

MushRumors

The Newsletter of the Northwest Mushroomers Association

Volume 25, Issue 3

August 2014

Welcome to the Fall Mushroom Season!

By Chuck Nafziger

Photo by Chuck Nafziger



Russulas emerging from the soil.

The recent rains have me excited about a new and interesting mushroom season. During a recent hike by Wallace Falls, there were many species of mushrooms fruiting, even in the relative dry of summer. That, plus the recent rains, make me think this fall will be a prolific season for us mycophiles. I still have lots of dried oyster mushrooms from the spring, and a good fall season will mean I do not have to ration those tasty foods. I smile to think of the recent compliments I received for a stir fry I served to a group of friends containing a large quantity of those mushrooms.

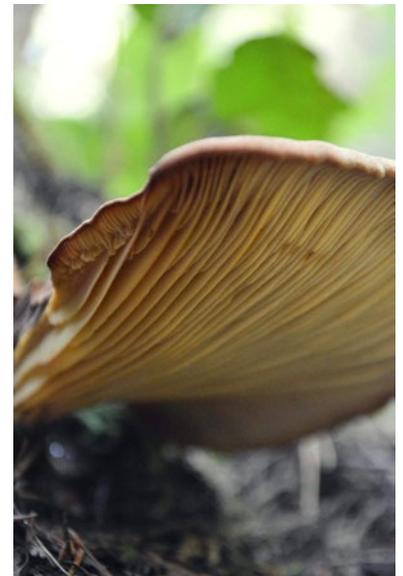
NMA has a great line of speakers for the three fall meetings; our own Buck McAdoo in September, the fantastic photography of Taylor Lockwood in October, and Daniel Winkler of Mushrooming Eco Tours in November. The forays following the general meetings are always an enjoyable way of learning more about the wonders found in the woods.

As usual, I am eagerly looking forward to the October 19 Mushroom Show. The show six years ago is what convinced me that I could learn enough about mushrooms to feel safe picking them, and each year since I have enjoyed learning more while participating in the great club effort to put on these amazing shows. In the years I have been participating, we have had every kind of weather from arid to drenched, and have always found enough mushrooms for a wonderful show. I think this year's show will be better than ever.

Christine Roberts is teaching the I.D. class this year. I do not know if the class is filled yet, but if you are uncertain about your I.D. ability, check it out. I found those classes invaluable for honing my skills at figuring out what mushrooms were appearing in my forays into the woods. For me, mushroom identification has not come easy, and I have needed all the help I could get.

Let's all hope for a wonderful fall season filled with amazing mushrooms, and spiced with a fantastic fall show!

Photo by Chuck Nafziger



Sunlight catches the margin of *Paxillus tomentosus*.

Photo by Chuck Nafziger



A tiny chanterelle, harbinger of fall bounty!

WILD MUSHROOM SHOW—October 19th, 2014!

Hello fellow Mushroomers!
Summer is almost over, which means our Wild Mushroom Show is just around the corner! Besides doing rain dances, we all need to pick a task to help with the show.

At our Sept 11th general meeting, we'll have sign up sheets to help guide you with your choice. There is something for everyone:

- Supply bark for the display trays
- Supply moss & sticks, also for the trays
- Clean up crew (before, during or after the show)
- Display tray arrangement
- Prepare snacks & lunch for show volunteers
- Hang posters & banners
- Cook samples in the kitchen for our show visitors
- Do a "Pavilion Talk"
- Art projects in the Children's Corner
- Help visitors ID fungi brought from home—we need BOTH experienced AND novice ID'ers
- Touch & Smell Table
- Club membership sign-up table
- Book sales
- Door watch
- Help organize the after show potluck (yum)
- Show photographer

Thanks for volunteering to help with the Show!
See you at our September meeting....
Maggie (co-chair with Chuck)
360-724-3158

Photo by Cynthia Hansen



Visitors marvel at the well-stocked display trays (and an enormous fried chicken mushroom) at the 2013 show.

Photo by Vince Biciunas



Fred sorting mushrooms before the 2013 show.

Northwest Mushroomers Association Officers and Contact Information

President: Chuck Nafziger (360) 724-3781, canafziger@hotmail.com
Vice President: Richard Morrison (360) 393-4297, seeddoc07@yahoo.com
Treasurer: Mariepaule Braule mariepaule@wavecable.com
Secretary: Sue Blethen
Book Sales: Margaret Sullivan (360) 724-3158 or maggie@fidalgo.net
Membership: Jen Green (360) 820-2748 or scoriojen@hotmail.com
Field Trip Coordinator: Bruce Armstrong (360)-201-2295 or bruce.armstrong45@gmail.com
Science Advisor: Dr. Fred Rhoades fmrhoades@comcast.net
Web Site Manager: Erin Moore chanterellerin@gmail.com
Mailing Address:

NMA
P.O. Box 28581
Bellingham, WA 98228-0581

The Northwest Mushroomers Association meets on the second Thursday of the months April, May, and June and September, October, and November, from 7 - 9 pm.

Meeting location is the Bellingham Public Library. We will inform you in advance of any changes of venue. Membership dues are \$15 for individuals/families and \$10 for students. Please make checks payable to NMA and send to: membership, at the mailing address above.

Field trips are scheduled for the Saturday after each meeting.

MushRumors is published on 3/7, 6/7, 8/31, 10/25, and 12/7. Club members are encouraged to submit stories, photos, recipes, poetry, and artwork related to their own mushroom hunting experiences. Submissions should be made 7-10 days prior to publication.

Editor: Jack Waytz 360-752-1270 or gandalf5926@comcast.net
Assistant Editor: Cynthia Hansen cynthiah9@gmail.com

MushRumors c/o Jack Waytz
P.O. Box 28581
Bellingham, WA 98228-0581
www.northwestmushroomers.org

Unique Habitat Reveals Intricate Mycorrhizal Relationship

By Jack Waytz

Photo by Jack Waytz



Leccinums found fruiting amidst kinnikinnick.

Several years ago, I got a call from a friend of mine who was an avid hobby flier who had built his own small airplane. He housed this airplane in a hangar on the Concrete Airstrip. It was the middle of September and the fall mushroom season was well underway. He reported that upon his takeoffs and landings, he observed a myriad of mushrooms growing along either side of the runway, and asked if I would come out to see them. Naturally, I did, and that trip started what has become several years of study, analysis, and photography of a most unique situation of mycological habitat.

The airstrip itself is about one mile long, and on either side of the runway there is an approximately 500 yard strip of greenway, which is composed primarily of kinnikinnick. It is in this kinnikinnick that I discovered that many different mycorrhizal mushrooms were flourishing. Despite the complete absence of trees, there were several different species of *Cortinarius*, one *Scleroderma*, some *Tricholomas*, *Laccarias*, and most interestingly, as many as 4 different species of *Leccinum* mushrooms, including 2 that may be previously undescribed. The most prevalent of the *Leccinums* has been identified by David Arora as *L. arctostaphyli*, derived from the Latin name of the kinnikinnick plant, *Arctostaphylos uva-ursi*. This mushroom is known from Alaska, but has never been reported from Washington.

For those who might have been wondering, it is edible, subtly flavored but tasty, and the texture is also quite pleasant. I have 2 gallons of dried material secured from the instantly legendary 2013 fall season. These mushrooms also benefitted from the ideal conditions that saw audacious fruitings of most, if not all, of the mycorrhizal mushrooms of our area.

Last year, in the event of this bountiful fruiting, I brought David Arora to the site to see for himself, this unique habitat. Upon closer investigation, he was able to ascertain that everywhere that there were concentrations of mushrooms, there was at least one seedling pine or Douglass Fir in close proximity to the fruiting bodies, suggesting perhaps yet another illustration of the mycorrhizal relationship between mushrooms and trees. It would seem, however, that the kinnikinnick plays an integral role in the growth environment, if not the mycorrhizal connection itself. Certainly, more studies will follow in this fascinating site.

Photo by Jack Waytz



Burnt Ridge

By Randy Marchand

This is the first in a series of stories by Randy Marchand, a Canadian commercial mushroom picker with over four decades of experience hunting edible mushrooms in the Canadian wilds.

The pack on my back was heavy and the pack straps were digging deeply into my shoulders. I had a tump line across my forehead that came from the top of the pack and had my name, Randy Marchand, printed in black letters. It was made from a yellow leather belt given to me by my cousin in England. This tump line had become synonymous with me and my reputation as a morel mushroom picker.

I was working my way towards a high strip of burned ridges about one and a half kilometers to the northeast. It was heavy going with the pack I had to carry. The pack consisted of five five-kilo mushroom

baskets and lids tied on with bungee cords to the wooden pack board. The pack now weighed about 75 to 80 pounds. The ground was strewn with fallen burned spruce trees that we call—or, should I say, curse—as blow-down. These trees are black, crisscrossed, clutching horrible devils that can tear you up in a hurry if you accidentally slip or are not careful. They will rip and tear your flesh and clothes and make cross-country travel very hard and dangerous.

I looked up towards the ridge system I was working towards and tried to pick out the best route. I was trying to stay to the areas of partially burned trees as here the way would be easier going and I could scout for morel mushroom that now filled the baskets on my pack. About three hundred yards ahead there was a long stretch of

Photo by Randy Marchand



orange-tinged half-burned trees that still had some of the needles on them. The ground was covered with an orange carpet of needles. This is what we call a “needle zone” and is a great place to find morels. It took me about 25 minutes of steady hiking to get to the needle zone and by that time I was hot and sweaty ready for a break.

As I reached the needle zone I looked for somewhere to take my pack off and have a rest. The ground was covered with morels; I could see they were just everywhere; big, blond, beautiful fire morels. I was very excited as I took off my pack and looked around. “My god,” I said out loud, “there are fifty baskets or more here.” My heart was just pumping now as I looked around, planing how I would pick and get all these morels out of here before some other picker found them.

I knew that I still had a lot of hard work cut out for me to get back to camp but the adrenaline of the mush rush was pumping in my veins. I picked up my pack and just threw it up and onto my shoulders as if it was now light. I started off just cruising the needle zone scouting out to see how many morels there were. They were even more profuse than I first guessed, and they were everywhere. It was hard not to step on them, especially the baby ones just coming up. I was making great time towards the ridge through the needle zone. The mushroom fever was just speeding me along and I had forgotten about the weight of the pack on my back.

The sun was hot and the sky was totally free of clouds. The temperature was a stifling 103°F. The drone of hungry mosquitoes was the only sound to be heard. There would be the occasional ruckus from some bird perched atop a burnt tree screaming a call similar to a killdeer, but much louder and more annoying. I was soon climbing the first of the ledges up to the ridge top that I was trying to reach and the pack was now beginning to get very heavy. It was now one foot in front of the other with each uphill step a grab purchase and push the leg straight.

The sweat was running down my face, dripping off my nose, and getting in my eyes. Every time I rubbed the sweat from my face, I would spread more black charcoal from all the burned organic material standing and laying about. No matter how careful you are, the black somehow seems to get on you, making you appear like you have just come up from a coal mine. After an hour or two in the burn your face is very black, the whites of your eyes are pronounced, and you appear very humorous.

The last few ledges are about 100 feet high and quite steep, and it was very hard to finish. I almost gave up and had a rest but I became stubborn and endured to the top. The view was enlightening and I could see our camp about three miles to the east. Going back to camp would be quite easy as the trees here were very small and the terrain was mostly downhill.

I took advantage of my lookout and surveyed the burn that ran to the south and west of the ridge I was now standing on. The burn was from a forest fire that burned through here last year. It had burned in a long finger consisting of over 23,000 hectares. The fire had burned very hot on the south side of the ridge system where the trees were bigger. On the north side where the trees were smaller, it had flash burned.

Depending on the weather, the best flush of morels may come in the hot burn or in the flash burn. If it is a wet spring then the hot burn will produce more morels, but if it's dry sometimes the flash burn will produce the best.

Nature will determine where and how the morels will flush. One must always remember to keep an open mind, as nature will throw you a surprise when you think you have it all figured out.

Off to the south there were a few small lakes that were surrounded by needle zones, which I logged in my memory. I took a compass reading of the lakes from the ridge top and made a few quick notes in the notebook that I always carried with me. I also made a few sketches and a rough map of the lay of the land with notes to help with future explorations. I made a note of the morels that I had seen in the burned needle zone that I had followed on my way up to this ridge top.

After a bite of food and a liter of water I choose my route to camp, picked up my pack and was on my way. I made very good time on my way back to camp with it being downhill and no blow-downs to contend with. In just over one hour, I came puffing and sweating into camp to a chorus of “you loaded again?” from my four boys that had come on this trip to the Yukon.

My son Dave rushed to help me take off the heavy pack, groaning as he felt the weight. I collapsed to the ground, laid back, and just let my body recover some of the energy that I had used in the grueling hike and pick of over 12 miles, over hard ground littered with blow-down and muskeg swamps. My other son Chris filled up the metal bucket with clean water and put it on the propane burner so I could have a well-earned shower. Ah, it felt great to be back in camp and to just relax.

It was 2:30 a.m. and we were all sitting outdoors around a fire under the darkening sky with a wonderful prolonged sunset. The colors from the setting sun enhanced our surroundings with an orange glow for the last few hours. The sparks from the fire floated up into the air to burn out, adding even more color to the majestic scene before us. The effect of the scene had an enchanting feel that had us all under its spell. This was added to by a crescent moon rising in the southern sky behind the silhouette of some burned spruce trees.

The boys were joking and teasing each other about who would carry the most morels tomorrow, when we would start to pick the needle zone that I had found that afternoon. Suddenly, there was a loud howl of a wolf off to the south, from somewhere on the ridge system. The wolf never received an answer from his own kind, but the boys joined in with the wolf howling at the rising moon, which made us all break out in laughter.

I left the fireside and went to check the generator and fill it up with gas. When I had finished I went to check on the morels that we had put out to dry under a plastic-covered two by four shed. The plastic ends were rolled up to allow free airflow through the shed and speed up the dehydration process. I spread out the last remaining morels from the day’s pick on our wood-framed wire racks, and lowered the rolled ends of plastic in case the weather changed during the night.

Then I went to the finishing dryer and stoked up the wood burner that was our heat source, and checked to see how the morels that were in there were coming along. They were doing just fine and would be just about finished by the morning. This was the last stage where we could get the heat up to 130°F to 150°F while finishing the morels and bring them to about 95 to 98% dry.

Some say that you should not dry morels too much, but leave them with a rubbery texture. I believe that this is very dangerous as this leaves the morels in a state where they are susceptible to mold and bacteria; they will also be much heavier, and the cost of shipping from remote areas is a huge consideration. Some will say that the flavor will be compromised but I believe that the opposite is true. When the morels are dried the flavor is enhanced and preferred by many chefs.

Photo by Randy Marchand



When I had checked everything and was satisfied, I went back to the fire and grabbed one last beer before heading for bed to try to get a few hours' sleep. Our routine would soon change to where we would work through the night and sleep in the day, now that we were into the full flush of the morel harvest.

In the morning we were all up very early, as the boys were very excited. We had our breakfast and then prepared our packs and gear to be ready for a heavy day of picking and packing. My oldest son Chris had lost the draw after breakfast and had to stay in camp and work on drying morels, watching camp, plus have dinner ready for us when we got back around midnight. We would be working at least 18-hour days, if not more, and seven days a week. This would be our schedule until all the harvest was done.

The four of us started off full of vigor and with a spring in our step. We picked a route close to the way that I had used yesterday on my return to camp. We each had lots of water, food, and six empty mushroom baskets with lids on our pack boards. It took us a little more than one and a half hours to get over the ridge and make the beginning of the needle zone.

Photo by Randy Marchand



The boys were very excited when they saw all the morels standing there in such abundance. I could see that the morels had grown overnight and the volume had increased while I had been in camp. We picked a shady spot to make a place for our packs, in order to help keep the mushrooms we picked from heating up in the sun. We took off our packs and set out to pick with great fervor. Within two hours we each had filled all of our baskets and had them bungee-strapped onto our pack boards.

After a well-earned break for some food and water we started the climb back up the ridge with six baskets each bungeed onto our pack boards. The weight was staggering and must have topped the scale at over 95 pounds. The hill was grueling and soon had us all puffing and sweating. Mike said, "last one to the top has to stay in camp tomorrow." Well, the boys exploded up the hill racing each other and were soon way ahead of me. I just kept my pace and was last to the top, so I guess I would just have to stay in camp tomorrow.

I smiled at the boys and said, "thanks, pick on an old man eh?" And they replied, "you have earned it as usual." We made three round trips that day but carried only four baskets each on the last trip. We had picked and packed out 64 baskets (totaling 950 pounds) of morels. It was a record-breaking day, and we still had one-third of the needle zone left to pick.

When we came into camp that night with the last load, Chris had already spread out our previous loads. The air dryers were almost full and there were only a few racks left; this last load would run us into overload. We all were really tired and beat but glowing and totally pumped. When all the day's work was done and we had rehydrated with coffee and beer we sat around the fire and talked about the load that we had harvested that day. We decided that we had to change our plan of attack now that we had picked the needle zone once. We decided that we would take some plastic and wire screening back to the needle zone and set up a long pre-dryer to save time and use the day's hot, sunny hours to our best advantage. This meant that we would cut the weight we had to carry down to a portion of what we now were carrying. With this procedure, a day's pick would have lost about three-quarters of its weight and shrunk in size by at least 50%. We would then be able to reach farther out into the burn, and attempt to get to and pick the little lakes that I had on my map that I made from the top of the ridge.

Late the next day the boys came into camp with seven baskets of morels each that were 75% dried. They were only able to pick for a few hours that day as they had to build the field pre-dryer before picking any morels. It had been a hot, windy day, just perfect for pre-drying. Over the next few days we worked like mad and even spent a few days and nights non-stop, sleeping in our clothes right on the burn. We had continued to pick the needle zone every second day and had reached the little lakes where we had found morels everywhere in the needle zones. Some shifts would run 30-40 hours, and we were getting touchy and very burned out.

It was getting time for a Dawson City trip to unwind and recuperate some of our energy. I brought it up with the boys, who immediately let out a whoop; we all agreed to leave as soon as possible. We were on our way to

Dawson within five hours and our spirits were already lifting. We had left camp with a fellow picker and trusted friend. It would be his job to finish drying the morels there and guard camp.

As soon as we hit the first town, I searched out a telephone and phoned my friends Nancy and Haine at the Midnight Sun hotel in Dawson. I booked the log cabin that they sometimes rent out. This cabin dates back to the Klondike gold rush of 1898. It has three double beds and would be just perfect for us. Nancy was happy to hear from me and was very accommodating on the phone; she had everything all arranged when we arrived in Dawson.

Dawson was just what we needed. The service and the atmosphere of the Midnight Sun was great, as were the rooms, bar, cabaret, restaurant, and of course the music. The atmosphere in Dawson is very spirited and has a very Klondike gold rush feel to it; it had us all ready for round two of mushroom picking within a few days. It was with sad farewells that we left Dawson and headed back for camp a mere 600 miles away.

When once again we were within sight of our camp, it felt like we were coming home and it was good to be back. Tim, the fellow picker we had hired to stay and watch camp for us while we were away, was standing by the dryer with a big smile on his face. The camp and guard were fine and he was happy to see us, but the first thing he asked was, “did you remember the beer?” We just opened the back of the cube van and his eyes lit up as he saw the pile of beer boxes.

After we had unloaded our new supplies, we all sat around the fire to discuss the rest of the season and talked about how we would spend our money and how much we liked Dawson City. I told the boys that we should hold onto our money ‘til after the Pine mushroom season was finished, and that Dawson is fun in the summer but that I thought that the winter would be totally different experience.

It was one of those warm nights with a warm breeze blowing. We went to bed and awoke wholesomely refreshed the following morning. The next day we went back to the needle zone across the ridge and found that the morels were ready to pick again but the volume had fallen off quite a lot. We only made one trip that day and it took the whole day to get our five baskets that we had taken with us that morning. The next few days were similar as we traveled to the little lakes and back. We settled into the slower pace that the flush gave us with a bit of an increase in yield a few days after a heavy rain storm.

We knew that we had about two more weeks of our harvest before we cleaned up our camp and left the burn to head back on the long drive to British Columbia. The season was over ten days later and we decided to just hand about for a few days, to camp and fish as we slowly took down our camp and drying operation. It had been a very good morel season and a great time in the Yukon. It was with mixed emotions that we loaded our vehicles and started for home. As we hit the Yukon - BC border, we shouted out of the van's windows, “see you next year,” to the forest that was speeding by.

Photo by Randy Marchand



I was supposed to write about *Russula exalbicans* Secretan, which I got all excited about when I found it all over the lawns of our apartment complex shortly after moving to Bellingham from Vancouver Island. It was associated with the birches there, which I thought were European rather than native birch (note that there are no native birch on Vancouver island). This was a first record of *R. exalbicans* in the Pacific Northwest. Lest you think this is unusual, there are so many undocumented species of mushrooms out here to be found that getting something “new” in a season is a high probability event!

Photo by Christine Roberts



Russula versicolor collected under birch in Fairhaven showing varied cap color and yellowish bruising at the stipes' bases.

So why did I think it was *R. exalbicans*? Well, when I tasted it, it was initially mild with a distinctly peppery aftertaste, not really acrid, but definitely not completely mild either. It varied in colour from reddish purple to pale greenish white; some were dull green, some a bit more reddish, some brownish purple, and they faded dramatically. The cap surface, slightly viscid when wet, was often broken up into minute scales, a term called ‘chagrinat’ in Romagnesi, which refers to shark skin – a leather popular in the 1920’s for elegant furniture.

The stipe had yellowish bruising at the base, sometimes further up but not discolouring inside the stipe; occasionally this yellowing showed up on the cap surface of old fruitbodies. It had a fruity smell like stewed apples, and a deep cream spore print, on Romagnesi’s scale, IIIa. All these characters suggested

to me something close to the *Sardoninae* group (like *R. queletii*), except with birch, thus the *Exalbicantinae*—a sister taxon, to which it keyed out easily in Romagnesi. I looked through my books in that section and—bingo! *Russula exalbicans* had all those features. When I checked the spores, they matched the descriptions and drawings in Romagnesi and in Sarnari; the photos matched, too. Even the pileocystidia had the sort of bubbled contents often seen in that section, though they did not stain as strongly in sulphovanillin as I would have expected; but then the staining reaction of this chemical seems to be related to the acrid taste—the more peppery, the darker in sulphovanillin. I thought I had it nailed, and for the next couple of years I confidently pronounced these mushrooms as being *R. exalbicans*!

But my original photos and descriptions of “*R. exalbicans*” were on a now defunct computer. I nipped over to the site and combed the lawns for more collections. Sparse pickings since the weather was very dry, but enough small ones showed up to star in a new photo and make a new collection. I like to look things up from the beginning again when I collect something I haven’t seen for a couple of years, just in case it got renamed in the meantime. That is when I turned up the description for *Russula versicolor* in Harry Thier’s book Agaricales of California: III: Russula. The description for this species also matched pretty well the characters of my mushroom, including an association with birch. It also keyed out (not so easily) to *R. versicolor* in Romagnesi, but it appears there are several forms varying in spore size. *R. versicolor* is placed in the *Tenellae* along with *R. puellaris*, which normally has very different characters to those in the *Exalbicantinae*. Most other species in the *Tenellae* taste mild, have larger and often darker spores and don’t fade as dramatically as *R. versicolor*. So what are the differences and how can they be told apart?

Firstly, Schaeffer originally described *R. versicolor* from North America, so it is an indigenous species whereas *R. exalbicans* is European and has not been reported from the Pacific Northwest. Periodically, European species turn up in places they never were before due to the introduction of host trees. Witness the appearance and spread of *Amanita phalloides* in this region, so we need to be careful of assuming something is or is not likely to be here.

Secondly, although the spores of the two species are very similar in shape, ornamentation and colour, those of *R. versicolor* range slightly smaller than those of *R. exalbicans* by around 1µm in each dimension. The clincher,

though, is in the cap cutis where specialized hyphae termed pileocystidia have rounded ends and more septa (1-3) in *R. versicolor* than those of *R. exalbicans* with 0-1 septa and occasional capitate ends. The latter also react more strongly with sulphovanillin. The difference is subtle and you need a microscope and some nasty chemicals to see this.

Besides the obvious resemblance to *Russula exalbicans*, three more follow here:

- *Russula abietina* – Differs by its association with fir, its slightly darker yellow-ochre spore deposit, and its mild taste.
- *Russula gracilis* – Found in mixed woods, it differs by having no parts that change color when bruised. It appears to be more viscid with a more acrid taste.
- *Russula puellaris* – An extremely fragile species that differs by its mild taste, more tawny-vinaceous cap centers, and tendency for the entire fruiting body to turn yellowish in age.

Description of Fairhaven collections of *Russula versicolor*

These Russulas appear in late summer through to the first really hard freeze, particularly where the grounds have been watered, and in some years can be quite abundant. The colours can vary from dark dull purple, light red, pale green, or pink to pretty much white, and if they were not all found together you would think they were unrelated. They have a peppery taste, sometimes only slight, and the flesh stains a dingy yellow especially at the base of the stipe, but this yellowing is quite variable in intensity. The spores are unusually narrow for a species in this group of Russulas.

- Caps - 3 to 8 cm, convex but soon cushion-shaped (depressed in centre, margins rounded), eventually plane (flat) but retaining a depression in the centre. Colours very variable, slightly brownish shades of cream, purple, pink, reddish, grey to dull green, fading almost to white with the surface breaking into minute concentric patches—chagrinat. Not very viscid even when wet and drying matte. Sometimes developing dull yellowish tints which make those with purple caps appear brownish.
- Flesh - White, initially quite firm but brittle, becoming softer and more fragile in age, not changing to slightly yellowing at and under the cutis.
- Gills - Deep cream with a slightly orange cast when viewed edge-on, rounded at cap margin, adnate at stipe, no forking or subgills, moderately spaced, broadest in outer third, pliable, not bruising.
- Stipe - Short, about $\frac{1}{3}$ to $\frac{1}{2}$ the cap diameter and about 0.8 to 2.5 cm thick, broadest at base, white, rarely with a pinkish tinge, generally bruising strongly yellow-brown especially at the base and occasionally throughout. Not bruising as much inside. Stipe flesh initially solid, developing irregular cavities inside and eventually being hollowed out by larvae.
- Spore print - Deep cream to pale yellow, IIIa on Romagnesi's scale.
- Habitat - Around planted birch trees on grounds around Fairhaven Park Apartments. To find them you'll need to be there ahead of the lawn mower, otherwise there are only decapitated stipes and tiny buttons. This fact may influence the ratio of stipe length to cap diameter, which may not be the same in woodland-grown *Russula versicolor*.

Photo by Christine Roberts

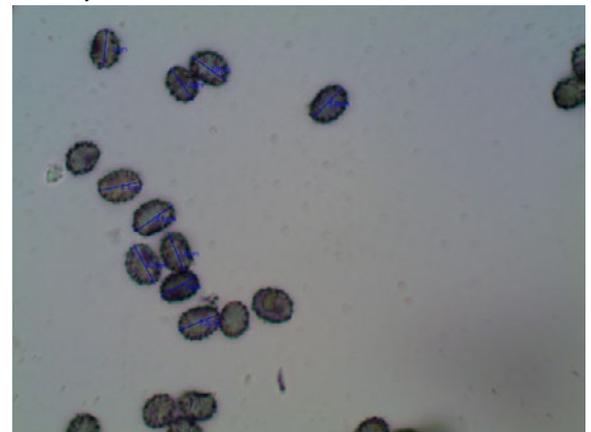
Microscopic characters

Basidia - Mostly 4-spored, around 12.5 μm wide and around 37–40 μm long.

Spores - 6.5–8.2 (9) x 5–6 μm , obovate to ellipsoidal, L:W ratio 1.3–1.5, warts blunt, to around 0.7 μm high, joined by fine lines in a partial to almost complete reticulum, often in rows, sometimes zebroid in part, occasional small isolated warts in between the mesh, (Patterson/Woo types 2B-C).

Suprahilar patch - Amyloid, circa 2 μm diameter.

Pleurocystidia and cheilocystidia - Fusoid, normal, staining weakly purple in sulphovanillin.



Spores of *Russula versicolor* at 1000x magnification.

Cutis - An ixodermis with a turf of epicutal hyphae circa 3 µm wide and narrowly clavate pileocystidia 5–13 µm wide by 50–80 µm long, ends mostly rounded rather than capitate, smaller ones aseptate, longer ones with 1–2 septa, end cells not or only slightly inflated but some with a slight cinched in appearance at the septa, not or barely staining in sulphovanillin. Contents often with a banded or bubbled appearance in sulphovanillin in some sections of epicutis.

All in all a nice lesson in foreign versus indigenous names. Sometimes it is tempting to reach for a convenient European name when a perfectly good local name already exists. In either case, it is a nice suburban *Russula* worthy of some much needed literary exposure.

Bibliography

Henri Romagnesi, *Les Russules d'Europe et d'Afrique du Nord*, 1996 reprint. A.R.G. Ganter Verlag K.-G. FL-9490 Vaduz.

Harry Thiers, *The Agaricales of California: 9 Russulaceae I. Russula*, 1997. Published by Mad River Press.

The Most Dangerous Mushroom: The Death Cap is Spreading

By Cat Adams

The death cap mushroom likely kills and poisons more people every year than any other mushroom. Now there finally appears to be an effective treatment—but few doctors know about it.

When someone eats *Amanita phalloides*, she typically won't experience symptoms for at least six and sometimes as many as 24 hours. Eventually she'll suffer from abdominal cramps, vomiting, and severely dehydrating diarrhea. This delay means her symptoms might not be associated with mushrooms, and she may be diagnosed with a more benign illness like stomach flu. To make matters worse, if the patient is somewhat hydrated, her symptoms may lessen and she will enter the so-called honeymoon phase.

Photo by Justin Pierce (www.mushroomobserver.org)



A. phalloides from button stage to full-sized.

Meanwhile, the poison stealthily destroys her liver. It binds to and disables an enzyme responsible for making new proteins. Without this enzyme, cells can't function, and liver failure results. Without proper, prompt treatment, the victim can experience rapid organ failure, coma, and death. A few mouthfuls of death cap mushroom can kill.

Extremely adventurous mushroom connoisseurs have supposedly removed toxins from slightly poisonous mushrooms such as the fly agaric, *Amanita muscaria*—the archetypal red and white polka-dotted mushroom beloved by Nintendo video game enthusiasts and nature artists. A complicated boiling process is said to allow the nutty-tasting mushroom to be enjoyed with no harm.

Despite folklore to the contrary, the death cap's deadliest toxins, called amatoxins, cannot

be removed this way. Amatoxins cannot be destroyed by any conventional cooking method, including boiling or baking. Freezing or drying the mushrooms also fails to remove any amount of amatoxin, instead preserving it to wreak havoc later. The death cap doesn't taste remotely like death—many people who are poisoned claim the mushroom was the most delicious they've ever eaten.

Its appearance doesn't scream deadly, either: In its early "button" stage, it closely resembles immature edible white species, including the common field mushroom *Agaricus campestris*. Full-size death cap is reminiscent of other innocuous mushrooms. In California, a number of immigrants have confused it with the edible paddy straw mushroom *Volvariella volvacea*, which is harvested in Asia.

Upon ingestion of death cap, about 60 percent of the absorbed amatoxins travel directly to the liver. Both poisoned and healthy liver cells spit out amatoxins into bile, which is then concentrated in the gall bladder. After each meal, the gall bladder releases bile into the gut, and the amatoxins travel with salts in the bile. At the end of the small intestine, most the bile gets reabsorbed back into the liver. Amatoxins re-enter the liver via the same receptors as the bile salts, and the poisoning cycle repeats.

Photo by Ron Pastorino (www.mushroomobserver.org)



Amanita phalloides var. *alba* is pure white and resembles many edible species, especially when young.

The other 40 percent of absorbed amatoxins initially make a beeline to the kidneys, which serve as the blood-waste treatment center of the body. Healthy kidneys can extract amatoxins from the blood and send them to the bladder—an ability that is rare for liver poisons. Until the kidneys kick out every last bit of poison, amatoxins continue damaging the liver. The kidneys can continue to function only if the victim stays sufficiently hydrated. Without aggressive hydration, amatoxins poison the kidneys as well. After the kidneys fail, rapid organ failure is not far behind. But if the patient still has liver and kidney function, and enough fluid to urinate regularly, she can essentially pass the still-intact amatoxins out in urine, like the smallest, deadliest kidney stone.

To keep the amatoxins from causing damage, a drug would have to protect the liver while the kidneys eliminated the poison. A nationwide clinical trial is testing a new treatment for amatoxin poisoning: silibinin, a drug derived from the plant milk thistle, *Silybum marianum*. When administered

intravenously, the compound sits on and blocks the receptors that bring amatoxin into the liver, thus corralling the amatoxins into the blood stream so the kidneys can expel them faster.

S. Todd Mitchell of Dominican Hospital in Santa Cruz, Calif., and his team have treated more than 60 patients suffering from amatoxin poisonings. Every patient who still had intact kidney function and was started on the drug within 96 hours of eating mushrooms has lived. Only a few patients sought treatment later and did not survive.

The research hasn't been published yet—60 patients aren't enough to confirm that silibinin really is the liver savior it seems to be—but the researchers are confident. “When we present to FDA, it will be a slam dunk for approval,” Mitchell says. “The drug has virtually no side effects, it's very well tolerated, and if used correctly it's awesomely effective.”

After ingesting amatoxins, “patients go into early renal failure for two reasons,” Mitchell explains. “One, they just present so late that their kidneys have already shut down. Or two, more commonly, they're just not aggressively hydrated enough by the treating physicians.”

Medical treatment often goes awry in the early stages of amatoxin poisoning. Poison control centers generally recommend three main treatments, none of which is effective. First, activated charcoal is recommended to prevent poisons from being absorbed by the gastrointestinal tract and causing liver damage. This works well for most poisonings, but by the time a patient usually seeks medical assistance for amatoxins, the poison has traveled well past the GI tract. Similarly, centers often recommend pumping the patient's stomach, which is hard on the body and does nothing to remove the amatoxins damaging the liver. Third, acetylcysteine is often prescribed. It is very effective at preventing liver damage in acetaminophen poisoning. But in amatoxin poisonings, it is completely ineffective, thins the blood unnecessarily, and gives misleading liver-function test results. These recommendations make the patient sicker while diverting attention from the most effective weapon against amatoxins: aggressive hydration.

Part of the challenge of recognizing the symptoms of amatoxin poisoning and properly treating it is that mushroom poisonings are relatively rare. The first time a physician treats a patient for amatoxin poisoning, Mitchell explains, is likely to be her last. Doctors may be encountering more cases in the near future, however.

The death cap mushroom is an invasive species from Europe, now present on every continent except Antarctica. It became such a world traveler because humans spread the mushroom's spores around like glitter at a kids' glitter party.

Fungi such as the death cap are ectomycorrhizal, meaning that they live symbiotically on the roots of trees. The fungus extends from the roots to form a network in the soil, called a mycelium, which is much finer than tree roots. The mycelium can more easily reach nutrients like nitrogen and phosphorous than the tree can, and it trades these nutrients with the tree in exchange for sugars, which the tree makes using photosynthesis.

A mushroom is the love child of two sexually compatible mycelia. Mushrooms in turn make tiny spores that easily disperse and can grow into new mycelia.

Photo by Franck Richard (www.slate.com)



A young death cap showing remnants of its universal veil forming the volva at its base.

In the 19th century, people tried introducing their favorite trees to new continents. Seeds were planted but quickly died. Nothing seemed to help until someone had the bright idea to bring seedlings in pots with their native soil. The soil worked like a charm. The trees grew smashingly, but people didn't know they had spread fungal spores and other soil microbes along with the trees.

A few researchers in the mid-20th century did notice that some mushrooms seemed to have appeared in new areas, but because they lacked a historical baseline for fungal diversity, nothing could be proved. Most scientists simply assumed the death cap was native to both Europe and the United States.

Anne Pringle became interested in the death cap as a postdoctoral fellow studying fungi at the University of California–Berkeley. (Disclosure: She later became my graduate adviser.) She was learning the local mushrooms by collecting them in the small canyon behind her house. She brought one sample to an adviser, Tom Bruns, who identified it as *Amanita phalloides*. He then hinted about an enticing rumor among the amateur mycological community that the death cap wasn't actually native to California. Pringle admitted the idea was interesting but didn't think too much about it until Bruns dropped some not-so-subtle hints that she should investigate, such as leaving drawings of a skull and crossbones on her desk.

Pringle quickly learned that scientists in the early 20th century had been using descriptions to identify death cap that were so broad they encompassed several other species. By sequencing the DNA of old, dried specimens in collections across the country, she found that all specimens labeled before 1938 were actually different species of *Amanita*. While other North American mushrooms had long records in herbaria, the death cap made a sudden appearance in 1938 and became increasingly common after that year.

Pringle also sequenced the DNA of wild *A. phalloides* mushrooms picked in the United States and Europe. She found much less genetic variation in U.S. mushrooms. That indicated that the species had started in Europe and that the U.S. mushrooms had undergone a "population bottleneck" in which a mere handful of individuals had colonized the continent.

Why were most scientists wrong about the death cap? Prior to Pringle's discovery, known invasive fungi fell exclusively into the category of plant or animal diseases, such as the one that wiped out the American chestnut. These fungi were ones we can usually see on the host, and they cause obvious symptoms.

The death cap can't live without its tree host. In order to become invasive, *A. phalloides* underwent something incredibly rare: a host shift. The fungus somehow switched from being able to grow only on European oak roots to growing on a completely different oak species, the California live oak. Not only was it able to colonize a new species of oak, but in the United States it has also been found to grow on native pines.

A shift from partnering with a deciduous oak to canoodling with a coniferous pine tree is a very large step for a fungus. Pringle's discovery shook up scientists' ideas of what it means to be a symbiont.

The death cap story intrigued me, and it is one of the reasons I joined the Pringle lab. I am currently conducting a literature review of research on *Amanita phalloides* and hope to eventually uncover the cellular mechanism by which the death cap was able to switch hosts.

The death cap is now widely distributed in the United States. Based on the weather patterns within its native range, it appears to have spread as far as tolerable conditions allow on the East Coast. But there are still areas in the Pacific Northwest and Canada that it should be able to live in but where it hasn't yet been recorded. The mushroom is spreading in Ohio, and marching south into Mexico.

With this long history of confusion about whether or not the death cap is native, combined with the fact that it's still spreading, it's not surprising that people accidentally harvest and eat it. Similarly, it's no wonder that people intentionally eat it: It's large and meaty, it's often plentiful, and it smells delicious.

Even very experienced mushroom hunters aware of both the historical confusion and the death cap's resemblance to edible fungi have been poisoned by *Amanita phalloides*. Because the mushroom is so deadly and can grow side by side with edible species, one wrong mushroom picked in the failing light can invite disaster.

If you ever suspect you may be suffering from mushroom poisoning, ask your doctor to call Mitchell in Santa Cruz and request to be enrolled in the milk thistle treatment study. He will ship silibinin to anyone, anywhere in the world. And remember to stay hydrated if you want to live.

This article was published by Slate.com on Feb. 10, 2014 (http://www.slate.com/articles/health_and_science/medical_examiner/2014/02/most_dangerous_mushroom_death_cap_is_spreading_but_poisoning_can_be_treated.html)

Mycophile Poetry

By Chuck Nafziger

A few years ago, I read the poetry book, *Decomposition: An Anthology of Fungi-Inspired Poems*. I was put off by how many of the poems gave negative impressions of fungi. In 2012, when David Arora spoke at Western Washington University before our fall mushroom show, he read excerpts from some of the poems as he expounded on the mycophobia that is so prevalent in the US. I would like to change that by collecting some Mycophile poetry. I propose to start with some limericks, a loose form of poetry that is basically for fun. Please join me by sending in some limericks that the NMA can publish. Do not expect compensation other than author attribution: after all, I am asking for limericks. If you need to protect your poetic reputation, submit the work as Anon. Since this is a family friendly newsletter, save the raunchy ones for forays deep in the woods. Here are a couple of examples. I have changed the names to protect the innocent.

Puck picked an unknown *Clitocybe*
he had an eat-it-all philosophy
he cooked up a batch
they went down the hatch
but the sight that night, oh dear me!

On a weedy lawn stood a Prince so fine
with permission it soon became mine
almond flavor delight
savoring each bite
I invite *A. augustus* to dine

Photo by Jack Waytz



The princely *Agaricus augustus*.

Submit your own poems to the newsletter c/o Jack Waytz at gandalf5926@comcast.net!

Get on the Wait List for the Mushroom Identification Class!

The popular Mushroom Identification Class has reached capacity, but a wait list is available! If you are interested in taking the class, please send an e-mail to Christine requesting to be added to the wait list. The class is for NMA members only and runs from September 16th to October 21st, meeting every Tuesday evening in Bellingham from 7 p.m.–9 p.m. All six classes are just \$25 (not each!) which covers expenses. We have fun and sometimes frustration trying to sleuth the identities of the mushrooms class members bring in.

E-mail Christine at mycoart@gmail.com for more information!

Photo by Cynthia Hansen



Learn how to identify everything from Amanitas to Zeller's Boletes in the Identification Class this fall!

Call for Mushroom Art to Be Displayed at the Wild Mushroom Show

At the upcoming fall show, we would like to have a table featuring all kinds of mushroom art, from spore prints to sculptures to photos to jewelry and everything else in the broad definition of “ART.” Artists will be responsible for bringing their pieces on the morning of the show, and picking them up at 5:00 p.m. when the show closes. If you wish to sell your art, either stay at the table during the show, or leave a card with pricing information with the art.

If you have any artwork you would like to include in the show, please contact Cynthia Hansen at cynthiah9@gmail.com or Jill Emerson at canafziger@hotmail.com. Please put “Mushroom Show Art” in the subject line or your e-mail may cyber-disappear. Include space requirements so we can arrange the display.

Cynthia and Jill,
Art Table co-chairs

Northwest Mushroomers Upcoming Events

September 11th, 7–9 p.m.: Member meeting, Bellingham Public Library

Speaker: Buck McAdoo (NMA)

Topic: Rare, unknown and unusual fleshy fungi of the Pacific Northwest

October 9th, 7–9 p.m.: Member meeting, Bellingham Public Library

Speaker: Taylor Lockwood (mushroom photographer, author)

Topic: Spirits of the forest—an evening sharing the passion of the world's leading mushroom photographer

October 19th, 12–5 p.m.: Wild Mushroom Show, Bloedel-Donovan Park, Bellingham

November 13th, 7–9 p.m.: Member meeting, Bellingham Public Library

Speaker: Daniel Winkler (Mushroomers)

Topic: Amazing Amazon mushrooms

Upcoming Mycological Events from Around the Region

Photo by Cynthia Hansen

October 17th–19th: Sunshine Coast Mushroom Festival
5027 Bear Bay Road, Garden Bay, B.C.
<http://new.scsroom.org/>

October 18th, 10 a.m.–4 p.m.: OPMS Fall Mushroom Show
Elk's Sequim Lodge, 143 Port Williams Road, Sequim, WA
<http://www.olyrmushrooms.org/>

October 25th–26th: PSMS Annual Wild Mushroom Show
October 25th: open to PSMS members only
October 26th: open to the public
Mountaineers Building, 7700 Sand Point Way NE, Seattle, WA
<http://www.psms.org/>

October 26th, 11 a.m.–4 p.m.: 35th Vancouver Mushroom Show
VanDusen Botanical Garden, 37th Ave. & Oak St., Vancouver, BC
<http://www.vanmyco.com/>

October 26th, 1 p.m.–5 p.m.: KPMS Wild Mushroom Show
Silverdale Community Center, 9729 Silverdale Way NW, Silverdale, WA
<http://www.kitsapmushrooms.org/>

October 26th: SCMS Annual Fall Mushroom Show
Floral Hall, 802 E. Mukilteo Blvd, Everett, WA
<http://www.scmsfungi.org/>

November 2nd, 11 a.m.–4 p.m.: Richmond Mushroom Show
Richmond Nature Park, 11851 Westminster Highway, Richmond, B.C.
<http://www.vanmyco.com/>



Photo by Cynthia Hansen



Here's to a bountiful fall mushroom season!

Correction: A Fortuitous Fungal Find

In the October-January 2013 newsletter, the rare *Tricholoma atroviolaceum* pictured on page 8 was erroneously described as having been found by Dick Morrison in Sudden Valley. The actual collector of this specimen was Seren Fargo, who found the mushroom in Glacier and brought it to Dick Morrison and Buck McAdoo for identification. We regret the error!

You can read more about the unusual and fascinating fungi that appeared in last year's Wild Mushroom Show in the October-January 2013 edition of MushRumors in the article entitled, "Observations From the Autumn Show, October 20th, 2013" by Buck McAdoo. Seren Fargo's find is pictured below:

Photo by Buck McAdoo



The very rare *Tricholoma atroviolaceum* found by Seren Fargo in Glacier, WA.