MycoDigest: Fungal Snares and Other Sticky Ends

Else C. Vellinga

For over twenty years we have watched a fallen oak be devoured by oyster mushrooms. At first the decay went slowly, but during the last few years it has accelerated. This winter, for the first time, we could not really find the wood, and the oyster mushrooms had disappeared.

Wood is a very inhospitable substrate. Its components are hard to break down and, though rich in carbon (C), nitrogen (N) (an essential component for amino acids and proteins) is in very low supply. Wood decayers have come up with ingenious ways to cope with this shortage, including one chemical pathway that has bioluminescence as a by-product (e.g. in the jack-o'lantern).

Oyster mushrooms and their relatives in the genus *Hohenbuehelia* (gilled mushrooms chockfull of thick-walled incrusted cystidia, with a gelatinous layer in the cap) have come up with a remarkable alternative—they devour nematodes. The mycelium of these species forms drops (in the case of *Pleurotus*) or adhesive knobs (*Hohenbuehelia*), which contain toxins that paralyze the nematodes (which are very small worms). The reaction of a nematode to these toxins is immediate—it stops wriggling and forms a simple target for the hyphae of the fungus. The hyphae hone in on the mouth of the nematode and enter the animal, which is at this point still alive. The hyphae proceed inside and devour the nematode from the inside out. Just like humans

*Pleurotus ostreatus* fruitbodies on wood. The mycelium in the wood produces toxic drops that paralyze nematodes, which are consequently devoured by the fungus. Photo © by John Lennie

Continued on page 6

MycoDigest is a section of *Mycena News* dedicated to the scientific review of mycological information.
I’d be willing to bet that the majority of our members (and those in other clubs) joined because they are “foodies” that appreciate a well prepared wild mushroom dish and want to find out how to find them on their own. Apply to you? Well, you should check out our Culinary Committee. They meet once a month (except over the summer and in December) on the first Monday to share incredibly delicious gustatory creations. Of course, there is a cost and there are responsibilities to be a part of the group. Yearly dues are $12 and each meal is $14. At least once a year you should volunteer to help with the main dish or the standard sides, and you should regularly plan to bring an appetizer to share. The meal itself is a grand affair, full of camaraderie and cheer, not to mention a terrific raffle presided over by Curt Haney. For more information and to make reservations contact the committee chairperson, Pat George at plgeorge33@yahoo.com.

To be perfectly honest, I am not a real foodie. Oh, I like to eat all right and I love wild mushrooms, but I really don’t like to cook (a requirement for the title, I believe). No, I’m involved with the Mycological Society for the sake of the organism—the science end of things. Many of you know I obtained my Master’s degree at San Francisco State studying with Dr. Dennis Desjardin, our MSSF science advisor. My thesis involved collecting and identifying fungi associated with manzanita species. Perhaps your interests lie in finding out more about the biology of fungi, too. If you are new to this, a good place to start is one of our identification workshops (see the calendar on page 8) sponsored by our Education Committee, co-chaired by Alice Sunshine and Paul Koski. With those workshops, in combination with going on forays with the Society, you will be well on the road to identifying many of the mushrooms you encounter—edible, poisonous, or otherwise.

Another path you may like to take in the Society is to learn how to grow your own mushrooms. You can find out more about how to get involved from our Cultivation Committee chairperson and growing guru, Ken Litchfield at litchfield.ken@gmail.com.

Whatever focus you choose to indulge in, I hope you enjoy being a part of this remarkable community of knowledgeable people.

Good hunting!

- J.R. Blair
Where’re the books? I got that question a lot at the January General Meeting.

The answer: We sold over $5,000 in books at the MSSF Fungus Fair this year! The Oakland Museum bookstore sold out at the Fair, as well.

Good news: We have just received a large order of our most popular books, and they will be available for sale at the February MSSF General Meeting.

Anyone who is interested in donating used books for resale by the MSSF can contact me at (415) 333-8820, or just bring them to me at the next General Meeting. Book sales are from 7–8pm on the lowest level of the Randal Museum. Come early (before the General Meeting at 8pm), so you can ID mushrooms, munch on goodies generously provided by the Hospitality Committee, and (the important part, here) look for the table stacked with books. As always, MSSF members in good standings receive a 10% discount on all books.

Curt Haney
MSSF Book Sales

Marin Mushroom Mania
Marin Art and Garden Center
Saturday, February 9, 2008 9am–4:30pm

$25 entry

Speakers:
9:30am - Ken Litchfield - The Intrigue of Fungi
10:30 - J.R. Blair - Getting to the Bottom of It All
11:30 - David Campbell - Fungimental Mycophagy…
12:30 - Dorothy Beebee - Mushrooms for Color
2:00 - Taylor F. Lockwood - Chasing the Rain
3:15 - Dr. Dennis Desjardin - Bioluminescent Fungi Around the World

12:00–2:30 Mushroom Cooking Demo and Tasting
12:00–2:30 Mushroom Café—Lunch catered by Julie Ashby for Rancho Nicasio (not included in admission price)

Afternoon Workshops:
Cultivation - Log plugging demo and take home your own pet log
Mushroom Taxonomy - Hands-on characteristics and distinctions
Mushrooms for Color - Hands on dying with mushrooms
Cooking Demos - Several cooking demos during the lunchtime break

Volunteers get free dinner Friday or free admission Saturday!! Contact Terri Beausejour at terri.beausejour@autodesk.com if interested.

Check www.mssf.org for info on Feb 8 Collection Forays

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Past issues of Mycena News can be read on-line at www.mssf.org.

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Recently, a discussion came up on the MSSF Yahoo list about what to buy if you want to get into mushroom photography. As somebody who majored in mycology in graduate school, but also has a couple of years of photography education under his belt, I have some definite opinions about what kind of equipment performs well for mushroom photography and what doesn’t.

**Camera types: digital minis v. SLRs**

First there’s the issue of whether you want to get a digital mini-cam or a digital SLR. If you’re just starting out, the decision really depends on how deeply you think you want to get into photography. If you’re not sure, Mike Wood’s advice, with which I definitely concur, is to get a digital mini-cam and a small tripod so you can “test the waters” and see whether you like it and how far into it you want to get.

I would definitely avoid digital mini-cams that are strictly “point and shoot”—you want to be able to use manual functions if you expect to take good pictures beyond the likelihood of pure chance. The better digital mini-cams are pretty good and can take some nice macro shots (close-up or small object photography). However, there is a mistaken perception that a good digital mini with a lot of manual functions is more-or-less the equivalent of an SLR for a lot less money. Having used both, I think there are some real downsides to digital minis. Notably, they have the distinct disadvantage of only allowing you to view and focus on your image through the digital view screen, and that’s inevitably a lousy image. Manual focus on these cameras is rudimentary, and auto-focus is really hit-or-miss, so, basically, a fair number of out-of-focus shots (ones you thought were in-focus when you looked at them through the view screen) are par for the course with digital minis. Not to mention all manner of clutter in your image that you didn’t even notice on the tiny screen. What you (think you) see is not necessarily what you get! An SLR actually allows you to see directly through the lens when you look through the viewfinder and, based on my experience, I really can’t emphasize enough what an advantage that is.

One of the major areas of dubious information around digital cameras is the issue of “megapixels.” On one hand, they are often seen as all-important to the exclusion of all other factors, and on the other hand, there’s the erroneous idea that resolution beyond X megapixels is superfluous. First, the number of megapixels is one factor that goes into making a good image; however, the overall quality of optics is certainly another concern, and this is an area where SLRs are overall better, even though better digital minis (such as the Nikon Coolpix series) do shoot some very nice images. (And minis actually have one distinct optical advantage over larger SLRs: they are able to get a lot of depth-of-field even with a moderate aperture.) Another important factor is bit-depth, which I’ll return to shortly.

One statement made during the Yahoo list discussion, with which I took strong issue, is the idea that over 6 megapixels is “overkill” if you don’t intend to make large prints. First, just in terms of side-by-side comparison, I don’t think that anything less than 8 megapixels equals the resolution of modern ISO 100 color film (and I’ve seen tests that have clearly borne this out)—something that’s kept me basically a film photographer for a long time. Also, I contest the idea that there’s a maximum number of “useful” megapixels. Well, if you’re not going to do very much with Photoshop, sure, but if you get serious about digital photography at all, (and its easy to get hooked, believe me) you will definitely end up using Photoshop quite a bit, and will definitely appreciate all those extra megapixels. Quite simply, just about every piece of manipulation/correction you do in Photoshop results in a loss of data, so having as much overhead as possible—even beyond the image’s final print resolution—is very helpful indeed.

Bit depth is the other important factor in terms of how much “information” is in an image. 16-bit has tremendous advantages over 8-bit in terms of manipulability of the image. Most new digital cameras are 16-bit capable, but many that are more than a couple years old are not—be sure to ask about this.

And of course, any discussion of digital photography brings up the issue of film versus digital. In my opinion, film cameras are hugely underrated. Shooting on film means, of course, you don’t have a digital image unless you have a way of scanning your slides, so that’s a real downside. On the other hand, film cameras are such a great bargain these days it’s not even funny. I learned photography on a Canon Elan I bought 4 years ago, and can’t say enough good about it. In fact, I still prefer it for things like black-and-white and infrared photography.

**Camera and lens recommendations**

If you want to go the digital mini route, I think the clear choice in this category is the Nikon Coolpix S10. It’s the latest in the Coolpix “twisting body” series (I have an older one, a Coolpix 4500), with 6 megapixels and 16-bit, it is small and light, and—new to the Coolpix series—has image stabilization, which allows for handheld shots at surprisingly long exposure times. And like the earlier generations of “twisting body”

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Continued on page 7
Internationally renowned Japanese artist Takashi Murakami is just about to wrap up his latest retrospective, ©MURAKAMI, at MOCA’s Geffen Contemporary museum in Los Angeles. For those lucky enough to have recently foraged in Greater LA, or for those who have made arrangements to attend the Los Angeles Mycological Society’s annual Wild Mushroom Fair (February 10, 10pm–4pm, Ayres Hall, LA County Arboretum & Botanic Garden, 301 North Baldwin Avenue, Arcadia, CA), perhaps you already know what’s to follow.

The majority of us, however, are knee deep in Bay Area duff and thirsty for a forager’s cultural report. Those who think they are unfamiliar with Murakami’s work need only glance at the photos that accompany this article. Your nephew’s stylish girlfriend was no doubt in possession of her very own limited edition Murakami-styled Louis Vuitton handbag at one of this past season’s gatherings. You know this guy. …still need a refresher? Born in 1962, classically trained Murakami is best known for his postmodern “superflat” style, which I will try to qualify as the bastard child of Western pop and Japan’s seventeenth and eighteenth century Edo period-inspired 2D, detailed painting style (e.g. Kano Ryoke, Maruyama Okyo).

Here are some themes: spiteful worship of ravenous consumerism, western imperialism, clean graphic design, US occupation-imposed infantilism, Japanese fetish, manga comics, anime cartoons (especially those of Hayao Miyazaki), and recurring motifs—especially mushrooms! While we can’t be certain of properly IDing these specimens, most would agree that his shrooms exhibit telltale Amanita sp. characteristics (e.g. veil remnants, spotted tops, googly eyes, fangs, nausea).

And some iconography: did this man eat a lot of matsutake growing up? Or are those blissed-out, yet menacing, yet so CUTE caps a thinly veiled reference to psychedelics and their portrayal in mainstream culture? Probably both. And what about the mushroom cloud?

Like so many of today’s commercially successful artists, Murakami’s work sells at all price points. Maybe you can’t have the LV handbag, but a toothbrush or keychain for next season’s SOMA camp? Definitely!

Hope you get the chance to nibble some of Murakami’s ideas. Do you have a different interpretation? Please submit stories and photos to mycenanews@mssf.org.

©MURAKAMI, October 29, 2007–February 11, 2008, The Geffen Contemporary at MOCA, 152 North Central Avenue, Los Angeles, CA 90013. Check out online flight deals—who knows, you could have a wild long weekend: Marin Mushroom Mania, LA Wild Mushroom Fair, Murakami’s Mushrooms. All interested parties, meet at JetBlue counter, 0100 hours, February 10

eat meat for their protein supply, so does the oyster mushroom “eat” the nematode.

Hohenbuehelia species that do this have been known for a long time, but mostly not in the form of fruiting bodies; rather, they exist as sterile mycelia in the soil under the genus name Nematoctonus. Another source of nitrogen for the oyster mushrooms is bacteria, and this might be the case for more species than we realize. There is a report that Laccaria species can obtain nitrogen from springtails—another way of getting this essential part of the fungal diet. It is, however, not known how the Laccaria are able to kill the springtails.

The nematode-killing abilities of the oyster mushrooms, plus Hohenbuehelia, are not found in other gilled mushrooms. Instead, they form a separate group that, in an evolutionary context, is close to the family of the deer fungus, Pluteus. However, fungi in the Phylum Ascomycetes have come up with the same idea to supplement their spartan carbon diet. One order in particular, the Orbiliales, is rich in species that have come up with fascinating trapping devices. The genus Orbilia is an example; its species form very small, glassy, brightly colored little cups on wood, which are easily overlooked.

The classical and thorough work—with beautiful illustrations—on these nematode-trapping fungi was done by Drechsler in the 1930s. There are at least five different models of these traps, including adhesive knobs, two-dimensional or 3D networks of adhesive cells, adhesive columns, and a lasso-like structure made up of three cells that inflate (like an air bag) when the nematode pokes in. Rings that do not inflate are also found, but only in combination with the adhesive knobs (which makes sense). Educational movies on the workings of those traps can be found online at www.microbelibrary.org. How these structures have evolved, and which ones are more derived, is not yet quite clear—the two papers dealing with this issue reach opposite conclusions. One paper has the 3D networks primitive and the adhesive knobs derived, while the other reverses the order.

Recently, hyphae with non-constricting rings were found in a piece of amber dating from the Late Albian period during the Cretaceous (around 100 million years ago). Nematodes were present in the same amber, which indicates that this type of interaction is not a modern invention at all. To put this in perspective, small mushrooms, very closely resembling modern Marasmius species, have been found in 90–94 million-year-old amber from New Jersey. Arbuscular mycorrhizal fungi have been found in much older deposits, dating from the Ordovician (460 million years ago).

There is a huge interest in using the nematode-trapping fungi as possible bio-control agents for those nematodes that cause animal and plant diseases, and also in the fungal species that might be a threat to those nematodes which are, themselves, used to controlling plant-pathogenic insects.

Oyster mushrooms can be found on almost every walk in the woods, and the soils of the grasslands and forests harbor many species of other nematode trappers. Does this make you think of Gulliver? You might not want to stand in one spot for too long. 😊

Further reading:


Beginner’s Guide continued

Coolpix cameras, it shoots great macro, notwithstanding my earlier caveats about out-of-focus images and shooting through a view screen, of course. (The view screen on the S10 is larger than the one on the 4500, so that helps.) They can be found for under $300 and are really a great buy. They come with a plethora of features, so be absolutely sure to read your owner’s manual.

If you do decide to take the dive into a digital SLR, it pretty much boils down to Canon or Nikon—I don’t think other brands of dSLR and accompanying lenses are even in the same league at this point. You need to decide early whether you’re going with Canon or with Nikon, because lenses and flash and some other parts of your “kit” are specific to each and are not interchangeable. For various reasons, I think as far as newer macro lenses go, Canon has an edge, so that’s what I recommend—either the Canon 40d (10.1 megapixels, not-full-frame) or Canon 5d (12.8 megapixels, full frame).

If you’re interested in film SLRs, the Canon Elan 7 would be my recommendation, which you can find for around $200 or even considerably less on eBay, depending on whether it comes with a lens or not and whether it has the (not-very-useful, in my opinion) eye-controlled focus feature. (Canon Elan II’s, which is what I use, routinely sell for less than $100 these days.) Other than the fact that it’s not digital, this is a superb camera. As for the film itself, my favorite for mushroom photography is Fuji Astia 100, which is an incredibly high-resolution film with highly accurate color.

With an SLR, you need to have a set of separate lenses, as well. First is the basic lens or lenses you use for general photography—either a zoom lens of some kind or a fixed “normal” lens. (Fixed lenses, though less flexible than zoom lenses, offer very nice optics for the money.) From there, a 100mm macro lens is a necessity for shooting mushrooms smaller than a typical Agaricus. Canon makes a top-notch one, though it’s pricey; Tamron also makes an excellent lens, also pricey, but a few hundred less than the comparable Canon macro lens. (I don’t know what’s standard for Nikon, though I do know the Tamron 90mm macro also comes in a Nikon version.) A 50mm macro lens is also good to have. For even larger mushrooms, a regular mid-range lens with a close-up filter can be very useful, and I’ve taken some of my best mushroom shots with a 50mm “normal” lens/close-up filter combo.

Lenses will have a differing effective focal length depending on whether your dSLR has a “full frame” sensor (basically, the same size as a 35 mm film frame) or a smaller one, as on a Canon 40d. The small-frame sensors increase your effective focal length by something like 1.6 times, which can be an advantage in macro photography.

One constant of mushroom photography is low light conditions, and that means two things: flash and tripods. I’ll cover these fairly substantial topics next month in part 2 of this article.

会员角

感谢所有已续交2008年会费的人士！

截至2007年12月31日，MSSF会员人数共876人，其中个人会员846人，机构或社会会员30人。

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感谢George Collier和Jeanette Larsen在Fun-gus Fair上对会员的接待。

Alvaro & Sherry Carvajal
MSSF Calendar, February 2008

Saturday, February 2, 2008, 10:00am Salt Point Foray and Potluck Lunch with Darren Murphey and Mark Lockaby.
Please bring rain gear and collecting baskets or paper bags. About three hours of collecting before a potluck lunch at the picnic area next to the parking lot. More collecting after lunch. Reservations are not needed. To get to Salt Point take Hwy. 101 a little past Santa Rosa and take the River Road Mark West exit. Follow it west through Guerneville. River road becomes Hwy 116 stay on it to Hwy. 1. Take Hwy. 1 for 30 miles to Salt Point State Park. Turn in to the Woodside Campground day use parking area ($6). I will be there at 10am. Questions? e-mail Darren at Bugsbunny@sbcglobal.net or Mark at marklockaby@sbcglobal.net Mark’s phone 510-387-5957.

Monday, February 4, 2008, 7pm, Culinary Group Dinner.
As usual, we will meet at the Hall of Flowers, Golden Gate Park, 9th and Lincoln, SF. Dinner cost will be $14. Reservations are required. Contact Pat George at (510) 204-9130 / plgeorge33@yahoo.com no later than Friday, February 1, to make your reservation. As the Hall of Flowers does not provide tableware, you must bring your own, as well as your beverage and an appetizer to share. Our next dinner meeting will be March 3.

February 9, 2008, 9am Marin Mushroom Mania Marin Art and Garden Center. See page 3 for full details.

Saturday, February 16, 2008 9:00am Salt Point State Park cleanup and potluck with SOMA Mycological Association.
Meet at the Woodside parking lot at 9am. This is a chance for members of the two societies to give something back as a thank you for being able to collect mushrooms at the park. We will pick up junk along the road for a few hours and then we will go over to Fisk Mill for the potluck. For information contact Mark Lockaby at: marklockaby@sbcglobal.net or 510-387-5957.

Wednesday, February 20, 2008, 7:30pm Beginner’s Mushroom Identification Workshop. Held at the Randall Museum and led by J.R. Blair. Learn key features used to identify mushrooms in standard field guides and keys. Bring your recently collected specimens and field guides. Limited to 15 people. Call J.R. Blair at 650-728-9405 to make a reservation.

Wednesday, February 28, 2008, 7:30pm, Intermediate Mushroom Identification Workshop. If you have taken one of the Beginner’s ID workshops you are qualified to take the next step in this series. We will key out and identify mushrooms using the terms you learned in the first workshop. Bring mushrooms to work on as well as a copy of Mushrooms Demystified by David Arora if you have one. Limited to 15 people. Call J.R. Blair at 650-728-9405 to make a reservation.