Mycena News

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Speaker for April 16 MSSF Meeting

Shannon Shechter

Arbuscular Mycorrhizal Fungi in Extreme Environments

Shechter has been studying arbuscular mycorrhizal (AM) fungi for 10 years. She began with her Masters degree in soil microbiology from the University of Hawaii at Manoa, studying the effects of phosphorus fertilizer in the production of mycorrhizal seedlings. After her degree, Shechter became

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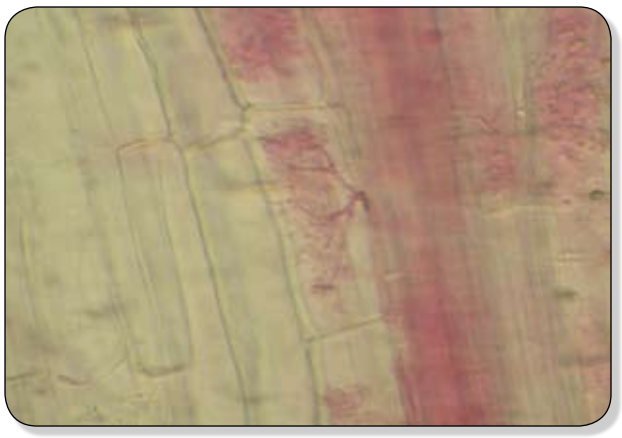
Inside This Issue...

MycoDigest: How Plants Colonized the Land

Kabir Peay

It's understandable that most botanists tend to focus on what's going on above ground. It's the world we can touch and see easily, and it's where the most striking parts of the plant are—flowers, leaves, stems. For most fungi though, private creatures that they are, life really happens below ground, away from the prying eyes of mycologists. We're reminded of this every year when our favorite fungi fruit ever so briefly and then retreat beneath the ground, lying in wait for the next storm. To use a botanical analogy, it would be as if the entire body of the plant—leaves and stem—was below ground, and only the flowers and fruits would occasionally peek their heads into the air. (You can imagine how impatient botanists might get waiting for spring.) Because of this bias, it's easy to think of plants as truly independent creatures, putting out their leaves and basking in the sunshine. In reality though, plants are involved in a constant below-ground battle to pull up enough water and nutrients from the soil to feed their leaves and keep photosynthesis running. In fact, extracting water and nutrients from the soil has been the most important challenge for plants ever since the first green algae left the water and colonized the land. And, ever since plants began to colonize the land, fungi have been there to help.



An arbuscule from a plant growing on serpentine soils. This is the same sort of structure that has been found in fossilized plants some 400 million years ago. **Photograph by Shannon Shechter**

Most people are probably familiar with mycorrhizal symbiosis, a mutualistic relationship between plants and fungi. In some ways, the best analogy for mycorrhizal symbiosis is an economic one. Plants are very good at taking sunlight and converting it to energy (i.e. carbon) through photosynthesis, but bad at getting nutrients and water out of

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MycoDigest is a section of *Mycena News* dedicated to the scientific review of mycological information.

THE PRESIDENT'S POST

I would like to announce that we have a new Books Committee Chairperson, Curt Haney. He's taking over for Lynn Marsh, who has served us long and well with aplomb and dedication. Thank you, Lynn, and thank you, Curt, on behalf of all MSSF. Be sure to buy a book or a poster from Curt at the next meeting; he'd love to clear inventory to make space for new acquisitions, and the proceeds do directly support the numerous programs and activities MSSF has to offer!

Also, a heads-up to what's going on with our revved-up Education Committee. Co-chairs Alice Sunshine and Paul Koski are revitalizing our educational programs to a degree that promises to do our MSSF mission of "promoting and sharing mushroom knowledge" oh so proud! Check out their new and ever-developing outreach program for school curriculums, soon to be posted on our website; and their new "Quick Start Guide" specimen identification form, found in this issue of *Mycena News*, designed to fast-forward our new members, and perhaps even some with longer tenure, in their ability to identify the mushrooms they find.

As MSSF members, we are *entitled* to this newsletter, as well as attendance at Society-sponsored forays, events, and council meetings. We're also *entitled* to join the MSSF Yahoo! group e-mail listserv and the Culinary Group. On the other hand, other than reasonable expectation of maintaining proper civility and decorum, our membership *requires* us to do nothing beyond the paying of our annual dues.

Fortunately for us, MSSF has quite a few members who do plenty more than nothing, and as a result, our membership *entitlements* ultimately pale in comparison to the true value of the MSSF experience. This is the *opportunity* provided by MSSF for personal involvement in mycological projects, forays, seminars, and events, along with the *opportunity* to share our enjoyment of pursuing mushroom knowledge in camaraderie with like-minded, knowledgeable fellow mycophiles. Mushroom knowledge is not worth all that much if not shared. And to be able to share with people who care is a wonderful thing. That's what makes our Society tick!

Uh-oh. I'm starting to vibrate. The morels must be coming. Good thing we've got some forays scheduled. Check out the newsletter calendar for dates and details… Foray Czar Norm knows all!

~DC

Nominations Needed!

The MSSF Nominating Committee is seeking new recruits for next year's mushroom season! Currently, we are looking to fill the following positions in the MSSF Council: Vice President, Membership Co-Chairs, and Secretary. If you are interested in volunteering, or know of someone who would make an ideal candidate for one of the above positions, please contact a member of the Nominating Committee: Carol Hellums / hellums@worldnet.att.net, Curt Haney / lingking@sbcglobal.net, Ken Litchfield / klitchfield@randallmuseum.org.

Looking For A Few Good Logos

We are looking to add to our collection of logo images that we can use for the *Mycena News* (see masthead and back page for nice examples from member Dorothy Beebe), officer business cards, educational materials, and the like. We'd like for you artist types to submit line drawings of mushrooms and perhaps you'll see your art in print. The illustrations must be of fine enough detail that they are recognizable to species, yet not so much that details are lost when the image is highly reduced (down to about an inch or less). Send high quality digital or photocopied prints to jrblair@mssf.org or 895 Sierra St., Moss Beach, CA 94038 by April 30.

Scott Howard's: A Restaurant Review and Adventure

Liana Hain

I was invited out on the town by a girlfriend to watch some short one-act plays last month at the Eureka Theater. So, knowing that I should catch the J-line near my apartment to get to the Embarcadero, I asked two nice young men waiting at the Muni stop for directions to the Eureka Theater. One of the nice young men was an actor in one of the plays at said theater and proceeded to escort me the whole way! I share this story of how my evening began because it is just one of the serendipitous events that took place that night. After meeting up with my friend and seeing some fun short plays, we set out on foot to find a late night snack. We entered one restaurant/club where there was an old model mint condition Rolls Royce parked in the front, but felt 20 years too old and about 1 billion dollars too poor after walking through the door. (Can't remember the name, must have blocked it out.) Although we did not appear homeless, we were ignored by all staff. We promptly left.

Then we walked into Scott Howard at 500 Jackson Street. Oooh, la la. My eyes feasted on the wild mushrooms strewn across the menu, like a pregnant forest waiting for the committed and obsessed fungus forager. The foie gras appetizer featured beech mushrooms, the risotto had beech and hen of the woods mushrooms, the Maine scallops featured maitakes, the Scottish salmon had hedgehogs, and short ribs were slathered in king trumpets. Did I die and was now in fungus forager culinary heaven? This needed immediate research! I interviewed the waiter and Paul Wetzel, the chef de cuisine, and found their source and supplier of this heavenly bounty—Wine Forrest Mushrooms, near Napa. Apparently the chief chef and owner, Scott Howard, is friends with Connie Green, who owns Wine Forrest Mushrooms. Connie is a member of our own MSSF!

When Scott first came out to San Francisco, Connie mentored him regarding which wild mushrooms were best suited for which recipes. Connie has been commerciallly foraging and growing for about 30 years in the hills above Napa. She is a wholesaler and can be reached at wineforrest@earthlink.net but does not sell to the general public. She thinks a great deal of Scott and what he is doing with wild mushrooms at his restaurant.

When I spoke to Scott he confessed that his absolute favorite mushrooms are morels and that he loves to braise and fry them. Next he loves porcinis and sautés them in olive oil and frequently eats them with polenta, and third he loves making king black trumpet pasta with goat and white cheddar cheeses at home. Scott, invite me to your home for dinner! Although he doesn't forage in the forest, he frequents the farmer's market in Marin and gets his bounty of wild mushrooms there. Check out what others have said at http://www.scotthowardsf.com/about.html.

Scott has generously given the Mycena News permission to publish his famous, award winning *Carrot Broth* recipe, which makes five to six servings:

3 cups diced carrots (small diced), use organic to get increased sweetness
6.5 cups carrot juice (suggest Odwalla)
Salt and pepper to taste
1 cup heavy cream (suggest Clairville)
½ tablespoon curry powder

Technique:
1. Put diced carrots in small pot
2. Cover with carrot juice (reserve remaining for later)
3. Cook carrots in juice until the juice is reduced until dry
4. In blender, puree cooked carrots (in small batches) with remaining juice until smooth
5. Return to stove, slowly heat to a simmer
6. Add curry powder and then salt and pepper
7. Add cream
8. Strain through chinoise (fine mesh strainer)
9. Garnish with whipped crème fraîche and black truffle oil

This soup can be deliciously paired with Morton Estate Marlborough Sauvignon Blanc, 2005. All the brand suggestions came from me, not from Scott.

If you are interested in going on a field trip culinary dinner experience to Scott Howard's Restaurant, please let me know and I will arrange it. I can be contacted at liana.hain@ucsf.edu. ❁

Scott Howard is located at 500 Jackson Street, San Francisco. To make reservations, call (415) 956-7040.

MycoDigest continued

the soil. Fungi are pretty well designed for growing through the soil and scavenging for nutrients and water, but not quite so good at getting carbon. As a result, many plants and fungi trade carbon and nutrients much in the same way nations might trade sugar and aluminum. As some indication of the importance of this relationship, approximately 90% of "higher" plants (i.e. flowering plants and conifers) are involved in some type of mycorrhizal symbiosis. But has it always been so?

The earliest land plants evolved from green algae, that living in the water, had little use for specialized structures to absorb water and nutrients. As such, many of the earliest land plants did not have true "root" systems, but instead possessed a modified stem, referred to as a rhizome, and root-like structures known as rhizoids, which served mainly as anchors to the soil. The evolution from primitive land plants to modern flora dominated by angiosperms (flowering plants) and gymnosperms (conifers) can be seen in many ways as a progression towards more sophisticated structures for dealing with life on land, such as a more complicated rooting system and a well developed vasculature that is more efficient at transporting water and nutrients from the soil to the canopy.

Modern plants with extensive root systems still benefit incredibly from associations with mycorrhizal fungi, so it is reasonable to assume that the earliest plants, with their primitive root systems, would have benefited considerably as well. In fact, in an article by D.J. Read and others (2000), the authors point out that there is evidence from species living today that those plants with poorly developed root systems are much more responsive to mycorrhizal fungi than those plants with more finely branched rooting systems. By implication, the earliest land plants with their primitive roots would probably have benefited dramatically from mycorrhizal colonization.

Aside from such logical inferences, there is also extensive fossil evidence that suggests that the first land plants were already involved in mycorrhizal symbiosis. One of the most widespread types of mycorrhizal symbiosis, arbuscular mycorrhizas, is characterized by the presence of hyphae that penetrate root cells and form highly branched structures. Because of their characteristic appearance, these structures are named "arbuscules," from the Latin word for bush (see image). Amazingly, fossilized plants dating from some 400 million years ago show well preserved structures that look identical to modern arbuscules (Remy and others, 1994). Since the earliest plant fossils also date back about 450 million years, during the Silurian Period, it appears very likely that the first land plants had mycorrhizal associations. Furthermore, a "molecular clock" based on genetic mutation rates also place the origins of the Glomeromycota, the phylum of fungi involved in arbuscular mycorrhizal symbiosis, between 450–360 million years ago (Simon and others, 1993).

More evidence that fungi were instrumental in the colonization of land comes from the analysis of plant-fungal symbiosis among "living fossils." While most of the species in the flora today come from groups that evolved relatively recently, there are still a number of extant species that represent the earliest lineages of land plants. These "lower" plants, such as the mosses, liverworts, ferns, and horsetails, still have rhizomes and lack well developed vasculature. Unsurprisingly, a number of these lower plants have well documented associations with a wide range of fungi. While the effect of these associations in promoting plant growth is still a subject of ongoing research, they often involve arbuscular mycorrhizal fungi and produce fungal structures in the root that resemble arbuscules.

Overall, the evidence seems to suggest that the colonization of land by plants was a fungal mediated process. So, while it's easy to look at the flowers and leaves and ignore what's going on below ground, in reality, without fungi all of our land plants would probably still be algae. ❁

Read DJ, Duckett JG, Francis R, Ligrone R & Russel A. (2000), *Symbiotic fungal associations in "lower" land plants*. Philosophical Transactions of the Royal Society of London B, 355: 815-831.

Remy W, Taylor TN, Hass H & Kerp H. (1994), *Four hundred-million-year-old vesicular arbuscular mycorrhizae*. Proceedings of the National Academy of Sciences, 91: 11841-11843

Simon L, Bousquet J, Levesque RC & Lalonde M. (1993), *Origin and diversification of endomycorrhizal fungi and coincidence with vascular land plants*. Nature, 363: 67-69.

Books & Posters

Fungus Books and Posters will be available for sale prior to the next MSSF general meeting in the mushroom identification room. Special discounts will apply to all current members in good standing. Cash, checks, and credit cards accepted and welcome.

Finding Morels is Easy

Norman Andresen

Finding morels is easy...if you look in the right place. Morels fruit when the ground is around 50 degrees Farenheit, usually in the spring as the soil warms, near their food sources,which can be mycorrhizal companions, past or present or cellulose-rich plant materials. Rain or regular watering is normally required to provide the moisture necessary for fruiting but certain circumstances (including underground water sources such as stream banks, swampy areas, hanging aquifers, seeps, and lake shores) can provide sufficient water for fruiting, with rain causing the most widespread fruiting.

In Northern California we have the best luck in burned or logged forest areas above 2,500 foot elevations. The soil warms more quickly at lower elevation and progresses up slope, so fruiting periods can be extended as heat travels higher in elevation. In my experience, the tree line is the upper limit to morel fruiting.

To my mind? The ideal habitat for morels is a dense conifer forest between 4,000–10,000 feet in elevantion, under burnt ground covering, but with the larger trees alive and the ground gently sloping to provide moisture gradients. The forest floor should also be covered with needles to provide humidifying cover. The morels will start to fruit when the soil temperature reaches 50 degrees Farenheit, with precocious fruiting beginning two to three weeks earlier in sunny spots. A rainy spring will do the best with small rains every week or so, as in the 2004 Power Fire, which allowed a marginal habitat to produce in legendary quantities. Generally, at low elevations snowmelt will not provide enough moisture for wide spread fruiting. At higher elevations with good water holding capacity, snowmelt fruiting is possible but not guaranteed.

Locally, morels fruit in several different types of habitats, such as newly landscaped areas, orchards, and among coastal ice plant. The landscaped zones have most often been scraped clean of plants and covered with woody debris, chips, or beauty bark, and irrigated. There fruiting can be during any month and can continue for weeks, I think most often occuring from January through February. A famous fruiting was in Gilroy in July, so go figure. Our local native Morel seems to be *M. rufobrunnea*, which has quite different habits then burn morels; it is a "white morel," but it can show up as blush pinkish.

The orchard fruiting morel is thought to be a mycorrhizal companion of the trees it is fruiting under, often old apple or pear, but olive fruitings have been reported. Generally the orchards have been tilled to remove weeds, which may be the necessary soil disturbance that makes the fruiting, older orchards more likely to produce.

The lifestyle of our quarry is one that involves rapid exploitation of a cellulose or sugar rich habitat. The conversion of cellulose to fungal tissue requires the formation of sclerotium (i.e. resting bodies) in the soil. When the substrate is consumed and sclerotia are formed, some combination of conditions (probably appropriate moisture, critical temperature, and sclerotia density) trigger fruiting body (i.e. ascocarp) formation.

Things that the successful morel hunter considers are substrate, moisture, and temperature. Most hunters develop a mental picture of past successful habitats. Without a stockpile of past finds, a newbie moreller will have to use a more systemic methodology to be successful. A morel hunter asks, "Does this spot provide all the needs of the quarry: food, water, and warmth?"

The habitat will be recently disturbed sometime last summer or fall, such as a burnt or logged forest. Salvage logging or slash piles the second year after the fire are also good, as the wood on the ground and the dying roots in the soil are the food source for the morel. Moisture is also a crucial element in ascocarp development. Having both humidity (i.e. airborne water) and a moist substrate are necessary for fruiting. The humidity can derive from soil moisture if air movement is impeded by a barrier (such as needle cover, brush, or tree cover) to impede the humidity dissipation. Be wary of wind, an enemy of mushrooms, since exposed habitats don't produce well unless we've had a rainy spring.

Now that you have the perfect spot—it has everything: warmth, water, and food—the next question is, "When?" All things being equal, in a normal year you're likely to find morels at sea level from January to February, at 4,000 foot elevations in mid-April, at 6,000 foot elevations in mid-May, and at 7,000 foot elevations and above as late as July.

Slope orientations are important, as this information can allow you to predict fruiting locations and timing. If you find a fruiting of morels on an east facing ridge, you know that they're just starting; but if they are fruiting on a north facing creek bottom, that signals just about the end of fruiting in this area. Typically, the fruiting will last about three weeks at a given elevation, and progresses up slope roughly 1,000 feet a week.

Happy hunting! ❁

MSSF QUICK START GUIDE
for Identifying Mushrooms

This questionnaire is designed to help you get started LOOKING at mushrooms. It is NOT designed to help you find edible mushrooms.

It is safe to handle all mushrooms. However, no one should eat a wild mushroom unless an expert has identified it as edible.

For more information see www.mssf.org, or send email to MSSF Education Committee co-chairs Paul Koski / pkoski04@yahoo.com and Alice Sunshine / asun1@pacbell.net. Please let us know of ways in which we might improve this Quick Start Guide for MSSF members.

With this guide you will:

1 – Collect a mushroom.
2 – Identify a few basic features used by mycologists.
3 – Compare your mushroom to photos and descriptions of other mushrooms.
4 – Bring your mushroom and the completed Quick Start Guide to an MSSF meeting to discuss it with other MSSF members.

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1 - COLLECT SPECIMEN

Dig one or, if possible, several specimens from the habitat. Use a small hand shovel or a knife. Be sure to collect the whole mushroom; dig down to get the bottom. Store the specimen in wax paper or a paper bag; no plastic.

2 – DESCRIBE YOUR SPECIMEN

Complete the questionnaire on the next page about your specimen. This questionnaire covers many of the main external features (morphology) that are visible with the eye,

Make a spore print: Cut the cap off a specimen. Place it gills down on white paper and cover it with a bowl for several hours. Notice the color of the print left by the spores. Notice the design formed by the dropping spores.

3 – COMPARE YOUR SPECIMEN WITH OTHERS ONLINE

Go online to www.mykoweb.com to see photos of fungi. Compare your mushroom to the photos. Read descriptions. Do the descriptions match features you noticed about your mushroom? Notice the variety of shapes, colors, and sizes. Notice the scientific and popular names.

4 – SHARE YOUR SPECIMEN

Bring your mushroom, questionnaire, and spore print to the next meeting of the MSSF. Starting at 7 pm, there is an identification table where you can display your mushroom and discuss your questionnaire with others. Talking with folks about your “critter” is a big part of the fun in fungus.

Mushroom Identification Questionnaire

Size

_____ How wide is the cap? Measure it.

_____ How long and how wide is the stem? (also called the stipe)

Color

_____What color is the cap?

_____What color is the stem?

_____What color are the gills or pores on the underside of the cap?

_____What color are the spores on the spore print?

Shape

_____What shape is the cap? (dome, round, flat, funnel, cone, etc) Draw it in the box.

_____Is the stem wider or narrower at the bottom, or is it straight all the way down?

_____Is there a ring on the stem?

_____Is there a wide "cup" at the base of the stem, maybe underground?

Texture

_____Does the underside of the cap have gills or pores?

_____Is the stem smooth or shaggy or textured?

_____Is the cap dry, slimy, sticky, smooth, bumpy?

_____Are there spots on the cap? How many and what color?

_____Are the edges of the cap shaggy (fibrous)?

Habitat

_____Where did you find the mushroom? in grass, in dirt (soil), on leaves, under trees, or attached to wood?

_____Were there a lot of this kind of mushroom together, or was it alone?

_____If you know plants, what kind of tree or plant was growing near it?

Cultivation Corner: Mushrooms and Fire

Ken Litchfield

Let's discuss a couple of aspects of the relationship between mushrooms and fire. The first is the fire analogy for capturing and growing mushrooms, and the other is about burn morels, coming soon to a Sierra near you.

If you think about the fungal body or the mycelium or the "apple tree," as opposed to the mushroom fruit or the "apple," it is like a living blob of an organism. It is exposed on all surfaces to the environment that, also, tends to be the substrate it is growing on and digesting. This metabolizing blob is very much like a very slow fire that metabolically burns the substrate or fuel it is growing on.

If you have pyromaniac tendencies, then you know that starting and building a fire requires certain principles and procedures to get it going and built up to an easily sustainable and controllable size that is useful for your purposes. You could consider flint and steel or wooden implement frottage, or matches or sparks from a bonfire to correspond to mushroom spores. A flaming torch is like a hunk of robust mycelium, and glowing coals are similar to sclerotia or perhaps a chunk out of a spent fruiting block that has flushed once or twice but not lost all of its oomph.

When you are out collecting mushrooms, you should collect a little of the adjacent substrate as similar tinder material to keep the mycelial fire burning at the same rate. This works especially well with saprobic mushrooms, those living on dead stuff like leaf or wood chip mulch, compost, or wood. (Not saprophytic mushrooms, for there are no such things, as those are plants that grow on dead things.) For example, if you happen to collect some, say, blewits, *Clitocybe nuda*, from a patch of oak leaves, don't just cut off the stipe. Garden giant (*Stropharia rugoso-annulata*), stinky whiffleball (*Clathrus ruber*), oysters (*Pleurotus ostreotus*), and morels (*Morchella esculenta*) cultivate especially well using this technique. Pull up the base with some of the mulch attached and a little more from around the base that contains some of the lavender mycelium. Cut the stipes and put the tops in your skillet basket and put the bases into a damp paper bag with an equal volume of the extra mycelium concentrated mulch. Moisten the whole batch slightly to make it a little damp, but not at all wet, as this can drown the mycelium, especially when it is contained.

Put the paper sack into a plastic bag to keep it from drying out, and put the plastic, unsealed bag in the fridge to keep down bacterial growth and keep the bases from rotting. The bases act like glowing embers as they provide life force to the mycelium coalescing in the bag. They will continue to smolder in the bag like a damp fire smolders without enough oxygen to ignite. As they grow out, the bag will fill with lavender mycelium at which time more dampened oak leaves can be added, like tinder, to a fire. If the weather is cool and damp outside, it is easier to transfer the fire to more damp oak leaves in a pile.

But, rather than adding more oak leaf mulch, it is easier to finely shred some fresh straw, wet it to break the dry surface tension, soak some water into it, and then drain it well so it is damp. This straw acts just like tinder as it is an excellent texture for the mycelial fire to leap onto. Other materials, besides oak leaves, like finely sifted wood chips, can be dampened and added to the straw for a better "burn." Usually, sawdust is way too fine and smothering for the mycelial fire to burn properly and it has to be mixed carefully with other materials. With the linear structure of the straw like struts keeping the fine chips open, more air and dampness can be distributed to the mycelial fire, so it spreads quickly through the open latticework. Just as you don't dump a pile of fine tinder onto a sprouting fire so it smothers or smokes, you want to try to keep the structure of the substrate cake somewhat open, so air and moisture can reach all areas of the cake.

Yes, there is a bit of difference here between a fire and the metabolic mycelial fire, in that the fuel you are adding is moist. The fire needs its tinder dry but the mycelial fire needs dampness for the individual cells in the blob to do their metabolizing.

Ramping up the blob to more mass is, however, like building a fire by adding bigger and chunkier hunks of fuel to it until you have quite large logs roaring in a bonfire. Next, when the blob has fully infiltrated all the new stuff, add medium sized sifted wood chips to your mix, with more straw that hasn't been shredded. The straw stem struts should be solid but cut short to fit into the bag easily, so the mycelium can leap more easily onto the more massive stuff. The wood chips have to be soaked longer to get moisture into their centers, but still drained well enough so no extra water hangs around to drown things or provide an anaerobic pool for bacteria to fester.

If you have a cool, damp spot outdoors, especially during the wet cold winter weather where you can build your mycelial fire, then first use the fridge method to get things started and then use that culture torch to ignite the substrate bonfire in your outdoor patch. Or build your fire outdoors from the start!

First, the soil of the patch needs to be mounded a little above the surrounding terrain so there is good drainage and no sitting

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Cultivation continued

water. The ground soil needs to already be moist so it doesn't suck moisture out of the patch above it. Next, place a layer of large, chunky wetted and drained wood chips down about 3 inches deep as a drainage layer and source of fuel when the mycelial fire gets roaring. On top of that, add a mix of whole straw and medium-to-large damp wood chips about 6 inches thick. This layer will be prime burning territory for the mycelial fire when it gets chugging. On top of that layer you can put about 1–2 inches of finer chips and shredded straw, then top off the whole thing with a casing of straw. The straw casing acts as a humidity protection; it will dry out but allow the upper layers of the patch to remain damp, so the mycelium can grow right to the surface without drying out. Flat wooden boards laid on top could also serve the purpose and it is easy to check the progress by lifting them ever so often to see if the mycelium is spreading across the bottom of the board's surface. The whole bed of fuel should be about 3–4 feet by 4–6 feet wide and around 9–12 inches deep.

The wood chips we are talking about are the standard issue you can get from tree trimmers, who are always seeking convenient delivery locations to save them the gas of a trip to the dump and the dump fee. The straw is available from stables or Golden Gate Fields in Berkeley, for free if the bale got wet or $6 each for dry ones. You probably only need one for your typical backyard operation, but this depends upon how big you want to ramp up your mycelial bonfire.

To this layered bed of fuel, you add your sparks or torches of mycelial fire. If you have only one small hunk of mycelial culture, don't make the bed so wide that there is so much material that bacteria and other fungi start burning it also, giving your culture too much competition. Most importantly, distribute what you have pretty evenly across the whole bed, but especially locate the mycelium at all depths of the bed. (When you build a pile of fuel for starting a fire, typically, you make it teepee style with the small tinder propped up high so you can get the match under it and the larger and larger tinder and sticks on higher, since the heat from the flame rises to ignite larger and larger stuff.)

With the blob, you want to insert it down into the pile at all levels so it can burn laterally though the fuel at the level it likes the best, until it meets itself and coalesces back together into a big blob. Surrounding each chunk of mycelium with a cylindrical core of the straw-little chip mix helps to act as tinder for the blob fire to leap out horizontally at all levels. Conditions of moisture and air differ at different levels in the pile; the amount of water the pile gets and the heat and dryness of the weather will determine at what level the life force or the "fire" of the mycelium burns. Say it grows through the whole pile under prime conditions and then you go on vacation or the summer is extra hot and the upper layers of the pile are drying out more; the blob's life force will travel down the mycelial rhizomorphs to deeper zones. Then, when more water is provided, the mycelium can travel up the rhizomorph channels very quickly. Sometimes the mycelium can appear to be dead in the upper levels, but when moisture returns the life force seems to run right back up through those channels as long as the whole bed hasn't been totally parched.

If the weather is very wet and the pile gets sogged, it might need fluffing with a pitch fork to get enough air into it so the mycelium can breathe. The pile shouldn't be turned. Just spear the fork into it horizontally at different levels and lift a half inch to fluff in some air. If the pile is too airy in hot weather, it can dry out too easily and may need to be compressed by spearing it vertically with the fork to the hilt of the tines to push down the chips.

Once your bed of substrate has been fully infiltrated with the blob, more fuel can be added to the fire periodically. Wet more small wood chips and spread them in a layer 2–3 inches deep on top of the whole bed. Then use a spading fork to stab the bed vertically through all layers and twist the fork a quarter turn as you pull it out. Move over next to where you just twisted and repeat the "stab and twist" again until you've done the whole bed. This process breaks open the blob matted mulch, allowing the fresh new layer of stuff on top to drop down into the twisted openings, and feeds the mycelial fire within. Within a week or so, the blob will leap up and invade into the new stuff.

When you want fruiting, use a Foggit nozzle on your hose to wet the bed of mulch so it breaks the surface tension and soaks up the water like a sponge. It is best to wet it several times per day for several days until the whole bed is soaked, but the soil under it is not getting too wet. If you try to water the bed in one sitting, most of it won't get the surface tension broken well enough and the water will run right off. Once the bed is soaked and you keep the humidity high by periodically fogging the whole area, primordial button blobs will develop and grow into mushrooms that you can harvest by the armload. Think of the fogging procedure like pumping a gasoline mist into a burning fire. It makes the fire really productive. And with that extra water the blob's mycelial fire that has smoldered through the whole bed of fuel can ramp up to flush into a bunch of mushrooms.

Talk about a flush of mushrooms, soon it's going to be burn morel season! If things work out right, you'll be going up to selected burn zones in the Sierras where there's nothing living except a few fern fiddle heads curling up out of the ashes along moist ravines—and a stubby Gumby Christmas tree forest of

Continued on page 11

Foray Recap: Briones Regional Park

Cordelia Chadwick

A group of approximately ten MSSF members set out with experienced trip leaders Norm Andresen and Ken Litchfield to prowl Briones Regional Park for mushrooms on a sunny Saturday in February. Before even leaving the parking lot, we spotted a few fungal beauts amid wood chips and dog poop. The day proved sufficiently warm, such that jackets and long sleeves shed themselves as we entered the main trail. Norm advised the group on the differences between mycorrhizal and ectomycorrhizal fungi, and suggested we stick to the tree line. Apart from what Ken called "Canis droppems" or some such, we encountered only "pedestrian" fruiting bodies. This group of beginners, however, was surely excited by the first *Mycena sp.* in the dewy, shaded grasses, as well as the *Psilocybe coprophila*-covered cow pats…alas, inactive.

Cows

Briones offers visitors four main trailheads, as well as several looping options. Whether spurned on by lowing cows—who may, incidentally, graze throughout Briones Park until it's time for slaughter—or a premonition that there was more in store, Norm led the group to do some trailblazing of its own, cutting up, sometimes directly up, one of the steepest hills in the park. On our way to the top, we spotted one candy cap, lots of turkey tail, a bundle of glowing jack o' lanterns, and even the ever popular strap fungus, which I almost decimated with my big ol' boots. Like a fawn in heat, Norm leapt over brambles and rotting wood to uncover some chanterelles... albeit a hoax to gather up stragglers. Ken brought over some sulfury specimans and pink mold…which a few of us tasted—the sulfury one, that is—then spit and rinsed. As the sun crested at the three o'clock hour, we made our way down a gravelly path, spotted Mount Diablo…or was it the Sierra Buttes?…and thanked Norm and Ken for their generosity of time and for sharing so much wonderful fungal knowledge with rascals like us. ❁

Clean fingers hold a cow pat...covered in *Psilocybe coprophila*

Ken Litchfield and the jack o' lanterns

Cultivation continued

cinder mimicking burn morels as far as the eye can see. Last summer's fires produce this spring's burn morels. And since these patches only last one season, they are special places that you can share with your friends and know they won't go back and raid your patches year after year. With every burn site there is a science and art to predicting warmth, moisture, and humidity levels at particular elevations and exposures to find the height of the flush in a particular area. So if everything is cooperating you'll want to set aside some weekends to participate in some of the MSSF morel forays, scheduled and unscheduled, especially San Jose camp. Look out for spring porcinis, too.

If you go morelling, you can also collect morel mycelium for cultivation purposes. When you pull up a morel you typically cut or tear off the dirty base and toss it aside to keep it from contaminating the skillet bags. Yes, bags because in a good burn you'll be filling more paper grocery bags than you can carry. This isn't the back-East-skimpy-afternoon of morel picking where a good haul is twenty morels. Here twenty pounds of morels is the low end of the scale. At least one of your bags, a plastic one, should be dedicated to the cut bases with a little bit of extra ashy substrate to keep them company. By the time you're done that bag can contain quite a mass of inoculating mycelium that you can put into your garden or with which you may try a few other techniques. Keep the bag in the cooler with the other grocery bags full till you get back home and can ramp them up by the techniques described above. There is a lot of secret and mysterious lore to growing your own morels, and it is worth the little extra effort to collect and keep your morel bases as you harvest the tops for your skillet bags.

If you happen to collect any porcinis, and you may encounter a past prime, please keep them in a separate bag and bring them back, also. We're doing some cultivation experiments and can use them. Of course, if you want to share some of the fresh ones, we're doing some culinary experiments, too. Hey, the morels, too, for that matter! ❁

Education Committee

Do you have fungi-related educational materials to share? Are you interested in getting involved with MSSF's newly minted Education Committee?

If so, contact Committee co-chairs Alice Sunshine / asun1@pacbell.net and Paul Koski / pkoski04@yahoo.com.

Speaker continued

the Director of Research and Education at Reforestation Technologies International in Salinas, CA. There, she headed the laboratory and field research program to study the performance of AM fungal inoculum in restoration and agricultural applications. Currently a fourth-year graduate student in the Bruns lab at UC Berkeley, Shechter studies the role AM fungi play in plant adaptation to serpentine soil. Shecter's lecture will cover topics in "Arbuscular Mycorrhizal Fungi in Extreme Environments."

Library News

The MSSF Library Committee wishes to thank Dr. Bill Freedman for his recent donation of a CD titled "Wild and Cultivated Mushrooms: A Mushroom Grower's Virtual Visit to China." This CD will be accessioned into the library and available for members to borrow. Dr. Freedman recommended that the MSSF Library start a CD collection for members' use—an excellent idea! Thank you, Dr. Freedman! Thus, a call to members: the MSSF Library welcomes your recommendations (and donations) of pertinent CDs and books. Many thanks!

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MSSF Calendar, April 2007

Monday, April 2, 2007, 7pm. Culinary Group Dinner. Hall of Flowers, Golden Gate Park, SF. $14. Reservations are required and must made be no later than Friday, March 30. Call Pat George at (510) 204-9130 or email plgeorge33@yahoo.com to make your reservation. Bring your own tableware, beverage, and an appetizer to share. Our last dinner before the summer break (June, July, August) will be May 7, but fall 2007 dates include September 10, October 1, and November 5.

Tuesday, April 16, 2007. MSSF General Meeting. Randall Museum. 7pm mushroom identification and refreshments (provided by the Hospitality Committee). 8pm, Shannon Shechter will discuss **Arbuscular Mycorrhizal Fungi in Extreme Environments**.

May 4-6, 2007. San Jose Family Camp Foray. Registration for the weekend includes six meals from (Friday dinner to Sunday lunch), lodging, group forays, and Saturday program. The cost is $116 for MSSF members, $70 for children, and $136 for nonmembers. To register, write a check to MSSF and send to Tom Sasaki, 1506 Lyon St., San Francisco, CA 94115. For questions, contact Tom at (415) 776-0791 or sasakitom@sbcglobal.net.

May 19–20, 2007. Morel Car Camping Event. Basset Fire Area. Camping at the Chapman Creek Campground, eight miles east of Sierra City on Highway 49 near Yuba Pass. Saturday potlock dinner and camp fire. On fairly steep slopes with a large elevation range and some tree covered creeks, this area is a known habitat for morels! For more information, email Norm Andresen at n.andresen@comcast.net. Cost is campground charge.

Deadline for the May 2007 issue of *Mycena News* is April 15.
Please send your articles, calendar items, and other information to: mycenanews@mssf.org