

Mycena News



The Mycological Society of San Francisco • May 2016, vol. 67:09

MAY 17

General Meeting Speaker

Eugenia Bone

“Mycophiles: Festivals, Forays, and the Company of Mushroom Hunters”



About the speaker:

Eugenia Bone is a nationally known food journalist and author. Her work has appeared in many magazines and newspapers, including *Saveur*, *Food & Wine*, *Gourmet*, *Fine Dining*, *Martha Stewart Living*, *Sunset*, *The New York Times*, *The Wall Street Journal*, and *The Denver Post*.

She is the author of five books. *At Mesa's Edge* was nominated for a Colorado Book Award. She wrote *Italian Family Dining* with her father, celebrated chef Edward Giobbi. *Well-Preserved* was nominated for a James Beard award, and was on many best cookbooks of 2009 lists. *Mycophilia: Revelations From the Weird World of Mushrooms*, was on Amazon's best science books of 2011 list and nominated for a Council on Botanical and Horticultural Libraries award. Her fifth book, *The Kitchen Ecosystem* (October, 2014) has been nominated for a Books for a Better Life award, and was on many best cookbooks of 2014 lists.

Her writing and recipes have been anthologized in a number of publications, including *Best Food Writing*, *Saveur Cooks*, and *The Food & Wine Cookbook*, among others.

Eugenia has lectured widely, in venues like the Denver Botanical Garden and the New York Public Library, judged food and wine competitions, and she has appeared on television and radio many times.

She is the founder of Slow Food Western Slope in Colorado, a master preserver, and the president of the New York Mycological Society, which was founded over 50 years ago by composer John Cage. She writes the blog, kitchenecosystem.com

Eugenia lives in New York City and Western Colorado.

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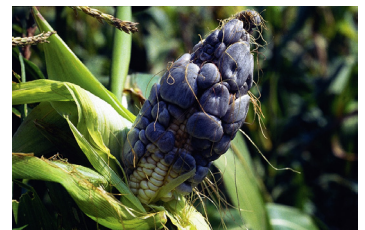
Mushroom of the Month: *Puffballs and Huitlacoche*

by Ken Litchfield

First published in "Mushroom the Journal" Spring 2002 and "Fungi Magazine" Spring 2009 and updated and elaborated here.

Huitlacoche is one of the most ancient, interesting, and useful mushrooms in the collection of human fungal interactions. The parasitic corn smut fungus invades developing corn kernels and swells them into greenish silvery grotesquely enlarged, delectable maize truffles that split open with age releasing powdery black spores. When young and succulent it is an ancient Aztec delicacy and one of the best fresh mushrooms you can eat, especially in summer when most other California mushrooms aren't available. Hopefully, by the time you finish reading this article you will be out digging up a garden spot so you can plant some corn to grow your own maize truffles, which

is why you are reading about its cultivation in this issue just in time for corn planting season. First we'll look at the nomenclature and taxonomy, some of the biology and natural history, the get down to herbal lore and culinary considerations before we go over to the Cultivation Quarters to learn how to grow it.



Huitlacoche © David Bote

Nomenclature

Like many fungi nowadays, huitlacoche has two scientific names: the common scientific name that most folks are

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PRESIDENT'S POST

by Brennan Wenck

Hello MSSF Members,

I want to start off by saying that the MSSF has its Annual Meeting of the Society coming up this month. In this issue of *Mycena News*, the MSSF Council is announcing the nomination of incoming officers and councilors for the 2016-2017 season. The election of incoming officers and councilors will be by majority vote of MSSF members present at the May annual meeting, provided a quorum is present as stated in the MSSF by-laws. I highly encourage as many members as possible to attend this important meeting and help with the voting process. This is also the last general meeting until September, when our monthly meetings will resume at the present location, the County Fair Building in Golden Gate Park.

Morel season is upon us! There have been quite a few reports of morels popping up around the Bay Area and even up in the lower Sierras. It looks like it's going to be another fantastic year. Both the Marin Mycological Society and MSSF will be hosting forays up to the Sierras to collect the bounty that should be present. The MSSF foray is currently scheduled for the May 20-22 weekend. Details are still being finalized, so keep an eye on the MSSF calendar so that you can be sure to sign up and claim your spot. I want to take a moment to thank Eric Multhaup for all his efforts in organizing the event and coordinating so closely with the Marin Mycological Society in orchestrating what has always been a fun weekend of camping, hiking and of course, morels.

It has come to my attention that some people from our meetings have been helping themselves to the food next door at the Succulent and Cactus Society meetings. They have expressed that the food they bring is only for their members, so unless you sign up to be a Succulent and Cactus Society Member, please refrain from eating their food. If you would like to become a member of the Succulent and Cactus Society you can do so here: <http://www.sfsucculent.org/membership.html>

I want to take the time to thank all the members of the society for an outstanding year. As President, I have really enjoyed getting to know the ins and outs of the society at a deeper level. It has been a great honor to represent a group that is so full of lively characters who are responsible, motivated, and fun to engage with. I am looking to make improvements for the society for next year, and want to hear your suggestions. Please feel free to contact me at president@mssf.org.

Thank you all for a great MSSF season.
Forage Responsibly, and have a great summer.

Brennan - president@mssf.org

ANNOUNCEMENTS / EVENTS

The *Mycological Society of Marin County* next meeting will be held at the

Mill Valley library on

May 13, 2016 at 6:30 PM

Norm Andresen will be giving a talk on
"Morels"

Check for the speaker and register for this event [online](#)

For more information call Kevin Sadlier at 415-389-8333.

Herbal Mead Making

7pm-10:30ish Every Wednesday Night

at Omni Commons Lab

[4799 Shattuck Ave, Oakland](#)

Contact Ken Kitchfield

(litchfield.ken@gmail.com) for more info



Dear Members,

It has come to my attention that some people from our meetings have been helping themselves to the food next door at the Succulent Society Meetings. They have expressed that the food they bring is only for their members, so unless you sign up to be a Succulent Society Member, please refrain from eating their food. If you would like to become a member of the Succulent Society you can do so here: <http://www.sfsucculent.org/membership.html>

Brennan - president@mssf.org

familiar with, and the proper scientific name that it got changed to in an obscure publication due to byzantine nomenclatural rules. The properly corrected scientific name of *Ustilago zaeae* (Beckm.) Unger has been published for over twenty years. To quote the correction from the hefty tome “Fungi and Plant Products in the United States” by David Farr, et al, APS Press 1989:

“*Ustilago zaeae* (Beckm) Unger

“*Lycoperdon zaeae* Beckm 1768

“*Lycoperdon maydis* (DC.) Corda

“Distr.: Widespread. Notes: On *Zea* and related genera. Widely known as *Ustilago maydis*. The earliest name for this fungus is *Lycoperdon zaeae* Beckm. 1768 (Mordue & Ainsworth. Mycol. Pap. 154:61 1984. Vonky (Sym. Bot Upsal 24:12.1985) rejected this name stating that *U. zaeae* is preoccupied by *U. zaeae* (Link) Unger. Schweinitz treated *zaeae* in *Uredo* not *Ustilago*; hence the correct name is *U. zaeae* (Ainsworth CMI Descr., 79 1965 as *Ustilago maydis*). Host: *Zea*”

Though *Ustilago zaeae* (Beckm) Unger is accepted by the American Phytopathological Society as the proper scientific name the common scientific name of *Ustilago maydis* (DC<) Corda is much better known and more widely used. Plant pathologists specializing in corn smut usually use *U. maydis* even in APS publications.

Taxonomy and Relatives

Ustilago maydis belongs to the family Ustilaginaceae, in the Order Ustilaginales, Subclass Ustilaginomycetidae, Class Ustilaginomycetes, Phylum Basidiomycota of the Kingdom Fungi. It is one of an estimated eighty to two hundred species of *Ustilagos*, which mostly infect grasses and grains but which can also parasitize *Silene* and *Stellaria* of the Caryophyllaceae, *Polygonum* of the Polygonaceae, and *Commelina* of the Commelinaceae.

Ustilago esculenta is another member of this genus which is edible by infecting *Zizania latifolia* (Grizeb) Turcz. ex Stapf., a type of perennial wild rice known as water bamboo or Manchurian wild rice. It is closely related to the wild rice, *Zizania aquatica* L., of North America. It is eaten in the orient as *coba*, *kuw-sun*, *kwo-bai*, or *jiao-bai* in China and Taiwan and *makomo dake* in Japan. The plant is an edible vegetable only because the smut fungus causes the stems to swell into a succulent delicacy. There are three forms: an early maturing, fine leaved small plant called Green Stem, a mid to late season large plant called White Stem, and a large mid to late type called Pink or Red Stem. The plant is only propagated asexually by cloned cuttings and offshoots already infected with the fungus, which prevents formation of seeds. This is therefore an example of a triple kingdom symbiosis between the human animal, a plant, and a fungus. Herbally, when cooked fresh it eases constipation and urination. Interestingly, *Ustilago esculenta* is the probable antigen producing a nasty sounding thing called smut lung, a type of hypersensitivity pneumonitis, in humans exposed to Japanese handicrafts. Its importation to the US is forbidden due to the uncertainty of its action on native grasses. As recently as twenty years ago it was eradicated from an accidental introduction in San



Puffballs from Norway
© Donald Hughes

Francisco's Strybing Arboretum.

Native and Herbal Uses

Huitlacoche is the sanitized, Anglicised name given to the culinary mushroom called *cuitlacoche* in native Mexican cuisine. *Cuitlacoche* is pronounced “kweet’-lah-KOH’-chay” and huitlacoche as “weet’-la-KOH’-chay” with the heavier accent on the third syllable. There are various alleged etymological explanations for the origins of the words but changing the “c” to an “h” removes the direct translation of *cuitlacoche* as “sleeping excrement” from the native Mexica Nahuatl *cuitlatl* for “excrement” and “cochtli” for “sleeping”, referring to the mushroom's hidden nature in the husks of the ear and some other herbal uses. Some folks have erroneously worked “black” or “raven” into the translation but those don't derive from the Nahuatl.

Excrement had a little different connotation to the Aztec Mexica than the typical modern repulsion. Periodic purification rituals were used to cleanse the body of detrimental actions and excesses. This literal and spiritual purging was offered up to one of the goddesses in the Aztec pantheon who devoured the excrement and redeemed the individual. Common practice in Tenochtitlan, the capital of the Aztec empire, built on islands in Lake Texcoco, was to take the household chamber pots by canoe to the canalled milpas, where the night soil was added to the raised growing beds that were created



Puffball © Pascal Pelous



Huitlacoche © David Bote

by dredging the rich lake bottom onto flattened pyramidal mounds whose sides were supported by wooden poles driven into the lake bed. These raised beds, wicking up the lake waters, were planted with maize, amaranth, and other food plants in one of the most productive food production methodologies ever devised. The interstitial canals were teeming with fish and meaty axolotl salamanders plus aquatic beds of blue-green algae.

The sacred maize devoured the nightsoil and generated multitudes of golden and other kernel colors for human sustenance, including its own excrement, sacred *cuitlacoche*, for human culinary sacrament. Plant culture and human culture and their attendant productivity were a symbiotic relationship developed over thousands of years. Neither maize nor humans would be the same species today without each other, and huitlacoche exploits both for its gourmet galls.

Huitlacoche has a number of herbal uses, both fresh and smutty. Most native tribes that cultivated maize used the black smut powder as a ceremonial body paint. Like the puffball it was originally named after, the black powder was used as a styptic or hemostatic, with or without spider webs, to clot the flow of blood in wounds. It has been added to water and spread on a compress to apply to a sore throat. In Chinese medicine the fresh mushroom has been found to contain at least 16 amino acids. Frequently eating it stir-fried prevents and cures hepatic and gastrointestinal ulcers, and the fungal fluid has been found to inhibit growth of cancerous tumors in laboratory mice. Equal parts black spore powder and brown sugar are recommended for neurasthenia, a little different than the western concept of this condition, and infantile malnutrition due to digestive disturbances or intestinal parasites. Dosage is three grams three times daily for adults and .3 to .9 grams for infants.



Calvatia booniana © Fred Stevens

And, like puffballs, the black powder has been flung or puffed into a fire to flare up explosively for magical shamanic purposes. In more recent times, ditzy kids have conflated a, perhaps, hallucinogenic Mexican puffball with local puffballs and occasional corn smut spores in hopes that they might get high off of this exploded smoke. Instead they have created and new and rather nasty disease called lycoperdonosis, a lung infection caused by unburned puffball spores sprouting in the lung tissue. Yes, this sounds like a hoax foisted upon desperate urban teenagers by “the Man” to keep their misbehaviors in check, but it is apparently a real disease that can happen from inhaling “too many” puffball spores.

There is a good deal of false information in much of the herbal literature about corn smut, giving rise to the erroneous notion that huitlacoche is poisonous, particularly to pregnant women. Corn smut is one of over 150 pathogens of corn, *Zea mays* L., half of which are fungal, but the only one that has a definite redeeming quality of being more delicious and economically valuable, on a small scale, than the corn itself.

One of these other fungal pathogens is corn ergot *Claviceps gigantea* (Fuentes et al.). Corn ergot looks amazingly similar to corn smut on superficial examination. It is also known as horse’s tooth or *diente de caballo*. It has similar properties to rye ergot, *Claviceps purpurea* (Fries, Tulasne) and is used herbally similarly. These may range from vasoconstriction to uterine contractions and may result in side effects of gangrene or miscarriage. Rye ergot, and corn ergot, contain ergine, often known as “natural LSD,” and other psychoactive alkaloids. Eating infected rye bread in Middle Ages Europe sometimes caused ergotism, with mass hallucinations, convulsions, gangrene, St. Anthony’s fire and other symptoms.

Now, harking back to the discussion of the Nahuatl origins for huitlacoche: excrement in our modern, sanitized life is usually a completely repulsive subject totally out of mind, flushed down the toilet and polluting otherwise perfectly drinkable and valuable water. In Aztec culture, periodic purification rituals and preparations were used to cleanse the body of detrimental actions and excesses. This literal and spiritual purging offering was devoured by one of the fertility goddesses in the Aztec pantheon to redeem and rejuvenate the individual. The contents of dry toilet chamber pots were carried by canoe from all over Tenochtitlan and other cities on the shore of Lake Texcoco in the valley of Mexico to the “floating garden” milpas, where the excrement was combined with the watery underworld dredgings of the canals to create some of the most productive raised-bed gardens ever developed. These gardens weren’t actually floating but were raised vegetation plots surrounded by aquacultural transport canals where fish, axolotl salamanders, algae and other aquatic organisms were raised. Along with the other fruits, vegetables and grains grown there, corn had extremely rich and well aerated soil kept damp from moisture and liquid fertilizer wicking up from the teeming canals. This corn provided the civilization with sacred golden grain and the substrate for its own excrement, the black *cuitlacoche* and its special sacred twin for human sacrament. The twin symbiotic relationship of humans and corn were exploited parasitically by the fungal twins governed by the Aztec twin lord of monstrosities Xolotl, who also governed the twin worlds of upper garden and lower watery underworld of the “water monster” axolotl, the literal edible delicacy “feathered serpent.”

Many of the ethnographic works from the 1800's didn't recognize a distinction between the two fungi, corn smut and corn ergot, placing the descriptions of their two native uses in one location under the name *Ustilago maydis*. Corn ergot, *Claviceps gigantea*, wasn't described as a "new" fungal species until 1964. Among the Zuni and Hopi, corn smut was fried as a delicacy, while corn ergot was used as a parturient to increase the force of contractions during childbirth without increasing their duration. This is much like rye ergot and its modern pharmaceutical derivatives, only milder and less dangerous. Like rye ergot it is also used to stanch blood flow in post- parturient hemorrhaging. Dosage with corn ergot for both these conditions is 15 to 60 grains or 1/2 to 2 drachms of fluid extract, the same as for rye ergot, not that you should be messing around with this. This has resulted in the modern occasional misunderstanding that the culinary and herbal uses of huitlacoche vary depending upon the stage of its development, when in reality two different fungi, corn smut *Ustilago maydis* and corn ergot *Claviceps gigantea* are responsible. While it has occasionally been erroneously warned that pregnant women should not eat huitlacoche to avoid premature childbirth or miscarriage, no one including pregnant women would have any desire to eat corn ergot. It is dry and hard and not remotely palatable. No one including women, pregnant or otherwise, or men in whatever condition, should be eating corn smut if it had side effects for pregnant women, because those would be side effects that would also affect the physiology of any human. For readers wondering what happens to males who partake of the black powder of corn ergot for "female problems," corn ergot was once used in the treatment of the "male problem" of "excessive" masturbation. As this dates from an earlier era, detailed descriptions were obscure, but presumably the corn ergot was used for somehow diminishing the excessiveness rather than as an ointment for calluses. Which is interesting, because corn ergot was considered to be an herbal Viagra for men due to its vasoconstriction properties. This could be tragic if it actually produced a big boner that fell off due to gangrene.

MEMBER RECIPE *by Donald Hughes*

The morels from left to right were stuffed with: lobster, prawns, goat cheese. The section on the left is the bottom trimmings and the prawn trimmings. I used bacon to separate the differently stuffed morels; to keep them separate and to add the bacon fat. Once they were all placed in the baking pan. I poured a butter, garlic, herb and white wine sauce over the whole tray.

It was so fantastically good!



CULINARY CORNER *by Heather Lunan*

The April Culinary group dinner was a Forager's Heart Healthy Feast, prepared by Team Captains Curt Haney, Carol Reed, Peter Griffin, and Janet Dudley, and team members David Campbell, Ruth Erznoznik, Honoria Sarmento, and Dave Surballe.

The entrée was a seafood chowder created by Curt Haney and loaded with wild abalone, red rockfish, local clams, *Agaricus bernardii* mushrooms, turkey bacon, potatoes, skim milk and no butter. The *Agaricus bernardii* are characterized as edible by their red staining flesh, have a briny aroma like a tide pool, and were utterly delicious. Many thanks to Curt Haney for risking life and limb for free diving for the abalone, and for foraging the clams and rockfish, and thanks to David Campbell for foraging for the mushrooms. The vegetarian entrée was a savory bread pudding by Carol Reed made with King Trumpet mushrooms, Swiss cheese, walnut bread, and egg beaters. The sautéed kale with smoked morels and olive oil was the creation of David Surballe and Honoria Sarmento; the smoked morels were a bite of genius. The salad was the creation of Carol Reed and Ruth Erznoznik, and showcased foraged greens including the largest miner's lettuces I have ever seen, peppery nasturtium, dandelion greens, aromatic wild ramps and ramp flowers, pumpkin and sunflower seeds and a judicious application of gorgonzola, dressed with a balsamic vinaigrette or a raspberry vinaigrette. Dessert was a homemade candy cap ice cream made by Peter Griffin and Janet Dudley, and was scooped over a succulent blackberry cobbler with a tender crust. Coffee and tea service was provided by Carol Reed, and the entire team pitched in for the set up and clean up.

This innovative meal was primarily sourced through local foraging, which emphasizes the bounty of nature that we are most fortunate to have access to in the Bay Area. Despite the heart- healthiness of the meal, it felt utterly luxurious and soul satisfying, which is a tribute to the culinary talents of the team. Many thanks and accolades to the team for their hard work and for the perfect spring meal.

During our dinner we were treated to a raffle of two enormous gourmet mushroom gift baskets graciously provided by Lisa Bacon of Mycopia Mushrooms in Sebastopol (<http://www.gourmetmushroomsinc.com/>). Two beautiful wicker baskets stuffed with five of their mushroom varieties (Trumpet Royale, Velvet Pioppini, Forest Nameko, Alba Clamshell and Brown Clamshell) were raffled off to the dinner attendees. Virgilio Cardona and I were the lucky winners of the raffle! A huge thank you to Lisa Bacon and Mycopia Mushrooms for their generous treat and support of the MSSF and the Culinary Group!

As one of the fortunate winners of the baskets I was thrilled to be able to experiment with recipes to showcase these beautiful mushrooms. The basket contained a variety I had not used before, the Forest Nameko mushroom with its gelatinous cap and glorious walnut brown color. Half of the generous amount of Forest Namekos in the basket went into a comforting miso soup I made with homemade dashi (kombu and bonito flakes from Nijiya Market in Japantown), golden carrots and rose potatoes from the Ferry Building farmer's market, and country miso paste from Aedan Fermented Foods (available through Good Eggs, <https://www.goodeggs.com/aedan>).

The remainder of the glorious mushrooms were incorporated into a mushroom lasagna that a friend and I made for our weekly "friends who are family" dinner, and out of all of the various lasagnas I have made over the years, this one was by far my absolute favorite. We served it with a simple salad of romaine, halved seedless Thompson grapes, and a light vinaigrette of apple and balsamic vinegars, chased with glasses of chilled rosé. It was hard to wait for the lasagna to cool enough to slice!

The May dinner heralds the return of the beloved osso bucco, a Sicilian Dinner by Team Captains Toni Kiely and Kristin Jensen. Mark your calendars for Monday, May 2nd and be sure to register early for the final culinary dinner of the season.

GOURMET MUSHROOM LASAGNE (SHROOMASAGNA)

Ingredients:

- 1 pound wavy lasagna noodles
- 2 Tbl olive oil
- Ricotta filling
- Mushroom filling
- Mornay sauce
- 1 pound sliced mozzarella cheese
- 1 cup grated Parmesan cheese
- 1 cup grated Monterey jack cheese

Ricotta filling:

- 1 pound ricotta cheese
- 4 cloves garlic, minced
- 1/4 cup parsley, minced
- Salt and pepper

Mushroom filling:

4 cups of chopped mixed mushrooms (I used a mixture of Trumpet Royale, Velvet Pioppini, Forest Nameko, Alba Clamshell and Brown Clamshell mushrooms. The Trumpet Royales were diced, the stems of the other mushrooms were roughly chopped and the caps left whole.)

- 1 Tbl. olive oil
- 1 cup chopped yellow onion
- 4 cloves garlic, minced
- 1 cup dry white wine
- 1/4 tsp. grated nutmeg
- Salt and pepper

Mornay sauce:

- 4 Tbl. unsalted butter
- 1/4 cup flour
- 1 cup minced onion
- 2 cloves garlic, minced
- 1 cup chicken stock
- 1 cup dry white wine
- 2 cups whole milk
- 1 bay leaf
- 1 Tbl. Dijon mustard
- 3 shakes Tabasco sauce
- 2 cups grated Monterey jack cheese
- 1 cup grated Parmesan cheese
- Salt and pepper

Preheat oven to 350 F. Lightly oil a 9" x 13" casserole pan.

Prepare ricotta filling: Mix ricotta with garlic, parsley and season with salt and pepper to taste. The ricotta should be pleasantly flecked with light green.

Prepare mushroom filling: In a large skillet over medium high heat, add olive oil, onions and garlic and sauté for 5 minutes until the onions begin to soften. Add mushrooms and a sprinkle of salt and sauté until the mushrooms release their liquid, stirring frequently. Add the grated nutmeg and a few grinds of pepper, and continue to cook until the mushroom liquid is evaporated and the mushrooms are beginning to stick and brown, stirring frequently. Lower the heat to medium and continue to brown the mushrooms, stirring frequently, for about 5 minutes. Add the wine, stir well and allow to simmer until the wine is reduced but the mushroom mixture is not dry. Add salt and pepper to taste, and set aside to cool a little.

Prepare the Mornay sauce: In a deep saucepan, melt the butter over medium heat and add the onions and garlic and a teaspoon of salt, and sauté until the onions have softened, about 5 minutes. Sprinkle in the flour and stir for 2-3 minutes. Remove the pan from the heat and whisk in the chicken broth. When smooth, whisk in the wine and the milk and return the pan to the stove. Add the bay leaf, the mustard, nutmeg, the Tabasco, and a few grinds of pepper, stirring well. Bring the sauce to a simmer. Cook until thickened and beginning to simmer, about 5 minutes. Sprinkle in handfuls of the cheeses, stirring in between to incorporate thoroughly. When all of the cheese has been added and the sauce is once again smooth, taste for salt and pepper and set aside.

Prepare the lasagna noodles: In a large pot of boiling, salted water, cook the lasagna noodles according to the package directions, boiling for about 8 minutes. Drain and toss with olive oil carefully so that each noodle is coated so that they do not stick together.

Assemble the lasagna: Ladle in enough of the Mornay sauce to coat the bottom of the casserole. Place a layer of noodles over the sauce but do not overlap. Spoon in 1/3 of the mushroom mixture, spread evenly, then spoon on dollops of the ricotta mixture, spread evenly, then sprinkle with jack cheese. Add a ladleful or two of the Mornay sauce, then top with noodles, and continue to build the layers. For the top layer, place the last of the noodles and cover with the Mornay sauce, then the mozzarella cheese, and then the Parmesan cheese. Lightly spray or butter a piece of aluminum foil and cover the casserole, and place on a baking tray.

Bake the lasagna, covered, for 45 minutes, then remove the foil and bake until the top is deeply golden brown and the sauce is bubbling. Let rest 15-20 minutes before serving. Serves 6-8.

MENDOCINO WOODLANDS NEEDS YOUR HELP

by Curt Haney on behalf of the Mendocino Woodlands Camp Association

Members of the MSSF have been using the Mendocino Woodlands Camps for more than 30 years, at a very good rental rate, which has kept our costs of using the camp very reasonable. Now the Woodlands need help from all of the organizations which use the camp annually. Without help from us and others, they will be required to increase the rental fees for all of us.

What's wrong? During the economic downturn times were tough for everyone, including the Woodlands. Significant maintenance needs had to be deferred. They need help from their camper groups to make needed repairs and restorations now to ensure the Woodlands remains a destination for your enjoyment for generations to come. Immediate needs are as follows:

Camp #1 – The cabin balconies are rotting and must be replaced.

Camp #2 – The floors in the cabins in Camp 2 are also rotting.

Camp #3 – The tents and mosquito netting in all Camp 3 cabins need to be replaced.

As you can see, there is much to be done. At present, the majority of the Camp 1 balconies are closed to use until they can be repaired. The Camp 2 floors are being patched with plywood, but that will only last for so long; and the Camp 3 tents and mosquito netting are failing. The Woodlands staff is actively seeking grants and in-kind donations to help meet these needs. But they need our help as well. If they are unable to raise enough funds to meet their considerable needs, the Woodlands will have no choice but to raise camper fees.

This is more than a question of facilities, the preservation of the Woodlands historic buildings goes to the heart of the magic of the camp; we have only one chance to save them, if they are lost, they are lost for good.

All donations are tax deductible and you will receive a thank-you letter documenting your contribution. You will also be contacted and provided with material to become an annually renewed "Friends of the Woodlands member", should you wish to do so.

We hope your love of the Woodlands and appreciation of the wonder and magic of this special place will move you to lend us your support. Together we can ensure the Mendocino Woodlands Camp will be able to host us for generations to come.

Please click the link below to make a donation. If you prefer, you may send a check to: Mendocino Woodlands Camp Association, PO Box 267, Mendocino, CA 95460

NOTE: If you donate through the link below, the form allows you to put in the camp you usually attend (CAMP #1 – MSSF). You can also request that your donation go toward a specific cabin by number if you'd like.

<http://mendocinowoodlands.org/camp-group-fund-drive/>

Thank you! We appreciate your support and look forward to your visit this coming season!

Sincerely,
Cyrus Kroninger
Executive Director

DNA BARCODING OF MORELS IN THE RIM FIRE

by Alan Rockefeller

Morels are fruiting in the Rim Fire area off Evergreen Road – at least that is what the ranger at the Groveland station told me when I got my mushroom permit. I went there and made some scientific collections, making sure that each photo could be tied to dried specimens by labeling each morel collection with the photo number from the camera.

I found two species of black morels fruiting at the rim fire:

Morchella snyderi

<http://mushroomobserver.org/236446>

<http://mushroomobserver.org/236445>

<http://mushroomobserver.org/236444>

<http://mushroomobserver.org/236439>



Morchella brunnea

<http://mushroomobserver.org/236456>

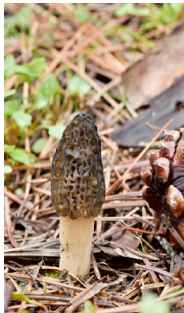
<http://mushroomobserver.org/236455>

<http://mushroomobserver.org/236448>

<http://mushroomobserver.org/236447>



Morchella snyderi is much larger, and has a very strong spermatic-musky-ralphanoid odor. *M. brunnea* is a smaller species which has almost no odor when young, and when old has a musky odor which is not very strong. 99% of the morels I found were under white fir, *Abies concolor*. One collection was found growing far from white fir, and was near incense cedar and Jeffrey pine. When sequenced, this one turned out to be *Morchella brunnea*.



← *Morchella brunnea*

In addition, *Morchella tridentina* is fruiting – but it appears to be a “natural” morel and fruiting was not accelerated by the fire.

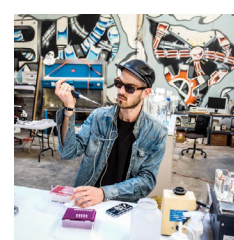
In 2014 I collected morels from the Rim Fire, and the ITS sequences indicated that they were *Morchella sextelata* and *M. eximia*. It appears that the burn morels which fruit the first year or two after a fire are different from the ones which fruit a couple years later.

The 2015 burn in Lake County produced an interesting specimen, collected on April 14 – ITS sequences place it maybe with *Morchella pragensis*, an *M. importuna* lookalike.

<http://mushroomobserver.org/237290>



For more information on how I do DNA barcoding, see https://counterculturelabs.org/wiki/DNA_sequencing.



BAY AREA APPLIED MYCOLOGY (BAAM) UPDATE

by Mino de Angelis

We at Bay Area Applied Mycology (BAAM) had an eventful year in 2015, finally acquiring 501 (3)(c) non-profit status. It's a step that will allow us access to larger public projects and we hope to keep offering fungal remediation as an alternative to potentially more toxic practices.

Our most current field project just concluded its first stage with the inoculation of eucalyptus stumps in the East Bay Regional Parks: Redwood and Tilden.

For those of you following the eucalyptus cutting controversy in the East Bay hills we can say, at least, that the EBRP system is open to experiment with alternative methods in the decomposition of the stumps and chips and hopefully we can wean them off the use of herbicide as a first course procedure. That's a very long term view and won't alter the first round of eucalyptus cutting, or fuel reduction, as they like to put it, but if we can chip away at 'better living through chemistry' to 'better living through mycology' mentality then we feel we can make a difference.

Eucalyptus, love or hate it, is quite a successful propagator. Not only can it regenerate from the cut stumps, but the downed logs and even chips have a substantially long decomposition period. What our recent trial is attempting to accomplish is to reduce that period by the introduction of decomposing fungi, most notably *Laetiporus gilbertsonii* (Sulphur Shelf) a cellulose decomposer and *Trametes versicolor* (Turkey Tail) a lignin one. These are fungi available in the greater area and we have been fortunate to have Far West Fungi clone specimens and propagate them onto wood chips to create an expedient inoculation medium. I've found that when working with entities like the Park System time is an important calculation in their choice of methods and rather than let 'nature' move at it's own pace they tend to choose practices that offer the quickest results. Our contribution to their choice is to make ready fungal decomposers that will shorten the time of the inoculation over purely natural means. In some cases this may be years earlier.

Our basic technique is for the stump cut ends to be prepared with cross-hatched grooves to anchor and serve as a conduit for the myceliated spawn. We are also experimenting with a dowel method to inoculate into the side surfaces of the stumps and into downed logs. After packing with mycelium we then cover the exposed surface with either burlap or a cut round from the same log. In the case of wood chips we hand spread after letting the chips cool for a period.



Our agreement with EBRP is to monitor the two trials over the next few years checking both for mycelial growth and the reduction of growth in the stump sprouts that will inevitably appear soon after cutting. Other stumps in the area left as controls will either be cut, but not inoculated, or will be treated with Garlon, the EBRP preferred herbicide. Hopefully, the mycelia will compare well and entities like our Park system will make it a permanent feature in their 'best practice' toolbox.

Currently we have no summer projects planned, but we are always interested in hearing new ideas and of possible collaborations. Keep in touch through our [Bay Area Applied Mycology Facebook page](#) or our new Pascal re-edited website: <http://bayareaappliedmycology.com/>. While there you can become a member and join our Group List for announcements.

We also have the BAAM mycolab which is a collaboration with [Counter Culture Lab](#) in Oakland. We have lab nights to work on cultures and Alan Rockefeller is frequently there DNA sequencing new finds. Come check it out.

[Continued on page 11](#)

Morel season is upon us. Here are some Haiku to celebrate. Translation by R.H. Blyth

Nigemo senu no wo awate kinoko-gari

Mushroom hunting;
They don't run away,
But everyone's in such a hurry! Senryu

Takegari ya kyo wa ki no ne ni korobu made

Mushroom gathering;
Today let's go on till we fall over
The roots of the trees. Kaso

Yume di nashi matsutake ouru yama no hara

It is no dream!
Morels are growing
On the belly of the mountain. Shigetaka

Ureshisa no yama wo tsukamu ya kinokogari

Taking hold with the hand
Of the happiness of the mountain,—
Mushroom gathering! Raisha

Takegari no heta ya hitodaki kusa no hana

Mushroom hunting;
Someone not good at it,
With an armful of wildflowers. Issa



Art by *Wakana Kawamura*

CULTIVATION CORNER

by Ken Litchfield

If you want to grow some huitlacoche, you must first grow some sweet corn, this parasitic fungus's host substrate. For this purpose you will need a warm sunny, wind protected patch of ground, preferably against a south facing wall, unless your area is really hot in the summer. If you plant in clumps or a wide patch, pollination is better than in one or two long rows that some gardeners inappropriately apply from observations of monocultured field grown corn cultivated with industrial machinery. You will want good pollination so that you at least get full sweet corn ears in case your huitlacoche infection isn't successful. Be sure to add even more organic matter like compost and manure to the soil than you would for just sweet corn. Sweet corn is a heavy feeder and this stimulates robust plant growth, which the parasitic phase of the fungus life cycle prefers; the saprobic stage that lives in the soil likes the extra humus and high nitrogen. Rabbit or chicken manure or even blood meal will up the nitrogen level but you should also increase the phosphorus and potassium levels with some bone meal and wood ashes to ensure robust tassling and earing of the corn.

After working the whole bed very deep with lots of compost, manure, meal and ashes, try this native American corn cultivation method. Add fish, Thanksgiving turkey, roadkill, or other animal carcasses to the bottom of the pit or trench about twelve to eighteen inches deep below the future clump or patch just before planting the seeds. Digging deep works the soil deep for easy root penetration and prevents carcass odors from reaching surface-dwelling digging mammals. Later in the season, by the time the roots penetrate to the carcasses, they will be decayed and releasing their nutrients just when the corn is able to feed most heavily. If you have access to the leftovers from children's petting zoo animals or the remains of raptor rejected rodent cadavers, they are readily devoured by summer sweet corn roots.

Once the soil is prepared you will want to plant the corn when the soil itself is warm. If you plant too early the cool soil will prevent robust germination and early growth. Twenty to thirty kernels can be planted three to five inches apart in each direction in a two to three foot diameter circle over an enriched pit. Or rows of corn kernels can be planted zigzag style over an enriched trench. The kernels should be placed on the soil surface to gauge the proper distribution, then poked into the ground with the straightened index finger to the finger's depth or a little less for the smaller kernel types. After all the kernels in an area are poked in so that you can see that the area is finished with a full coverage of holes, cover the soil a little and water the area lightly to melt and settle the soil and prevent birds and other animals from finding the seed.

All types of corn are susceptible to corn smut, but those bred for best sweet corn and popcorn seem to be the most susceptible, even their supposedly resistant hybrids. Try some giant corn which can be seven to twelve or more feet tall with three to four or more ears per plant. Also try some Chinese baby corn. Each plant forms clumps of three to six branches with multiple little ears per plant that can provide the base for multitudes of huitlacoche popcorn tumors or mature into a mini popcorn. Plantings of early sweet corn maturing in 60 to 70 days can be staggered over the spring and summer so you can have many stages of ripening corn all season. Long season varieties like Indian corn may not have enough time to ripen for more than one planting in some short season areas. This would be true for the giant purple Peruvian Indian corn with almost black kernels good for a purple drink. Corn varieties that have large kernels with fewer per ear like hominy corn are good at sending large quantities of nutrients to the huitlacoche that infects those fewer kernels. Different corn varieties give their huitlacoche parasites different flavors, with the supersweet sweet corn producing some of the best and most delicately flavored truffles.

Therefore, if it is just huitlacoche you want to grow then sweet corn is the type for you. Of course, there are numerous varieties of sweet corn to choose from, both heirloom and well known standard hybrid strains that would be best for your particular climate and soil type. The types of sweet corn generally available on the market can be divided into three categories of sugar genes of the thirteen identified. The su or "sugary gene" is your traditional sweet corn that is sweet if picked and eaten fresh off the stalk from the garden but otherwise begins to convert the sugars to starches almost immediately. These or "sugary enhancer" gene types are similar but produce much more sugar which stays sweet longer though it converts to starch at the same rate as the su types. These types also have a thinner pericarp and thus a more tender kernel. They come in two types: homozygous se that is high sugar in one hundred percent of the kernels and heterozygous se that is high sugar in twenty five percent of kernels. Lastly are the SH2 "supersweet" or Shrunken-2 types that are a new breed of sweetness. Everyone would probably plant these except that they are considerably more cold-sensitive so have to be planted later, and they have considerably less storage reserves so they can't be planted as deeply to make it to the surface during germination. In addition the seed is more fragile and so cracks more easily if handled roughly. All three categories of sweet corn are available in the colors of yellow, white, and bicolor mixed.

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It appears that the earliest maturing, white SH2 types are the best substrate to grow huitlacoche, or, in other words, they are the most susceptible to infection by corn smut.

You can start inoculating for corn truffles anytime after your corn is about one foot tall but especially when the young ears just begin silking and the temperature is between 79 degrees F and 94 degrees F, the best herptile weather for spore germination. The spores produced by the saprobic stage of the fungus that resides in the soil usually infects the corn plant through the silks where the pollen enters the ovule, making this a venereal disease of corn. However it can also infect any corn plant through the exposed sap at any injury anywhere on the plant so it is also a sap-borne disease. The huitlacoche truffles are produced at the infection entry point. One way is to mound up the soil around the base of the plants after injuring the stem where the soil will cover it. Parasitic smut spores from saprobic mycelium in the soil will invade at that injury point. This won't give you the largest, most delectable huitlacoche but it will tell you if you have viable spores in your soil. If you live in an area where there is a lot of corn smut in farmers' corn fields or gardener's corn plots you will probably get huitlacoche on your corn naturally anyway, but to increase the chances, get the past prime black spored smut from farmer's markets or farms in your area. Unless you have made the mistake of enlightening them about the wonders of maie truffles, most farmers would be delighted to let you clean their fields of all the young and old smutty ears you can haul away. At the market be sure to ask discreetly and they will often bring it out from under the table for you weirdos when no customers are around to be freaked out.

The fungus can exploit hail and insect damage so, to simulate this you can throw sand or pea gravel at the whole plants to produce multiple injuries, then mix spore ink into a watering can and pour the mixture over the whole plant to produce multitudes of weird tumors all over the plants. The fungus is not systemic; it only fruits at the infection location. If you wanted to get artistic you could nick or notch each leaf edge at regular intervals to make a popcorn border to the leaves. Any part of the plant with a sap exposing injury could become tumorous, but the best truffles are produced from the sweet corn kernels. This is done by inoculating the freshly emergent corn silks. The black smut from the corn ears is full of teliospores that can overwinter and sprout and grow in the soil saprobically. However the teliospores can be used to inoculate the silks also. They will germinate in a warm moist area like inside the husks of the ear and have enough juice in them to produce the saprobic phase that then produces the parasitic sporidia, and these sporidia can then germinate on the corn silks, all inside the husks.

To get the most efficient inoculation wait until most of the corn silk for the whole ear has emerged. Each kernel is a single ovary with its own silk style. The silks from the kernels at the bottom of the ear emerge first, followed by silks from consecutively higher kernels, all within the space of a few days. You can estimate how many silks should be emerged from the whole ear by the number of kernels that would fill that variety's ripe ear. When it appears that most of the silk has emerged, you can cut them all to the same length just beyond the end of the husks where they emerge, wait twenty-four hours for them to grow out another inch or so, and start inoculating. A paper sack over the end of the silking ear prevents pollen from germinating on exposed silks and thereby preventing the huitlacoche from infecting that kernel. Mix the black smut ink with some water to make a wet gooey paste and apply it to the end of the silks and ear. Cover it with a moist, not wet, paper towel and then a plastic bag and tape it all around to keep it the paste moist. You can also carefully inject a more watery solution into the side or end of the ear with a pig syringe used by plant pathologists when testing for plant resistance to corn smut. However, they culture the smut teliospores until they have sprouted and produced their parasitic sporidia on petri dishes in the laboratory and these they collect to make the inoculating mixture. This is a little more overhead than the average gardener's wherewithal, which is why the teliospores should work for gardener efficiency. However, you could try this yourself by making use of the Bay Area Applied Mycology lab at Counter Culture Labs at Omni Commons in Oakland. Even the supposedly more resistant commercial corn that rarely succumbs to huitlacoche can be inoculated with this technique suggesting that the resistance is not genetic but due to some other influence. Some claim that corn resistance to smut may be determined by how much the husks cover the silk end of the developing baby cobs, so if you split them open a bit you may get better inoculation even in "resistant" varieties.

A trick to widen the window of infectability is to remove the male tassels at the top of the plant before they can shed their pollen. This should be done on all the plants in the patch or the area to be truffled. If the silks are not pollinated they will stay viable and receptive for much longer and therefore vulnerable to truffle attack. Once pollination occurs there is a period of a couple days before the silks begins to degenerate and is no longer truffleable. If pollination does not occur the silks are viable for as much as two or more weeks and can be inoculated during a longer window of opportunity. Getting some huitlacoche truffles to use for inoculation may have to wait for the Saturday farmer's market or another time that doesn't necessarily coincide with your personal schedule or the corn silk's. Instead of or in addition to removing the tassels you can bag the ears with paper sacks before they start to silk to prevent pollination.

Here is a trick to get the very biggest, juiciest truffles, similar to growing giant pumpkins. Think of the corn plant as being a photosynthetic sugar factory with all its energy focused on feeding huitlacoche truffles instead of corn. Removing nonessential plant parts like the male pollen tassels when they are as young as possible diverts that energy to the rest of the plant. Carefully thinning the corn ears to just the first most robust ear on the stalk will put all the juice of the plant into that ear. Except for those wounds avoid any injury to the plant to avoid infection in less desirable locations than the ears that will drain the energy from the truffles in the ear. If it is a variety that has fewer kernels per ear then all the energy of the plant goes to fewer kernels. And if it is a variety that has the thin kernel skin of the young sweet corn stage even if it isn't actually a sweet corn breed, it provides a stronger sheath to contain the expanding gall for bigger galls as they expand like a balloon. However this last consideration is somewhat contradictory since the reason the sweet corn is so desirable is not just the sweetness but the tenderness from thin skinned kernels. Thicker skinned varieties are usually dent or other corn types wherein the sugars are stored as starch and wouldn't be as tasty when young and tender. Regardless, these are all refinements for the discerning corn breeder when likely huitlacoche size, flavor, and productivity has never been a mainstream corn breeding endeavor. But then if there is anyone who is discerning it is the fanatical mushroom cultivator.

Trying to isolate a special strain of huitlacoche is a little more involved. You could try to get the clonable mycelium in the young galls to infect corn silk since this is the parasitic phase of the mushroom and any characteristic such as flavor or size in the "parent" galls would be continued through the length of at least one season as new crops of later planted corn were reinoculated from this special clone. Blend the young galls and infected ears of the original parent and use this to inoculate newer ears. This would be the method for perpetuating a particularly desirable strain of huitlacoche as if growing a sterile culture of a wild mushroom to capture it for domestication. However this is only good for one season since corn is an annual and no one has yet divulged their proprietary methods of how to cultivate the parasitic phase of the fungus if they have succeeded. One might think that a strain of huitlacoche could be kept going on perennial teosinthe, the wild precursor of domesticated maize, but the persnickety huitlacoche truffle has the galling habit of galling a couple weeks after infection of the host. While this can make many flushes of truffles per season, it won't sit around in a stable mycelium for human domestication. However you could take a skillet and cookstove into an infested cornfield to do some taste tests on a portion of each of many truffle galls. Theoretically you could find a particularly desirable gall and blend up a portion to inoculate a patch of corn isolated from other genetic strains of huitlacoche. If you were successful this could be duplicated that season for several flushes on that or other isolated patches to make sure that the strain has been isolated. At the last flush of the season, you would let it go to spore and collect them to use the following season. The offspring of those spores would be somewhat inbred, increasing the likelihood of the same strain reappearing, at which point the skillet isolation technique is repeated. After a few repetitions you may have developed a strain of heirloom huitlacoche. Sounds as simple as cultivating mycorrhizal mushrooms, just more complicated.

Whatever black smut you have left over from inoculations should be returned to the soil in the corn patch. Also any infected corn plants, harvested detruffled cobs, or extra truckloads of finicky farmer finagled smut should be shredded or chopped up and added to the corn patch as mulch. The black corn smut teliospores are very resistant to freezing or desiccation and viable for five to seven years in the soil, but the higher the concentration the better it will be for reliable infection from the saprobic soil phase to the parasitic corn stage.

While it may seem that corn smut is enough of a pest in the corn belt that it must be easy to grow, I have a few words of advice from Glen Burns of Burns Farms in Florida. Until he sold the business to his brother eighteen years ago, he was the main supplier of fresh and frozen huitlacoche to the gourmet Mexican restaurants across the U.S. He was a few miles south of the panhandle, where he had to go to collect huitlacoche to inoculate his corn since it wouldn't grow wild naturally in central Florida. He was probably the person with the most experience in the US growing huitlacoche intentionally. He said he also grew shiitakes on logs and they were easier to grow than huitlacoche. While this may be a local situation, he was also growing professionally for the gourmet market so the standards are probably higher than what you might demand from your garden.

Some of the tricks and techniques described here come from conversations years ago with Jerald Pataky, a plant pathologist at the University of Illinois, who spent years trying to find methods of control for corn smut before converting over to using that same knowledge to proselytize for farmers to grow huitlacoche as a more valuable food crop than the corn commodity. You can google "Jerald Pataky" for many interesting research papers on "corn smut" and "huitlacoche" over the past twenty years or so.

MUSHROOM SIGHTINGS IN APRIL 2016



Hypholoma fasciculare - El Dorado NF, CA



Sarcosphaera coronaria - Stanislaus NF, CA



Calbovista subsculpta
El Dorado NF, CA



Aleuria aurantia - Stanislaus NF, CA



Floccularia albolaripes - El Dorado NF, CA



Boletus rex-veris
El Dorado NF, CA



Morchellas - El Dorado NF, CA

Send photos of your findings to mycenanews@mssf.org to be published in the next newsletter.

MSSF Calendar May 2016

Monday, May 2, 7:00 p.m. - Culinary Group Dinner

Theme: Sicilian Dinner - [details](#)
Hall of Flowers, County Fair Building
Golden Gate Pk., 9th & Lincoln, S.F.
Advance registration required at mssf.org.
Email culinary@mssf.org to volunteer.

Tuesday, May 17, 7:00pm - 10:00 pm - General Meeting

7pm - Mushroom Identification, mushroom appetizers...
8pm - General Meeting

Speakers: Eugenia Bone

Topic: *Mycophiles: Festivals, Forays, and the Company of Mushroom Hunters*

Hall of Flowers, County Fair Building
Golden Gate Pk., 9th & Lincoln, S.F.

Check the MSSF online calendar at:
<http://www.mssf.org/calendar/index.php>
for full details, latest updates
and schedule changes.

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Join the Council leadership, learn the inner workings of the MSSF and help make decisions that shape the future of the society. Do your part by contributing your time to this 100% volunteer organization!

To learn more about all council and committee positions, go to: www.mssf.org members-only area, file archives, council member position descriptions. Or email president@mssf.org.

HOSPITALITY

The Hospitality Committee gives a shout-out to guest chef Eric Multhaup for April appetizers, consisting of shitake bruschetta with black truffle topping. Ingredients for the shitake spread -- roasted shitake, shallots, thyme, tarragon, crimini. The black truffle topping is a prepared product sold as "black truffle sauce", produced by an Umbrian company and imported by a San Francisco company called Italian Harvest.



YOU TOO can be a guest chef for a hospitality hour. Just e-mail George at george_willis@sbc-global.net, or Eric at mullew@comcast.net. You will have an \$80 food budget from the MSSF, and Hospitality Committee members available for advice and support.



Mycena News

May 2016, vol. 67:9

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Please e-mail photos, comments, corrections, and correspondence to mycenanews@mssf.org

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Membership@MSSF.org

Past issues of *Mycena News* can be read online at www.mssf.org

Mycological Society of San Francisco
The Randall Museum - 199 Museum Way, SF, CA 94114

Submit to *Mycena News*! The submission deadline for the September 2016 issue is August 15th. Send all articles, calendar items and other information to: mycenanews@mssf.org

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