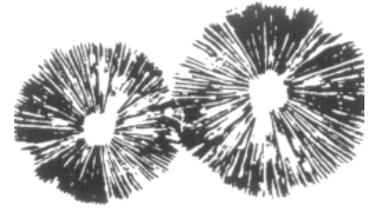
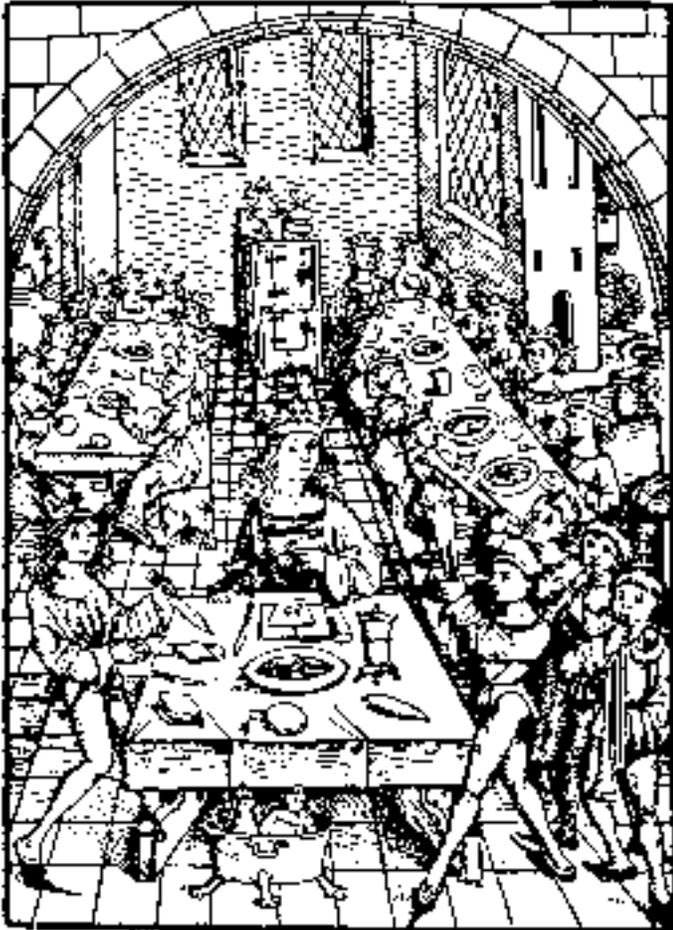


SPORE PRINTS



BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 420 March 2006



DON'T MISS THE BANQUET! Colleen Compton

Be sure to mark your calendars for Saturday, March 11, 2006. You don't want to miss our annual Survivor's Banquet. PSMS members are such great cooks and it will be a potluck. Bring either an hors d'oeuvre, an entrée, or a dessert. Be there at 6:30 PM for the social hour, 7:30 PM for dinner. Punch and coffee will be served. Bring your own wine.

The dress code is elegant to casual. This is a dress-up opportunity; a chance to wear your favorite mushroom accessories, come in costume—whatever you feel like.

New board members and officers will be announced, as well as the winner of the Golden Mushroom Award. There will be a raffle and entertainment. There is a \$7.00 fee to cover costs for the building and supplies.

Sign-up by sending a reservation for yourself and any guests, along with a check for \$7.00 each (payable to PSMS), to: PSMS Banquet, c/o Younghee Lee, 2416 N. 43rd St., Seattle, WA 98103. You may also pay at the door.



PRESIDENT'S MESSAGE

Ron Post

Time flies, and mushrooms attract flies. That is almost the sum of my wisdom after serving as your president for the past two years. I will continue to serve on the board and help out where needed, so don't forget to say hi from time to time. But I also want to leave you with a recommendation or two.

Our club will spend some time at the May membership meeting talking about the legacy of Dr. Daniel Stuntz, and I hope that you will lend your support to the Stuntz Foundation in all of its future endeavors. Also, take some time to consider the benefits of joining the North American Mycological Association. We may be hosting another national foray sometime, who knows?

I can only begin to tell you how much it has meant to me to hear all your expressions of support during the past two years. I've really enjoyed representing the society. Thanks to all of you for your efforts on the club's behalf.

THE MUSHROOM THAT COULD CAUSE A WAR

Damien McElroy, *The Sporeprint*, L. A. Myco. Soc., Feb. 2006

China is willing to invade its Himalayan neighbor to secure supplies of Cordyceps.

In the high Himalayas, on the border between Chinese-controlled Tibet and Bhutan, the *Cordyceps sinensis* is king of crops. Almost as valuable as gold by the ounce, the mushroom is one of the few cash treasures the sparsely vegetated hills yield up. With a tiny black head on a lurid yellow stem, its reputation as an aphrodisiac and health food means it is prized all around the Pacific Rim.

In recent years, wizened farmers have harvested a quiet bonanza as demand for the rare fungus soared. So good is business that the world may be witnessing the first mushroom war.

If that sounds alarmist, consider a recent flood of smugglers from China who have been trafficking *Cordyceps* to sell in Japan and California. They were followed into Bhutan by 200 Chinese troops who marched across the tundra last month on an unannounced construction mission to erect bridges and roads.

Put crudely, it seems the smugglers needed motorized access to the mushroom crop and procured the army's help to build bridges and roads. Bhutan cried foul. Not for the first time, a remote region is being colonized by foreign commercial forces with military backing.

Across south Asia there is real concern that the Chinese military will use its muscle to propel the overseas expansion of its economy: valuable teak in Burma, precious metals in Outer Mongolia, opium in Afghanistan, people and wildlife in Vietnam. Trade in all these things draws Chinese citizens over the nation's frontiers.

China's tremulous neighbors look at recent events in Bhutan and wonder which one of them will be next.

Spore Prints

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CALENDAR

March 9 PSMS ballots due
March 11 Survivor's Banquet, 6:30 PM, CUH
March 20 PSMS Board Meeting, 7:30 PM, CUH
March 21 *Spore Prints* Deadline
April 1 Field Trip, MacDonald Park
April 8 Field Trip, Flaming Geyser State Park

BOARD NEWS

Dennis Oliver

On a dark cold night, the board met with the promise of warming weather and soon-to-come spring mushrooms. The board's agenda was blessedly short. The election ballots will be sent out soon with a full slate of candidates. The dates have been set for the spring mushroom class (see article on page 3 in this issue.) The annual survivor banquet will be at CUH on March 11, and over 40 people have signed up to attend so far. For further information on the banquet, see the article on page 1 in this issue.



MEMBERSHIP MEETING

This month is the **PSMS Annual Meeting and Survivor's Banquet**, Saturday, March 11, at the Center for Urban Horticulture. Festivities begin at 6:30 PM. This year's banquet is again a potluck, so please bring a favorite dish in one of the following four categories: appetizer, main dish, salad, or dessert. This is an event you won't want to miss. See you there!



UPCOMING FIELD TRIPS

Cathy Lennebacker

Spring is almost here, and we have again scheduled two early field trips to introduce mycological eager beavers to the Early Morel, *Verpa bohemica*. Mark your calendars and look forward to collecting mushrooms, swapping tales over our usual creatively delicious potluck, and benefiting from the expertise of our intrepid identifier(s) and the convivial company of fellow fungi seekers!

April 1

MacDonald Park
30 miles east of Seattle

MacDonald Park is located about ½ mile south of the town of Carnation in King County. Enter the park on N.E. 40th Street from Highway #203. Watch for the PSMS signs and use the day-use parking lot. This is a learning field trip and will be held rain or shine.

At 9:30 AM at the shelter across the suspension bridge, there will be a short introduction to mushroom hunting by Brian Luther and Hildegard Hendrickson. Then we will break into small groups and go out collecting. When we return to the shelter the mushrooms found will be identified. We should find *Verpa bohemica* under the cottonwood trees.

You may want to bring a lunch. The field trip ends at 2 PM.

March 8

Flaming Geyser State Park
35 miles from Seattle

Grab your all-weather gear and meet us at Flaming Geyser State Park for an Early Verpa/morel hunt. This lovely park has lots of level woods to walk through along the Green River for good hunting, Mother Nature willing. Bring a sack lunch. There is a \$5 fee payable at the park.

Driving Directions: From I-405, take Black Diamond/Maple Valley Highway #169 east. Three miles south of Black Diamond turn right onto Green Valley Rd. This is before Enumclaw. Proceed 3.5 miles, then turn left onto Flaming Geyser Road. This park is along the Green River. Look for the PSMS signs at the picnic shelter close to the entrance.



FIELD TRIP TIPS

Agnes Sieger

For those who joined PSMS at the Annual Exhibit in October, I thought it might be nice to review some basic mushrooming tips regarding the upcoming spring field trips.

Apparel: The Pacific Northwest is wet. Wear warm clothing, preferably in layers, and waterproof shoes or boots and bring your rain gear. Pacific Northwest vegetation is usually thick, and the sky is frequently overcast. Bring a compass and whistle and a map of the area—and remember to use them.

Mushrooming Gear: You will need a wide-bottomed container for your mushrooms. This can be a basket or bucket. Do not use plastic sacks; they tend to condense moisture and turn mushrooms into mush. You will need a sturdy knife suitable for cutting and prying and perhaps a soft brush to clean up the edibles; some people even bring a small garden trowel for digging. To protect individual specimens for identification, take some wax paper sandwich bags or aluminum foil.

Collecting: If you know you have a good edible, cut off the stem cleanly and brush off as much soil and debris as possible. Store like species in a rigid container where they won't get crushed or pick up more dirt. Try to keep the mushrooms cool and dry, and process them as soon as possible.

Field Trip Format: Most PSMS field trips are planned for Saturdays, since this is the most convenient time for many people. Almost all field trips have hosts, who set up by 9:00 AM on Saturday with hot coffee and snacks. The hosts greet and sign in members, relay general tips on what is up and where to find it, and introduce newcomers to more experienced members. They also have a map of the area. After signing in, field trip participants gather their gear and head for their favorite hunting grounds. In the afternoon, they come back to the campsite to identify their finds, compare notes, and prepare for the potluck.

Potluck: The potluck starts at 4:00 PM (sometimes later when the days are longer in the summer). You need to bring your own eating utensils and beverage and a dish to contribute to the table. This can be an appetizer, a salad, a main dish, or a dessert. The food is usually delicious, and the potluck is a great time to swap tales, collect recipes, and share mushroom information with friends old and new.



VERPA BOHEMICA

Agnes Sieger

The first field trips this spring are dedicated to *Verpa (Ptychoverpa) bohemica*, the first edible mushrooms to lure the mycophagist after the winter doldrums. Often called the early morel because of its timing and superficial resemblance to the true morels, *Verpa bohemica* fruits from late February through April, depending on the season. In the Pacific Northwest, it is associated with cottonwoods, often fruiting right around the drip line of mature trees “when the cottonwood leaves are the size of a mouse’s ear.” Once you learn to recognize the cottonwood, a tall, dark, poplar-like tree with wrinkled bark that grows in damp river bottoms throughout western Washington, you can spot your hunting ground from afar. Finding your quarry amid the debris of the previous fall, however, isn’t that easy.



Verpa bohemica is a medium-sized (3–8 in. tall), tannish mushroom with a wrinkled, bell-shaped cap which is attached only at the top, forming a skirt over the stem. The stem is long, at first whitish to cream in color and becoming tan with age, and filled with cottony fibers.

In contrast, true morels have pitted, not wrinkled, caps that are attached to the stems at the bottom (or in some cases part way up); their stems, while hollow, are empty.

Unlike other verpas, and most large Ascomycetes, *Verpa bohemica* has only two spores per ascus instead of eight. For that reason, modern taxonomists have split it into its own genus, *Ptychoverpa*. What each ascus lacks in numbers, however, it makes up for in size; the spores are huge.

Although considered a good edible by many, this mushroom causes gastrointestinal upsets and loss of muscular coordination in some people and should be approached with caution. Many field guides recommend parboiling it and throwing away the water and eating only small amounts at a time. The effects may be cumulative, so don’t pig out on it several days in a row, even if it is the only edible mushroom out at the time.



MUSHROOM ID CLASSES

Colin Meyer

Beginning mushroom identification classes will be offered this spring on Tuesday evenings, beginning on April 18 and continuing through May 9. Classes will be held at the Center for Urban Horticulture, from 7:00 until 9:00 in the evening.

The classes will focus on learning the anatomy of mushrooms and how to use dichotomous keys for identification. The recommended text is *Mushrooms Demystified* by David Arora. The book will be available for sale on the first day of class, and there will be a few copies available for borrowing from the PSMS library.

The cost for the classes is \$30. Registration is available to PSMS members only. The class always fills up, so please do not come if you do not have a confirmed registration. For more information or to register, please e-mail Colin Meyer at education@psms.org (preferably) or telephone (206) 722-6687.

Mushroom Dance

*Dancing on the mushrooms
Jumping on their hats
We are the faeries of the night
You can't see us if there's light*

*Can you see us as you're passing by?
We like to see our shadows when we dance
But only by candlelight!
We are the faeries of the night*

*And before daylight comeswe're gone!
And though you'll never in this lifetime see us twice
You'll always remember us with an enchanted sigh
Dancing on the mushrooms at night
By candlelight!*

—Daphne

MUSHROOM OF THE MONTH

Buck McAdoo

MushRumors, Northwest Mushroomers Assoc., May–July 2005

Our Mushroom of the Month is *Polyporus tuberaster* (Jacquin ex Fries) Fries. This widespread but rather uncommon polypore prefers the drier climate of the eastern Cascades to conditions on our western side. Anybody going on a morel weekend should keep an eye out for it. These in the photo were found by Jack Waytz last year in early May off of Lake Creek Road outside of Winthrop. He found 20–30 of them in clumps near burned stumps. I had found a solitary specimen on May 9 the year before on burnt ground at a campsite up Icicle Canyon outside of Leavenworth. Jim Ginns had identified it for me, and now thanks to Jack's El Dorado, we could now photograph it and taste it.

The somewhat odd thing is that both of us missed the significant sclerotium that *Polyporus tuberaster* fruits from when it grows on the ground. These sclerotia are potato-like masses composed of earth, sand, and pebbles bound together by whitish hyphae and mycelial strands. They have a marbled appearance when cut and can weigh up to 20 pounds. I suppose we missed them because they resembled the earth around them. But according to Arora, the sclerotia themselves are valuable. He writes that they are sold in markets in southern Italy. People plant them in flowerpots, water them regularly, and harvest the polypores that erupt. Evidently you can score several years of *P. tuberaster* with this method.

Also known as the “stone fungus” (because of the sclerotium), *Polyporus tuberaster* has caps up to 15 cm wide, a depressed to umbilicate cap center, and irregular, lobed margins. The caps are scaly becoming more fibrillose toward the thin and lacerate margins. The scales are ochre-brown to tawny-brown on a pallid ochre ground. The context is fleshy becoming rigid when dried. The stems are central when they fruit on the ground, but lateral to off-center when found on wood. They can measure 6 cm long and 1½ cm thick. The stipe color is white to pale ochre with a narrow black zone near the base. This zone is often obscured by white tomentum. The pore surface is white to pale tan. One specimen bruised brown when handled. The tubes measure up to 5 mm long and are decurrent on the stem. The tube mouths are quite large and polygonal in shape becoming more radially elongated or even dentate in age. The stems arise from a large brown to black sclerotium, which is rubbery when fresh, rock hard when dried. Even when they are fruiting on hardwood stumps such as aspen, there is often a connection through the wood to an underground sclerotium. The stone fungus causes a white rot in hardwoods.

The spores are white in deposit, cylindrical to oblong ellipsoid, and measure 10–16 × 4–7 µm. The hyphal system is dimitic, meaning they have two kinds of hyphae, in this case generative and skeletal. Both the generative hyphae and the bases of the basidia have clamps. In North America, *Polyporus tuberaster* ranges from British Columbia south to Arizona. It has also been reported from Germany, Holland, Japan, Russia, Sweden, Italy, and England. The larger specimens with sclerotia are more common in the Mediterranean regions. And this brings up a nomenclature puzzle.

In the more northerly regions of Europe, a smaller version of *P. tuberaster* fruits on oak and beech twigs, and even gorse stems. It is a collective group and includes the names *Polyporus lentus*, *Polyporus floccipes*, *Polyporus forquignoni*, and *Polyporus coronatus*. Since all of these are microscopically identical with *Polyporus tuberaster*, the lumpers have turned them all into synonyms. *Polyporus lentus* has caps up to 5 cm wide, has no sclerotium, no black at the stem base, and an odor of aniseed. It fruits on dead wood of oak and beech. *Polyporus coronatus*, *Polyporus floccipes*, and *Polyporus sfagicola* are synonyms. Dr. Jahn, who studied this group, figured that *Polyporus forquignoni*

was a dwarf form of *Polyporus lentus*. It has cap scales concolorous with the surface, fringed margins, and white stems that become floccose at the base. Splitters, such as Moser, generally recognize these differences. They conclude that only *Polyporus tuberaster* sports the sclerotium. As Jahn points out, cultural studies need to be made to determine whether they are conspecific or not.

According to Marchand, the entire complex is related to *Polyporus squamosus*, commonly found in almost any guide you pick up. *Polyporus squamosus* fruits on trees, has no sclerotium, a thicker and tougher context, and more flattened scales on the cap surface. Other look-alikes include *Polyporus radicans* of the east coast. Instead of a sclerotium, it has a long, black, rooting stem base. Locally, *P. tuberaster* could be confused with *Jahnoporus hirtus*, which has a cinnamon-brown, hairy cap, a bitter taste, and no sclerotium. In most guides, it is called *Albatrellus hirtus*.

While a few authors claim that *Polyporus tuberaster* is inedible, most concur that it is edible but tough. Thanks to Jack's generosity, I was invited to sauté the specimens in the photo below. After turning golden brown in the frying pan, I found them to be a crunchy version of *Boletus edulis*. No wonder they sell the sclerotia in Italy!

But in Australia they do us one better. The giant and related *Polyporus mylittae* is not only edible, its sclerotium, which can weigh up to 40 pounds, is also edible.

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Polyporus tuberaster

BALLOT ERROR

The sentence reading “vote for six” should read “vote for five.” One of the candidates will be appointed.

WHAT IS AN OOMYCETE—AND WHY SHOULD I CARE? compiled by Agnes Sieger

Long considered a fungus, *Phytophthora*—species of which are notorious pathogens of everything from Irish potatoes to European grape vines to California oak trees—are actually classified as oomycetes.

Oomycetes are a unique group of organisms which share some characteristics of fungi but are biologically different. Like fungi, oomycetes exhibit filamentous growth and can feed on decaying matter. Unlike fungi, however, they have cell walls that are composed not of chitin but of a mix of cellulosic compounds and glucan. The nuclei within the filaments are diploid, with two sets of genetic information, not haploid as in fungi. Oomycetes also have zoospores with two types of flagella.

There are more than 500 species in the Oomycota, which includes the so-called water molds and downy mildews. Some water molds are parasites on other organisms and may grow on the scales or eggs of fish or on amphibians. Other species are parasitic on aquatic invertebrates such as rotifers, nematodes, and arthropods and on diatoms.

Their greatest impact on humans, however, comes from the many species which are parasites on flowering plants. These include root-rotting fungi, seedling-dampening mold, blister rusts, white rusts, and the downy mildews that affect grapes, lettuce, corn, cabbage, and many other crop plants. Two of these disease-causing oomycetes have had a major influence on world history.

The first is *Phytophthora infestans*, the organism that causes late blight of potatoes. In one week during the summer of 1846, *P. infestans* wiped out almost the entire potato crop of Ireland. Nearly a million Irish died in the resulting Great Famine, and an additional one-and-a-half million emigrated to other countries.

The other oomycete that has severely affected recent history is *Plasmopara viticola*, which causes the downy mildew of grapes. Accidentally introduced to Europe from America in the late 1870s, *P. viticola* almost wiped out the entire French wine industry. The industry was saved by the serendipitous discovery of Bordeaux mixture, a combination of lime and copper sulfate, which brought the disease under control when applied to the leaves of the plants. This discovery is also important for being the first known fungicide, and in fact the first chemical used to control a plant disease.



Grapes infested with *Plasmopara viticola*

PHYTOPHTHORA ENDANGERS UNIQUE AUSTRALIAN TREES

Rod McGuirk

The Sporeprint, Los Angeles Myco. Soc., February 2006

Canberra, Australia - The only known wild stand of a tree species dating to Jurassic times has been endangered by a deadly disease probably introduced by an unauthorized hiker, a government official said Monday.

The Wollemi pine, often described as a living fossil, was thought to be extinct until 1994, when a park ranger stumbled upon a stand of fewer than 100 trees in a remote gorge in Wollemi National Park, 120 miles west of Sydney. Since then, the trees' location has been kept a closely guarded secret. Those authorized to visit the

grove undergo strict infection control procedures that involve sterilizing their footwear and equipment. Now the stand has been endangered by a fungus-like pathogen, *Phytophthora cinnamomi*, that was detected in two trees in November last year and was almost certainly introduced by an unauthorized visitor, New South Wales state environmental department spokesman John Dengate said. "It is an endangering factor. Nobody can be sure at this stage how big a threat it poses, but we're treating it very, very seriously." Dengate said the department was hopeful that treatment would wipe out the threat to the stand.

Despite the threat, the species is not at risk of extinction. Thousands of trees have been propagated in plantations from the wild stand and some went on sale to the public for the first time in October last year.

Dengate said it was unlikely that anyone officially involved with the wild trees had been responsible for the infection. "The pines have been there for something like 200 million years unaffected by anything," he said. "We've been scrupulous with our staff to make sure they don't carry anything in."

"We understand that people are really keen to see the trees in their natural environment, but there are only a few dozen left and they are extremely vulnerable to infections so we're asking people to stay away," he added.



Wollemi pine
Wollemi nobilis

NEW BID TO CONTROL SUDDEN OAK DEATH

Mike Geniella

The Sporeprint, Los Angeles Myco. Soc., February 2006

State and federal agencies have launched the largest experimental project yet to control the spread of sudden oak death syndrome, this time on state park property in southern Humboldt County, California. The 50-acre site is believed to be the state's northernmost location of woodlands infested with the fungi-like disease.

"At the very least, we're hoping the pathogen will be contained at the site," said Katie Palmieri, spokeswoman for the California Oak Mortality Task Force. The agencies are hopeful that the project will halt the spread of the disease in timber-rich Humboldt County.

Sudden oak death is caused by a fungus-like pathogen called *Phytophthora ramorum*. The experiment focuses on containing the disease by cutting and removing infected trees, followed by burning of debris and undergrowth over several years. Palmieri said it may take several years of intense monitoring before results of the cut-and-burn experiment are known. Even so, it could lead to finding a treatment to control the disease and prevent its spread.

Palmieri said the infected trees are predominantly tanoak, bay laurel, and madrone. Environmental experts don't know how the disease got established at the site, but a significant number of already dead tanoak trees were there when state parks personnel inspected the property last October.

The tree-killing disease was first observed in the state in the mid-1990s and was found in Humboldt County in 2002 in an isolated area near Redway.

IDENTITY THEFT

Dick Sieger

A newly discovered fungus uses identity theft to get loving care from termites. It is a species of *Fibularhizoctonia*, a crust fungus, which came to the attention of Dr. Kenji Matsuura when he found “termite balls” (TMBs) among the eggs in some of the nests of three termite species—*Reticulitermes speratus*, *R. flavipes*, and *R. virginicus*.

The TMBs are sclerotia, compact survival structures containing vegetative fungus cells. They are brown globes that match the smooth surface and exact diameter, but not the elongated shape, of termite eggs. That, and their chemical composition, fools termites into nurturing TMBs with the same care they give to their eggs. The fungus is provided with a clean environment, protection from desiccation, grooming with antibiotic saliva, and transportation to new locations.

When TMBs were given to *R. okinawanus*, a species that had no previous experience with them, workers carried the fungal pellets to their egg piles. Glass balls of an appropriate size were ignored.

Some termite species depend on *Termitomyces*, a genus of gilled mushrooms, for survival. The mushroom provides strong enzymes that change lignin and cellulose into food that the termites can digest. These *Reticulitermes* spp. don’t need that help. They don’t eat TMBs, and TMBs don’t affect the survival rate of their eggs. So what does the fungus give to the termites in exchange for care, shelter, and transportation? Nothing.



Termite egg pile incorporating sclerotia (round balls) of the crust fungus Fibularhizoctonia

MAYHEM AMONG THE MADRONES David Berger

“Pacific Northwest Magazine,” *The Seattle Times*, 2-5-06

The move is on to save a distinctive northwest native from disaster.

It’s true for Valhalla at the end of “The Ring of the Nibelungs” and it’s true for the Pacific madrone, one of the Northwest’s most beloved native trees: Without fire, these fire-adapted trees can suffer. So in suppressing fire, we’ve contributed to a slow-motion catastrophe.

Blackened trunks, denuded branches, and large cankers sadden madrones up and down the Puget Sound basin. “People come in here all the time and say, madrones have all these diseases. Is it OK to grow them?” says Deb Ferber, nursery manager at the MsK Rare Plant Nursery of the Kruckeberg Botanic Garden in Shoreline.

The short answer is yes, it’s OK to grow them, and yes, it’s possible to have them thrive. Madrones, also known as madrona or *Arbutus*, are a defining icon of the region, like salmon. They are the state’s only native broadleaf evergreen, a seemingly exotic anomaly compared to the familiar needled trees. Perched on bluffs like those north of downtown Seattle in Magnolia, around Lake Washington, in forests and throughout the San Juan Islands, they cling to fast-draining slopes and stretch out to the sun like weight lifters doing bench presses. The white flowers in spring and red berries in fall nourish wildlife, from bees to band-tailed pigeons and hummingbirds. The paper-thin bark—an extraordinary red-orange as eye-catching as any San Juan sunset—peels and exfoliates to reveal on younger stems a pistachio-green face as smooth as a newborn’s cheek.

Visitors from other parts of the country are routinely amazed and inquire about those “strange and beautiful” trees. What’s primarily harming and killing such special trees is *Fusicoccum*, a kind of fungal organism, according to Marianne Elliott, a forest pathologist who recently completed her doctorate at the University of Washington with madrones as her focus. Elliott suspects this organism has always been around, but environmental conditions are stressing the madrones and making them vulnerable.

Virtually every tree in Seattle is infected. Among the most damaged are some of the city’s grandest and most visible, like those in the highlands of Magnolia overlooking Puget Sound and along scenic Lake Washington Boulevard. The fungus invades the xylem tissue just below the bark, interrupting the flow of water and nutrients and resulting in something akin to starvation and ultimately death.

The problem was not noticed until the early 1970s, when summers started getting drier and springtime wetter. Damp springs are ideal for fungal growth, and drought summers tax the trees. “It’s the perfect conditions for the fungus,” observes Elliott.

In the wild, relatively frequent fires help rejuvenate madrones. Fire kills pathogens, and the tree resprouts using starchy food stored in the roots. But lack of fire isn’t the only problem in Seattle. As people remove big leaf maples and Douglas firs for expansive views, madrones are suddenly left in isolation to bear harsh wind and sun. Such exposure damages bark and gives the blight an entry. Elliott says wherever the trees are stressed, by not only wind and sun but soil compaction, pollution, and so on, they are hammered by the disease.

Elliott has several recommendations for worried tree owners. The most basic is to keep trees as healthy as possible, for example by removing competing vegetation such as grass, by mulching with wood chips, and by making sure the soil remains uncompacted. She advises avoiding sudden changes, such as major pruning around the tree, allowing a lot of sun and wind. Make changes gradually over several years, she suggests.

Mark Mead, the Seattle Parks and Recreation Department’s senior urban forester, says removing dead wood is a good idea, but be sure when pruning to stay within the dead stuff; otherwise, you risk accelerating spread of the disease.

Thoroughly grooming away blighted leaves is also helpful for smaller trees. Over watering is another common problem. Adapted to our dry Mediterranean summers, madrones suffer from the abundant water that lawns and gardens typically receive. A more drastic approach for infected trees is to cut them down to mimic the effect of fire. The tree can resprout lushly if it’s not so far gone that resources stored in the roots are depleted.



Valuable large trees can also receive emergency medical aid, but unfortunately palliatives are labor intensive and expensive and far from guaranteed.

Not every urban madrone tree is on death row. There are a few gorgeous healthy stands, especially in southwest Seattle. Much of the parks department's madrone emphasis is keeping these from harm. The department is also working with the group Save Magnolia's Madrones to replant madrones. Launched in the 1990s, the group has sponsored path-breaking research into madrones over the past 10 years. Unfortunately, much remains unknown. The group's funding, supplied by a settlement over a sewage-plant expansion at Discovery Park, is now mostly gone. And the success rate for newly planted trees is less than 50 percent.

Despite the challenges, madrones are such a distinctly fabulous tree, they are absolutely worth growing. Nurseries are increasingly sophisticated with propagating techniques and cultural advice. Look for a sunny, well-drained site with low-nutrient soil and no supplemental water (though a little summer water can be needed until the trees are established). Try to duplicate the natural conditions of madrones that may be growing successfully in your neighborhood. Choose young plants and transplant gently; madrones don't like their roots disturbed. And if half the seedlings die, that means half will live. So plant with abandon. This unique Northwest native more than repays the effort.

RESEARCHERS FIND ANTI-FREEZE IN FUNGUS FLEA

Julie Mollins

The Sporeprint, Los Angeles Myco. Soc., December 2005

Canada (Reuters) - Tiny fleas that survive on fungi found under a blanket of snow contain a unique antifreeze Canadian researchers said. The researchers, whose report is published in the latest edition of *Science*, said their findings could help protect plants or animals from frost, or allow donated transplant organs to be stored and transported at lower temperatures.



The six-legged snow fleas are between 1 and 2 mm long (0.04–0.08 inches), with six legs and no wings. They are also known as springtails because they have an abdominal spring called a furcula that lets them jump away from predators.

Their bodies contain proteins that limit the growth of ice by lowering the freezing point of fluids by 6°C (11°F), said the researchers, from Queen's University in Kingston, Ontario.

One practical application of the study could be to store transplant organs at cooler temperatures to preserve them for longer, said Laurie Graham, one of the two researchers who carried out the study. She said frozen foods could also benefit from the discovery, if the antifreeze, which she derived from crushed snow fleas, can be used to inhibit freezer burn. Another possible application could be in crops susceptible to frosts, which might be genetically modified to survive a cold snap.

The researchers found that the antifreeze proteins in the snow fleas were different from those in beetles and moths, prompting Graham and her research partner, Queen's University biochemistry Professor Peter Davies, to conclude that these antifreeze proteins evolved independently in the snow fleas. "There would have been climate change and the organisms were challenged by a new environment," Graham said. "It's almost like nature has had to reinvent the wheel."

The snow flea is not related to the biting flea, which is a true insect.

MUSHROOMS THROUGH THE SEASONS

Erin Moore

MushRumors, Northwest Mushroomers Assoc., Sept. 2001

The last, spring-season Northwest Mushroomers Association meeting on June 14 featured Veronica Wisniewski, who spoke on "Cooking with Mushrooms through the Seasons" and afterward served up a satisfying "Tired Chanterelle Pickers' Hot Dip" for all to taste.

Throughout descriptions of mushrooms and their best seasonal companion ingredients, Veronica sprinkled nuggets of wisdom. Did you know that soggy morels, saturated from spring rains, can be dry sautéed to yield a savory sauce great for keeping? Or that you can freeze Matsutake whole for later consumption? A good way to store prepared fruiting bodies is to freeze the reduced mushrooms (cooked without butter) in ice cube trays.

In spring, morels are divine cooked with asparagus and sherry. In fall, chanterelles excel melded with pine nuts and marsala, and King Boletes thrive with chestnuts and marsala (do we detect a pattern here?). Chanterelles are one of this chef's most cherished, and she spoke of them cooked in many ways, including a sauté in lemon and butter added to onions and sweet root crops like squash or mixed with leeks, red pepper, and garlic. "With mushrooms, some pairings make flavors that are more than the sum of their parts," said Veronica.

She noted that she was once lucky to receive from Eric Swisher bags of Oyster Mushrooms (*Pleurotus ostreatus*), which she cooked up in endless pasta dishes, sautéed with wine, parsley, and thyme. She also dried the Oyster Mushrooms and ground them to powder for later use in soup stocks. The Honey Mushroom, *Armillariella mellea*, is one of Veronica's old-time favorites, and she likes to stew them on the stove in pickling spice, onions, and sugar. On the topic of onions, *Lepiota rachodes* (the Shaggy Parasol) is also excellent with onions, and Lobster Mushrooms (*Hypomyces lactiflorum*) with olive oil and onions.

"Some wise person once said that 'eggs were made for mushrooms'," she relates, going on to describe Shaggy Manes (*Coprinus comatus*) with scrambled eggs or Bear's Heads (*Hericiium abietis*) in an omelet with tomatoes and parsley.

For Matsutake (*Tricholoma magnivelare*), she marinates fruiting bodies whole in soy sauce and lemon before broiling thick-cut slices. Sweet-sour flavors like ginger and citrus bring out the unique taste of this magnificent mushroom. She punctuated her recipe with a story of the cat who came begging after a mushroom hunt, so delicious were the offerings.

Two of Veronica's favorite cookbooks are *Joe's Mushroom Cookery* by Jack Czarnecki and *The Mushroom Feast* by Jane Grigson, both hard-to-get titles. What a treat to learn from this long-time lover of mushrooms and local member of our club. We left with our curiosity and hunger for mushrooms made all the more delicious.

DON'T EAT FROZEN MUSHROOMS John Dennis

Mycology Technician, Natural Resources Canada

Mushrooms, like other fruits and vegetables, can be killed by freezing. If following the freezing there is warmer weather, the mushrooms thaw and bacterial decay begins. If the weather is quite warm, which it can be if it is a sunny day, it only takes 24–48 hours for the bacteria to reach very large numbers and potentially produce toxins. This can happen repeatedly over a few winter days. You wouldn't eat a rotten tomato, so why would you eat a rotten mushroom. Throw it out.

MUSHROOM STUFFED BRIE EN CROUTE

Gourmet Magazine via "Cooking Live: Hors D'oeuvre Party"

- 1 small onion, minced to ½ cup
- 2 tablespoons unsalted butter
- ½ pound mushrooms, finely chopped
- 1 tablespoon dry sherry
- ½ teaspoon freshly grated nutmeg
- 1 (17 1/4-ounce) package frozen puff pastry sheets, thawed according to package directions
- 1 (14 to 17-ounce) chilled Brie wheel
- 1 large egg

In a 9- to 10-inch heavy skillet, cook onion in butter over moderate heat, stirring, until softened. Add mushrooms, sherry, nutmeg, and salt and pepper, to taste, and sauté over moderately high heat, stirring, until the liquid that the mushrooms give off is evaporated. Cool mushroom mixture.



On a lightly floured surface roll out 1 sheet of pastry into a 13-inch square and, using Brie as a guide, cut out 1 round the size of the Brie. Cut out a mushroom shape from scraps for decoration.

Horizontally halve Brie. Roll out remaining sheet of pastry into a 13-inch square and transfer to a shallow baking pan. Center the bottom half of Brie, cut side up, on pastry square and spread mushroom mixture on top. Cover mushroom mixture with remaining half of Brie, cut side down. Without stretching pastry, wrap it snugly up over Brie and trim excess to leave a 1-inch border of pastry on top of Brie.

In a small bowl, lightly beat egg and brush onto border. Top Brie with pastry round, pressing edges of dough together gently but firmly to seal. Brush the top of pastry with some egg and arrange pastry mushroom on it. Lightly brush mushroom with some egg, being careful not to let egg drip over edge of mushroom (which

would prevent it from rising). With back of a sharp small knife, gently score side of pastry with vertical marks, being careful not to cut through dough. Chill Brie, uncovered, 30 minutes. Brie may be made up to this point 1 day ahead and chilled, loosely covered.

Preheat oven to 425°F.

Bake Brie in middle of oven until pastry is puffed and golden, about 20 minutes. Let Brie stand in pan on a rack 15 minutes and transfer with a spatula to a serving plate. Serve with bread or crackers. Makes 8–10 servings.



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