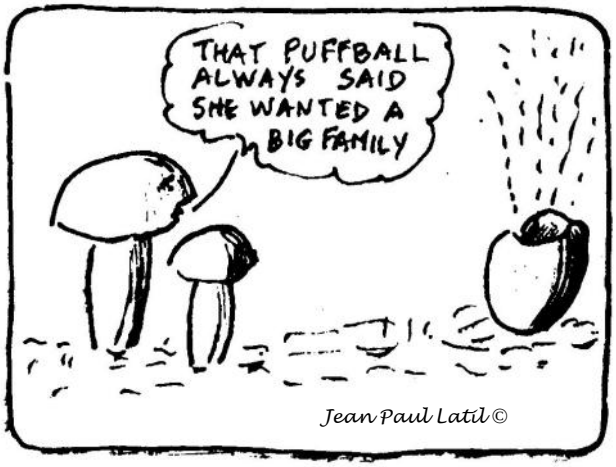
Mycena sp.
by Nick Simone

Stropharia rugosoannulata
by Elettra in Brookhaven

ERRATA

The last (Spring) edition listed species that had been removed from our species checklist, and replaced with the correct name, but the following two were incorrectly entered, and are hereby correctly entered below:

Geastrum coronatum has been replaced by ***Geastrum minimum.***
Geoglossom fallax has been replaced by ***Trichoglossom walteri.***



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"Science is a human enterprise through and through…..it grows out of its past but never outgrows it, any more than we outgrow our childhoods."

Oliver Sacks

LONG ISLAND MYCOLOGICAL CLUB
11 RAMBLEWOOD RD.
RIDGE, NY 11961