



Ohio Mushroom Society

The Mushroom Log

**Fall Foray, 2017 at
Camp Asbury
September 22-24**

By Debra Shankland

2017 OMS Fall Foray at Camp Asbury. We return to Portage County once again this autumn to foray hills and valleys full of mature Beech-Maple forest and other healthy habitats. Most activities will occur at Camp Asbury, comprised of 450 acres of woodlands, wetlands and fields nestled in the Eagle Creek valley in northern Portage County. Operated by the East Ohio Conference of the United Methodist Church, the camp property includes diverse forests with areas of immense oaks, other hard mast trees, and tulip trees. Our headquarters will be the Epworth Retreat Center, containing not just an ample meeting room, but complete

kitchen facilities, two dorm wings accommodating up to 14 people, plus its own picnic pavilion and fire ring. Imagine the convenience of arriving Friday night, participating in all foray activities, and not needing to move your car until Sunday afternoon!

In addition, this weekend will also include a foray at the 500-acre James H. Barrow Field Station of Hiram College. This living laboratory supports over 200 acres of Beech-Maple forest, along with aquatic and other habitats. Our foray mycologist and presenter will be Django Grootmyers. Still a student, his pursuit and knowledge of fungal taxonomy is stunning. He will present a program on the still-evolving citizen science in mycology. Camp Asbury is located at 10776 Asbury Road in Hiram. For maps and other details,

please check www.campasbury.org Overnight accommodations at Epworth Retreat Center are limited and expected to go quickly. The full foray, including two nights accommodations in the Center, a Friday night hot dog roast and social, and morning continental breakfast both days is only \$90 per person. Those wishing to commute to the Foray may join us for the Friday night meal and social for \$10 each. Reservations are required in advance by mailing a check, payable to Ohio Mushroom Society, in the appropriate amount. Please mail your check to: volunteer treasurer Jerry Pepera, 8915 Knotty Pine Lane, Chardon, OH 44024. Foray coordinator Debra Shankland would appreciate knowing your plans; please contact her at

dkc@clevelandmetroparks.com or at 440-263- 2334 to reserve your bunk at the retreat center, r.s.v.p. for the hot dog roast, or are planning to just attend on Saturday and/or Sunday. Don't delay!

Everyone attending any part of the Foray must be an Ohio Mushroom Society member.

Obtaining a membership is easy! Just fill out the form near the back of this newsletter and mail it with your check to Jerry at the address above.

Participants are also welcome to join the club on-site at the foray. Saturday's lunch will be potluck. Please bring serving utensils for your dish, and a label identifying ingredients is helpful. A refrigerator, stove, microwave and electric outlets are available, however, please know that you will be responsible for all preparation and clean-up of your contribution. Please, no home-canned food.

SCHEDULE OF EVENTS

Friday, September 22
4 p.m. Check-in begins at Epworth Retreat Center
7 - 10 p.m. Hot Dog Roast and Social at Epworth.
Enjoy a relaxed meal (with vegetarian

options) and conversation around the fire. Includes star-gazing and cricket serenades!

Please make advance reservations for this activity (see above).

Saturday, September 23
8 a.m. Breakfast begins for full foray attendees
9 a.m. Foray registration and coffee for commuters begins 9:30.

Foray welcome and introductions
10 a.m. - 12N Forays at Camp Asbury
12:15 - 1:15 p.m. Potluck lunch

1:15 - 2 p.m. Illustrated program by Django Grootmyers

2:15 - 4:15 Afternoon forays

5 - 5:30 Table talk concerning noteworthy collected specimens

6 p.m. Dinner at Mantua Corners Bar & Grille on state route 44; see their menu at

www.mantuacornersbar.org They will be providing us with our own server and room, and are happy to make a vegetarian version of most items on their menu. If you would like to request a grilled portabella version of a meat sandwich, salad or entrée, please let Debra know in

advance; this is a small, independent business.
Sunday, September 23
8:30 a.m. Breakfast begins for full foray attendees; review and study collections
10:30 – 11 a.m. Clean up and check-out
11:30 Foray at James H. Barrow Field Station at 11305 Wheeler Rd. in Garrettsville 44231; see <http://www.hiram.edu/academics/support-services/field-station/map-and-directions/> for a map and directions.
2 p.m. Farewell!

WHAT TO BRING (All Participants)

- o Refillable water bottle
- o Reusable coffee/tea mug
- o Food/drink to share at the potluck
- o Utensils and knives needed to serve your potluck item; cooler if necessary.
- o Cash for a donation (Forays are free for members, but your generosity buys coffee, paper products, nametags, goodwill for our hosting institutions, speaker expenses, and more. Thanks!)
- o Basket (paper bag can do in a pinch)
- o Sharp knife
- o Whistle

What Causes a Beer to “Gusher”?

By Will Deutschman

We've all had the experience: You open a bottle of that beer you have been cherishing – saving for just the right moment – and an instant after you pop the cap, your only thought is, “Why is it raining beer from my ceiling right now?”

Perhaps you have been lucky enough to not have that experience. But, in a milder form, have you ever opened a bottle and had it gently spew foam over the top? You think you'll just wait for a second and everything will be fine, but the foam just keeps on coming.... and coming... and coming..... In desperation, you pour in the gentlest fashion you know and you get a glass full of.... foam?

Gushing.

Congratulations (in the worst possible way). You have just experienced gushing. In its severe incantation, it's the phenomenon that turns a bottle of beer into a miniature version of Old Faithful in your kitchen – the kind of experience that leads you to discovering that you can mop your

ceilings just as effectively as you can mop your floors. In its more mild incantations, gushing is a phenomenon that converts a bottle of beer to a pile of foam as you sit there, powerless, watching it happen – not even able to get a glass of the beer you have been waiting so long to try. In its more major form, it creates a beer bottle version of Old Faithful, which is not a national treasure or geologic wonder. So why does it happen and what can be done about it? This is wasted beer we are talking about! This is a crisis! Well, the good news and the bad news is that there is not a damn thing you can do about it. You didn't mistreat that bottle, and it's not your fault. Slightly less comforting is the fact that your favorite brewer didn't either. So, don't hold it against them. Please. It was nothing they did, nor anything they could have fixed. So, who is to blame?

Barley growers. Those bastards. They caused us to lose a whole batch of beer. (Rest assured, it was not just your beer that foamed all over the place. Every bottle produced from that batch of barley did the same thing. Probably.)

Now, in all fairness, it's not really the barley growers

“fault.” It's just that that is where the problem started. There's not a ton they can do about it either, but everyone downstream from them was hosed before they even started making their product from the raw barley.

So, who is the real culprit?

Ascomycetes, Basidiomycetes, and Zygomycetes.

What or who are those?

They are fungi of several species, and they produce several proteins known collectively as “Hydrophobins.” Those proteins are the direct cause of uncontrolled foaming in beers. (OK, it's also possible you can see that from beers that are infected with various spoilage organisms like *Brettanomyces*, *Lactobacillus*, and *Pediococcus*. But, at the probrewer level, those kinds of infections are rare for any established brewery, so we won't consider them here. At the homebrew level, those are MUCH more likely causes than the fungi I mention above. So, if a homebrewer friend of yours gave you a bottle that just exploded in your kitchen, “thank” them with a bottle of sanitizer and a suggestive look.)

So, what is the link between those fungi and gushing/explosive beers? Well, it's not the direct one you might think. For the homebrewer, infection with *Brettanomyces*, *Lactobacillus*, or *Pediococcus* means that there is an organism in their bottles that can ferment sugars that the "normal" brewing yeast cannot. Hence, those sugars produce more carbon dioxide (among other things like sour flavors) and the beer becomes grossly over carbonated. Pop the cap and, BAM! Geyser. But, the fungi I mentioned above do something entirely different, and very cool – at least to a brewing biochemist.... They don't ferment sugars left over after terminal gravity is reached. They don't over carbonate the beer once in the bottle. What they do is turn the dissolved carbon dioxide into tiny little carbonation bombs. I kid you not, these are referred to in the brewing literature as "nanobombs".

Some nerdy biochemistry and physical chemistry is coming at you right now. If you get lost or bored, jump to the big summary at the end. It's worth it, I promise! OK. Here's the deal, When your beer is bottled, it is 'force carbonated'. When

you taste the tablespoon of beer left over after the foam sprays everywhere and it tasted sour, thin, and insipid, then it's probably an infection and it's the brewer's fault. Think twice before buying their stuff again. Or, better yet, let them know in a kindly e-mail. They might replace the bottle for you, and I'm sure they'd like to know if they have a problem with their sanitation protocols. But, if you taste that remaining few drops and it still tastes good (if a bit flat), then it wasn't the brewer's fault and you should definitely give them a second shot. They had no control over that outcome and are probably just as horrified as you are about what happened. means that the CO₂ dissolved in the beer is at a concentration higher than the level of saturation. (You might remember the concept of saturation from the somewhat controversial post on the myth of 100+ IBU beers.) What that means is that the CO₂ was forced into solution under high pressure. Even if the beer was bottle conditioned, this is still true, though it is done more slowly as yeast produce the CO₂ rather than the giant tank on the side of the brewery providing it. Once you pop the cap, the pressure is released and that

CO₂ comes out of solution – slowly. That's what gives you the nice head on your beer and that's one of the reason the head persists as you enjoy that nice pint you just poured. Over the course of the time you drink, more and more CO₂ bubbles out of solution and replaces all the bubbles that are popping in the nice foam pile atop your beer. But, what would happen if all that dissolved CO₂ were to come out of your beer at once? Beer-spllosion! Or, more scientifically, gushing. That is the cause of that beer fountain that just shot out of your bottle. That, of course, leaves a major question: Why do most beers slowly release their dissolved CO₂ while others let it all hang out in the blink of an eye?

Hydrophobins and nanobombs.

One key concept in chemistry is "like dissolves like". That is, compounds interact well with other compounds that have similar chemical characteristics. This is why, for example, sugar dissolves well in water, but oil does not. Water is polar, sugar is polar, oil is nonpolar. As it turns out, carbon dioxide is a fairly nonpolar substance as well. It *can* dissolve in water, which is a "polar" solvent, and

does so reasonably well – for reasons I won't talk about here. But, if it is given a chance to interact with something nonpolar, it much prefers to do that.

Enter the hydrophobins.

These are proteins produced by our trio of gushing producing fungi. These proteins can basically collect the CO₂ out of solution, forming a nanobomb. The nanobomb is a bunch of CO₂ stuck to a hydrophobin.

But, this only works under high pressure. So, when the bottle is opened and the pressure drops..... Bam!

(For those who skipped the science, rejoin here.) Those nanobombs basically release all their collected CO₂ at once and it all tries to escape the bottle at the same time. Geyser city! So, what to do about this? Here's the most depressing part of this whole post... Nothing. There's not a damn thing you can do about it. The infection occurred in the barley field and everyone downstream of that got hosed.

So, here's the big take-home message. If you bought a bottle of beer from a brewer you love or a trending brewer that you have been dying to try, and if that bottle explodes upon opening, don't immediately

blame the brewer. It may be their fault. If you taste the tablespoon of beer left over after the foam sprays everywhere and it tasted sour, thin, and insipid, then it's probably an infection and it's the brewer's fault. Think twice before buying their stuff again. Or, better yet, let them know in a kindly e-mail. They might replace the bottle for you, and I'm sure they'd like to know if they have a problem with their sanitation protocols.

But, if you taste that remaining few drops and it still tastes good (if a bit flat), then it wasn't the brewer's fault and you should definitely give them a second shot. They had no control over that outcome and are probably just as horrified as you are about what happened.

Reprinted from the Spore Print—the Journal of the Los Angeles Mycological Society, Inc. Page 6, June, 2017.

SCIENTISTS ACCIDENTALLY DISCOVER WORLD'S OLDEST FUNGUS; MAY BE EARLIEST KNOWN MULTICELLULAR LIFE

<http://www.siasat.com/>, May 9, 2017
New Delhi - Researchers on Monday accidentally stumbled upon what is being called the oldest fungus ever discovered. Found in South Africa, the new discovery predates the previous oldest fungus by a margin of 1.2 billion years, and has raised questions on the evolution of these organisms.

The fungus, which can be considered neither flora nor fauna, has slender filaments that are bundled together like brooms.

The 2.4 billion-year-old microscopic creature could also be the earliest known specimen of the branch of life to which humans belong, researchers reported in the journal *Nature Ecology & Evolution*.

Up to now, the first fossil trace of eukaryotes—the “superkingdom” that includes plants, animals, and fungi, but not bacteria—dates to only 1.9 billion years ago. Earth itself is about 4.6 billion years old.

According to BBC, the find suggests that fungi arose not on land but in the deep sea. If not a fungus, the organism could be from an extinct branch of life that has not been described before.

World's oldest fungus.

Lead researcher Prof Stefan Bengtson of the Swedish Museum of Natural History explained how previously, scientists may have been looking in the wrong place for the oldest fossil fungi—on land or in shallow seas rather than in the deep sea.

It has long been assumed that fungi first emerged on land, but the newly found organisms lived and thrived under an ancient ocean seabed, tucked in the crevices of volcanic rock.

The ancient fungus-like life forms, found in fossilized gas bubbles 800 meters (2,600 feet) underground in South Africa's Northern Cape Province, are remarkable not just for their age but their origin, the researchers said.

Nobody was looking for them, explained co-author Birger Rasmussen, a geology professor at Curtin University in Bentley, Australia, who was examining lava samples from the Ongeluk Formation to determine their age.

"My attention was drawn to a series of petrified gas bubbles, and when I increased the magnification of the microscope, I was startled," he recalled. The bubbles were "filled with

hundreds of exquisitely preserved filaments that just screamed 'life'," he wrote by email.

The plot thickened when Rasmussen realized that the surrounding lava was not 2.2 billion years old, as previously thought, but 2.4 billion years old. That extra 200 million years was significant because it straddles a critical threshold in Earth's geological history called the Great Oxidation Event—a rapid and massive outpouring of oxygen into the atmosphere.

Scientists not involved in the study said it was potentially paradigm shifting, but must be bolstered by further research.

RADIATION-RESISTANT MUTANTS AT CHERNOBYL PAVE THE WAY FOR LIFE ON MARS **Becky Ferreira**

<https://motherboard.vice.com/>, May 7, 2017

Comic book logic dictates that a high dose of radiation will turn you into the Hulk, Godzilla, Radioactive Man, or any number of other radiation-induced superbeings. In real life, it's more likely to cause deleterious mutations, as shown by major ecological damage in nuclear meltdown fallout zones like Chernobyl and Fukushima.

These contaminated regions have become a popular destination for scientists interested in the immediate and long-term impact of radiation on wildlife, which has led to the formation of intriguing niche disciplines, like radioecology and radiobiology.

Understanding how living organisms adapt to radiation doses has a range of applications, from medicine to conservation, but one of the most overlooked is preparation for long-duration human space missions and interplanetary colonization, both of which involve sustained exposure to higher radiation doses than what we experience on Earth's surface.

An experiment conducted on the International Space Station last year examined this idea with the help of eight fungus species from the Chernobyl exclusion zone that sprung up in the wake of the 1986 meltdown, and two of them—*Cladosporium* molds—seem to prefer radioactive surfaces. The fungal samples were curated by a team led by Kasthuri Venkateswaran, a senior research scientist at

NASA's Jet Propulsion Laboratory, who goes by Venkat for short.

"The radiation seen at Chernobyl is high, but this black fungi popped up first [after the meltdown] compared even to the bacteria," Venkat told me over the phone. "That is how we selected those fungi, from such a radiation-rich environment. These fungi persisted due to some sort of protein-coding and biomolecule information that protect against the radiation level."

Would ingesting such a hardy mold give one radioactive superpowers? Not quite—or more accurately, not yet. The eventual goal of Venkat's research is to develop a fungi-based "sunblock" for outer space radiation that could be used to protect humans from the harmful effects of long-term exposure. The fungi were returned to Earth just a few months ago, so the results are preliminary, but Venkat and his colleagues are eager to pursue the research further.

"We have to take all the precautions before building a human habitation on Mars and beyond," he told me.

In addition to helping humans become more radiation-resistant,

studying the wildlife in fallout regions can also yield insight into engineering crops that can survive the radiation environment beyond Earth—especially highly irradiated worlds like those in the Jupiter system.

The Chernobyl exclusion zone is significantly more radioactive than the interior of proposed long-duration spacecraft, which makes it a bad direct analogy to outer space. But the ways in which crops develop tolerance to contaminated environments is rich with clues about surviving sustained doses of cosmic radiation.

"Radiation-resistant genes can be incorporated into yeast cells that produce beer so that humans are willing to go to space—they will have a better beer to drink," Venkat said, as one example. Fallout zones are also useful testbeds for studying astrobiological questions about the search for aliens on other worlds, and the origins of life on our own planet. Flax crops grown at Chernobyl in the decades since the meltdown have demonstrated increasing resistance to contamination, for instance, leading some researchers

to wonder if their genes are a kind of vestigial time capsule to the dawn of life on Earth.

"My favorite speculation is that when life on Earth was evolving, radioactivity was much more present on Earth's surface than is today," Martin Hajduch, a senior scientist at the Slovak Academy of Sciences' Institute of Plant Genetics and Biotechnology, said of his research into Chernobyl flax. "And so the plants are somehow 'remembering' it, [which is] what helped them to adapt in Chernobyl's radioactive area."

In this way, the world's worst nuclear disasters, which have threatened the health of our planet, may now help us understand our origins on Earth, and learn to survive the harsh conditions.

Reprinted from the Bulletin of the PSMS, June, 2017.

Articles for the next Log due September 24, 2017

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OH 44119
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Calendar of Events

Check your most recent issue of the *Mushroom Log* or our website for more detailed information. Please plan to join us. All mini-forays are subject to cancellation. Call first to confirm. Please bring a whistle and compass and an **RSVP to the host is mandatory so they have cancellation flexibility.**

Morel and other mini-forays, are subject to change, especially the former. Leaders will be checking the woods to assess their progress, so you should contact them at least a week prior to the announced mini-foray for any updates.

Miniforays: (RSVP required)

See later issues of the Log or the OMS website for later postings of these miniforays.

**Fall Foray at Camp Asbury in Hiram
September 22 - 24**

See pp. 1 & 2 of this Log for details.

**Thursday, September 28
from 2 - 4 p.m.** – Co-sponsored by Dawes Arboretum in Newark. Contact them or Shirley at

shirleymcclelland@msn.co



[m](#)

Saturday, October 14 -
Columbia County.
Contact Walt Sturgeon at
330-426-9833.

October 21 OR 22 in
eastern Ohio. Sharon
Greenburg coordinating.

**The Dick Grimm
Memorial Banquet,
Sat. Nov. 4, 6:30 pm** at the
historic Wolf Creek
Tavern near Norton.
<http://wolfcreektavern.com>

August 19 at a private
preserve north of
Wakeman, Huron County,
Ohio, from 10:00 to 2:00
or so. Bring lunch
and drinks, a knife, and a
basket or bag with
handles for specimens.
This property has a good
diversity of habitats
including fairly mature
oak-hickory forests, a

beech grove, and a
planted pine grove on
higher elevations; and
seasonal
lowlands/wetlands with
other trees and
vegetation.

September 30 at a private
preserve north of
Wakeman, Huron County,
Ohio, from 10:00 to 2:00
or so. See August 19 for
details. Contact Pete
Richards,
peterichards@oberlin.net
(preferred) or 440 775-
3412.

**NEMF (Northeast
Mycological Fed.** Will
have its annual summer
gathering at Stratton
Mountain Resort July 27-
30. For details see their
website at www.nemf.org

Name:(printed) _____ Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

Fax: _____ Email Address: _____

Enclosed please find check or money order (check one):

____ \$15.00 annual family membership (newsletter via email and website only)

____ \$20.00 annual family membership (newsletter via paper, email, and website)

____ \$150.00 life family membership (newsletter via paper, email, and website)

My interests are: Mushroom Eating/Cookery _____ Photography _____ Nature Study _____ Mushroom
ID _____ Cultivation _____ Other (specify) _____

Would you like to be an OMS volunteer? In what way? _____

How did you hear about our group? _____

May OMS provide your name to other mushroom related businesses? Yes _____ No _____

LIABILITY RELEASE AND PROMISE NOT TO SUE:

I understand that participating in the activities of a mushroom club involves a moderate amount of risk. This includes all of the risks of being away from home, risks associated with moving about in fields and woods, risks of encountering inclement weather, risks involved in eating wild mushrooms, risks of losing personal property by theft or misplacement, and all other expected and unexpected risks, including illness or injury. While a member of the Ohio Mushroom Society; or as a non-member attending any event hosted by the Ohio Mushroom Society, I agree to assume total responsibility for my own safety and well-being; and that of any minor children under my care, and for the protection of my and their personal property. I release the Ohio Mushroom Society, its board members, club members, contractors, and any and all entities such as parks or preserves, or any private property owner who may host an Ohio Mushroom Society event, and all other persons assisting in the planning and presentation of any Ohio Mushroom Society event, from liability for any sickness, injury, or loss I or any minor children under my care may suffer during any event or as a result of attending or participating. I further promise not to file a lawsuit or make a claim against any of the persons or entities set forth above, even if they negligently cause me or my minor children injury or loss. I agree to hold the Ohio Mushroom Society harmless from any liability they may incur as a result of any damages to any property I may cause. This release and promise is part of the consideration I give in order to be a member of the Ohio Mushroom Society, or to attend any event which they host or attend, whether a member or a non-member. I understand this affects my legal rights. I intend it to apply not only to me but to anyone who may have the right to make a claim on my behalf.

Signature: _____ **Date:** _____

Return form and check or money order to: Ohio Mushroom Society, c/o Jerry Pepera, 8915 Knotty Pine Lane, Chardon, OH 44024

2016 Ohio Mushroom Society Volunteers

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The Mushroom Log

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Contributions of articles and ideas for columns are always welcome. Articles may be edited for length and content.

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