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Please address comments, complaints, and contributions to the Editor, Sara Jenkins at omphalina.ed@gmail.com

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We eagerly invite contributions to Omphalina, dealing with any aspect even remotely related to NL mushrooms. Authors are guaranteed instant fame—fortune to follow. Issues are freely available to the public on the FNL website.

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Cover: A fitting tribute for a master mycophile: the recently discovered *Gymnopilus voitkii*. For more about how this mushroom was recognized after hiding in plain sight for many decades, see p. 53. Image provided by David Malloch.

Message from the Editor



Hello again, friend of fungi!

Wow, what a weird summer it's been on the Avalon already; with a few hot weeks followed by a quick dip in mercury, our mushrooms have been fooled into thinking it's fall already! If this is the year you have been wanting to learn your local mushrooms, you've picked a good one. Here's hoping that our season is extended by this weather, rather than truncated by it...

This issue includes, among other things, an article focusing on a fitting tribute to Andrus Voitk's efforts to create and foster the fungi community here in NL—a mushroom named after him—and a nod to Beethoven. There's something for everyone.

On that note, I had intended to include a list of great “citizen science” initiatives and links... but wouldn't you know it, the North American Mycological Association beat us to it with an excellent list of their own. Please see the Announcements section for a link to their most recent newsletter, and also check out the note about Leho Tedersoo's request for samples from your own homes. Leho's household/houseplant fungus & microbes projects offer a unique opportunity for you to contribute to global science from the comfort of your home and local turf. If you envision grander plans beyond your own living room and would like to coordinate a local group to work on this project, please email the Editor (omphalina.ed@gmail.com) to help spread the word to our membership.

And as always, Happy Hunting everyone!

Sara



This charming little *Xeromphalina campanella* inspired the color scheme for this issue.

Foray Matters & Message from the President

Hello Foray NL Members,

Mushroom season is already upon us and it's looking promising. I hope you get lots of chances to explore, learn about, and enjoy the wonders around us. Sadly we won't be able to search for mushrooms, learn about lichens, or share local beer, moose-burgers and edible mushrooms together at a Foray this year—but we will look forward to Foray 2021 for that.

Despite that sad news, this year we are lucky to have an impressive collection of people who have agreed to share their knowledge and enthusiasm with us online. Running from late summer through October, Foray NL will be hosting a weekly online learning event. Join us to learn about everything from basic mushroom and lichen identification, to extracting mushroom essences for making sublime hot chocolate! There's so much exciting stuff out there to learn about. Keep an eye on your emails and on Foray NL's website (www.nlmushrooms.ca) and social media accounts (Facebook @ForayNL or Instagram @ForayNL) for more information and registration links.

There will still be an Annual General Meeting this year, probably in early October, with notification at a later date. The Foray Board is a working board, i.e. we all take on one or more significant tasks. It has a fairly diverse set of skills, but we can certainly benefit from new perspectives, so if you have an interest in joining the Board next fall, please let me know.

Hope we'll "see" you online soon, and until then, happy mushrooming!

Helen Spencer

July 7, 2020



The spores of the early spring pinkgill *Entoloma vernum* are certainly prolific, if not delicately pink. This little spore pile resulted from an approximately 10-hour spore print, and stands over a millimeter high!



Announcements

Document Your Dust: where curiosity meets research



map from sisu.ut.ee/funhome/avaleht

Here it is, folks, the project you've been waiting for...finally, someone wants to know what kinds of tiny monsters are loitering in those corners you just can't quite reach with the vacuum. Dr. Leho Tedersoo at the University of Tartu (Tartu, Estonia) is seeking samples of your household dust and swabs from plants in your favourite local environments for two related projects focusing on the global distribution of fungi and other microbes.

Read more about the projects and how to contribute here:

- [FunHome Global Household Dust project](#)
- [FunLeaf Biodiversity of Plant Leaf Microorganisms project](#)

Samples need to be received by **August 30, 2020**, so get swabbing!

More Citizen Science Resources

Instead of reinventing the wheel—or *slapping a big OMPHALINA sticker across the title bar and violating every copyright law ever written*—we'd like to point you to this [excellent recent issue of "The Mycophile"](#), published by the North American Mycological Association. The July/August issue has a list of resources to help you keep learning your mushrooms from a distance, as well as some important announcements and discussion of the recent lysteria outbreaks associated with packaged Enoki mushrooms. And of course, if you enjoyed this content, when you renew your annual Foray NL membership, hop on over to www.namyco.org and join there too. By supporting mushroom clubs and culture, big and small, you'll never miss any important mushroom news again!





Gymnopilus voitkii

David Malloch¹ & Greg Thorn²

INTRODUCTION

In February 2020 a new species of *Gymnopilus* appeared on the scene (header image). It was named *G. voitkii* in honour of Dr. Andrus Voitk, who has made so many valuable contributions to the mycology of Newfoundland and Labrador. Appropriately, it can be found throughout Newfoundland and is easy to recognize.

Gymnopilus voitkii belongs to a group of *Gymnopilus* species often lumped together under the name *G. junonius*, or sometimes *G. spectabilis*. Recent work on this group in Canada, though, reveals that we have several species, including *G. voitkii*. Oddly, *G. junonius*, a species everyone thought they could recognize, may not occur in Canada at all. Maybe not even in North America. Most of the Canadian species in this group grow on dead wood of hardwood trees such as sugar maple, oak, beech and basswood. Newfoundland, largely lacking an eastern

hardwood flora, probably also lacks most members of the *G. junonius* group. *Gymnopilus voitkii* is the exception because it is known so far to be confined to conifers, especially balsam fir.

Recognizing *G. voitkii* is not difficult. It is usually a large mushroom with an orange brown cap and a stem bearing a conspicuous ring or even an annulus. The flesh is yellow and extremely bitter. It often grows in small clusters on living trees, arising from old wounds. It may also be found on dead and fallen trees still in the early stages of decay.

Although it has only recently been given a name, *G. voitkii* is fairly widespread in conifer forests of North America. Aside from Newfoundland it has been collected in British Columbia, New Brunswick, Ontario and Quebec in Canada and in the spruce-fir forests of the Appalachians of North Carolina. All of the

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Canadian collections were made fairly recently, but the two records from North Carolina date back 70 years to 1950 and 1951.

So why, if it has been collected for at least 70 years, has it not until now been given a name? The answer to that is that it was always one of those species grouped under the name *G. junonius* (or *G. spectabilis*). Using any of the field manuals to mushrooms, this is where it would go. In fact, most of those manuals support the idea that *G. junonius* grows on the wood of both conifers and hardwoods, thus keeping *G. voitekii* neatly hidden away.

Suspicion that a distinct species might be present began with us in 2004, with collections made along the coast of the Bay of Fundy in New Brunswick, and from the Foray Newfoundland and Labrador, always growing on balsam fir. Several collections from both provinces were used by Greg Thorn in his lab to extract DNA and compare this with known DNA sequences of other species. To our delight, sequences from the supposed new species turned out to be quite distinct from those of all known species of *Gymnopilus*. Subsequent work with more collections and numerous specimens borrowed and sequenced from several Canadian herbaria strongly supported the hypothesis that it is a distinct species. These studies also revealed a complex of other species that require further work. Sixteen years later this work was finally published, including a formal description of the new species *G. voitekii*.

HOW TO RECOGNIZE IT

In Newfoundland and Labrador it is probably the only large, annulate species of *Gymnopilus* growing on the wood of conifers. There are some other species in the genus, such as *G. penetrans* and *G. sapineus* growing on conifers and hardwoods, but these are smaller and lack an annulus or ring. It seems to be most common on living or recently dead trees and characteristically arises from wounds near the base of the tree (Fig. 1, 2). In New Brunswick these wounds are almost always caused by porcupines, but in Newfoundland, without porcupines, there are other causes. The bitter taste of the flesh is probably not especially useful for identification of *G. voitekii* since many species of *Gymnopilus* have this taste. The fruiting bodies have a peculiar and characteristic odour, described in the species description.

Four other members of the *G. junonius* group have been identified in Canada. These are mostly quite similar



Figure 1 (above) and 2 (below): *Gymnopilus voitekii* often fruits from wounds on trees.



in appearance to *G. voitkii* but can be separated from it partly on the basis of their preference for softwoods or hardwoods. Beyond that it is more confidently done

using microscopic features, mostly size and shape of the basidiospores, the size and form of the cheilocystidia and the size and form of the caulocystidia (Fig. 3-5).

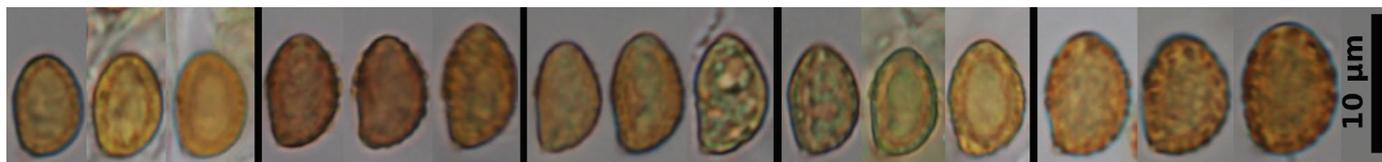


Figure 3: The basidiospores of all five Canadian species are illustrated above, with three spores each taken from different collections. These are, left to right, *G. luteus*, *G. speciosissimus*, *G. subspectabilis*, *G. ventricosus* and *G. voitkii*. Although the differences are subtle, the three species in the centre have a rather conical apex and often a flattening or depression above the apiculus (the point of attachment to the basidium). The ones at each end have a more rounded apex and are also more rounded above the apiculus.



Figure 4: The cheilocystidia (the cells along the edge of the gills), stained here in the dye “Congo Red”, are arranged in the same order as the basidiospores. It’s obvious that these are of less use in distinguishing the species than the basidiospores. Nevertheless, note that all have a sharply defined and nearly spherical “head” except for *G. ventricosus*, second from right, where the apex is barely swollen at all.

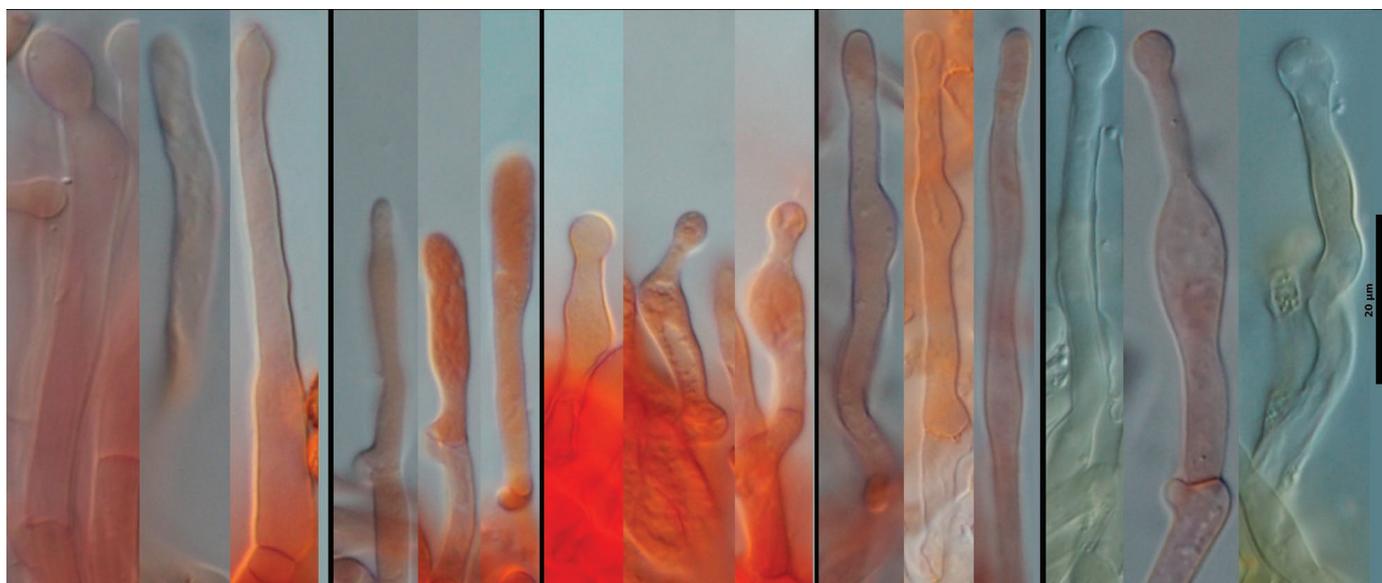


Figure 5: The caulocystidia, taken from the surface of the stipe above the annulus are more useful for identification than the cheilocystidia. Note here that two of the species, *G. speciosissimus* and *G. subspectabilis*, have rather short caulocystidia, measuring from the apex down to the first septum. The other three have rather long caulocystidia, with *G. luteus* and *G. voitkii* always, or often, having a swollen apex, while those of *G. ventricosus* are hardly swollen at all.

KEY TO FIVE SPECIES OF THE *GYMNOPILUS JUNONIUS* GROUP KNOWN IN CANADA

1. Growing on the wood of hardwoods – 2
1. Growing on the wood of conifers - 4
2. Basidiospores with a rounded apex and suprahilar region, 6.5-8.3 x 4.5-5.7 µm (average: 7.4 x 5.1 µm, Q = 1.45). Caulocystidia often longer than 40 µm above the first septum, frequently swollen at apex but often not consistently so – *G. luteus*
2. Basidiospores with a conical apex and suprahilar depression, larger than above. Caulocystidia mostly shorter than 40 µm above the first septum – 3
3. Very large mushrooms with caps 130-150 mm in diameter. Base of annulus green in young stages; cap and stem of strongly contrasting colours. Basidiospores 7.7-9.1 x 4.8-5.7 µm (average: 8.4 x 5.1 µm, Q = 1.61). Caulocystidia without a spherically swollen head – *G. speciosissimus*
3. Smaller mushrooms. Base of the annulus never green. Cap and stem not of strongly contrasting colours. Basidiospores 7.1-10.0 x 4.4-6.2 µm (average: 8.6 x 5.3 µm (average: 8.6 x 5.3 µm, Q = 1.61). Caulocystidia with a spherically swollen head – *G. subspectabilis*
4. Stem large and often swollen in the middle (ventricose). Basidiospores 6.6-10.2 X 4.0-6.3 µm (average: 7.9 x 5.2 µm, Q = 1.52), often with a subconical apex. Caulo- and cheilocystidia only slightly swollen at apex; pleurocystidia usually present and not difficult to locate. Known only from the west coast of North America – *G. ventricosus*
4. Stem not usually ventricose. Basidiospores 7.2-10.2 x 5.2-7.2 µm (average: 8.9 x 6.2 µm, Q = 1.43), broadly rounded at apex. Caulo- and cheilocystidia with a conspicuous head; pleurocystidia rare to absent. Known from both eastern and western North America – *G. voitkii*

DNA

Admittedly these mushrooms are difficult to distinguish, even with a microscope, so how do we know that they are not just one big variable species? To answer this question we have turned to molecular genetics to compare pieces of DNA from them. It is clear in Figure 6 that we have three distinct branches of the *G. junonius* group: 1) *G. voitkii*; 2) a group of species including *G. junonius*, *G. subspectabilis*, *G. speciosissimus* and *G. ventricosus*; and 3) *G. luteus*.

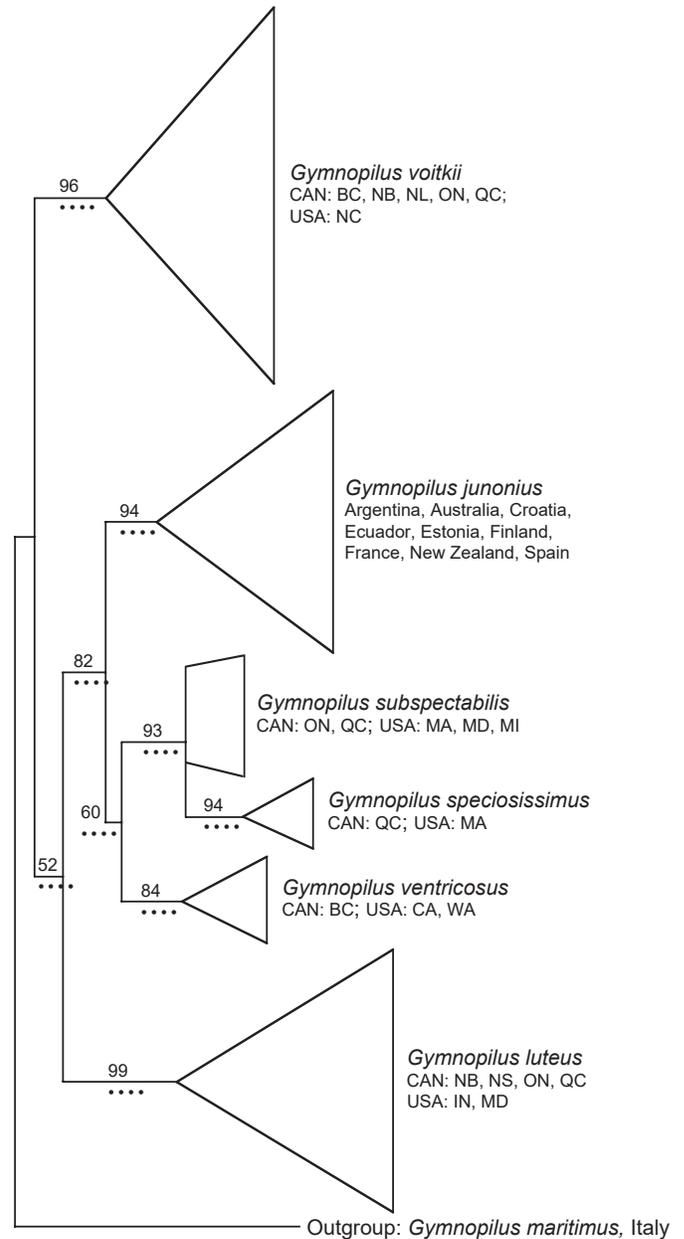


Figure 5: Figure 6: Phylogenetic tree of selected species in the *Gymnopilus junonius* group, based on sequences of the nuclear ribosomal DNA internal transcribed spacer (ITS) region. Numbers above the nodes are bootstrap values from neighbour-joining and below are from maximum-likelihood.

PRESENCE OF HALLUCINOGENS IN THE *GYMNOPILUS JUNONIUS* GROUP

Some members of the *Gymnopilus junonius* group have been reported to produce various forms of euphoria, laughter and hallucinations when ingested accidentally or intentionally, with reports going back to the 1950s and 1960s. Indeed, Sanford¹ has suggested that one of the 11th century tales in Konjaku Monogatari-shu may have referred to a member of the *Gymnopilus junonius* group, which is now often called the “big laughter-mushroom”, “big laughing Gym”, or “oh-waraitake” in Japanese. In this story, four Buddhist nuns who became lost in the woods decided to eat some unknown mushrooms rather than starve, and were overcome with the desire to dance. They came upon some woodcutters who were also lost and hungry, and after they too ate the mushrooms the nuns and woodcutters laughed and danced around together until the intoxication wore off and they all found their ways home. In the original story, the mushrooms were referred to as “dancing mushrooms” (“mai-take” in Japanese, although clearly not the same mushroom, *Grifola frondosa*, that we now know by that name). Studies of chemical extracts of North American and European members of the *Gymnopilus junonius* group have yielded contradictory results: the known hallucinogen psilocybin in some collections of some species², or none in any³. Japanese collections identified as *Gymnopilus spectabilis* were found to contain hallucinogenic oligoisoprenoids named gymnopilins, but no psilocybin or related tryptamines were detected⁴. The internet is full of confident claims of the hallucinogenic effects of *Gymnopilus* species, but given the intensely bitter taste of the flesh in most species we think you would need to be very hungry or very much in need of mental release to ingest any of these species. And, since we can't reliably identify any of them without resort to microscopy or DNA sequences (except *G. voitkii* in NL, where it is the only species in its group), we strongly advise against it. We hope that, having sorted out at least some members of the group in North America⁵, this information may lead to careful chemical studies linked to voucher specimens that are identified by microscopy and sequence data.

SO WHAT IS *GYMNOPILUS JUNONIUS*?

Most field manuals for North American mushrooms

use the name *G. junonius* or *G. spectabilis* for these large annulate species of *Gymnopilus*. Unexpectedly, sequencing of North American collections of this group have yet to turn *G. junonius* as it is known and described in its native Europe. On the other hand, sequences from collections made in South America and Australia reveal that *G. junonius* is present there and apparently fairly common. Why it is not in North America is a mystery. Maybe it's just not here, or maybe it is here, but has yet to be collected and sequenced. It's possible that it is native to Europe and has been introduced into South America and Australia along with commercial timber species, or, alternatively, it was introduced to Europe from the Southern Hemisphere. It may not have reached North America because we already have native species occupying its preferred habitat.

The “true” *G. junonius* seems to be a genetically stable group more closely related to the species having basidiospores with a conical apex, such as *G. speciosissimus*, *G. subspectabilis* and *G. ventricosus*. *G. luteus*, with rounded basidiospores, is more distantly related to *G. junonius*. *Gymnopilus spectabilis* is treated by most authors as a synonym of *G. junonius*, although it has also been suggested to be related or identical with *Phaeolepiota aurea*.

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TECHNICAL DESCRIPTION

Gymnopilus voitkii

Macromorphology: **Cap** conic-convex at first, expanding to broadly convex at maturity, with a low broad umbo or without an umbo, dry and with a matte and unreflective surface, glabrous to finely appressed-scaly, orange yellow to brownish orange, pale yellow below the surface tissues, sometimes with a submarginal fringe of veil remnants and then the annulus less well-defined, 27–155 mm in diameter. **Stem** equal to clavate or centrally swollen, sometimes extended slightly into a root-like base, dry, bare or with some small scales, greyish orange to brownish orange, 28–120 x 6–20 mm. **Gills** greyish yellow, slightly darker and developing some rusty stains in age, close to subclose, adnexed, not marginate. **Partial veil** forming a membranous and pendant annulus in some collections but with this reduced to a fibrous annular ring in others, often appressed to the stem in age. **Flesh** pale yellow, more orange toward the base of the stipe, often with a complex odour described as mushroom mixed with sweat, coconut or mint, very bitter in taste.

Micromorphology: **Basidiospores** ellipsoidal, with broadly rounded apices, coarsely roughened with large and irregular warts, darkening in 5% KOH, non-dextrinoid to lightly dextrinoid, 7.9–9.9 x 5.6–6.9 μm , $Q = 1.31\text{--}1.54$ (average: 8.9 x 6.2 μm , $Q = 1.43$). **Cheilocystidia** mostly bowling-pin-shaped but occasionally without a swollen to, 23.0–40.3 (length) x 4.8–9.3 (body) x 1.8–3.7 (neck) x 3.7–7.1 (head) μm . **Pleurocystidia** rare to absent, similar to the cheilocystidia but a less strongly defined head. **Caulocystidia** abundant above the annular zone, produced as terminal cells of long hair-like hyphae, narrowly ventricose-capitate to cylindrical-capitate, sometimes cylindrical and without significant apical swelling, 35.0–76.2 x 3.1–8.9 x 1.8–4.7 x 3.6–8.4 μm . **Basidia** 4-spored, clavate to cylindrical, usually constricted near or above the middle, occasionally stipitate, 28.9–39.1 x 7.3–9.2 μm . Clamp connections present throughout.



The mushroom, the gardener, and ...

Beethoven?

By Greg Thorn

If you open a mushroom book to find species related to *Gymnopilus voitkii*, which we just named after FNL founder Andrus Voitk¹, you will probably find another one called *Gymnopilus spectabilis*. OK, you wonder, why didn't they title their paper "New species of the *Gymnopilus spectabilis* group"? That apparently simple taxonomic question is the basis of part of this short note—only part of it, because the sociological context is way more interesting than who called which mushroom what.

Let's start with the mushrooms. And, as Andrus is fond of pointing out in other similar examples², none of this matters very much to Newfoundlanders (or folks from Ontario, for that matter), because none of these species really grow here. It's just that, over the years, various mushroom experts called some of the mushrooms that do grow here by these names. But, if any of you ever go to northern Europe and find a mushroom that looks much like *Gymnopilus voitkii*, you will want to know what to call it, right?

As with many questions about mushroom names, our story starts with the "father of mycology", Elias Magnus Fries (1794–1878) and with the first volume of his encyclopedic book of mushrooms, *Systema Mycologicum* (1821)³. There, Fries named *Agaricus junonius*, which he described as small, solitary mushroom with smooth

yellow cap, fulvous-yellow gills, solid stipe with an annulus, growing on rotting wood (beautiful, rare, October). Three years later, Johannes Anton Weinmann (much more on him later) described a mushroom with large, hemispherical cap, growing in troops on the ground in a grassy area of the Imperial gardens of the Empress Maria Feodorovna. Weinmann described his *Agaricus spectabilis* as entirely rusty and velvety ("*totus fungus ferrugineus, velutino*"), the gills white at first, and the surface of the annulus as having small scales or hair-tufts, and ridged ("*squamulosa vel floccosa, sulcata*"; Fig. 1a)⁴. Weinmann added that the species is close to *Agaricus vahlii* [first described by Schumacher in 1803 and treated by Fries in his 1821 *Systema*, where Fries described it as spectacular and big (*speciosus, amplus*)], and Weinmann goes on to speculate whether *A. spectabilis* shouldn't be added to Fries' list of spectacular species. Four years later, in his *Elenchus Fungorum* (1828), Fries accepted Weinmann's *Agaricus spectabilis*, paraphrased his description of it, then added a variety "b" growing on roots of oak, with no further description ("b. *ad radices Quercus Sept. Oct.*")⁵.

As the years went by, it was Fries' unnamed "variety b" that became the central concept for the species known as *Agaricus spectabilis*, later transferred as *Pholiota spectabilis* and then *Gymnopilus spectabilis*, and *Agaricus junonius* was mostly forgotten. As you can see (Fig. 1b), the fungus that became known as *Gymnopilus spectabilis* is neither small and solitary, nor large, totally velvety, and growing in troops on the ground. However, it is our best guess that the mushroom Fries described



Figure 1: Two versions of *Agaricus spectabilis* Weinmann: a) As described by Weinmann (1824), a totally rusty and velvety, large mushroom growing in troops on the ground, now known as *Phaeolepiota aurea*. Photo: Bernie, Public Domain, accessed at <https://commons.wikimedia.org/w/index.php?curid=8017836>); b) As the species became known after the writings of Fries (1828), a smooth-capped, smooth-stemmed mushroom growing alone or in clusters on decaying wood, now known as *Gymnopilus junonius*. Photo: Strobilomyces, CC-BY-SA 3.0, accessed at https://commons.wikimedia.org/wiki/File:Gymnopilus_junonius_110813w.JPG#file).

as *Agaricus junonius* was just a small, depauperate specimen. Under the International Code⁶, both names are “sanctioned” (approved by Fries), but since *Agaricus junonius* was published (and sanctioned) first, it would be the correct choice between the two if both names referred to the same species. However, the totally velvety, trooping mushroom growing on the ground (not on rotting wood) and described by Weinmann as *Agaricus spectabilis* seems like quite a different fungus, which—sadly for Weinmann—was named and sanctioned earlier as *Agaricus aureus* Matt. (1779, sanctioned by Fries in 1821). We now know this mushroom as *Phaeolepiota aurea* (Matt.) Maire (Fig. 1a), but it doesn’t grow here either^a. *Agaricus vahllii*, which Weinmann said was close to his *A. spectabilis*, is another among the numerous synonyms of *P. aurea*⁷. But wait a moment, say some mushroom experts: “I am not convinced that *Agaricus spectabilis* is synonymous with *Phaeolepiota aurea*... Open grassy fields are not right as it, too, likes forests, and grows in groups beneath deciduous and coniferous trees on disturbed ground, often together with nettles”⁸. The answer to this possible objection lies with Weinmann, the gardener who described the mushroom, and his garden.

Johannes Anton Weinmann (1782-1858; Fig. 2) was born in Würzburg, Germany, and almost seems to have been born a gardener. He worked in the Botanical Garden of Würzburg and then as assistant gardener at the estate of Count Andrei Razumovsky in Vienna, before taking the post as head gardener of the newly established Botanical Gardens of the University of Tartu, Estonia, at the age of 23 in 1805⁹. Weinmann assisted Gottfried Albrecht Germann, the founder and director of the gardens at Tartu (Dorpat in German, and Derpt in Russian), in moving the gardens to their new location in 1808-1810, and building the collection of plants grown there to over 4,600 species⁸. In 1813, Weinmann left Tartu to accept the position as director of the gardens at Gatchina Palace of the Dowager Empress Maria Feodorovna, and two years later transferred to the gardens of her other palace at Pavlovsk, where our story catches up with him. How could his *Agaricus spectabilis*, which (if it is *Phaeolepiota aurea*) likes to grow in disturbed areas of deciduous and coniferous forests, be growing in grassy areas in a palace garden?

Here I am indebted for insider information to Russian botanist Alexander Sennikov, working in Helsinki. When I emailed



Figure 2: Johannes Anton Weinmann, gardener, botanist and mycologist, and describer of *Agaricus spectabilis* Weinm. Image: University of Tartu, open access; URI: <http://hdl.handle.net/10062/66845>

to ask him about Weinmann and the Imperial Gardens of Pavlosk, he wrote:

“The area was created as a special landscape park attraction by Pietro Gonzago, one of the first landscape designers who worked in Russia. It was formed in place of some forest, according to the legend—by cutting trees selectively in order to produce a semi-open spectacular landscape. The area was managed after clearing to achieve a smooth grassy ground; however, there is no evidence of introduced grassland in the area (unlike in other places of the park). The area was originally developed during 1801-1828. Most probably, your fungus was collected from this man-made meadow some 10-15 years after the meadow had been established.”

^a *Phaeolepiota aurea* does grow on the wet West Coast (of North America, not Newfoundland), and has recently been found in parks and gardens on the US East Coast, but these may be a horticultural import from Asia since their sequences are subtly different from those of European collections.

Bingo! Weinmann's *Agaricus spectabilis* was collected in a disturbed area that had recently been a mixed forest of birch and pines, perfect habitat for *Phaeolepiota aurea*^b.

About the gardens at Pavlosk, Alexander Sennikov went on to say:

“The palace was a place of her [Maria Feodorovna] frequent residence; she lived there until her death in 1828. She owned and supervised the park, which is a real masterpiece of landscape gardening of the Age of Enlightenment. Inside the park, the territory included a botanical garden (Hortus Imperialis Pawlowskiensis), which was Imperial and private at the same time, but also truly scientific. Johann Anton Weinmann was employed as the Scientific Curator to the garden. The garden had a good area outdoors, and also greenhouses which were among the only two rich scientific indoor botanical collections in Russia of those times (the second was also private; that was the garden in Gorenki at Moscow, owned by Count Alexei Razumovsky, a person of big fortune and protector of natural sciences).”

Remember that name, Razumovsky? The young young Weinmann's second major gardening job was at the estate of Count Andrei Razumovsky in Vienna. And here I am indebted to my mentor and PhD supervisor David Malloch for this insight:

“I noticed the reference to Count Alexei Razumovsky, “protector of natural sciences”. That immediately reminded me of Beethoven, who wrote three string quartets for Andrei Kirillovich Razumovsky and dedicated his fifth and sixth symphonies to him. Andrei was the son of Alexei's brother Kirill, and thus Alexei's nephew. Alexei, born to a humble Ukrainian Cossack family, rose up in the world to found a dynasty of patrons of the arts and sciences.”

So, the next time you hear “*da da da dum*” (the opening strains of Beethoven's fifth symphony), you can think of a gardener and his spectacular mushroom—which still doesn't grow in Newfoundland.

^b For those of you with access to Google Maps, try going to 59.634 N, 30.444 E and have a look at the photos of the palace and garden, and from there you might wander a while in Wikipedia, reading about the Empress Maria Feodorovna, who remained in power for 27 years after the assassination of her husband, Tsar Paul I.

Acknowledgements

I thank David Malloch, Scott Redhead, Alexander Sennikov, and Andrus Voitk for contributions to this commentary, which in no way makes them responsible for errors you might find.

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The big cat and its brown sister, or **Catathelasma of NL**

By Andrus Voitk

When we designed our poster of edible mushrooms, Faye Murrin suggested a good common name for *Catathelasma ventricosum* would be **the big cat**. It is impressive because of its size, and equally impressive for being edible. The flavour is a bit aromatic and not to everybody's taste, but for most it is an exciting find.

In this province we have two species of *Catathelasma*. The big cat, *C. ventricosum*, described by Peck,¹ is the commoner, but we also have a very similar brown cat, which we have collected at our Gros Morne forays in 2003 and 2014, and on the Great Northern Peninsula in 2012. I have also collected it on the Port au Port Peninsula, where it appears regularly. Such a species was first described from Scandinavia, now known as *C. imperiale*, and I thought this was our brown one. However, a study by Vizzini and collaborators² reveals that *C. imperiale* is a European species, and the brown

one in North America, including ours, is *C. evanescens*, first described from Wyoming by Lovejoy, who also created the new genus *Catathelasma* for it.³ We know that these are the correct identifications for our species because in their study, Vizzini's team used the DNA from our NL collections, one grey and one brown.

How many were at our first foray, 2003, in Gros Morne? If you were, you will remember that our first faculty was made up of Kuulo Kalamees, Anu Kollom, Bellis Kullmann and Vello Liiv from Estonia, Vello Soots from Toronto and Rod Tulloss from the US. Kalamees was excited to see our cats at that foray (Fig. 1), both new species to him. He asked permission to take them home, which we gladly gave. In our first foray we did not have our preservation protocols defined, and did not keep any specimens; only those taken home by the faculty survived. Both our species were accessioned to the



Figure 1: a) *Catathelasma ventricosum* on the right and Kuulo Kalamees on the left. Not the best of lighting, but you can see that the latter is photographing the former in the woods along the trail to Stanleyville; b) Kuulo in better lighting, checking the dryer to see how his big cats are coming along.

fungarium at the Estonian University of Life Sciences (TAA), and both were sequenced and the sequences made available in GenBank. When Vizzini's team came to study this group, they used these sequences in their study. As a result, thanks to our very first foray, we now know the exact identity of our own species.

Separating the two in the field is easy: *C. ventricosum* really is grey (Fig. 2) and *C. evanescens* really is brown (title image; Fig. 3). Both are big (cap diameter can easily exceed 30 cm), have a double veil, and a pointed end to their stem. The gills of *C. ventricosum* are more obviously decurrent and its smell is "mushroomy", while the gills of *C. evanescens* may be more adnate, and it smells more mealy. There are also significant microscopic differences: their spore size does not overlap in length, reported by Vizzini et al.² to be 9.8–12.2 × 4.0–4.7 μm (average 11.0 × 4.4 μm) for *C. ventricosum* and 13.5–16.7 × 5.1–6.1 μm (average 15.1 × 5.6 μm) for *C. evanescens*; further, *C. ventricosum* has basidia about 45 μm long, whereas those of *C. evanescens* are around 75 μm. Both are limited to upper North America, east to west, whereas *C. imperiale* is restricted to Eurasia.

Acknowledgments

I thank Giovanni Consiglio for reviewing this manuscript and Kuulo Kalamees, Maria Voitk and the mushrooms for patient posing both in and out of focus.

Note: Please avoid the trap from which Giovanni rescued me. Despite its seemingly feminine ending with an "a", *Catathelasma*, like *Tricholoma*, is a neuter noun and takes a neuter adjective in Latin. Therefore, *ventricosum*, not *ventricosa*! Both are derived from Greek, resulting in unusual Latinization, so do not be fooled. For the meaning of *Catathelasma*, see caption to Figure 2a.

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Figure 2: *Catathelasma ventricosum*; a) Showing grey colour, double veil, decurrent gills and pointed stem. In the synopsis for her new genus, Lovejoy states, "The ring and volva, together with the very decided decurrent gills (upon which character the genetic name is based), are the telling characteristics of this genus of the Leucosporae." If you know that volva is the universal veil, which envelops the entire stem below the ring zone, then you get an idea of the shape of the unit from the decurrent gills down to the pointy tip of the stem. Wikipedia will tell you (with references) that cata and thelasma are two Greek words, downwards and suckling, that together suggest the shape of a teat. Once you see that shape, it will not escape your notice that there is a swelling in the middle of the structure, aptly captured by the epithet *ventricosum*, or bellied. While translating this into English is an option for the common name, I'd probably stick to the big cat... ; b) Maria with a large specimen in Sir Richard Squires Provincial Park. She did not collect it. Honest; c) A collection from near our house, showing the button forms. Slugs love this mushroom, and big slug holes through the cap are a distinguishing feature for the genus in this province.

Figure 3: [below] *Catathelasma evanescens* among dwarf willow on the Great Northern Peninsula. Note reddish brown cap, double veil, gills not as decurrent, and pointed stem. Squint hard to see the spore size difference. **Title image** from the Port au Port Peninsula. The red speck in the background is not a berry, but Maria, a bit out of focus.



THE MAIL BAG

The Editor thanks Teuvo (Ted) Ahti for writing in with the correct identification of this yellow rust, which was featured in *OMPHALINA* 11(2):42. This is *Exobasidium canadense* Savile.

Some of you may be saying “but that’s what the article said!”. And that may be true; those of you that received this issue by email will see it incorrectly identified as *Pucciniastrum vaccinii*, but those of you resourceful readers who downloaded the issue directly from the Foray NL website will see the error corrected. Ah, the beauty of digital media!



The Bishop's Sketchbook

Artwork by
Glynn Bishop



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