

# Spore Print

Newsletter of the Connecticut Valley Mycological Society  
Affiliate of the North American Mycological Association  
Member of the Northeast Mycological Federation  
Vol. XLV, No. 1, Winter/Spring 2019

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## Coming Events

**March Mushroom Madness**, Sunday March 17 2019 at Sessions Woods WMA, Burlington, CT. CVMS Members: \$5.00 at the door (talk is free to the public). This is a potluck event for CVMS members—each adult attendee should contribute a dish to share that can serve 6, please bring appropriate serving utensils, a label with all ingredients listed and the name of who made it; the dish *does not* have to contain mushrooms

Tentative Schedule:

8:15 Set up room, chairs, and tables

9:00 Doors open, pay fees or dues, coffee, change in procedure: handbooks will NOT be handed out this year!

10:00-11:15 (approximately!) Public program with presentation by David Spahr: The “Mushroom Maineiac”

11:30 Public session ends, CVMS club business meeting and election of 2019 officers

12:00 Potluck lunch, please wait for the signal to begin lunch

1:30 Clean-up: volunteers appreciated! Tables and chairs must be put away, and the kitchen must be cleaned

Membership: Dues per calendar year are \$15 individual; \$20 family (two or more persons at one address and requiring only one copy of club mailings). Lifetime memberships are \$200 individual and \$250 family. Make checks payable to CVMS and send to: CVMS/Karen Monger, 32A Perkins Ave., Norwich, CT 06360. CVMS members may pay for NAMA membership yearly by visiting:  
<http://www.namyco.org/join.php>  
for application and payment information

The Sporadic Spore Print newsletter is published *about* three times per year: Winter/Spring, Summer, and Fall. It is distributed to all members of the club in good standing, and on an exchange basis to the newsletter editors of other mushroom clubs. Submissions to this newsletter can be sent to the editor; if you would like to get your newsletter copy online, in full color and with working links, send your email address to: speditor@cvmsfungi.org

## **Renew for 2019 NOW!**

Applications for membership renewals are available on the CVMS website at <http://www.cvmsfungi.org/membership.html> and in this newsletter. Handbooks and nametags will be mailed directly to all members. Send checks or money orders only payable to **CVMS** to:

Karen Monger  
32 A Perkins Ave  
Norwich, CT 06360

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## **Slate of CVMS Officers for 2019**

The nominating committee will present the following slate of officers at March Mushroom Madness:

Beth Karwowski . . . . President  
Bill Yule . . . . Vice President  
Terri Hungerford . . . . Treasurer  
Karen Monger. . . . Membership Secretary  
Dinah Wells . . . . Secretary

Hello CVMSers,

As we all know, 2018 was a banner year for mushrooms. Rainfall in Connecticut in 2018 topped 62 inches in some areas and that pattern of wet weather has continued into the winter with mild, wet days being a regular occurrence. As I write this, we have just come off of a cold spell, but temperatures are again above freezing. We may have some good winter foray weather!

March Mushroom Madness is a mere two months away. The event will be held on March 17<sup>th</sup> and David Spahr has agreed to present a program for us. David, known as the “Mushroom Maineiac”, is the author of *Edible and Medicinal Mushrooms of New England and Eastern Canada*.

In a change from previous years, **2019 Member Handbooks and 2019 name tags will not be handed out at March Mushroom Madness**, but will be mailed to paid current members using the address on record with the Membership Secretary. This step is being taken for several reasons, including as a cost saving measure. In years past, we would print name tags for all members from the previous year in anticipation of their renewal, but in many cases these members do not renew. This results in unnecessary costs in both time and money to the club. This new procedure will eliminate those costs, as well as alleviate a bit of chaos at March Mushroom Madness, where tracking payments and handing out books has been somewhat of a challenge for club officers.

We will continue using “To be determined” (TBD) foray locations for some dates in 2019, as we have for the previous two years. The locations of the forays for these dates will be determined by the club officers based on precipitation maps in the week prior to the foray. The phone number and procedure will be outlined in your Member Handbook, as it was last year.

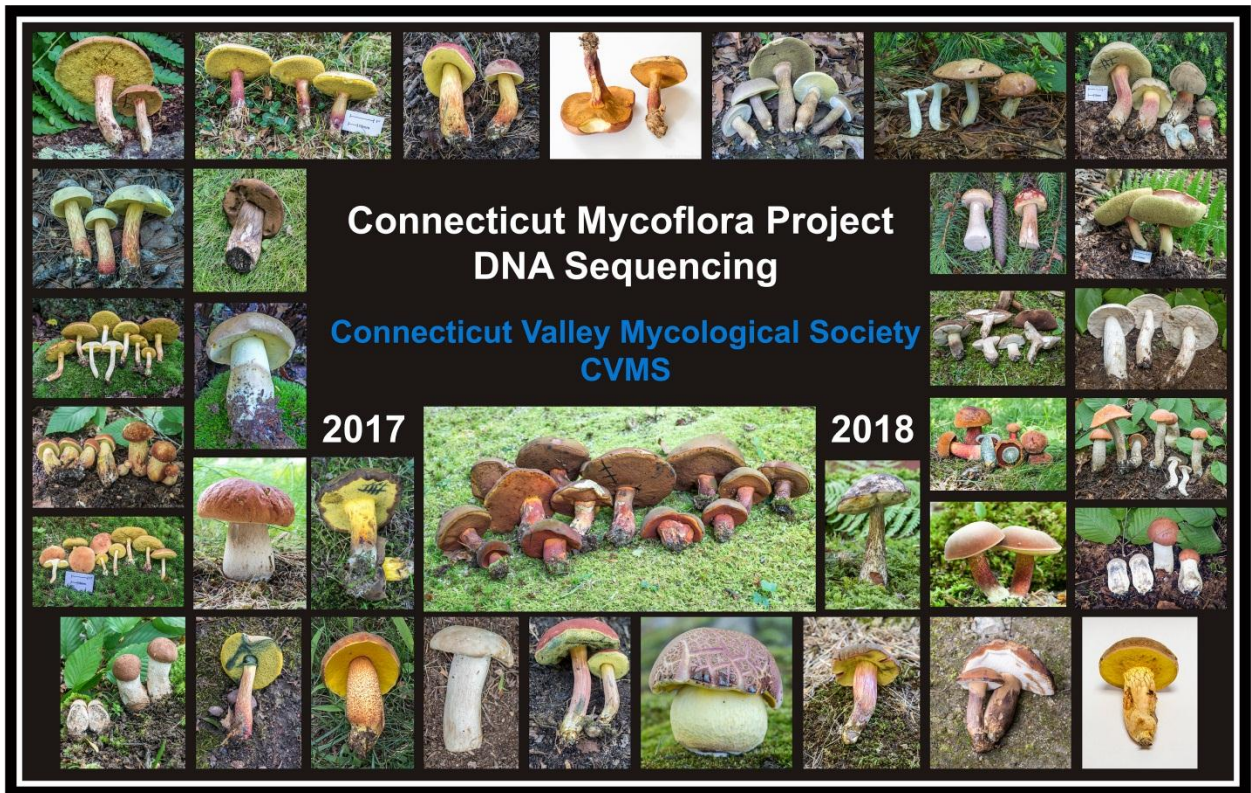
We have invited the Boston Mycological Club (BMC), the New York Mycological Society (NYMS), the Pioneer Valley Mycological Society and the Connecticut Westchester Mycological Association (COMA) to join us on forays again in 2019. The joint forays were well attended and praised by all attending clubs in 2018. As usual, no foray will be scheduled for the week of the Northeast Mycological Federation (NEMF) Foray, which will be held in Pennsylvania on August 1<sup>st</sup>-4<sup>th</sup>.

I wish you all a safe and happy new year. Let us hope for another great season!

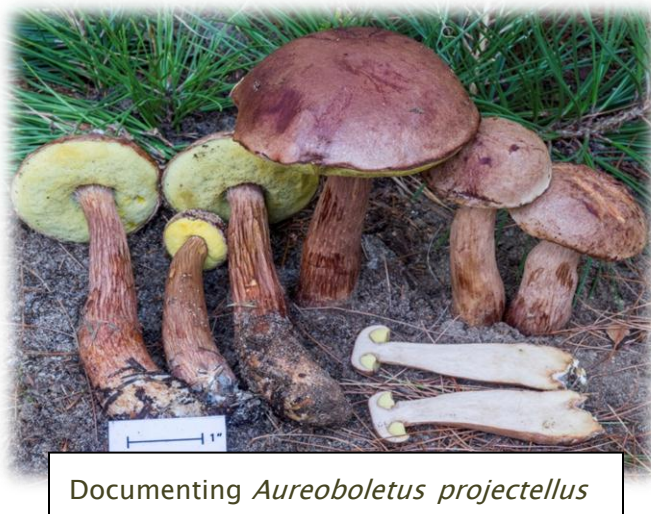
Beth Karwowski  
President, CVMS



Winter fungi photos by Terry Stoleson: Hymenochaete and Gloeoporus



Photos and text by Robert Gergulics  
Collecting Fungi for DNA Sequencing



Documenting *Aureoboletus projectellus*

The work begins when I find interesting or unknown fungi in the field. Before I pick the mushroom I begin to survey the surrounding area and try to ID every tree within a 30-40 foot area around the mushroom and try to determine which tree could be the host tree or which tree has a mycorrhizal relationship with my fungi. I look for more than one specimen of the same mushroom, hopefully at different stages of growth and

at different ages in the same area. Then I will start to take photos of the specimens in different positions; I take photos of the cap, stipe, and pore surface, and I will cut it in half length-wise to see if there is any staining or color change and also to record flash color changes-- taking photos immediately after I cut it in half, and about 5-10 minute after the initial cut to see color reaction changes. At this point the field work is pretty much over and I wrap

several of the specimens that are in the best condition in a wax bag and take them home.

The page from the Mushroom Observer website for #250775, my collection of *Boletus huronensis*

At home I will take a sample of the pore surfaces to use a microscope to measure the spore sizes and any spore ornamentation, taking photographs of the spores. Then I will slice the mushrooms in half and place them in the dehydrator, setting the temperature to 110 ° F or below to dry. When the pieces are fully dry and crispy they get packed into wax bags and divided into two zip-lock bags. At this point I will create an observation to the Mushroom Observer website, uploading all of the collected data about the specimen to the observation: location, measurements, tree associations, any associated Mycoflora projects, herbarium records, and upload my photos. Mushroom Observer generates an observation number for each mushroom recording that gets attached to each specimen that will now follow the specimen through the rest of the DNA sequencing and identification process. I add the MO number to my packaged mushrooms—preparing one dried sample to send out for DNA sequencing and one dried sample for deposit into the New York Botanical Garden Herbarium collection, where the catalogued dried sample will be available for further study by mycologists.



I will wait until I have at least seven other dried mushroom samples to send out for sequencing, because it is easier to sequence in batches of eight for practical reasons. Once the first dried sample of a documented specimen is mailed to the NY Botanical Garden for placement in the

herbarium and the second dried sample is sent out to a partner university for DNA preparation for testing, my work is usually done. Recently I have had the opportunity to sit in and help with some of the actual DNA preparation work for some of my collected samples. The DNA work, DNA interpretation, and searches of results on GenBank are done collaboratively by many people in several Mycoflora groups to the benefit of the entire myco-community. When I have eight samples to send out for sequencing, it needs to be determined which type of sequencing will get the best results for our mushrooms.

### DNA Sequencing

Here are the 3 types of sequencing that are used for fungi:

**ITS** = InTernal Transcribed Spacer (a spacer inside the ribosomal DNA); sequenced regions are ITS1 and ITS2, and these are separated by a third region called 5.8S

**LSU** = DNA that codes for the Large Sub-Unit of the nuclear ribosome; the most frequently sequenced region is the first 1000 bases

**TEF-1-alpha** = Translation Elongation Factor (a single-copy protein-coding gene)

We use **ITS** only when the genus of my mushroom is known from morphology (Leccinum, Xerocomus, Boletus, Suillus) but I am not sure about species.

The **LSU** locus is our workhorse gene for boletes that are not readily placed into a genus from morphology.

**TEF-1** is a protein-coding gene that is very useful for analyzing evolutionary relationships and it is relatively new and does not have a lot of deposits for comparison in GenBank yet.

### Preparation for DNA Sequencing, and What Comes Next

The genes that are sequenced are part of the genomic DNA. That DNA is actually what makes up chromosomes. Chromosomes are inside the nucleus of a living cell, and the nucleus is inside the cell itself, floating in the cytoplasm.



Getting dried mushroom samples ready for PCR in the thermal cycler

1. The first step is called **DNA extraction**: In order to get access to the chromosomes/genomic DNA, one must lyse (i.e., burst open) the cells, so the cellular contents can spill out into a solution for further "processing". So, the first step is to take a small sample of your dried mushroom, make a powder out of it (to increase the surface area and facilitate the cell lysis) and then add it to an aqueous solution containing reagents that will destroy the cells and make the DNA available for the next step.

2. The next step is called **DNA amplification**. We are making many, many copies of a specific gene or DNA region you want to sequence (ITS, LSU, etc.) The large quantity of the desired DNA is necessary so that the machine that reads it can detect it easily and give you a nice and clean result (a chromatogram consisting of peaks that represent each nucleotide in your DNA sequence) .DNA amplification is achieved through a process call **Polymerase Chain Reaction (PCR)**.

3. Once we think the PCR reaction has made enough DNA for sequencing, the reaction is terminated, and the DNA is purified. The purification step also lets you know if the PCR reaction worked, which is obviously very useful because you don't want to submit junk for sequencing.

4. The purified DNA sample is then placed into a vial and sent out for sequencing. A DNA sequencing machine reads the DNA and gives you a raw sequence (an .ab1 file). This file (a raw chromatogram) is what we get back from the company who does the sequencing. The raw data then must be processed/transcribed by a special program to ensure the quality of data.

5. After this process we end up with a bunch of letters or a file called fasta files that look like a chain of letters, for example:

```
TAGGTGACCTGCGGAAGGATCATTATCGAATCCTACCAGGGAGGGGAGGGAAGAYGG
ATGGAGGAGTCAAGGCTGTCGCCGGCAACGTGCACGCCCTTTCTCTTTCGTGGAACC
TCCCCTTTCTAGTTTCCTTATCCACCTGTGCACCCTTTGTAGGCCCTCGAAAGAGGATC
TACGTTTTCTCTATATACGCTTTTTGCTACGCATGTCCAGAATGTATACAACTTTACAA
CTTTCAGCAACGGATCTCTTGGCTCTCGCATCGATGAAGAACGCAGCGAATTGCGATA
AGTAATGTGAATTGCAGATTTTCAGTGAATCATCGAATCTTTGAACGCACCTTGCGCTC
CTTGGTATTCCGAGGAGCATGCCTGTTTGAGTGTGCATCGAATTCTCAACCATGTCCTTG
AATTAGGCATGGCTTGGACTTGGGGGTTGCTGGCACACGTTGTCAGCTCTCCTGAAAT
```

6. Sequences get deposited to Genbank and compared to other deposits to see if we have any match to species that have already been described and sequenced. Verifications of identifications are made and the MO observation will get updated as needed. Specimens that don't match known species will be studied further and perhaps named at a later date.

## Fungi News, Blogs, and Videos

Scientists believe they may have found an unlikely ally in the fight against plastic pollution -- fungi. Experts say the fungus, known as *Aspergillus tubingensis*, which was found in Pakistan, is capable of eroding plastics such as polyester polyurethane, which is often used in refrigerator insulation and synthetic leather. <https://edition.cnn.com/2018/09/12/uk/fungi-plastic-mushrooms-intl/index.html?no-st=1536771224>

They're all around us, in the soil, our bodies and the air, but are often too small to be seen with the naked eye. They provide medicines and food but also wreak havoc by causing plant and animal diseases. According to the first big assessment of the state of the world's fungi, the fungal kingdom is vital to life on Earth. <https://www.bbc.co.uk/news/science-environment-45486844>

Can anyone make plant pathogens and rusts as much fun as Kathy Hodge? Check out another edition of the Cornell Mushroom Blog

[http://blog.mycology.cornell.edu/2018/11/18/connecting-the-rusts/?fbclid=IwAR2RDr2D6pnAZZdE8SyVU5fPXHzlyqXVRaG0tgJIN\\_lPK0gCmWR8OSj2dPM](http://blog.mycology.cornell.edu/2018/11/18/connecting-the-rusts/?fbclid=IwAR2RDr2D6pnAZZdE8SyVU5fPXHzlyqXVRaG0tgJIN_lPK0gCmWR8OSj2dPM)

Looking for a longer read? This link is to a 92 page PDF file about the State of the World's Fungi, published by the Royal Botanic Gardens at Kew, where there has been a Fungarium since 1879 that houses 1.25 million specimens! No identifications here, but discussions about new species discoveries, fungi use as food and tools—meds and remediation, plant-fungi interaction-mycorrhiza, diversity, fungal threats to ecosystems, conservation of fungi, and a section that focuses on fungi in China

[https://stateoftheworldsfungi.org/2018/reports/SOTWFungi\\_2018\\_Full\\_Report.pdf?fbclid=IwAR2Imn35CiRy4SFi5osllhNAP2nmsTS9sBaHfGsOiBE1ugElt98cqHpzN0](https://stateoftheworldsfungi.org/2018/reports/SOTWFungi_2018_Full_Report.pdf?fbclid=IwAR2Imn35CiRy4SFi5osllhNAP2nmsTS9sBaHfGsOiBE1ugElt98cqHpzN0)

In the past, food scientists often praised mushrooms as healthy because of what they don't contribute to the diet; they contain no cholesterol and gluten and are low in fat, sugars, sodium and calories. They are very healthy foods because they are good sources of protein, B-vitamins, fiber, immune-enhancing sugars found in the cell walls called beta-glucans, and other bioactive compounds. [https://www.ecowatch.com/mushroom-nutritional-benefits-2561760735.html?xrs=RebelMouse\\_fb&ts=1524240622&fbclid=IwAR3u1nCzQxkUHm5h8GsJQUbaYxH1tWLVz2mdMKCymA8TTQr\\_9O2vR2Ib35A](https://www.ecowatch.com/mushroom-nutritional-benefits-2561760735.html?xrs=RebelMouse_fb&ts=1524240622&fbclid=IwAR3u1nCzQxkUHm5h8GsJQUbaYxH1tWLVz2mdMKCymA8TTQr_9O2vR2Ib35A)

[https://www.ecowatch.com/mushroom-nutritional-benefits-2561760735.html?xrs=RebelMouse\\_fb&ts=1524240622&fbclid=IwAR3u1nCzQxkUHm5h8GsJQUbaYxH1tWLVz2mdMKCymA8TTQr\\_9O2vR2Ib35A](https://www.ecowatch.com/mushroom-nutritional-benefits-2561760735.html?xrs=RebelMouse_fb&ts=1524240622&fbclid=IwAR3u1nCzQxkUHm5h8GsJQUbaYxH1tWLVz2mdMKCymA8TTQr_9O2vR2Ib35A)

Renew your membership now--2019 Member Handbooks and 2019 Name tags will be mailed to the address you provide on your membership application, please make sure it is current and up to date! No handbooks or name tags will be given out at the March Mushroom Madness meeting or at forays. No cash will be accepted through the mail, checks or money orders only, *please*.



Using one of the most versatile wild mushrooms in recipes can be as simple as substituting it for a similar protein in recipes. Chicken mushroom, once properly prepared first, can easily replace real chicken in many recipes calling for cooked chicken, especially in cold salads or chilled noodle dishes. Cooked chicken mushroom can be kept in the freezer to thaw and used later in the winter time.

### **Chicken Mushroom, Snow Peas, and Sesame Noodles**      makes 4 servings

- 6 cloves of garlic, minced
- 4 Tbsp sugar
- 4 Tbsp oil
- 6 Tbsp rice vinegar
- 6 Tbsp soy sauce
- 2 Tbsp toasted sesame oil
- 2 tsp chili garlic paste or Sriracha

- 1/2 pound cooked pasta, like linguine or spaghetti
- 1/2 cup raw snow peas

- 1/4 cup julienne carrots

- 1/4 cup additional raw chopped veggies like cabbage, celery, sweet peppers
- 1 cup cooked, sliced chicken mushroom, chilled
- 4 tsp toasted sesame seeds

1. Make the dressing: In a small saucepan, add the minced garlic, sugar, oil, rice vinegar, soy sauce, sesame oil, and garlic chili paste. Bring it to a quick boil and stir until the sugar dissolves, a few seconds. Cool.
2. Toss the pasta with the veggies and the chicken mushroom and pour the dressing over the noodles. Sprinkle the sesame seeds over the salad to serve.

Note: If you are not serving the salad immediately the pasta will soak up the dressing, so save a bit of the dressing to add to the salad right before service.



**CONNECTICUT VALLEY MYCOLOGICAL SOCIETY  
APPLICATION FOR MEMBERSHIP FOR 2019**

*Note: New members who pay full yearly dues after September 22 are paid through the next year.*



Renewal? \_\_\_\_\_ New Member? \_\_\_\_\_

Individual (\$15) \_\_\_\_\_ Family (\$20) \_\_\_\_\_

LIFETIME Individual (\$200) \_\_\_\_\_ Family (\$250) \_\_\_\_\_

Donation to the Ed Bosman Scholarship Fund \_\_\_\_\_

**Please make check payable to CVMS and send to:**

**CVMS/ Karen Monger, 32A Perkins Avenue, Norwich, CT 06360**

*To join the North American Mycological Association (NAMA) at discount affiliated club rate, Visit <http://www.namyco.org/join.php> for application and payment information*

NAME(S): \_\_\_\_\_

STREET: \_\_\_\_\_

CITY AND ZIP: \_\_\_\_\_

EMAIL: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_

Club Use: Check # _____ Letter _____ Handbook _____ Nametag _____ Family # _____ SP _____
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Your participation in the group (the "Group") sponsored by the Connecticut Valley Mycological Society ("CVMS") constitutes a continuing acknowledgment that you are aware that (a) the identification of wild mushrooms always carries with it the risk that a mushroom may be misidentified, (b) consuming a mushroom that has been incorrectly identified creates a risk of personal injury, including serious illness (up to and including an untimely death), (c) eating mushrooms and other foraged foods, even if correctly identified, involves a risk of illness, injury or death as a result of personal sensitivity (including allergy or harmful interaction with other medicines you may be taking), and (d) participation in a foray may be physically strenuous and hazardous, personal responsibility and care should be exercised. In consideration for your acceptance as a member of the Group and/or participation in any activities sponsored by CVMS or the Group and its respective members, you agree to, and do, personally assume all risks arising from these activities and agree to release, hold harmless, and indemnify the Group, CVMS and any of their officers and members from any and all legal responsibility for injuries or accidents suffered by you, your family members or any minor child under your care during or as a result of any activity conducted or facilitated by the Group or CVMS, including but not limited to use of information provided by the Group and CVMS directly or in their sponsored websites, and all activities involving mushroom collection, identification or consumption.

X \_\_\_\_\_ Date \_\_\_\_\_

X \_\_\_\_\_ Date \_\_\_\_\_



More winter fungi photos by Terry Stoleson, always something to see!