



Newsletter for Wild Mushrooms PNW ❖ www.wildmushroomspnw.com

Mushroom Leather



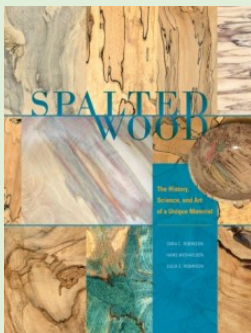
This material is easily shaped into a myriad of three-dimensional forms, including purses, watch straps, shoe insoles, and hats. It is similar to Myx which is a Danish-made textile made by fusing commercial mushroom production waste with hemp or linen to create a durable yet flexible matrix. This is great news for vegans. A lamp shade is grown into shape for 2-3 weeks where the mycelium grows together the plant fibers into a flexible and soft living textile. The mycelium stabilizes the construction by physically growing together the material behaving as a glue between the fibers. After 2 weeks you can even harvest the mushrooms that are produced. It can then be dried and used as lightweight material that is both organic, compostable and sustainable. (From *Vegan Enthusiasts*)

What Are Some Insects Doing With Fungi?

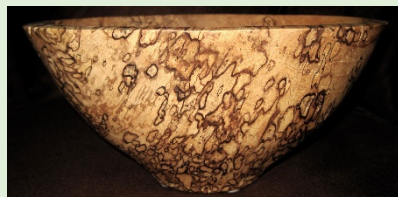
Leaf-cutting ants have been harvesting plant material, bringing it to their nest, chewing it up, and then growing fungi on this material, which is what they eat. Their growth plots are referred to as “fungus gardens.” Termites do similar things except that their fungi are not eaten directly, but used to break down woody plant material. Snails graze on fungi growing on the wounds that the snails themselves make on the leaves of marsh grass. It also turns out that bees are on the list of insects that farm fungi.

Before depositing the eggs, bees place within the eggs a mass of semi-liquid food that is regurgitated by the workers and which serves as food for the larvae hatched from the eggs. Investigators also found that the fungus resides in the bees’ intestines and is spread from one to another by mouth-to-mouth feeding. It is possible that the fungal material is not only food for the bees but also is used as an antibiotic to protect them from harmful organisms such as parasites. Investigators found that, the bees’ relationship to fungi is required. No fungi, then no bees. (Extracted from an article by Elio Schaechter in the *Mycophile*, January-February 2016)

Fungi Pigments and Spalted Wood



Dr. Sara Robinson from Oregon State University, where she teaches *Wood and Fiber Anatomy*, is an expert in spalted wood and has a new book on the subject. The process of wood spaling produces a stunning array of colors in wood. Her pioneering work bridges the gap between artists, scientists, designers, architects, and engineers who utilize wood. Spaling is any form of wood coloration caused by fungi. Usually found in dead trees, it can occur under stressed tree conditions or even in living trees. This unique coloration and patterns of spalted wood are sought after by woodworkers. Check out the internet and e-bay for many examples of spalted wood.



Mushroom Batteries in our Future?

In the future the Portobello mushroom might power everything from smartphones to our cars. The anodes in the lithium ion batteries that charge our devices are made of graphite, an expensive material that leaves toxic waste. Now researchers are discovering that Portobello mushrooms might do the job even better. They can store energy while still be porous enough to enable efficient energy transfer. The high potassium salt concentration in the mushroom skin actually improves its capacity over time. This could result in an increase in run time after many uses, rather than a decrease. The concept was detailed in *Nature Scientific Reports*. It is estimated that by the year 2020 there will need to be 900,000 tons of raw graphite for EV anodes alone. It seems that nature has again shown us untapped potential and it could replace this toxic alternative. (from an article by Maddie Stone at Gizmodo.com)

Can Plants Slow Climate Change Using Fungi?



Scientists have discovered why certain plants can take in extra carbon dioxide when levels rise and help to reduce global warming. Plants take in CO₂ for growth. This effect is also thought to work on a global scale with plants currently absorbing about 30% of human CO₂ emissions. This helps to remove some extra CO₂ from the atmosphere, slowing down the rate of climate change. It is not known how long plants can do this and testing has had mixed results.

Most land plants have contact with the mycelium of fungi attached to their roots, which provide the host plant with nutrients and water gleaned from the soil, and the fungi receive carbohydrates in return. The plants that associate with certain types of fungi can take advantage of higher CO₂ levels. The type of fungus a plant associates with is important because they affect how much nitrogen a plant can access from the soil. For plants nitrogen is an important nutrient that aids growth. (Reported by Hayley Dunning from the Imperial College, London, research team)



Porcini Ketchup or What To Do With All Those Dried Porcini Mushrooms?

Long before there was commercial ketchup there was mushroom ketchup. The main ingredients are mushrooms, spices, onions, and vinegar. The ancestor of modern ketchup was completely tomato-free. After all, tomatoes were not eaten for centuries since people considered them poisonous.

Ingredients:

3 ounces dried porcini mushrooms

½ tsp. garlic salt

3 cups hot water

¼ tsp. salt

¼ cup white wine vinegar

¼ tsp. Tandoori Marsala

1 cup chicken broth

¼ tsp. ground allspice

2 cups chopped yellow onion*

¼ tsp. powdered cloves

¼ cup cooking sherry

½ tsp. fermented chili paste

1 Tbsp. butter

Roux: 2 Tbsp. butter and 2 Tbsp. all-purpose flour

Combine porcini mushrooms and 3 cups boiling hot water in a bowl and let stand until rehydrated about ½ hour, then remove with a slotted spoon and squeeze out any extra liquid, but reserve the soaking liquid. Put rehydrated porcini mushrooms in a food processor, add 1 cup strained liquid and process to combine, then transfer to a large saucepan and put aside.

Combine onions, garlic salt, and salt in a frying pan and sauté until the onions begin to turn brown. Put in food processor with ¼ cup white wine vinegar and process. Add to saucepan with the porcini mushrooms. Add spices and sherry: allspice, chili paste, cloves, fermented chili paste, tandoori marsala, and the cooking sherry.

Bring mixture to a boil over medium high heat, then reduce heat to low and simmer uncovered, stirring often, about 1.5 hours. To thicken the sauce make a roux: 2 Tbsp. butter and 2 Tbsp. all-purpose flour. Melt butter in small sauce pan and then add the flour. Stir to mix and then add to the porcini sauce pan and mix thoroughly. Cool and then refrigerate. The sauce gets better as it ages. Serve as a condiment. Makes 3 cups sauce.

*I used Walla Walla sweet onions. If you can't find them use yellow onions.

Yotam Ottolenghi, a James Beard Award winning chef for International Cooking and the author of several cookbooks approaches mushrooms in surprising ways. He has Middle Eastern and Asian recipes that can be found online to spice up your mushrooms-culinary repertoire. You can look for his books at www.ottolenghi.co.uk. If you google Yotam Ottolenghi, mushroom recipes, you will find examples such as his mushroom and tarragon puff pastry recipe, Portobello mushrooms with pearly barley and preserved lemon, mushrooms and herb polenta, etc.

Intestinal Fungi May Aid Relief in Inflammatory Disease

Fungi that live in a healthy gut may be as important to good health as beneficial intestinal bacteria, according to new research conducted at Weill Cornell Medicine. Fungi, as well as viruses, may play a part in how the body handles inflammation. There is now evidence that a healthy intestinal fungal community definitely plays a role in immune response, both inside and outside the gut. It also appears that fungal and bacterial communities in the gut are co-dependent and that disruption of one community affects the other. So anti-fungal drug overuse may have an undesirable effect and promote inflammation. (from the Cornell Chronicle by Geri Clark)

Taylor Lockwood Has a Video on

If you are not familiar with Taylor's you are in for a treat. His latest called worldwide hunt for mushrooms that journey to Brazil, Madagascar, China, Taylor has carved his own niche in the



Bioluminescent Mushrooms

many videos about mushrooms then *Spirits of the Forest* takes you on a wild glow in the dark. The video covers his the USA, New Zealand, and Australia. field of mycology. See taylorlockwood.com.

Did Hijacked Cell Division Help Fuel the Rise of Fungi?

It may be more than 90,000 species of mushrooms, molds, and yeasts and other fungi that owe their abilities to grow, spread, and even cause disease to an opportunistic virus they caught more than a billion years ago. In the May 10th issue of *eLife*, researches from Duke University and Stanford U. suggest that a viral protein may have invaded the genomes of early fungi and hijacked their cell division control machinery, duping them into making more viruses as the fungal cells grew and divided. The viral protein was eventually adopted by its host and incorporated into the fungal genome, generating a family of proteins that are now critical to producing spores, invading host tissues, and other fungal characteristics.



The virus likely commandeered its host's cell cycle controls for its own benefit, but fungi may have found the protein useful and adopted it through a process known as horizontal gene transfer. Could this new knowledge lead to ways to prevent fungal infections from killing many people each year? Fungal pathogens aren't limited to people. Rotting and plant disease in crops, some bats, and colony collapse disorder in bees are all caused by fungi. If the researchers can understand how the cell cycle control machinery of fungi was co-opted without wreaking havoc on the life of the cell, then the future may have more ways of treating fungal disease. (from an article by Robin A. Smith)



Mushroom of the Month - *Cantharellus roseocanus* - Rainbow Chanterelle

Dust off your mushroom baskets because the Rainbow Chanterelle has already been popping up at the Oregon coast. The cap's surface lacks scales even when young with an orange-yellow spore deposit. The gills are more brightly colored than other chanterelles and its odor is more fragrant and sweet or fruity This good edible is usually found growing solitary or in small groups or clusters, in second growth with Sitka spruce and shore pine along the coast and Engelmann spruce in the mountains, but not found in pure forest stands of either Douglas fir or hemlock.

Does That Fungus Have a Name? - There are between 1.5 million and 5 million species of fungi on earth, and only 100,000 of them have been named according to the rules in the International Code of Botanical Nomenclature. Of those, barely a fifth have gene sequences in GenBank, the world's main storehouse of genomic data. Only a couple of hundred have been sequenced completely, mostly yeasts with commercial value. Mycology is not considered a glamour field. If you discovered a new deer, you'd be on the cover of the popular journal *Nature*, but if you find a new fungus, you would be lucky to find yourself in the middle pages of *Mycotaxon*, the international journal of fungal taxonomy and nomenclature, read primarily by mycologists.

News Flash

Crater Lake Rangers Seize Over 234 Lbs. of Illegally Picked Morel Mushrooms



Over the 4th of July holiday rangers at Crater Lake National Park seized all of these morel mushrooms that are potentially worth around \$8000. They were illegally harvested from burned woods at Oregon's only national park. Fourteen people were cited. Most of the morel pickers had permits allowing them to harvest the mushrooms in national forests, but that doesn't apply to the National Park Service area.

The law enforcement officers issued the pickers citations carrying \$100 fines. They could contest the citations and go to court where a judge could increase the punishment to up to \$5000 and up to six months in jail. This is a reminder that mushroom harvesting is not permitted anywhere in Crater Lake National Park.

Rangers are keeping the seized mushrooms as evidence and will eventually destroy them. This large fruiting of burn morels was because last summer the largest fire in the recorded history of the park, the National Creek Complex, charred over 20,000 acres in Crater Lake National Park and the neighboring Rogue River-Siskiyou National Forest.

Be sure you know the rules for picking wild mushrooms, and where you need a permit, or this could happen to you. (from an article in the *Register-Guard* by Dylan Darling)