

Speaker for
 Tuesday,
 May 18th 2004
 MSSF Meeting

Dr. Tom Bruns
 Observations on the Natural
 History of Ectomycorrhizal
 fungi

Animals and plants have a rich body of literature that addresses their natural history: how they make a living, how they compete, how they disperse, and who their natural enemies are. Unfortunately, the same cannot be said of many fungi. Usually we are lucky if we know when and where to find their fruiting structures; other parts of their lives remain hidden below ground or buried in a substrate like wood or dung. For mycorrhizal fungi the situation is particularly poor, because they are often difficult or impossible to grow in culture, and

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Myce^{na} News

The Mycological Society of San Francisco

May, 2004, vol 56:04

MycoDigest

MycoDigest is a section of the Myce^{na} News dedicated to the scientific review of recent Mycological Information

The Biggest Mushroom?

by Else C. Vellinga (macrolepiota@comcast.net)

“How big can a mushroom grow?” – my favorite question from the children at the fungus fair! There is always a clump of *Gymnopilus spectabilis* to show how huge our local mushrooms can grow, but still that is half the size of the record holder, *Termitomyces titanicus*. Caps more than 3 feet wide are no exception! And these fungi are good to eat too!

Unfortunately we have to travel quite a bit to collect those giants. *Termitomyces* species only grow in Africa and South East Asia. Furthermore, they are exclusively found in connection with termites and their nests, living a pampered existence where all the material for them to grow on is faithfully schlepped in by the termites. Their lifestyle is similar to that of the leucocoprinoid fungi cultivated by the leaf cutter ants and relatives in the New World. Besides the titanic *T. titanicus*, there are some 30 to 40 *Termitomyces* species, most of them smaller, starting at half an inch. Throughout their range, *Termitomyces* species are sought after for food, and are widely sold on markets.

Not all termite species rely on fungi. All members of one subfamily (*Macrotermitinae*) do, but the other termites have found another way to break down their favourite foods (wood and other dead plant tissues) by harbouring bacteria and protists in their hindguts to do the work. Without the fungi the *Macrotermitinae* can not live, and without the termites, *Termitomyces* species are not able to survive – an obligate mutualistic relationship for both parties.

The fungi are grown on combs, special structures made by the termites. The termites eat fresh plant material which passes quickly without much decomposition through the intestinal canal, and that material is moulded together to form a substrate for the fungi. On these combs, the fungi form white blobs (in jargon they are called myco-têtes, which is French for fungal heads), containing asexual spores, and the termites eat this part of the fungus. Different termite species use the fungi and the comb in different ways, some eat the fungus for food, and do not eat anything else, others eat the fungi for their enzymes and eat plant or comb material as well. In some cases, only the lignin degrading enzymes are used, in other cases also the enzymes which decompose cellulose. It is nature at its best: for everything a solution, and no two systems exactly the same.

By using this extra step in their plant diet, the termites get food which is much richer in nitrogen than if they only eat plants.

MycoDigest Continued on page 2

President's Message

This is our last Mycena News for the season and I would like to thank a few of our members who have volunteered to help out the society in a variety of positions. They have decided to retire or they have come to the end of their elected term. Some of the positions are appointed by the council and others are elected.

Of the elected positions I would like to thank George Collier for serving as the treasurer for the past two years and Carol Hellums for being the secretary. Completing two-year terms as councilors are JR Blair and Peter Werner.

Of the appointed positions I would like to thank Sonja Norwood for doing the layout for the Mycena News, Kelly Ivors for lining up the speakers for the general meetings, and Jane Collier for handling the membership duties. Without people like all of you volunteering to fill these spots it would be impossible to keep the club running. I know I am joined by all of the members of the society in thanking all of you for jobs well done.

I would also like to thank David Rust – council member and past president – for helping me to do my job correctly.

Mark Lockaby



MycocDigest Continued from page 1

The fungus combs not only serve as food, but also as regulators to keep the temperature and humidity in the termite nests or heaps constant. Thereby they provide a stable environment for the eggs and developing larvae.

Of course, the combs full of easily accessible plant material is attractive to lots of other fungi, but the termites ward these intruders off with specific fungicides in their saliva. In abandoned nests *Xylaria* species immediately take over from the *Termitomyces*.

Because of this cultivation strategy, termites build huge heaps and have big colonies. The same is true for the leaf cutting ants with colonies of millions and millions of individuals. Farming is a good strategy: the human population, too, exploded after the invention of agriculture around 10,000 years ago. The mutualistic relationship between fungi and termites is much older than that, 30-50 million years older, by present estimates. It evolved only once, in Africa, followed by several waves of emigration to Asia.

Some species never produce fruitbodies and in their nests, before the winged termites set out on their flight to form a new colony, either the females or the males, depending on the species, first eat spores from the white blobs, and later excrete a bolus to inoculate the combs in the new nest. However, most of the species of fungal symbionts do produce fruitbodies, and these appear outside the nest at just the right time. When a new nest has been constructed but is still fungus-free, workers leave the new nest and gather the spores with which they will inoculate the combs.

As always there are still many questions. In the first place, of course, is: how did this mutualism evolve? What triggered the termites to change from the trusted bacteria and protists within their bodies to this much more complicated system of fungus culturing? Secondly, there is a huge disparity in the numbers of species involved, not more than about 40 fungi but about 330 fungus-growing termites. Cultivar-sharing or competition for the symbionts must be going on; is there also competition on the combs by different *Termitomyces* species? For the species that produce fruitbodies, how do worker termites recognize *Termitomyces* as THE mushroom to gather spores from?

Questions, questions, at least, we know the answer to that one from the beginning: termites grow the biggest mushrooms on earth!

Selected reading:

Aanen, D.K., P. Eggleton, C. Rouland-Lefèvre, T. Guldberg-Frøsvlev, S. Rosendahl & J.J. Boomsma, 2002. The evolution of fungus-growing termites and their mutualistic fungal symbionts. *Proceedings of the National Academy of Sciences, USA* 99: 14887-14892.

Wood, T.G. & R.J. Thomas, 1989. The mutualistic association between *Macrotermatinae* and *Termitomyces*. In: N. Wilding, N.M. Collins & C. Longhurst (eds.) *Insect-fungus interactions*: 69-92. Academic Press, London.

Speaker Continued from page 1

they only exhibit their natural behavior when they are associated with plant roots. The use of molecular tools, microcosms (or 2-dimensional view chambers), and manipulative experiments have started to change this, and we now have some intriguing glimpses into the other sides of these fungi. This talk will be focused on studies of the common fungi found in our coastal pine forests, and will cover such topics as spore dispersal, vegetative spread, spore-banking, competition for roots, and post-fire colonization strategies.

Tom Bruns is a professor at the University of California Berkeley in the Department of Plant and Microbial Biology. He received his Ph.D. training at the University of Michigan, where he studied molecular systematics of *Suillus*. He moved to Berkeley as a post-doctoral associate in 1987 and joined the faculty there in 1989. Initially his work remained focused on molecular systematics and evolution, but in the early nineties he began to switch to the field of mycorrhizal ecology. He was one of the first to incorporate molecular identification methods into such work, and this change opened up a new direction in fungal research, which will be the subject of his talk.

MSSF Discussion Group on Yahoo Groups

A great way to stay in touch during the summer months!

The MSSF email discussion group facilitated through Yahoo Groups is a great way to keep in contact with other members and is one of the primary ways in which members keep up on news about the Society. The list features often-intriguing discussion of fungal-related topics, tips about current fungal activity, and up-to-the-minute news about MSSF functions.

The list is available in both individual-message and digest formats. Additionally, you can also subscribe to the group in "Special Notices" mode. That means that if you wish to receive only official announcements from the society and not email traffic from other members, you can subscribe using this method. (Subscribers to the list in regular and digest formats also, of course, receive official announcements in addition to posts from other members.)

To sign up, go to:

<http://groups.yahoo.com/group/mssf/>

Follow the link that says "Join This Group". (You will need to sign up for a free Yahoo Groups membership if you do not have one already.)

Slow but Certain Success

by Else C. Vellinga (macrolepiota@comcast.net)

Termites, attine ants and human farmers all have very sophisticated cultivation techniques. Their cultivar, be it fungi in the case of termites and attine ants, or the plants, fungi and animals which are raised by humans, is put in well-prepared fields, barns or other structures, subsequently manured and/or fed, weeded or groomed, and finally harvested.

The mushroom cultivated by the termites is only found on termite heaps and nowhere else; it cannot grow independently without the termites. On the other hand, there are still primitive corn and wheat varieties in nature, but the only cows we know are the ones in pastures and sheds.

A much looser relationship has been discovered recently between certain snails and fungi. *Littoraria irrorata* is a small snail called periwinkle, which is abundant in the salt marshes along North America's east coast. It grazes on the grass *Spartina alterniflora*, inflicting long gashes on the leaves as it scrapes its radula (the snail's equivalent of teeth) over them. Then, fungi invade the grass and take over. And these fungi are the preferred food of the snail, not the grass! So, the snail grazes the fungi, poops when it is happily eating, and this excrement stimulates the fungus to even more growth. The fungi are common grassland ones, belonging to *Mycosphaerella* and *Phaeosphaeria*, two genera in the ascomycetes. The initial grazing of the grass serves only to provide the fungi with places to grow. If snails are put on grass without fungi a lot of them die and the others look hungry and pitiful.

Together, the snail and the fungus keep the grass in check, but enough is left to sustain this delicate relationship.

Again we are left with a lot of questions, how did the snails and the fungi start their mutual beneficial relationship? How much of it is intentional, and how much is just accident? Is this kind of interaction between animals and fungi widespread? Have we just not looked carefully enough to discover it in other systems?

Science is a partner in the mutualism too, feeding on the questions raised by the others.

The full story of the snail and the fungi can be found in: Silliman, B.R. & S.Y. Newell, 2003. Fungal farming in a snail. *Proceedings of the National Academy of Sciences* 100 (26): 15643–15648.



The Foragers' Report

May 2004

by
Patrick Hamilton

Morels are being found in the Sierras as this is being written (April 22) and I hope that you are amongst the happy folks who are (were, did?). If not, well, there are more to be picked through this month and maybe into next. Go get 'em.

Spring boletes were discovered in mid April at 4,600' and with some continuing moisture they should be available into early June higher up.

Winter chanterelles (yellow foot) are having a late season in Salt Point. Many were found by a SOMA group mid month.

The season is all but over in our area but now you can go to the mountains. You just need to figure out a plan for the wheres and the whats of the wonderful Sierra.

For any unfortunates who have not been personally mentored in the hunt by one of our society's celebrated mushroom pickers and who wish to learn things rapidly—get thee to a group foray. There is no better place to gather pertinent information in quick fashion.

If there you are being ignored by the cognescenti try and make a small, yet giving, spectacle of yourself. Initiate conversations with the most knowledgeable folks while holding bottles of good wine. Spirits can be good, and high, too. Unpronounceable stinky French cheeses attract good teachers. Homemade mushroom pickles have worked also.

The best way that I know of for new members to procure space on a small, potentially successful, foray—one of those many unannounced outings that small groups of members do each spring—is to already be camping in the area and just sort of “run into” them with the above mentioned camping foods and say, “I have way too much good stuff for myself, can I trail along with you?” It has worked.

On the other hand you might run into people who don't want you to be there. Find this out before you share any of your food and wine.

There are some foragers who have told me that they're moving into yet another, this time way different, “new mushroom picking ethic” in which no newbies are taught anything—dissuaded, actually, from learning the lore. Comestibles don't work as bribes here.

“How many fishermen can our secret hole support?,” they ask metaphorically discontented. “There's no hatchery truck in our patch,” they add grumpily.

And they have a point (if not odd comparisons). We have only so many places to pick mushrooms within reasonable driving distances from our homes so why reveal these to folks with whom you don't share anything else? Do you invite strangers to the dinner table? Loan your valued mountain bike (tools, car, etc) to unknowns, especially when you know that upon return they will assuredly not be the same? Is this different?

Well, I think that it is. I learned about morels from The Great Dispenser of Information, Larry Stickney, (by taking him to the mountains) and by cooking on Arora's early 90's spring Sierra forays. My education in mushroom hunting would have taken years longer without hooking up with these guys.

I also got me a couple of buddies who would go with me again and again to explore new habitats in almost every season. I pursued anything about fungi that time allowed; and when I had not enough time I would curtail other, then seemingly unnecessary, activities (e.g., work) to be able to go mushroom hunting. In a few years a lot of information was processed and a certain level of knowledge attained.

So I suggest for those of you who want to quickly learn enough so that you can go picking alone sign up for a MSSF sponsored foray.

Any food or wine sent for secret mushroom maps will not be returned.

That's all for now folks.

Society Officers

President: Mark Lockaby	(510)412-9964
Vice Pres: David Campbell	(415)457-7662
Secretary: Carol Hellums	(415)255-4950
Treasurer: George Collier	(415)641-6068

Select Committees

Forays: Tom Sasaki	(415)776-0791
Book Sales: Norm Andresen	(510)278-8998
Membership: Jane Collier	(415)641-6068

Officer Nominations for 2004-2005

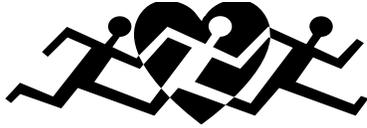
This year's nominating committee (David Rust, Lorrie Gallagher and Mark Thomsen) proposes the following slate of MSSF officers for a one-year term starting in July, 2004:

President	Mark Lockaby
Vice President	David Campbell
Secretary	Mark Thomsen
Treasurer	Shawn Johnson

Councilor nominations for a two-year term starting in July, 2004:

Hilary Somers
Gary Wolf

Upcoming Foray



Saturday, May 8: Morel Foray at Undisclosed Area: Norm Andresen, David and Jeanne Campbell will lead a foray to a destination undetermined at publication time. Please contact leaders a week or two before foray date, Norm Andresen at 510-278-8998 or email at n.andresen@comcast.net and David and Jeanne Campbell at 415-457-7662 or send email to: yogidog@comcast.net



HELP WANTED:

Layout Person for the MYCENA NEWS

The Mycena News has been very lucky to have William Karpowicz (Editor) and Sonja Norwood (Layout) at the helm. They have done a superb job. Unfortunately, (for MSSF) this will be Sonja's last issue. The Mycena News is very important to the MSSF providing vast amounts of information and insight about the wonderful world of mushrooms.

If there is anyone in the Society who would willingly and joyfully step forward, now is the time. Please contact Mark Lockaby at marklockaby@sbcglobal.net or 510-412-9964, if you are willing to help.

Many thanks to Sonja Norwood for doing the layout for this season. Without her willingness to do so, we would have been hard pressed to have a newsletter this year.

HELP WANTED:

Membership Chairperson

The MSSF desperately needs someone to take over membership for Jane Collier. Jane will help you to get started with this important task. If you would like to help out the society by filling this position please contact Mark Lockaby at: marklockaby@sbcglobal.net or 510-412-9964.

We need your feedback!

Help us improve the *Mycena News*. Please take a few minutes to complete this survey. When you are finished, either fax it to 415-701-8769 or mail it to MSSF, c/o The Randall Museum, 199 Museum Way, San Francisco, California 94114. If you'd like to complete this electronically, send an e-mail to sfborowik@curven.com and you will receive a word.doc. Thank you for your input.

Do you find the newsletter informative? (circle one)
 Yes No

What are your suggestions for improving the *Mycena News*?

Please rate the following regular features on a scale of 1-5 with five being excellent and one being poor. If you think something should be eliminated from the news letter circle zero

Monthly Meeting Update	0	1	2	3	4	5
Myco Digest	0	1	2	3	4	5
Foray Information	0	1	2	3	4	5
The Foragers Report	0	1	2	3	4	5
Cultivation Corner	0	1	2	3	4	5
Culinary Corner	0	1	2	3	4	5
Dinner Reviews	0	1	2	3	4	5
Recipes	0	1	2	3	4	5
Calendar	0	1	2	3	4	5

Newsletter Layout 1 2 3 4 5

What features/changes would you like to see?

Use an extra sheet of paper, if necessary.





Cultivation Corner

By Ken Litchfield © 2004
klitchfield@randallmuseum.org



The MSSF's "Mushrooms in Your Garden" display at the San Francisco Flower and Garden Show was a great success even with the lack of rain for display mushrooms the preceding several weeks. We had a few fresh mushrooms, especially a popular heap of *Clathrus ruber*, the smelly scarlet Basket Stinkhorn, a Zen collection of dried polypores, and a much-commented-on fairy ring of grocery *Agaricus* in some grass sod. Many thanks go to everyone who helped to set up and staff the display: Debbie and Bill Collins, Tom Sasaki, Larry Stickney, Lorrie Gallagher, Monique Carment, Beryl Durnell, Bill and Louise Freedman, David Sarasua, and Terry Sullivan.

During the summer we plan to have our cultivation seminars back up and running in a whole new venue. Be sure to sign up for mssf@yahoo.com so you can get the announcements for cultivation seminars and all the other great information from the society's communication center for the summer while the newsletter and meetings are on hiatus. Here are a few upcoming mushroom related seminars and events to plan for during the "off season":

"Create Your Own Mushroom Garden" at the Garden for the Environment at 7th and Lawton in San Francisco. For class info and registration contact the Haight Ashbury Neighborhood Council at 415/731-5627 or: <http://www.bapd.org/n4253.html>

For these Crissy Field Center classes you can get description and registration info at:
<http://65.18.217.185/newcork/html/spring04.htm>

Nature Photography (Parts 1 & 2)

Learn the important elements of framing, lighting, focus, depth of field, and taxonomic requirements you'll need to know when photographing wildflowers, mushrooms, birds, with and landscapes with your own camera on Crissy Field trails. Part 1: Saturday, May 22; 9:30 a.m. to 12:30 p.m. Part 2: Saturday, June 5; 1 to 4 p.m.

Mushrooms in Your Garden

Grow mushrooms organically in your garden as easily as you grow plants! Learn to plug logs with mushroom dowels for raised beds, grow mulch-eating mushrooms under your veggies, and cultivate compost feeders in your compost or worm bin. Then, take home some edible mushroom samples to start your own mushroom garden magic. Saturday, June 19; 1 to 4 p.m.

Membership and Subscription Information

To join the MSSF and receive this newsletter, send a \$25 check (\$20 for seniors (65+) and full time students) made payable to **MSSF** to:

MSSF Membership, Membership Chair
c/o The Randall Museum
199 Museum Way
San Francisco, CA 94114

Please include contact information: home and/or work phone numbers and e-mail address. New and renewal memberships will be current through December of each year

MSSF members may also join or renew membership in the North American Mycological Association at a reduced rate by including with their MSSF check a separate check for \$32 payable to NAMA.



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Mushroom Garden Workday and BBQ Potluck, Sunday August 15th at the MSSF Mushroom Garden in the Presidio Community Gardens, time TBA. Contact Ken Litchfield at 415-863-7618 or klitchfield@randallmuseum.org.

Happy Summer Mushrooming!



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Layout: Sonja Norwood

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Please send your articles, calendar items and other information to:
mycena-news@mssf.org



Culinary Corner

from Grandma's Attic



White Miso Noodle Salad with Enoki

This is a great excuse to haunt our fabulous Asian markets.

Dressing

1 rounded tbls. white miso paste
3 tbls. brewed rice vinegar (not seasoned rice vinegar)
1 tsp. mirin (Japanese seasoned rice wine)
½ tsp. sesame oil
1 tbls. peanut or olive oil
Whisk until smooth

Noodle Salad

Buckwheat noodles (soba) 2 bundles (if the noodles you buy are not individually bundled grab a bunch about 1 inch in diameter for each serving). Place noodles in enough boiling water to cover them and boil gently for 6 minutes. Rinse with cold water and drain. Put them in a bowl large enough to hold all the ingredients.

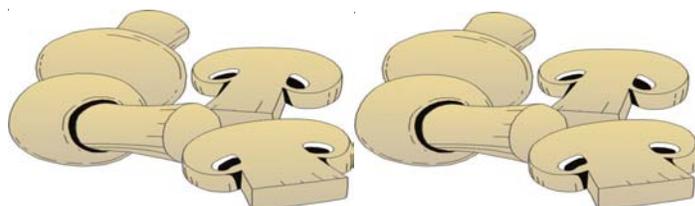
Fish Cake (Matsal Ca) Any fish cake will work. The pink and white is colorful, but I like this kind because it doesn't have the coloring and other chemicals. Note: it sometimes comes in a tight plastic casing. Thin slice about two inches off one end then quarter each slice (they look like little fans).

Enoki Mushrooms (*Flammulina velutipes*) usually come in little sealed plastic bags. Separate a bunch from the bag about 1 inch in diameter, cut off bottom end so that you have only clean stems and caps. Chop up stems about ¼ long. Leave the cap with enough stem to look good. Put all the cut up Enoki in a small bowl with a mixture of 1 tbls. mirin and 1 tbls. rice vinegar and 1 tbls. toasted sesame seed. Mix well and let soak for a least 15 minutes.

Add the Fish Cake and Enoki mixture to the noodles then pour the dressing over it all mix well and chill

Serve in small bowls

If you like add a garnish for color like a few julienne carrot sticks and some shreds of daikon radish or line the bowls with radicchio leaves before adding the noodle salad.



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MSSF Calendar, May, 2004

Friday-Sunday, April 30-May 2: Annual San Jose Family Camp Foray: Come for a fun and carefree weekend where lodging and meals are provided. Stay in tent cabins with electric lights and where nearby bathrooms have hot water and showers. Enjoy hunting morel in its natural environment and you may even find spring boletes. Cost for the weekend for members is \$95, for nonmembers, \$115 and \$55 for children. Leaders: Mark Lockaby and Tina and Thomas Keller. For reservations and information, contact: Tom Sasaki, Foray Coordinator (415-776-0791 or email to: sasakitom@aol.com).

Monday, May 3: Culinary Group's Monthly Dinner: 7:00 PM. Meeting and dinner at the Library of the Hall of Flowers in Golden Gate Park, in San Francisco. For reservations or information, please contact Jeanne Campbell at (415 457-7662 or send email to: yogidog@comcast.net)

Saturday, May 8: Morel Foray at Undisclosed Area: Norm Andresen, David and Jeanne Campbell will lead a foray to a destination undetermined at publication time. Please contact leaders a week or two before foray date: Norm Andresen at (510-278-8998 or send email to: n.andresen@comcast.net) or David and Jeanne Campbell (415-457-7662 or email to: yogidog@comcast.net)

Tuesday, May 18: General meeting: Doors open and identification starts at 7:00 PM and the meeting starts at 8:00 PM. See page 1 for featured speaker.

Saturday, June 19: Mushrooms in Your Garden: Crissy Field Center. For description and registration info visit <http://65.18.217.185/newcork/html/spring04.htm>

Sunday, August 15: Mushroom Garden Workday: Presidio Community Gardens. Contact Ken Litchfield at 415-863-7618 or klitchfield@randallmuseum.org.

