SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 482 MAY 2012

Beatrix Potter's groundbreaking scientific mycological research revealed

Jennifer Cunningham, *The Herald (Scotland)*

Beatrix Potter is best known as the creator of Peter Rabbit and Mr. Macgregor, but she also had a flair for science. Now – nearly 70 years after her death – her "lost" research paper will finally be presented.

Ali Murfitt, a 29-year-old ecology graduate who completed an apprenticeship in wildflower and fungi identification with the Royal Botanic Garden in Edinburgh and the National Trust for Scotland, will appear before the Linnean Society, the world's oldest natural history society. She will dress as Beatrix Potter would have done in 1897, had she been allowed to deliver her paper on her discoveries about how fungi grew and how she germinated the spores of the velvet shank fungus.

Potter, the creator of Peter Rabbit, was not permitted to describe her experiments to the society and her paper was delivered by a man. The Linnean Society, now headed by a woman, will make amends by inviting Ms. Murfitt to describe the germination process Potter carried out, while Professor Roy Watling will give an overview of mycology in Europe during Potter's childhood.

Potter made some of her earliest paintings of fungi at Dalguise House near Dunkeld, Scotland, where her family spent holidays for 15 years. It was at Eastwood, another Potter holiday house in Dunkeld, that she started painting in earnest. It was here also that she wrote a letter to Noel Moore, the son of her former governess, containing a story about a naughty rabbit called Peter. One hundred years ago it was published as the Tale of Peter Rabbit, the first of the well-loved series.

Potter was keen to make contact with George Massee, the mycologist at the Royal Botanic Gardens at Kew, and was introduced through an uncle, Sir Henry Roscoe, a scientist and vice-chancellor of the University of London. Mr. Massee was dismissive. Potter lost his sympathy on three counts: she was a woman, an amateur and she had succeeded in germinating fungal spores to a greater degree than he had. On Massee's advice she read the findings of Julius Brefeld, a German mycologist who had done a considerable amount of work on

cont. on page 7

Save the date! 5th Annual Mushroom Maynia is Sunday, May 6, at the Burke Museum

This is a fun, one-day event to raise awareness of the roles of fungi in our lives and the world. This year, the event will tie in to the Burke's exhibit "Hungry Planet: What the World Eats," so the focus will lean toward the nutritional, culinary and cultural aspects of mycology.

Mushroom Maynia needs volunteers to help with displays and activities. These include family oriented cultivation workshops, art activities, books, tasting, microscopes and a variety of displays to introduce the public to the kingdom of fungi. Volunteers with all levels of mushroom expertise are needed, including beginners. Admission to the museum for Mushroom Maynia will be free to PSMS volunteers who sign up ahead of time.

Mushroom Maynia is a collaboration between the Daniel E. Stuntz Memorial Foundation, PSMS, and the Burke Museum of Natural History and Culture.

Mycology is intimately connected to the studies of forestry, botany, ecology, medicine, and the culinary arts. It is the goal of The Daniel E. Stuntz Memorial Foundation and PSMS to keep these connections alive by supporting the study of fungal systematics and the natural science of fungi.

WHO SAID IT?

A real gourmet will know that the different species of mushroom are cooked in different ways and used for different purposes, and that all the edible species have a place in a refined cuisine. (see pg. 7)

PCC Tastings at the Burke: Northwest Mushrooms with Becky Selengut

Sat., May 5, 2012 , 11 a.m. – 1:30 p.m.

Learn more about cooking with Pacific Northwest ingredients as PCC Cooks instructor Becky Selengut shares a favorite recipe, spring vegetable risotto with fava beans, morels and pea vines.

As a graduate of William Smith College and the Seattle Culinary Academy, Becky spent three years at the nationally acclaimed restaurant, The Herbfarm. She has started a private chef and instruction company, founded a Web site devoted to seasonal and local foods, and she runs a blog and has a cookbook.

For 2012, PCC members will receive $10 off the basic membership price at the Burke.

The Burke Museum will host tastings throughout the run of the *Hungry Planet* exhibit.

Jim and Lynne Weber

Tastings are scheduled at 11 a.m. and 1 p.m. and include recipe demonstrations as well as sample bites of the featured cuisine.

Seating is limited.

Spore Prints

is published monthly, September through June by

Puget Sound Mycological Society

Center for Urban Horticulture Box 354115

University of Washington, Seattle, Washington 98195

(206) 522-6031 http:/www.psms.org

MAY MEMBERSHIP MEETING

We welcome back Noah Siegel in May. His talk is titled, "It's Called *What* Now? Name Changes in the DNA Age." Why are the names for our mushrooms undergoing a massive overhaul? Because DNA sequencing technology is now the gold standard for the naming of genus and species. As soon as you learn a new name, an even newer one replaces it. Noah's presentation will highlight the technology behind the changes, as well as a few stories behind some of our favorite mushrooms' many names, how they are related, and why future scientific advances mean more taxonomic transitions to come.

Noah's field mycology skills are extensive. He spent two decades seeking, photographing, identifying, and furthering his knowledge about macrofungi. He's hunted for mushrooms throughout the United States and Canada, and on multiple expeditions to New Zealand and Australia.

His photographs have appeared on the covers and in issues of "FUNGI," "Mushroom the Journal," and numerous mushroom books as well as in NAMA and other club publications. He is currently working on a book, "Mushrooms of the Redwood Coast." He is president of Monadnock Mushroomers Unlimited, (MMU) a Keene, New Hampshire, mushroom club and an active member of the Boston Mycological Club and the Fungus Federation of Santa Cruz. He is also a trustee for the Northeast Mycological Federation, the Northeast representative to NAMA, chairman of the NAMA Foray Committee, and serves on NAMA's Photography Committee.

Will members with last names beginning with A-L please bring goodies to share after the presentation?

Board Notes Denise Banascewski

The Joy Spurr Memorial Foray at Cispus (near Randle) is coming up! We have 60 people registered and have space for 30 more. Among other activities, there will be speakers, a cultivation workshop and a dyeing workshop. You will need two permits because we will be hunting in different areas (note: ranger district offices are closed on Saturdays.) The cutoff date for registration is Monday, May 14, so register soon if you want to go. See www.psms.org for more details. Pacita Roberts and Teddy Basladynski will co-chair the planning committee for the 2014 NAMA Foray, which will be held in Port Townsend. We will continue to sell raffle tickets for Alexander (Sasha) Viazmensky's original watercolor painting of morels and will pick the winner of the painting at the June membership meeting. There are several volunteer activities listed on our Web site; please look under "Events Registration." Going forward, if you want to go into the PSMS office, you will need to either have a key or be accompanied by someone with a key; CUH staff will not let anyone in. We are looking into replacing the old PSMS laptop with something more current. Finally, although the business portion of the members' meeting starts at 7:30 p.m. the doors open at 6:30 p.m. so please come early to socialize and meet other members before the meeting begins.

March 31 field trip Brian Luther

It was a very wet, cold day and we didn't expect much of a crowd because of it, but a surprising 70-plus intrepid members signed in to participate. Everybody was greeted with hot coffee and goodies provided by our host Kitty Loceff, with backup support from new member Jean-Paul Boisvert and hosting chair Debra Lehrberger. Your work was greatly appreciated!

Hildegard and I had an introductory meeting discussing several relevant topics including collecting, communication and safety at the field trips in general, as well as the habitat and where to look for *Verpa.* After this we gave members a little more time to have some snacks and coffee, then broke up into five different groups to see what we could find, each led by knowledgeable members. Thanks to those who acted as guides.

Fungi were very sparse in the woods, but we ended up with a small but nice selection of fungi on a picnic table. About 15 or so different species were displayed and some *Verpa bohemica* were found by members being led in different directions, so at least we didn't get "skunked." Danny Miller and I spent some time talking about each of the collections found, which finished this half-day field trip.

The prettiest fungi found were several collections of *Guepiniopsis chrysocomus*, a bright orange jelly fungus, a gorgeous yellow-orange, viscid *Hygrocybe* of the *persistans – chlorophana* group, and a single scarlet cup, *Sarcoscypha coccinea*. One of the most unusual fungi brought in turned out to be *Arrhenia onisca*, after doing a microscopic study of the specimen. It's a petite, dark umber-colored omphalinoid fungus with a pronounced umbilicate pileus. For a good online photo of this species, refer to this Web site: http://www.fungipedia.es/clasificacion-orden/basidiomycota/tricholomatales/321-arrhenia-onisca.html

Yes, Virginia, there really is a Miss Mushroom contest, and it's in Irvine, Kentucky

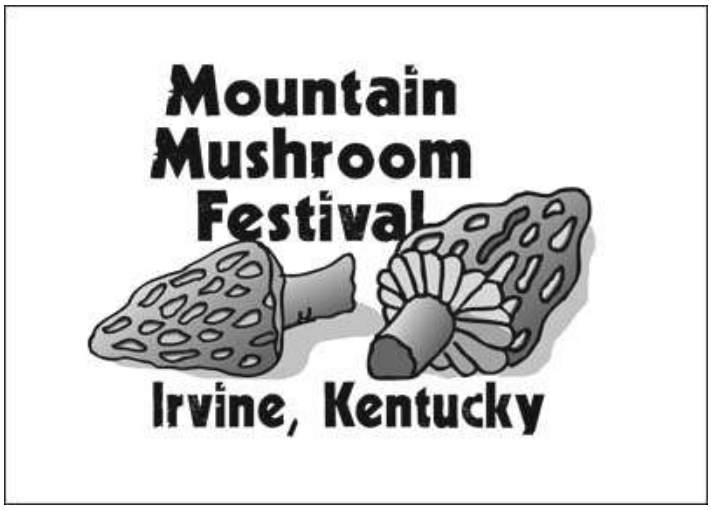
Last month's issue of this newsletter included an "April Fools" article about a fictitious Miss Mushroom North America contest. But there really is an annual Miss Mushroom contest, and it was taking place just as the current issue of the newsletter was going to press.

It's called the Miss Mountain Mushroom Festival Pageant. The Mountain Mushroom Festival in Irvine, Kentucky, crowns up to five candidates during the festival each year, in various age categories (Enter early as the T-shirt sizes are in short supply, the Web site warns prospective pageant-goers.)

To enter the pageant, girls must be between ages four and 21, must reside in Estill County, Kentucky, or be a college student whose parents reside there, must be single and never married or ever had children, and must not have won the contest in their age category previously.

The pageant hopefuls are judged on a variety of qualifications just as in any pageant. The winner in each age group receives a tiara and a sash; the runner-up receives a trophy. Another contest during the festival awards mushroom hunters their own trophies.

The festival also has a parade, a fungus run (5K) and many other mushroom-related events.



Tanka

Bolete mushrooms seem

Iike lamps in the dark forest

As I examine

Each one, its curvy cap, red

Bruising on the stipes I cut.

Bd fungus hits Alaskan frogs, boreal toad

Peninsula Clarion

During a hot July day in 2002, Mari Reeves, a biologist with the Anchorage Field Office of the U.S. Fish and Wildlife Service, was poking around the Swanson River Road in the Kenai National Wildlife Refuge. Reeves was just starting a multi-year investigation of structural abnormalities in our ubiquitous wood frog. What she found was a dead frog that was diagnosed with chytridiomycosis, a sometimes lethal disease caused by *Batrachochytrium dendrobatidis* (Bd).

Finding Bd in Alaska was is a big deal. This fungal pathogen was first described in the scientific literature in 1999, but was widely recognized as the cause of recent global declines in amphibian species. Bd appears to be capable of infecting most of the world's more than 6,200 amphibian species, of which 30 percent are already threatened with extinction. And Reeves' frog was the first time that Bd was found in Alaska.

Bd is a chytrid fungus, of which there are approximately 1,000 different species that live exclusively in water or moist environments. The chytrids are among the most primitive types of fungi, known to be at least a half billion years old. Bd is unusual because it is the only chytrid that parasitizes vertebrate animals, specifically amphibians. Chytridiomycosis is the disease that occurs when an amphibian is infected with large numbers of the Bd fungus; it becomes lethal when zoospore count equivalents reach 10,000. Infection with Bd occurs inside the cells of the outer skin layers. With chytridiomycosis, the skin becomes very thick, and the change is deadly to amphibians because - unlike most other animals - amphibians absorb water and electrolytes like sodium and potassium through the skin.

In Southeast Alaska, boreal toads - Alaska's only toad species - have gone from abundant to almost non-existent in less than 10 years. The cause remains uncertain, but biologists have found boreal toads in Alaska's coastal rain forest (and in other states) that died from the chytrid fungus.

In 2006, Reeves and her colleagues found Bd-infected wood frogs in the Swanson River canoe system as well as along the Swanson River Road. In 2011, Bd-infected frogs were found at 17 sites, including 10 frogs carrying lethal loads of zoospores. During that same year, Meg Perdue, who replaced Reeves as lead investigator, also employed a new genetic method for detecting Bd in water samples, which did not require the conventional method of swabbing the skin of captured frogs. More than a third of 34 sites that she tested came back positive for Bd in the water.

Neither Reeves nor Perdue have yet to find Bd in wood frogs on Tetlin or Innoko National Wildlife Refuges, two other places their team has surveyed. But other researchers have found Bd as far north as Denali National Park.

Declining boreal toad populations are especially alarming because amphibians are indicator species, an early warning system of environmental health, because of their sensitivity to pollutants and changes in environmental conditions.

Author John Morton is the supervisory biologist at Kenai National Wildlife Refuge.

Common chorus frog seems to play role of Typhoid Mary in spread of chytrid fungus

San Francisco Chronicle

Biologists have discovered the Typhoid Mary of the frog world – a little green hopper that is spreading a deadly chytrid fungus to other frogs and amphibians in the Sierra while remaining largely immune to the infection itself.

The Pacific chorus frog, common to California, is known for its distinctive "ribbit" call that can be heard from dawn to dusk around lakes from the Bay Area to the High Sierra.

The fungus it spreads has killed other frogs, toads, salamanders and newts in the Sierra and is the same fungus that has wiped out hundreds of frog species throughout the world in what many biologists have termed a "mass extinction."

In California, two San Francisco State University researchers have discovered that the common frog appears to be heavily infected with the killer fungus, but almost never shows symptoms of the disease. The report appears in the online journal, Plos One, authored by biologist Vance T. Vredenburg and Natalie M.M. Reeder, a recent graduate student in his lab.

The frog's neighbors, the yellow-legged frogs that also inhabit Sierra lakes, are rapidly being infected and dying with a litany of severe symptoms, including "weight loss, lethargy, excessive skin shedding, muscle spasms and loss of reaction to stimuli," the researchers said.

Worldwide, the chytrid fungus has spread to nearly 600 species of frogs, Vredenburg said, and has probably driven more than 200 species to extinction.

"It's the worst population crash of animals in history," he said.

Reeder, a UC Berkeley graduate with a major in integrative biology, backpacked across the Sixty Lakes Basin in the High Sierra east of Fresno to study the chorus frogs and the endangered yellow-legged frogs that inhabit the same lakes.

Bacteria tend leafcutter ants' fungal garden

Department of Energy Pacific Northwest National Laboratory

RICHLAND, Wash. – Leafcutter ants, the tiny red dots known for carrying green leaves as they march through tropical forests, are also talented farmers that cultivate gardens of fungi and bacteria.

Ants eat fungi from the so-called fungal gardens, but the bacteria's role has been unclear until now. New research shows the bacteria help decompose the leaves and play a major role in turning the leaves into nutrients that may be important for both ants and fungi. The findings were published March 1, 2012 by *The ISME Journal*, a publication of the International Society for Microbial Ecology.

"This research provides some of the first tangible details about the fascinating symbiotic relationship between leafcutter ants, fungi and bacteria," said Kristin Burnum, a bioanalytical chemist at the Department of Energy's Pacific Northwest National Laboratory.

Burnum is a co-author on the paper and led the study's protein analysis. "Understanding how bacteria turn plant matter into a source of energy in ant fungal gardens could also help improve biofuel production." The gardens in question are initially sowed by the ants, which bring leaf pieces into their underground nests. From the leaves grow the fungus *Leucoagaricus gongylophorus*, traditionally thought of as the ants' food.

The relationship between leafcutter ants and fungi has been known since 1874, but it wasn't until the late 1990s that scientists started to also identify bacteria in the underground gardens. Since then, a lively debate has gone on about the bacteria's role.

Because pure samples of the garden fungi grown in laboratories don't easily degrade cellulose, a molecule that gives plants structural stability, many scientists have argued the bacteria help decompose the leaves. Other researchers have proposed bacteria – like the microscopic bugs in our guts – help ants obtain nutrients from the leaves.

Lead author Frank Aylward of the University of Wisconsin-Madison, Burnum and their co-authors set out to help resolve the debate by doing a comprehensive survey of the various bacteria species that live in the gardens and examining the suite of proteins those bacteria produce. They traveled to a Smithsonian Tropical Research Institute site near Gamboa, Panama, and gathered samples of fungal gardens tended by two ant species, *Atta colombica* and *Atta cephalotes*. Aylward and several others on the research team are part of the Great Lakes Bioenergy Research Center, one of three Bioenergy Research Centers established by DOE's Office of Science in 2007 to accelerate research toward the development of cost-effective advanced biofuels from nonfood plant fiber. The University of Wisconsin-Madison leads the Great Lakes center.

To produce results that more accurately reflect the large diversity of real-world gardens, the team collected large samples with bits of leaves, ants, fungi and bacteria intermixed instead of just gathering samples of the bacteria they intended to study. This allowed them to better examine the entire community of bacteria that live in the gardens and prevented them from missing some bacterial species. The team then studied the bacterial community's genes and proteins – an approach known as metagenomics and metaproteomics.

The researchers sequenced their genetic samples at Lawrence Berkley National Laboratory's DOE Joint Genome Institute. With the help of an extensive library of bacterial genes developed by co-author Cameron Currie, team members at University of Wisconsin-Madison identified thousands of bacterial genetic sequences from the two ant gardens.

More than two-thirds of the bacterial species found were from just a few groups. More than half of those identified belong to the family *Enterobacteriaceae*, whose members are known to ferment sugars and include the intestinal

microbes that help animals digest food. From the bacteria, Burnum and her PNNL colleagues in Richland examined proteins, the workhorses of the cell that perform the tasks needed to keep organisms alive and well.

They used mass spectrometers at EMSL, the Department of Energy's Environmental Molecular Sciences Laboratory at PNNL, to identify proteins in an *A. colombica* nest.

They found proteins that were involved a surprising number of different metabolic pathways, including:

*Breaking down complex sugars that make plants tough and durable, but difficult to digest;
*Transporting sugars, allowing broken-down sugars to be used for energy;
*Making amino acids, the buildings blocks of proteins;
*Making vitamin B5, which is needed to both break down proteins, carbohydrates and fats and to make energy from nutrients.

When compared to all other bacteria in Currie's large library of bacterial genes, very few – just 0.2 to 0.6 percent – of the garden bacteria were involved in breaking down cellulose. Instead, most of the garden bacteria were involved in breaking down simpler sugars, indicating that perhaps fungi initially breaks down cellulose and the bacteria then turn the partially digested sugars that result into a variety of nutrients that could promote the fungi's growth or even nourish the ants themselves.

"Our results show that calling these 'fungal gardens' is pretty misleading; 'fungus-bacterial communities' would be far more accurate," Burnum said. "Bacteria are not only integral residents of these communities, but they perform essential tasks that keep the communities – and the ants that help cultivate them – living."

Next, the team plans to analyze the fungi, lipids and various metabolic products found in the gardens. This study's findings and future results could advance the work of scientists who are looking at fungal enzymes to make biofuel out of plants. The enzymes, or biological catalysts, of fungi are exceptionally talented at breaking down cellulose in plants, making them a good model for large-scale biofuel production.

"It's apparent that neither fungi nor bacteria work in isolation when it comes to leafcutter ant gardens," Burnum said. "It's possible that the same goes for biomass conversion; perhaps both fungi and bacteria are needed to efficiently turn plants into biofuel."

REFERENCE: Frank O. Aylward, Kristin E. Burnum, Jarrod J. Scott, Garret Suen, Susannah G. Tringe, Sandra M. Adams, Kerrie W. Barry, Carrie D. Nicora, Paul D. Piehowski, Samuel O. Purvine, Gabriel J. Starrett, Lynne A. Goodwin, Richard D. Smith, Mary S. Lipton, Cameron R. Currie. Metagenomic and metaproteomic insights into bacterial communities in leaf-cutter ant fungus gardens. *The ISME Journal*, Online publish date March 1, 2012. DOI: 10.1038/ISMEJ.2012.10.
www.nature.com/ismej/journal/vaop/ncurrent/full/ismej201210a.html.

Plant-eating fungus joins battle against Japanese knotweed

The Daily Telgraph (London)

A fungus that attacks plants is the latest weapon to be deployed against the spread of an invasive weed that costs the economy £166 million a year.

The Government hopes the leaf spot fungus could help in the fight to control Japanese knotweed, an aggressive nonnative species which can damage property by growing through concrete or tarmac.

Knotweed poses a threat to Network Rail, which spends millions eradicating it from its embankments and railway lines. Homes have even been lost to knotweed, peers were told. Psyllids, flying beetle-type insects which drink the plant's sap, are already being used to combat the weed, and experts are now testing the use of fungus as a form of biological control.

On the Menu

Cutting a stipe is a little too much
What with those fungus waiting,
I guess the pileus needs a crutch
But we have need for plating.

The parasite and the saprophyte
Are my favorite fungi of the fall,
Once they're cooked I get first bite
And I never stop till I've eaten all.

What matters is getting the right one
And cooking 'em well; they're done
When you smell the perfume made.

So hum along with the kitchen sound
As the mushrooms sizzle and fool around
In fry pans; have red wine, ale or lemonade.

- R. M. Sarton

Fungal disease killing North American bats is invader from Europe, scientists say

Vancouver Sun, April 10, 2012

The death of millions of bats in Canada and the United States has been traced to an invasive pathogen from Europe, which may have been carried into North America on someone's shoes. An international experiment, run on bats that hibernated in a biosafety lab in Saskatchewan, has provided the strongest evidence yet that the bat killer is a fungus from Europe.

"And it's a reasonable hypothesis that it came in on someone's shoes," says biologist Craig Willis, University of Winnipeg, who led the study published in the Proceedings of the National Academy of Sciences.

More than 90 percent of bats have been wiped out in colonies in Eastern Canada and the U. S. as a result of white nose syndrome, which is caused by the fungus.

The quickly spreading fungus has decimated colonies in the eastern U. S. as well as Nova Scotia, New Brunswick, Quebec and Ontario.

The syndrome kills bats while they hibernate and gets its name from the white fuzzy fungal growths around the nose and wings of infected animals.

A fungus called *Geomyces destructans* is responsible, and scientists have suggested it's either a recent invader from Europe, where the microbe is known to occur, or it was in North America all along but suddenly become a bat killer as a result of genetic mutation or environmental change.

Willis and his colleagues ran a four-month long experiment on little brown bats in an attempt to find out.

The researchers collected 54 bats that had recently started hibernating in an uninfected cave in central Manitoba. They stashed the creatures into a cooler and drove them to the Western College of Veterinary Medicine at the University of Saskatchewan in Saskatoon.

There, the researchers infected a third of the bats with fungus that has been killing bats in New York state, while another third were infected with fungus from Germany that was flown into Canada under special permit. The last third was the control group.

The bats were fitted with tiny heat sensors and, within 48 hour of being snatched out of their cave in Manitoba, they were put in simulated caves created in refrigerator-sized environmental chambers in a biosafety lab.

"We wanted to be extremely careful not to let the fungus escape," says Willis.

The bats snuggled in the simulated caves and continued their hibernation. Post-doctoral fellows Lisa Warnecke and James Turner then kept a close watch for the next four months, using surveillance cameras.

The bats infected with fungus soon developed the signs of white-nose syndrome, including powdery white fungal growths on their exposed skin and damage on their wings.

The infected bats also "aroused" from their hibernation three to four times more often than the bats in the control group. Such arousal entails warming the body many degrees, and depleted the bats' fat reserves, says Willis.

Bats in both the groups infected with North American and European fungus were emaciated and near death several weeks before the end of the experiments and were destroyed.

The bats in the control group were all still in good shape at the end of the 120-day experiment.

The scientists say the study strongly supports the idea that accidental introduction of the fungus from Europe "is responsible for the white-nose syndrome-related mass mortality of bats in North America" because bats infected with both the European and New York fungus developed the syndrome.

The findings also shows white nose syndrome kills bats by interrupting their hibernation, and depleting the fat reserves meant to get them through the winter. This fits with the observation that infected bats often emerge early from hibernation and are seen flying around in mid-winter before they dehydrate or starve to death. The syndrome has been linked to deaths of more than 5.7 million bats in Canada and the United States.

"Bats provide tremendous value to the economy as natural pest control for farms and forests every year…"

While the fungus is deadly to North American bats, related bats species in Europe are known to coexist with the fungus, suggesting they have some sort of immunity, says Willis. He and his colleagues are planning more experiments to try find why the European can live with the fungus in the hope of slowing the "disaster" unfolding in North America.

Top wildlife experts say the rapidly spreading fungus poses a serious threat to the survival of Canada's bats.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in February recommended Environment Minister Peter Kent declare three of the country's bat species — the Tricoloured Bat, the Little Brown Myotis bat, and Northern Myotis bat — endangered species.

"Bats provide tremendous value to the economy as natural pest control for farms and forests every year, and may play an important role in helping to control insects that spread disease to people," COSEWIC says.

Researchers have estimated the bat die-off will cost North American agriculture $3.7 billion annually.

Bats reproduce slowly with just one pup every one to two years, so biologists say the populations will not rebound quickly.

Now showing: Post-apocalyptic toxic fungi versus Asian super princess

DVD review by Ron Post

It's one of Hayao Miyazaki's older and perhaps least-known animated films (if you haven't seen "My Neighbor Totoro" you're missing something) yet the story behind "Nausicaa of the Valley of the Wind" is completely familiar to anyone who has thought about the greatest threat to the human race: toxic fungi that start to penetrate the far reaches of the earth 1,000 years after an all-out war has destroyed most of mankind. We all worry about such impending doom, don't we?

Anyway, the first scene of "Nausicaa" shows a seriously sporulating forest of mushrooms and weird, bulbous, fern-like trees casting off their shiny-deadly reproductive structures in the direction of two of the film's main characters, who must wear special breathing masks so as not to be overcome by the fouled air. And of course, the threat of these spores is spreading, destined to poison the entire, as-yet-unforested planet. So what's the big deal?

The sweet Princess Nausicaa understands what is going on, and when she doesn't, she takes her time to assess things: "Oh no, they must have landed and angered the insects!" When she isn't busy saving the lives of her people, she comes to suspect that the fungi are playing some sort of beneficent role even as they wreak ecological havoc on the remaining humans. She also seems to be in psychic control of evil bugs that can swarm out of the ever-expanding toxic forest (which of course is the prime habitat for the toxic fungi.)

The giant insects, for some reason, seem to want to deal harshly with the less-than-intelligent, surviving humans. Shades of Mothra! After all the threats (from ignorant, warring humans as well as toxic fungi and giant bugs) become clear, let's just say that the plot gets even more involved. But fungi never lose their place of supremacy (underground as it may be) in this 1980's sci-fi fantasy.

"Look at that cloud of spores," says the princess a few minutes into the film. "It's the jungle's poisons taking their toll," says the wise old man, Lord Yupa, voiced by Patrick Stewart (aka Captain Jean-Luc Picard). But this isn't "Star Trek." Go ahead and root for the toxic fungi. I did.

Nausicaa never loses her flair for problem-solving, even though the rest of the planet wants to annihilate everything that lies within the path of the spores (the giant bugs are no saving grace, either). Only the princess sees how stupid people can be in the face of such threats. She convinces people of her vision, though it's almost too late.

The artistic accomplishments in this film are not quite up to the level of Miyazaki's other films such as "Totoro" and "Arietty." But the film is worth the purchase price if you can find a DVD to buy; don't count on finding a copy to rent. Most of the rental copies have either been appropriated for sale or been stolen. The Disney version, released also on BlueRay, is probably easiest to purchase (if $35 is easy).

Answer to page 1 question: Euell Gibbons in "Stalking the Wild Asparagus"

Beatrix Potter's research, 70 years later

cont. from Page 1

germination.

This convinced Potter of the correctness of her own work and she wrote up her results for the botanists at Kew. The director rejected it but Mr. Massee was now prepared to acknowledge her discovery and collaborate with her. The Linnean Society did not admit women and so Mr. Massee presented the paper "On the Germination of the Spores of *Agaricineae*" on Potter's behalf on April 1, 1897.

Beatrix Potter

The tale of the fungi apprentice remains unfinished. Unable to find a job directly related to her new knowledge and skills, Ms. Murfitt hopes to become a freelance mycologist.

Psalm of the Spore

Oh, Lord, thou givest mushroom fever

To these lowliest forms imbibing forever

Thy slimiest condiments. We give thanks

For thy grace for on dung it chooseth to dwell.

Mould is the sacred church mycophagous,

Living holy carpophore, hymenium of the soul,

Fungus of celestial fire stoked with they mercy.

O Lord let angels sing of the heavenly spore.

BARLEY, CELERY ROOT AND MUSHROOM SALAD WITH SCALLION VINAIGRETTE

Melissa Clark
NEW YORK TIMES, March 7, 2012

The mushrooms, barley and celeriac make this dish a light, spring-like fare. Tossing each of the main ingredients, including the barley, is essential. Use plenty of water when cooking barley to help keep it from clumping.

1 cup pearl barley

1 large celery root, peeled and cut into half-inch cubes (about 3 cups)

One-half cup plus one TBSP extra virgin olive oil

2 TBSP plus 1 TSP salt, more as needed

1 pound mixed mushrooms cut into bite-size pieces

1 TBSP cider vinegar

3 scallions, finely chopped

1 TBSP chopped celery leaves

One-third cup celery stalk, finely chopped

Three-quarter cup fresh parsley leaves

Preheat oven to 350 degrees. Spread the barley on a rimmed baking sheet and roast until fragrant and golden, about 15-20 minutes. Remove from oven.

Increase oven temp. to 400 degrees. On a rimmed baking sheet, toss celery root with 2 TBSP of oil, one-quarter teaspoon each of salt and pepper.

On a separate rimmed baking sheet toss the mushrooms with one-quarter cup oil and a half-teaspoon each of salt and pepper.

Roast both, tossing occasionally, until golden and tender. Celery root could twice as long as mushrooms, as much as 40 minutes. Transfer these ingredients to a large bowl.

In a large pot, bring 10 cups of water and 2 TBSP of salt to a boil. Add barley and simmer until tender. Drain it and add it to the bowl with mushrooms and celery root.

In a small bowl, whisk the vinegar, scallions, celery leaves, and one-quarter teaspoon each salt and pepper. Toss the vinaigrette and diced celery stalk into the salad. Coarsely chop one-quarter cup of the parsley leaves and add to the salad. Toss in the remaining whole leaves, tearing the large ones into smaller pieces. Adjust the seasonings. Serve warm or at room temperature.

Yields four to eight servings.

Puget Sound Mycological Society
Center for Urban Horticulture
Box 354115, University of Washington
Seattle, Washington 98195

RETURN SERVICE REQUESTED

Non-Profit Org.
U.S. POSTAGE
PAID
SEATTLE, WA
PERMIT NO. 6545