SOMA NEWS

VOLUME 28: 1 September 2015

September Speaker: Josh Harrison

September 17th, 7:00 PM, at Sonoma County Farm Bureau (See directions on last page)

"The Fungi Within: the Ecological Importance of Symbiotic Fungi"

"Over the past few decades, it has become clear that most plants and animals harbor numerous non-pathogenic fungi. These fungi are still quite mysterious, with many only known from their DNA. But these hidden fungi are tremendously important and may mediate many of the ecological interactions we observe in the natural world. I will briefly discuss what we know regarding some of these fungi and how we may study them with new DNA-based techniques. I also will present results from studies I have conducted on the fungi that live within the Melissa blue butterfly and its host plants, and describe my ongoing research at the University of Nevada in Reno."

As a PhD student at the University of Nevada, Reno I am lucky enough to study interactions between fungi, plants, and insects in a truly beautiful landscape. I also worked to restore degraded grasslands and woodlands in the Wilamette Valley of Oregon with the Long Tom Watershed Council. I have also performed botanical work with the United States Forest Service, the Institute for Applied Ecology, and the Bureau of Land Management. I gained my bachelor's degree from Lipscomb University in Tennessee, where I studied environmental science, with minors in biology and mathematics. I have been a naturalist my entire life, and there is nothing I love more than exploring the natural world, botanizing, looking for unusual insects, and, of course, hunting for mushrooms!

NEED EMERGENCY MUSHROOM POISONING ID?

After seeking medical attention, contact Darvin DeShazer for identification at (707) 829-0596. Email photos to: muscaria@pacbell.net and be sure to photograph all sides, cap and of the mushroom. Please do not send photos taken with older cell phones – the resolution is simply too poor to allow accurate identification. NOTE: Always be **100% sure of the identification of any mushroom before you eat it!**

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Dispatch from the Duff

Greetings to all and best of luck for the coming season, fungily speaking. Again, we anticipate a wet year as predicted by those who venture a guess or two, or three. Yes, we wait and hope … and contemplate a quote from Alexander Dumas, "All human wisdom is summed in (those) two words: wait and hope." Not feeling especially wise, at the moment, but I plan to try harder.

SOMA Board of Directors Officers for 2015/2016 are Judy Angell, Treasurer; Gene Zierdt, Secretary; Rachel Zierdt, Vice President; and me, as President. The Board is a group of very able and busy people and have begun organizing SOMA Camp 2016. It will be held on January 16th, 17th and 18th at the CYO Camp in Occidental. Dennis Dejardin will be the Sunday Speaker and Daniel Winkler will deliver his talk on Saturday. Please plan to register as soon as possible to ensure you will have the opportunity to attend. Please note we need to replace a key member of the Camp Planning Group. Tom Cruckshank, has done terrific work organizing and printing the large number of documents and papers that are published for campers and SOMA speakers. If you have experience with word processing software and interest in assisting the Club efforts, please contact any Board member. Tom will continue to handle the work this year, but would like to assist and advise someone to take over in 2017. The bonus is a large paycheck and free attendance at Camp ….. kidding about the paycheck.

Third Thursday of the Month Meeting Speakers for the fall are:

- Joshua Harrison, a scholarship recipient from Reno Univsity.
- Justin Reyes from Gourmet Mushrooms
- Dorothy Beebee, our Fabric Arts Director for many years.

The last big effort this summer was to organize and contract a web designer to rebuild the SOMA website. Steve Warner, who joined the club last year, offered his services to SOMA. The decision to rebuild was based primarily on the need of many members and potential members to access the web using mobile devices. We look forward to seeing Steve's work and posting it for the membership to use. The Epicurean Group organized and led by Julie Schreiber and Chris Murray held two dinners that were very, very delicious and well attended. A third is planned for September. We thank Barbara and Mike Heiman for hosting the second dinner at their home. They have a lovely home and grounds, with a very productive vineyard out their back door. The menu was just perfect for a warm and beautiful day in Sonoma and the group had much fun throughout the meal. Looking forward to seeing everyone sometime during the new collecting season, hopefully we will be wearing rain gear, have some mud on our shoes and a basket full of interesting mushrooms.

Best regards, Jim Wheeler

INSIDE THIS ISSUE :

Credit: HD Wallpapers Images

JOIN SOMA! Your membership in the Sonoma County Mycological Association, or SOMA, is a great way to meet and interact with other mushroom enthusiasts, learn more about identifying fungi, and share interests such as cooking and cultivating mushrooms. Head to http://soma-mushrooms.org/membership and sign up; the season is just beginning!

The Foragers Report: September 2015

By Patrick Hamilton

"What Did You Do This Summer?"

Remember what our teachers always asked us to do in some years of grammar school on that first day back from vacation? The short piece on how much fun we had? Brief reflections to jog us back from the freedom-filled then and into the now of the classroom and its confines?

Well--what did you just do? And in the springtime right before? As far as mushrooming goes/went, hmm?

Did you end last coastal season with that fab picking time of "pinetrells" under the fog-dripped stands of Bishops? Did you take advantage of the late season porcini mini flush in the same hab?

Or maybe you also did pay attention to the burns and planned your attacks as the fire retardant bombers do?

And if you did could it be that you had a pretty frickin' good morel picking season? That you kept your fungal demons at bay by denying them their usual months of no collecting? Did you?

Well--if attention was paid to the Internet discussion groups like MushroomTalk or right around here at SOMA's Yahoo list you could have learned stuff, found out directly--or obliquely if it was me talking--just what was happening up there in our High Sierras, what was occurring in almost real time and what had gone on, and what should be having to happen too. Did you have at it?

If you were astute and acute in your garnering info then you might have been able to go right up to the King Fire burn above and beyond Pollock Pines and pick to your ole heart's content and fill your collecting bags and baskets and buckets with all sorts of *Morchellas* of various species.

If you went and did some recon back in early March as soon as the snows melted at the lower elevations a good idea of the burn area--from the ground in real view rather than virtually via a fire map -- you could see the extent of that fire. Whoa!

And if you kept going to see what was higher up, before, during, and after the snows (which came sporadically until May, intermittent with the good rains) you saw those early signs of maybe morels-to-be like snow plants, young Miner's lettuce, orange cups, etc--all the usual cool stuff.

And because of the consistent and persistent (and odd) rain and varying habitats too we had some real fine fruitings of morels of many colors.

There were white morels (*M. frusrata*), yellow ones *(M. americana*), red-brown (*M rufobrunnea*), black "burns" (*M. tomentosa*), and pinks and greenies and all colors it seemed in between.

And when I mean "in between" I mean to say that these fruitings went on not only in between the rains but during them also (duh).

Morchella tomentosa **Taylor Lockwood**

There were morels in the same areas week after week after many, many, folks left their trod marks all over those burnt woods. Morels popping up in the heels and soles of size 12's

& The Foragers Report Recipe

extra wides appeared to heed no rule I'd ever known. No matter where you went--to the same places exactly--there would be morels (of different hues) right there again. Yikes!

To my figuring over 600 pounds were picked by just normal non-commercial-at-all folk in the same elevation band, in the same 250 acres or so, from April to early May. Hmm. . . noice!

Then there was another cool thing that did happen this last summer: A real nice flush of Sierra fall porcini came upon us who did go check certain spots after those splendidly abnormal July thunderstorms.

These favorites of many edulis gatherers and gourmands were hard as rock and bug-free--if they were not picked up Highway 50, a.k.a. the "bug zone"--this past summer.

Why Highway 50 got all those *Boletus* bugs we (my picker buddies) do not know but elsewhere the bugs did not seem to go.

So what will you do this fall? Opportunities to learn a lot are out there: Our SOMA SPSP monthly forays and popular pot lucks are real good places to be the 1st Saturdays after the 3rd Thursday (who made that formula up?) from September until April or maybe May. Other private groups also go out

But what's not to keep private is a good recipe and here is a simple one that's not really a recipe but a method which you can use again and again with many mushrooms -- especially all the *Russulas* we'll be picking under Doug-fir this fall and winter:

Turn oven on to 450. Slice most any edible wild (or button) mushrooms approximately 3/8" thick and toss in good olive oil until coated. Add flakey sea salt, toss again. Spread out on a sheet pan and roast about 10 minutes. With a spatula or spoon turn them around and over a bit and continue to roast until crispy at the edges and cooked through--about 15 minutes or so more. Grind some pepper on them. Voila!

Roasted *Russulas* **Credit: David Schiller**

Armillaria mellea: A Love-Hate Relationship

By Meredith Sabini

In forty years of foraging, I've managed never to poison myself on a mushroom. But I did make a neighbor's wife very sick once, long ago, when I shared with them the overflow of *Armillaria mellea,* Honey mushrooms, growing at my cabin. It was Thanksgiving week, and around the base of an old pine was an enormous fruiting, 3-4' in diameter, with more than 250 caps. I called to tell Andrew, an Italian vintner, about this bounty, knowing he had his secret sources for Chanterelles among valley oaks.

He was delighted by the news and said he'd definitely take some off my hands. To make it more manageable, I cut the fruiting into quarters, and took one portion down the mountain to their house. It was only years later, while we were having lunch on their patio, amidst the lovely fig trees, olives, and Zin vines, that Barbara confessed she'd been up all that night, vomiting, and hadn't been able to even look at another mushroom for a whole year. I was grief-stricken, and said I was terribly sorry.

By this time, I'd learned that Honeys shouldn't be handed out or fed to guests indiscriminately, since some people do exhibit the type of allergic reaction she had. I told her that now I knew better, and explained that just as some folks are allergic to shrimp or nuts or strawberries and may not know it until they have eaten them, people can be allergic to some mushrooms, and Honey is one of them. I didn't tell her that none of the guests at the meal I served, which included Honeys cooked with turkey stuffing, got sick.

You might think that after such a bad mark on my record, I wouldn't be an advocate for the consumption of *Armillaria mellea*, but I am. They are too abundant a species and, to my taste, too good in flavor to relegate to the compost heap. Mushroom season is just around the corner and, though fruitings in general may be impacted by the low rainfall this year, Honeys are bound to show up somewhere. I've learned to expect them for Thanksgiving, so regular are they; but a dry year can delay their fruiting. Like so many species, once you know where their root system is, you can look for them in the same vicinity. That old pine tree has nothing left to feed on, and the mycelium has spread out around it, farther each year, so that Honeys now fruit as much as 30' from its base. They come up

.....*Armillaria mellea*: A Love-Hate Relationship

in clusters all over the hillside, naturalizing like spring bulbs. Even though I easily recognize them, I still look for the white spores that drop on lower caps or I take a print if there are none. What's kept me safe is adhering to a promise, made when I began this hobby, not to eat anything I wasn't 150% certain about.

My impression is that Armillaria isn't especially popular among mushroomers. They're certainly not in the top echelon of edible fungi – morels, boletes, Chanterelles – and never will be. Even oysters seem to hold a more elevated status than Honeys, tho they seem pale in both color and flavor by comparison. Honeys are perhaps on the same level as Inky cap (or Tippler's bane) – easy to find and identify; equally risky to eat. (*C. atramentaria* act like Antabuse when consumed with alcoholic beverages.) But I've never heard anyone speak disparagingly of *Coprinus comatus* because of their tendency to deliquesce or upset stomachs; people don't walk away or turn their noses up when coming upon Shaggys fruiting by the roadside. What is it about *Armillaria* that evokes such disdain?

An arborist friend of mine once offered me all the Honeys his crew came across during the season – which, he said, is always too many – because he can't stand them, they are "so destructive." Their common name is "oak root fungus," and they do colonize not only oaks but also roses and related species. Could this explain why we might be inclined to avoid collecting them for culinary purposes? Maybe, but I'm not entirely convinced. After all, we don't avoid buying shark at the fish market or ordering it grilled at the restaurant just because of its species' reputation for nibbling the toes and fingers of swimmers; we don't turn down escargot in garlic butter just because their cousins are out munching our garden greens.

But maybe I'm underestimating the impact of *Armillarias*' bad behavior as a blight on the landscape. It doesn't wait until a tree is dead to start the natural recycling process, but it gets a head start while it's alive. It's a ruthless parasite, no doubt about it. It's akin to mistletoes that haven't evolved enough to know not to kill their host.

The impression that mushroomers don't like Honeys is something I've picked up over the years, at forays, at the Fungus Fair. I had a chance to test it informally at Camp last year when I was helping out at the display tables. There were some modestly good-looking specimens of *Armillaria mellea*, and I would ask visitors, informally, if they had tried it or if they like it. The majority answered either that they hadn't tried it or that they didn't like it; I didn't encounter anyone who claimed to be fond of it. That tally shifted at the volunteer picnic when I happened to recount the arborist's offer of Honeys; Charlie Thurston leaned over and quietly asked for his phone number. (I'm glad to share it; He's a good arborist!)

I've also wondered if Honeys are shunned as a culinary choice simply because they are so common. Hardly any effort is required to locate a nice crop after the first big rains; no arduous hiking on mountain trails after a fire, as for morels, or scurrying secretly under oaks, as for Chanterelles. Last winter, I found a large cluster of Honeys near the Mill Valley Post Office, freshly blooming at the base of a street tree. With just a pocket knife, I trimmed off two dozen caps and carried them in my hands back to my companion's cottage to cook them up for dinner. Several months later, I walked that block to find out what kind of street tree they had colonized; to my surprise, it was a liquid amber. No

.....*Armillaria mellea*: A Love-Hate Relationship

one's gonna like that. Obviously, they were not cultivated; but would they qualify as wild?

How interesting could such a specimen be, growing in broad daylight? Honeys don't even do anything weird like turning blue when cut or oozing peppery orange milk. Perhaps it's like with potatoes – when you can buy red fingerlings or purple Peruvians, why settle for plain russet? There was a night in the early 70s when I wished I'd eaten a russet rather than the Honeys I'd picked in Buena Vista Park, in the City. I had a stomach ache and felt unpleasantly queasy; as the evening wore on, I got sicker, but not sick enough that I couldn't call the mushroom hot line. Across town the specimens went, in a taxi, paid for in advance; by ten o'clock, the verdict was in: they were Honeys, and I was grateful to have nothing more than stomach flu. This remains the best reason to avoid *Armillaria mellea*: they could potentially make you sick. Mushroom reference books may say that it can be "indigestible" for some people or that it must be cooked thoroughly to avoid stomach upset, but I believe this information is inadequate and does not convey the extent of the problem. They should be safety-tested by all who eat them. But even Arora rates them as "eminently edible" and "a very passable substitute for shiitake." I agree: they are very like shiitake in flavor, cooking style, and culinary uses.

I used to offer to trade any morels or Chanterelles I found for any Honeys other mushroomers found, a statement that surprised many. Upon hearing this, David C. once guessed that I probably wasn't cooking the former correctly, and gave me instructions. *Armillarias* also have to be cooked right, and some suggestions follow. But first, you have to be sure your identification is correct – that all the macroscopic features of what's in your hand match the features listed in a reliable key, and spores are white. They're easy to identify, once you get accustomed to their terrain- and weather-based variations.

If you follow the precept of thinking globally and acting locally, then Honeys meet the criteria on both counts. They are a locally abundant food source, with plenty of protein and surely one of the highest umami rating, satisfying vegetarians and meat-eaters alike. At the global level, the largest and one of the oldest living organisms on earth is *Armillaria gallica,* also an edible honey mushroom. Found in the Blue Mountains of eastern Oregon, the fungus is at least 2400 years old and covers 2200 acres, meriting the name "the humongous fungus." (See E. Bone, *Mycophilia*, pg53). When you sit down to sample this taste-treat, picture its cousin out there spreading delicate mycelia over the land.

Remember these tips:

Safety test: This is a good practice with any new specimen. It's slow but sure, and eliminates the potential false positive reaction that can come when anxiety itself produces a GI upset. The first morning: saute a small bite and eat it alone or with something your stomach is accustomed to for breakfast; wait and see. If all goes well, the next morning, saute a small cap, 2-3", and eat this, again with nothing novel. If there are no untoward reactions, on the third day, eat a regular portion of the new shroom.

Cooking Honeys: Honeys are a hearty, solid fungus that hold up well in all sorts of cooking methods. They are wonderful stir fried with rice or grains, added to omelets, in curries or soups with potatoes or barley, in stews mixed with other mushrooms. Cook the youngest caps, avoiding the tempting huge ones with rust spots on their gills, as their flavor is strong, even unpleasant. Cook within three days of picking and do a maggot check by slicing each cap in half. Saute Honeys in ghee, butter, or your choice of oil (except olive) on medium high heat. They need to be thoroughly cooked, and a little water, broth, or soy sauce can be added to help them stew.

Drying: Honeys dry very nicely and, given their abundance, make a good choice to keep on hand. Slice them and lay out on a wire rack; put them in the oven at a low temp until dried, checking on them often so they don't dry too fast. You can also dry them overnight atop a woodstove or in an electric humidifier. Caution: I once dried a huge quantity in a gas oven overnight, with just the pilot light for heat, and by morning had a fine crop of fly larva; the oven functioned as an incubator. Higher heat eliminates this.

Freezing: Honeys also freeze well and keep for about 6 months. Saute them over relatively high heat until they are about ¾ cooked. Let them cool and pack them in airtight glass containers.

Photo of the Month

By Amy Earl

A Host of *Laetiporus gilbertsonii*, or Chicken of the Woods

Credit: Amy Earl **Courtesy: MushroomObserver.com**

Laetiporus gilbertsonii grows on dead or mature hardwoods and has been reported from a very wide range of host trees, such as *Quercus, Prunus, Pyrus, Populus, Salix, Robinia,* and *Fagus*, occasionally also from conifers, from August to October or later, sometimes as early as June. In the parts of Sonoma County with a maritime climate, this species is usually found on *Ceratonia* and Eucalyptus. It can usually be found growing in clusters.

The mushroom causes brown cubical rot on the heartwood in the roots, base and stem. At first the wood is discoloured yellowish to red. Later on it becomes reddish-brown and brittle. At the last stage the wood can be rubbed like powder between the fingers.

The outside inch or so of the freshest finds, weaping fluid, is the best for cooking.

A specimen weighing 100 pounds once was found in the New Forest, Hampshire, United Kingdom, on 15 October 1990. Get your basket scales out.

Recipe of the Month:

Adapted from Mushroom-Appreciation.com

Chicken of the Woods

This easy chicken of the woods recipe was adapted from Italyville.com, an awesome and delicious Italian cooking blog. It's a simple and tasty way to enjoy their flavor and texture. Serve it as an appetizer, side dish, or add it to meat or pasta.

Ingredients:

3 cups chicken of the woods mushrooms, cleaned;
1 tablespoon olive oil;
3 cloves garlic, minced;
2 cups of tomato sauce;
1/2 cup dry white wine;
Salt and pepper to taste.

Laetiporus sulphureus

Credit: MushroomHunter.com

Clean the mushrooms with a damp cloth, and then either tear or chop them into small pieces.

Warm the olive oil over medium heat and add the garlic. Let it cook for one minute.

Add the mushrooms and cook for 10 minutes, stirring occasionally as they turn a vibrant orange.

Pour in the white wine and cook for another 5 minutes.

Add the tomato sauce and let the whole thing simmer for another 10-15 minutes.

There's a lot to enjoy about the chicken of the woods, whether admiring its vibrant beauty in nature or exploring its possibilities in the kitchen. Try to get your hands on a specimen and tweak some recipes of your own.

Enjoy!

(I'll give you another hint....they're REALLY good deep-fried).

SOMA Scholarship Recipients By Rachel Zierdt

This year SOMA is proud to announce 3 graduate level scholarship awards. These go along with the 5 awards we presented at the Healdsburg Science Fair and the 4 we gave at the Sonoma County Science Fair.

Members Lee McCarthy Smith, Jim Wheeler, and Rachel Zierdt were the committee who read applications and awarded the following graduate level scholars $1500 each.

Our first winner is Jade Florence who is studying for a PhD. At Oregon State University. She is investigating the biology of an Ascomycete pathogen, *Monilinia vaccinia-corymbosi*, to determine whether a management method can be developed for use in blueberry production. Her project has been conducted in collaboration with the Pacific Northwest Center For Alternatives to Pesticides and 2 blueberry growers. She will be using her scholarship money to study in a 6 month work/study abroad opportunity. She will be researching the fungal disease, Fusarium Wilt of Watermelon, caused by Fusarium oxysporum, with the support of the Laos Department of Agriculture and Forestry.

Anne Kakouridisis our second winner this year. She is a graduate student in the lab of Professor Mary Firestone at UC Berkeley. Her Master's project investigates the role of arbuscular mycorrhizal fungi in the carbon cycle and their potential to mitigate climate change by sequestering atmospheric CO2 in the soil. Her scholarship funds will be used to pay for AMF DNA by Illumina sequencing.

Our final 2015 winner is Jackie Shay who is studying for a Master's Degree at San Francisco State University. She has traveled to Madagascar where she studied the *Marasmius* mushroom group. This genus plays a key role in forest ecology, decomposing plant litter. Her intention is to better understand the evolution and biodiversity of this genus. She is partnered with the California Academy of Sciences and their biodiversity research center located in Antananarivo, Madagascar. She has already discovered some novel species. Her scholarship funds will also go directly towards sequencing and genomic analysis.

As always, we are super impressed by the high levels of scholarship and rigorous training that our applicants have. Thank you SOMA campers who have helped source the funds so we at SOMA can continue to help fund scientific research by honoring worthy science students.

Marasmius plicatulus Credit: Mycoweb.com

Bee Friendly Research Update by Alex Taylor

(Adapted from News from Fungi Perfecti)

In our last newsletter you may have read about our Bee Friendly research initiative. This is what we are calling our research, development, and outreach campaign to draw attention to ways that fungi may be able to help reverse the devastating declines in the global bee population.

Our approach stems from the philosophy that synergistic problems require outside-the-box thinking to discover synergistic solutions (for more information about our philosophy and approach, see Newsletter #5.)

Apis mellifera, the Western Honey Bee
Credit: BeeWorldProject.

Over the past year, Fungi Perfecti, LLC has partnered with the Honey Bee Laboratory at Washington State University to research ways to use beneficial fungi to improve honey bee health. Scientists Walter S. Sheppard, PhD and Brandon K. Hopkins, PhD have begun preliminary bench-scale testing on two "MycoBee" approaches with generous financial support provided by the WWW foundation, Lee and June Stein, Dusty Yao, Paul Stamets, and Fungi Perfecti.

In the first set of bench-scale experiments, extracts of seven species of polypore fungi were fed to groups of caged honey bees to determine the effect of fungal extracts on captive life span and viral burden.

For each type of extract, mixed aged honey bees from a single hive were collected on a single day and distributed at random into 16 cages of roughly 100 bees each.

Each set of 16 consisted of four control cages (fed sugar syrup), four low concentration cages (fed mycelium extract in sugar syrup at 0.1% v/v), four medium concentration cages (fed mycelium extract in sugar syrup at 1% v/v), and four high concentration cages (fed mycelium extract in sugar syrup at 10% v/v).

In each group of four cages, three cages were used for longevity tests and the remaining replicate cage was used for total viral particle testing.

The preliminary results suggest that fungal species and feeding concentrations vary considerably in their effect on honey bees. Some species, such as the Chaga mushroom (Inonotus obliquus) had no detectible effect on captive longevity at any concentration, while others, such as the red-belted polypore mushroom (Fomitopsis pinicola), appear to improve captive lifespan and may decrease viral burden at certain concentrations (see figure).

Additional experiments to confirm or refute these initial findings are currently underway and the research will be submitted to peer-reviewed journals for publication as results warrant.

A second set of bench-scale experiments is currently underway where the entomopathogenic fungus Metarhizium anisopliae is being investigated for its ability to control Varroa mite populations using non-spore-based delivery systems and mechanisms of action. While promising for its paradigm-altering potential for beekeeping, this research poses much greater logistical and scientific challenges for demonstrating efficacy and practicality than the longevity and antiviral research.

Female Varroa destructor mite on the head

Varroa Mite **Credit: Wikipedia**

of a honeybee nymph. By Gilles San Martin from Namur, Belgium (CC BY-SA 2.0), via Wikimedia Commons.

Over the past ten years, Fungi Perfecti has developed novel approaches to fungal biocontrol, which have resulted in several proprietary technologies.[i],[ii],[iii],[iv]

These approaches include the preparation of fungal extracts to limit the spread of zoonotic diseases such as bee viruses, the development of fungal biocontrols that use "pre-sporulating" mycelium, and the use of extracts of entomopathogenic fungi as insect attractants.

While developing Metarhizium anisopliae as a Varroa mite biocontrol product poses significant challenges, the strategic application of Fungi Perfecti's original innovations may help turn the tide on this important research.

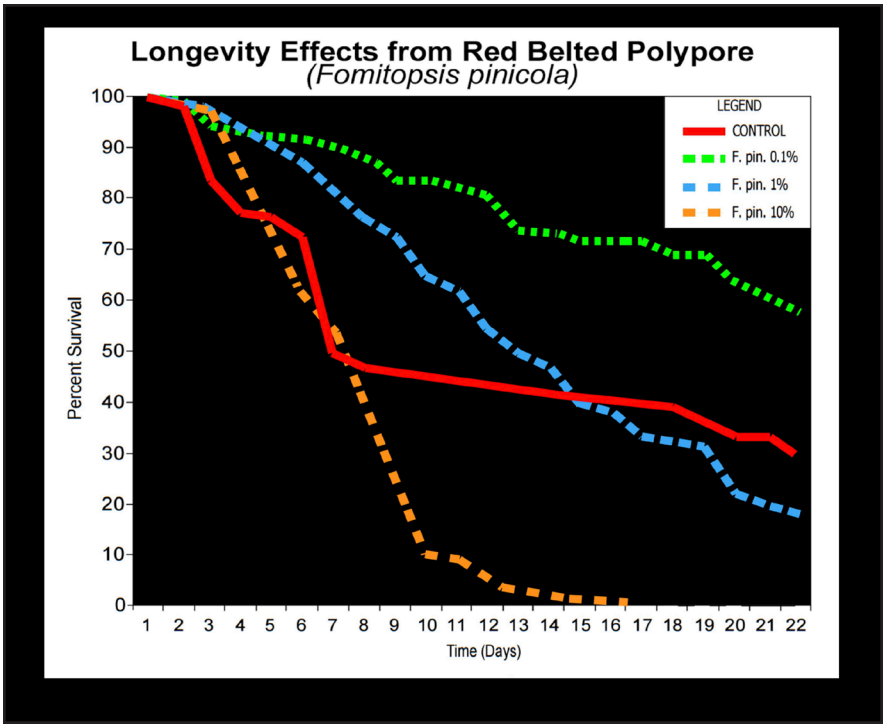
First, research with social insects has generally demonstrated that the presence of fungal spores induces specialized grooming behaviors designed to remove and limit transmission of potentially dangerous fungal pathogens.[v]

This effect may partly explain why other researchers' efforts to apply Metarhizium spores to bee hives to control Varroa mites have failed to provide effective control. Counter-intuitively, the pre-conidial (non- sporulating) mycelium of the same fungal species has powerful insect attractant properties.[vi]

Second, the use of dehydrated pre-conidial mycelium as a biocontrol delivery system may reduce the germination time required for spore-based approaches.

Metarhizium spores generally require 18 to 48 hours to germinate, and three to ten days to infect and kill Varroa mites.[vii]

Notably, research by James demonstrated that spore germination rates decrease exponentially upon introduction to bee hive temperatures.[viii] The combination of these limitations points to a fundamental problem with the status-quo approach of applying spores as Varroa treatment. In contrast, dehydrated and powdered pre-conidial mycelium (aka hyphal fragments) of thermotolerant Metarhizium strains, may be able to resume active growth more quickly after re-hydration than spores.



This approach is expected to significantly reduce

issues of timing, concentration, and loss of viability after application in a hive.

In line with our multidisciplinary and synergistic philosophy for developing fungal-inspired treatments for improving bee health, our future research goals include:

* Development of concentrated fungal extracts that can selectively reduce honey bee viral burden when fed in sugar solution.

* Development of effective and practical Varroa mite control products.

* Testing the effect of fungal extracts on honey bee detoxicification pathways including cytochrome p450-mediated pesticide detoxification.

Controlled field-scale testing and beta testing of bee health products after bench-scale optimization of preparations and application methods.

The research-to-date has been made possible by the generous support of individuals, companies, and private foundations. Continued financial support of the WSU Honey Bee Research Laboratory makes this novel research possible.

If you would like to contribute to this research, donations to WSU can be made securely online here:

https://secure.wsu.edu/give/default.aspx?fund=3345&utm_source=Fungi+Perfecti+Newsletter&utm_campaign=eb96fc9ae3-Newsletter_6_6-2015&utm_medium=email&utm_term=0_bb0b442a80-eb96fc9ae3-318367125

Just write "for honey bee fungus research" in the comments section. Alternatively, checks can be sent directly to the bee program with a letter explaining the intent of the donation. Make checks payable to "Department of Entomology, WSU": PO Box 646382; Attention: Adam WIlliams Department of Entomology Washington State University Pullman, WA 99164-6382

And of course, your continued support of www.fungi.com allows us to reinvest into research efforts such as this. Many thanks to all of you who aid us in these endeavors!

FOOTNOTES:

[i] Stamets, P. 2014. U.S. Patent # 8,765,138. "Antiviral and antibacterial activity from medicinal mushrooms."

[ii] Stamets, P. 2014. U.S. Patent # 8,753,656. "Compositions for controlling disease vectors from insects and arthropods using preconidial mycelium and extracts of preconidial mycelium from entomopathogenic fungi."

[iii] Stamets, P. 2015. U.S. Patent Application # 14/641,432: "Integrative fungal solutions for protecting bees." Filed March 8, 2015.

[iv] Stamets, P. 2013. U.S. Patent # 8,501,207. "Mycoattractants and mycopesticides."

[v] Reber A., Purcell J., Buechel S.D., Buri P., Chapuisat M. 2011. The expression and impact of antifungal grooming in ants. J. Evol. Biol. 24, 954–964.

[vi] Stamets, P. 2013. U.S. Patent # 8,501,207. "Mycoattractants and mycopesticides."

[vii] Kanga LHB, Jones WA, Garcia C. 2006. Efficacy of strips coated with Metarhizium anisopliae for control of Varroa destructor (Acari: Varroidae) in honey bee colonies in Texas and Florida. Exp. Appl Acarol. 40:249- 258. DOI 10.1007/s10493-006-9033-2.

[viii] James R.L. 2009. "Microbial Control for Invasive Arthropod Pests of Honey Bees," in: Progress in Biological Control Volume 6 - Use of Microbes for Control and Eradication of Invasive Arthropods, Eds: Hajek A.E., Glare T.R., O'Callaghan M. Springer Science+Business Media B.V.

Alex is an Assistant Research Scientist with Fungi Perfecti. He has been there for nearly six years and supports the research team with technical writing, project management, and development activities. He lives in Olympia, WA with his wife, two children, five chickens, and several thousand honey bees.

SOMA CALENDAR, NOTICES & NOTEWORTHY EVENTS

Calendar: Sept 13; Epicurian Group

Is It Time To Clam Up? Nah: It's Time For A Stupidly Splendid Shellfish Shout Out!

If you're so inclined help put on a fishes-with-shells phantasmagoria of greatly gargantuanian gloating giddy goodnes. Yes! Appetizers All Wild Mushroomie. Do come one, do come all, to the SOMA Epicureans next bash of cooks' bounty to be held September 13 from 3 til 5 p.m. At the Graton Community Center 8996 GRATON ROAD, GRATON, CA 95444

Cooks and other helpers always not just appreciated but a must have, duh! Do inquire to Julie or Patrick, or Brian

Please register for this event at this link: http://goo.gl/forms/q1bRErTY55

Contributions for this meal are $20 per person. Send checks, payable to SOMA, to:
Chris Murray, PO Box 624, Forestville, CA 95436

Please put "Epicureans" in the note field of the check - this helps our bookkeeper. Checks must be received by one week ahead of the event in order to guarantee your place and allow the chef to esti mate ingredient purchases.

Please take note: You must be a SOMA member to participate in this event. If you are a member, you can bring a guest.

SOMA REBATES FROM AMAZONSMILE

SOMA is registered as a 501 (c)(3) public charitable organization with Amazonsmile Foundation. That means Amazon will donate 0.5% of the price of your eligible AmazonSmile purchases to Sonoma County Mycological Association whenever you shop on AmazonSmile, at: http://smile.amazon.com/ch/68-0486141.

AmazonSmile is the same Amazon you know. Same products, same prices, same service. Support your charitable organization by starting your shopping at smile.amazon.com.

SOMA Financials Available

To comply with the SOMA Bylaws, the fiscal year financials have been posted SOMA website at the following link: http://www.somamushrooms.org/about/. Scroll to the "Members Only " section. The Username and Password for access are:

UN: member
PW: Pholiota

Contribute to SOMA News!

The monthly SOMA News wants you to contribute to our pages with news about your life with mushrooms in Sonoma County and beyond. We need photos, short or long stories, academic or other musings on mycology, recipes, notices, events and more. The deadline for each issue is the weekend before the first of the month. You needn't be a professional photographer or writer to join in; just take an interest in sharing what you know and find with others!

Email me at chazwt@gmail.com or call 707-799-9766 with inquiries.

Thanks, Chaz Thurston
SOMA News editor.

JOIN SOMA!

Your membership in the Sonoma County Mycological Association, or SOMA, is a great way to meet and interact with other mushroom enthusiasts, learn more about identifying fungi, and share interests such as cooking and cultivating mushrooms.

Sure, most of what SOMA does is open to the public, but wouldn't you rather join SOMA and get all the goodies?

Head to http://somamushrooms.org/membership **and sign up!**

SOMA MONTHLY MEETING DIRECTIONS & MAP

SOMA usually meets on the third Thursday of the month throughout the year (September through May), at the Sonoma County Farm Bureau , 970 Piner Road, Santa Rosa, California, 94931. Fungi are displayed at 7 PM, and speakers begin around 7:30 PM. Bring in your baffling fungi to be identified!

Directions to the Sonoma County Farm Bureau

From the south:

- Go north on Hwy 101
- Pass the Steel Lane exit then take the Bicentennial Way exit
- Go over Hwy 101 (heading west) and then right on Range Ave
- Turn left on Piner Rd and go about 1/4 mile
- Turn left into Farm Bureau parking lot at 970 Piner Road

From the north:

- Go south on Hwy 101
- Take the first Santa Rosa exit for Hopper Ave/ Mendocino Ave
- Stay left on the frontage road (it becomes Cleveland Ave)
- Turn right on Piner Rd and go about 1/4 mile
- Turn left into Farm Bureau parking lot at 970 Piner!