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MYCOPORTAL HELPS SAVE LIFE! by Timothy J. Baroni & Andrew N. Miller

Dr. Tim Baroni, a professor of mycology at SUNY Cortland, received an email request to identify a possible poisonous mushroom from the Upstate New York Poison Center in Syracuse, New York concerning a Rome, New York patient who had recently consumed mushrooms from his lawn and was seriously ill in the autumn of 2017. The initial identification was thought to be Chlorophyllum molybdites, commonly known as the green-gilled Lepiota, based on some blurry images of the fungi and what the patient described of the various fungi he had eaten. C. molybdites is known to cause severe gastrointestinal symptoms of vomiting and diarrhea for 1-3 hours, but is not known to cause death. It occurs in lawns and other grassy areas in summer and autumn and holds the infamous reputation of being the most commonly consumed poisonous mushroom in North America. Even though the patient was quite ill at the time, the caregivers believed that the worst of the effects of the mushroom toxins would soon subside if it was Chlorophyllum poisoning. Therefore the attending medical staff decided not to treat the patient immediately but did reach out to Dr. Kathie Hodge at Cornell University who is, as is Tim Baroni, on the Poison Control Center call list for possible mushroom poisoning cases. Dr. Hodge was not convinced the blurry images of the partially consumed mushrooms provided enough evidence to confirm the fungus was Chlorophyllum. Luckily for the patient, Kathie decided to confirm the identification with another mushroom expert.

Enter Dr. Baroni, who after examining the blurry images of the half-eaten mushrooms had a suspicion that the cause of this illness was actually the fatal *Amanita virosa* (commonly known as the Destroying Angel) since he was fairly certain that *C. molybdites* does not occur in this upstate area of the Northeastern US. He turned to the Mycology Collections Portal (MyCoPortal) to confirm his initial



Figure 1. Species distributions for *Chlorophyllum molybdites* (green circles) and *Amanita virosa* (red circles) in the United States.

belief where he was able to map the species distributions for both the non-lethal Chlorophyllum molybdites and the deadly Amanita virosa (Fig. 1). Based on these readily available data this was clearly not going to turn out well for the patient unless immediate treatment was given! He strongly urged treatment for Amanita poisoning directly to the attending medical staff at Upstate Medical Center in Syracuse, NY. Dr. Baroni requested that fresh samples from the patient's lawn be collected and sent to his laboratory by overnight mail, which the patient's brother did. That next morning Dr. Baroni opened the package to find several species, one of which was A. virosa. He immediately contacted the attending medical staff at the hospital to confirm the poisoning was from a deadly mushroom, and was relieved to learn his advice had been heeded the day before and treatment for Amanita poisoning had started already. The life of the patient was saved after several days in Upstate Medical Hospital and then at the Strong Memorial Hospital in Rochester, NY where the patient was transferred to receive further treatment. The patient was very lucky, thanks to Dr. Baroni and the MyCoPortal.

UPCOMING FORAYS & OTHER EVENTS

The events page of *The Mycophile* publicizes forays and events of NAMA affiliated clubs which may be of interest to our members. If you would like to list your club's next big event, contact Susan Kayser, Editor: mycophile@namyco.org.

Include date, location, brief description, link for information, and host organization name.

Status of the World's Fungi symposium

13-14 September 2018; Royal Botanic Gardens, Kew, UK

Scientists and policymakers will gather at Kew for the first international State of the World's Fungi Symposium. The two-day symposium brings together plant and fungal scientists, ecologists, conservationists, industry and policy experts from around the world, to discuss issues raised in the annual report. www.kew.org/fungi-symposium

18th Annual Gary Lincoff Foray

15 September 2018 | North Park (Pittsburgh, PA) The Western Pennsylvania Mushroom Club hosts the 18th Annual Gary Lincoff Foray on Saturday, 15 September. Guest Speakers will be Taylor Lockwood, Walt Sturgeon and John Plischke III. For more, see: http://wpamushroomclub.org/lincoff-foray/

Wildacres Regional Foray

27-30 September 2018 near Little Switzerland, NC, just off the Blue Ridge Parkway. http://www.wildacres.org/workshops/septemberevents.html

NAMA 2018 Annual Foray

11-14 October, 2018 at Salem, Oregon The chief mycologist is Dr. Joseph W. Spatafora, Professor in the Department of Botany and Plant Pathology at Oregon State University in Corvallis, Oregon. See p. 3 for more information. NAMA 2018 Salem, Oregon Foray - North American Mycological Association

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DO CHAGA MUSHROOMS HAVE HEALTH BENEFITS? by Dr. Ceppie Merry, from https://healthybutsmart.com/chaga-mushroom/

(This article, a review of current studies, is excerpted from Healthy But Smart.com.)

The Chaga mushroom is called the "king of mushrooms," while the better-known reishi mushroom gets the title of "queen of mushrooms." Chaga mushrooms are marketed as having a wide range of medicianal benefits, including anti-inflammatory cancer-treating and -preventative, hepatoprotective, and immunomodulation effects.

The *Inonotus obliquus* mushroom, also known as Chaga mushroom in Russia and Kabanoanatake in Japan, is essentially a black parasitic whiterot fungus that generally inhabits the living trunks of mature birch trees (Betula app). It grows best in cold climates between 45 and 50 degrees north.

Given the fact that Chaga mushroom extract sells for as much as \$130/oz, this mushroom would have to be scientifically proven to do all of the above (and do my ironing) for me to treat it as royalty. There are a total of 54 papers looking at Chaga mushrooms for cancer treatment or prevention. The knowledge base on Chaga mushrooms in cancer can be summarized as follows.

Laboratory-based studies suggest that Chaga mushrooms may exert an anticancer effect in colorectal, lung, and cervical cancer. Laboratory models also suggest that Chaga mushrooms may exert an anticancer effect via four possible mechanisms:

- antioxidation to prevent the development of cancer in the first place
- arresting the growth of tumor cells
- killing tumor cells directly and
- activating the immune system to kill tumor cells.

The anticancer activity of Chaga mushrooms is largely attributed to triterpenoid compounds in the mushroom. Bottom line: There is no human clinical proof at this time that Chaga mushrooms can prevent or treat cancer

There are three studies looking at the antiviral effects of Chaga mushrooms in herpes simplex infections. Bottom line: there are laboratory and animal data supporting an antiherpes role for Chaga mushrooms. However, this has not been validated in humans.



There are several other claims for Chaga: reducing inflammation, aiding the GI tract, helping the immune system, and helping with hairloss and weight loss. Studies in mice indicate some virtue in improving physical endurance.

Conclusion:

Available information on Chaga mushrooms is limited to animal studies (at best). This raises the question of the nature of the correlation between animal and human studies. Are animal models predictive for humans? A comprehensive review of the subject was published by researchers from Wichita State University in 2009 (*Phytochemistry*, Vol 108, Pages 171-176).

The review reports that the predictive power of animal studies is only 10% for drug behavior in humans. We could reasonably expect a similar poor correlation for functional foods. The authors explain that it is not surprising that animals fail to act as "causal analogical models" given ten key differences between humans and animals (genes, gene regulation, gene expression, mutations, proteins, protein-protein interactions, genetic networks, organismal organization, environmental exposure, and evolutionary history).

The authors concluded by saying that "when one empirically analyzes animal models using scientific tools, they fall far short of being able to predict human responses."

The current scientific literature does not justify spending a lot of money on Chaga mushrooms. (There are far less expensive sources of vitamin C available.) Neither does it deserve any royal titles. In fact, in the absence of human clinical data, this mushroom should not even have a knighthood.

BOOK REVIEW: A FIELD GUIDE TO MEDICINAL MUSHROOMS OF N. A. by Dianna Smith

A Field Guide to Medicinal Mushrooms of North America

By Daniel Winkler and Robert Rogers Mushroaming Publications 2018

Copies can be purchased at <u>www.mushroaming.com.</u> for U.S. residents and for Canadians.at <u>http://</u> <u>www.selfhealdistributing.com/</u> \$10 US, \$12 Canadian

This small field guide booklet is an accordion-style folded 8 panel doublesided brochure on good quality heavyweight paper with a glossy finish. It seems relatively water-resistant. Given that those most interested in consulting this educational work on traditional fungi employed in various folk cultures might take this along with them in a crammed backpack or mushroom basket, it probably could have been a bit sturdier. It is in the same format of three others produced by Daniel Winkler: *Field Guide to Edible Mushrooms of the Pacific Northwest, Field Guide to Edible Mushrooms of California*, and *Field*

Guide to Tropical Amazon Mushrooms. (See reviews by Steve Trudell in *the Mycophile* January-February 2012, November-December 2012 and May-June 2015).

The authors are Daniel Winkler and Robert Rogers. Daniel is perhaps most known for his study of the medicinal, social, economic and environmental effects of the ascomycetous club-shaped Ophiocordyceps sinensis, a hugely popular parasitic fungus that infects insects. It is found in high altitude locations in Tibet, Nepal and other regions west of and including mountainous areas of China. He has also written numerous articles and books and leads travel expeditions to various locations around the world. Robert Rogers has been an herbalist for some 45 years, author of many popular books and articles on medicinal herbs, lichens and fungi, and assistant clinical professor of Family Medicine at the University of Alberta. Both men regularly lead walks, take excellent photographs and are crowd-pleasing presenters for mushrooming and other naturalist organizations.

The cover panel has the title and four photos of fungi displayed against a dark burgundy background. On opening the booklet, there are five categories



addressed on the left panel: an introduction to fungi discussing their substrates, and functional roles in the environment; instructions on correctly identifying specimens, accompanied by the caveat that a number of them are difficult for the novice to correctly ID. They advise on consulting field guides for further in-depth information on properly identifying the included fungi. 'When in doubt, throw it out!' The third section provides a three-part visual symbol indicating the ease of identification of each fungus depicted:

1. A black and white symbol of the brochure means that fungi displayed with this emblem are relatively easy to identify.

2. Moderately difficult to ID fungi have been assigned a logo containing couple of stacked field guides.

3. The third figure features 3 stacked books seen through a large magnifying glass for challenging fungi that have several lookalikes, some of which might be toxic.

Additionally, 2 different edibility symbols are posted with each entry: 'choice edibles' are marked Cont. on p. 5

FIELD GUIDE TO MEDICINAL MUSHROOMS, CONT.

Cont. from p. 4

with 2 forks displayed within a circle and 'good edibles' are marked by a circle containing just one fork. There are also a few brief general remarks on fruiting seasons of various fungi and on the variability in their respective sizes depending on conditions and the age of specimens.

The second facing page includes a quick and easy guide to preparing your own medicinals, for making tinctures, teas, salves and creams, as well as daily dosage recommendations. It ends with a cautionary statement about consulting the advice and guidance of an expert, and not relying solely on the photos in the brochure-booklet to confirm the identification of fungi readers may want to try.

The first fungi included are genera within the Polyporales of the Basidiomycota. Above each photo and associated information on the identifying characteristics and traditional or folk medicinal uses of each species discussed is the scientific name and common name printed in white against a dark tealgreen horizonal strip. The polypores included are: Fomes fomentarius, Fomitopsis betulina, Fomitopsis pinicola, Ganoderma tsugae, Ganoderma applanatum, Laetiporus sulphureus, Laricifomes officinalis, Phellinus ignarius, Inonotus obliquis, Trametes betulina, Trametes versicolor, Grifola frondosa, Polyporus umbellatus and Sparassis radicata. Oddly, Cyathus striatus, in the Agaricaceae family has been placed in the Polyporales. (Undoubtedly this was an oversight.) The next group to be featured are cap and stem gilled fungi in the Agaricales: Agaricus subrufescens, Coprinus comatus, the Armillaria mellea group of honey mushrooms, Flammunlina velutipes, Lentinula edodes, Lyophylum decastes, the Pleurotus ostreatus group of oyster mushrooms, Hypsizygus spp., Psilocybe cubensis and Schizophyllum commune.

Labeled in white against a brownish horizontal bar are *Hericium erinaceus*, *Hydnum repandum*, *Phallus impudicus*, *Auricularia auricula*, and *Tremella mesenterica*. The text accompanying the stinkhorn mistakenly says that *Phallus ravenelii* differs from *P. impudicus* in that the volva is of the former is tinted purple. I believe the species with the purple tinted volva is actually *Phallus hadriani*. Three fungi from the Ascomycota are listed against a blue stripe: *Cordyceps militaris*, species of *Morchella* and of *Xylaria*. An Excel-like listing of all 33 fungi included in the booklet is on the left side of the next to the last page, and a vertical listing is at the top on the right side indicating 21 of the traditional medicinal effects or uses of fungi. The symbol of a golden mushroom is placed in the spaces adjacent to the alphabetically arranged botanical name of each fungus treated in the booklet indicating the purposes and range of therapeutic effects one might expect as a result of consuming them. The back page gives a concise overview of the purpose of the booklet and biographical information on the authors, Daniel Winkler and Robert Rogers.

The booklet was designed by Daniel Winkler. NAMA members should be aware of his talents as a photographer, given the many stunning awardwinning photos he has submitted for NAMA's annual photography contests. He contributed 51 of the total in the booklet, while Robert Rogers contributed 9. Five other photos were taken by four additional mushroom photographers. Most of the booklet's photographs are well-done, if rather small, but given the size of the booklet, and the need to include identification, medicinal use information, and symbols on identification ease and edibility, the authors addressed these limitations fairly well. A few shots are a bit on the dark-side (particularly the center one of 3 Ganoderma tsugae photos, one of 2 shots of Flammulina velutipes, and the wood ear fungus). They would have benefited from highlighting the surface textures in a photo editing program.

A Field Guide to Medicinal Mushrooms of North America will appeal to people who believe in the efficacy of medicinal fungi used historically in various cultures, or who at least see no problem experimenting with them for either preventative or curative purposes. Assuming advocates do not overdose on suggested dosages, they are relatively safe to take. Despite the existence of numerous trials to determine their efficacy, so far studies suggest that they may work, but there are no published evidencebased trials to date which prove they do so. As the authors say, do your homework.

Dianna Smith

Chair of NAMA's Medicinal Mushroom Committee

BOOK REVIEW: MUSHROOMS OF THE GEORGIA PIEDMONT & S. APPALACHIANS by Steve Trudell

Mushrooms of the Georgia Piedmont and Southern Appalachians: A Reference

Mary L. Woehrel and William H. Light 2017; University of Georgia Press (www.ugapress.org) 978-0-8203-5003-5 (Hardcover: 8.5 × 11", 664 pp) \$59.95

Although the Preface states that "This book is intended to be a field-durable guide to the wild mushrooms of Georgia...", I doubt whether many persons would take this hefty tome into the field. The pages are standard letter size and the hardcover volume tips the scale at just over 6 pounds—a bit much if one also hopes to be carrying a basket full of mushrooms. And the physical weight is matched by the weight of its content (the subtitle, "A Reference" is apropos), so this might not be a guide for everyone. Let's take a look at it. The contents ...

The general front matter includes the Preface (Scientific Synonyms, The Geographic Area of This Book, Other Useful Guides) and Acknowledgments. The Introduction follows, and a rather long one it is (Three Domains and Six Kingdoms: Is That All? So What Are Fungi Anyway? Who's Who among the Fungi, Fungi: An Overview, Mating Types and Sexuality, Division/Phylum Basidiomycota [Club Fungi and Mushrooms], Division Ascomycota [Yeasts and Sac Fungi], Zygomycetous Fungi [Pin Molds, Bread Molds, and Other Zygospore-Forming Fungil, Division Chytridiomycota [Chytrids], Mycorrhizae Division Glomeromycota (arbuscular mycorrhizae), Ectomycorrhizal Fungi, Mycoheterotrophic Plants], Carnivorous Fungi, Endoparasitic Fungi, Fungus-Gardening Beetles and Ants, Mycetozoa / Myxomycota (Slime Molds), Lichens, Mushroom Toxins and Mushroom Poisoning, Medicinal Properties of Some Southeastern Mushrooms, Collecting and Identifying Mushrooms [What's Needed, Chemical Staining, Microscopy], Scientific Nomenclature, References Cited), and Mushroom Morphology: A Brief Pictorial Primer; altogether 54 pages in a small font.

Although the next section is titled "Dichotomous and Pictorial Keys to the Major Mushroom Forms," there's only one key, a dichotomous one. Three pages of numbered thumbnail-size images follow. They were chosen well, effectively illustrate particular features, and are cited in the key; however, they do



not constitute a key by themselves. Given that half of the couplets in the text key include a second lead "Fruitbody otherwise," it takes a while to work through and so might have been better to just provide a simple pictorial key to the major morphological groups (gilled mushrooms, boletes, corals, etc.), as many other books have done.

The Species Accounts comprise the bulk of the book (Morels, False Morels, and Elfin Saddles; The Carbonaceous Fungi [Xylariales]; Black Knot; Jelly Fungi; Earth Tongues, Club Fungi, and Coral Fungi; Parasitic Fungi [Arthropod-Parasitizing Fungi, The Insect Destroyers (Order Entomophthorales), Mycoparasitic Fungi, Molds, Hypomyces]; Cup and Disk Fungi; Class Agaricomycetes: An Overview [Puffballs, Earthstars, Truffles, False Truffles, and Deer Truffles; Stinkhorns and Stinky Squids (Order Phallales, Family Phallaceae); The Boletes (Old Man of the Woods, Other Boletes); Inky Caps (Coprinoid Mushrooms); The Amanitas (Order Agaricales, Family Amanitaceae); The Lepiotas (Order Agaricales, Family Agaricaceae); Stropharia-Like Mushrooms (Order Agaricales, Family Cont. on p. 7

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Cont. from p. 6

Strophariaceae); The Corts (Webcaps, Order Agaricales, Family Cortinariaceae, Genus Cortinarius); The Rooted Collybia Complex; Oyster-Like (Pleurotoid) Mushrooms; Miscellaneous Euagarics (The Magic Mushrooms [Psilocybe and Panaeolus], Brown Look-Alikes—Some Edible, Some Deadly Poisonous); The Russulas and Milkcaps (Russulas, Milkcaps); Chanterelles; Corticioid Fungi (Crusts, Spreads, and Parchment Fungi); Polypores (Shelf and Bracket Fungi); Hydnoid (Toothed) Fungi; Bird's Nest Fungi and Artillery Fungi; Slime Molds (Mycetozoa / Myxomycota)].

Although most of these categories are typical ones, a few, such as "Brown Look-Alikes—Some Edible, Some Deadly Poisonous," are unusual. In this case, the mushrooms in the category don't look all that much alike, only one is deadly poisonous, and many of them are not brown. Odd species placements include the cedar-apple rust inexplicably appearing in the Corticioid group.

The book concludes with a Glossary of Some Mycological Terms, Index of Common Names, and Index of Scientific Names.

The Preface contains a number of snarky comments—"Many of the photographs in current guides are 'Hollywood' depictions (although just what this means is not explained) of these fungi that do not show the various forms and color morphs that fungi assume in nature"; "Nomenclatural problems abound in most of these works (referring to other, unnamed, field guides)"; "Specialists often tend to throw their keys together as an afterthought, casting about for features they can fit into a dichotomousstyle key without any consideration given to the features' relevance or usefulness." These sorts of comments give the book an uncomfortable tone that carries into many of the nomenclatural comments in the species accounts.

Given that the main purpose of the book is to serve as a tool for identifying mushrooms, the Introduction is much too long and contains far too much detail, much of it not relevant to identifying mushrooms. Although I fully support mushroom hunters learning all they can about the fascinating biology of fungi, there is no need in an identification guide for such things as a lengthy discourse on highlevel biological classification (still very much in flux), comparison of the use of commas between the zoological and botanical/mycological nomenclature codes, discussion of form-genera and form-species, or a figure showing zygospore formation (zygomycetes do not produce mushrooms). In most places, "Division" is used for the taxon below Kingdom and above Class. Although formerly used, and still technically allowable, mycologists and botanists now nearly all use "Phylum," to provide consistency with other groups of organisms. However, on the plus side, it's good that the artificial nature of categories and classification in general is emphasized. The pigeonholes exist in our minds, not in nature.

The Introduction also suffers from a much-toolarge number of factual errors (mostly involving details), over-generalizations, and misleading statements, and is in need of a comprehensive editing to catch the many repetitive passages, conflicting statements, inconsistent terminology, and miscellaneous goofs such as incorrect unit conversions, misspelled author names, and wrong dates in reference citations. For instance, formally defined taxa do not go out of existence when revised classification schemes cause them to fall out of favor-they just become unused. Not all basidiomycetes have a two-locus, multiple allele mating system. The tetrapolar mating system involves two, not four, DNA loci. Malus is the genus of plants that includes apples, it is not the genus of the apple scab fungus. Not all mycoheterotrophic plants are associated with ectomycorrhizal fungithere are also many associated with arbuscular mycorrhizal fungi. Other examples: In one place "cells of a filament," in another "compartments of a hypha"; "allantoid" here, but "sausage-shaped" there. We are told that certain reportedly medicinal mushrooms are "without apparent adverse side effects", but, a few paragraphs later, that they "could have unwanted side effects or deleterious interactions." Likewise, "Studies on the anticancer effects of Reishi have not been convincing," but then "Several compounds in Reishi were shown to inhibit a variety of human cancers." It is reported correctly that the arbuscular mycorrhizal fungi (members of the Glomeromycota, often incorrectly referred to here as "mycorrhizae") are no longer considered to belong to the Zygomycota (an out-offavor, more or less trash-can phylum whose disparate members are being transferred to many

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Cont. from p. 7

other groups), but later there is mention of zygomycetes being involved in arbuscular mycorrhizas. The Basidiomycota is described as representing 37% of the described species of fungi, and the Ascomycota as representing 75% of described species. That makes 112% without including the Chytridiomycota, Glomeromycota, and zygomycetes. Lichenicolous fungi are those that grow on lichens, they are not the fungi involved in the lichen itself. It is initially stated that the fungi involved in lichens are all ascomycetes, but a later discussion correctly describes the small minority of lichenized fungi that are basidiomycetes.

The species accounts describe and illustrate, by my count, 318 mushroom species and 12 slime molds. Forty-four of the mushroom species are not covered in other books for the Southeast (and somewhat beyond). These numbers are nearly the same as those (321 and 50) for the recent Southeastern Mushrooms, by Todd Elliott and Steve Stephenson (reviewed in The Mycophile, May-June 2018). Common names are used for the main heading of each account, which I found puzzling, given the authors' emphasis on scientific nomenclature. Most of the names used are familiar or fairly obvious ones, but a few struck me as newly invented and unlikely to be widely used, such as dead man's rubber gloves, crossveined troop mushroom, and landslide mushroom. The Latin binomial appears below the common name, in a smaller font and, below that, the photographs, typically two or three, arranged in a row. The detailed text includes the full name of the fungus, complete with author name(s) and date and place of publication; sometimes the basionym is given; a breakdown of the higher taxa of which the species is a member-phylum, class, order, family; the derivation of the scientific name; general description of the fruitbody; spore-print color; key microscopic features; occurrence (substrate, habitat, distribution); edibility; and comments.

The species accounts text is the strongest aspect of the book, especially the detailed commentary that gives key features for distinguishing look-alikes and explains misapplied names and other nomenclatural issues. Like the Introduction, the comments sections would have benefited from a careful editing to catch obvious errors, eliminate repetitive information, and generally improve clarity. For instance, in the comments for *Annulohypoxylon multiforme* and *A*.

Wine-cap Stropharia

Stropharia rugosoannulata

14[32:139 (1922)

Flesh: Firm, white,



ulata Farlow ex Murrill, Mycolo

Basidiomecota Agaricomecotina Agaricomecetes

Derivation: Strophonia, Greek, from strophos, "belt"; annulata, Latin, "wrinkled ring."

Cap: 4-15 cm (19)-6 in) across, initially bell-shaped, becoming broadly convex to flat, dry, smooth; wine-red (Fig. A) or reddish-brown, fading to pale tar; margin often with remnant

Gills: Attached, close (Figs. D & E), at first pale grey or whitish

(Figs. A & B, black arrow) smooth to fibrous, white, staining yellowish with age (Fig. B), with thick, typically persistent spli

apical pore: chrysocysticlia present on gills that stain yellowish in KOH: vegetative hyphae producing abundant, large, stellate

led, bulbous (Figs. A & B), with white mycelial threads

becoming purplish-grey (Fig. E) to purplish-black. Stipe: 5-15 cm tall by 1-3 cm thick (2-6 x 35-114 in), bx

Agaricomycetidae, Agaricales, Strophariaceae

fragments of partial vell (Figs. A, B, & E)

and tattered ring (Fig. A, arrow: Fig. E).

Spore print: Dark purple-brown to blackish

Chemical staining: Cap surface olive-green with KOH. Microscopic: Spores 10-14 × 7.5-9 µm, elliptical, smooth, with





Stropharia-Like Mushrooms @ 323

(star-shaped), spiked cells (acanthocytes) (Fig. C), this feature characterizing the genus Strophonio.

Occurrence: Saprobic; scattered to gregarious on wood chips, mulch, and grass and in woods.

Edibility: Considered choice

Comments: The vegetative hyphae of all species of Struphuria produce stellate (star-shaped) acanthocytes ('lypiny cells') like the one in the micrograph in Fig. C. Strupharia rugosoannulatin uses them to tall soil nernatodes', certain species of which are them digested as a source of nitrogen. The sharp, spiny acambacytes inflict deep wounds in the caldes of the worm, whose internal target them causes the body contents to leak to the exterior, kling them. The worms are then digested and absorbed by assimtative hyphae as a source of integen and other matrixens for the fungas.' The acambacytes of this species also contain nernatodial toxins.' See the section on cantivorous and nematophagons (nernatod-cating) fung in the interioduction.

 Nematodes, so-called roundworms of the phylum Nematoda (Nemathelmisthes), are (reviewing and paraitic worms found in very conceivable habits on the phase). Most are microscopic, but one sperm whale paraitic reaches a length of 13 nr (a) ft).
H. (au et al., 2005, Appl. Environ. Microbiol. 72(2):391-3981.

cohaerens, Daldinia concentrica is cited as a possible look-alike. However, three pages earlier, it is stated that *D. concentrica* occurs only in Europe (true, as far as is known, but such absolute statements should be avoided) so the look-alike comparison(s) should have been made with the southeastern U.S. species of *Daldinia*, such as *D. childiae*.

Most of the photographs are not the usual field guide shots, which typically show a group of the mushrooms in the field, with individuals selected to show the progression from young to mature, and arranged so as to illustrate the key features for identification. Instead, most photos show a single individual, sometimes clearly in habitat, other times not. Although focusing closely on an individual mushroom offers the benefit of showing particular features well, there is a tradeoff in not having a group, as it prevents the user from gaining much appreciation for the variability in the species. Although not especially large, the size of most of the photos is adequate to show key features. Many close-up inset photos are included, which is helpful. The technical quality of the photos varies. Some are Cont. on p. 9

MUSHROOMS OF THE GEORGIA PIEDMONT, CONT.

Cont. from p. 8

quite good, others are not as well lit and exposed as they could have been. A number of photos taken in Europe are included, which cannot be recommended given the frequency at which we are finding our mushrooms to be different from their overseas counterparts. In a few cases, the photographs are not of the species being described. For instance, two of the three photos for *Marasmius oreades* are of an agrocybe, perhaps *A. pediades*, and the third shows an apparently brown-spored mushroom (a psathyrella perhaps?) with gills that are too thin and closely spaced to be *M. oreades*. Based on their coloration, the photos for *Hydnellum aurantiacum* and *H. peckii* appear to be of other hydnellums.

I did not follow up on many of the nomenclatural discussions, as most of them appeared to be accurate. However, given the number of times that the authors point out mistakes in the application of names that others have made, it is ironic that the first species they describe is misnamed. The common vellow morel that, in North America, we have traditionally called by the European name, Morchella esculenta, is now correctly named M. americana, not M. esculentoides, which is a later synonym (by a matter of mere weeks). Another obvious error is in claiming that the name, Cortinarius marylandensis, has not been validly published. It has, and those other guides that are said to be in error were not wrong in using the name (although some of them might have done so before it was actually valid). For those who are interested in the sometimes lengthy lists of synonyms associated with the species names, the authors have compiled, based on information in *Index Fungorum / Species Fungorum, MycoBank,* and other sources, a list that is available on the book's website (downloadable at

h t t p : / / w w w. u g a p r e s s. o r g / u p l o a d / Appendix%20A_Scientific%20Synonyms%20of%20 Fungi_01-31-2018.pdf).

Although I applaud what the authors set out to do, clearly there are a lot of shortcomings in the execution, most of which reflect a lack of attention to detail. So, given that, is this a book that I would recommend a mushroom hunter in the Southeast buy? It depends. Despite my concerns, I think that experienced mushroomers (including those known in certain circles as taxonomy nerds or taxonomy geeks) will appreciate the detailed treatments and nomenclatural information. Thus, they will find a lot of value here and, for them, it will serve as a very useful reference. However, less experienced mushroomers might not be prepared for the level of technical detail and would be better served by other more approachable field guides, such as Bill Roody's Mushrooms of West Virginia and the Central Appalachians (reviewed in The Mycophile, July-August 2003), the aforementioned Mushrooms of the Southeast, or even Tim Baroni's Mushrooms of the Northeastern United States and Eastern Canada (The Mycophile, January-February 2018), which, despite the title, has a large number of species that extend as far south as Georgia. Although these don't go into much detail on fungus biology, Nik Money's Fungi: A Very Short Introduction (The Mycophile, July-August 2018), offers an inexpensive primer on the subject.

Don't forget to register for the NAMA annual foray!

A WELL DESERVED AWARD FOR DR. TOM BRUNS

Professor <u>Thomas D. Bruns at UC Berkeley</u> is awarded the Mycological Society of America's prestigious Distinguished Mycologist for a life's work basically inventing the field of molecular fungal ecology. Dr Bruns is a NAMA Institutional Trustee.

Longtime NAMA member Erik Purre has passed away. He and Gundi Jeffrey led the MexMush tours in Mexico for decades. A memorial page has been set up on Facebook: https://www.facebook.com/groups/FriendsOfErik/

HESPEROMYCES VIRESCENS – OR, HOW I SPENT THE MEMORIAL DAY WEEKEND by John Dawson, from The Keystone Cap, Summer 2018

At one of our club's winter meetings four years ago, Danny Haelewaters, a Harvard doctoral student, spoke about the Laboulbeniales, an order of some 2000 species of ascomycete fungi that are rather benign ectoparasites of insects and mites. Their sticky spores adhere to the exoskeletons of a variety of arthropods, especially beetles. Once attached, the spores germinate by penetrating the exoskeleton with a nutrientgathering organ called a haustorium, through which the fungus "sips" small amounts of blood. The fungus then develops a thallus bearing external male and female reproductive structures. Within the latter, ascospores are produced, which at maturity are released when a trigger mechanism is touched.



Infested Hesperomyces Virescens Photograph by George Morrison

The diagram below, taken from Kathie Hodge's Cornell Mushroom Blog (<u>http://blog.mycology.cornell.edu/2014/01/17/ladybug-fungi/</u>), illustrates those structures on a thallus of *Hesperomyces virescens*, a parasite of the Asian ladybug *Harmonia axyridis* (an invasive species that was introduced to the U.S. to control aphid infestations but that has since spread far and wide and displaced many native ladybird beetle species).



The thalli are tiny (about .5 mm long) and cluster in very specific sites on the backs and bellies of the beetles, situated so that when the ladybugs are in position to mate, so are the fungi. In other words, *Hesperomyces virescens* is an STD of ladybugs!

R. Thaxter (1896), Contribution towards a monograph of the Laboulbeniaceae. I. Memoirs of the American Academy of Arts and Sciences 12: 187-429.

Ever since Danny told us about labouls on ladybugs, I've looked for them, and last winter George Morrison showed me his fine photo (reproduced above) of a heavily infested ladybug that he had found. That encouraged me all the more to search for them, and this past Memorial Day, as Cheryl and I were leaving a restaurant, a ladybug alighted on our car window. I captured it, and when I saw that it was infected, I took it home to examine under the microscope. I succeeded in removing some of the thalli and was excited to obtain the photomicrograph of one of them shown below, whose resemblance to the diagram on Hodges's blog convinced me that I had identified it correctly.



Photograph by the author.)





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Photograph by the author.) - 10 -

MAGIC MUSHROOMS TO TREAT DEPRESSION? by Jade Scipioni, from https://www.foxbusiness.com/features/magic-mushrooms

The Food and Drug Administration has greenlighted the use of the psychedelic ingredient in "magic" mushrooms for a drug trial to treat depression. The federal agency gave the U.S. approval to a London-based life sciences startup called Compass Pathways that launched in 2016 under the backing of billionaire Peter Thiel. Regulatory approvals for the trial have already been given in the U.K., the Netherlands and Canada.

The trial is expected to be a phase IIB doseranging study involving 216 patients in 12 to 15 research sites across Europe and North America. The tests will begin in the U.K. later this month and sites in other countries will kick off as soon as regulatory approvals are received.

For years, many psychedelic scientists have been theorizing that hallucinating on so-called magic mushrooms could possibly reboot the brain and clear out negative thoughts that may contribute to depression. Compass Pathways says psilocybin therapy, which combines a dose of psilocybin, a psychoactive medicine and the active ingredient in "magic mushrooms," with psychological support has shown promising signals of efficacy and safety as a treatment for depression in academic studies in both the U.K. and U.S. If the trial is successful, the company said it will be followed by phase III studies.

"Depression is the leading cause of ill-health and disability worldwide, and treatment-resistant depression affects more than 100 million people. It is a huge unmet need and the trial will teach us more about how this new approach might address it," George Goldsmith, chairman and co-founder of Compass Pathways said in a statement.

Ekaterina Malievskaia, chief medical officer and cofounder of the company, added that the study has been a collaborative effort with scientists, clinicians, patient representatives and regulators from all over the world.

Thiel, who invested an undisclosed amount in 2016, was one of the company's first high-profile backers.

ORAL HISTORY FOR MYCOLOGY

Thirty videos are available on YouTube which present interviews with mycologists. The link to them is:

Oral History for Mycology - YouTube

(https://www.youtube.com/results?search_query=Oral+History+for+Mycology)

BOOK RECALL: TALES FROM A FORAGER'S KITCHEN

Rodale Books and our author Johnna Holmgren take very seriously the concerns expressed by readers regarding the preparation and cooking of recipes with raw ingredients (mushrooms and elderberries) that are contained in her recently published *Tales From a Forager's Kitchen*. In light of our review of these concerns, and because of our dedication to wellness, Rodale Books and Johnna Holmgren have decided to discontinue the publication and promotion of the book. We are encouraging retailers to return their stock, and we are offering a full refund to consumers who have purchased the book. Consumers should email foragerskitchen@rodalebooks.com for more information. We are all committed to publishing books that offer reliable and comprehensive guidance about their subjects and we regret the inconvenience to our booksellers and readers.

JUDY ROGER (1943-2018) by David Rust and Michael Beug

Judy Roger passed away on July 16, 2018 after a two-year battle with pancreatic cancer. Judy was a life member of the North American Mycological Association and served as NAMA's Executive Secretary for over a decade.

Judy attended the University of Washington where she studied mycology. Judy was a life member of the Puget Sound Mycological Society and the Oregon Mycological Society. She helped found the Estacada Mycological Society. Judy was a board member of the Daniel Stuntz Foundation. Over the years, she taught many mushroom identification and microscopy workshops. In fact, she was scheduled to give a microscopy workshop at this year's annual foray in Salem, Oregon.

Judy was also an avid racer of Siberian husky sled dogs in the Pacific Northwest. She and her husband Phil operated Spindrift Kennels for nearly twenty years in the Estacada area and produced several well-known lead dogs and Iditarod team dogs during that time. Judy was also a life-long gardener and was an active member of the Gladstone Gardening Association where she served as vice president for four years.

* * *

I was very saddened to learn of the passing of long-time NAMA member Judy Roger. Judy died on July 16, 2018 after a long bout with pancreatic cancer. When I last saw her in November of 2017 at an Estacada Mushroom Club talk, we both thought that she had beaten the cancer. She looked great and felt great. It is a shock to realize that her smile and jovial demeanor will no longer grace our forays.

Judy and I joined the Pacific Northwest Key Council and the North American Mycological Association in about 1974 and forayed together regularly over a 44-year period. She was active in NAMA, serving as Executive Secretary for over a decade. For a brief period, she also served as Editor of *The Mycophile*. She organized the highly successful NAMA Foray at Diamond Lake in 2002 when no regional club wanted to assume the sponsorship.

I remember one memorable foray held at Hill's Resort on Priest Lake in Idaho. Hill's Resort was the site of the NAMA annual forays of 1966, 1968 and 1972 (sponsored by the Spokane Mushroom Club), though NAMA soon outgrew the size of that



wonderful foray site. The foray I remember was a later foray sponsored by the Spokane Mushroom club in about 2001. On Sunday, everyone was packing to go home and Judy and I went out for a morning of mushroom hunting around the cabins of Hill's Resort, cabins just being vacated by 100+ mushroom enthusiasts. We picked enough Matsutake that morning to fill my 80-quart ice chest, though we kept our activities as clandestine as possible. I traded most of my share for a case of Syncline Syrah when we stopped at the winery on our way home. Judy lightly sautéed her collection, froze them until spring, and brought them to the Oregon Mycological Society Spring Mushroom Camp at Suttle Lake, Oregon for the mushroom tasting event.

One of Judy's favorite mycological activities was to teach microscopy and encourage the serious study of mushrooms. Her specialty was the study of the genus *Galerina* and she was always ready to help identify non-descript little brown mushrooms. She also was an avid trainer of sled dogs. Many of the dogs she trained did well in the Iditarod Trail sled Dog Race, known as "the last great race on earth".

Michael W. Beug

* * *

When I became an active NAMA member, Judy was my first contact with the organization. I was sent a copy of the roster. Having just done research for our Bay Area club's website, I alerted her to several California club address/contact changes. Next, as Cont. on p. 13

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JUDY ROGERS, CONT.

Cont. from p. 12

contact for a newly affiliated club, I was sent a copy of the bylaws, which I read, and then suggested some formatting and punctuation changes. Then I waded in on the website with some suggestions there. Looking back at this period, Judy and I communicated almost daily. I couldn't believe how responsive she was to a new member's ideas and suggestions. By the time I arrived at the 2008 McCall, Idaho, foray, we were definitely "buddies". It was Judy's

I am a full-time botany student at the U.W. with special interest in fungi and plant pathology. I am running for a second term on the Board of Trustees. Historian and librarian for PSMS. Have worked on the exhibit several years; member of the educational committee, morel and puffball committees.



From the March 1975 issue of the Puget Sound Mycological Society's newsletter, *Spore Prints*.

address that was listed on the old version of the NAMA poison poster; even after she stepped down as Executive Secretary, she continued to get and forward mushroom poison calls to the appropriate contact.

I also knew Judy through her participation in a mushroom presentation on the Oregon chanterelle study project, which she coordinated for a number of years. Each year a small group of mycologists were admitted to a study site in Portland's Bull Run watershed in Mt. Hood National Forest. More often than not, volunteers had to clear the access road of fallen trees. Lorelei Norvell published the results of this study with Judy as co-author: The Oregon Cantharellus Study Project: Pacific Golden Chanterelle preliminary observations and productivity data (1986-1997).

The last time I stayed at Judy's home, she took me to the foothills around Mt. Hood to show me the famed sites to see the amazingly huge *Bridgeoporus nobilisimus*. We poked around in the woods for the few mushrooms fruiting at the time, and as we were finishing up, she informed me that I'd need to "work up" and identify all the mushrooms I'd collected. Given my skill level with this endeavor, I was petrified. When we returned, she took us down to the lab, sat me down at a microscope. I don't do microscopes at home and have only rudimentary training. Thanks to her patience, we got through the identification process; it was a great learning experience.

Judy Roger was a friend and mentor to many people in NAMA. Her kindness, curiosity and diligence will be missed.

David Rust



A small representation of past and present OCSP volunteers at the April 1998 meeting of the Oregon Mycological Society. Back Row: Eleanor Milner, Paul Patrick, Kathy Patrick, Tom Jones, Frank Ropecky, Conrad Thorne, Gene Lehmer. Front row: Judy Roger (Coordinator, 1982-2006), Joyce Mills, Maggie Rogers, Lorelei Norvell (Designer-Coordinator,

1982-1991) Janet Lindgren.



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TWO NEW TRUFFLE SPECIES FROM FLORIDA PECAN ORCHARDS from the Florida Museum of Natural History, Phys.org

Two new species of truffles were recently discovered on the roots of pecan trees in Florida orchards. The good news is that you can eat them —the bad news is that you wouldn't want to.

While *Tuber brennemanii* and *Tuber floridanum* are edible "true" truffles, in the same genus as the fragrant underground mushrooms prized by chefs, their unappealing odor and small size about 1 inch wide—will likely discourage people from eating them, said Matthew Smith, an associate professor in the University of Florida department of plant pathology and an affiliate associate curator in the Florida Museum of Natural History Herbarium.

"At least one of the species was pretty stinky and not in a good way, so you wouldn't necessarily want to eat it," Smith said. "These guys are small, and they don't have these really great odors, but the animals love them."

Smith and his team were studying pecan truffles when they found the new species.

"One of the things we wanted to do is identify the communities we find in these pecan orchards because those are the things that are going to be there naturally and those are the ones that are going to be in direct competition with the species we're interested in trying to grow," he said.

Arthur Grupe, lead author of the study and a doctoral student in UF's department of plant pathology, said the team is researching another,



The *Tuber brennemanii* specimen on the left shows the rough, knobby exterior of the mushroom while the halved specimen on the right shows the interior. Credit: Rosanne Healy

more common pecan truffle, *Tuber lyonii*, potentially an important economic crop in Florida.

Valued for their pleasant aroma and taste, pecan truffles sell for \$160 to \$300 per pound. Pecan orchards with a high density of pecan truffles might increase farmers' per acre profit by up to 20 percent, Grupe said.

Even though the two new truffle species might lack the appetizing qualities of more commonly known truffle species, Smith said their discovery is important and points to the significance of conservation, especially in forest habitats. "Just because you don't see diversity easily doesn't mean that it's not there," Smith said. "I guess to me it speaks to the fact that there's really a lot we don't know about the natural world, and it's worth preserving so we can try to understand it."



This *Tuber floridanum*, halved to show the interior, was found in a commercial pecan orchard in Cachoeira do Sul in southern Brazil. Credit: Marcelo Sulzbacher

Photographs by Angela Wade



Puffball





Unknown mushrooms

Unknown fungus

Amanita rubescens



Yellow coral fungus





More on the next page... The Mycophile, September-October 2018

PHOTOGRAPHS FROM A MEMBER by Steve Rock

"I thought you'd enjoy this photo of our cat, Ghost, pondering some stinkhorns. I think he's wondering why there are little dogs under the mulch and what could possibly have them so excited.

You may like this one, too-a fruiting of *Boletus sensibilis* just asking to be picked and eaten. Found in northern Putnam County, NY, late June 2018. They were delicious."





FUN WITH THE MYCOFLORA PROJECT or: My Transformation from Common Pot-hunter to Pseudo-citizen-scientist by Dave Layton

I've always been a good-ol'-boy at Prairie States Mushroom Club (PSMC) forays, who'd say, "very interesting" when something like *Phlebia incarnata* was discovered, but actually I'd be totally uninterested because it wasn't a yummy Chicken-ofthe-woods. Often my favorite part of a foray would be when it was time to clean up our mess at the end of the day and folks would say they didn't want their *Hericium, ischnoderma* etc. That meant I got to take home the spoils—those that weren't already spoiled anyway.

Everything was all well and good in my pothunter world until an energetic Environmental Science student at University of Iowa, Sarah Delong-Duhon joined PSMC last year. I first communicated with her because we both had lots of concerns and questions about the seemingly invasive nature of yellow oysters (*Pleurotus citrinopileatus*). Sarah discovered her love of fungi in spring of 2017 and already she was researching the interactions of fungi, especially certain polypores, more in-depth than any member since Dr. Rosanne Healy, who got her Mycology Ph.D. and went to work out East.

It wasn't long before Sarah told PSMC about iNaturalist and the Mycoflora project. My first thought about all that was: smartphone app—really? Like I'd ever share the location of my bicolor boletes. And genetic sampling—isn't that what's causing scientists to change the names of all my favorite mushrooms? That's so annoying.

However, I quickly learned I was no match for Sarah. She talked about how we now had a platform to really contribute to science. This information might help map environmental trends and protect habitat. By demonstrating ecological diversity in Iowa, we are actually promoting diversity—hmm... preserving Iowa's woods and wetlands also means preserving tasty fungi.

Still, I wasn't on board until Sarah noted that, since Iowa fungi is so underreported, I may actually find a new species and have it named after me. That nailed it. If you want to get me to act, just appeal to my massive ego. Plus that would be redemption for the last time I thought I found an unknown species soon to be named *laytonii*. That time Rosanne clued me in to the possibility that *laytonii* was actually smashed paintballs, which, of course, it was. In her graciousness, she recounted a similar incident of hers with a giant swollen tick. But, I digress.

When Sarah approached the club about applying for a NAMA Mycoflora Grant, I was definitely on board, and I was willing to work with Sarah as PSMC Board liaison for the grant. One of the first things I did was involve Rosanne who, with her typical graciousness, provided us with excellent advice on developing the grant. She was excited because we could add greatly to the diversity of fungi stored at the Ada Hayden Herbarium at Iowa State University. She also used the argument that knowing what is out there is the first step in saving what is out there, and we have a lot of saving to do in Iowa.

PSMC was awarded the NAMA grant so I figured I better put iNaturalist on my phone and learn how it I was amazed at how easy it was to worked. photograph and document fungi with my phone. Once the Mycoflora sample tubes and documentation sheets arrived, I was soon crawling around through nettles and bugs to photograph and sample strange mushrooms. My first sample was an unusual Bolbitius growing on mulch rather than dung. What? Why was I having so much fun with some dinky inedible fungus? No matter, it was fun and I now knew more about subspecies of Bolbitius titubans than I could ever imagine. Maybe even the whole world will know more about Bolbitius now because of iNaturalist and the Mycoflora project. In the past, I ended my research on Bolbitius with, "They're not Psilocybes."

At the time of this writing, I've already sampled 19 species of mushrooms for the Mycoflora project, and it's just mid-July! Most of those species are not yet in the Ada Hayden Herbarium, but they will be. For example, we'll at least triple the Russula collection there. I've also finally had the pleasure of hunting mushrooms a few times with Sarah and her boyfriend, Brian, who has a great talent for finding fungi and no desire eat them. Now that's my kind of mushroom hunting partner!

And what about my pot hunting days? Sarah sent a message about unusual fungi at a park in Cedar Rapids. I went there only with the thought of adding Cont. on p. 21

FORAGING FOR ANSWERS: WHAT MYSTERIES DO MUSHROOMS HOLD? by Stacey Jenkins, from https://www.rewire.org/video/mushrooms-steve-ness/

Following Steve Ness through the old growth forest of the Olympic Peninsula, I have a sudden thought: "I'll never be able to hike through the forest the same way again." Previously ignored dead leaves, rotting wood and tree branches now have the potential to hide hidden gems: mushrooms.

Mushroom "wellness" has exploded on the health scene this year. Sales of foods containing medicinal mushrooms have surged by as much as 800 percent year-on-year, according to Food Navigator. Whole Foods has listed functional mushrooms as one of its top food trends for 2018. Mushroom varieties like reishi and lion's mane are showing up on shelves in the form of coffees, teas and smoothies.

A forest full of fungi

Ness is an expert mushroom forager who knows the forest like his own backyard. Seeing as we only have to walk 10 minutes from his backyard to reach the forest, he has an advantage.

He takes us to examine an agarikon mushroom behind a fallen log he's been watching since it was a "baby." He pulls up a Dyer's polypore mushroom from under dead leaves that's used for dying wool. He leads us down to the river to reveal Chanterelles hiding in the long grass. It's a fascinating scavenger hunt that has captivated Ness for decades.

"I think its the mystery of their life cycle, they just hold so many life histories," Ness said. "How much do we really know about mushrooms?"

Good question. There are over 10,000 known species of mushrooms in North America, but scientists agree this might be only a third of what's really out there. Ness has joined the citizen scientist movement to learn more about fungi and how it benefits humans and the planet.

An untapped resource

Today's trek is part of this scientific field trip. He was recently awarded a grant to have 30 waxcap mushrooms analyzed for their DNA. We fill out a card for the mushrooms we can't identify, entering information like location, nearby trees, smell and snapping photos. Fun fact: Mushroom DNA is actually more closely related to humans' than to plants'.



Hericium erinaceus (Lion's Mane) Photo courtesy of Steve Ness.

"It's all interconnected," Ness said.

Scientists are learning more about the amazing benefits of fungi. They are studying mushrooms' ability to break down carbon-based compounds in soil—testing their ability to help clean up oil spills and filter contaminated water.

The health benefits of fungi are also being revealed. Scientists are currently studying the lion's mane mushroom for its ability to enhance memory, which could potentially be used to help people with Alzheimer's and dementia.

Editor's note: Watch the video on this link to Rewire, following Steve Ness through the old growth forest of the Olympic Peninsula.

There is a reference to the video in the article about citizen science on p. 19.

A HUB OF CITIZEN SCIENCE IN SOUTH PUGET SOUND by Ellen King Rice



The North American Mycoflora Project (http:// mycoflora.org) is a collaboration between professional mycologists and citizen scientists to identify and map macro-fungi across our continent. Currently there are seventy regional projects registered and thirty-five of these projects have been awarded "Sequencing Grants" where amateur mycologists will submit correctly collected samples for DNA analysis.

This is a powerful path for local naturalists to get a "look under the hood" of neighborhood fungi that have caught eyes and raised questions. This work has been generously supported by a gift of \$10,000 from Paul Stamets and Dusty Yao, who live and research in the South Puget Sound region of Washington State.

The South Sound Mushroom Club, led by Corinne Srsen, is an active backer of citizen science work like the Mycoflora project. Recently the club changed its mission statement to reflect interests beyond "mycophagy" (the eating of fungi) by stating that the club "is dedicated to safe foraging, identification and conservation of fungi."

This one local club is hosting three of the thirtyfive DNA sequencing grant projects. Regina Johnson, an ecologist with the state of Washington, is leading "Olympic Polypores". Regina says, "Wood-rotting organisms, including polypores, are a critical part of forested ecosystems." Steve Ness is examining "Hygrophoraceae of Lower Puget Sound," a group that he has been evaluating for several years [see article on p. 18], while Club members are also exploring more generally under the "South Sound Mycoflora Project." The group project struck scientific gold on a spring foray when South Sound Mushroom Club member Eric Chandler found a gilled bolete, believed to be *Phylloporus arenicola*, at Millersylvania State Park, which is a range expansion for this species. Eric's find is an excellent candidate for DNA analysis because of the confusion around the distribution of highly similar species, *Phylloporus rhodoxanthus*. We're eager to learn what the DNA says about Eric's find!

There was also strong success in supporting the Polypore project on the same foray. Regina Johnson found a "Smokey polypore," *Bjerkandera adusta*, M. Miazio found the "Elegant polypore," *Polyporus elegans*; E. Roberts found the Root Rot polypore *Heterobasidion annosum* and the Brittle Cinder fungus, *Kretzschmaria deusta*; while Mary McCallum hit a triple by finding Artist's Conk, *Ganoderma applanatum*, the Veiled polypore, *Cryptoporus volvatus* and the Purplepore Bracket Fungus, *Trichaptum abietinum*. This combination of expert leadership with many searching eyes is exactly what the group wants to continue to develop.

A very dry late spring and early summer in 2018 impeded further collections, but the members of the South Sound Mushroom Club will surely be back on the trails and stumps during the fall.

Meanwhile, the Public Broadcasting Service online site, "Rewire" has produced a short video on our area efforts. Follow Steve Ness as he shows how citizens can and do document mycological finds: <u>What mysteries do mushrooms hold? -</u><u>YouTube</u>

MUSHROOMING WHILE AWKWARD by Ellen King Rice

I fell into mycology. Truthfully, I first fell into a grassy yard that was infiltrated with moss, but that eyeball-to-the-earth experience nudged my brain a bit to consider there might be interesting things happening at the lawn level.

Let's be clear. I am wholly awkward. I suffered a spinal cord injury decades ago, which means I navigate with paralyzed feet encased in clodhopper orthopedic shoes. Leg braces and a pair of canes aid my short steps. Any unevenness in the turf or projecting stone or smidge of ice or slant of surface can be enough for me to reacquaint myself with the Law of Gravity, which is a rigged game in which Gravity always wins.

I've learned to take a breath after a fall. I make a point to look around while I am down at the gravel and duff level. It's a fresh perspective to see this tier of the forest from the side view. Also, taking a moment to see the mouse-high perspective lets my body's alarm system calm down after yet another crashing event. Most of the time, all I've damaged is my dignity, and dignity can be restored when I feel I am reconnoitering new territory.

It was at yet another failure to remain upright that I spotted tiny white mushrooms sprouting from a rotting Douglas fir cone. On another occasion I saw an insect-infested orange mushroom. The next find was a white mushroom wearing a skirt around its slender middle. My interest in mushrooms was growing, albeit slowly, as many falls yielded only close-ups of gravel and dust clouds.

Our home road presents ample opportunity to practice slow navigation. We live in rural western Washington on a five-acre forested patch accessed by a dirt road with a community mailbox row about two hundred yards away. As I walk to collect the mail, I concentrate on each step I take. I scan the road ahead, vigilant as a night watchman watching for any potential disruption to safety. I shuffle along, focused and wary.

Which turns out to be perfect for mushrooming.

Despite my first accidental finds, I was oblivious to much for a very long time. One fall day, I left our front gate to fetch our mail just as our elderly neighbor was passing by on the same errand. He was a bent and dour man and that day he seemed particularly irritable. I was in a perverse mood myself, so I took up the challenge of charming him. I played the babbling brook to his stoic rockiness. By the time we reached the mailboxes at the road junction, we were in agreement that bills and advertising were boring mail, but magazines made the journey to the mailbox worthwhile.

It was on the return toddle up the road that one cause of my neighbor's irritated mood became clear. His face contorted in anger as his words burst forth: "Why aren't you picking the chanterelles?"

"The what?"

"The chanterelles! The chanterelles!" He motioned with his cane at my front gate. His face finally softened when he realized he had lost me. You could see the realization set in as he became aware that not only was he speaking with an awkward woman, but she also seemed to be rather shallow in the brainpan as well. His next words were kind. "You have mushrooms," he said. "Good ones."

He began pushing aside a leaf here, a stick there and gold burst forth every time. Even more embarrassing was the fact there were a number of well-emerged chanterelles that were shining like spotlights—and I had not noticed them. We were ankle-deep in epicurean goodness and I had not noticed. Once the shapes and styles of hiding places were demonstrated, I knew "how" to look. Unfortunately, it was late in the season and the mushrooms were well past their prime. How awful it must have been for my neighbor to walk past every day that fall and see my woodland treasures sitting unappreciated and uncollected.

I vowed I would never again overlook such riches (which, Fungal Fates being what they are, meant that we have not had a repeat of such a flush of chanterelles). That year I subsequently looked for chanterelles on every trip to the mailbox. I looked in December, January, February and March before it dawned on me that fall mushrooms are best sought in the fall. I failed at collecting chanterelles, but I did acquire a better understanding of the forest floor paralleling our road.

A few years passed, as did my neighbor, and then one day the aging process struck my body with an ugly opening salvo. My previously feminine chin

MUSHROOMING WHILE AWKWARD, CONT.

Cont. from p. 20

began to sprout a few whiskers! These horrible protrusions were completely lacking appeal and I attacked them with tweezers and a vengeance.

In my disgust, I began to devise an alternate reality. I began developing a story line in which an older woman (a thoroughly adorable older woman) sprouted feathers instead of chin hairs. I recalled from a long ago biology class that feathers, like hair, were made primarily of proteins, so the biochemistry of my idea was possible—in fact, our bodies make proteins constantly. We have the cellular machinery, but instructions to the machinery would have to be different for a human to produce feathers. What could I use as a change agent?

It was again a fall day when I shuffled to the mailbox pondering the question of what could be a trigger to activate human DNA to perform a new function. A number of spider webs were glistening in the late afternoon sunlight. I studied them for a moment. A spider's bite would be ideal, but, dang it, Spiderman's creator had already used that device.

As I limped home from the mailbox, I spied a tall, pale mushroom on the edge of the road (one that I now know as *Coprinopsis atramentaria*, or "Inky cap"). Hmm... Could a mushroom activate a change in human cells? Weren't there some medicinal mushrooms?

My mail was left on the kitchen counter as I flew (well, shuffled more rapidly than usual) to the computer. My life changed that afternoon as I began a year's long immersion in things fungal. Before long I was greeting friends, family and complete strangers with "Did you know that mushrooms..." (Even the dog gets a harassed look at times). I've learned that the small white mushrooms that sprout from Douglas fir cones are *Strobiluris trullisatus* and that the orange jobs are highly desirable lobster mushrooms (*Hypomyces lactifluorum*) and that lean, gray road edge mushroom is *Coprinopsis atramentaria* or "Inky cap." I've learned that the white mushroom with a skirt may very well be an *Amanita*. I also collected dozens of rejection slips on my proposed story idea. The rejections didn't matter. The mushrooms kept popping up along the road and in my head, bringing to mind the folk proverb: Once the mushroom has sprouted from the earth, there is no turning back.

I wrote my story about mushrooms working as an epigenetic trigger to start feathers. I self-published *The EvoAngel* in 2016 and *Undergrowth* in 2018. I am now at work on a lichen story. A happy side effect of my adventure writing is how I now view difficult people. When someone is being obnoxious, I tilt my head and absorb details because one never knows what will come in handy when describing the next novel's murder victim.

Aging and awkwardness continue and will only intensify as the years arrive. I know I will become slower and have more opportunities to lose to the Law of Gravity. But, thanks to mushrooming along a dirt road on the way to the mailbox, I find I can embrace the words of Don Blanding, who wrote:

"I find that with the passing years my pace is just a little slowed. I may not go as fast or far but I see more on the road."

Ellen King Rice lives near Olympia, Washington. Learn more about her writing at: <u>https://</u><u>www.ellenkingrice.com</u>

FUN WITH THE MYCOFLORA PROJECT, CONT.

Cont. from p. 17

to science, but it was amazing! Yes, several species were collected for the Mycoflora project. However, I was like a kid in a candy (cap) store. Sarah and PSMC Treasurer Roger Heidt, who joined us for a walk there, both gave me most of their edibles. I thought they were the finest folks I ever met! I spent the next several days comparing the deliciousness of *Lactarius corrugis* to *L. hygrophoroides* to *L*.

volemus, in a variety of tasty meals. Plus, I now have a jar of dried bluegreen Russulas (*R. parvovirescens*) ready for a wonderful Thanksgiving side dish. Incidentally, it was Sarah who found that updated Russula species name for me. Before, I really only knew them as Yum!

MACRO PHOTOGRAPHS OF MUSHROOMS by Angela Wade



Amanita muscaria



Decaying Amanita muscaria

Dried out Amanita muscaria



More on the next page...

MACRO PHOTOGRAPHS, CONT.



Oyster Mushroom



Oyster Mushroom



Puffball



North American Mycological Association

Barbara Ching 2019 Ashmore Drive Ames, IA 50014-7208

Change Service Requested

Newsletter of the North American Mycological Association



Mushroom Photos by Angela Wade



British Soldier lichen

Two colors of Amanita muscaria



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