



The Toadstool Review

OFFICIAL NEWSLETTER OF THE MMS, A SOCIETY FOR THE STUDY OF MUSHROOMS AND OTHER FUNGI

PRESIDENT'S MESSAGE



By
John Lamprecht

The 2015 morel season is behind us, and summer/fall foraging is right around the corner with all the unique challenges that brings. In retrospect the morel season was productive and really different. In my memory I have never before found half-frees, greys, yellows and big foots in the same section of woods on the same day. No matter how much we learn there are always new insights and bits of knowledge in store if you just get out and about.

That's one of the greatest gifts for me and my family as members of the MMS. We have learned so very much, but are humbled to know there is so much more to learn about the fabulous Third Kingdom, the fungi. We joined the MMS to learn more about what we could gather and eat, but soon realized it involves so much more, and that extra knowledge supports rather than "gets in the way" of our hunt for what's good to eat. We would never have learned, and still continue to learn, so much without our mentors, the members who have so willingly shared their knowledge and expertise with us "rookies," and to them goes all the credit for any success our society enjoys in its mission of educating the public.

I was recently contacted by a past president, Mitch Metcalf, who was MMS president more than 20 years ago. He has relocated to Oregon and has continued to actively pursue many interests, among those, helping the Oregon club expand its teaching and start a photo contest.

He is credited with many things we enjoy today in our club; one in particular being a leader in developing our "Twin Morel" logo, which is on our official communications, newsletters, website and on many items in our "store," which he also started. Succeeding presidents—Anna, Bob, Ron, Steve, Barry and many more—all have been part of adding additional features and events, and working to make membership a worthwhile investment.

One such very popular MMS event, the Annual Potluck will be undergoing some necessary changes. A committee is looking at finding an alternative site where more of our members can attend and enjoy the event. We are also reviewing our list of approved mushrooms and rules to ensure safety for those who attend. More information will be provided in the future, through the next newsletter, our website, and every other means we have to get the word out. Following the rules will be essential and a condition for participation. It will be a members-only event.

Finally, with summer and fall forays starting, a review of foray etiquette is in order. On page 4 of this newsletter you will find suggested foray guidelines. These guidelines make great sense in so many ways and will actually help to enhance your experience. Sadly, we still can't do much about mosquitoes, ticks, buckthorn, prickly ash and maggots in your chanterelles and porcini. Fun foraging everyone and bring your cameras!

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SUMMER 2015

UPCOMING MMS FORAYS...

July 18, Wild River State Park, 10 a.m.

This foray will be at the main park entrance (not the Sunrise entrance). Meet at the picnic parking lot. Take Interstate 35 north to North Branch, then go east (right) on Highway 95. Continue to follow MN-95 E/St Croix Trail (around 9 miles) then turn left onto Park Trail to Park entrance (about 2.5 miles).

July 25, St. Croix State Park, 11 a.m.

Take I-35 to the Hinckley exit 183. Turn right at MN 48/Fire Monument Rd. and continue to follow MN 48. Go 13 miles on MN 48, then right on Co. Hwy22/Fleming Logging Rd. Then to the park Ranger Station, take a right and go 7.3 miles. Look for a sign to Big Eddy. Take a right and go 2.2 mi to the Big Eddy parking lot.

July 29, Brandt Pines, 10 a.m.

Directions: Take Hwy I-35 north to Hwy 70 exit (165), then east on Hwy 70 across the river. Continue 2.7 miles on 70, Look for Brandt Pines sign. Turn left/north at Larsen Rd. and drive 6 miles to the trailhead.

August 8, Sand Dunes State Forest, 10 a.m.

Go north on Hwy 169 to Zimmerman MN. Take a left (west) on Hwy 4 and go 5.4 miles west. Turn left at campground sign and go 0.4 miles. Turn right for 0.6 miles, then left at the Ann Lake Day Use sign. Go to the end of the road.

August 15, Lake Maria State Park, 10 a.m.

The park may be reached from the south via I-94 (exit 193) at Hwy 25, south to Chelsea Rd to Hwy 39 west and Wright County Rd 111; or from the north via I-94 (exit 183) to Hwy 8, County Rd 39 and County Rd 111. Take Park Rd to the parking lot by Lake Maria.

August 29, Nerstrand Big Woods State Park, 10 a.m.

Take I-35 to State Highway 19 east into Northfield. Go south on State Highway 3, east on State Highway 246, then turn right onto County Road 29 west to the park entrance.

Sept. 12, Afton State Park, 10 a.m.

Go to the end of road to the picnic area.

Sept 26, William O'Brian State Park, 10 a.m.

Stay left and go down to the picnic area between the lake and the river (do not go to the trail center).

October 3, Lyndon Cedarblade Township Park, 10 a.m.

Go north on Hwy. 65 to Hwy. 22 (north of Ham lake). At the lights turn left (west) and goes 8.4 mi to Hwy 47. Turn right (north) and go 8.7 mi to Isanti 8. Turn left (west) and go 1.4 mi and park on left side (south). (Note: primitive woods, no facilities). Alternate route: 169 north to Zimmerman turn right (east) on Sherburne Co.4; at lights follow straight --- when hwy. changes to Isanti 8 go 5.5 mi -- park on right side (south).

October 10, Linwood Lakes Regional Park, 10 a.m.

Take I35 north to the Wyoming (#135) exit. Go left (west) on Hwy 22 about 5 miles. Look for a sign for Linwood Lake Landing on the left side of road (before you get to the large "Linwood Pizza Man" statue and outlet). Turn left into the Linwood Lake Landing parking area.

Volunteers needed for the MMS display at the State Fair

The MMS display of fresh, cultivated and dried mushrooms at the MN State Fair is entering its eighth year. Our exhibit is always, and only, displayed on the first two days of the Fair, so mark your calendars for Thursday, August 27th and Friday, August 28th. Each year the club recruits a terrific group of member volunteers to take part in this adventure. Through the efforts and contributions of these amazing people the MMS has won numerous award ribbons, including three Grand Prizes. This year our exhibit is slightly smaller but expect it to be just as exciting. The *Star Tribune* is writing an article spotlighting our display, and we plan to shine so the public learns more about the MMS, mushrooming and identification. The MN State Fair is our biggest outreach to the general public, and many Fair-goers sign up as MMS members upon viewing the exhibit. The public greatly enjoys our educational display and lets us know how much in many ways. Whether you are a novice member or an experienced one, we are always in need of volunteers, so if you want to help with the MMS exhibit at the State Fair here is an overview of available opportunities:

- Field Collection (solo or group): Between August 22 - 25, collect fresh wild mushrooms suitable for display, during solo or group outings.
- Field Collection Leaders (for group forays): Between August 22 - 25, schedule and lead small groups to collect as many varieties as possible of fresh wild mushrooms in excellent condition suitable for display.
- Drop-Off Stations: Between August 22 - 25, receive and store fresh mushroom specimens at home (or other place) and on August 26, deliver them safely to the fairgrounds for setup by 11:00 a.m.
- Cultivation: Cultivate mushrooms with logs, kits, toilet paper, kitty litter, etc. Ron Spinosa is the contact person for help or guidance with cultivation.
- MMS Representatives at the Fair: Staff the MMS exhibit and talk with people who visit. Field questions about our club and mushrooms. Members of all experience levels, from beginner to advanced, are welcome for this opportunity; enthusiasm is the primary requirement.

If you are interested in volunteering in any of these areas, contact MMS State Fair Display Chairperson, Betty Jo Fulgency (bfulgency@gmail.com) or MMS Volunteer Coordinator, Delia Lam (slowlorus@gmail.com). And for all our members, whether you volunteer or not, be sure to stop by the MMS exhibit in the Horticultural Building to say hello and see what natural treasures we find this year!

UPCOMING MMS MEETINGS & EVENTS...

July:

July 13, 6-9 pm, Annual Picnic, mini-foray and MMS meeting

Blackhawk Park in Eagan. Foray will leave the pavilion area about 7 pm after eating. This is **not** a potluck. Bring what you want to eat, and the MMS will have hot dogs, Arnie Palmers, and paper plates, forks, cups, etc. We rented the pavilion so folks can hang out and wait until we return from the woods. We should only be foraging an hour or so. After an ID session and announcements, you should be on your way by 9 pm. The Park is located near 35E at 1629 Murphy Parkway. There is a parking lot near the pavilion and a playground for the kids

August:

Aug. 10, 7:15 pm, MMS Meeting. 110 Green Hall, U of M St Paul Campus

MMS member Howard Goltz will give a presentation on how to photograph fungi. This will also be an ID meeting.

September:

Sept. 14, 7:15 pm MMS Meeting. 110 Green Hall, U of M St Paul Campus

Labor Day Weekend Joint Foray

Save the dates—Friday, Sept. 4th to Sunday, Sept. 6th—for a joint MMS foray in Cable, WI, in conjunction with the Wisconsin Mycological Society and Cable Natural History Museum. Some details still need to be worked out—you will be updated through our website and email. Events will start with an informal pizza social on Friday evening, with forays on Saturday morning and afternoon, Sunday morning and afternoon, with the evenings reserved for ID as items are cataloged by our foray mycologist (possibly renowned mycologist Pat Leacock). There will be no charge to attend for members of the MMS, WMS, or the Museum. Lodging and transportation will be your only expense and they will be up to each person to arrange. Lakewoods Resort and Lodge will likely be the host for the event and may be a good source for lodging, but there is other lodging in the area, and folks may have cabins or other options within an hour or so drive. You can attend all or some of the forays, stay, commute, whatever. We will do a check-in at each foray site. Stay tuned.

Mushroom Foray Tips and Etiquette

What to bring on a foray:

1. Basket or bag for your treasures. Basket should have a sturdy handle and not be a bother to carry on a hike; bags should be mesh or cloth. Mushrooms need to breathe; plastic bags can cause fungi to sweat and deteriorate.
2. Knife. Knives with folding or retractable blades are safer, but that is up to you. Cut the mushroom instead of pulling it out of the ground to keep excess dirt out of your mushrooms and basket and to minimize disturbing the mycelium. If collecting for ID, you may need to collect the base also, as in the case of Amanitas or possible look-alikes.
3. Small paper bags or wax bags. These are used to separate fungi in your basket until you can identify them, and will keep dangerous ones separate from ones you may want to eat.
4. Whistle (see safety tips below) and Compass or GPS. Check a map of the foray area before heading out and keep yourself oriented. A GPS can help save promising spots for coming back to later (and back to the parking lot at the end).
5. Insect Repellent. Use Deet or Permethrin (can be sprayed on clothing only). Folks have even used mosquito nets in the worst part of summer. Tuck pants inside socks/boots to guard against ticks.
6. Clothing. Long pants and a long sleeve shirt are a must, and breathable fabrics are great in the heat and humidity.
7. Reliable footwear or hiking boots. Waterproof is best. We go off trail on uneven terrain, hills and ravines, and often cross small streams or walk in wet areas.
8. Rain Gear. We foray in just about any weather. Check the forecast, but be prepared.
9. A sturdy walking stick - or grab one in the woods. They help on uneven terrain and for moving vegetation to look for mushrooms (street hockey sticks are popular for this).
10. Camera. Helps with specimen ID, memories and for the annual MMS photo contest.
11. Water. Stay hydrated and bring extra (dehydration is very dangerous).
12. State Park sticker (if required). Needs to be up-to-date and properly displayed on all vehicles.

What to bring for after the foray:

1. Field Guide or ID books. We often have MMS copies to share.
2. ID slips and a pencil or pen (a leader should have a copy of our ID slips, but you can also get one from our website: www.minnesotamycologicalsociety.org).
3. Magnifying glass.
4. Lunch, snacks and refreshments for yourself and to share if you wish.

Foray safety & etiquette:

- Spring forays are only open to members of the MMS. If you are not a member, this is a great time to sign up – summer and fall forays allow guests, but require a fee and signed waiver.
- If you strike out on your own make a point of being back at the meeting place on time. If you plan to leave early, let one of the foray leaders know.
- Before heading out, exchange cell phone numbers. Walk in groups and keep yourself oriented with a compass, GPS or landmarks. If you lose track of the group or get lost, use a whistle or cell phone if you have service.
- Do not foray on private property without permission of the owner – know where you are at all times.
- Respect nature (and the rules of the park). Do not pick wild plants like ramps, leeks, jack-in-the-pulpit or ferns.
- Do not grab all the mushrooms in sight—leave some behind for others to enjoy (adding rotting or marginal specimens to your basket will ruin all of the contents).
- Let small mushrooms grow—an immature one may be useful for identification, however.
- Let members who have never found the targeted mushroom have a chance to see what you have found and possibly pick that first prized specimen—this is our standard for our morel forays.
- Share your knowledge and bounty.
- Do not pick at the specific foray location **for at least a week** before the foray, and do not show up early the day of the foray to pick before the group arrives.

Hunting mushroom enzymes in the post-genomics era

By Chris Flynn

Mushrooms produce an incredible array of compounds for defense and signaling purposes, many of which are also useful for humans as medicinal compounds. While mushrooms, such as *Ganoderma lucidum* (Lingzhi) and *Inonotus obliquus* (Chaga), have been known to traditional healers for centuries, an ever-expanding list of medically relevant, complex compounds (often called natural products) continue to be identified in mushroom extracts. However, while natural products may be readily identified in small scale laboratory tests, affordably producing them at the large scales necessary for medical use is often an insurmountable barrier, preventing further drug development and medical application. My research goal is to identify the enzymes that mushrooms use to make the largest group of fungal natural products, the terpenoids. I hope that these enzymes may be applied to producing medicines on a larger scale than is possible using wild-harvested mushrooms, and far cheaper than possible using chemical synthesis.

Terpenoids are widely produced by plants, bacteria, and fungi, and have a wide range of natural, industrial, and medical functions, including as vitamins, flavor compounds, and most importantly as antimicrobial, cytotoxic, immune-modulating, and anti-inflammatory compounds. Most of the compounds found in Lingzhi and Chaga are terpenoids. Additional examples of isoprenoids in wide use include menthol, the anti-malaria compound artemisinin, and the effective chemotherapy drug Taxol[®]. Each of these commercial compounds were initially produced in plants, likely owing to the ease in finding plants, developed agricultural methods, and pool of experienced scientists in the field. The testing of mushroom natural products for pharmaceutical activity, as well as understanding of mushroom natural product biosynthesis, lags far behind that of many plants, but has developed rapidly in the last decade due to the newfound affordability of genomic sequencing. The advent of the genomic era has revealed that fungal genomes are much smaller than plants' (and thus cheaper to analyze), and also that fungal biosynthetic pathway genes are encoded next to each other in the genome. This means that, just like page numbers in a disordered pile of sheet music, once I find the gene encoding the first enzyme in a pathway, the nearby genes are likely to complete the next step in the pathway leading to the final pharmaceutical compound, akin rearranging the stack of papers back into the correct song.

During my Ph. D. research, my colleagues and I have searched the genomes of *Omphalotus olearius* and *Stereum hirsutum* to identify the sesquiterpene synthases producing each of the major types of sesquiterpenes (15-carbon terpenes), most importantly several protoilludene synthases.^[1] Protoilludene synthase is the key enzyme in producing the largest and most medically relevant family of sesquiterpenes, and are found only in mushrooms. My current work is focused on identifying the biosynthetic pathways that begin with protoilludene synthases, to learn how these mushrooms produce their final bioactive compounds in nature, and how we can make them industrially. Once I identify their key biosynthetic enzymes, I will have overcome the main obstacle to terpenoid research by enabling production of pure compounds at a reasonable price. Affordable production would make terpenes readily available for further pharmaceutical development, or (if we're very lucky) directly for medical use. **[cont'd on pg. 6]**



Chris Flynn is a Ph.D. Candidate in the Department of Biochemistry, Molecular Biology, and Biophysics (BMBB) at the University of Minnesota. He is native to Winona, Minnesota, and obtained his B.Sc. in Biochemistry at the University of St. Thomas in St. Paul, MN. He is one of the winners of the MMS Scholarship, granted annually to promising U of MN graduate students performing mycology research.

Much of my research has taken advantage of genomic sequences and previously isolated mycelial cultures of mushrooms. However, we have recently begun searching for isoprenoid producing enzymes in previously uncultured and unsequenced mushrooms. Because my work is largely confined to the lab, I am dependent on experienced mycologists to hunt, correctly identify, and send fresh mushrooms for analysis. I can then use these mushrooms to begin growing samples in isolation, a necessary step in preparing clean genomic DNA for sequencing. Should anyone seek MMS help (as I have done), we have identified a few key techniques necessary to obtain viable tissue for culture and genomic sequencing:

1. Accurate mushroom identification is essential, so recording of the growth location, associated plants, and preservation of as much of the base, stem, and cap of the mushroom is necessary. Also, individual mushroom stands (genets) should be kept separated during collection to minimize genetic variability across a sample, simplifying genomic sequencing.

2. Larger, thicker, “stiffer” mushrooms are easier to process. To obtain viable, sterile lab cultures, internal tissue must be dissected to remove surface contaminants.

3. Tissue should be fresh, refrigerated, and never frozen. We've found that both freezing and drying prevent growth of most fungal cultures. The best way to handle mushrooms for lab culture is to refrigerate in wax paper bags, and immediately deliver or send by refrigerated, overnight mail to the end user. While dependent on the species and condition of the mushroom, many samples remain viable through 2-4 days of refrigeration.

4. Make sure the recipient thanks you! Without your expert foraging, species identification, and sample preservation, none of the subsequent laboratory work would be possible!

Notes:

[1]. Quin, M.B., Flynn, C.M., Schmidt-Dannert, C. (2014) Traversing the Fungal Terpenome. *Natural Product Reports* 31: 1449-1473

The Toadstool Review is the newsletter of the MN Mycological Society published in January, April, July and October. The newsletter keeps members informed about club meetings, forays and other events, and includes articles and mycological information. The newsletter staff does not advocate or advise any specific use of wild mushrooms and assumes no responsibility for the consequences thereof. Submissions from members are welcome. **Please email your submission to the editor: jancontursi@msn.com Deadline for submissions is the 15th of December, March, June and September.**

Photo and Article Guidelines

1. Articles should be around 700 words or less. Add a brief (2-3 sentences) bio and submit as a Word file. If sending photos, they should be jpg, no more than 90kb, and sized for the web (320x240). If you need to resize your photos before sending them, here is a free program: <http://ipiccy.com/> If you cannot resize photos, send them as-is and I'll resize.
2. Photos of fungi should be accompanied by a caption, including identification of genus and species, and the photographer's full name.
3. Articles and photos taken from another source should have permission for reprinting. If you see an article/photo you think will be of interest, send me the link/title, and I'll request permission to reprint.
4. If you are writing an original scientific article, please cite your sources.

MMS Mushroom Forays — Inventory List

By Ron Spinosa

MMS Lake Saketah Foray, May 9, 2015

Yellow Morel.

Half Free Morel

Devils Urn

Polypores:

Turkey Tail

False Turkey Tail

Cerena unicolor

Smokey Polypore. *Bjerkandera adusta*

Hexagonal pore poly. *Polyporus alveolaris*

Gilled Mushrooms:

Velvet Foot

Deadly Galerina

MMS Quarry Trail Foray, May 23, 2015

Yellow Morel

Devils Urn

Gilled Mushrooms:

Oyster. *Pleurotis populinus*

Phellinus tremulae

Pluteus cervinus

Gymnopilus sp. maybe *G. sapineus*

Gymnopus subsulphureus

Felt Patch Inky. *Coprinopsis variegata*

Polypores:

Polyporus arcularis

Hex pore. *Polyporus alveolaris*

Lumpy Bracket. *Trametes gibosa*

Turkey tail

False Turkey tail

Perenniopora sp. maybe *P. fraxinae* but on aspen

Report from the First Annual Morel Fest

May 30, 2015

By Kathy Yerich

Despite a short morel season in Minnesota, MMS member Mike Kempenich, of Gentleman Forager, hosted the state's first annual Morel Fest on one of the most beautiful Saturdays we've seen this summer! Huge congratulations to Mike and all of his comrades for a successful event, held in the parking lot behind the Sample Room Restaurant in NE Mpls.

Numerous well-known chefs and bartenders showed off their skills, including Chef Thomas Boemer of Corner Table, Chef Gavin Kaysen and bartender Elliot Manthey of Spoon and Stable, Chef Jim Christiansen and bartender Britt Tracy of Heyday, Chef Nick O'Leary of Smack Shack and Todd MacDonald of Parella, plus bartenders Trish Gavin of Il Forno, Kris Gigstad of Eat Street Social and Scott Weller of Parlour Bar. Adding even more energy to this fungal foodie event was a constant supply of lively music by Loons in the Attic, The Awful Truth, The Dead Willow and Chester Bay.

The VIP crowd arrived early. Paying a premium price for tickets allowed them to chat with the chefs, taste the first morel delicacies and vote for their favorite dish. The next to arrive were "Mushroom Mogul" ticket holders, who joined the fun an hour and a half later, but still enjoyed all of the morel-centered food and cocktails, like an Old-fashioned garnished with a candied morel.

The winning dish was a beautiful morel soup from Jim Christiansen of Heyday, which was anything but ordinary. Food writer Pat Lindquist described it as "a warm, rich, buttery brown morel broth—topped with some chopped greens and zest of lime—then topped off with a hot glazed morel and finally a green leaf of Nasturtium, from the watercress plant family, that gave a spicy, bittersweet taste." Wow!

The festivities continued into the night with free admission and other entertaining food items for purchase, including morel sausages with an electric green ramp mustard, created by Chef Kyle Gage from The Sample Room, and brisket sammies from Chef Taylor O'Brien, also of The Sample Room. Some sweet treats could be found in the form of morel ice cream, and Chef Cameron Borne of Gentleman Forager even created morel cotton candy! Thanks to Karen Tobler for the beautiful photographs that really capture the flavor of the event.



Corner Table went all out with a three-part dish for the Morel tasters.

Part one is an arancini. Typically arancini are stuffed rice balls that are coated with breadcrumbs, and fried. Corner Table's twist on this dish was barley risotto with morels, ramps and parmesan, which were breaded, fried and then wrapped with country ham and served on a morel soubise sauce.

Part two of the dish is a deep fried pork rind called Chicharrón, sprinkled with morel salt and garnished with Parmesan cheese whiz.

If that weren't enough, they added a morel stuffed with crawfish and trinity mix (diced onion, green pepper and celery) on micro greens.



Spoon and Stable decor



Crew from Heyday restaurant happily prepping the winning dish



Not your average soup and sandwich



Vote for your favorite



Photographer Karen Tobler and MMS Member Kathy Yerich try the morel cotton candy



Morel brat with vibrant green ramp mustard

Science Corner

Mycorrhizae & Mycorrhizal Soil Amendments

If you garden, watch this video. Mycorrhizal fungi help your garden grow! The video also asks: Do you need commercial mycorrhizal soil amendments, or can you develop mycorrhizae naturally?

<https://www.youtube.com/watch?v=2tdo3wSHVhA>

How much do you really know about ticks?

It's not all about deer. Recent research has made new discoveries and exposed old myths. Read an interview with disease ecologist Dr. Richard Ostfeld of Cary Institute of Ecosystem Studies.

<http://awaytogarden.com/the-tick-borne-disease-equation-with-dr-rick-ostfeld-of-cary-institute/>

Toxic mushroom-based drug may help battle colorectal cancer

Can "death cap" mushrooms become a possible cancer treatment?

http://www.eurekalert.org/pub_releases/2015-04/uotm-tmd042215.php

No link between psychedelics and mental health problems

Good news for some!

http://www.eurekalert.org/pub_releases/2015-03/sp-nlb030515.php

Tick-killing Fungi? It was just a matter of time

The fungus grows inside the tick until it fills the whole body. It then extrudes out of the tick again and forms new spores on the outside of the body, which can spread to new ticks.

<http://www.sciencedaily.com/releases/2013/11/131112091005.htm>

Ticks and their control

Information by entomologist Jeff Hahn, University of Minnesota

<http://www.extension.umn.edu/garden/insects/find/ticks-and-their-control/>

A poisonous cure

Can enzymes in poisonous mushrooms be transformed into delivery systems to supply medicine - rather than poison - to a single target in the human body?

http://www.eurekalert.org/pub_releases/2014-12/msu-apc120414.php

Garlic Mustard vs Mycorrhiza

Martine and Hale of Bucknell University, Lewisburg, PA, recently published a paper introducing evidence toward the negative effects of the invasive plant garlic mustard (*Alliaria petiolata*) on native mycorrhizal associations. The disruption occurs because garlic mustard produces anti-fungal compounds which not only hampers formation of new associations between native plants and mycorrhizae, but also diminishes the effectiveness of existing connections.

<http://www.amjbot.org/content/early/2015/03/02/ajb.1500025>

MMS MEMBERSHIP APPLICATION / RENEWAL FORM

Name _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone (____) _____

Email _____

New Member _____ Renewal _____

Individual (\$20) _____ Family (\$25) _____ Student (\$15) _____

Send newsletter via email _____ postal mail _____
(Make check payable to MMS)

Optional: I also want to join NAMA and receive NAMA's newsletter at the special MMS member- affiliated rate of:

\$25.00 Individual w/electronic newsletter _____

\$40.00 Individual or family w/hard copy newsletter _____
(Include a separate check payable to NAMA)

Send application form, check(s) and release to:
Minnesota Mycological Society
P.O. Box 211444
Eagan, MN 55121

RELEASE

I (We) realize that when engaged in wild mushroom activities, serious physical injury and personal property damage may accidentally occur. I (We) further realize that there is the possibility of having an allergic reaction to, or being poisoned by eating wild mushrooms, and that the adverse reactions to eating wild mushrooms range from mild indigestion to fatal illness.

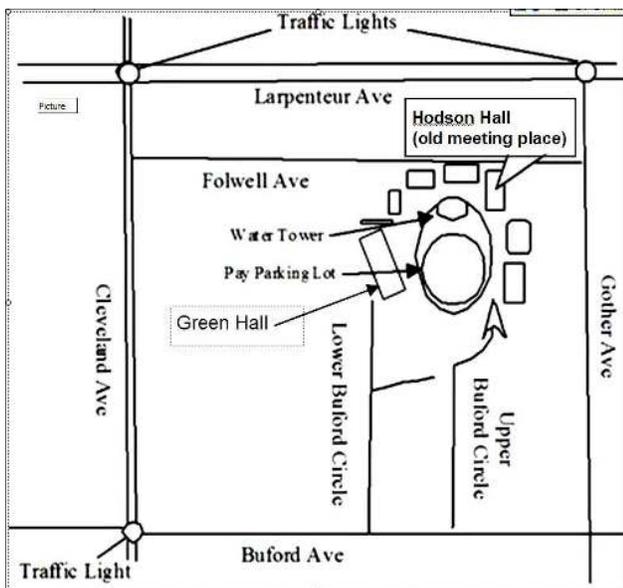
Knowing the risks, I (We) agree to assume the risks, and agree to release, hold harmless and indemnify the Minnesota Mycological Society, and any officer or member thereof, from any and all legal responsibility for injuries or accidents incurred by myself or my family during, or as a result of any mushroom identification, field trip, excursion, publication, meeting, dining or any other activity sponsored by the MMS.

Signature: _____

Date: _____

Signature: _____

Date: _____



The MMS meets in Room 110 Green Hall on the St. Paul Campus of the U of MN (unless otherwise noted). Check the website for meeting dates and times: www.minnesotamycologicalsociety.org

Van's Wine Cap Recipe

By Van Bialon



Ingredients:

5-6 lbs. Stropharia Wine Caps (*Stropharia rugosoannulata*), cut into 1/2-inch strips
10 large cloves of garlic, minced
3 large sweet onions, sliced
2 cups of red wine
Salt
3 Bay leaves per pan
1 or 2 quarters of unsalted butter per pan (to taste, and you should taste from time-to-time)
Garlic infused olive oil

Use two large pans for this recipe and divide ingredients between them.

In each pan, sauté garlic in oil for about 5 minutes on medium heat, then add mushrooms and a good pinch of salt to sweat out the moisture from the Winecaps. There will be a lot of water to reduce, so constantly mix. Turn up the flame if necessary. The mushrooms will reduce about 50 percent or more.

Add the onions and 1/2 of the butter to each pan at this time.

After the onions are translucent, add the wine and more butter, which will be absorbed into the mushrooms. Cook down to the consistency you like—remember, you will cook this again with your dishes if you freeze for the future. This process takes about an hour.

My method of storing this is to let it all cool down to room temperature (at least 2 hours). Then, use a vacuum sealer, making the bags about 12 inches long. Label each bag as “Winecap Onion” and add the date.

I add two big handfuls of the mixture to each bag, set the machine to “moist,” and wipe the ends of the self-made bags with paper towels to remove any moisture so the bags will seal airtight. Then I flatten out the sealed bags gently to make them perfectly flat, and freeze.

This mixture can be added to soups and stews, and used as a side dish for meals. Of course, other varieties of fungi can be substituted. Vacuuming makes the food last two to three times longer than conventional methods. Enjoy!

Van is an MMS member who cultivates Wine Cap mushrooms and is doing a study for Field and Forest Products, a specialty mushroom spawn supplier. Van has articles published in newspapers, FUNGI Magazine, and in The Toadstool Review. Van says: “If people want Wine Caps, when I have a lot, I let them pick and clean them.” Contact him if interested: v9875568@yahoo.com

Quiche with Morels and Scallions

By Rachel Pastick



Ingredients:

Pate Brisee to make one 10-Inch crust
All-purpose flour, for surface
1 ounce (2 tablespoons) unsalted butter
3 scallions, thinly sliced
4 ounces small fresh morel mushrooms (about 12 to 15), halved
3/4 cup whole milk
1 cup heavy cream
1 teaspoon coarse salt
1/4 teaspoon freshly ground pepper
3 large eggs
1/2 cup (1 ounce) finely grated Gruyere cheese

Roll pate brisee to 1/4-inch thickness on a lightly floured surface. Fit dough into a 10-inch tart pan with a removable bottom; trim dough flush with rim. Prick bottom all over with a fork. Freeze until firm, about 30 minutes.

Preheat oven to 375 degrees. Line dough with parchment, and fill with pie weights or dried beans. Bake until edges turn gold, about 20 minutes. Remove parchment and weights, and bake until crust is golden brown, 15 to 20 minutes. Let cool on a wire rack.

Reduce oven temperature to 350 degrees. Melt butter in a medium saute pan over medium heat until foamy. Add scallions; cook, stirring, for 1 minute. Add morels, and cook, stirring often, until fragrant, for 2 minutes. Stir in milk and cream, and bring to a simmer. Transfer to a medium bowl; let cool to room temperature, about 30 minutes. Stir in salt and pepper.

Place crust on a rimmed baking sheet. Whisk eggs in a medium bowl. Stir in mushroom mixture. Fold in Gruyere. Pour mixture into crust. Bake until puffed and gold, 25 to 30 minutes. Let cool slightly; serve warm or at room temperature.

Rachel is an MMS member.



35th Annual Telluride Mushroom Festival

Since its founding in 1981, the Telluride Mushroom Festival has been committed to providing the best in mycology through creative presentations, one-of-a-kind workshops and top-notch science. We have many events planned, including our annual festive mushroom parade and costume contest and a mushroom cook-off that features some of the most innovative dishes from professional and amateur chefs. This year we are returning the highly successful and scientifically important Telluride Voucher Program to help identify and characterize the local fungi.

The Telluride area is home to the best foraging in the Rocky Mountain area and features *Boletus edulus*, which is considered to be one of the best edibles in North America. The area is also home to apricot-flavored chanterelles and the photographic *Amanita muscaria*. The festival runs from Thursday, August 13, 2015, through Sunday August 16, 2015, with pre-conference workshops held on August 12th.

The initial lineup of presenters includes mycologist Sue Van Hook of Ecovative, author Eugenia Bone, mycologist Cathy Cripps, author Vera Evenson, Telluride Mushroom Festival founder and author Gary Lincoff, fungi activist Giuliana Furci, author and mycologist Tradd Cotter, Johns Hopkins cognitive neuroscientist Fred Barrett, and clinician Mary Cosimano, Turtle Lake Refuge founder and chef Katrina Blair, film director Gay Dillingham, Radical Mycology co-founder Peter McCoy, field mycologist Noah Siegel, Female & Fungi founder Mara Penfil, Graham Steinruck & Nick Martinez of Hunt and Gather, LLC, macro-fungi expert Jay Justice, Oregon State University professor Seri Robinson, FUNGI magazine editor-in-chief Britt Bunyard, author and mycologist Larry Millman, and internist Jonathan Reisman.

Key Ticket Details: Full 4-day festival passes, which include all lectures, forays, and the cook off are on sale now for \$275. Tickets are on sale through EventBrite and can be found at this link: <https://www.eventbrite.com.au/e/2015-telluride-mushroom-festival-tickets-14829183487> or through the festival website. Additional tickets for paid workshops are also available.

Follow the Telluride Mushroom Festival on the web at: www.telluridemushroomfest.org on Facebook at facebook.com/TellurideMushroomFest and on Twitter @shroomfest. The festival is sponsored by the Telluride Institute, an innovative non-profit organization that fosters the transition to a sustainable world.

Maggie Klinedinst will be happy to answer any questions.
717-309-7843
maggie@telluridemushroomfest.org

The Telluride Institute, NFP - 210 Fat Alley, PO Box 1770 - Telluride, CO 81435
The Telluride Institute is an innovative non-profit organization that fosters the transition to a sustainable world.

Fungus enhances crop roots and could be a future 'bio-fertiliser'

New research has found that the interaction of roots with a common soil fungus changes the genetic expression of rice crops – triggering additional root growth that enables the plant to absorb more nutrients.

In addition to causing extra root growth, the mycorrhizal fungus also enmeshes itself within crop roots at a cellular level – blooming within individual plant cells. The fungus grows thin tendrils called hyphae that extend into surrounding soil and pump nutrients, phosphate in particular, straight into the heart of plant cells. Plants 'colonised' by the fungi get between 70 to 100% of their phosphate directly from these fungus tendrils, an enormous mineral boost which may eventually mitigate the need for farmers to saturate crop fields with phosphate fertiliser to ensure maximum yield.

The hope is that mycorrhizal fungi could one day act as a 'bio-fertiliser' that ultimately replaces the need to mine phosphate from the ground for industrial fertiliser. Finding a replacement for mined phosphate is a critical problem as not only is the resultant fertiliser a pollutant – causing algal growth which chokes water supplies – but the big phosphate mines are now depleted to the point where they are expected to run out in the next 30 to 50 years. Many experts are predicting a 'phosphate crisis'.

"The big question we are trying to answer is whether and how we can make use of the biofertiliser capacity of mycorrhizal symbiosis in modern and more high input agricultural settings, meaning more intensive farming methods. We need alternatives to phosphate fertiliser if we are to feed growing populations," said Dr Uta Paszkowski from the University of Cambridge's Department of Plant Sciences, who co-authored the research published today in the journal PNAS.

"Cereals such as rice, wheat and maize are the most important crops in the world, feeding billions of people every day. mycorrhizal fungi have a mutualistic relationship with plants, including cereals, going back to the earliest days of plant life on land, before roots were 'invented'. By analysing this ancient and common relationship we are gaining insights that could be used to breed crops with the best possible root architectural and symbiotic properties – towards 'designing crops' with very high food outputs," she said.

The new research pioneers the examination of the root system building units of adult rice plants at a molecular level, as rice can be used as a model for cereal crops generally. Cereal root 'architecture' involves a few big, thickset roots called crown roots that act as a scaffold from which all the smaller, lateral roots spread out into the different layers of soil, which contain the various nutrients.

Researchers found that plants colonised by mycorrhizal fungi have a different genetic expression which causes the cell walls within crown roots to soften, triggering the growth of many more lateral roots which are able to suck in more nutrients, contributing to a healthier plant with a higher yield. This is in addition to the phosphate provided by the fungal 'hyphae' tendrils, which in effect act as extra roots themselves (in return for which, the fungus gets its carbohydrate from the plant).

"Plant roots that have the capacity to explore the widest soil area absorb the most nutrients as a consequence and so are likely to have a greater crop yield. By finding out which parts of the genome are responsible for the best plant root systems we can start breeding for the best root 'architecture'," said Paszkowski. "Designer crops with the best possible root systems will mean greater crop yield, which means more people fed."

Rice is best grown in highly irrigated paddy fields, but there are many parts of the world where this isn't an option, and 40% of the world's area for rice crop is grown 'dry'. However, the plant-fungi relationship that creates enhanced crops actually works best in dry environments. Mycorrhizal fungi could be of huge benefit to those who rely on dry rice crops in some of the poorest areas of Asia and sub-Saharan Africa.

The main hurdle for researchers to overcome is the self-regulation of plants, which means the fungi cannot be tested on an industrial scale alongside traditional fertiliser. "Plants monitor their own nutritional state. If a plant has enough phosphate it will not allow fungus to enter root – so at the moment it's one or the other. We are working on ways to circumvent this blockage so we can allow symbiosis to contribute in agricultural practices in better developed countries " said Paszkowski.

Mycorrhizal fungi are extremely common in all soils around the world, and are an ingredient in many 'bio' plant foods found in domestic garden centres, but have yet to be used for industrial agriculture.

Article source: <http://www.cam.ac.uk/research/news/fungus-enhances-crop-roots-and-could-be-a-future-bio-fertiliser#sthash.wLnanFrq.dpuf>

The Minnesota Mycological Society

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