FUNGIFAMA

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October 2016 sadly witnessed B.C.'s first recorded fatal poisoning by the Death Cap, Amanita phalloides. *The death of a three year old boy from a mushroom picked in Victoria underscores the extreme urgency of increasing public education on the identification of these deadly fungi and best practices for mushroom harvesting.*
Our thoughts go out to everyone affected by this tragedy.

Photo credit: wikimedia.org

PREZ SEZ

By Bruce Pendergast

At our November meeting we will be electing new SVIMS board members. There are nine voting members and one non-elected member, past president (Richard Winder) representing the Pacific Forest Centre. The November meeting is our AGM, required once a year by the Societies Act, since SVIMS became a registered society this year. In the past, the elections have been almost entirely by acclamation - typically, when one person agrees to run, no one else offers. It would be nice if this year we could have a real election with more than one candidate for some positions. At our Board meeting in September, we tallied the existing members stepping down in the voting board. We have vacancies for Vice President, Treasurer or Membership (Jaz Grenier has offered to do either) and a general board member. The volunteer positions also have three vacancies, including Librarian, Membership Assistant, and Foray Assistant (a new position to supervise sign-in and sign-out). I think it is healthy to have turn over on half the board members every 2 to 3 years so that we get fresh ideas that can be tempered by a few longer serving members. Also as a volunteer organization that works amazingly well, we don't want to burn out those who have been performing so well for us. Anyone who would like to participate more in the workings of our club is welcome. Please contact me if you are interested in joining this dynamic group.

In November we will also be voting on a fee change. The current $20 per household fee was applied in 2005. Although we have other sources of income from the show and calendar and we save by coordinating our speakers with other clubs, speaker costs have increased considerably, primarily because of travel expenses. Gary Sawayama carried out a review of other North American club fees and we are among the lowest. If we want to maintain a variety of speakers from year to year we simply have to spend more than in the past. The Board recommends raising the fee to $25 per person and $30 per household. As we are a Registered Society we are required to have a general member vote on fee changes at the AGM. Other suggestions can be discussed and voted on at that time, such as the option of a fee for non-members who attend just for the speaker.

Please note our annual mushroom show will not be held at Swan Lake this year. The new location is Cordova Bay 55 Plus Association, 5238 Cordova Bay Rd. There is plenty of parking and rooms for small presentations as well as the mushroom display. The show is Sunday the 23rd, not the 30th as shown on your SVIMS calendar. Hope to see you there!

We are always looking for photos, articles, comments and ideas

The next deadline for submissions is December 31

fungifama@gmail.com

THE COVER ILLUSTRATION IS A DEPICTION OF FUNGUSMAN, A MYTHOLOGICAL CHARACTER IN HAIDA LORE. THE PIECE WAS GENEROUSLY PRODUCED AND DONATED TO FUNGIFAMA BY ARTIST SHAWN O'KEEFE, AND IS INSPIRED BY THE WORK OF CHARLES EDENSHAW. SHAWN HAS BEEN THE ARTISTIC POWERHOUSE BEHIND PHILLIPS BREWING AND MALTING CO. SINCE ITS INCEPTION. HE RUNS ARTIFICIAL FLAVOUR GRAPHIC ENGINEERING, A VICTORIA-BASED DESIGN COMPANY. HIS ART IS ONE PART IRREVERENT PSYCHEDELIA, TWO PARTS REVERENT PACIFICANA. YOU CAN FIND MORE OF SHAWN'S WORK AT WWW.TRUST36.CA.

UPCOMING SVIMS EVENTS

OCT. 23: SVIMS WILD MUSHROOM SHOW, 10AM TO 4PM AT THE CORDOVA BAY 55+ ASSOCIATION (5238 CORDOVA BAY RD.) DONATIONS WELCOME!

OCT. 28-30: COWICHAN LAKE FORAY, COWICHAN LAKE, REGISTRATION NECESSARY.

NOV. 3: SVIMS MONTHLY MEETING, PFC. 7PM TO 9PM
SPEAKER: BRITT BUNYARD

DEC. 1: SVIMS MONTHLY MEETING, PFC. 7PM TO 9PM
SPEAKER: MARTY KRANABETTER

There are many more mushroom-related events happening in the South Vancouver Island area! For details, please see our more up-to-date listings online at
http://metchosinbiodiversity.com/mushrooms/eventlist.pdf

UPCOMING SVIMS SPEAKERS

Britt Bunyard

Our November guest speaker, all the way from California, is SVIMS favourite Dr. Britt Bunyard. Britt's talk is titled: "Diptera Strangelove: Or, How the fly learned to stop worrying about amatoxins and love the death cap."

There is to be no fighting in the War Room! You know how you've always heard do not eat Amanita mushrooms … they're deadly poisonous to all animals? Well it's not entirely true. Britt Bunyard has studied mushroom flies, and other insects associated with mushrooms, for decades. Diptera Strangelove is a lecture, with pretty photos, for all audiences with no prior knowledge needed. The focus will be on strange mushrooms and the stranger insects that love them … in strange ways. Oh and if you've never seen the classic movie Doctor Strangelove, now you have a good excuse.

Britt Bunyard is the founder, Publisher, and Editor-in-Chief of the mycology journal Fungi. Britt has worked academically (and played very amateurishly) as a mycologist his entire career, writing scientifically for many research journals, popular science magazines, and books, most recently Mushrooms and Macrofungi of Ohio and Midwestern States (2012) by The Ohio State University Press. He has served as an editor for mycological and entomological research journals, and mushroom guide books. A popular evangelizer on all things fungal, Britt has been featured on NPR's All Things Considered, National Geographic Magazine, PBS's NOVA television program, and in 2016 was made Executive Director of the Telluride Mushroom Festival. He is the co-editor of MycoEpithalamia: Mushroom Wedding Poems (The FUNGI Press, 2016).

Marty Kranabetter

Our December guest speaker is SVIMS' own Dr. Marty Kranabetter, Coast Soil Scientist for BC's Ministry of Forests, Lands and Natural Resource Operations. Marty's talk is titled: "The hidden reef: ruminations on the scarcely noticed yet spectacular symbiotic fungi of coniferous forests."

We typically think of trees as individual organisms, but connected to each tree belowground lies a diverse symbiotic community of mycorrhizal fungi that rivals coral reefs in their beauty and intricate interactions. In this talk Marty will describe some of his recent research on the diversity of ectomycorrhizal fungi and their role in supporting forest ecosystems. SVIMS members will better appreciate how symbiotic fungal communities, the 'reef hidden in the soil', provide the underlying vitality of our coniferous forests.

Dr. J Marty Kranabetter has been a soil ecology research scientist for 25 years with the BC Ministry of Forests, and has published 18 papers on the ecology of ectomycorrhizal fungi. He is a keen amateur mycologist with a growing interest in deciphering the poorly understood taxa of Cortinarius, Russula and Ramaria that thrive in BC forests.

Wild Mushroom Show

NEW LOCATION!! LOTS OF PARKING!!

Sunday October 23rd 2016 10am-4pm

Cordova Bay 55+ Association

5238 Cordova Bay Rd

View hundreds of edible, incredible and dangerous fungi!!

- Speaker presentations
- Mushroom growing kits
- Mushroom book sales
- Friendly and knowledgeable experts
- Medicinal display, and much more

Bring your mushrooms to be identified

Admission by donation

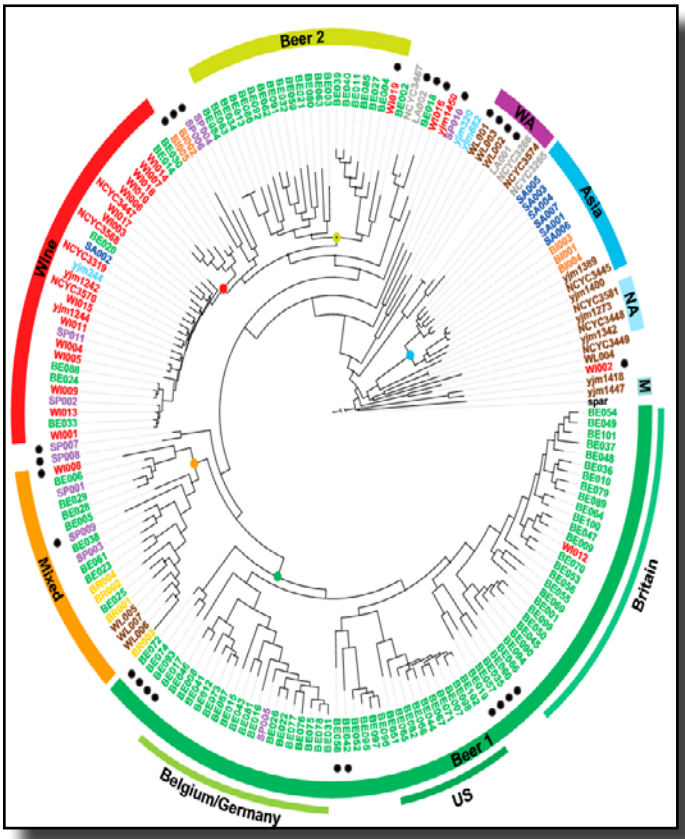
Domesticating Happy Hour

Budding Yeast and The Human Vice Genome Project

By Euan Thomson

If you're old enough to remember The Last Waltz, but you don't remember it, don't worry because most of The Band and definitely Neil Young don't remember it either. It was 1976, after all. However, if you do remember it, you might also recall the first published genome sequence of an organism - a landmark story in biochemistry. It was a bacterial virus called bacteriophage MS2, which infects *Escherichia coli* cells, and its genome was found to be 3,569 DNA units long. At the time, this was the approximate work equivalent of ten grad students banging their heads against a lab bench all day, every day for two years. By the 1990s, methods were advancing to the point where it took a decade of international collaboration and considerable financing to crack a single human genome, made up of over 23 million DNA units. Nowadays, one can prepare a sample of DNA from just about any organism, pop it into a machine that looks more like a Microlite oven than a tool of cutting edge science, and in the time it takes to burn a batch of cupcakes, harvest the secrets of its genome.

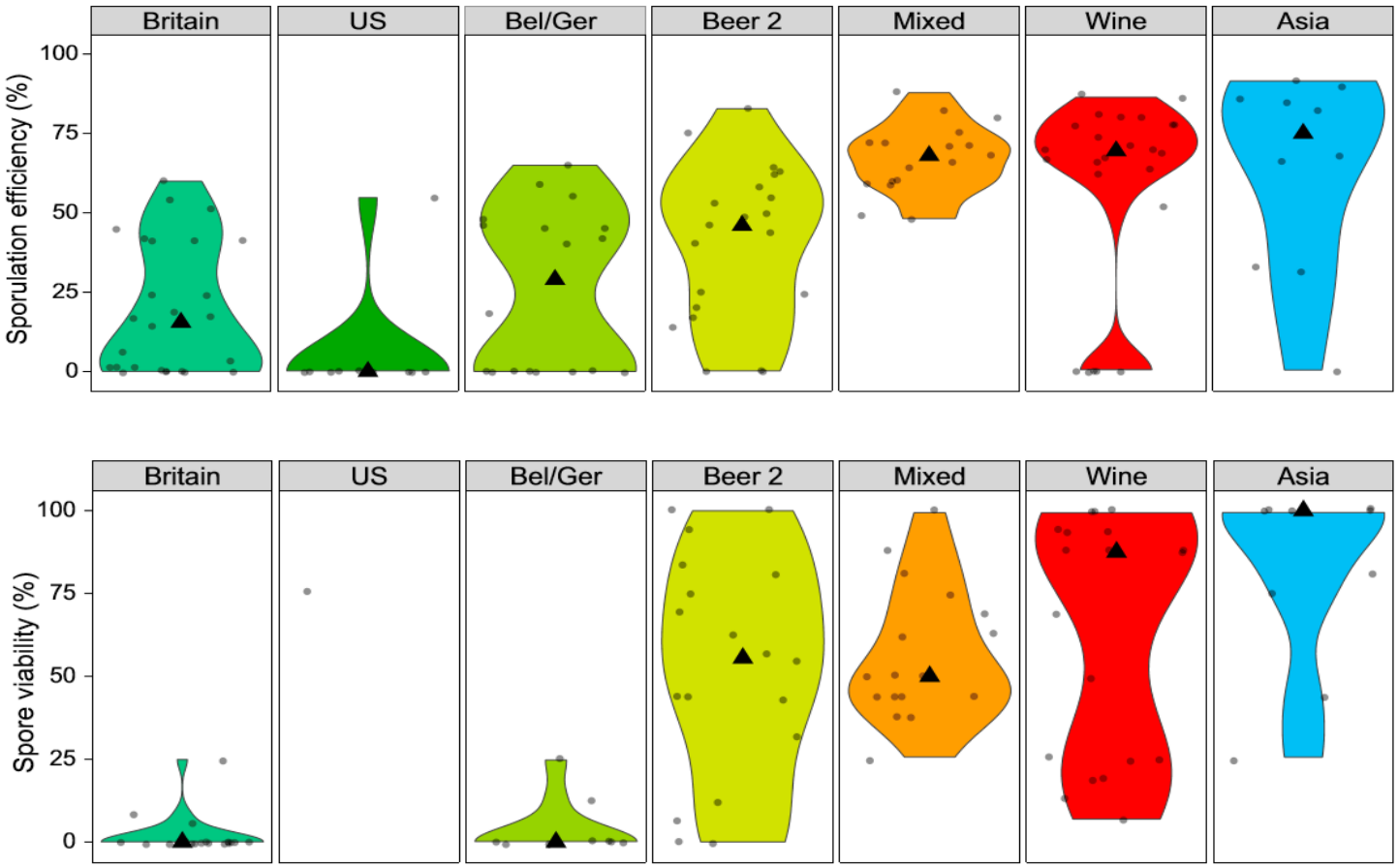
Last month, a research group led by Kevin Verstrepen at KU Leuven, Belgium published a paper summarizing the trends observed from the comparative analysis of 157 yeast genomes they sequenced in-house. That's a stack of typed paper up to your thigh with various repeating combinations of the letters A, C, T and G representing the individual genetic codes of these 157 unique organisms. The yeast strains, largely of commercial importance to the beer, wine, sake, bread and spirits industries, were found to group into distinct genetic families based on their industrial application: beer strains clustered into two groups, one of which was closely related to the wine yeast cluster, while sake strains clustered somewhat closely to the beer strains, and spirits and wild yeast strains showed little pattern, instead aligning sporadically with the other groups. The researchers completed a full analysis of the fermentation behaviours demonstrated by these strains, finding that genes responsible for certain flavour attributes tended to cluster with the different yeast groups. For example, it was found that the gene that drives production of the compound responsible for banana flavour, isoamyl acetate, was found in higher copy number (that is, duplication of the gene which tends to cause that gene to be expressed to a greater extent in the cell) in Belgian and German styles of beer, which are known for their banana goodness. Why? The researchers speculated that certain flavour attributes had been intentionally selected for over centuries by brewers, who carefully recycle yeast from one brew to the next as it settles to the bottom of a vessel once a fermentation is complete. The group determined that two or more independent European domestication events had given rise to the divergence in the two beer and wine groups. This divergence was followed by approximately 75,000 cell divisions, during which time many selective pressures were setting the course of these different strains for the benefit of beer drinkers everywhere. This means that the first domestic brewing yeast was tamed as early as the 1500s, centuries before we had any idea that microbes even existed!



Genome sequencing of 157 beer, wine, spirits, sake, bread and wild yeast strains showed close relationships between a yeast's preferred vice and its genetic heritage, pointing to several domestication events guided by humans over the past few centuries. Adapted from Gallone et al., *2016 with Creative Commons License.*

The brewing strains were so tightly clustered relative to the other groups that the researchers needed an explanation.

Wine yeasts tend to come from the skins of grapes and therefore undergo seasonal blooms, and it would be expected that geographical variability would give rise to greater biological diversity. Meanwhile, brewing yeasts are on a full year cycle - no winter hibernation, no summer holiday. They enter one fermentation, divide up to five times (no sexual reproduction here - strictly cell division), drop out of suspension and reenter another fermentation, undergoing yet another series of cell divisions. In this way, brewing yeasts quickly began to show hallmark traits of domestication: weak resistance to environmental stresses, nutrient source specialization (in their case maltose), and a lost ability to sexually reproduce - brewing strains are notoriously difficult to coax into sporulation, the fungal equivalent of making sperm and eggs, and even those that can produce spores tend to produce duds that are missing key genes required for growth and survival. Wine strains are relative savages with none of the refined characteristics of a cozy upper class upbringing.
So pinkies up for Oktoberfest, and enjoy your premium domesticated lager smug in the knowledge that these decadent critters rely on us for survival every bit as much as we rely on them for embarrassing dance moves.



These violin plots show the differences in spore formation and spore viability (when produced) among the various yeast groups: Beer 1 (Britain, US and Belgium/Germany), Beer 2, Mixed (comprising beer, spirits, wine, bread and wild yeast strains), Wine, Asia (comprising sake, bioethanol and wild strains). The large decrease in spore formation and viability demonstrated by the Beer 1 group may indicate a greater degree of domesticvation relative to the other groups, resulting from continual propagation of the yeasts in ideal growth environments over a centuries-long brewing tradition. Coloured regions help visualize the distribution of values (grey dots) from each strain, while the black triangles indicate median values for each group. Adapted from Gallone et al., *2016 with Creative Commons License.*

References

Gallone, B. *et al.*, 2016. Cell **166**:1397-1410. http://www.cell.com/cell/pdf/S0092-8674(16)31071-6.pdf

BAMFIELD FUNGUS FESTIVAL 2016

All photos by James Holkko

Thanks to Orla Osborne and our Bamfield hosts for another successful festival!

Springtails and Fungus Gnats:
Common Fungivorous Hexapods

By Tom Witte

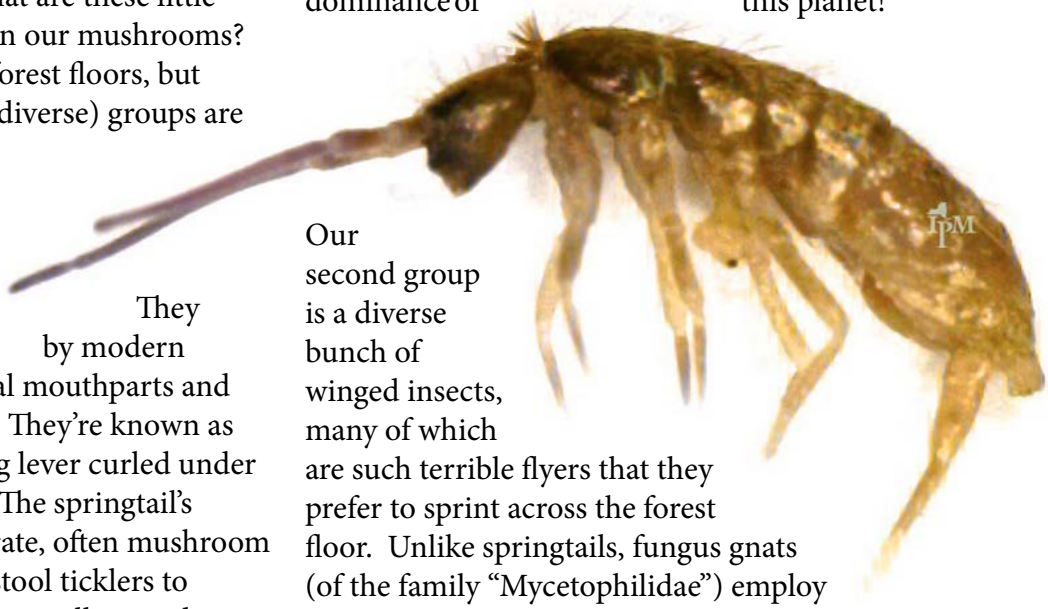
Who hasn't cut open a beautiful looking bolete only to find a swiss cheese labyrinth of maggot tunnels? Insects may help a fungus to spread spores around the forest, but they are a picker's bane in the basket! What are these little many-legged critters growing on our mushrooms? There are many fungivores on forest floors, but two of the most common (and diverse) groups are springtails and fungus gnats.

Springtails are the tiny black flecks that seem to teleport through mushrooms gills. They aren't technically insects by modern definitions, as they have internal mouthparts and a simplistic respiration system. They're known as springtails because of a jumping lever curled under their bellies, called a "furcula". The springtail's furcula snaps against the substrate, often mushroom gills, launching these tiny toadstool ticklers to safety. The jumping process takes milliseconds to enact, which is near the limit of what the human eye can perceive.

Collectively, the roughly 3,600 known species of springtails occupy a massive diversity of ecological niches, and are considered to be among the most abundant animals on the planet, comparable to nematodes, crustaceans and mites.

Springtail research has focused on their use as indicators of soil pollution, their potential as a biocontrol in reducing levels of crop-destroying fungi, or as alternately symbiotic fungi-spreading vectors (good for farms) or crop destroying invaders (bad for farms). The next time you see springtails under a mushroom cap, take a moment to appreciate their largely unseen dominance of this planet!

By EBKauai - http://www.flickr.com/photos/13470115@N08/3517202763/, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=15270366



Our second group is a diverse bunch of winged insects, many of which are such terrible flyers that they prefer to sprint across the forest floor. Unlike springtails, fungus gnats (of the family "Mycetophilidae") employ metamorphosis to transform from a wriggling white maggot with a blackened head burrowing through a soft mushroom stem, to a tiny winged gnat feebly joining its neighbours in clouds of chaotic attraction.

Many of these gnats are agricultural pests, invading mushroom farms and even damaging greenhouse plant root systems. They thrive in moist environments and typically complete their life cycles over about a month.

Fungus gnat larvae are perfectly edible (when cooked, I presume), though perhaps unsightly - Paul Kroeger has been known to suggest grinding coarse pepper on wild mushrooms to disguise the possible presence of the larva's distinctive black head!

Collembola photo (top right) used under Creative Commons Liscence, photo credit NY State IPM Program at Cornell University

WELCOME NEW MEMBERS

Florence Raffaelli
Erin Feldman
Stas Bekman
Roman Mateyko
Pamela Kohl
Phil Chebuhar
Christopher Cairns
Carmelle Lemaistre
Sarah Adams
Tracy Davison
Matthew Andres
Marleen Lapalucci
James Garry
Cheyney Jackson
Adrian Pendergast
Paul Lescarmure
Hilary Dougall
Ingeborg Woodsworth
John Robertson

For those who no longer wish to be on the SVIMS email list, please follow these steps instead of emailing the listserve:

- Click the link at the bottom of any SVIMS email : http://lists.vifa.ca/mailman/listinfo/svims
- Scroll to the bottom of the page and enter your email address into the "unsubscribe" field.

Thinking of collecting some mushrooms for the SVIMS wild mushroom show on Oct. 23rd? For those who may not know, here's a quick primer on the collection practices to ensure experts have an easier time identifying your find:

- Harvest the entire mushroom - don't cut the stem! Use a tool such as a knife to gently pry up the mushroom from underneath the base, being careful to keep soil disturbance to a minimum (but it's okay to have some substrate on your stem)
- Roll up your individual mushrooms in a sheet of wax paper, to keep them separate from each other and to protect them (twist the ends like a candy wrapper)
- Take basic notes about where you found the mushroom - in what kind of forest was it found, and on what was it growing?
- Be safe and have fun!

SVIMS EXECUTIVE AND VOLUNTEER POSITIONS 2016-2017

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Past President
Richard Winder
Vice President
Sinclair Philip
Treasurer
Donna Humphries
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Jaz Grenier
Membership Assistant
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