

SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 515 October 2015



THE PSMS 52ND ANNUAL WILD MUSHROOM SHOW, OCTOBER 10–11, 2015, AT BELLEVUE COLLEGE NEEDS YOU! Milton Tam

Our 52nd Annual Wild Mushroom Show will be on Saturday and Sunday, October 10–11, at Bellevue College in the main cafeteria area. There will be ample free parking and easy access from I-90. While our annual show is a fundraiser, it is also an educational event that introduces the public to the incredible diversity of mushrooms and other fungi found in this region. We will have mushrooms on display in all shapes, sizes, and colors; an identification table (so be sure to bring the mushrooms you find); lectures and talks; edible mushrooms to sample; a photography exhibit; other exhibits; commercial vendors; arts and crafts; and even a cultivation table to assemble a mushroom growing kit. You are also invited to a members-only reception after the close of the show on Saturday, October 10, from 7–9 pm.

We need you! For the show to be a success, we will need lots of volunteers. Please get involved, sign up for a job, meet your

fellow PSMS members, and make new friends. There is a special delight in volunteering! You can sign up for various tasks at our **October 6** membership meeting (note the date change) or at any time on our PSMS website (www.psms.org).

We also need everyone to get out into the woods and bring back prime specimens of as many species as you can. Don't forget to look in lawns, gardens, and urban landscaping, too. Last year we could have used more mushrooms, and with the dry summer this year and late rains, we can't yet predict where or if they will be fruiting. So we may need more folks to collect farther afield. If you plan to go collecting, are willing to drive, and need gas money, be sure to contact me (miltontam@aol.com). Your mushrooms are perishable, so please collect them on the Thursday and Friday before the show, and don't forget to bring back some moss and duff from the forest floor, too! We will need them for the displays.

Collected mushrooms can be dropped off after 5 pm on Friday, October 9, at Bellevue College by the cafeteria. Look for the PSMS signs.

COLLECTING FOR THE SHOW Marian Maxwell

We again ask that everyone help by bringing in for display any mushrooms they find. Collect the entire mushroom, even structures that may be under the ground. Protect the mushrooms in wax paper or foil. If they are geotropic (like *Amanitas*, which orient their gills toward the ground) or elongated (*Lepiotas*, etc.), you can stand them up gently in empty milk cartons. Most mushrooms will need to be gathered within a couple of days of the show since we want them to be prime specimens. Don't assume that we will have one that you think is common (like the fairy ring mushroom, *Marasmius oreades*)—sometimes those are the ones we don't get since everyone thinks everyone else is bringing them! The inky cap families are delicate so should be gathered on Friday or on Saturday morning. Smaller mushrooms can be misted to keep them fresh and colorful (but don't soak them). Keep your mushroom collections and species separate. Recycled yogurt containers are a great way to keep the smaller mushroom collections separate. It helps to include a leaf or two of the tree under which you find the mushrooms, or grass snippets for the grass-inhabiting varieties, with the individual collection. Show receiving is Friday night at the tent outside the Bellevue College cafeteria building after 5 pm (look for the signs). The mushroom sorting and categorizing for the show are done by people who previously signed up for the committee and are approved.

We ask that you do not bring small children or pets to the sorting Friday night or to the arranging Saturday (7 am to noon). If you have any questions, please contact me at pastpsmspres@yahoo.com (phone 425.235.8557).

2015 PSMS 52nd Annual
Wild Mushroom Show
Saturday, Oct 10th
Noon - 7PM
Sunday, Oct 11th
10AM - 5PM
Bellevue College
Cafeteria
3000 Landerholm Circle SE
Bellevue, WA
FREE PARKING
Easy Access from I-90
Admission—\$10
Students—\$5
12 and Under—FREE
Presented by the
Puget Sound Mycological Society
Visit psms.org Join us!

Spore Prints

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MEMBERSHIP MEETING

Tuesday, October 6, 2015, at 7:30 pm at the Center for Urban Horticulture, 3501 NE 41st Street, Seattle

Our speaker for the evening will be Britt Bunyard, founder, publisher, and Editor-in-Chief of the mycology journal *Fungi*, which has the largest circulation of any mycological publication in North America. The title of his talk is "Diptera Strangelove: Or How the Fly Learned to Stop Worrying about Amatoxins and Love the Death Cap."



Britt Bunyard

Britt knows whereof he speaks. The main focus of his research has centered on the co-evolution of macrofungi and *Diptera*, the true flies, and he has served as a Subject Editor for the Entomological Society of America's journal *Annals of the Entomological Society of America*.

But that merely scratches the surface of this talented mycologist. In addition to his work on *FUNGI*, he has served as Editor-in-Chief of NAMA's journal *McIlvainea* and its newsletter *The Mycophile*. He has coauthored *Mushrooms and Macrofungi of Ohio and Midwestern States: A Resource Handbook* and other books, published scientific papers in 16 different international research journals, one patent, and articles in popular science magazines. He has been featured on NPR's *All Things Considered*, has been a reviewer of several published mushroom guide books, and has consulted for *National Geographic Magazine* and, most recently, for an episode of PBS's *NOVA* television program.

Come prepared to be entertained and enlightened on a fascinating mycological subject few of us know much about.

Would members whose last names begin with the letters A-K please bring an edible treat for sharing after the meeting.

CALENDAR

- Oct. 6 Membership Meeting, 7:30 pm, CUH
(one week early because of early exhibit date)
- Oct. 9 PSMS exhibit setup, Bellevue College cafeteria
- Oct. 10-11 PSMS Annual Wild Mushroom Exhibit, Bellevue College cafeteria
- Oct. 17 Field Trip (see PSMS website)
- Oct. 19 Board meeting, 7:30 pm, CUH
- Oct. 20 *Spore Prints* deadline
- Oct. 24 Field Trip (see PSMS website)
- Oct. 31 Field Trip (see PSMS website)

BOARD NEWS

Luise Asif

Reminder: The **October membership meeting will be one week early**, the *first* Tuesday, October 6, so the final details for the show can be addressed. Most of the meeting was taken up with preparing for the show. Thank you to those **show volunteers** who have already signed up. The show needs your help; signup is on the PSMS website. PSMS now has the appropriate information to apply as a provider for **CE Credits** possibly by 2016. With Erin and Brady taking the lead, the board is developing a **PSMS BLOG** to complement *Spore Prints*, Facebook, and the PSMS website.

PRESIDENT'S MESSAGE

Kim Traverse

It's SHOWTIME! Let's make it the best ever. Sign up to volunteer and volunteer to put signs up! The mushrooms are starting to show up, too. I was on in the Olympics recently with The Seattle Lichen Guild and along with the lichens we were collecting, I saw a couple dozen species of mushrooms. More than I had seen in a long, long time.

PHOTO EXHIBITION AT THE WILD MUSHROOM SHOW

Paul Hill

Many people take beautiful photographs of mushrooms in the wild. This year we are inviting people with pictures they would like to exhibit during the show to submit them for a photograph exhibition. We'll be having awards voted on by show attendees. Get your favorite photos matted and to PSMS before the show! The official rules will be posted on the PSMS website, along with a downloadable form to submit entries. Entries may be submitted in person or mailed to the address listed on the form.



NEW MUSHROOM SPECIES LOOKS LIKE PEOPLE

Carrie-Ann Taylor

Mycology, Humboldt Bay Myco. Soc., Sept. 2015

You would think you're not mistaken that you are looking at a group of tiny dolls. But these weird, human-shaped things are actually a newly discovered species of mushroom. With fleshy heads, arms, and legs, they look like pretty fun guys (sorry, we had to). Discovered by Jonathan Revett in Cockley Cley, Norfolk, they have been given the name *Geastrum britannicum*—which reflects the fact they are unique to the UK. Jonathan, 49, said: "They do look like little mushroom men.



"It's really strange how their shape makes them look like they have a head and arms. That's what drew my attention to them."

Jonathan first spotted the weird mushrooms in 2000, but experts at Kew Gardens dismissed them as a sub-species of earthstar fungi, which are common in Norfolk. However, 15 years later, mycologists in Spain carried out a DNA sequence analysis and have just confirmed they differ slightly. Jonathan—who runs the mycology website *fentungi.com*—said: "It felt brilliant knowing I'd found something new. I wouldn't normally question the experts but I just knew these were different. I go back to the site every year doing tours and they're always there. It's incredible to think I'd only gone out there to look at some big mushrooms I'd been tipped off about."

Since Jonathan's original find, three more specimens have been collected in Norfolk and the fungus has also been found in Hampshire and the Welsh Borders. Carl Chapman, of Norfolk-based Wildlife Tours and Education, said: "This is riveting stuff. This is not just a new species for Norfolk—this is a new species for the world."

RESEARCHING THE FAR-REACHING TRAVELS OF FUNGI

Northern Arizona University, Sept. 4, 2015

An NAU professor is joining international researchers to discover how fungi are traveling around the world, a mystery uncovered in a new study released this week in the journal *Science*.

Nancy Johnson, an NAU ecology professor, contributed field samples to a global-scale study of the biogeography of Arbuscular mycorrhizal fungi, also known as AM fungi. Johnson is listed as an international co-author on the paper.

Arbuscular mycorrhizal fungi support 80 percent of plant species, including crops, by capturing nutrients from soil. Johnson said understanding how different species of AM fungi are distributed around the globe is important because of the vital roles they play in the ecosystem.

Researchers gathered 1,014 fungi samples from six continents, and what they discovered was surprising.

"Our study suggests that most species of arbuscular mycorrhizal fungi are found all over the world, which is rather unusual among organisms," Johnson said. "The question is, how do they get everywhere?"

While the disbursement of AM fungi was surprising to many researchers, Johnson said she discovered indicators of this back in 1988 as a graduate student. She said she was shocked to see the strong similarities between the communities of fungi in Costa Rica compared with Minnesota. "Back then we used microscopy to identify the fungi from their spores and now, newer molecular methods are showing the same patterns."

For the recently published paper, Johnson, who teaches in the School of Earth Sciences and Environmental Sustainability, provided samples from the Serengeti in Africa. These samples contained the most diverse fungal communities in the entire study.

Northern Arizona University has a strong international reputation for mycorrhizal research. In August, Johnson and biology professor Catherine Gehring hosted the eighth International Conference on Mycorrhizas, which brought 500 scientists from 52 countries to Flagstaff. Johnson is working with conference presenters on a book detailing some of the latest international research on AM fungi.

COLORADO ASPEN AND COTTONWOOD LEAF DISEASES COULD AFFECT FALL COLORS

North Forty News, Wellington Weekly, Sept. 8, 2015

Some stands of aspen and cottonwood trees across northern Colorado and along the Front Range won't be their most picturesque this fall, due to leaf spot diseases that benefited from an unusually wet spring and early summer. For about the past month, foresters have been seeing an unusually high degree of leaf blight in the mountains and along the Front Range as far south as Aspen, the Collegiate Peaks, and Colorado Springs.



Jonathan Gonzalez, KUSA

This leaf fungus...

At least two fungal diseases are to blame for the leaves now showing significant spotting or dark splotches. Marssonina leaf spot is caused by the *Marssonina* fungus and is the most common leaf disease of aspen and cottonwoods in Colorado. The disease can be identified by the presence of dark brown spots or flecks on leaves, which can then fuse into large, black splotches on severely infected leaves. Also active now, mainly on Colorado's cottonwoods, the *Septoria* fungus initially causes tan spots that become irregular brown-to-black spots coalescing to cover much of the leaf by late summer.

"The good news is that these diseases rarely cause any permanent tree damage or death," said Dan West, entomologist for the Colorado State Forest Service.



"But this is the highest level our foresters have seen in many years for some parts of the state."

...could spoil this.

MUSHROOM STAMPS FROM NAMIBIA

Brian S. Luther

Namibia got its independence from South Africa in 1991 and is a vibrant multi-racial and stable English-speaking democracy. It's located in SW Africa on the Atlantic Ocean with Angola to the north, Zambia, Zimbabwe, and Botswana to the east, and South Africa to the south. Namibia is one of the least likely countries on earth where you would expect to see many mushrooms, being as arid as it is. It gets its name from the Namib Desert, one of the driest places on earth. Yet, the country has issued a couple of interesting stamps showing fungi, which I discuss below.

All catalog numbers are from the Scott Postage Stamp Catalogues. FDC=a first day cover, an envelope (cover) showing the set of stamps cancelled on the first day of issue, often with a colorful cachet or envelope illustration of the same theme.

Scott 940. Issued 6/19/1999. Value N\$5.50 (Namibian dollar)

The fungus shown is *Termitomyces schimperi*, one of many species in the genus found on termite mounds in Africa (Heim, 1942). The stamp itself has only a single mushroom, but the souvenir sheet (s/s) shows a habitat view with eight basidiocarps on a large conical termite mound. If you only collected the stamp by itself, then you can see how you would miss out on much of the mycological illustration.



Namibia Scott 940 & s/s.

The common name Ejova (singular) is shown on the stamp (which only has one mushroom on it), but the s/s showing many mushrooms is labeled with the plural common name of Omajova. The Scott Catalogue assigns a single catalog number for both the stamp itself and the stamp on the s/s. According to Morris (2008) *T. schimperi* has been recorded from Ethiopia, Tanzania, and Zambia. It fruits during the rainy season from February through March and is highly regarded and widely used for food by native people in Namibia and elsewhere in Africa according to Van der Westhuizen & Eicker (1994). These authors also note that the cracked scales on the cap of *T. schimperi* look like "sun-dried mud." I've discussed stamps and postal items showing the genus *Termitomyces* in two earlier articles (Luther, 2012 & 2014).



PhilexFrance cover with Namibia Scott 940.

cancel date, reflecting the dates of the stamp show. The cachet on the left is a photograph that's very similar in appearance to what the artist created for the illustration on the stamp s/s. An enclosed flier prepared by Marion Leeser gives some fascinating additional information, with one example here: besides being a popular edible

Also shown is an envelope that was issued to commemorate a large French philatelic show (Filexfrance 99) showing this s/s. It's just like an FDC for this set, but with a later

mushroom with humans, it's eaten by native wildlife, including "kudus, warhogs, duikers, porcupines, and baboons."

The Central African Republic and Zambia have issued mushroom stamps that show small portions of termite mounds where the mushrooms are growing from, but not the entire mound. Whole termite mounds as shown here on this s/s are rare to see on stamps, but the country of Gabon issued a four value set of stamps devoted to different shaped termite mounds (Scott 721–4, 1991). Coincidentally, one of these stamps (Scott 723) actually shows a termite mound from Gabon that's in the shape of a mushroom. This stamp is shown in the mycophilatelic catalog by Gimeno (1999–2000), as well as in this article.

Scott 1168. Issued 10/1/2008. Value N\$18.20

Two *Podaxis pistillaris* mushrooms are illustrated, along with a Scarab beetle and desert plants. This is a semi-desert or desert loving species that is widespread in Africa. *Podaxis longii* is a related species found in both North and South America in semi-desert conditions,



Namibia Scott 1168.

and there are other species. The common name given on the stamp is False 'Ink Cap.' Although it doesn't look like an Inky Cap (*Coprinopsis atramentarius*) as we know them, it does resemble a Shaggy Mane (*Coprinus comatus*) and in North America the common name for *P. longii* is the Desert Shaggy Mane. In England and Europe they often refer to what we call the Shaggy Mane as the Ink Cap. Because common names are often regional, like this, it's best to always use scientific names to avoid confusion. This stamp shows no denomination, but is marked Registered Mail. According to the Scott Catalogue it has a fairly high value of N\$18.20. This stamp is part of a four stamp set (Scott 1165–68) depicting the biodiversity of Namibia. *Podaxis pistillaris* is also shown on a 2007 stamp from Lesotho, which is located entirely within the country of South Africa.

The genus *Podaxis* is in the family Agaricaceae, related to the genus *Agaricus* and *Coprinus comatus*. DNA studies have shown that *Coprinus comatus* is unrelated to the coprinoid fungi (family Psathyrellaceae), but has co-evolved the peculiar spore-dispersal mechanism of deliquescence (Redhead et al., 2001). It's confusing, because the genus *Coprinus*, owing to widespread and common usage, has been retained for the Shaggy Mane group of fungi. Thus several other genera must now be used for the true coprinoid fungi. In reference to the stamp showing *Termitomyces schimperi* (Scott 940) mentioned at the beginning of this article, it's also a coincidence that some other species of *Podaxis* are found associated only with termite mounds.

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Gabon Scott 723, showing a mushroom-shaped termite mound.



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IT'S OFFICIAL: DENMARK HAS A NEW MUSHROOM

Philip Tees

<http://cphpost.dk/>, Sept. 14, 2015

The discovery of a new species of mushroom in Denmark has been announced in the scientific journal *Mycological Progress*. It can grow to a height of up to 10 cm, which makes the find unusual because most new species discovered aren't as visible.

The new fungus, which was found on the forest floor of Mariesskovlunden near Kolding in southern Jutland, has been given the name *Cortinarius koldingensis*.

The samples of the mushroom were first found ten years ago, but researchers had to wait until 2013 for enough data to be able to officially prove that it is a new species.

Tobias Guldberg Frøslev, a researcher at the natural history museum at Copenhagen University, was the lead author of the reported findings. He explained that the species is thought to be quite uncommon.

“*Cortinarius koldingensis* is a large, green-yellow cap mushroom that belongs to the [family Cortinariaceae],” he said.



Tobias Guldberg Frøslev

Cortinarius koldingensis

“*Cortinarius* is one of the first [genera] of mushrooms [to be] studied in detail with DNA analysis, but despite the extensive analysis of [the genera], *Cortinarius koldingensis* is to date exclusively known from Marielundskoven near Kolding. So we assume that the species is very rare in Europe.”

“CLEVER ADAPTION” ALLOWS YEAST INFECTION TO EVADE IMMUNE SYSTEM ATTACK

<http://www.jhsph.edu/>, Sept. 7, 2015

Johns Hopkins Bloomberg School of Public Health researchers say they have discovered a new way that the most prevalent disease-causing fungus can thwart immune system attacks.

The findings, published September 7 in the *Proceedings of the National Academy of Sciences*, offer new clues about how *Candida albicans*, the fungus responsible for vaginal yeast infections and the mouth infection thrush, is able to cause a deadly infection once it enters the bloodstream.

When the body is faced with an infection, cells give a burst of free radicals to kill the germs. *Candida albicans* and other fungi use copper to fuel an enzyme designed to neutralize the free radical attack. But once the body senses the presence of the fungal infection, it flushes copper into the bloodstream to fight, leaving copper-starved fungus in the tissues in places like the kidney.

But instead of being thwarted by a lack of copper to feed its defense, the Johns Hopkins team has discovered that *C. albicans* has uniquely evolved to switch from using copper to counter the free radicals to using the metal manganese.

“What we have found here is a very clever adaptation to changes in copper during infection,” says study leader Valeria C. Culotta, PhD, a professor in the Department of Biochemistry and Molecular Biology at the Bloomberg School. “The more we learn about this pathogen’s ability to survive inside a human, the more points of vulnerability we may identify.”

Candida albicans only has the potential to become lethal to humans once it enters the bloodstream, where it can then affect the liver, spleen, and kidneys. People with compromised immune systems such as premature babies, chemotherapy patients, and those with HIV are particularly vulnerable to this and can die of the kidney failure it causes.

Using a mouse model for *C. albicans*, Culotta and her team sought to understand why the pathogen switches between copper and manganese to fight free radicals. They discovered a surprising role for copper in immunity—levels of copper in the bloodstream go through the roof during infection in an attempt to kill the pathogen with copper poisoning. Organs such as the kidneys send their copper into the bloodstream, causing their levels to drop.

The story would likely end there, if not for the switch the fungus makes in how it protects itself, one of the Johns Hopkins team’s new discoveries. In an unexpected twist, the enzyme *C. albicans* uses to counter the free radicals changes from one that requires copper to one that requires manganese. The fungus can then use manganese to neutralize the attack.

“The fungus laughs in the face of this loss in copper by simply switching metals,” Culotta says. “Somehow this fungus has evolved to adapt to this immune system attack. This allows *C. albicans* to survive when other organisms might be thwarted.”

Copper and manganese are both found in relatively small quantities in the human body. Copper mainly comes from the consumption of crustaceans such as lobster and crab and from vegetables grown in copper-containing soil. Manganese is found in whole grains, nuts, leafy vegetables, and teas.

Copper is known to fight off the spread of bacteria. In the United Kingdom, for example, many hospitals have switched out steel doorknobs for copper ones. The pathogens can’t live on the surface of the copper knobs, dramatically reducing the spread of infections.

Current antifungal medications work on the surface of the cell to destroy the fungus. But there is a growing problem of human

cont. on page 6

Yeast Infection, cont. from page 5

resistance to antifungal medications, similar to the well-known issue of antibiotic resistance. Just as has happened with some antibiotics, some fungi have evolved with the overuse of current antifungal medications and may no longer respond to the drugs designed to cure them.

Culotta says there may be some way to design drugs in the future to disrupt the process whereby *C. albicans* switches from using a copper-based enzyme to a manganese-based one.

WHAT IS THE MOST COMMON FUNGUS ON STATEN ISLAND?

Clay Wollney

Staten Island Advance, Sept. 8, 2015

STATEN ISLAND, NY - Though I don't know of any official counts, my bet as the most common fungus on Staten Island would be on the turkey tail fungus (*Trametes versicolor*). As it decays, almost every dead broad-leaf tree will provide a place for turkey tail fungus to grow, so this fungus is commonly observed on a decomposing log. But its usefulness isn't limited to helping break down dead trees. Turkey tail fungus has been studied for its medicinal value, with some positive preliminary results.



Trametes versicolor, the turkey tail fungus.

Both its common and scientific names describe its shape and color pattern. The common name is an obvious reference to the tail feathers of everyone's favorite Thanksgiving bird, which it does indeed resemble.

Its scientific name, *Trametes versicolor*, is also based on its growth. Turkey tail fungus belongs to the genus *Trametes*. Trama is a Greek word that refers to an interwoven cluster of fibers, denoting the arrangement of fungal cells at the base of the cap where this bracket-type fungus grows out from the tree. The epithet *versicolor* means multicolored, in reference to the concentric bands of tan, cinnamon, brown, and even purple that make this fungus so noticeable.

Whether it takes the form of a mushroom, toadstool, bracket, or cup, the part of any fungus that we see above ground is a reproductive organ produced solely to spread spores that will grow into new fungi.

The real body of a fungus consists of long, thin thread-like strands known as hyphae. These threads release digestive fluids into the dead wood around them. The digestive fluids break down the tree

into simple nutrients that the fungi can absorb as they need. The remaining material is often useful for plants to grow in. Hyphae can be observed growing under the bark of a rotting log.

An important feature of the turkey tail fungus is the small pores on the underside of its brackets. The pores can be used to distinguish the turkey tail fungus from two similar species it may be confused with. The false turkey tail fungus is a member of the parchment fungus family, and the brackets are smooth on its underside, with no pores. The other turkey tail doppelganger is the gilled polypore, which has gills instead of pores on its underside.

While the turkey tail fungus is common on Staten Island, it is by no means limited to our fair isle. This species of fungi is found throughout the northern hemisphere from Europe to Asia and throughout North America. In Japan it is known as Karawatake, while the Chinese call it Yung zhi.

Although the turkey tail fungus is edible, you won't find it in stores or restaurants. Those who have tried it describe its rubbery texture as being somewhat like fungus-flavored chewing gum.

Despite its lack of culinary allure, the turkey tail fungus does have some redeeming medical properties. In China and Japan, tea brewed from the turkey tail fungus has been used for thousands of years in folk medicine to improve the functioning of the immune system. More modern medical studies have shown that extracts from this fungus have been useful in fighting certain cancers.

The main chemical found in the turkey tail fungus that has medicinal value is a polysaccharide known as PSK. According to a website from the Memorial Sloan-Kettering Cancer Center, PSK has been shown to benefit patients after the surgical removal of stomach and colorectal cancers, but did not have the same effect on leukemia or liver cancer.

In 2013, Bastyr University and the University of Washington began a study of the application of turkey tail fungus extract to patients with advanced prostate cancer. It is hoped that, when taken along with conventional chemotherapy, the fungus extract will boost the immune system to keep it functioning normally.

PSK works by inhibiting the expression of genes associated with the development of cancer, suppressing the growth of tumor cells, and stimulating the immune system to increase its production of immune cells that attack foreign cells in the body.

In Japan, PSK has been an approved cancer drug since 1977, sold under the name Krestin. Today it accounts for a major portion of the Japanese expenditure for cancer-related drugs.

YOUR NEXT CAR COULD BE MADE OF FUNGUS

Ryan McElroy

<https://www.carkeys.co.uk/>, Sept. 14, 2015

Outside of pollution, overpopulation, and climate change, dependence on plastics is one of the biggest environmental issues the world is currently facing.

Plastic, as any primary schooler will tell you, doesn't degrade, and as a result it's filling our landfills and oceans faster than we can possibly get rid of it. However, scientists and designers have come up with a viable replacement that could make its way into your car soon: fungus.

Professor Han Wösten from Utrecht University in the Netherlands has been working on harnessing the abilities of fungi's filament-style growth. Able to grow within various waste materials, it can simultaneously decompose and reinforce them; when grown within wood pulp, the result turns out something a little like cork.

In Zaandam, designers have already used this method to build furniture by encouraging the fungus to grow within potato starch. Once it's fully grown, the fungus is then baked in a drying oven, with the result strong enough to support the weight of a fully grown person.

Even more amazing still, fungus can also be grown to emulate different types of plastic, with elastic, rubbery versions or hard materials both able to be produced from the same type of fungi.

Taking up less resources and energy to produce than oil-based plastics, it's also biodegradable despite being strong and resilient enough to be used like regular plastic. As a result, dashboards, components, and even body panels for cars could soon be grown rather than milled at a steel plant.

Several automakers, including Ford and Mazda, have already started exploring the possibilities of using organic materials to manufacture parts and components for use in automotive applications.

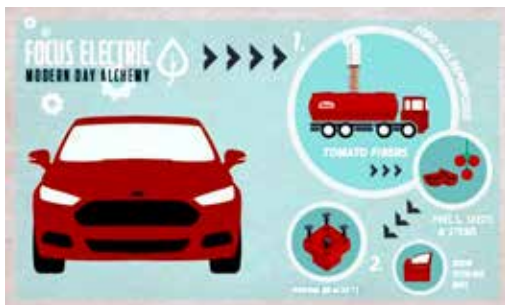
Last year, Mazda announced the development of a new bio-based plastic, which the manufacturer says will be used for exterior parts in the future. Engineered from materials derived from plants, Mazda says that the new bioplastic will decrease the environmental impact of manufacturing while also reducing oil use and CO₂ emissions.

It also has the ability to be dyed to any color, and Mazda says that it can still hold a smooth mirror finish just like a regular panel, reportedly of an even higher quality than traditional painted plastic. The firm also states that it's more weather, scratch, and impact resistant than previously developed parts, with the added bonus of being highly moldable.

Likewise, Ford enlisted the help of ketchup giant Heinz to help find materials for the cars of the future. The carmaker has explored the use of tomato fibres to create sustainable composite materials.

According to Ford, dried tomato skins could be used to create wiring brackets, a storage bin for coins, and other small items, with the manufacturer's researchers currently testing the material's durability.

In addition to Heinz, Ford has also collaborated with a range of companies including the Coca-Cola Company, Nike, and Procter & Gamble. With



their help, the aim is to try and develop a 100 percent plant-based plastic that could be used to make everything from fabric to packaging. Recently, Ford has increased its use of recycled non-metal and bio-based materials with the inclusion of cellulose fiber-reinforced console components and rice hull-filled electrical cowl brackets introduced in the last year.

Plant-based plastics are already in use on a number of cars currently available on the market, including the Toyota Aygo, which uses bio-plastics on some of its parts.

It's not all good news, however, after a London driver reported that his Aygo suffered extensive damage after it was ravaged by a gang of squirrels, who were apparently attracted to the plant-derived plastic.

The driver, Tony Steeles, said that the rodents stripped his car of its aerial, rubber trim and several of its sensors, all of which use materials made from plant-based compounds.

“DEATH CAP” MUSHROOMS: ONE MORE WORRY ON REFUGEES’ LIST OF WOES

Sarah Kaplan

The Washington Post, Sept. 18, 2015

The patients started trickling in not long after the refugees arrived: Some had painful cramps, others suffered from vomiting or dehydrating diarrhea. In some, their livers had completely stopped working. Some were already close to death.



Amanita phalloides,
The Death Cap.

These were men and women who had survived catastrophic civil war in their home country, a dangerous land or ocean crossing into Europe, and days of walking through fields littered with land mines and on roads barred by police officers wielding water cannons. The fact that they were in Germany at all represented something of a defiance of the odds.

But now, in one of the nations that is thought to be most welcoming to asylum-seekers, they faced another deadly hazard.

Poisonous mushrooms, the doctors diagnosed it. According to a flier issued by Hanover Medical School in northern Germany, more than 30 refugees have been sickened after eating “Death Cap” mushrooms—a species so toxic a small amount of it can cause organ failure in a matter of days. *The New York Times* reported that similar cases have been seen in Münster, a two-hour drive west.

“Do not collect mushrooms, if you are unfamiliar with edible mushrooms growing here,” warned the flier, which was printed in Arabic, Kurdish, and other languages, according to the *Times*. “A mushroom you regard from your homeland as a delicious edible mushroom could be deadly here although they look similar.”

According to the Associated Press, most of the refugees sickened by the mushrooms were Syrian. The Death Cap, formally known as *Amanita phalloides*, bears a resemblance to mushrooms that grow in the eastern Mediterranean. Its unassuming shape and white coloring are easily mistaken for edible species, and its taste is innocuous, even delicious.

To make matters worse, it takes several hours for the fungus's deadly poisons—compounds known as amatoxins—to reach the liver, where they do the most damage. By the time someone starts to feel sick, they may have no idea that the lowly little mushroom they ate half a day ago is the source of their illness.

cont. on page 8

BAKED MUSHROOM CHIPS

Stefanie Bryant
ktalnews.tv, Sept. 14, 2015

- 1½ lb large mushrooms
- 1 to 2 TBs olive oil or olive oil cooking spray
- ¼ tsp salt (or to taste)
- ¼ tsp garlic powder
- 1 tsp freshly ground black pepper



Preheat oven to 325°F with two racks positioned in the upper and lower third section of the oven. Line two baking sheets with parchment paper.

Slice mushrooms 1/8 inch thick with a mandolin, sharp knife, or the large blade of a box grater.

Place the mushrooms in a single layer on the baking sheets. With a pastry brush lightly dab each mushroom with a little oil (or spray lightly with cooking spray).

Mix salt, garlic powder, and pepper in a small dish and sprinkle lightly over the mushrooms.

Bake for 20 minutes, then rotate baking pans. Bake another 20 minutes and turn the trays again. Continue to bake checking every 5 minutes until the edges get crisp. Turn off the oven, and leave the chips in there for another 10 or 15 minutes until the centers get crisp as well, but not long enough where they start to burn. Remove from the oven, taste for seasoning, and immediately add more if needed.

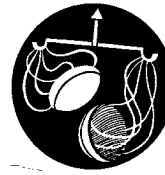
Death Cap Mushrooms, *cont. from page 7*

The North American Mycological Association (the Death Cap is an invasive species here) says that fatality rates from amatoxin poisoning are about 50 percent without prompt treatment.

The fear is that, after days on the road with little to sustain them, refugees have resorted to foraging for food. It is the middle of its three-month growing season in Europe, and the poisonous mushrooms could sicken still more people. Dr. Michael P. Manns, chairman of the department of gastroenterology, hepatology, and endocrinology at Hanover Medical School, told the *Times* that 12 patients remained hospitalized on Thursday, three of them in critical condition.

MUSHROOM ASTROLOGY

Bob Lehman, LAMS



Libra (Sept. 23–Oct. 22): You appreciate the ecological role of mushrooms and have a good sense of where different species can be found. However, you may never get to some of their habitats because you like easy activities and often do your mushroom hunting in city parks and residential areas. You are pleased to share your mushroom hunting territory with others (which is a good thing, since this is often other people's homes). You consider a foray successful if everyone has gotten something of value from it. You fret over identifications. You have a good feel for the edible qualities of mushrooms even though you may not do much cooking.

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