OMPHALINA

ISSN 1925-1858

Newsletter of FORAY NEWFOUNDLAND AND LABRADOR

Feb 2019 • Vol XI, No. 1

FORAY NEWFOUNDLAND AND LABRADOR

Board of Directors

President
Helen Spencer

Treasurer
Geoff Thurlow

Secretary
Robert MacIsaac

Directors
André Arsenault
Bill Bryden
Shawn Dawson
Chris Deduke
Rachelle Dove
Katherine Flores
Jamie Graham
Verlé Harrop
Sara Jenkins
Sean Martin
Maude Parent

Consultants

Mycological
Dave Malloch
NB MUSEUM

Auditor
Gordon Janes
BONNELL COLE JANES

Legal Counsel
Andrew May
BROTHERS & BURDEN

Webmaster
Jim Cornish

Past President
Michael Burzynski

Foray Newfoundland and Labrador is an amateur, volunteer-run, community, not-for-profit organization with a mission to organize enjoyable and informative amateur mushroom forays in Newfoundland and Labrador and disseminate the knowledge gained.

www.nlmushrooms.ca

info@nlmushrooms.ca

Foray Newfoundland & Labrador
21 Pond Road
Rocky Harbour NL A0K 4N0
Canada

OMPHALINA, newsletter of Foray Newfoundland & Labrador, has no fixed schedule of publication, and no promise to appear again. Its primary purpose is to serve as a conduit of information to registrants of the upcoming foray and secondarily as a communications tool with members.

Issues of Omphalina are archived in:

Library and Archives Canada's Electronic Collection
http://epe.lac-bac.gc.ca/100/201/300/omphalina/index.html

Centre for Newfoundland Studies, Queen Elizabeth II Library (printed copy also archived)
http://collections.mun.ca/cdm/search/collection/omphalina

The content is neither discussed nor approved by the Board of Directors. Therefore, opinions expressed do not represent the views of the Board, the Corporation, the partners, the sponsors, or the members. Opinions are solely those of the authors and uncredited opinions solely those of the Editor.

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

Accepting Contributions

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.

OMPHALINA

ISSN 1925-1858
Vol XI, No. 1
February 2020

CONTENT

Cover image: As close as we can come to a bleeding heart, this *Hydnellum peckii* is doing its best to wish you a belated Happy Valentine's Day. Image sent in to us by Carmel Conway.

For more information on the color variation during maturation of *H. peckii,* see Andrus Voitk's response in our "Ask An Expert" section. Got a myco-query of your own for our experts? Send it to the Editor at **omphalina.ed@gmail.com**.

Message from the Editor

Happy Belated New Year, 2020! And since it's been a while, Happy Belated Valentine's Day, too! What could be better for the cover of a belated Valentine's Day issue than a bleeding red mushroom?? What the *Hydnellum peckii* lacks in beauty, it sure makes up for in gasps of horror and disgust. Not to us of course… we've got the stomach for it! Don't let that last line fool you into think it's edible; Andrus Voitk offers some advice in our "Ask the Expert" column about keeping this species well away from your mouth. You stay unpredictable, fungi of Newfoundland!

It's hard to imagine there is life below the two meters of solid ice in my front yard here in St. John's, but laying out this issue has already got me excited for Foray 2020. After an 10-year gap, we will be returning to the parks, reserves, and wetlands of central Newfoundland, last visited by the Foray in 2008 and 2009.

Foray 2020 will be held on October 2–4 at Lion Max Simms Memorial Camp of Newfoundland and Labrador in Bishop's Falls, NL.

This location was a rich one for previous Forays, with 121 and 20 new-to-the-Foray species identified in 2008 and 2009, respectively. The region is also great for folks interested in pine-associated species, and those learning how to distinguish between the various members of the *Cortinarius* and *Lactarius* genera, judging by the reports to come out of those previous Forays*. Surely there will be a few more additions this year, especially since we are holding the Foray a little later than in previous years to see what surprises those extra few weeks and cooler temperatures will bring out. Keep an eye on Omphalina, members; registration will be open in late spring, first for members and then the general public.

I hope you enjoy this first issue of 2020, replete with a satisfying mix of updates to taxonomy, research, photography tips, answers to your everyday questions, and recipes to help you empty your freezer in anticipation of all of the fungi you'll find this fall.

Sara

* Previous Foray reports are available online at **http://nlmushrooms.ca/foray_reports_all.html**

Foray Matters

Want to learn more about the mushrooms and lichens of NL?

Attend the 2020

FORAY NEWFOUNDLAND AND LABRADOR

OCTOBER 2-4, 2020

LION MAX SIMM'S MEMORIAL CAMP, BISHOP'S FALLS, NL

- With Guest Faculty and Local Experts -

DETAILS AND REGISTRATION COMING SOON

WWW.NLMUSHROOMS.CA

Message from the President

Hello Everyone,

I'm writing this on a beautiful, sunny February day while also glancing out of the window at my garden, cozily blanketed with more than a meter of snow. I often hike on the lovely East Coast Trail with our dog and, just now, the thick layer of snow makes us at least 1 meter higher than usual which means frequently ducking small branches that are reaching down to poke at our eyes. Scanning the air for wayward branches is a change from the usual eyes looking downwards for mushrooms, flowers and berries. Will the snow have an effect on the coming season's bounty? Here on the Avalon, I have a feeling that the ground is hardly frozen under the snow and so I imagine fungal hyphae slowly growing under the insulation of snow. Have you ever noticed those mycelial mats covering lawns when the snow melts? I get them on my (rather wild) lawn. I bet there will be lots of it this coming spring. I think it's going to be a good year for fungi.

While fungal mycelia are sleepily at work under the snow, the Foray Board of Directors have been busy. We meet monthly by Skype to report progress, discuss ideas and make decisions about future Forays. At the last two AGMs our Foray board grew in size and shrank in average age, which I hope is a healthy sign for the future of the NL Foray. Fortunately, along with enthusiastic new members we also have a healthy number of experienced board members and the continued support of retiring members. I'm not sure we have thanked the retiring people properly, and so I'd like to do it here. **Thank you Michael Burzynski** (past President) and **Anne Marceau** (past Director) for your extremely hard work and dedication to the Foray over many years. I'm sure you will still be with us at future Forays, but hopefully can sit back and relax (well - just a little) at the coming Foray. I'd also like to acknowledge Sara who has taken on the significant task of editing Omphalina, **Jim Cornish,** our webmaster, and all the folks out there who are pulling together the data from the last Foray (release coming soon!).

Here are some of the things I can report from the board and for which there will be more details either in this issue of Omphalina or a future one:

Foray 2020 will be at Max Simms Memorial camp near Bishop's Falls, NL on October 2 to 4. Registration for Foray members will start in late April or early May—be sure to register early to secure your spot. Public registration opens a couple of weeks later

In late 2019, we received generous funding from the Minister of Fisheries and Land Resources which will go to support the next Foray. This is a sign of the value attached to our growing list of provincial fungi, lichens and slime molds. The collective work of so many citizen scientists combined with the support of expert scientists is generating an impressive amount of data, including new species and the writing of scientific papers (e.g., see Voitk et al.'s *Pseudoomphalina* article, this issue). It is valuable work and we should all be proud to be a part of it.

Foray NL is branching out a little. On March 26, 2020 we will be hosting an exciting, educational film "Fantastic Fungi" which will be shown at MUN's Bruneau Centre. Forthcoming details will be emailed to members, and advertised via local media/social media.

We are reviewing the Foray safety policies and procedures. If you have any safety concerns from a previous foray, please contact me at info@nlmushrooms.ca.

In the last Omphalina Andrus Voitk threw out a challenge to the current board to get the NL Government to **declare Cantherellus enelensis our provincial mushroom. Let's make it happen!** If anyone would like to help the board with this or has useful contacts, please let me know.

I've attended most of the NL Forays since 2008 and I've noticed one change that makes me a little sad. Where are the children? There used to be more of them at the Forays, and they are very, very welcome. Children are like sponges - they absorb and retain information so quickly. They notice details that adults don't and they contribute a special perspective to our events. A lifetime isn't long enough to learn everything there is to know about fungi, so it's best to start early. So this year, bring your kids and grand-kids—get them excited about nature!

Hope to see you in October.

Helen Spencer
February 24, 2020

Announcements

Missing in action: Vol 1 of 2012 Funga Nordica did not return home with me from the 2019 Foray. If you picked it up by accident, please let the Editor know at omphalina.ed@gmail.com. Picture at right shows the lonely Vol 2. They look alike, except for what is inside. No colour pictures.

Andrus Voitk, February 2020

Fantastic Fungi are coming to St. John's NL!

Get out those mushroom t-shirts! Mark your calendars! Tell your friends!

Foray NL is pleased to be organizing local participation in the global viewing event for the film Fantastic Fungi in the evening of **Thursday, March 26, 2020**. A public showing will be presented at Memorial University's St. John's campus. More details about this exciting event and information about how to purchase your ticket coming very soon!

For information about the film, visit

www.fantasticfungi.com

Pseudoomphalina and Pseudolaccaria of NL

Andrus Voitk, Irja Saar, Renée Lebeuf, Peter Kennedy

As a member of a mushroom club with a former *Omphalina* (current *Arrhenia*) as its logo and a newsletter named Omphalina, it behooves you to keep up with the latest about omphalinas and their allies in your neighbourhood, including, of course, the wannabe or pseudo omphalinas. To help you meet that obligation, we published a study of the *Pseudoomphalina kalchbrenneri* complex in North America in the recent issue of Botany.[1]

It began when John Tuach invited the lead author (AV) and his wife to look for mushrooms on his property in Pynn's Brook, near Deer Lake, NL. They finished the day with a stroll along the shore of Deer Lake, where, in the gravel of the beach near some dead alder branches, AV noticed a single small tan mushroom. It was *Omphalina*-like, but not something he recognized (see illustration with description). The specimen was sent to Irja Saar for sequencing, and the DNA came back as a close match for *Pseudoomphalina kalchbrenneri*. AV had never heard of *Pseudoomphalina*, but thought the name must be real, because nobody's sense of humour could be lame enough to make up such a name as a joke. About this time Renée Lebeuf found a nice collection of *Pseudoomphalina pachyphylla* in a sand dune on the road to Terra Nova (illustrated with description). That name has since been changed to *Pseudolaccaria pachyphylla*, but at the time, all of a sudden, we had two species of a genus we did not know existed.

This presented an opportunity to learn about them. *Pseudoomphalina kalchbrenneri* had been known in Europe since its description by Bresadola in 1883.[2] A major review was published in 1995 from the former Czechoslovakia,[3] which included spore measurements of Bresadola's type specimen, and the species was epitypified and sequenced in 2015.[4] The spores of our NL "*Pso. kalchbrenneri*" overlapped the European species on one end, but were noticeably smaller on the other (Fig. 1). Could ours be a different species, even though it looked like *Pseudoomphalina kalchbrenneri*? Might there be other species of *Pseudoomphalina* in North America? Indeed, three other species had been described from eastern North America: *Pseudoomphalina compressipes* by Peck, *Pseudoomphalina felleus* by Kauffman, and

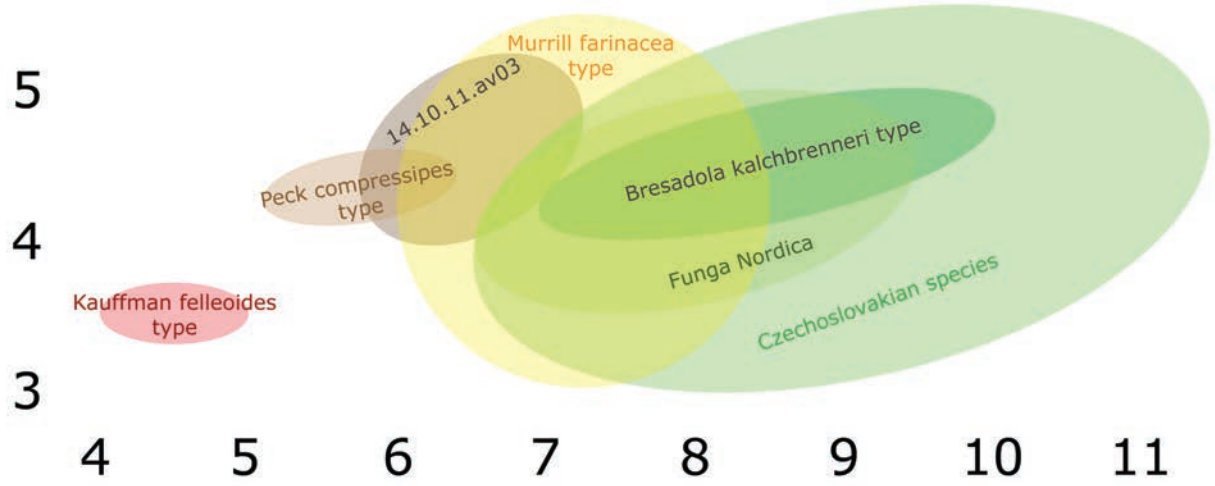


Figure 1: Chart of spore sizes of *Pso. kalchbrenneri* (green) from two European sources and measurements of type specimen by Kotlaba and Pouzar, compared to the Deer Lake specimen (14.10.11.av03) and three described North American species (size as reported by author in protologue). Measurements in µm, length on x axis and width on y. Note that despite marked overlap for most, spore size of all North American species extends lower than that of *Pso. kalchbrenneri*. All three eastern North American species turned out to be conspecific, and are now known by the oldest epithet, *Pso. compressipes*. The spores of Kauffman's species seem considerably smaller than the others. Our measurements confirmed that it did, indeed have smaller spores, but within the range we found for several specimens.

Pseudoomphalina farinacea by Murrill. All had smaller spores than the European *Pseudoomphalina kalchbrenneri* (Fig. 1).

To determine the species native to Newfoundland, Irja Saar sequenced the type specimens for these species. **Surprise**: all three were the same species, and the same as our Deer Lake mushroom, a species different from the European *Pseudoomphalina kalchbrenneri* (Fig. 2). The oldest name for this clade was *Pseudoomphalina compressipes*, so that becomes the correct name for them all, including our Deer Lake specimen.

We submitted these findings for publication, and the reviewers suggested we get a more complete overview of the complex across North America. Perusal of the available collections across North America confirmed that the reason we had found only one specimen in 16 years of collecting was because these are not common species. A quick estimate of the collections available suggested that studying less than 10 additional collections across the continent should produce as complete a picture for North America as is possible at this time.

This additional work proved very fruitful. It confirmed that *Pseudolaccaria* was a distinct genus from *Pseudoomphalina*, and *Pseudolaccaria pachyphylla* was a single species across the Northern Hemisphere, including both eastern and western North America. In contrast, the *Pseudoomphalina kalchbrenneri* complex has diversified into different species. Although the three species described originally from eastern North America turned out to be the same, we found two additional species to make, again, three different *Pseudoomphalina* species across North America (Fig. 2). On the Pacific coast, *Clitocybe intermedia* had to be transferred to *Pseudoomphalina* as *Pso. intermedia*, and in addition to our *Pso. compressipes* (illustrated with description) on the east coast of North America, we also identified a new species, *Pso. anticostica* (illustrated with description), first collected by Renée Lebeuf on Anticosti Island, QC. Although we have only found the former in NL so far, these species occupy the same range elsewhere. Because they are so uncommon, it is likely that *Pso. anticostica* will be discovered here as well, but it may take some time. Or maybe they are more common than we realize, but because they do not stand out, they may have been misidentified as a species of *CIitocybe* or discarded as unidentified specimens at forays.

Identification is difficult because all four species look alike. However, provided you know whether you are in Europe or the Pacific coast of North America, you can ascertain whether you have *Pso. kalchbrenneri* or *Pso. intermedia*, respectively (Fig. 3). The problem comes for us on the east coast, because it seems that both *Pso. anticostica* and *Pso. compressipes* occupy similar habitat

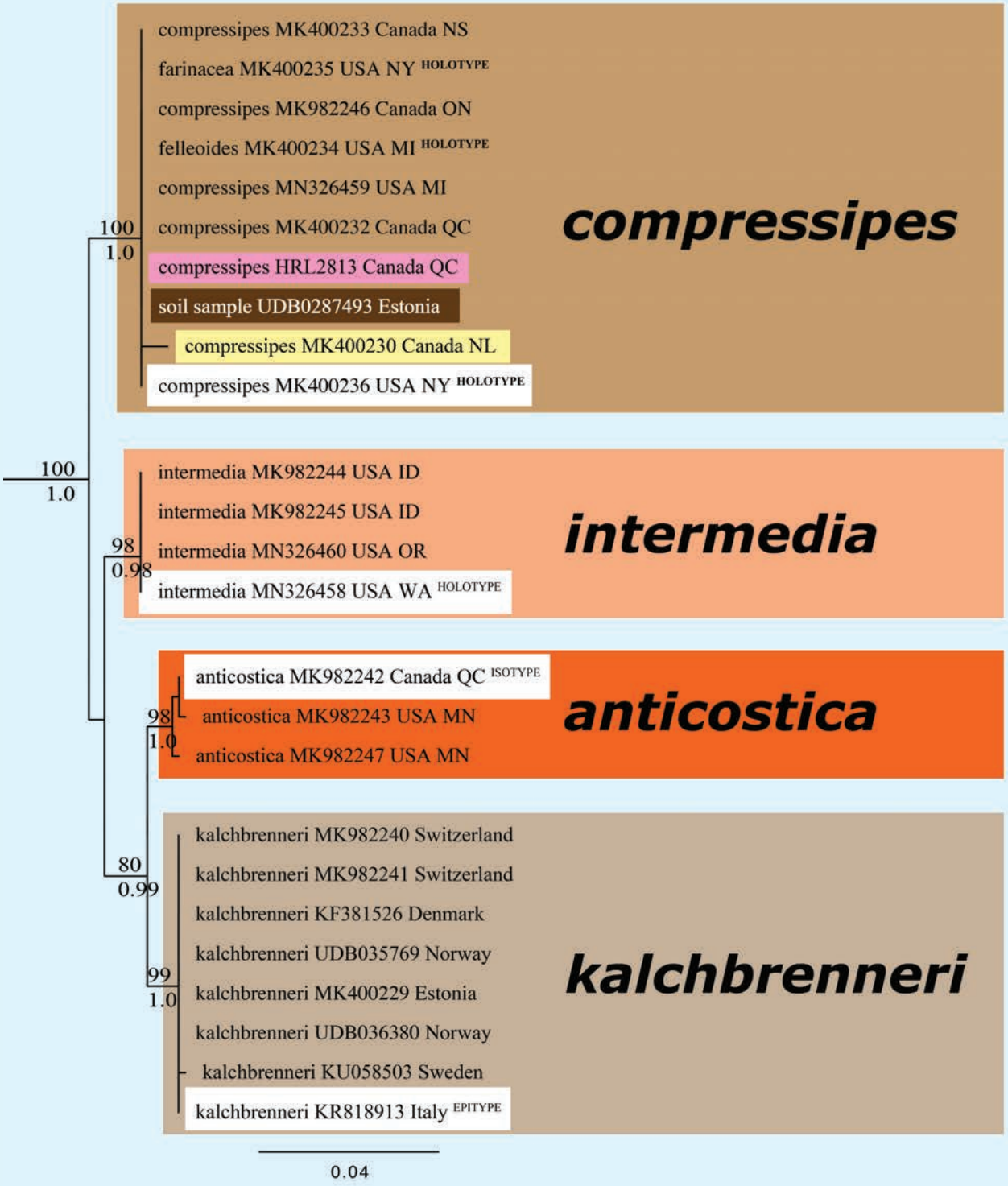


Figure 2: Phylogeny of the known species in the *Pso. kalchbrenneri* complex. The type specimens for each taxon are on a white background, fixing each name. After our first study, we were aware of only the top and bottom species. Because the reviewers asked us to study more, sequencing an additional seven (7!) collections revealed two more species in North America. From above downwards, *Pso. compressipes* from eastern North America; the Deer Lake specimen on yellow background. Note first, that the types for the later-described species *felleoides* and *farinacea* fall in the same clade with *compressipes* (i.e. are the same species). Note also the two additions since our article in Botany: the long-spored specimen from Québec on pink background that caused one of the authors (AV) to lose a Toonie bet to another (RL)—bet hitherto unpaid—and the environmental sample from Estonia on brown background, the first known report that this species extends beyond North America, although a second species of the complex has not been reported in Europe to date. Then *Pso. intermedia* on the Pacific coast of North America, *Pso. anticostica*, the new species, in eastern North America and the European species, *Pso. kalchbrenneri*. Note that *Pso. kalchbrenneri* and *Pso. anticostica* are sister species and also have the longest spores, whereas the more ancestral species, *Pso. compressipes* and *Pso. intermedia* have shorter spores.

Figure 3: World distribution of the *Pso. kalchbrenneri* complex. Knowing whether you are in Eurasia or the Pacific coast of North America will make identification of *Pso. kalchbrenneri* and *Pso. intermedia* easy. However, separation of *Pso. compressipes* and *Pso. anticostica* in eastern North America is more difficult. Spore size, despite significant overlap, may help. At least, this was the case until the DNA of *Pso. compressipes* was found in Estonia. Now we may find that species in Europe as well, changing this equation. Our problem in NL will remain the same: how to tell whether we have *Pso. compressipes* or *Pso. anticostica*, provided the latter is shown to grow here.

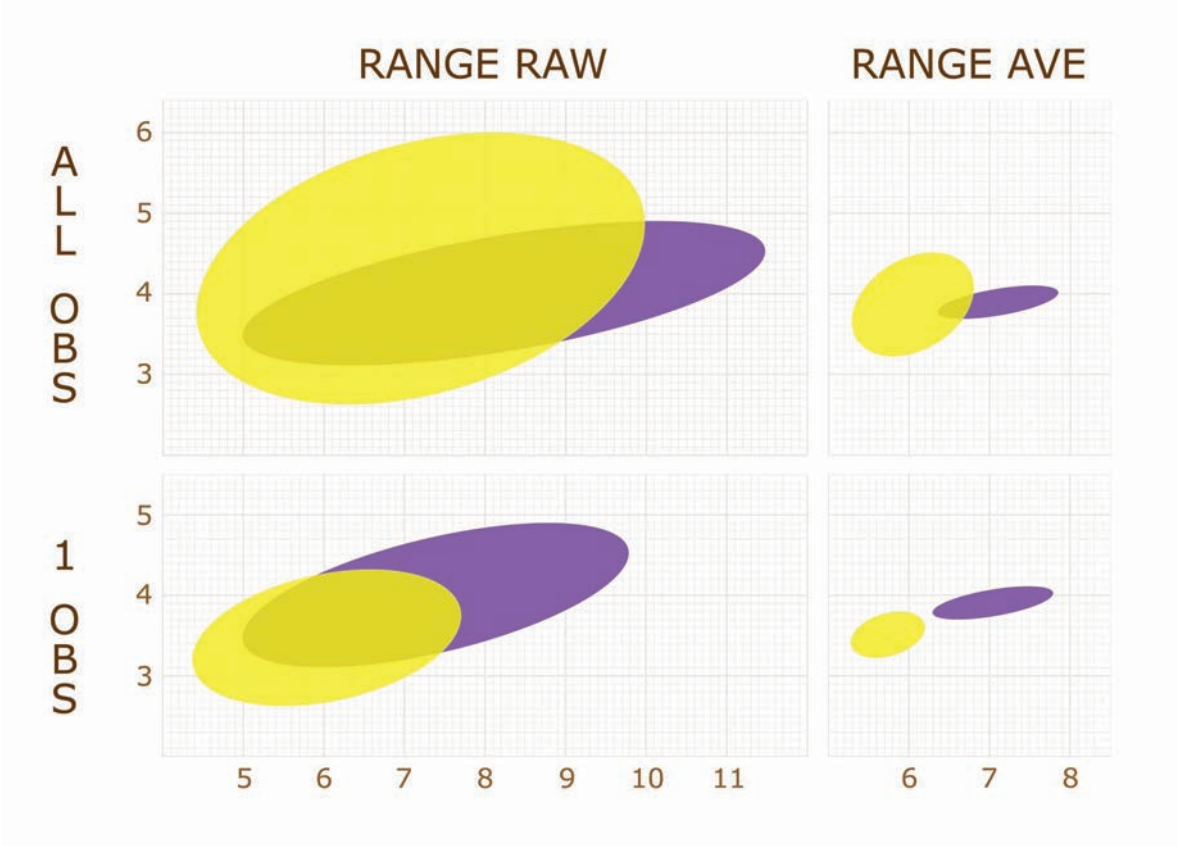


Figure 4: Comparison of spore size (µm) of *Pso. compressipes* (yellow oval) and *Pso. anticostica* (lilac oval) at the conclusion of our initial study. Length on x-axis and width on y. All measurements our own, using sequence-confirmed collections only. LEFT: range of raw data for all spores. RIGHT: range of average sizes for each specimen (min 20 spores/specimen). UPPER: data from all observers. LOWER: data for single observer (IS). Note that using average measurements reduces variation markedly, bringing out differences between species, and single observer measurements eliminate interobserver error due to individual differences of measuring. The combination separates the two species completely. While greater numbers of samples can be expected to cause some overlap, the effect will still be observed.

with a similar distribution. Most of the time they can be differentiated by spore size, despite significant overlap (Fig. 4); using average spore size will separate them better, and single observer measurement will refine the difference even more, as we reported in our article. Renée Lebeuf, who collected the holotype (Fig. 5) from Anticosti Island, also noted that *Pso. anticostica* seems more red in colour and occasionally *Pso. compressipes* seems to have a fuzzy cap, caused by upward projections of the long cells of the cap skin (Fig. 6). However, we have seen so few specimens, that for the moment we are not able to conclude whether these observations can be generalized to their species, or whether these characters may not also be seen in other species.

To underline how little we know about these species and how difficult it is to tell them apart, we describe two events after the report in Botany was accepted for publication.

Spore measurements and colour

Renée had some of her mushroom collections sequenced and among them one (see illustration with description of *Pso. compressipes*) was reported back as *Pseudoomphalina* cf. *kalchbrenneri* (i.e. if not the same, at least close). Having just worked on this group, we suspected this must be one of our eastern North American species. The spores were longer than any of our *Pso. compressipes* spores, and two average measurements fell outside the range for that species, but both measurements fit with *Pso. anticostica* (Fig. 7), suggesting it should be that species. Even the colour, although light, had some pink tones, which also fit with red tones noted for *Pso. anticostica*. However molecular studies placed the collection firmly in the *Pso. compressipes* clade (Fig. 2, pink background). Thus, this one collection has increased the range in spore size for *Pso. compressipes* from our report, thereby making it even more difficult to separate them by spore size (Fig. 7).

Figure 5: Holotype collection of *Pso. anticostica*, collected by Renée Lebeuf on Anticosti Island (HRL2133; DAOM970939). The florid crenulation-to-lobulation of the cap may be due to overmaturity, not a character of the species. We need more observation to learn reliable identification characters of this species. Photo: Jacques Landry.

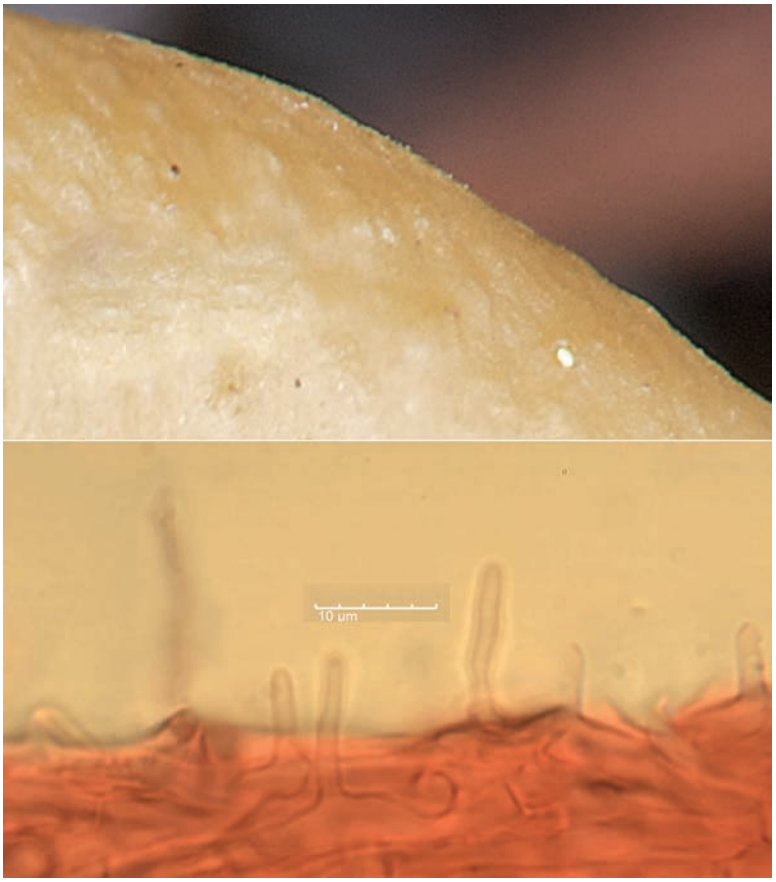


Figure 6: UPPER: cap of the Deer Lake *Pso. compressipes,* showing areas of fuzziness. LOWER: microscopic digitate hyphal projections identified by Renée, likely corresponding to the fuzzy areas of the cap. These were not seen on all specimens, so that we need more observations to know whether this is a useful identification character or something seen with other species as well.

Distribution

Irja came across a soil sample from Estonia that matched *Pso. compressipes*. Soil samples are bulk analyses of samplings of a portion of soil for the DNA of any or all species in the sample. Thus, it does not show the fruiting body, but merely indicates whether a species is present in the sampled soil of any specific place. Because the DNA of *Pso. compressipes* was found in Estonian soil, it means that the species must exist there, even if never reported or recognized.

First, this finding extends the range of what we thought as a North American species to northern Europe. That raises the question of why the species, clearly present in the soil, has never been recognized. The easy answer is that species of the complex are so alike, that one has been mistaken for the other. However, to date no collections with spore sizes as short as those of *Pso. compressipes* have been recorded in Estonia, or elsewhere in Europe. The epithet *compressipes* has been applied to some European specimens in the past, but these are now considered misapplications of the name, and the collections are considered conspecific with *Pso. kalchbrenneri*. In Europe only one other member of the complex has been described, *Pso. graveolens*. The macroscopic description of this species fits with any member of the complex, and the spore measurements fit best with *Pso. kalchbrenneri*, so these two species have been synonymized.

So long as there was only a single European species in the complex, this seemed logical, but now we know two things not known before: i) *Pso. compressipes* is also known to exist in Estonia, not far from the type region of Denmark, and ii) the spore measurements of *Pso. compressipes* may on occasion overlap those of *Pso. kalchbrenneri* considerably more than reported before. Therefore, at least theoretically, *Pso. graveolens* could be conspecific with *Pso. compresipes*. Unfortunately, this cannot be examined further, because the holotype for *Pso. graveolens* cannot be found. From a practical point of view, this is irrelevant, because *Pso. graveolens* was described after *Pso. compressipes*, so that in the case of conspecificity, the former name would become a later synonym. The foregoing was one of those Byzanthine discussions you may have to read several times, before you get the meaning, and then discover that it really does not matter... The long and short of it is that under the circumstances there seems no need to involve *Pso. graveolens*, but keep an eye out for *Pso. compressipes* in Europe.

Summary

This is the story of how a person who did not know the genus *Pseudoomphalina* existed, and who has in his life seen only one single mushroom of one species of the genus, got to be a world expert on this complex by virtue of following the advice of reviewers. As it turned out, the number of collections we needed to sequence after our first effort, in order to find the additional two species in North America, was seven. That is all it took to go from regional authorities to world experts! But as we see, after the report the new "world experts" still did not know these species very well. And the lead expert lost a Toonie bet to Renée in the process.

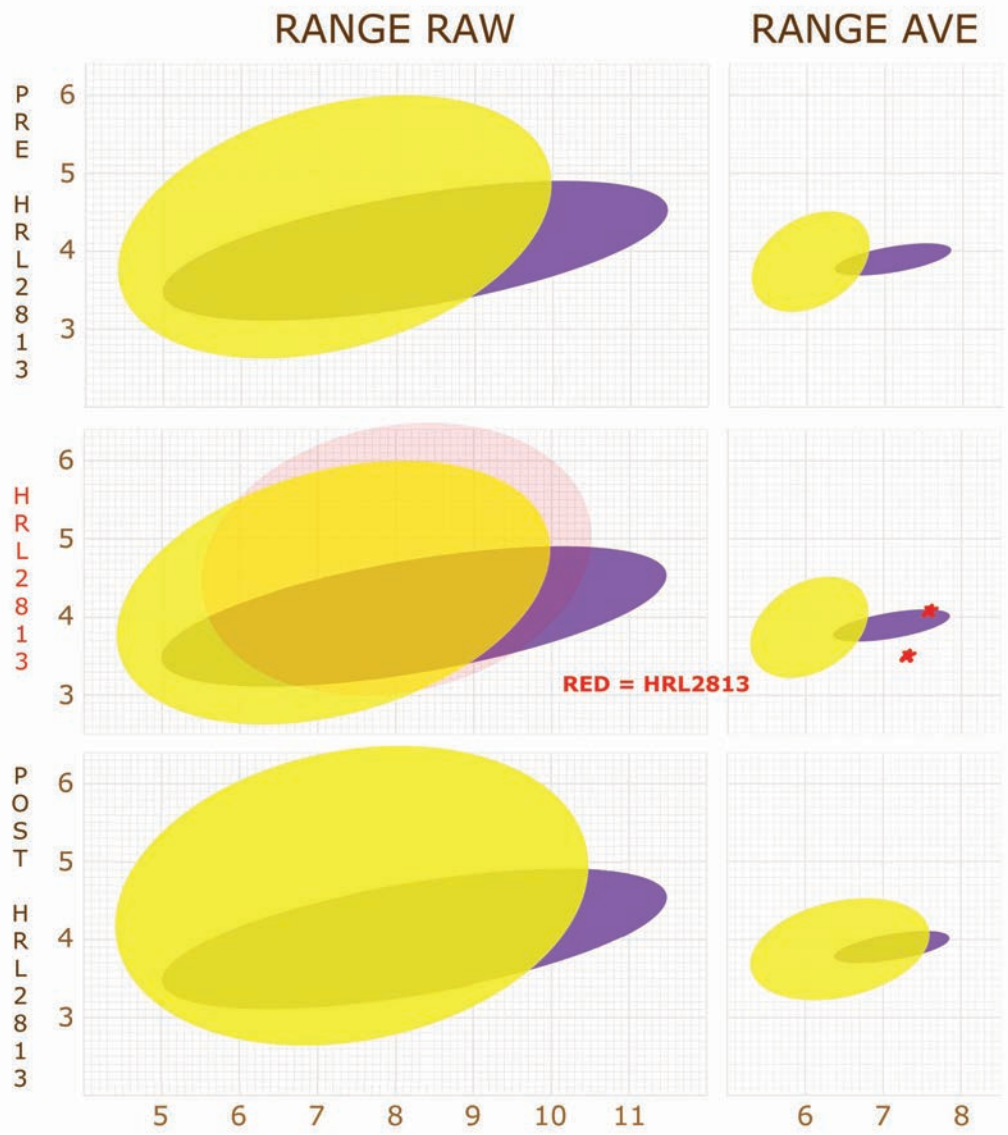


Figure 7: Revision of spore measurements because of a Renée's single collection, found after our initial report in Botany.
UPPER: The range and average spore size of *Pso. compressipes* (yellow oval) and *Pso. anticostica* (lilac oval), as reported in Fig. 4.
MIDDLE: The same graphic with Renée's later collection superimposed separately in red. The range size increase does not seem unusual, but the average size, which usually eliminates "noise" and becomes much more accurate and focussed, is significantly outside the range for *Pso. compressipes*. This is a very unusual finding.
BOTTOM: The spore size data revised from our previous publication after the addition of data from Renée's collection. The difference between the two species has now become very small, although spores of *Pso. anticostica* remain narrower than those of *Pso. compressipes*.

So, now you know that our *Pso. compressipes* has a wide range in spore size, and distribution to Europe according to soil sampling. **You read it here first!**

A brief description of *Pso. anticostica*, *Pso. compressipes* and *Psl. Pachyphylla* follows; the last two are confirmed from the province and the first likely also grows here.

Acknowledgments

In addition to the list in the peer-reviewed publication[1] of all the good folk who helped this happen, we thank Roger Smith and FNL, and Jacques Landry for the use of their respective photos. We thank Christian Lange at the Danish State Museum for pursuing the type of *Pso. graveolens* for us, and Pablo Alvarado for sequencing and permitting us to use the sequence of the last collection of *Pso. compressipes* from Quebec. And, here, to our embarrassment, we also need to add our gratitude for the loan of the Groves specimen from our own National Herbarium, DAOM, in Ottawa. Humble apologies for somehow omitting it and its staff from the acknowledgments in the Botany article. So sorry, Jen.

References

1. Voitk A, Saar I, Lebeuf R, Kennedy P. 2020. The *Pseudoomphalina kalchbrenneri* complex in North America. Botany 98: 91–101.

2. Bresadola G. 1883. Fungi Tridentini 1: p 32 t. 35 f. 2.

3. Kotlaba F, Pouzar Z. 1995. *Pseudoomphalina kalchbrenneri* (Agaricales) in the Czech Republic. Czech Mycology 48: 199–205.

4. Lavorato C, Vizzini A, Ge Z-W, Contu M. 2015. Redescription of *Clitocybe umbrinopurpurascens* (Basidiomycota, Agaricales) and revision of *Neohygrophorus* and *Pseudoomphalina*. Phytotaxa 219: 43–57.

Pseudoomphalina anticostica Lebeuf, Kennedy & I. Saar

MACROSCOPIC: Cap 1.5–4.5 cm, convex at first, depressed in the centre, becoming infundibuliform with age, with a margin incurved becoming strongly crenulate-lobate in old age; surface glabrous, hygrophanous, shiny; colour brownish orange to greyish orange. Gills adnate then decurrent, distant, becoming strongly forked and intervenose with age, thick, waxy, moderately broad; colour off-white becoming pale brownish orange in old age. Stem 2.8–5.0 × 0.4–1.6 cm, central, first cylindrical becoming flattened and flexuous with age, hollow; surface glabrous, concolorous with the cap, covered by white tomentum at base and bearing white rhizomorphs. Context thin; colour whitish. Smell farinaceous; taste farinaceous, bitter.

MICROSCOPIC: Spores 5.0–11.5 × 3.1–4.9 µm, ave. 7.2 × 4.0 µm, Q = 1.8, smooth, ellipsoid, amyloid. Basidia 29–50 × 6–7 µm, four-spored. Cheilocystidia 20–50 µm high, protruding up to 25 µm above the hymenium, 3–5 µm wide, 2–5 µm at the apex, abundant, filamentous, sometimes knobby, rarely branched, rarely capitate. Pleurocystidia rare, present close to gill edge, similar to cheilocystidia. Pileipellis (Fig. 3D) a cutis made up of repent hyphae 4–9 µm wide, mostly smooth, rarely finely incrusted. Clamps abundant in all tissues.

ECOLOGY, HABITAT & DISTRIBUTION: Putative saprobe. So far known from three collections, one made in mid-September in *Picea* needle litter in Quebec, Canada, and two made in early October on soil under young conifers in northern Minnesota, USA. For the time being, not documented in NL, but we suspect it may also be found here and has not been found because these species are rarely encountered here, and for this reason describe it, just in case you should meet it.

COMMENT: Given the small number of collections available, the sympatric *Pso. compressipes* and *Pso. anticostica* are difficult to distinguish macroscopically, but spore measurement may help, despite significant overlap. The colour of the fruitbodies might also be a distinguishing character, orange-brown in *Pso. anticostica* and tan to light-straw in *Pso. compressipes*. The specimens on Fig. 5 show marked crenulation of the cap edge, with larger specimens approaching lobulation; the two other collections look like the photo shown here, resembling the other species of the complex. We suspect that the size and florid crenulation-lobulation are the result of postmaturity hyperplasia, rather than distinguishing characters for the species. More collections will be necessary to confirm noted differences.

Pseudoomphalina compressipes (Peck) Singer

SYNONYMS: *Agaricus compressipes, Clitocybe compressipes, Clitocybula compressipes, Clitocybe farinacea, Pseudoomphalina farinacea, Clitocybe felleoides, Cantharellula felleoides, Pseudoomphalina felleoides*

MACROSCOPIC: Cap 2–4 cm, arcing downwards from an umbonate centre, edges lifting up to become infundi-buliform with crenate margin in age; surface glabrous, at times fuzzy or variously patterned, hygrophanous, opaque, but may be mildly translucent at edge; tan to light straw colour. Gills decurrent, narrow, close to subdistant, forked and interveined; colour off-white to straw. Stem 2–6 × 0.2–0.9 cm, central, ± equal, occasionally flattened ± longitudinally sulcate, pithy to hollow; surface glabrous; concolorous with to darker than cap, covered by white tomentum at base and forming white rhizomorphs. Context thin; colour whitish straw. Smell farinaceous. Spore deposit white.

MICROSCOPIC: Spores 4.4–10.5 × 2.6–6.4 µm, ave. 6.4 × 3.9 µm, Q = 1.7; smooth, ellipsoid; weakly to moderately amyloid. Basidia four-spored, 32–35 × 7–8 µm, clavate. Cheilocystidia 50–65 µm high, protruding up to 35 µm above the hymenium, 4–5 µm wide, 2–3 µm at the tips, uncommon to abundant, filamentous, thin-walled; pleurocystidia similar, rare to abundant, mostly present near gill edge. Pileipellis a cutis made up of repent hyphae 3–6 µm wide, mostly smooth, rarely finely incrusted; abundant cylindrical digitate projections 5–27 × 2–3 µm observed in one collection (Fig. 6). Clamps abundant in all tissues.

ECOLOGY, HABITAT & DISTRIBUTION: Putative saprobe. Terricolous on woody debris in open areas of leafy or mixed forests. Uncommon, occurs in scattered to moderate groups in the autumn; confirmed in northeastern North America as far west as Michigan. The only species in the complex documented in NL, it is now also known from Europe, found in a soil sample in Estonia.

COMMENT: Digitate projections of pileipellis hyphae have not been noted before in this group. We documented these projections in one basidiome of one collection (CMMF2076, Fig. 6). We did not find these structures on other collections or a different basidiome from the same collection. More observations are needed to know whether this is a differentiating character or an uncommon event in this and possibly other species of the complex. It differs from the sympatric *Pso. anticostica* by smaller spores.

Pseudolaccaria pachyphylla (Fr.) Vizzini & Contu

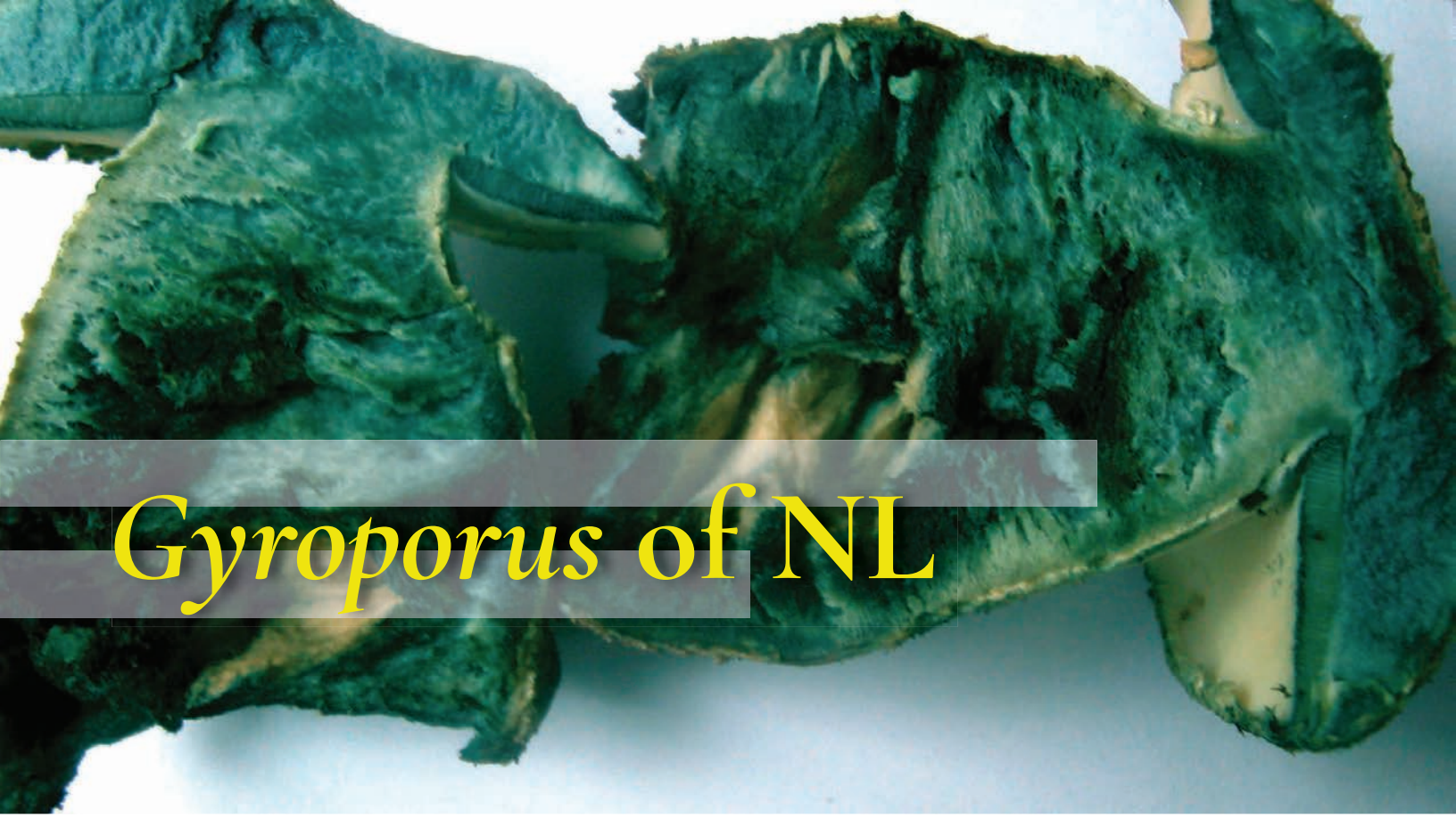
SYNONYMS: *Agaricus pachyphyllus, Clitocybe pachyphylla, Camarophyllus pachyphyllus, Omphalia pachyphylla, Pseudoomphalina pachyphylla*

MACROSCOPIC: Cap 1–3.5 cm, convex, usually with an umbilicate centre, becoming nearly plane; surface finely scaly, non-hygrophanous, tan to light straw colour. Gills sinuous, adnate, usually with small decurrent tooth, broad, thick, subdistant; colour light straw. Stem 2–5 × 0.15–0.25 cm, ± equal with slightly swollen base; surface glabrous to finely tomentose; pithy; concolorous with cap or slightly darker; white tomentum at base. Context firm; colour whitish. Smell farinaceous to near-rancid. Spore deposit white.

MICROSCOPIC: Spores 6.0–8.5 × 4.5–5.5 µm, ave. 7.1 × 4.9, Q = 1.4; smooth, weakly amyloid. Basidia four-spored. Cystidia none. Clamps in all tissues.

ECOLOGY, HABITAT & DISTRIBUTION: Putative saprobe. Terricolous in sandy, poor soil and moss of open areas in or near mixed forests, autumn, in scattered to moderate groups; uncommon; recorded in a boreal band across the Northern Hemisphere. Documented once in 16 years in NL.

COMMENT: Among differences from species in the *Pso. kalchbrenneri* complex are its smaller size, finely granular cap, non-decurrent to subdecurrent gills, larger spores, complete lack of cystidia, preference for poor, sandy soil, and circumpolar distribution. The ability to thrive in poor soil with little evident source of nutrition suggests that it may be worthwhile to question the lifestyle of this putative saprobe. Photo: Roger Smith.



Gyroporus of NL

Andrus Voitk

This article is prompted by a recent report, "A global view of *Gyroporus*", by Davoodian et al., 2018.[1] A global view may be difficult—which, no doubt, is why Davoodian had so many helpers—but discussing the genus *Gyroporus* in NL is easy: we have only one species, *G. cyanescens*, and it is not common (Fig. 1). We have never collected it in 16 years of forays, but I have one collection of one mushroom, found on our lawn under birch in 2004. So the provincial review of the genus involves learnedly discussing one single mushroom found 15 years ago. If it were more difficult, you would not see me tackling it.

The genus, found on all continents save for Antarctica, comprises mycorrhizal boletes with a yellow spore print, clamp connections and non-longitudinally arranged stem hyphae. Like *G. cyanescens*—as its name implies—many (but not all) of its species undergo an intense bluing reaction in response to injury. Also, as the name implies (cyanescens = turning cyan, from the Greek "kýanos " for "dark blue", which is a bit misleading from a chromatic point of view), at times the bluing reaction of *G. cyanescens* tends to be a bit greenish, not pure blue (title banner—admittedly some of the green may be attributed to uncorrected incandescent lighting). This species has been documented in Europe, Japan, North America and South Korea. The specimen illustrated here (Fig. 1) is only about 6–7 cm tall, and exhibits the features of the species: a densely hairy cap, white pore surface becoming yellowish, whitish stem with sharp ring zone, whitish-yellowish flesh turning instantly blue to cyan if cut, very uncommon in NL, growth with birch. What catches your attention immediately is the dramatic, deep and swift appearance of the blue staining reaction.

The only other bolete species I have seen in NL with a comparable bluing reaction is *Suillellus* (formerly *Boletus*) *subvelutipes* (Fig. 2) but the chemical staining pathway differs and it is an entirely different mushroom: bigger, velvety cap, yellow pore surface becoming red, stem red with white fuzz toward base, no sign of ring zone, whitish flesh turning instantly dark blue if cut and becomeing almost black, common, growth with conifers.

There you are: this review of *Gyroporus* was so easy that you got a second species described for free. The vigorous bluing reaction identifies them for you immediately, but

they differ morphologically; mistaking one for the other should not be a problem.

Look for the attractive G. cyanescens, and **if you find any, please photograph, collect and let the editor know.** That way we can get a better picture of the distribution of this uncommon bolete in the province. It is reported to be edible, but at the rate of finding one small mushroom every 20 years, you might do better to look elsewhere for your victuals, and let these continue spreading spores...

Acknowledgment

The author thanks Naveed Davoodian for reviewing the text, thus absolving me of any responsibility for errors.

Reference

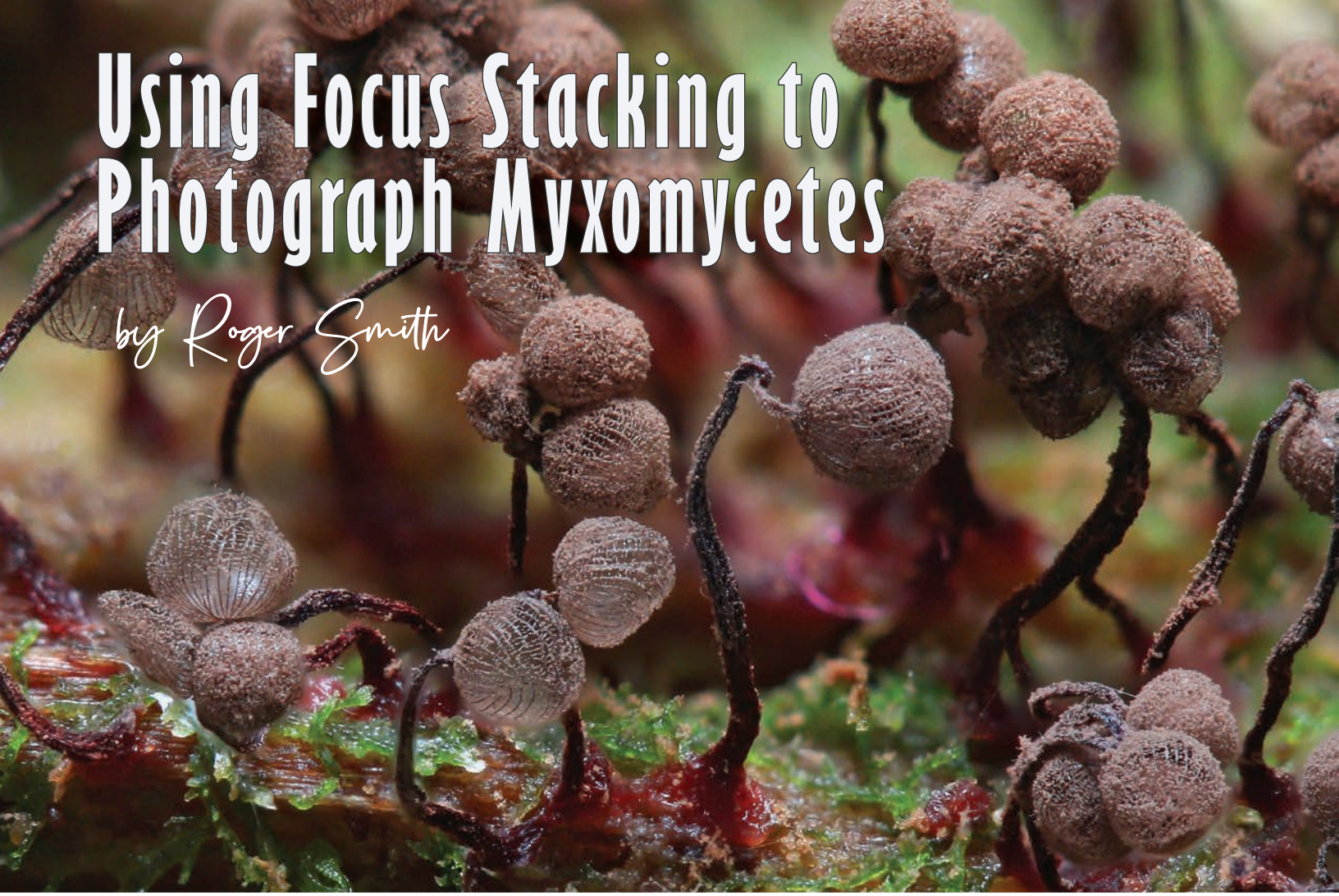
[1] Davoodian, N, Bergemann, SE, Hosaka, K, Raspé, O, Bougher, NL, Fechner, NA, Henkel, TW, Gelardi, M, Soytong, K. Naseer, A, Oritz-Santana, B, Baroni, TJ, Nagasawa, E, Smith, ME, Halling, RE. 2018. A global view of *Gyroporus*: molecular phylogenetics, diversity patterns, and new species. Mycologia 110:985–995.

Figure 1: UPPER: Swift blue staining of *Gyroporus cyanescens* is clearly visible; LOWER: this species also exhibits a densely hairy cap.

Figure 2: *Suillellus subvelutipes* showing a superficially similar, but actually very different bluing reaction in a noticeabl ydissimilar mushroom.

Using Focus Stacking to Photograph Myxomycetes

by Roger Smith

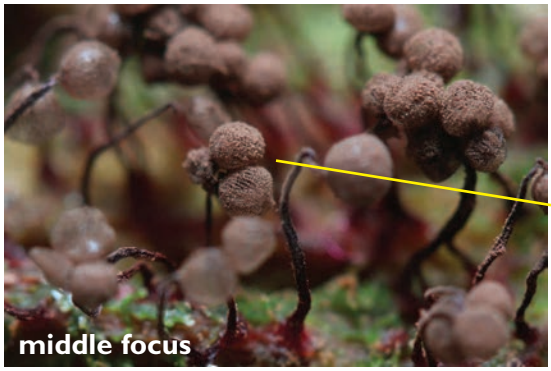


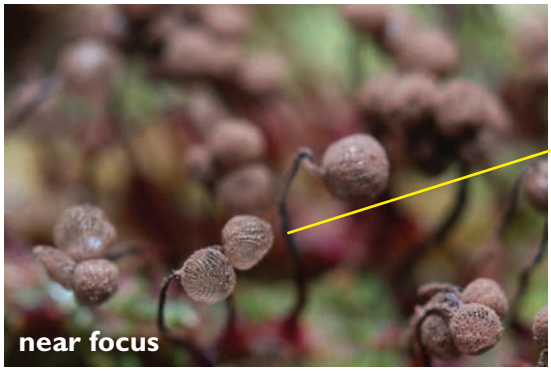
One of the challenges of macro photography is getting enough depth of field in your photos. Depth of field (DoF) is a term that describes how much of your subject is in sharp focus from front to back. Under extreme close-up conditions DoF is vanishingly small. The standard way of increasing depth of field is to use a small lens opening (also known as the aperture or f-stop). Even very small lens openings like f/16 and f/22 may be insufficient to get everything in focus in macro photography, and to make matters worse, using such small apertures at such close distances will result in an overall loss in image sharpness because of lens diffraction.

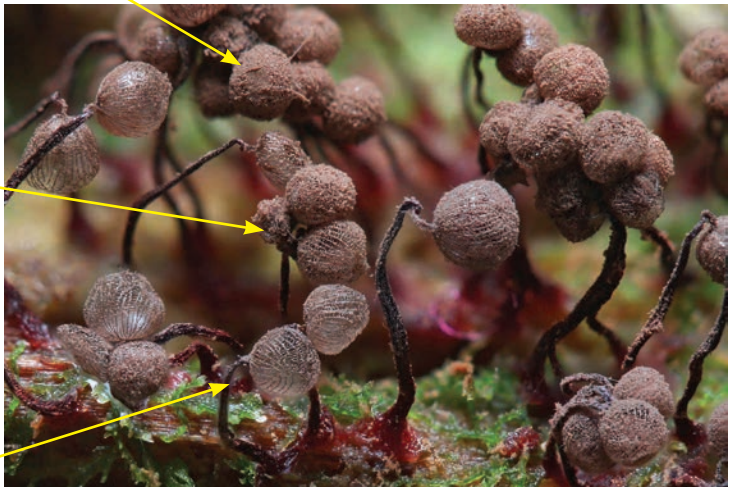
Focus stacking is a high-tech solution to this problem. The process involves taking several photographs of your subject, each of which is focused at a different distance from the front to back of the area you want to cover. There can be no subject movement or sideways camera movement, so use of a tripod is *essential*. Mount your camera and macro lens on a focusing rail for the most precise results. Use manual focus and a medium aperture like f/8, and take enough photos to make sure the focus of each one overlaps the next. Each photo will render a small part of the scene in sharp focus. You then transfer the photos to a computer running some type of focus stacking software. The software will analyze the images, selecting the sharpest sections of each individual photograph, and combine them into one photo that will display the full scene in sharp focus from front to back. This can be accomplished with as few as 5-10 images, or up to 100 or more.

There are several software packages available for focus stacking. Some, like Helicon Focus (HeliconSoft.com), are specifically designed for focus stacking. Other image editing programs like Adobe Photoshop and Affinity Photo contain a focus stacking function as one of their features.

The photographs accompanying this article are of the organism identified by myxomycete expert and Foray Faculty member Anna Ronikier as *Cribaria cancellata*, found on the 2019 Avalon Peninsula foray. The globular sporangia shown in the photos are only about 0.5mm in







diameter, so they are a challenging macro subject. The first three photos (left) illustrate the near-focus, mid-focus and far-focus points of the subject, no more than a couple of millimeters in total depth. The fourth image (below) is a stack of 10 photographs combined using Helicon Focus to render the whole scene in sharp focus. Refer to article header image to see in greater detail.

Editor's Note:

Like us, if you can't get enough of the incredible slime mold images made possible through focus stacking, check out the work of these other international photographers whose art highlights the minute and the often-overlooked:

Alison Pollack documents the tiny fungi of northern California on her Instagram account, https://www.instagram.com/marin_mushrooms/. Alison's work has recently been highlighted in a PetaPixel feature: https://petapixel.com/2019/12/05/photographer-shoots-stunning-super-macro-photos-of-minuscule-mushrooms/

Sarah Lloyd is an award-winning Tasmanian naturalist, photographer and author. She has written two books on slime moulds, including *Where the Slime Mould Creeps* (https://www.nhbs.com/where-the-slime-mould-creeps-book) and another forthcoming publication *Myxomycetes at Black Sugarloaf*. For more of Sarah's photographs, check out her blog at https://sarahlloydmyxos.wordpress.com/ or follow her on Instagram https://www.instagram.com/sarah.lloyd.tasmania/

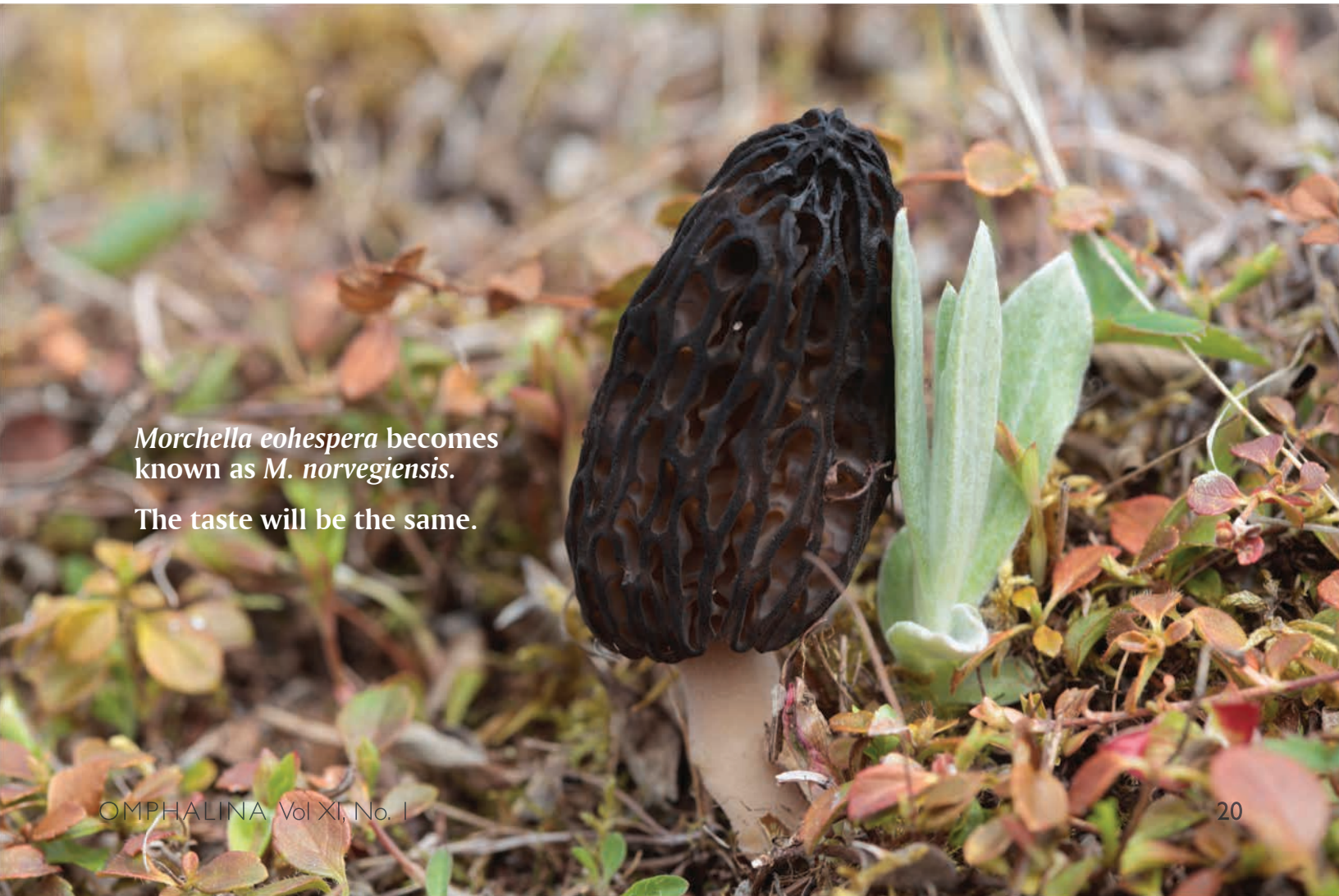
ONE OF OUR MORELS CHANGED ITS NAME—*AGAIN*

Andrus Voitk

I know there is still snow on the ground, but before you know it, morel season will be upon us. Then we shall need to know how to call them, or they will not come. One of our morels, which we described with the name *Morchella eohespera*, has changed its name, and is now properly known as *Morchella norvegiensis*. This has just been reported by Westholt, Alvarado, Kristiansen and Gulden in Agarica 39:1–22, 2019.

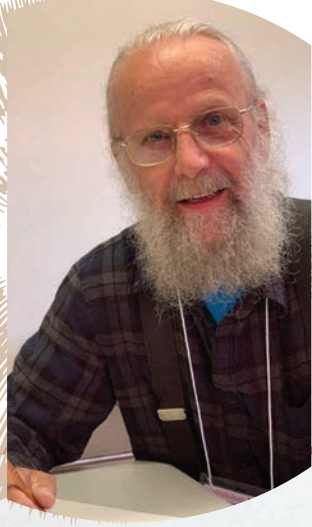
This name is not as new to this species of *Morchella* as you might think. It was described with that name from Norwegian specimens by the French mycologist E. Jacquetant. Before we described our three species, we suspected one might be *M. norvegiensis* (refer to Voitk 2015, "The hunt for *Morchella norvegiensis*", Omphalina 6 (4): 13-19). The type specimen had been sequenced, but did not yield enough DNA to be able to confirm. To settle this, Maria and I spent our 50th wedding anniversary in Norway, as guests of Gro Gulden, driven around by Jon-Otto Aarnæs, with the intent of picking some specimens of *M. norvegiensis* for sequencing in the hopes of getting more DNA. Unfortunately, the type site had been washed into the river years before, so we could not get specimens that could be identified reliably as that species by Roy Kristiansen, the man who collected the first specimens. During this study, however, a specimen collected from the toposite six years after the holotype and identified as *M. norvegiensis*, was located, which on sequencing fell into the same clade as *M. eohespera*. That specimen was declared the epitype for *M. norvegiensis*.

This means that from now on *eohespera* is set aside as a later synonym, and the species becomes known as *M. norvegiensis*, as the earlier name. The taste will be the same.



The Bishop's Sketchbook

Artwork by Glynn Bishop



Forage to Fork

with Shawn Dawson of Barking Kettle

In this issue, Shawn helps us clean out our pantry by making a hearty soup from the hedgehog mushrooms we picked and dehydrated last fall, and finds a new use for the chaga you might be harvesting this winter. In a pinch, substitute whatever mushroom broth you have at hand for the chaga tea.

Cream of Hedgehog Mushroom Soup.

Ingredients:
- 20-30 grams of dried hedgehogs
- 1 tsp of fresh Thyme leaves
- 3 tbsp of butter
- 2 cups of chaga tea
- 1 cup of veg or chicken stock
- 1/2 cup of whipping cream
- 1 onion (chopped)
- handful of fresh parsley
- 1/4 tsp ground pepper
- 1/4 cup all purpose flour
- Sea salt

Preparation instructions
on the next page

First step is to rehydrate your dried hedgehog mushrooms. Do this by placing them in a narrow bowl and soaking them with warm water.

While you're waiting for your mushrooms to rehydrate melt 1 tbsp of butter over med-high heat. Add chopped onions and cook until they soften.

Remove hedgehogs from bowl but do not throw out the water. A lot of the mushrooms flavor will be in the water. Add your hedgehogs, thyme, salt and pepper to pan of onions.

Add the second tbsp of butter. Cook, stiring regularly until the mushrooms and onions start to brown. Now the last tbsp of butter stirring it until it melts. Add the flour stirring constantly for 30 sec to a minute. Add the chaga tea and stocks and stir while returning the mixture to a boil. Reduce heat to a med-low and simmer. Stir ocasionaly for 10 minutes.

lastly. Add the heavy cream and cook for a minute or two. Add fresh parsley and salt to taste. Enjoy!

Hope you enjoy it!

- Shawn Dawson

ASK AN EXPERT

Carmel Conway sent us this image of a VERY red and VERY oozy bleeding tooth mushroom. It was so much darker in color than this Editor had ever seen, so we asked Andrus Voitk if we had the correct ID, and about the color variation in *Hydnellum peckii.*

"*Hydnellum peckii* begins very pale pink, goes through variable reds and ends up various shades of brown. Many hydnellums exude red droplets. To make sure what you have, taste the droplet. You know it's *H. peckii* if you'll wish you hadn't tasted it, for it is very hot. The species was described by Banker together with the very similar *H. diabolus*, both collected from the East coast of NA. We looked at them some years ago. Although there are some differences in their description, we were unable to differentiate between them with confidence, and decided to lump them as one until the matter was settled. For the interim, we chose the name *H. peckii*, the commoner name used by our identifiers. Actually *H. diabolus* was the first one described in the article, so if they are the same, the name *diabolus* gets priority, and to be correct, we should probably change. Otherwise, we'll help the later name become established as "current usage".Reported from eastern & western NA, Europe and Asia. I attach a selection of pictures [at right] to show the colour range. Mycorrhizal, usually recurring in same spot for years, so should be found in same place on same trail at same time of season.

- Andrus Voitk

Free advice from our expert advisors. Have a question about a fungus in your life? Send it to the Editor at omphalina.ed@gmail.com. *But remember... you get what you pay for!*

Our Partner Organizations

People of Newfoundland and Labrador, through

Department of Tourism, Culture, Industry & Innovation
Provincial Parks Division

Department of Fisheries & Land Resources
Wildlife Division
Center for Forest Science and Innovation

People of Canada, through

Parks Canada
Gros Morne National Park

The Gros Morne Co-operating Association

Memorial University of Newfoundland

St. John's Campus

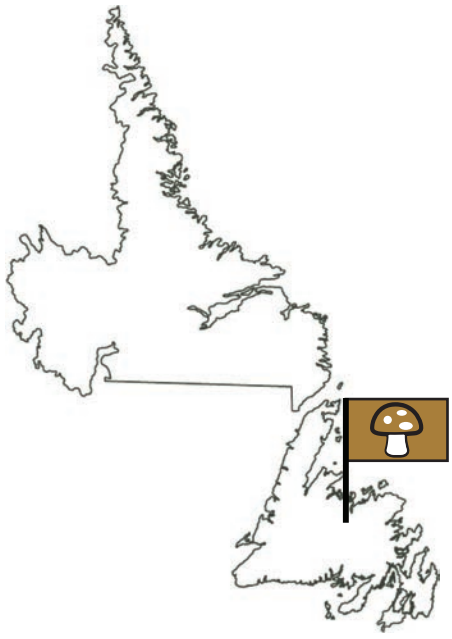
Grenfell Campus

Tuckamore Lodge

FORAY ZOZO ANNOUNCEMENT

Photo: Bill Bryden

FORAY NEWFOUNDLAND AND LABRADOR



OCTOBER 2-4, 2020

LION MAX SIMM'S MEMORIAL CAMP

BISHOP'S FALLS, NL

With Guest Faculty and Local Experts

DETAILS AND REGISTRATION COMING SOON

WWW.NLMUSHROOMS.CA