SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 485 October 2012

2012 ANNUAL WILD MUSHROOM SHOW

Marian Maxwell

Finally, the month for which we have been waiting arrives—October, the highlight of the mushroom season in Washington and the timing of our annual show!

Our annual show on Oct. 13 (12–7 pm) and Oct. 14 (10 am–5 pm) is one of the most exciting events in PSMS. You learn a great deal and forge new friendships as well as renew contacts with long time friends. As a volunteer organization we depend on our membership to keep us going!

We need you! Volunteer for the show! We now have on-line sign ups for the committees for our annual show on the Member's page under Event Registration. Select the committee from the list for which you are willing to volunteer an hour or two, and someone will contact you! You can also call the people below to volunteer. Please see the events page for committee descriptions and duties. Remember that many of the committees require help before the show opens, on Friday and early Saturday morning.

You will also have an opportunity to sign up at the October meeting.

Show Committees:

Arts & Crafts—Marilyn Droege—206.634.0394

Book Sales—John Goldman—206.778.0838
Cathy Lennebacker—425.678.8350

Cooking & Tasting—Dennis & Jamie Notman—206.545.7343

Construction—Kim Traverse—206.380.3222

Crowd Control & Greeting—Kim Traverse—206.380.3222

Duff & Moss collection—Marian Maxwell—425.235.8557

Exhibit Chair—Kim Traverse—206.380.3222
traverse.kim@gmail.com

Floater (helping where needed)—Kim Traverse—206.380.3222

Hospitality—Kim Traverse—206.380.3222

Kid's Table/Feel and Smell—Irwin Kleinman—206.323.2903

Membership—Pacita Roberts—206.362.2713

Mushroom Collection—Marsi DiGiovanni—206.243.0595

Mushroom Receiving & Sorting—Marian Maxwell—425.235.8557

Publicity & Media—Marian Maxwell—425.235.8557

Ticket Sales—Sherwood Stolt—425.793.3013

Display (Trays) Arranging—Marian Maxwell—425.235.8557

Vendors—Milton Tam—206.525.9556

Please call the chair people listed above for questions pertaining to their committees.

COLLECTING FOR THE SHOW

Marian Maxwell

We ask that everyone help by bringing in any mushrooms they find. Collect the entire mushroom, even structures that may be under the ground. Protect the mushrooms in wax paper or foil. If they are geotropic (like Amanitas, which orient their gills toward the ground) or elongated (Lepiotas, etc), you can stand them up gently in empty milk cartons. Most mushrooms will need to be gathered within a couple of days of the show since we want them to be prime specimens. Don't assume that we will have one that you think is common (like the fairy ring mushroom, *Marasmius oreades*)—sometimes those are the ones we don't get since everyone thinks everyone else is bringing them! The inky cap families are delicate so should be gathered on Friday or on Saturday morning. Smaller mushrooms can be misted to keep them fresh and colorful (but don't soak them). Keep your mushroom collections and species separate. Recycled yogurt containers are a great way to keep the smaller mushroom collections separate. It helps to include a leaf or two of the tree under which you find the mushrooms, or grass snippets for the grass-inhabiting varieties, with the individual collection. Show receiving is Friday night at the tent outside the Mountaineers building after 5 pm. The show's mushroom sorting and categorizing are done by people who previously signed up for the committee and are approved.

We ask that you do not bring small children or pets to the sorting Friday night or to the arranging Saturday (7 am to noon).

If you have any questions, please contact me at president@psms.org or 425.235.8557.

PSMS CLASSES AND EVENT REGISTRATION

Marian Maxwell

Our all-in-one-day beginning mushroom ID class was popular enough that we will offer it again after the first of the year. This first time was on a trial basis to determine whether some people would prefer that format.

At the time this is going to print:

The Alexander Viazmensky mushroom watercolor portraits class has five openings.

The October 2012 Beginning Mushroom Identification Series from Oct. 16 through Nov. 6 has five openings.

The November 2012 Beginning Mushroom Identification Series from Nov. 1 through Nov. 29 has 36 openings.

The Meany Lodge Mountaineers/PSMS members joint venture is now open. Remember this is not a drop-in event, you MUST be registered to participate. It is a fund raiser for the Mountaineers Lodge at Meany. After you register on our Website we will send you the password to register with the Mountaineers as a PSMS member. There are a finite number of places for PSMS members.

Spore Prints

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Annual dues: single or family **$30**; full-time students **$20**

CALENDAR

Oct. 6	Field Trip (see Website)
Oct. 9	Membership Meeting, 7:30 pm, CUH
Oct. 13–14	PSMS Annual Wild Mushroom Show, The Mountaineers headquarters, Magnuson Park
Oct. 18–21	Breitenbush Hot Springs Mushroom Conference Breitenbush, Oregon
Oct. 20	Field Trip (see Website)
Oct. 22	Board Meeting, 7:30 pm, CUH Board Room **(changed)**
Oct. 23	*Spore Prints* deadline
Oct. 26–28	PSMS/The Mountaineers Mushroom Weekend Meany Lodge
Oct. 27	Field Trip (see Website)

BOARD MEETING

Denise Banaszewski

We have a one-day class scheduled for beginner identification on September 23, the demand for which has been high with a long waiting list. We plan to offer more classes in this one-day format in the future. A subset of the 2014 NAMA planning committee visited Fort Worden for a tour of the facilities and grounds and were pleased with what they saw. The best news was that Fort Worden staff will manage room reservations directly, which will save our volunteers a lot of time. The library continues to improve, and we plan to sell the extra books from our library to members first, and then at our annual show. Danny Miller will work on determining prices for the books. There has been a revision made to our Website: it will now allow only one address and one newsletter per membership. This was always the intent for a membership; the Website had a glitch in the past that allowed more than one per membership. We participated in a Shadow Lake Bog event, and only a meager seven mushrooms were found. The drought has even affected the largest bog in the state. We are developing a formal scholarship request form that will be used for people seeking a scholarship from PSMS for our classes and other opportunities; it will be available online when finalized. We will include a memorial to Patrice Benson at our November membership meeting, so please come to honor Patrice. Finally, the 2012 annual exhibit is approaching quickly, and we need more volunteers to help. Please call Kim Traverse (206.380.3222) to volunteer. We also need rain if we want to have any mushrooms to actually exhibit, so any help you can give there is also appreciated!

MEMBERSHIP MEETING

Tuesday, October 9, 2012, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle.

Photographer extraordinaire Taylor Lockwood will present his new show "In Search of the Holey Veil." Taylor's mission is to melt the frost of fungiphobia in America through his photography. He has set out to find and photograph the world's most beautiful mushrooms, and to share with others the images that resulted from this global treasure hunt. Taylor likes to be called a "mushroom portraitist" and a pioneer on the frontier of discovery and appreciation of mushrooms and other fungi. He has been recognized by mushroom professionals and enthusiasts around the world for his work and vision to promote their beauty.

Taylor was born in New Orleans but grew up near Seattle and attended the University of Washington's College of Architecture. Shortly thereafter, Taylor, an accomplished musician, moved to California and started a band. In 1984, after several hot, smoggy years of rock-n-roll in Los Angeles, he moved to Mendocino where he could breathe fresh air again, and soon discovered the mushrooms coming up all around him. He bought a camera and started taking photos. The rest is history. He has since taken innumerable photos and has presented his work hundreds of times in the U.S. and around the world. His photos have appeared in newspapers and many other publications, and he has published two books, *Treasures from the Kingdom of Fungi* and *Chasing the Rain: My Treasure Hunt for the World's Most Beautiful Mushrooms*. In addition to his vocation as an esthetic mycologist, Taylor also educates people about mushrooms and other fungi. In 2005, he released a video DVD entitled *The Mushroom Identification Trilogy*, a three-part series about the basics of mushroom identification. Three Websites feature Taylor's photos, videos, and mushroom-art products: www.KingdomofFungi.com, www.TaylorLockwood.com, and www.FungiPhoto.com.

Will members with last names beginning with the letters A–K please bring a plate of refreshments to share after the meeting.

LOST AND FOUND

Debra Lehrberger

We have several items left over from prior field trips, as well as a briefcase left behind at a monthly meeting.

Field trip left-behinds include two stainless steel forks, a Swiss army knife, a plastic drinking glass, a coffee mug, a water bottle, a child's jacket, a camping stove, and a small fuel tank in a fishnet bag.

E-mail host@psms.org to discover how I might get these back to you!

UPCOMING MUSHROAMING TOURS

Daniel WInkler

Andean Amazon Bolivia: Jan. 31 to Feb. 13

http://mushroaming.com/Amazon_Tour

Together with Larry Evans we will meet in La Paz on the Altiplano and travel across the Andes via Coroico, located in the Yungas, down to Rurrenabaque and Madidi National Park, one of the most bio-diverse spots on the globe. We will spend 10 days in the Amazon region to explore flora, fauna, and fungi. Still impressed from our trip this last January we decided to go back to Madidi. Note the early bird special before Sept. 28.

Cordyceps Expedition May 24 to June 5

http://mushroaming.com/Amazon_Tour

We will explore the alpine *Cordyceps* habitat around Ganzi in the gorgeous Kham region of East Tibet/West Sichuan, where the valleys are in full bloom at this time. Every Tibetan who can walk is up on the high pastures in camps looking for yartsa gunbu. They are busy in the afternoons with yartsa dealing. We will have plenty of opportunity to explore Kham's rich cultural heritage in the form of temples and sacred sites. In the mountain forests morels abound under towering glaciated mountains. Lots of hot springs await. A photo report from the *Cordyceps* expedition visiting Kham in 2010 is posted on-line at http://www.danielwinkler.com/cordyceps_tour_2010.html

Summer Fungal & Floral Foray Tibet, 2 weeks late July & late August http://mushroaming.com/Tibet_Tour

We meet in Chengdu, Sichuan and will travel further eastward exploring the gorgeous forested region of Kham or Kongpo. We will cross several passes around 4500 m (14,700 ft) enjoying stunning vistas and an amazing alpine flora. Local Tibetans will guide us hunting for matsutake and other edible mushrooms. Detailed photo reports and itineraries including plants and mushrooms encountered on previous summer tours are already online.

CAULIFLOWER MUSHROOMS NEEDED FOR STUDY

Brian Luther

Dr. Ronald H. Petersen, Professor Emeritus at The University of Tennessee, Knoxville, is requesting samples of *Sparassis* from the PNW for a study of the genus. If you find any *Sparassis* collections in good condition, please cut off a pie-shaped wedge and make a spore print (on aluminum foil), then dry the fungus in a food dehydrator or mushroom drier. Photographs and habitat and location notes would be appreciated. Send to

Dr. Ronald H. Petersen
Emeritus Professor
437 Hesler Biology Building
University of Tennessee
Knoxville, TN 37996-1100

You can also notify me, and I can come get a piece and take care of it. I would appreciate hearing from you if you find fresh material this fall.

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STARBUCKS WORKING TO TURN STALE MUFFINS, COFFEE GROUNDS INTO LAUNDRY DETERGENT

FoxNews.com, September 4, 2012

Muffins and coffee are what you typically put in your body for breakfast—not what you use to take if off your body if you spill your breakfast on you.

Researchers in Hong Kong are working with coffee giant Starbucks to turn food waste like stale muffins and used coffee grounds into ingredients for everyday products like plastics and laundry detergents, the *New York Daily News* reports.

Scientists at the City University of Hong Kong are testing the project at a food biorefinery, the kind of place that converts corn into bio-based fuel. Think of it as an oil refinery that uses food and plant-based materials instead of petroleum.

The process involves mixing the old baked goods with fungi, which break down the carbohydrates into simple sugars, research team leader Carol S. K. Lin explained.

This blend then goes into a fermenter in which the sugars are turned into succinic acid, something that is used in products like medicine and laundry detergent.

British supermarket chain Sainsbury's already uses anaerobic digestion technology to turn food waste into energy.

Food waste is a serious problem in the United States, with more than 34 million tons being generated in 2010, according the U.S. Environmental Protection Agency.

TIGER ATTACKS INDIAN MUSHROOM HUNTER

Press Trust of India / Lakhimpur. Sept. 19, 2012

A 35-year-old man was today attacked and injured by a tiger in the Bhira range forests in the south Kheri forest division. Pappu, a resident of Kukra, was attacked by the big cat while he was collecting mushrooms, Sub Divisional Officer of forest department Som Nath Singh said. Pappu suffered injuries in the head and shoulder region, Singh said adding, "he was rushed to a local hospital where his condition was stated as stable."

The Bhira and Mailani ranges are close to the Dudhwa Tiger Reserve. Singh said the local villagers have been strictly warned not to venture into reserved areas. The tiger fled the scene after the villagers and Pappu raised an alarm.

RESUPINATE FUNGUS OF THE MONTH: The Genus *Serpula*, and a True Story of the Dreaded "House Fungus" ©Brian Luther

First, the Story

In June of this year PSMS President Marian Maxwell was contacted by a Seattle area home owner seeking advice about a significant fungal growth which was suddenly sprouting throughout his house. He was referred to me. The subsequent descriptions of his plight and the accompanying photos he provided were very ominous, indicating a serious infestation by a destructive "house fungus"—a severe problem that needed to be dealt with immediately. The fungus was literally decomposing the wood and destroying its structural integrity. Extensive, moist, actively growing rhizomorphic blobs were oozing out of walls and seams and around windows and counter tops. The fungus was everywhere. The homeowner was also experiencing respiratory problems due to the abundant spores blowing around inside the house. It was so bad he had to start wearing a respirator.

Photo by home owner.

Abundant, thick mycelial mats forming throughout the house.

House fungi, also called dry rot, are especially menacing because they can transport water from remote sources (soil contact, leakage or poor drainage, etc.), allowing them to grow in totally unexpected places.

B. Luther

Dense mycelium on plywood.

My first and foremost advice was for urgent action by the owner to locate the main source of the moisture and cut off the supply to the fungus. Fortunately, he was a contractor and was both used to, and comfortable with, tearing things apart—which is exactly what he had to do. He had to remove all the siding from his house, take off paneling on inside walls, and pull out counters, as well as crawl under the house inspecting the beams, joists, and any exposed structural wood for signs of infestation. He located and isolated the moisture source, but unfortunately the invasion was already extensive.

B. Luther

One area of the house torn apart to locate and eradicate the house fungus. Drastic measures were required, including cutting off floor joists.

The next step was removing as much of the mycelium as possible. He said the mycelium was in big clumps on the wood, like thick felt sheets or pads, and was dripping with water. After that, he had to cut out the infected wood, where possible, and replace it. Then he opened up the areas affected, letting them air and dry out.

I made a trip to his house for a first-hand inspection. He had already done a lot of demolition and repair work, but as I said, the problem was systemic. He had big bags of removed fungus tissue and a large pile of 2×4s, infected plywood, paneling, flooring, and other lumber ready for disposal. One of the saddest casualties he showed me was a large, otherwise beautiful and expensive thermal pane picture window where the wood framing was irreparably damaged and, unfortunately, the glass could not be removed and salvaged—a huge inconvenience and expense to the home owner.

Photo by home owner.

Serpula incrassata *mycelium growing from a window sill. Note the pale mycelium on the vertical surface and the copious orange spores being produced below.*

Photo by home owner.

Same location after being treated and rebuilt. The whole house had to be torn apart and restored like this.

Finally, before putting his house back together, he treated the wood and soil underneath with Boracare (disodium octa-borate tetrahydrate) and anti-freeze (ethylene glycol or propylene glycol). There are several different products available. All are water soluble, but when the borate compounds are mixed with ethylene glycol it increases penetration into the wood. This mixture is also an effective insecticide. Ethylene glycol is very effective, just by itself, for the fungus problem.

Both Boracare and ethylene glycol are toxic if eaten, and borate compounds will kill ornamental plants as well as fungi and insects, so they should be kept away from planting beds. They are safe if applied to areas where neither humans or pets can have access (like within walls and underneath a house with no access). These details are being presented only to inform you about the regimen that was used by this particular home owner. If you ever have a similar problem, you should consult an expert and learn more. There is a lot of information available on this subject.

Description of Collection

Serpula incrassata (Berk. & Curt.) Donk
BSL coll. #2012-713-1

Widespread throughout much of the structure of a local home, growing through seams, forming extensive, thick, moist mats of actively growing vegetative fungal tissue and fertile regions as well. Seattle area, King Co., WA. July 13, 2012.

Early on I had also asked the homeowner to save me samples of both the white rhizomorphic mycelial mats and some of the colored, fertile tissue to study. Unfortunately, the specimens that the home owner kept for me were very moist and had been put inside a closed, sealed plastic bag and left for several weeks before I got to see them. As a result, the material was completely overrun with a secondary fungal parasite, obliterating virtually all of the original fungus. This species "...is soon destroyed by molds and insects" in the fresh, moist condition (Humphrey, 1923, p. 261).

As a result, I was not able to observe mature basidiocarp tissue, as hoped. However, I was able to locate some patches of dried mycelium as rhizomorphic tissue on small wood samples, and this allowed me to at least look at the hyphae microscopically. The vegetative hyphae and mycelial mat tissue were consistent with that of *Serpula incrassata*. In particular the combination of the brightly colored basidiospores shown in the home owner's photo of the window sill and the microscopic structure of the hyphae I observed are characteristic for this species, but absolute confirmation will have to wait until the fungus is cultured. *Serpula lacrymans*, the other species that is implicated in some

dry-rot infestations has a dimitic hyphal system. I'm currently attempting to culture the fungus from bits of dried mycelial mat found on woody debris from the house. If successful, I'll be able to eventually report on the mature basidiocarp and provide an update on this article.

Mycelial Description

The hyphal system was monomitic (but no basidiocarp tissue was studied). The hyphae were 2–3.5 µm wide (some larger cells from 5–10 µm wide or wider were seen in the rhizomorphic mycelial fans), thin-walled and mostly hyaline (but some were slightly to prominently colored light brown), mostly smooth, lacking any incrustation, with both simple septa and clamp connections. Most of the septa were simple, with some branching, but infrequent.

I wanted to provide a complete description specifically from this collection, but no fertile tissue was observed. As I stated above, this article is based on the assumption that the fungus in question is, in fact, *Serpula incrassata*. The description provided below was a result of fresh notes I took on the hyphal tissue as well as information on this species from the following sources: Humphrey (1923, as *Poria*), Murrill (1942, as *Meruliporia*), Cooke (1957, as *Meruliporia*), Lowe (1966, as *Poria*), Ginns (1971–study of type collection), and Gilbertson & Ryvarden (1987, as *Meruliporia*).

General Species Description

Basidiocarp resupinate, annual, widely spreading, up to 13 mm thick and 20 cm or more wide, soft to slightly tough when fresh and easily separable from the substrate; margin whitish or lightly colored, pale yellow or the mycelium can be orangish where exposed to light, strongly rhizomorphic or not rhizomorphic at all, depending on the collection, often sterile; hymenophore surface merulioid at first, becoming distinctly poroid, pale at first (whitish, grayish-white, light buff) becoming darker with age (grayish-brown to pale ochraceous), darker brown, orangish to pale olivaceous with maturity (this is variable, depending on both age and exposure to light), becoming dark, almost blackish and firm when dried; pores regular (round in outline) or irregular, angular or elongate, 2–4 per mm, up to 10 mm deep, with thick, entire dissepiments; context soft and fragile and lighter than the pore surface; subiculum light buff and paler than the context, soft, fragile, up to 8 mm thick. Hyphal system monomitic, hyphae 2–5 µm wide, but larger cells up to 12 µm wide may be present in rhizomorphic strands; subicular hyphae thin walled, mostly hyaline at first, becoming lightly colored with age, branching or not, simple septate or with clamps; tramal hyphae similar overall, but generally slightly darker. Hymenium up to 30 µm thick; cystidia none; basidia narrowly clavate, 20–30 (60) × 5–9 µm, four sterigmate and with a basal clamp; basidiospores quite variable, 7–16 × 5–10 µm, broadly ellipsoid to oval, , smooth, thick walled at maturity, hyaline at first, varying from light brown to orangish to dark brown or olivaceous at maturity, dextrinoid in Melzer's reagent. Color photos of the mature basidiocarps of this species can be easily accessed on-line.

Discussion

This species was originally described by Berkley & Curtis (1849) as *Merulius incrassata*, but Peck (1888), unaware of this earlier name, described it as *Polyporus pineus*. It was later transferred to *Poria* (Burt, 1917), then to *Meruliporia* (Murrill, 1942), and then to *Serpula* by Donk (1948). Ginns & Lefebvre (1993) and Ginns (1998) treat it under *Serpula*. This is confirmed as the current, valid genus according to the Cortbase Website and is placed in the family Serpulaceae. A current DNA study by Skrede et al. (2011) details the evolutionary history and molecular phylogeny of the family Serpulaceae; this allowed them to propose remarkable myco-geographical origins and species distributions over time, taking into account continental drift.

Serpula incrassata is one of the most destructive fungi of wooden man-made structures, milled wood, flooring, siding, posts, structural timbers, railroad ties, beams, and all sorts of lumber that is untreated. This fungus and *Serpula lacrymans* are the most destructive forms of so-called "house fungi." They not only attack landlubber's buildings and structures, but will aggressively break down wooden boats. They have a long history of causing massive damage to fleets of warships and other vessels during the 18th and 19th centuries. These are just two of the many fungi that cause what has been termed "dry rot."

For an excellent account of the destructive nature of *Serpula incrassata* I refer readers to Humphrey (1923). I would like to point out that the main collections that Humphrey (1923) studied and described in his article were both from Washington State: a collection in the wild from Shelton and another from a lumber storage shed in Seattle. So, unfortunately, we're cursed with this fungus here. Ramsbottom (1953) devotes a fascinating chapter (Chap. 20) to the subject of dry rot and gives a good introductory and historical background on the subject, focusing on the related species *Serpula lacrymans*. Mez (1908) is also an older source (in German) for information on "house fungi."

Serpula incrassata decomposes both coniferous wood and hardwoods, but is most often found on conifer wood (Gilbertson & Ryvarden, 1987). It's a brown rot fungus, attacking only the cellulose and hemicellulose and is incapable of breaking down the complex lignins in wood, leaving the decomposed wood dark brown. Because it's a brown rot fungus it has a negative reaction with polyphenol oxidase testing reagents. It is known only from North America and is especially prevalent in the SE United States and the Pacific Northwest (Humphrey, 1923; Lowe, 1966; Verrall, 1968), but is widespread throughout the continent. Baxter (1940) discusses it from the Great Lakes area.

When growing in the dark, under flooring, beneath structures, and inside walls, *Serpula incrassata* mycelium is light in color (whitish to pale olive gray). When growing where it is exposed to natural light, it becomes distinctly orangish. In sunlight it forms more pigment in the mycelium, and the basidiospores forming in these areas are also colored, making this tissue even brighter.

Ginns (1971) documented the great variability in spore size when he studied the type collection. The degree of the dextrinoid reaction of spores to iodine solutions varies from species to species in the genus *Serpula.* Some authors also have very different observations for the same fungus when looking at different collections. Lowe (1966) states that the spores of *Serpula incrassata* (as *Poria*) are "IKI–" (inamyloid), whereas Gilbertson & Ryvarden (1987) say the spores are "dextrinoid in Melzer's reagent." Ginns (1971) notes that the spores of the type collection are dextrinoid, and those of *Merulius spissus* (a synonym of *Serpula incrassata*) are "weakly to distinctly dextrinoid." Gilbertson (1974) says the spores of *Serpula himantioides* are "strongly dextrinoid in Melzer's reagent," but Bernicchia & Gorjón (2010) state "some weakly dextrinoid."

According to Ginns & Lefebvre (1993) there are three species of *Serpula* known from Washington State: *Serpula. himantioides*, *Serpula incrassata*, and *Serpula lacrymans* var. lacryimans (as "lacrimans"). These species may be found in nature, but are most conspicuous when they invade and attack the unlimited assortment of wooden structures and things humans make and use. I have personally found *Serpula himantioides* in the wild here in Washington State, but not the other two.

Key to Species of Serpula *in Washington State*

1a. Hymenophore distinctly poroid at maturity; hyphal system monomitic, lacking skeletal hyphae; basidiospores 7–16 × 5–10 µm, dextrinoid ..... *Serpula incrassata*

1b. Hymenophore merulioid; sporocarp dimitic 2

2a. Sporocarp up to 2 mm thick; cystidioles none; skeletal hyphae acyanophilous..... *S. himantioides*

2b. Sporocarp up to 10 mm or more thick; fusiform cystidioles often present between the basidia; skeletal hyphae cyanophilous (stain dark blue in cotton blue).*S. lacrymans*

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Like a felon, this fungus came stealing,
And devoured all the beams in my ceiling
Not to mention my floors
And the front and back doors.
Let me tell you—dry rot's not appealing!

—Stephen Gold, OEDLIF

THE FIRST AFRICAN MUSHROOM STAMPS

Brian S. Luther

I'm documenting the initial three sets of mushroom stamps from Africa. The Central African Republic (CAR) was the first African nation to issue a set of gorgeous mushroom stamps as the main illustration in 1967. This was followed by a stunning set from the Congo Republic in 1970 and then a stamp from Cameroon in 1975. All three countries touch one another. These are some of the most valuable sets of mushroom stamps today. When the first CAR set came out, the prominent French mycologist Roger Heim even wrote an article about it, but unfortunately his photo has the chronological order and values (denominations) of the stamps all mixed up (Heim, 1967). He was most likely not a philatelist and didn't know to keep the stamps in order, from left to right.

These sets can also be found as FDCs (first day covers) and imperforate (no perforations, referred to as "imperf."). Imperf sets are even rarer and thus more valuable and highly collectible by mycophilatelists. Subsequent to this and up to the present, African nations have issued a vast assortment of myco stamps, some as the main illustration, some as MIDs (mushrooms in the design of the illustration), and some as Dr. Alexander Fleming stamps. They are far too numerous to even begin to list here. For a discussion of the first mushroom stamps ever issued world wide, as well as applicable references, please refer to Luther (2012).

Central African Republic 81-5, October 3, 1967

Scott Cat. No.	*Value*	*Species*
81	5 F	*Leucocoprinus africanus*
82	10 F	*Synpodia arborescens*
83	15 F	*Phlebopus sudanicus*
84	30 F	*Termitomyces schimperi*
85	50 F	*Psalliota sebedulis*

The "F" refers to francs, since these countries were previously French colonies.

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Some of the binomials on these stamps are either out-dated or misspelled. *Synpodia arborescens* is *Collybia arborescens*. *Phlebopus sudanicus* was originally described as a *Boletus*, but was transferred to that genus. Scott #84 is the first illustration of the peculiar genus *Termitomyces* on a stamp. (Refer to the discussion about this genus later in this article.) *Psalliota sebedulis* should read *Agaricus subedulis*—they're using an older generic name for *Agaricus* and the species name is misspelled on the stamp.

Congo Republic 208-13. March 31, 1970

Scott Cat. No.	*Value*	*Species*
208	5 F	*Volvaria esculenta*
209	10 F	*Termitomyces entolomoides*
210	15 F	*Termitomyces microcarpus*
211	25 F	*Termitomyces aurantiacus*
212	30 F	*Termitomyces mammiformis*
213	50 F	*Tremella fuciformis*

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Scott 208 should read *Volvariella esculenta*. This is a striking set, with gorgeous colors and fascinating fungi, and is highly sought after by collectors.

Cameroon 607 (set is 607-8), April 14, 1975

Scott Cat. No.	*Value*	*Species*
607	15 F	Labeled "polypore" = *Trametes versicolor*


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Auction prices for this single stamp have skyrocketed. The other stamp in this set (Scott 608, 40 F value) shows an insect chrysalis.

This stamp has the country name in French on the left side and English on the right, because it has a colorful colonial history and both are the official languages.

Concerning *Termitomyces*

This genus forms an obligate symbiotic relationship with the termites that culture and eat the mycelium. Species of *Termitomyces* are unique in that the mycelium only decomposes old termite mounds, which get huge and can be thousands of years old. Details about this relationship are captivating, and many scholarly papers focus on all aspects of this subject. Some species of *Termitomyces* are also excellent edible mushrooms for humans and are widely collected for food by native people across Africa. To illustrate this, I'm also including a single beautiful stamp from Zambia (Scott 244A, 1981), showing women collecting *Termitomyces* in baskets. This last stamp was surcharged and re-issued as Scott 358 in 1989 and Scott 505 in 1991. The late French mycologist Roger Heim (1900–1979), whom I mentioned earlier, named the genus and did much of the pioneering work on the species, as well as authoring other significant related publications (Heim, 1943, 1977). His early work on this genus was done during WW II, while France was occupied by Nazi Germany. There are approx. 30 species in the genus and most are African, but some occur in Asia. The genus *Sinotermitomyces* is a segregate of *Termitomyces*. For a discussion of this please refer to Pegler & Vanhaecke (1994). The largest known fleshy (non-conk) mushroom is *Termitomyces titanicus*, the cap of which can get over 3 ft in diameter. Now that would be quite a meal!

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HOW FUNGI CREATE THE AMAZON'S CLOUDS

Veronique Greenwood

Time, September 5, 2012

The Amazonian rain forest after a rain shower. The picture was taken from a measurement tower in March.

When you mess with the Amazon rainforest you mess with a lot of things—2.5 million species of insects, 40,000 species of plants, 1,300 species of birds, and those are only the known ones. The 1.4 billion of acres of thriving, sprawling biology that cover the Amazon help drive the very metabolism of a continent. And now it appears that the rainforest is at least partly responsible for something else: the Amazonian clouds themselves. Clear-cut the land and you could, in effect, clear-cut the sky.

That improbable idea comes courtesy of a paper just released in the journal *Science*, the product of work done by researchers at the Max Planck Institute for Chemistry in Mainz, Germany. The clouds in the Amazon, just like everywhere else, consist of water vapor clinging to tiny clumps of carbon compounds. In forested areas, the carbon compounds are byproducts of plants' metabolism; in populated areas, they are often from human pollution. Most of the time, atmospheric chemists can see the carbon clumping tak-

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Amazon clouds, *cont. from page 7*

ing place; when the microscopic bits reach a certain size, they are able to attract and hold water. In the Amazon, the clumps seem to appear out of nowhere, nearly fully formed. No one has ever been able to catch them in the act of coming together.

Max Planck graduate student Christopher Pohlker traveled to a pristine stretch of forest in Brazil to see if he could solve the riddle. He gathered a bit of rainforest air, using an instrument that sucks a sample through a fine nozzle and sprays it onto a ceramic square half a millimeter on each side, where any microscopic airborne particles get stuck. To figure out the chemical make-up of those particles, he and his colleagues brought the squares to Lawrence Berkeley National Laboratory in California and placed them in the facility's synchrotron, where X-rays of varying energies were fired at the collected specks. The specific frequencies that were absorbed would reveal the samples' chemical makeup.

What the researchers found was a mix of carbon compounds, plus one other thing: potassium—and that told them a lot. Potassium salts appear to be good at getting carbon compounds to stick together. The larger a carbon cluster was, the larger the ratio of carbon compounds to potassium within it, suggesting that just a certain amount of potassium was needed to get the accretion process started, and after that the carbon compounds kept piling on of their own accord. That, in turn, would get water droplets forming.

The real surprise was the source of the potassium. Forest fires often release the element into the air, but there were none burning when Pohlker took the samples. "Since we can rule out the burning source in our samples," he says, "the other source seemed to be the biosphere itself." In other words, the forest.

Plants and fungi can release potassium into the air under certain conditions. Fungi in particular are veritable fountains of the stuff: when they shoot out their spores, they also spray out a potassium-rich fluid. Biologists working with leaf molds and other fungi in the lab had noticed this, and atmospheric chemists had noticed that there seemed to be a lot of potassium floating above the Amazon in the wet season. Pohlker's adviser, chemist Meinrat Andreae, in fact recently reported that a third of the Earth's land surface is probably covered with microscopic fungi. But until now, no one had linked potassium from fungi to cloud formation. "We think the residue of these droplets is what we are observing," Pohlker says. "It's really impressive."

Pohlker, Andreae, and their colleagues ran the numbers and found that the amount of potassium particles released from microscopic fungi in the lab was indeed enough to account for the concentration of potassium they observed in their samples. But there are still some crucial experiments left to do: specifically, they have not yet actually verified that the microscopic fungi living on the forest trees in the Amazon are in fact releasing the potassium they see in the air. "What we're still lacking is a demonstration that if you go to a plant in the Amazon and put a plastic bag around it, you'll see these particles coming off," Andreae says. "That's one of the things we want to do next."

Even when that's done, it's not clear everyone will be sold on the new findings—or at least on their thoroughness. "Are these particles only relevant directly over the rain forest, or are they lofted by convection and transported to surrounding regions?" wrote Yale University professor and climate modeler Trude Storelvmo in an e-mail. Yet another topic for future research is the question of whether the Amazon is the only rainforest that gets the potassium cycle going this way or if other—perhaps all—rainforests do it. What's settled science now, however, is that just as the Amazon is dependent on the rain and sunlight provided by the sky, the sky is dependent on the nourishment from the forest. The circle of life just added another ring.

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