LONG ISLAND MYCOLOGICAL CLUB

http://limyco.org

Access our Website for the full color version.

L.I. SPOREPRINT

VOLUME 19, NUMBER 2, SUMMER, 2011

FINDINGS AFIELD

Spring is the season for Ascomycetes, but here on L.I. we rarely run across species of *Gyromitra,* and when we do the default species seems to be *Gyromitra esculenta*. This year, however, one of our newer members, Robert Pilosov, forwarded a photo of a Gyromitra found in Wellwyn in April with a query as to its identity. This had the effect of making me look a bit closer, and it seemed to have a thicker stalk and brighter colors than usual.

As a refrigerated specimen had been made available to me, I was able to determine that the spore precisely matched that of *Gyromitra korfii,* spindle shaped, with one central oil drop and 2 smaller end drops, measuring about 22-32 x 10-14 µm, the mature ones bearing end caps.

G. korfii is sometimes described as edible but to be avoided because of its close resemblance to the toxic *G. esculenta*. It is found east of the Rockies. We will now add it to our growing species list.

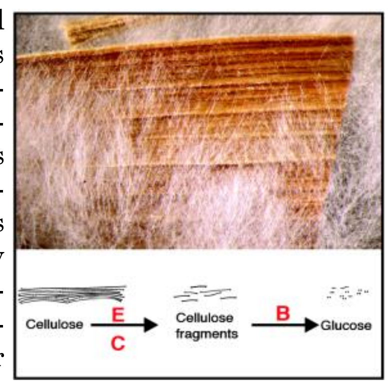
Letting go of old habits to make new friends: evolutionary origins of mushroom mutualisms in Amanita– Part II

by Benjamin Wolfe, PhD

(In the first installment Ben described his search for the origins of mushroom mutualisms, beginning in Rod Tulloss' garage collection of worldwide Amanita species, and ending with DNA documentation that all mycorrhizal Amanita descended from free living saprobes that decomposed dead organic matter.)

Once this initial pattern of long-term stability of mutualism had been discovered, I began to wonder what mechanisms might explain how this relationship has remained stable for so many years. Perhaps, just like the endosymbiotic bacteria of aphids described earlier, ectomycorrhizal *Amanita* have lost genes that are necessary to live without a tree host. A perfect place to look for this evidence of gene loss is to the genes that saprotrophic ancestors use to decompose litter. The cellulase enzymes that break down cellulose may no longer be needed by ectomycorrhizal species, because they get a large supply of carbon from the sugars in the plant roots. In fact, these cellulases may pose a risk to the woody roots that these fungi heavily colonize. If these fungi release these cellulases at the site of symbiosis with the plant root, they may dissolve the plant root or trigger systems that raise the defenses of the plant host against pathogen attack.

Using techniques that allowed me to probe the genome of each species in my phylogeny, I was able to determine whether the evolution of the ectomycorrhizal symbiosis in *Amanita* was associated with the loss of these cellulase genes. I focused on three cellulases in the cellulose degradation pathway (Figure 4). The first enzyme, endoglucanase (E), chops up cellulose molecules at internal sites, making smaller pieces of cellulose that can be further degraded by other enzymes. The second enzyme, cellobiohydrolase (C), chops up cellulose molecules at the ends, also making smaller



(Continued on page 6)

PRESIDENT'S MESSAGE

Summer has arrived along with the hope of a good mushroom season, following one of the best Morel seasons we've had. Out east, in Ridge and environs, we're off to a good start.. Along with *Laetiporus cinncinatus* (the peach-and-white Chicken mushroom,) some Boletes have shown up. These include many *B. affinis* (along with their numerous bugs) and *B. subvelutipes*, the beautiful but inedible red-pored bolete. B. calopus and Tylopilus ballouii, which we don't often see, made an appearance as well as *B. pallidoroseus* with its wonderful smell of beef broth. There were a few more, too. I mention these as the past few seasons did not produce too many Bolete species. Maybe this is a sign of things to come. Start looking for *Craterellus* and *Cantherellus,* which are starting to make an appearance as are a few Summer Boletes (*B. reticulates)* and edible Russulas such as *R. variata* and *R.crustosa. Amanitas* are popping up on every lawn, and Belmont Lake SP was a veritable forest of *Amanita rubescens.* (BTW, not all areas of the island are producing equally well; it might be that rainfall amounts were somewhat unequal across the island.)

Leonard Schecter, long-time faithful club and board member, will be leaving us in the fall to make a new home in Florida. He will, however still attend some forays before leaving. To me, Lenny has always been around and I will miss his presence a lot as I'm sure will all those who know him. We all wish Lenny and his wife a very happy future.

For those members who have not attended a foray recently, please try to make at least one this season. We'd love to see you.

EDITOR'S NOTE

There are those that collect to consume, and those that collect to identify. Neither of these groups are totally exclusive, since the gourmands must know at least the basics of identification in order to avoid a dire fate. And few identifiers are so hide bound as to be capable of turning their nose up at, say, a bountiful harvest of Chanterelles or Ceps.

Recently, interpretations of human behavior have tended toward the neurological and the evolutionary. Is it conceivable that either of these groups were more influential than the other during the course of human evolution? Is the gourmand faction more risk prone than the I.D. group? Studies have shown that risk takers are more prone to accident and injury than the shyer, detail oriented type. But the latter tend to be fearful of experimentation and less likely to try a new food. So perhaps it takes the cooperation of both groups to safely navigate the evolutionary rapids.

MATERIAL FOR THE AUTUMN, 2011 EDITION SHOULD REACH THE EDITOR BY SEPTEMBER 30TH

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

 (All unsigned articles authored by editor.)

Mushroom Names and Literature

By Justin Eric Halldór Smith, Prof. of Philosophy

(*Reprinted in edited form by permission of the author, from his website* http://www.jehsmith.com/1/2011/06/mycophilia.html *which see for complete essay.)*

Surely the single largest category of folk names for mushrooms is the one having to do with evil and death, and with the beings who bode and bring these: Witch's Hat, Death Cap, Destroying Angel, Poison Pie, Lead Poisoner, Corpse Finder, Witches' Butter, Devil's Urn, Goat's Foot, Dead Man's Fingers.

Other names are identifications, by appeal to some other thing in nature or artifice, that the mushroom supposedly resembles (though for the most part does so only remotely): Chicken Mushroom, Fried-Chicken Mushroom, Rooting Cauliflower Mushroom, Black Jelly Roll, Moose Ears, Old Man of the Woods, Pig's Ear Gomphus, Pretzel Slime, Scrambled Egg Slime, Blue Cheese Polypore.

Still other names involve incongruous juxtapositions (which include more or less all the 'tooth' mushrooms): Shaggy Parasol, Imperial Cat, Big Laughing Gym, Northern Tooth, Spongy-Footed Tooth, Bearded Tooth, Spreading Yellow Tooth, Hairy Parchment. Many names call the very thing they are naming into question: Deceptive Milky, Fuzzy False Truffle, Questionable Stropharia. Many attach a derogatory English epithet to a proper Latin taxon: Fetid Marasmius, Dung-Loving Psilocybe, Hated Amanita. Yet others appear as plays on words even though they are not, e.g., Dirty Trich. Some names are just revolting: Insect-Egg Slime, Tapioca Slime, Many-Headed Slime, Red Tree Brain; while many are simply and inexplicably delightful: Peppery Milky, Dirty Milky, Buff Fishy Milky, Fuzzy Foot, Carbon Cushion, Elegant Stinkhorn, Stinky Squid.

These are all just folk terms, [*except for those invented by the author's of field guides, (editor)]*and so, since the beginning of the 18th century anyway, are not the *real* names of anything. Or at least that's what we're supposed to believe. But classification is just one of the things we do with language; evocation, or conjuring, is another.

Other vulgates are just as rich as English in their myconymical creations. Thus German: *Hahnenkamm, Dickfuß*, *Hexenpilz*, *Satanspilz* (one possible etymology for the English 'toadstool' is *Todesstuhl*, which is to say 'death's stool'). Many folk associations are lost as we move from one language to another, thus the Dirty Trich (*Tricholoma pardinum*) evokes the tiger in its German and Latvian names (*Tigerritterling*, *Tīģeru pūkaine*), and the panther in Swedish (*Pantermusseron*). The Poison Pie (*Hebeloma crutuliniforme*), also known as a Weeping Fairy Cake, becomes the *ciuperca plângătoare* ('drooping mushroom') in Romanian, and the *parastā bārkstmale* in Latvian, which means (I think) 'tattered parasol'.

What the Germans call the *Hexenei* or 'witch's egg' is known in English as the 'universal shell', an oviform envelope that surrounds the young mushroom before it takes on its familiar stalk-and-cap shape. The German *Stinkmorchel* or stinking morel is born from a witch's egg but grows to resemble a phallus, so much so that Linnaeus could not refrain from classifying it as the *Phallus impudicus*. It is the mushroom that is impudent enough to demand that it be called after the thing no one can deny it resembles. No, that's not quite right. It doesn't *resemble* the phallus; it duplicates the phallus fungally. It is impossible to come across a *Phallus impudicus* and not find oneself transported back into that prescientific world-view on which affinities abounded between different categories of natural beings that share no ancestral relation.

It is also hard not to be transported back to a time when the names of things were held to bear some sort of essential relationship to the things themselves. And here (other than in a few cases where the Latin follows the folk, as with the impudent phallus, along with the *Lactarius mucidus* or Slimy Milky, the *Tricholoma saponaceum* or Soapy Trich, etc., all of which are only as foreign to our inmost sense of the names of things as is Latin itself): here it is the folk names, and not the Latin binomial nomenclature, that preserves the bond of being between word and thing.

Often, in fact, the Linnean name for a thing picks out features of it in a seemingly arbitrary way, features that seem to have little to do with what we associate with a given creature. In this respect it is often better *not* to know Greek or Latin, if one wants the name of the being to resonate. To move away from mycology for a moment and into Pleistocene mammalian paleontology, I recall being deeply disappointed when my Greek became good enough to notice that *glyptodont* means nothing more than 'carved tooth'. As if the shape of that giant, lumbering armadillo's teeth had anything to do with its essence! Much better to just hear the sound, *glyptodont*, and to picture the beast, as it is not hard for meaning the un-Hellenized to do, as a being that naturally embodies that sound.

Folk names work differently. They do not pick out some arbitrary and contingent feature of a being (I contend that a glyptodont would still be the being it is even if its teeth were otherwise than they are), but instead zero in on the most salient properties of a being, the properties that could not be subtracted without annihilation of the being itself, the properties that the philosophical tradition has associated with *essence*. That this essence is plainly related to human concerns

(Continued on page 4)

FORAY RESULTS SUMMARY

APRIL 23, WELWYN: In pouring rain, 6 intrepid collectors began the season with a total of 32 Black Morels.

APRIL 30, WELWYN: Ample rains resulted in a total of 28 morels, with Jim Lampert the proud possessor of 15 of these. An additional 11 species were found, unusual at this date, including a gigantic *Morchella semilibra* (see photo). *Gyromitra korfii* was new to the list (see Findings Afield, page 1).

Morchella semilibra

MAY 14, BETHPAGE SP: A slight lull in the rains resulted in the failure of the expected crop of *Pleurotus populinus,* resulting in a cancellation of this foray.

Cyptotrama asprata

MAY 21, PLANTING FIELDS: A total of 21 species was good for this time of year, and included 3 species of Psathyrella, Wine Caps, Agrocybes, etc. One new species was added, *Metatrichia vesparium,* a slime mold.

JUNE 4, MUTTONTOWN EQUESTRIAN: Cancelled for lack of fungi.

JUNE 18, CHRISTIE: 36 species was exceptional for this date, and included 3 species of *Russula*, one-*viridella*- being new to the list. Another first record was *Cyptotrama asprata,* a tiny, bright yellow species growing on logs.

MUSHROOMS & LITERATURE ***(Continued from page 3)***

(Dead Man's Fingers, Scrambled Egg Slime, etc.) does not compromise its status as essence, since the folk see the world anthropocentrically, as thrown up around them for their own purposes, edification, and temptation. In this respect, mushrooms have only *being-for-us*.

Nabokov famously told the story of the Cornell student who beseeched him to divulge the secret of great writing. 'Learn the names of plants', Nabokov is said to have said. He surely did not mean the Linnean names (though those can help to add an extra flair of erudition); he meant the Russian-English-French names that turn the things into repositories of human lore and values and fears. Nabokov understood how to draw essences out of names; he understood that what makes literature live is precisely the theory of nomenclature, the philosophy of language, that had to be repudiated with the rise of modern science, one of the great achievements of which was the arbitrary naming scheme of the *System of Nature* of 1735.

Genetically and evolutionally, fungus is closer among biota to the animalia than it is to plantae. It doesn't have locomotion, and it doesn't do photosynthesis either. Whatever is actually going on in nature, mushrooms can't but come across to us as liminal, as a higher-order instance of being neither fish nor flesh.

Liminal entities, as Mary Douglas has shown us, frequently offer a good point of access for unraveling the knots of cultures. Yet ethnomycology, particularly in the wake of R. Gordon Wasson's work, has for the most part been largely preoccupied with hallucinogens and with new-age forms of 'mind-expansion'. I've been doing my best to avoid association with that approach here. Not all mushrooms are psilocybes, and the strange position of fungi in human cognition of the natural environment would be no less strange even without the hallucinogenic species. It is more likely the toxicity of some, rather than the psychedelicness of others, that charges mushrooms with such folkloric force.

But beyond this it is their association with decay and death that, I think, gives them the particular cultural role that they have at least across the Indo-European world. Wasson and his Russian wife, Valentina Pavlovna Guercken, argued in their monumental *Mushrooms, Russia, and History* of 1957 that the Indo-Europeans can be further subdivided into mycophilic and mycophobic cultures, with the Slavs standing as the clearest example of the former, and the Anglo-Saxons of the latter.

But literature isn't about what exists, and the non-existence of the beings wrapped up in the folk names of so many mushrooms only makes them that much richer.

Name-giving here is not classificatory, concerned, like Linnean taxonomy, with the simple naming and distinguishing of entities in the natural world. It is rather the accrual of cultural meaning through the things of nature in which this meaning is invested. The literary use of language on this understanding is the unraveling of this meaning through a mastery of the names of things: the real names.

Gleanings

■**ORCHIDS, BEES & FUNGI:** Ten years of research by an international team (UK, South Africa, USA (Seattle), and Germany) has demonstrated how the complex relationships used by orchids affect speciation. The South African orchids studied shared pollinators, with the same bee species sometimes collecting the pollen of one orchid species with its front legs and another with its abdomen. But there was no switching of fungal partners when the orchids were transplanted, with one orchid associating with a different species than its close neighbor. However, shifts in fungal partners have occurred over millennia in the course of evolution, the more derived (recent) fungi being associated with other groups such as *Peziza. (The Effects of Above- and Belowground Mutualisms on Orchid Speciation and Coexistence*, *Waterman, Bidartondo, et al. The American Naturalist, Vol. 177, No. 2 (February 2011), pp. E54-E68*

■ **PINE KILLER FUNGUS DEFENSE GENE IDENTIFIED:** The "blue stain fungus, *Grosmannia clavigera,* in a deadly symbiosis with the Mountain Pine Beetle, has laid waste to great expanses of Lodgepole and Ponderosa Pine in the northwest. The gene cluster that is activated in response to the pine's chemical defenses has been identified and is thought to represent a major step in understanding these interactions and combating them. Experimentally neutralizing the gene resulted in making the pathogen vulnerable to the pine's defenses. If the beetle is successful in attacking pine species east of the Rockies, it could potentially spread to the east Coast of Canada and down into the USA. *(Genome and transcriptome analyses of the mountain pine beetle-fungal symbiont Grosmannia clavigera, a lodgepole pine pathogen, DeGuistini et al, PNAS Jan 24,2011 : 1011289108v1-201011289).*

■ **SHIITAKE SYNDROME:** The case of a 56 year old Portland, OR woman was presented in the NY Times Magazine Feb. 20, 2011 as part of a series of diagnostic mysteries. The extensive blistery whip-like rash she suffered from spread from her hands and arms throughout the skin of her entire body. Poison Oak was eliminated and the puzzling syndrome was finally identified by a young doctor who had recently read a medical journal illustrating this exact rash. The diagnosis was Shiitake Dermatatis, caused by eating raw or undercooked Shitake mushrooms; 3 days earlier the patient had eaten a sample of Shiitakes cooked in oil and garlic at her local grocery store. The rash is a toxic reaction to a starchlike component, lentinan, which is destroyed by heat. It appears that only a minority of people, less than 1%, are prone to this reaction, but consider it a cautionary tale against consuming raw mushrooma.

■ **OYSTERS REDUCE CHOLESTEROL:** At this point, this has been demonstrated only in rats, in a study by researchers at the University of Incheon, Korea. Cultivated Oyster Mushrooms, *Pleurotus ostreatus,* were dried with hot air and pulverized, after which they were fed to laboratory rats, some hypercholesterolemic, in a diet containing 5% of the *Pleurotus* powder. Results were dramatic, with reduction of total cholesterol, trigylcerides, LDL, and other lipids amounting to from 24 to 59%. Additionally, feeding Oyster Mushrooms also significantly decreased body weight in hypercholesterolemic rats, without causing any adverse effects. The authors indicate that this study was conducted to generate awareness of the health benefit of the potential hypolipedemic activity of *P. ostreatus. (Hypolipidemic Activities of Dietary Pleurotus ostreatus in Hypercholesterolemic Rats*, *Nuhu Alam et al, Mycobiology 39(1) : 4551, Feb. 16, 2011)*

(Compiled by editor from above cited sources.)

Mushroom Mutualisms ***(Cont'd from page 1)***

pieces of cellulose that can be further degraded by other enzymes. The final enzyme in this pathway, beta-glucosidase (B), breaks up these smaller cellulose molecules into glucose, which the fungi can use to obtain energy for growth. These enzymes function synergistically, being produced by fungi in a coordinated manner to ensure a constant supply of sugars for growth.

After probing the genome of each of the species in the evolutionary tree of *Amanita*, I again was struck by what I had found: the mutualistic *Amanita* species have clearly lost the genes for the first two enzymes from their genomes (Figure 3). Not a single ectomycorrhizal *Amanita* species had either the endoglucanase or cellobiohydrolase genes. Most ancestral *Amanita* species had these genes present, but one particular group lacked these genes, just like the symbiotic group. This suggests that gene loss occurred prior to the evolution of the ectomycorrhizal symbiosis. Cellulase gene loss may be a ***prerequisite for*** and not a ***consequence of*** the evolution of symbiosis. Interestingly, the final gene, B, was present in some, but not all ectomycorrhizal *Amanita* species, suggesting that these species still have the capacity to use degraded cellulose as a source of energy. But without the first two enzymes in the pathway, these fungi are dependent on other saprotrophic species to do the heavy lifting of cellulose decomposition.

Considering this evidence for cellulase gene loss, I began to wonder what the functional implications of this gene loss might mean. When ectomycorrhizal species lose cellulases, do they actually lose the ability for free-living growth? Perhaps these species have other ways to break down cellulose or other sources of carbon in the environment.

To test this, I developed pure cultures of ectomycorrhizal and saprotrophic *Amanita* species from mushrooms I had collected around the world. I was able to trick ectomycorrhizal species to grow without plant hosts by providing large amounts of sugars that mimic what the plant host would provide. When I tried to grow these *Amanita* species on dead grass litter as a source of carbon, the results from this test were clear: ectomycorrhizal *Amanita* species that had lost cellulases from their genomes had lost the ability to grow on litter (Figure 5). These experimental data provide strong support that when *Amanita* lost cellulases and evolved the ectomycorrhizal symbiosis, they gave up the capacity to live freely in the environment by degrading cellulose like their ancestors. In this mutualsim, old habits were clearly lost to make a long-term relationship possible.

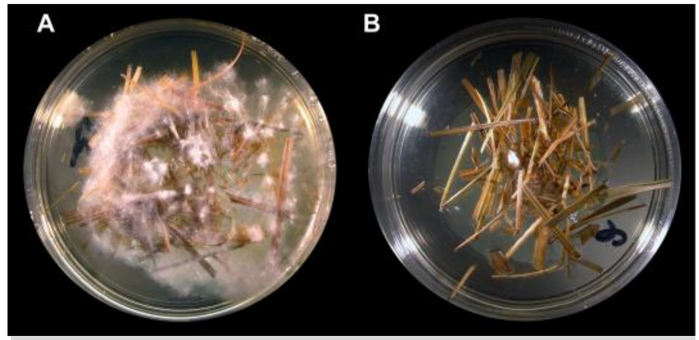


Figure 5: (A) *Amanita thiersii* (a free-living saprotrophic *Amanita*) and **(B)** *Amanita muscaria* (a symbiotic, ectomycorrhizal *Amanita*) growing on litter. Note that the symbiotic species has lost the ability to grown on litter.

We're not in Kansas anymore, *Amanita thiersii*

While our initial understanding of the evolutionary origins of mushroom mutualisms has come from a collection of mushrooms in a basement in New Jersey, a tiny spore from a mushroom collected on a lawn in Kansas will play an even greater role in the forthcoming years.

To truly unlock the secrets of symbiosis that are used by plants and mushrooms to form the ectomycorrhizal symbiosis, we need to determine the whole genome sequence of both partners. Just as the human genome project has uncovered the basic building blocks that make up all of the biological processes in humans, genome sequencing of ectomycorrhizal fungi will uncover the molecular machinery they use to unite with plant roots and maintain mutualisms. In addition to helping us better understand the process of gene loss that I discovered, we'll also be able to use the genome sequences to learn what has been gained by the mushrooms through the mutualism. Results from the sequencing of other symbiotic fungal genomes suggest that in addition to losing many genes, some ancestral genes undergo massive expansions and reorganizations leading to an increase in the diversity of some types of genes. Symbiosis can remodel the entire genome of a species, with both the loss and gain of novel genes.

Sequencing the genome of an organism isn't trivial. The genome size of an average mushroom forming fungus is 40,000,000 DNA units long. It takes many tries to ensure that each one of these pieces of DNA is covered by the sequencing. Once a genome is sequenced, the puzzle pieces of the genome are known, but it takes massive computing power and human guidance to know how to assemble all of those pieces together. Fortunately, our study of the evolutionary history of *Amanita* caught the attention

(Continued on page 7)

Mushroom Mutualisms (Continued from page 6)

of researchers at the United States Department of Energy's Joint Genome Institute. At this major research facility there is currently a major push to sequence the whole genomes of many fungal species. With their army of sequencing machines and computational power to help us, we had the chance to use whole genomes to unlock more mysteries from *Amanita* genomes. Now we just needed to figure out which species of *Amanita* to sequence.

After a rainy spell during the summer of 2009, I received a call from an avid mushroom hunter in Lawrence, Kansas, named Sherry Kay. Skipping any salutation, Sherry got right to the point. "They are ready" she said, and without any further explanation, I knew what she meant. Sherry had been keeping her eyes open for me for the appearance of *Amanita thiersii* (Figure 6). This sticky white mushroom, appears in lawns throughout Kansas, and over the past ten years has been increasing in abundance in this area, probably due to humans moving them around on feet, cars, and lawnmowers. This *Amanita* is a member of the ancestral clade of *Amanita* species that is free-living, and obtains its carbon through the decomposition of cellulose in grasslands. I decided that the first *Amanita* we should sequence should be *A. thiersii*, because its genome would give us clues about the structure of ancestral genomes before *Amanita* had evolved the capability to form the ectomycorrhizal symbiosis.

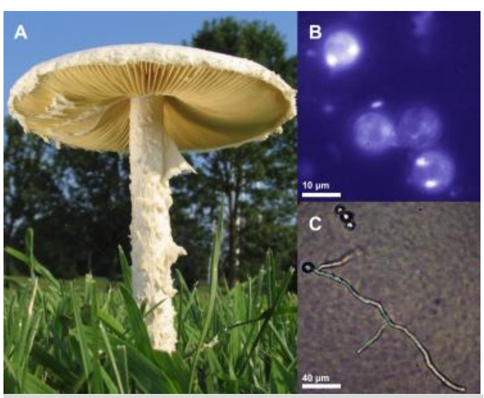


Figure 6: (A) A mushroom of *A. thiersii* (photo used with permission by Joe McFarland). (B) Microscopic spores of *A. thiersii*, stained to make their nuclei fluorescent. (C) Germinating spore that was used to generate the mycelium for the *Amanita thiersii* genome project.

While the mushrooms were making the trip from Kansas to Cambridge via FedEx, I began prepping our lab for the culturing of this valuable species. When they arrived, I carefully took the gills from under the cap of the mushrooms, and isolated single spores so tiny that they cannot be seen by the naked eye (Figure 6). After a week, the spores germinated and began to form fuzzy white hyphae that spread over the Petri dishes. From this initial colony, I grew hundreds of colonies of this fungus, to create enough biomass of the mushroom to have enough DNA to sequence the whole genome. If you lined up all of microscopic hyphe that I grew for this genome project, they would stretch down Massachusetts Ave. from Harvard Square to Central Square. As I am writing this, the genome sequencing of *Amanita thiersii* is in progress. DNA of *Amanita thiersii* is passing through DNA sequencing machines at the Joint Genome Institute sequencing facility in Walnut Creek, California. One DNA unit at a time, the genome is being decoded.

But *Amanita thiersii* will only allow us to know what *Amanita* genomes look like before the ectomycorrhizal symbiosis evolved. To truly understand what parts of a genome are critical in the functioning of the ectomycorrhizal symbiosis, we also need a genome of an ectomycorrhizal *Amanita* species. By comparing these two genomes, the free-living *Amanita thiersii* to an ectomycorrhizal *Amanita* genome, we can obtain a powerful picture of how genomic changes relate to the ability to form mutualisms.

Again, we turned to the Joint Genome Institute for help with sequencing a second *Amanita* genome. This time, we've turned to the species *Amanita muscaria*, that famous red and white *Amanita* from the Mario Brothers video games, from fairy tales, and from the cafes of Amsterdam (so I'm told…). At this moment, in an incubator in our lab at Harvard, the mycelium of this fungus is slowly filling hundreds of vials. Soon the DNA will be extracted from this fungus, and it will make its way to the sequencing machines in Walnut Creek. With each sequenced piece of DNA from the *Amanita thiersii* and *Amanita muscaria* genomes, gigabytes of genome information pile up that will eventually be assembled into the genomes. This genome data will become the next 'garage in New Jersey,' that will take our understanding the origins of mutualism in *Amanita* to a whole new level.

(*To be continued………)*

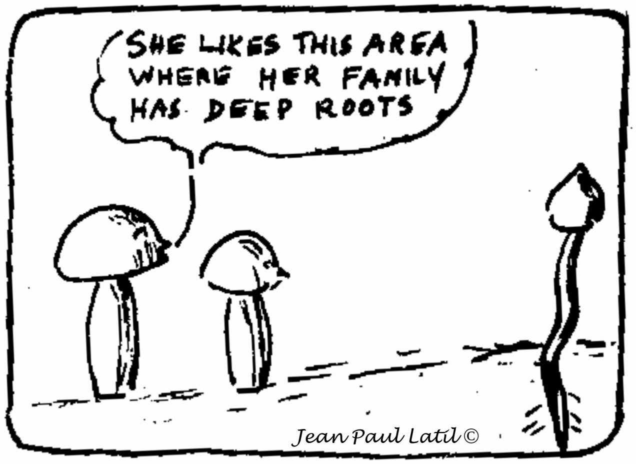
WELCOME NEW MEMBERS

DENNIS AITA

ERICA MEDITZ & THOMAS FARRELL

ROBERT & TAMARA PILOSOV

BARTLEY & SUSAN WILENSKI



IN THIS ISSUE

"Earth and sky, woods and fields, lakes and rivers, the mountain and the sea, are excellent schoolmasters, and teach some of us more than we can ever learn from books."

John Lubbock 1834-1913

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