

Mycena News



The Mycological Society of San Francisco September 2007, vol. 58:06

MSSF General Meeting
September 18, 2007

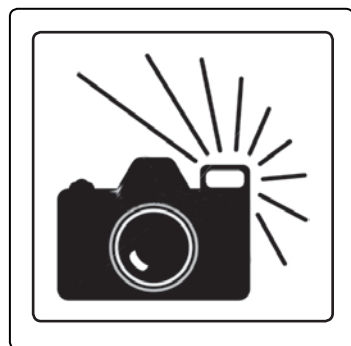


Photo Contest and Showcase

The rules are simple. Each entrant will have up to 10 minutes to show 10 images. Images can be either slides or digital. (The time and image limit may change based on the number of entries.) Please be prepared to share the ID for each image. You must register as an entrant by September 11, and be a MSSF member in good

Continued on page 7

Inside This Issue...

MycuDigest.....	1
Photo Contest.....	1
President's Post.....	2
Fungus Fair Planning.....	2
Cultivation Corner.....	3
On the Stinkhorn Trail.....	5
MSSF Culinary Group.....	6
MSSF Fall Calendar.....	8

MycoDigest: Are All Fungi Everywhere?

Kabir Peay

While this may seem like a ridiculous question, the subject is actually a source of recent debate in the academic world. Stated more precisely, the argument centers around the degree to which fungi are ubiquitous in suitable habitats. While no one would argue that *Boletus edulis* should be found growing on your carpet (although I wish it grew on mine), it does seem like *Penicillium* mold is ubiquitous as far as my bread is concerned. While strictly speaking it is far fetched, yet the idea that fungi are everywhere has a degree of acceptance. Take, for instance, this passage from the text *Fungal Biology: Understanding the Fungal Life Style*, which states that, "Fungi are virtually everywhere; as a result of their very effective means of reproduction and spore dispersal, fungi are always present when a suitable substrate becomes available." (p. 2)

The idea that microbes, such as fungi and bacteria, are relatively ubiquitous was first articulated by a Dutch microbiologist, Baas-Becking, who in 1934 hypothesized that, "Everything is everywhere, but, the environment selects." The belief that the world is awash in an unlimited sea of microbial propagules waiting for a suitable habitat to open up has profound implications for ecology and evolution.

And, until quite recently, the Baas-Becking view of the microbial world was accepted without much challenge. However, the support for Baas-Becking was primarily based on morphological observations, which are notoriously poor at separating the vast majority of fungal and bacterial species. It's easy to see how



Are we awash in a sea of fungal spores? The tuning fork basidia of *Dacrymyces palmatus* & conidiophore of *Penicillium sp.* produce copious microscopic spores with the potential for long-distance dispersal. Photos courtesy of John Taylor and Tom Bruns

Continued on page 4

MycoDigest is a monthly feature of *Mycena News* dedicated to the scientific review of recent mycological information.

THE PRESIDENT'S POST



Greetings to all! As you probably know, David Campbell has passed on the role of President to me beginning this July. I'm looking forward to serving as your President for the next year, perhaps longer. I can only hope I will do as good a job as David has done. Please join me in expressing our deep gratitude for his excellent service to the Society and in hoping that he will stick around to lend his good advice and support.

I am writing my inaugural President's Post from the cool climes of the Pacific Northwest, at a laundromat in Port Townsend on the Olympic Peninsula, to be exact. My wife and I are on a two and a half week road trip to British Columbia. It has been a relatively dry summer here, not to mention we've spent much of our time thus far in the high desert of northeastern California and eastern Oregon, so mushroom hunting has not been a priority. However, on a lovely four-mile stroll through the wildflower meadows of Mount Rainier I spotted some beautiful *Boletus edulis*, small buttons with no worms. Yum! Besides some perennial polypores, those have been the only fruiting bodies I've seen on this trip. Anyway, they were a nice teaser for the season to come!

As the mushroom season begins ramping up, so does the Society. This is the first *Mycena News* since May, our first meeting on the 2007 Fungus Fair is this month, local and long-distance forays are being arranged as you read, the Culinary Committee will soon enjoy their delectable dinners, our Education Committee is planning various instructional workshops, and several other behind-the-scenes activities are revving up. Clearly a lot of work is being done and has yet to be done so that we can fulfill our mission of education and camaraderie—the heart of MSSF. As a solely volunteer organization we heavily rely on folks like you to help us out over the next several months. Please consider volunteering in some capacity this year. You can be of great help by spending just a few hours at the Fungus Fair or other event. If you have more time, we have several committees that can use an extra set of hands and ideas. If you

aren't sure how you can help, please feel free to talk to me or anyone else on the Council to see where you might fit in according to your skills and time.

Wishing you all a good fall and winter in the woods! Tally ho!!!

~ J. R. Blair

Fungus Fair 2007 Planning Meeting

The date has been set for the event—December 1 & 2, Saturday and Sunday at the Oakland Museum. We will be setting up on Friday, November 30, from about 4pm on, as usual.

The first planning meeting is scheduled for Tuesday, September 25, at 7:30pm at OCM. Everyone welcome. Feel free to send any suggestions for your area of interest.

SF Botanical Gardens Summer Garden Fair Recap

On Saturday, August 4 the San Francisco Botanical Gardens had their annual Summer Garden Fair. Local plant, gardening, and natural history societies and institutions were invited to talk to the public, demonstrate knacks and know-hows, and display goods and wares.

The Mycological Society of San Francisco had two tables with the help of Ron Pastorino, Lou Prestia, Norm Andresen, and Monique Carment. They promoted the Society, answered questions, ID'd mushrooms, compared foraging stories, sold merchandise, prevaricated about patch positions, and checked out the other booths and the SF Gem and Mineral Society's annual Gem Show in the Hall of Flowers. A good time had by all.

~ Ken Litchfield

Cultivation Corner

Ken Litchfield

Here it is again, the beginning of a new season of Mycological Society meetings, culinary dinners, forays and fairs, featuring all things fungal and mushroomy. Over here in the Cultivation Committee Corner we have our main activity, the Mushroom Cultivation class at Merritt Community College in Oakland.

Each Sunday, August 26 to December 16, except holidays, from 10am to 2pm, we meet at the Landscape Horticulture Department in Room H108 to practice mushroom cultivation. From capture of wild- or grocery-foraged mushrooms to ramping up on various media and substrates, to fruiting-out or planting-out in sterile lab or natural garden or woodland conditions, we cover all aspects. We learn how to make spice jar and baby food agar containers for sterile capture. We also make dowels for log plugging and grain jars, and bags of straw, wood chips, compost, manure, and other more specialized substrates for ramping up captured mycelial mass, using procedures and materials convenient to your home kitchen canning operation. We practice pressure cooker, microwave, and hydrogen peroxide methods. We also capture and grow out mushrooms by non-sterile, organic methods for funging directly in the garden or other natural setting. We learn techniques for growing the usual saprobic mushrooms like oysters, reishi, chicken and hen of the woods, lion's mane, garden giant, stinky whiffle balls, blewitts, or buttons and shaggies that grow on dead stuff like logs, mulches, and compost. We also grow the more unusual substrates and specialized techniques for the parasitic fungi like luminous honeys, bug brain detonating *Cordyceps*, and corn kernel detonating huitlacoche. We also cover the secrets of mycorrhizal mushrooms like porcinis, chanterelles, candy caps, and truffles and the opportunistic species like morels, which have multiple means of nourishment.

Since we assume you may know nothing about mushrooms when you start, or may know a lot about certain aspects but want to know more about others, we cover all the associated reasons for growing mushrooms. We collect, ID, prepare, dry, and preserve mushrooms for culinary and herbal uses; cook and eat the edible ones, make infusions, decoctions, and tinctures

from the herbal ones; and learn how to sample the questionable ones. Our death cap taste-testings are to die for. We learn about identification and taxonomic relationships of fungi in order to domesticate new cultivars. We make spore prints for ID-ing, culturing, and artistic endeavoring. We cover mushroom dyes, paper, felt clothing, pyrotechnics, soil building, compost making, mycoremediation, ecology, ethnology, and mushroom lore, lore, and more lore.

Utilizing the facilities of the Merritt Community College Landscape Horticulture Department, we have classroom computer and AV equipment, lab and storage area with sterile transfer hoods, greenhouse space, organic and permaculture garden space, raised beds, and campus woodland and grassland acreage for collecting. We start this season with a straw bale mushroom igloo, which is part of our woodland Miwokian mushroom village that we built at the end of last semester and is now ready for inoculation and cultivation experiments. We have a special strain of corn patch planted at the end of last semester now maturing and getting ready for huitlacoche and



Students in the Merritt College Mushroom Cultivation class construct a mushroom igloo in the woods

corn grain jar experiments. We maintain a native mushroom trail through woodland, grassland, and chaparral. And we have lots of garden and wild patches laying dormant and waiting for the first rains. Not to mention, we also have special field trips and mushroom events.

The class is designed so you can take it as a beginning class and repeat it as an intermediate or advanced class. Though the course is set up so that you must take the beginning class as prerequisite even if you have previous experience, this allows you to take the class repeatedly and to use the facilities for your own special interests or projects—we have students with all levels of expertise and experience. It is a great opportunity to socialize with fellow mushroomers while practicing your favorite pastime.

If you would like to participate in all of this for a grade you can get two community college credits for it, or you can take it

Continued on page 5

MycoDigest continued

the mistaken attribution of European names, such as in the case of early *Amanita phalloides* records in the U.S. (Pringle & Vellinga 2006), could lend weight to the idea of fungal ubiquity. Now, however, the popularization of DNA-based techniques to accurately identify morphologically simple organisms has allowed microbiologists to begin rigorous testing of key predictions of the Baas-Becking theory. Recent research has focused primarily on two predictions. The first and more evolutionary prediction is that microbial organisms should not exhibit the same biogeographical patterns observed in plants and animals. The second, more ecological, prediction is that microbial communities will show very little species turnover at small spatial scales.

Biogeography, the observation of geographical patterns in the distribution of organisms, played a major role in Charles Darwin's and Alfred Russel Wallace's discovery of evolution by natural selection. Wallace, for instance, noticed a consistent break point in the similarity of flora and fauna between nearby islands in the Malay archipelago. The line, named after Wallace, is a channel of deep water that marks the boundary between the Sunda and Sahil shelves and is mirrored by the Australasian and Asian biota. Because these land masses were never joined they had separate evolutionary histories and evolved separate biotas. According to the Baas-Becking hypothesis, no barriers exist to microbial dispersal so we should not expect to see such clear geographical patterns of relatedness among microbial species.

So what do molecules tell us about fungi? A recent review of *Examples from the kingdom Fungi* by Taylor et al. (2006) finds quite conclusively that fungi are not everywhere. They show that for even the most widely recognized fungal morphospecies, such as *Schizophyllum commune* or *Saccharomyces cerevisiae* (brewer's yeast), when analyzed at the molecular level each global morphospecies breaks down into clear patterns of geographically restricted genotypes. In another example, patterns of genetic relatedness among matsutake trace the route they must have followed after evolving in North America and migrating across the Beringian land bridge into Europe and Asia along with their coniferous tree hosts (Chapela & Garbelotto 2004). These examples show quite clearly that, even for species with globally distributed habitats, there are significant barriers to dispersal, which lead to endemism patterns similar to those found for plants and animals.

The second, aforementioned, prediction rests on the idea that if microbes disperse ubiquitously, the distribution of these species should be very even within suitable habitats. And, because microbes are small, almost all of the species within an assemblage should co-occur over very small spatial scales. If this is true, we would expect to find almost all of the species

in a community within a very small area, and would discover few if any new species by sampling larger areas. Counting the number of species from smaller to larger areas produces something called a species-area relationship, and the rate at which species increase with area has important implications for the conservation of both biodiversity and ecosystem function. For example, if most fungi are present in very small areas, we shouldn't worry that destroying large amounts of habitat will reduce fungal diversity. While this idea may sound preposterous, a study by Fenchel and Finlay (2004) found as many morpho-species of protists in a single lake as had been previously described throughout the entire globe.

Two recent studies on fungi, one by Greene et al. (2004) and Peay et al. (2007) attempted to create species-area relationships for fungi using molecular data. Both studies found significant spatial turnover of fungi; however, they differed in the strength of the species-area relationship. Green et al., working with soil ascomycetes, found a species-area relationship lower than that commonly observed for larger organisms. Peay et al. looked at the species richness of ectomycorrhizal fungi on patches of trees that ranged in size from a single tree to over 10,000m² and found a rate of species increase much closer to that observed for plants and animals. While arguing about which study is more correct is the biological equivalent of counting angels on the head of a pin, taken together these studies show that, even at small scales, fungi do not disperse ubiquitously and can exhibit levels of spatial turnover equivalent to plants and animals.

Both the evolutionary and ecological evidence strongly suggest that fungi may not disperse quite as easily as was previously believed. At larger scales this dispersal limitation leads to genetic diversification and the endemic mycofloras that are beginning to be described across the globe, and at smaller scales to the

Continued on page 7

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On the Stinkhorn Trail: Hawaii, January 2007

Taylor Lockwood

It hadn't been since the *Grifola* shoot that I booked a flight for just one mushroom. For an upcoming project, I needed a good photo of *Aseroe rubra* and from all I could gather (if it rained) they would be out. Moreover, if I didn't find any there was a consolation prize: it was Hawaii!

So, Medea and I planned, booked the flights, and flew over there, even though I knew the odds were stacked against me. It was unusually dry. My contact, Dr. Don Hemmes from the University of Hawaii, couldn't be there to show me around. And all I had to go on was some information I had scribbled down from a phone call to him. Once again, I had set up a mushroom hunt on a whiff and a prayer, and it wasn't looking too promising. However, as we slept the first night in Hawaii, it started raining the kind of rain that stinkhorns love.

In the morning, I did manage to contact one of Don's students, Russell Shiohita, who offered to show me some hunting spots. But after a day of much driving and searching, we came up with no *Aseroe rubra*. The next day I found a different stinkhorn, *Dictyophora cinnabarina*, through another tip from Russell.

But *Aseroe rubra* was what I was after, so I decided to call him again. After some thinking, he remembered that he and Don had found some in Honoka'a, which was fairly close to Hilo. The next morning, I got up in the dark and was out the door at 6am to head north.

The details, as he told me, were community park, near the parking lot, away from the gymnasium, up a hill, in the grass. So I went to Honoka'a, found the park, the grass, and up the hill I went. As I was just getting to the intended location, I saw a city worker coming toward me on a big riding mower! All I could think was that my only chance to find *Aseroe rubra* had been mowed down just before I arrived.

My only consolation after walking and sniffing around the

whole park was that they probably hadn't fruited anyway. But mowed or not, there was nothing to see and photograph. So, I made one more call to Russell, and over my cell phone he guided me to the exact location where he and Don had found them before. However, after several more minutes of circling around (and sniffing, of course), I found nothing.

It was time to get in the car and head back to Hilo, but I refused to give up on what seemed to be a wild goose chase. I walked around one last time in a little wider circle looking in the trees and vegetation surrounding the lawn and then, bingo! There was one single, beautiful, little *Asero rubra* with no others (or eggs for that matter). I spent the next half hour or so at a photo-mycological feast, with the mushroom and a few flies to commune with. I took every possible still shot and video capture I could think of. Then, as I drove down the road, I savored not only the moment, but also a lifestyle of wild gambles that, most of the time, keep paying off. ☘

Cultivation continued

for no credit and participate as your schedule permits. The one thing you must do to participate, however, is register for the class through Merritt to pay for the use of their facilities. All of this costs \$42 for the semester. That works out to about 65 cents an hour, perhaps the least expensive and most fun activity in the Bay Area if you're a natural history buff.

To register you need the Class Name and Course Number—Mushroom Cultivation LH045A—and the Class Code M0951. The intermediate and advanced classes are 045B and C and the class codes are M0952 and M0953 respectively for those of you who have taken the beginning. To enroll you can go to the www.peralta.edu website and click on "Enroll Now!" under the "Quick Links" and follow the directions. Or register in person at Merritt College's main campus.

Last chance to register for the fall class is Saturday September 8, but we start Sunday August 26, skip Labor Day Sunday, September 2, and start again Sunday, September 9.

Merritt Community College is located in the Oakland hills above the intersection of Highways 13 and 580. It is on Campus Drive off Redwood Road between Highway 13 and Skyline Boulevard. You can take BART to the Fruitvale Station on the Fremont–Dublin/Pleasanton Line, then transfer to Bus 54 from Fruitvale Station to campus for \$1.75, minus the station transfer worth 25 cents both ways. For more info contact me at klitchfield@randallmuseum.org.

I hope to see you there. ☘



The stinkhorn mushroom, *Aseroe rubra*.
Photo courtesy of Taylor Lockwood

MSSF Culinary Group

Pat George

Did you know that the MSSF has a lively group of members devoted to the pleasures of the gastronomical aspects of mushrooming? Culinary Group members plan and execute a dinner at our meetings each month on the first Monday night, with some exceptions, from September to May, except for December, when we join the general group for the sumptuous holiday feast.

Members of the group receive notice of the upcoming dinners in the calendar section of the *Mycena News* and are sent its menu before the dinner by e-mail or by US mail. Reservations are required for all attendees and must be made in a timely manner by phone or e-mail. We meet at the Hall of Flowers in Golden Gate Park, and begin at 7pm.

We are united in our love of cooking as well as our love of mushrooms. Participants contribute to the dinner either as part of the team that prepares it or by bringing an appetizer to share. At meetings members contribute ideas and suggestions for the upcoming dinners, and they volunteer to do the cooking. The aim is for "chef-for-a-night" members to plan and prepare foods they love and to share them with the group. The cooks are reimbursed for the costs of their ingredients.

Traditionally, these dinners have been designed to take advantage of the wild mushrooms available at the time, as well as the best and freshest food of the season. Generally, the menus are centered on mushrooms, may have an ethnic food focus, or center on a special main ingredient or holiday near the time of the dinner. The dinners are generous and grand from the pre-prandial punch and appetizers to the coffee (decaf, of course) and dessert. All courses are prepared by volunteers.

To be part of the feast and fun you must be an MSSF member in good standing. There is a Culinary Group membership fee of \$12 (\$6 for seniors), with a meal fee usually of \$14 per person to cover the rental fee for the venue and the dinner's ingredients.

The Culinary Group is a participatory cooking group. Members should expect to take part in the preparation of the main dinner at least once a year. We also volunteer to help with special MSSF events such as the Holiday Dinner, the Mendocino Woodlands Foray, and the annual Fungus Fair. To show you just how special our dinners are, here is one of our menus from last mushroom year. (Making a choice from such riches was not easy.)

A Beautiful Spring Menu for May

Punch / Salad / Roasted Lamb / Morel & Garlic Mashed Potatoes / Asparagus / Candy Cap Mushroom Cheesecake

Come join us, you lovers of cooking, for good food and conviviality. For more information, contact Pat George at (510) 204-9130 or e-mail plgeorge33@yahoo.com. ☘

Education Committee Update

Do you have or know of lesson plans or teaching resources about fungi that you would like to share with others? The MSSF is preparing a sharing web page to promote teaching K-12 students about the often mysterious, widely misunderstood Kingdom of the Mycota. Please contact Paul Koski at pkoski04@yahoo.com or Alice Sunshine at asun1@pacbell.net.



OAK WOOD CABINET designed and constructed by David Moon for the MSSF library in about 1986. The cabinet's upper compartment is for oversize books, and the lower section has six fixed shelves. It measures 8' 4" tall, 40" wide, and 12" deep.

The cabinet can be viewed at the first MSSF General Meeting, Tuesday, September 18, between 7–8pm in basement of the Randall Museum.

Asking price is \$300 or best offer.

MycoDigest continued

patchy distributions of fungi that we notice out on forays. Does this mean that fungi aren't microbes, or does it mean that microbes in general aren't everywhere? In regards to the former, the jury is out. In many ways fungi are typical microbes—their spores are small (often <10µm) and disperse easily, and their hyphae are also microscopic (<5µm diameter). However, fungal individuals can grow quite large, occupying territories that can be meters in size, and produce fruit bodies that can be gigantic. As for the latter, the weight of the molecular evidence being collected from bacteria, phytoplankton, and protists are also showing the same patterns of biogeographic differentiation and spatial turnover. This suggests that dispersal limitation is important no matter how small you are. ☘

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Green, J.L., Holmes, A.J., Westoby, M., Oliver, I., Briscoe, D., Dangerfield, M. et al. (2004). *Spatial scaling of microbial eukaryote diversity*. *Nature*, 432, 747–750.

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Pringle, A., E. C. Vellinga. (2006). *Last chance to know? Using literature to explore the biogeography of and invasion biology of the death cap mushroom Amanita phalloides*. (Vaill. Ex Fr. :Fr) *Link. Biological Invasions*, 8: 1131–1144.

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Photo contest continued

standing. The best three photos will qualify for a prize TBD. We've got some terrific photographers in the MSSF. Give us your best shot!

To enter the contest, contact Mark Lockaby by phone at (510) 387-5957 or e-mail marklockaby@sbcglobal.net.

MYCOLOGICAL SOCIETY OF SAN FRANCISCO - Membership and Membership Renewal Application

New Members please fill out as much information as you can. Members who are renewing need to fill out only the blanks for which information has changed within the last year. Please check the current Roster to see if any of your address, phone, and e-mail need updating!

Name 1: _____ Home Phone: _____

Name 2: _____ Business Phone: _____

Street/Apt#/PO: _____ Cell Phone: _____

City: _____ E-mail 1: _____

State: _____ E-mail 2: _____

Zip Code: _____ Interests: _____

New Membership? _____ Renewal? _____

Membership type: _____ Adult/Family (\$25) _____ Senior/Students (\$20) _____ Electronic (\$15)

If sending a check, please make it out to "MSSF membership" and mail it, with this form to: MSSF Membership, c/o The Randall Junior Museum, 199 Museum Way, San Francisco, CA 94114

If paying by Credit Card, please provide the following information:

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September 2007, vol. 58:06

MSSF Calendar, September 2007

Monday, September 10, 2007, 7pm. Culinary Group Dinner. Hall of Flowers, Golden Gate Park, 9th and Lincoln, San Francisco. No reservations necessary as this is our annual potluck (forget your memories of those insipid bean casseroles; this is food to cheer about!). It's your chance to fix your favorite dish and impress us all. Or try something new. Make enough to share with 8–12 people. Bring your own tableware (the Hall of Flowers does not provide utensils, dishes, etc.) and beverage. We'll be back on our usual first Monday of the month schedule in October.

September 18, 2007, MSSF General Meeting. Randall Museum. 7pm, mushroom identification and refreshments provided by the Hospitality Committee. 8pm, MSSF members will participate in a photo contest and showcase. If you would like to participate, contact Mark Lockaby at marklockaby@sbcglobal.net.

November 17–19, 2007, Mendocino Woodlands Foray. Special guest Daniel Winkler will be in attendance. Stay tuned for details.

December 1–2, 2007, MSSF Fungus Fair. Oakland Museum. For volunteer opportunities contact Monique Carment at moniquecarment@yahoo.com.

February 9, 2007, Marin Mushroom Mania. Marin Art and Garden Center. Details forthcoming.

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