OMPHALINA

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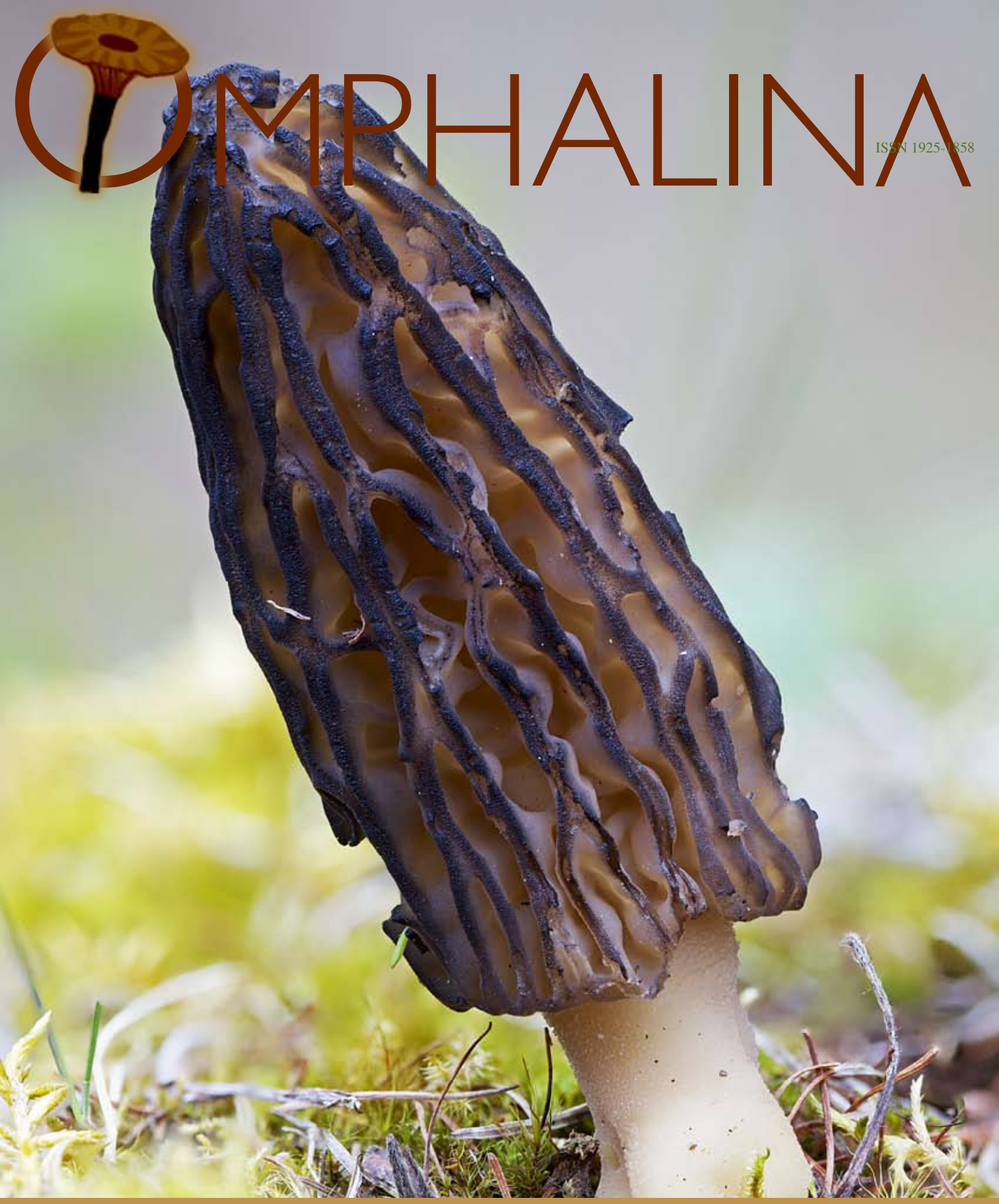

Newsletter of FORAY NEWFOUNDLAND AND LABRADOR

Vol. VII, No 2
Feb 24, 2016

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.

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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.*

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COVER

Morchella laurentiana Voitk, Burzynski, O'Donnell, type collection at unnamed location in Gros Morne National Park, 18 May, 2011. One of two new morel species from our province, just described in the scientific press. Scientific names include the names of the authors, a custom we have generally eschewed to avoid nominal clutter. But this time…

The names of both were chosen by the readers of OMPHALINA. Note the gracious preference for regional accuracy over jingoistic and vulgar self-promotion: readers were offered a name reflecting our province, where it was discovered, but opted for a name meaning laurentian, to reflect its presence elsewhere in the St Lawrence Basin.

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CONTENT

Message from the Editor

Happy 98th anniversary of Estonian independence!

Here we are, almost two years to the day when we published our morel issue, letting you know that we have three morel species in NL, two of them apparently undescribed. Now, two years later, they are formally described, with names you and everybody else can use. Named by readers of Omphalina! Come May, you should be ready, so go out looking and see whether you can identify them.

Everybody eats, so many must also cook, but few send in recipes. Why is that? Thanks to Robin McGrath for her steadfastness in this regard and an appeal to the rest of the cooks—please share your creations or favourites.

Boletus betulicola? You may not know the species, but if you were at the last Foray, you ate it. And from comments, apparently it is a species worth knowing. Should you have a bit of scientific curiosity, there is a good project in there to study, figure out. If you have some detective spirit in you, maybe we can find a partner to help with the technical aspect.

The same goes for *Xeromphalina enigmatica*. No more *X. campanella*. Yes, read the latest: *X. enigmatica* is the name of our version of the orange pinwheel mushroom. You will learn that *enigmatica* also has a mystery to be solved: very possibly there are more species than we are prepared to recognize now. If you are curious, have the resources to collect a week or two in a few places on the mainland as well as here, we might be able to find a partner with the high tech toys to finish a good project. Just call.

Happy mushrooming!

andrus

Photo: Claudia Hanel

Update:

Our morels are named!

Andrus Voitk, Kerry O'Donnell, Michael Beug, Michael Burzynski, Henry Mann

Preliminary investigations revealed that at least three morel species grow in Newfoundland and Labrador: *Morchella importuna*, the mulch morel, and two undescribed species, Mel-19 and Mel-36.[1] *M. importuna* is known from Europe, Asia and North America.[2,3] Mel-19 is cosmopolitan, known from Asia, Europe and east and west coasts of North America,[4] and Mel-36 is parochial known only from the St Lawrence River Basin.[5] Our readership was polled for suitable names to describe these novel species. Of the several choices offered, eohespera won out for Mel-19, and laurentiana for Mel-36, both with a wide margin over other candidates (graph in title banner).[6] Both names reflect the distribution of the species: "eohespera" is derived from the names of Eos and Hesperus, the Greek gods of sunrise and sunset, to symbolize its presence in the East and West,[4] and "laurentiana" means Laurentian to indicate that its distribution is limited to the St Lawrence River Basin.[5] Formal description of these two species has now been effectively published, and we are glad to report that the names favoured by our readers were used.[7]

Morels are notoriously similar morphologically, so a definitive identification frequently requires DNA sequence data (Figure 3). Our three morels all belong to the *M. elata* clade of black morels, inseparable from many of their lookalike relatives.

We provide an illustrated description of our three species (Figures 1 & 2), including the two newly described species, and a tabular key (p. 5). Differentiating characters work reasonably well in Newfoundland and Labrador, where only three *Morchella* species have been identified, but may be less reliable in regions with many other similar species. See Omphalina vol. 5, issue 2 for examples of how dramatically location, climate or maturity influence these characters. Because averages seem reliable but individuals vary (for example, see the fruiting time graph, Figure 4), do not focus on a single specimen, but try to get a sense of a "population." Similarly, do not focus on a single character, but try to use as many as you can discern.

If you wish to identify our species, then you need read no further, because now you have all the information you need to take up this challenge. If your main interest is collecting morels for your table, you need not even have read this far, because all three species are equally good edibles. However, if you are curious to know how we decided that two of our species were hitherto undescribed, read on, because the remaining discussion is devoted to the consideration of this question. That *M.*

Figure 1. *Illustration from the protologue (formal original description),*[7] *of* M. eohespera *(L) and* M. laurentiana *(R). A, E: morels in situ, B, F: texture of ridges and crypts, C, G: microstructures of ridges, and D, H: electron microscopic appearance of the spores. Bars: 10 cm (A, E); 1 cm (B,F); 10 µm (C, D, G, H).*

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Figure 2. M. importuna. *This species is readily recognized by its copious appearance in last season's newly made and mulched flower beds, its cespitose growth pattern and the preponderance of dark-edged ladder-like cross ridges that delimit equal-sized crypts.* M. laurentiana *has few cross ridges and long crypts;* M. eohespera *is in between. Selected photos—real life will not always favour you with such clear differences.*

		M. laurentiana	*M. eohespera*	*M. importuna*
cross ridges	number	moderate	few	many
	angle from vertical	acute (almost straight up and down)	obtuse (oblique cross ridges)	right angles (horizontal cross ridges)
	shade	light	darker	nearly black
crypts		few, vertical	more, mostly longer than wide	many, as long as wide
sulcus		clear	fine cross ridges	clear
stem		angled at base	straight	straight
growth pattern		singly	singly	cespitose
calciphilia		calcareous bedrock	limestone barrens or calcareous bedrock	probably not significant?
ground disturbance		anthropogenic disturbance 20 + years ago	wilderness or past anthropogenic disturbance	mulched new garden a year before
season (average, for Bay of Islands region)		mid-May	early June	late May
sterile elements		cylindrical to subcapitate	subclavate to capitate	subclavate to subcapitate

Key in tabular form of characters differentiating the three known *Morchella* species in Newfoundland and Labrador.

Figure 3. *Phylogram adapted from preliminary description[1] of our three species (pink panels), with some morphologically similar species from the* M. elata *clade found elsewhere*.

Note that M. laurentiana *and* M. eohespera *are closely related, whereas* M. importuna *is relatively distantly related to the two new species and their lookalikes from other areas*.

In the latest tree,[7] the statistical likelihood of consistent reproducibility of the branching pattern for M. laurentiana *was high, whereas it was low for* M. eohespera. *This suggests a genetic uniformity of the parochial species, which probably evolves in response to similar environmental stimuli, coupled to a small regional distribution, favouring constant intermingling of genetic material. The internationally distributed* M. eohespera *did not exhibit similar genetic uniformity, probably because evolution of its disparate populations respond to different environmental stimuli, coupled to spread across natural barriers making continued mixing of genetic material difficult*.

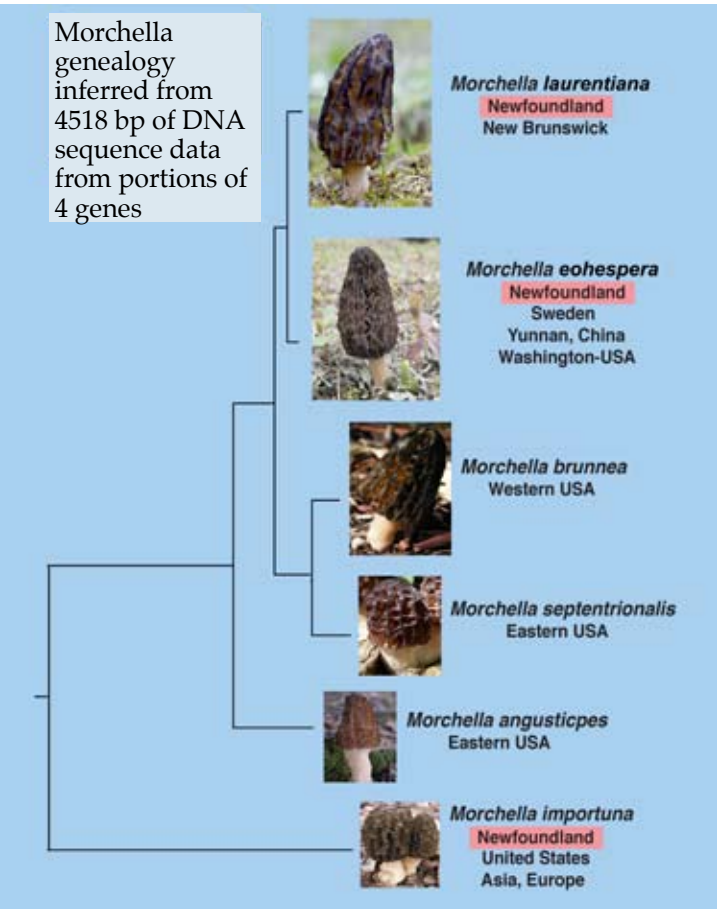


***Figure 4**. Recorded fruiting time of our three species.[5] These relative differences apply to the Bay of Islands area of NL. They will differ elsewhere, and fruiting times are later within the province the further north one goes. As seen from the M. laurentiana graph, the average may be distinct, but there is considerable overlap in range, making single observations difficult to classify.*

***Figure 5**. Contrasting distribution of* M. laurentiana *(●) and* M. eohespera *(●). The former appears to be characteristic of the parochial nature of morel species; the discovery of a genetically distinct species in this unstudied location makes it easy to accept that the species is hitherto undescribed. The relative commonness and widespread distribution of* M. eohespera*, however, mandates a thorough study of existing types and their descriptions, before concluding that such a find in Newfoundland and Labrador could be a novel species.*

laurentiana is a previously unknown species is not difficult to accept. Its distribution seems to be limited to the Laurentian basin (Figure 4), an unexplored region, where any new species is likely to be undescribed. This discussion really revolves around to the transcontinental *M. eohespera* (Figure 4).

In 2011, of 21 *M. elata* clade species studied, only Mel-19 & 20 had endemic distribution throughout Eurasia.[8] Our preliminary report extended the known distribution of Mel-19 to both coasts of North America.[1,4] By 2015, our Mel-19, now named *M. eohespera*, is only one of five transcontinental elata clade species.[9] In North America only two of these species are known from both sides of the continental divide, *M. importuna* and *M. eohespera*. Distribution of mulch morels, such as *M. importuna*, has been attributed to anthropogenic activity. Occurrence in remote wilderness suggests that Mel-19, our *M. eohespera*, may be the only known multi-continental elata clade morel for which man is not the primary vector of spread. The regional genetic variation of *M. eohespera* collections is consistent with genetic drift resulting from long isolated populations.

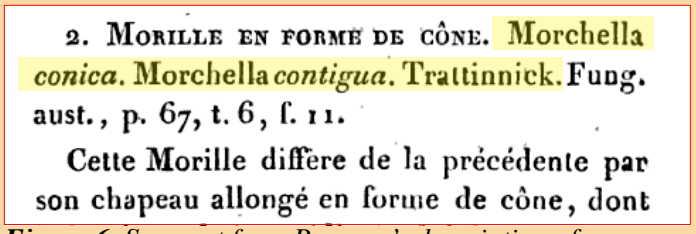
In our opinion it seemed highly unlikely that a species that is so widely distributed and regionally abundant—especially in Sweden, the home of Linnæus and Fries—had gone unnoticed until it was unearthed by a 2013 survey of the genus in remote NL.

No doubt many earlier mycologists have collected it, possibly even described it. The reason that we did not find a good match with a previous description is probably related to the lack of distinguishable morphologic characters between many closely related species, together with a changed species concept in this era of molecular phylogenetics. Probably early workers, setting out to describe a collection of this very species, also included characters from species not known to be different at the time. Add to that the very brief, often uninformative, and at times totally lacking descriptions, and it is easy to

understand why a currently circumscribed species may not match any earlier description.

Another obstacle has been a changing interpretation of some species concepts over time. For example, even before publishing our two species, and certainly after, the commonest question we have heard is, "Why is your *M. eohespera* not *M. conica*?" The question seems well founded, because the commonest original field identification for submitted collections of Mel-19 was *M. conica*. In this regard, our work was made easy by Richard and colleagues, who reviewed, revised, and resolved the confusing and conflicting taxonomy of the genus.[9] Their investigations revealed that the name "Morchella conica", as introduced by Persoon,[10] was illegitimate, used as a supplemental name for *M. continua*, described earlier by Trattinnick (Figure 6);[11] Fries used it later only as a variety, so the name is invalid at the species level.

Why, then, you might ask, is your *M. eohespera* not the same as Trattinnick's *M. continua*? Figure 7 is a reproduction of Trattinnick's handsome illustration of his species. There is no question about the conical shape, but unlike *M. eohespera*, ridges of the depicted morel are lighter than crypts. Yellow morels (esculenta clade) have light ridges and dark crypts; black morels (elata clade) have the opposite. Tratinnick's picture is of a species in the esculenta clade, not elata clade. All three morels found to date in NL, including *M. eohespera*, belong to the elata clade. Thus, Trattinnick's picture is not a suitable example of the elata clade species we now know as *M. eohespera*.



2. Morille en forme de cône. Morchella *conica*. Morchella *contigua*. Trattinnick. Fung. aust., p. 67, t. 6, f. 11.

Cette Morille diffère de la précédente par son chapeau allongé en forme de cône, dont

***Figure 6**. Segment from Persoon's description of* Morchella conica. *As you can see, he cites Trattinnick's* Morchella continua *as the same species. This makes "conica" a supplemental name; such practice was fashionable at a time, but has become a no-no in taxonomy for understandable reasons: more clutter and noise with pet names floating about obscuring real ones, so that it becomes increasingly more difficult to know whereof one speaks.*

Please note that Persoon has a typo in the name, "Morchella contigua", but there is no doubt about his intent: Trattinnick did not describe a species "contigua", and the plate reference is to that of M. continua.

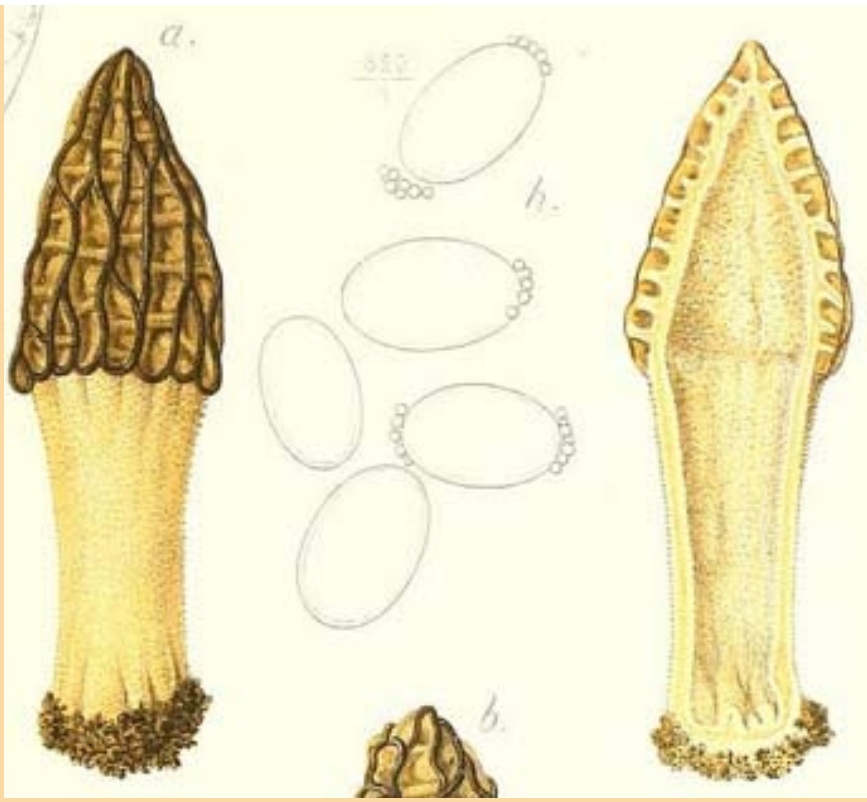


***Figure 7**. LEFT: Trattinnick's 1729 picture of* Morchella continua. *Note light ridges and dark crypts, characters of yellow (esculenta clade) morels. Also, lack of sulcus and irregular honey-combed crypts with no discernible ridge pattern. Even if Persoon's* M. conica *were a legitimate name, since he referred to this image, clearly he was not describing a black morel of the elata clade.*

RIGHT: Boudier's 1910 picture of Morchella conica.[12] *If the former was the original concept of* M. conica, *two centuries has changed the species concept to a black morel with dark ridges and light crypts. Also, note that the ridges now have a primarily vertical pattern. Only the shape remains the same, true to the name "conic". The sulcus here may have been obliterated by age (Figure 8).*

***Figure 8**. At times lack of sulcus may be a factor of development and aging, common to many species, rather than a species character.* Morchella eohespera *on the right and* M. laurentiana *on the left. These morels develop fast, gaining 60-80% of their size in the first day. Disproportionately more growth takes place in the stem. If the cap survives sun, wind, weather, and morellovores to senescence, often it shrivels and shortens, obliterating the sulcus and tapering upwards to a sharp point.*

When did the yellow morel concept of Persoon's "M. conica" (Trattinnick's *M. continua*) become a black morel? Figure 7 shows the result of this shift over two centuries. IMPORTANT: this evolution took place in people's heads, not in the morels! Note also that lack of sulcus may be a matter of aging (Figure 8), not a species character.

3. *M. elata*, pileo conico obtusiusculo basi adnato, costis longitudinalibus membranaceis, transversalibus junctis, stipite furfuraceo.

Stipes 2-3 unc. longus, unciam crassus & ultra, valde cavus & fragilis, irregulariter lacunosus, pallescens, testaceo-albidus. Pileus ovato-conicus, 2-3 unc. longus, sed substantia reliquis multo tenuiore; costæ longitudinales, valde elevatæ, membranacer, flaccidæ, rarissime anastomosantes, sed costis transversalibus angustioribus junctæ; unde oriuntur areolæ rhombeo-difformes, intus læves. Color gilvo-brunneus Sapor aquosus fatuus; jove pluvio turget, sicco corrugato-contrahitur, nigrescit & valde fœtet, ut commedi nequeat. *In silvis abiegnis. præcipue locis humidis adustis, raro. Vere.*
(v. v.)

***Figure 9**. Photocopy assembled from Fries' protologue for Morchella elata. Free translation of the last sentence is "In coniferous woods, primarily in moist burnt places, rare." ["Abies" in Sweden refers to the spruce species,* Picea abies, *not the fir genus,* Abies.*] This sentence describes the classical habitat of post-fire morels, usually found in the moist parts, not the charred and sooty ash.*[14]

Fine, you might say, but what about some of the other "classical" names used for black morels? Here, again, Richard and colleagues have done most of the work.[9] They reviewed and researched all the classical names, determining which are legitimate, which are synonyms, and so forth, and then matched those available to suitable nominally orphaned phylo-species. Therefore, all classical names are already matched to other species, or otherwise accounted for.

Except *Morchella elata*.

Richard and colleagues assigned it synonymy with *M. importuna*, but considered this temporary, pending further investigations. Because *M. elata* was described by Fries from his home in Femsjö,[13] and because our cosmopolitan Mel-19 was also quite common in Sweden, we thought this might be a good fit. However, we changed our mind after reading Fries' description (Figure 9). First, Fries states *M. elata* grows in burnt forest, suggesting a post-fire morel. In our experience *M. eohespera* is definitely not a post-fire morel. None of the five sites of our collections were from burnt areas, and it does not exhibit the ephemeral character of post-fire morels: it has recurred at every site monitored, the longest observation of a site being 22 years, during which it has recurred in the same quantities. Secondly, Fries describes his species as rare, which does not seem to fit with Mel-19 in Sweden (Figure 10).

In his description of *Morchella elata*, Fries cited an image, made by Micheli almost a century earlier (Figure 11).[15] Because morels are so notoriously similar morphologically, unfortunately this illustration is not too helpful to us. Fries also collected live material, preserved in Uppsala (Figure 11). This material has not yielded amplifiable DNA for identification purposes.[1] Until DNA can be extracted from such samples, decisions have to depend on other criteria, and critical parts in the description that Fries left us, suggest Mel-19 is not *Morchella elata*.

Having exhausted classical names, we turned our attention to more recent ones. Of these, *Morchella norvegiensis*, found by Roy Kristriansen in 1981 (Figure 12),[16] and subsequently described by Jacquetant,[17] stands out. Unfortunately, the type specimen

only yielded DNA from two of the four loci required for definitive multilocus analysis. This put *M. norvegiensis* into a group with Mel-17, 19, 20 & 34. The first three have been documented in Europe; thus, *M. norvegiensis* can be either an independent species or one of Mel-17, 19 or 20.

Because of the 25% possibility that our species might be *M. norvegiensis*, we delayed publication, and undertook a collecting trip to the type location with Roy Kristiansen in the hopes of collecting fresh material that would yield DNA for comparison.[18] Kristiansen had collected it at the same site in 1981 and 1982—but is careful to point out that his 1982 collection was not confirmed as *M. norvegiensis* by Jacquetant. He has not found the species there since. It turned out that the very land on which it grew, a river embankment, had washed away with spring floods. Although we found some other elata clade morels elsewhere in the region, Kristiansen was reluctant to identify them as *M. norvegiensis* or other similar species.

He felt that the morphological identification acceptable over 30 years ago was no longer adequate in the era of DNA sequencing. Therefore, exact placement of *M. norvegiensis* in current ranking is not possible, and its status must remain uncertain until an advance in technology allows recovery of more useful DNA from the holotype.

Parenthetically, should *M. norvegiensis* turn out to be conspecific with a common and cosmopolitan species, such as Mel-19, the original questions arise: is it likely that such a species has escaped the world's notice until 1981? Hardly, but for the reasons put forward for *Morchella eohespera*, its name may be the only valid one left. Naming species is not so much a matter of whether a species existed decades or centuries ago; rather it is a matter of whether the species was recognized as distinct from others in its group, and described with sufficient detail and clarity to make that distinction. If not, even a centuries-old common species may need a new name.

***Figure 10**. Known distribution of Mel-19 in Scandinavia: six collections in Sweden, one in Denmark; plus one in the Netherlands. Commonest field identification was* M. conica. *This relative abundance in Sweden made us expect that Fries'* M. elata *may be a good candidate for Mel-19. Not so—see text.*

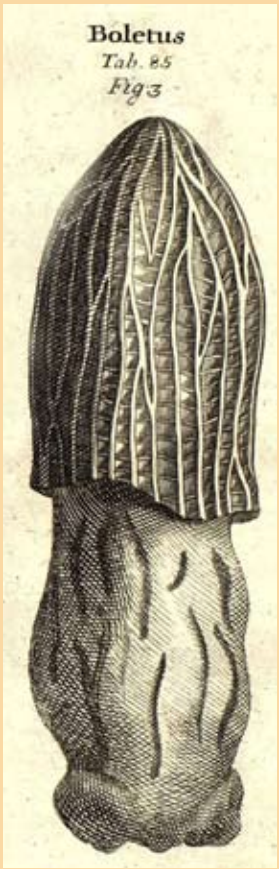


***Figure 11**. The two vouchers Fries supplied for his description of* Morchella elata, *the happy morel. On the left is a picture published by Pier Antonio Micheli in 1729. On the right is a collection of the species made by Fries and preserved in Uppsala. This has been examined by Kerry O'Donnell, who described it as looking like road kill.[1] The specimen did not yield DNA. Should either become typified to represent the species, the Code gives precedence to live collected material over icons. Again, it is conceivable that future advances in technology might allow genetic determination of this tissue—which may or may not cause some disruption to the taxonomy at that time. However, the advantage is that once firmly tied to a type, stability is guaranteed, and epitypification is possible for better voucher specimens. For the time being, we have no evidence suggesting either represents Mel-19, and Fries' description does not fit with what we know of Mel-19. Hence, if M. elata were the only classical name available, we conclude Mel-19 needs a new name.*

Figure 12. Morchella norvegiensis, *photos by Roy Kristiansen. The holotype did not yield DNA from all required genes for phylogenetic placement. Thus, the species awaits future technological advances to solve its place in the ranking. Although unlikely a post-fire morel, these specimens grew on the site of a former warehouse, which had burned down about a decade earlier. The riverbank site has been washed away since.*

Conclusion

Of three potential earlier descriptions, which might suit our Mel-19,

1. *M. conica* is an invalid name, as stated by Richard et al. (and applied to an esculenta clade species),
2. *M. elata* is described as an uncommon fire morel, totally at odds with our observations of Mel-19,
3. Current technology is unable to rank the type of *M. norvegiensis* phylogenetically, and collecting a topotype is no longer possible.

Therefore, we concluded that despite its common and cosmopolitan distribution, at this time Mel-19 requires description as a novel species with a new name.

Hence, *M. eohespera*.

Acknowledgments

This report would not have been possible without the work of many of the authors of the works cited, in particular Richard and colleagues.[9] We also thank Roy Kristiansen for his help, as well as our many friends and helpers in Norway, and others, mentioned in our original publicaton.[7]

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CHICKEN BREAST WITH MUSHROOM SAUCE IN WINE

Robin McGrath

This rich sauce recipe is an adaptation of a simple, traditional French white sauce. Be sure to boil off most of the alcohol in the first reduction so that it does not cause the cream to separate when it is added. The recipe is intended for two, but can be doubled or tripled for more. If you substitute breasts with skin or chicken thighs, you may want to drain off some of the excess fat after frying the meat. The wild mushrooms were a combination of mixed commercially available ones and home-dried chanterelles. Keep in mind when reducing or increasing heat that cooking times vary with electric or gas heat.

INGREDIENTS

20 grams (one ounce) dried wild mushrooms.
125 grams (half cup) warm water
2 chicken breasts, skinless
Salt and pepper
2 to 3 tablespoons flour
2 tablespoons butter
1 tablespoon olive oil
125 grams (1/2 cup) dry white wine
250 grams (1 cup) whipping cream

PROCEDURE

Soak mushrooms in warm water about 30 min. Sprinkle salt and pepper on the meat and flour, then roll the breasts in the seasoned flour. Heat butter and oil to a medium temperature in a heavy frying pan, then brown the floured breasts for about 5 minutes. Turn the heat low, cover with lid, and simmer until chicken is tender and cooked through (about 10 min.). Remove chicken when cooked and pour wine into pan, stirring to dissolve fats or drippings. Remove mushrooms from soaking water and add, then add the soaking water except for the dregs (may contain sand). Boil 3–5 min. to reduce liquid. Turn heat to medium, add cream, and continue to reduce 3 to 5 min. Return meat to pan and simmer a few min.

Serve with plain boiled rice or mashed potatoes, a green vegetable (broccoli or asparagus) and salad.

The edulis year: *Boletus betulicola*?

Andrus Voitk

2015 was propitious for *Boletus edulis*. Normally *Boletus edulis* is not an abundant species in our forests. Central NL forays have averaged 5 per year, but in Gros Morne the average has been 1; this year we collected 4, and we have seen them elsewhere on the west coast as well. Maybe the species is common here too, but requires certain environmental conditions for abundant fruiting, which were met this year.

We have only seen a single sporocarp of this species in the forests near our home during the 16 years that we have lived here. The last few years a neighbor mentioned having a few boletes around a birch on his lawn, but I paid it no special heed, suspecting these were the very common *Leccinum scabrum*. This year he asked us to come and look at a very abundant fruiting under the same birch (title banner). If you were at the foray, you were served these boletes as *Boletus edulis* at the Saturday Quidi Vidi QuuQup. But were they *B. edulis*?

Boletus edulis is thought to be a species complex of related and very similar species, initially described from Europe. Western North America has species of the complex not known from Europe, but most of the species we encounter here on the east coast also seem to be found in Europe. Usually it is a spruce partner. In 1948 Vassilov described *B. edulis* var. *betulicola*, a birch partner in the *B. edulis* complex, elevated to species by Pilát & Dermek in 1974. It was described as somewhat lighter in colour, possibly somewhat less robust in form, but descriptions vary considerably; the only constant is the association with birch.

Investigation of the phylogeny of this complex has shown several distinct species in Europe, while others, like the birch associate *B. betulicola* and the oak associate *B quercicola*, seem to cluster as one with B. edulis.[1,2] Despite this, some workers continue to recognize these as separate species, describing morphological differences between them.[2] I have tried to read the descriptions to get an idea of the differences, but must admit that my imagination has been dulled over the years: the overlap seems just too great to convince me of useful differentiating characters. But one difference stands out: the tree partnership.

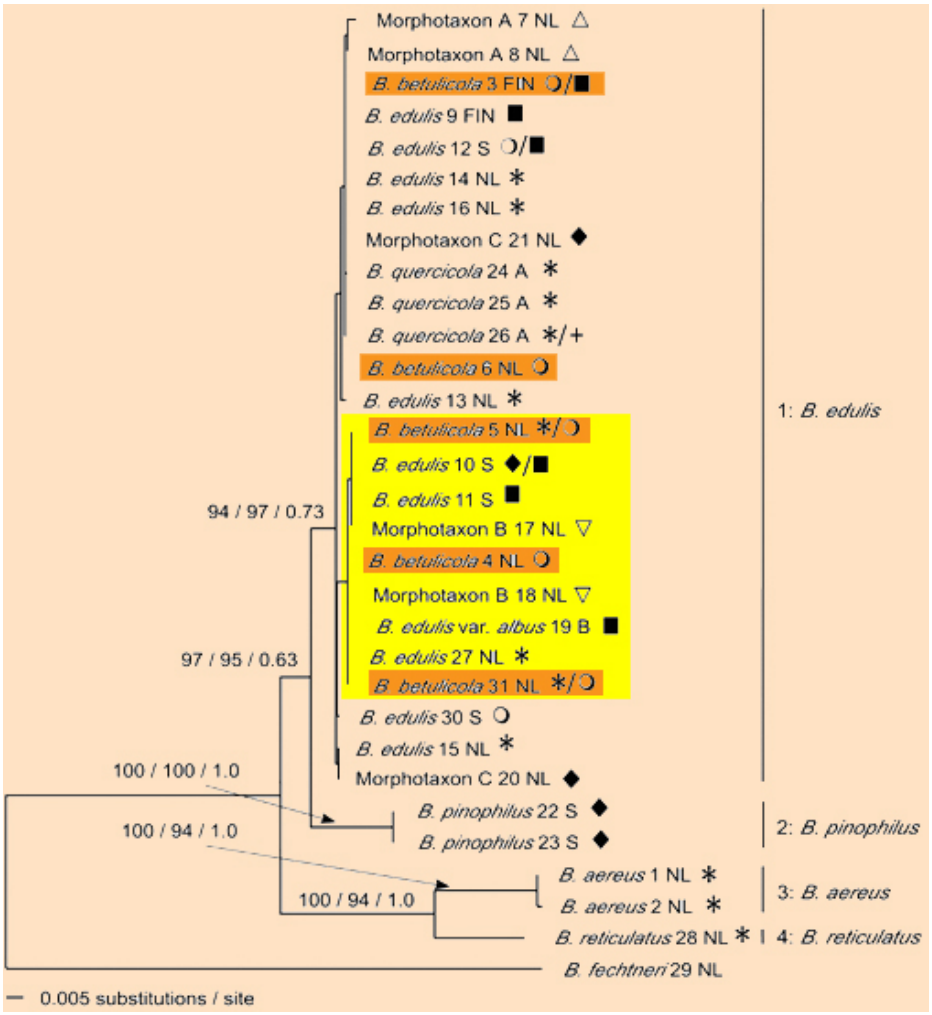
Is there any other support for considering these as separate species? Well, look at the phylogram, taken from one of these studies.[1] Note the large clade containing *B. edulis*. Within this clade you can readily see a few subclades on short branches of their own. One of these is highlighted with a yellow panel. Three of the five collections identified as *B. betulicola* (orange background) are in this subclade. The subclade above it contains all the collections identified as *B. quercicola*. Given the difficulty to identify these species accurately because of their morphologic similarity, this distribution suggests that these may indeed be good species, but that other studies are required to resolve

the divergent branches. Investigators have suggested that the genetic sites used may not evolve with sufficient rapidity to show the differences, and analysis of more rapidly evolving sites might show clear divergence.[3]

Until such studies are done, we cannot settle this question for certain. Normally, I prefer to miss a new species rather than claim one that does not exist here, but I have faith in trees—as Greg Thorn says, they are better taxonomists than we—so I elected to call these mushrooms *Boletus betulicola*. Analysis of different loci may show that they are that species, another, or even a new birch associate, evolved under the differing condition of Newfoundland. Until then, association with birch gives us a way to tell it apart from *B. edulis*.

What about *Boletus edulis* in coniferous woods? We know that most of our coniferous woods also have a few birch scattered here and there. It is unlikely, even if theoretically possible, that all or some are also birch associates. For now, it seems reasonable to think of them as *B. edulis*.

No need to worry about it too much: all taste equally good. But *B. betulicola* is what you ate at the foray.



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Datronia scutellata

Andrus Voitk

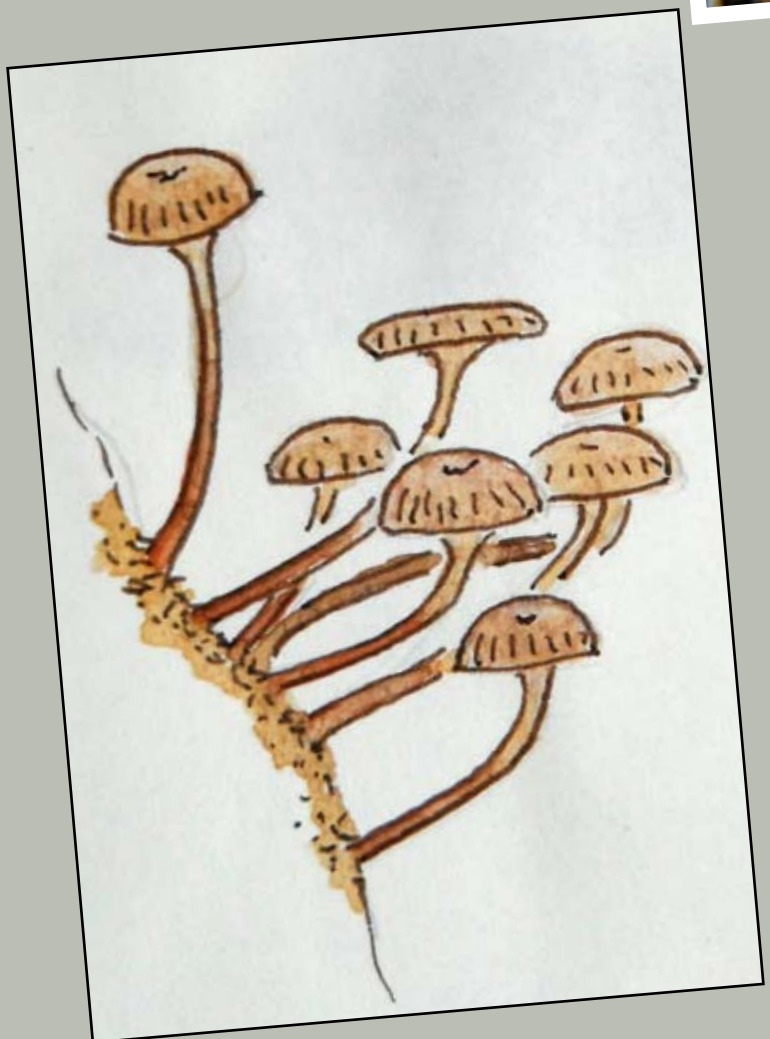
Photo: Maria Voitk

If you think you are looking at *Fomitopsis pinicola*, the red-banded polypore, you can be forgiven: this polypore has a distinct reddish band. The pores look disproportionately big, but are about the same size as those of *Fomitopsis*, about five per mm—which means that this conk must be small. Indeed, conks in the title banner measure 14-15 mm in greatest diameter, those below, left are 7-9, and the immature ones below, right, 3-6. Bigger fruit bodies can be found only if several small ones fuse, in which case they may reach 50 mm wide and are almost resupinate. The species is recognized by its black, zonate upper surface, reddish band, white poremouths, and slightly overhanging rim.

Despite the zonation, it is annual with just a single layer of pores on cross section. Fruit bodies appear in late summer, when they are white and fuzzy top and bottom (lower right), turning black and glabrous with age (title banner, lower left). Soon after the snow melts, they begin to die. Late winter is the best time to find these small polypores. Leaves are out of the way, most fungi competing for attention are sleeping, and snow makes access easy. Of my seven collections, six were made in March and April. Only the freshly sprouting one on the lower right photo was collected in August. In eleven forays we have collected it only once—an old, dry conk near Terra Nova in 2012.

Now you know what they look like and when you might find them. The where is alder thickets. I have only seen it on dead branches of standing speckled alder (*Alnus incana* ssp. *rugosa*), where it causes white rot. For some reason speckled alder is host to many fungi, whereas very few are found on our other species, mountain alder.

The Bishop's Sketchbook



Xeromphalina enigmatica

Andrus Voitk

Everybody who spends some time in our woods in the fall will meet the beautiful and not uncommon *Xeromphalina campanella*, fruiting in spectacular orange troops on rotten conifer wood. When I saw one such mass fruiting on yellow birch (*Betula alleghaniensis*), I turned to the books to learn that there is a lookalike species, *X. kauffmanii*, that fruits in a similar manner on hardwood. Pleased, I introduced both species in my book, identifiable by the substrate.[1]

I was wrong. It turns out that there have been occasional past reports of *X. campanella* on hardwood, so one cannot depend on the substrate alone. However, they can be separated microscopically, because *X. campanella* has larger spores than *X. kauffmanii*. Checking the spores of my collection from yellow birch after learning this, revealed that this mushroom was not *X. kauffmanii*, as I had assumed, but *X. campanella*. Why would a single individual of a mushroom known to digest softwood, grow on birch and seemingly thrive? Can it be the same species? Some years ago Greg Thorn taught me that trees are far better taxonomists than mycologists. If this is so, then there must be more to the story. The alternate, that Greg was wrong, is untenable.

In 2006 Ron Petersen was part of the faculty at our Foray. He collected some *X. campanella*, explaining that Jim Johnson, one of his former doctoral students, was continuing to investigate this species complex. Jim's PhD studies showed that *X. campanella* actually contained at least two cryptic species, which he had code named "Campanella 1" and "Campanella 2".[2] When, several years later, Ron presented an opportunity to send a few of our campanellas for this continued investigation, you can bet that a collection from our yellow birch was among the specimens that flew to Tennessee.

Xeromphalina enigmatica *on* Betula alleghaniensis. *In case you suspect that the stump on which the yellow birch is growing may be a conifer, the rotten wood substrate was examined by Prof. Henry Mann and determined to be "Deciduous wood, probably* Betula*". This is the only time I have seen this species fruit on hardwood; all my other collections are from softwood. Collections from softwood that were analyzed turned out to be strain ENA2. This one on hardwood turned out to be a hybrid between ENA2 and ENA1. Chance coincidence, or causal relation?*

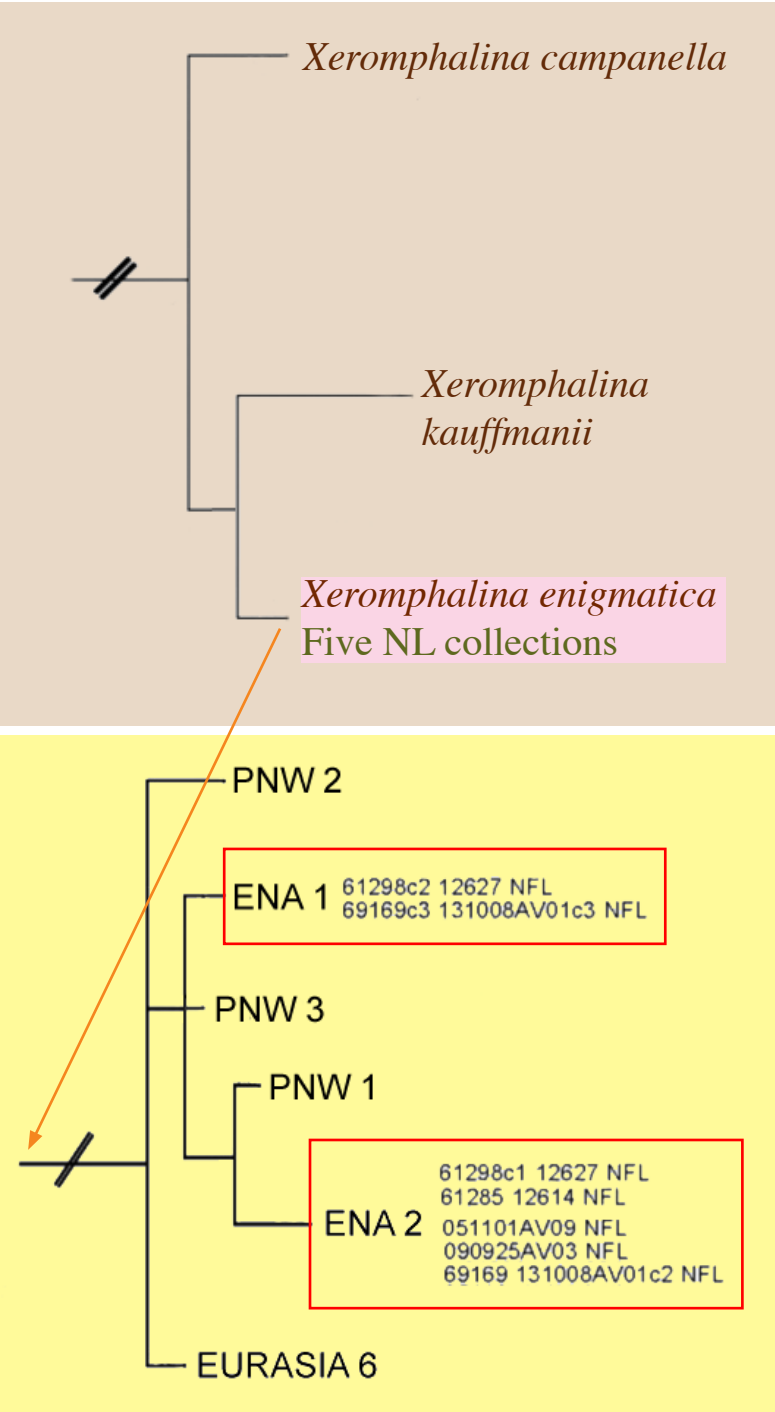


Figure 1 ***Upper****: Phylogey of the* Xeromphalina campanella *complex, simplistic adaptation from the Tennessee publication.*[3] *A common ancestor gave rise to* X. campanella *and a second arm, which also split, forming* X. kauffmanii *on one arm and the newly described* X. enigmatica *on the other. Species that evolve from a common ancestor along separate parallel branches are called sister species. All five NL collections fell in with* X. enigmatica. *All these species showed some subgroups within them.*

Lower*: Major subgroupings within* X. enigmatica*: in Eurasia, eastern North America and the Pacific northwest. Note that there are two eastern North American clades (ENA1 & ENA2), which are not directly related. All five NL collections fell in with ENA2. Three of the five grew on conifer and two on birch. Those two turned out to be hybrids between ENA1 and ENA2. Do ENA1 genes permit making enzymes capable of digesting hardwood?*

The results of these investigations have just been published.[3] The Tennessee group found that there were at least three species in the *campanella* complex: *Xeromphalina campanella* from Eurasia and North America (softwood), *X. kauffmanii* from northeastern North America (hardwood), and a new species (Jim's Campanella 2), which they named *X. enigmatica* from Eurasia and North America (softwood). *X. kaufmanii* and *X. enigmatica* are sister species that presumably sprang from a common ancestor. The authors speculate that their progenitor may have existed in Asia, but that likely the split that resulted in the hardwood eating *X. kauffmanii* occurred in eastern North America.

Of interest to us in this province is that all five collections from here turned out to be of the newly described species, *Xeromphalina enigmatica*. Although a greater sampling is required, it looks as if on the Island, at least, our only species is *X. enigmatica*—what we have been calling *X. campanella* is really *X. enigmatica*. If all you like to know is the proper identity of what grows here, you can stop reading now. But if you are curious how to explain finding one member of a softwood-eating species growing on hardwood, read on for a bit of speculation into this genetic evolutionary process. The aim of the Tennessee study was not to explain this finding, so we will need a good imagination, to fill in some holes, in order to reach a plausible theory.

As often is the case, a closer look at the species clades shows several subclades or strains (i.e. subgroups with slightly different genetic make-up from each other) within each of these three species (Figure 1). Of the several subgroups in our *Xerampholina enigmatica*, of interest to us are two subgroups limited to eastern North America, which were code named ENA1 and ENA2. Their presence suggests that evolutionary changes that the authors suggest took place in eastern North America may still be happening. We know that some of these changes involved a move from a softwood to a hardwood diet, resulting in the production of *X. kauffmanii*. Is there any suggestion that some of this is also going on within our X. enigmatica?

Typical Xeromphalina enigmatica *on coniferous wood. As expected, this turned out to be strain ENA2. Unfortunately, the amount of sampling has been too low to draw firm conclusions, but the questions hang in the air.*

As mentioned, all our five specimens were genetically identified as *X. enigmatica*. Three belonged to the strain ENA2, their genetic material coming from parents of that strain of *X. enigmatica*. Two—from different regions of the Island—were hybrids between strains ENA2 and ENA1. The three purebred ENA2 collections grew on coniferous wood. The two hybrids grew on birch*. What does this mean? Even given the small number of samples, these results suggest at least a possibility that ENA1 may contribute the ability to digest hardwood. Digesting hardwood and digesting softwood usually require different enzymes. Ability to produce enzymes is genetically controlled. Therefore, an individual from a species known to digest only softwood that is suddenly able to digest hardwood can be assumed to have a significantly different genetic make-up.

This may be the explanation of earlier reports of occasional *X. campanella* sightings on hardwood. *X. enigmatica* and *X. campanella* cannot be differentiated from each other morphologically, but because the former was not known at the time of these early reports, might the reports of *X. campanella* on hardwood have been instances of the *X. enigmatica* strain with hardwood digesting abilities? My best guess is that this is so. I have full faith in Greg Thorn's maxim that trees are better taxonomists than mycologists. The work of the Tennessee group may just have opened the door a crack, inviting further investigations to validate this theory.

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*The first collection from hardwood has been amply described and the substrate verified. The provenance of the second is a bit less certain. The collecting note lists the substrate as "birch and hemlock". We know that it was not a mixed collection of more than one individual. It is unlikely for a single individual to come from both hardwood and softwood. A collector familiar with the species might list a softwood automatically, because that is the expected finding. Since we have no hemlock, the suggestion is that this was such an automatic reaction. Birch would be added only if it was unmistakably seen, say, by its telltale bark. This suggests that most likely the collection came from birch. Although most likely, this cannot be proven, as no substrate was collected.

THE MAIL BAG

OR WHY THE PASSENGER PIGEONS ASSIGNED TO SERVE THE LAVISH CORPORATE AND EDITORIAL OFFICES OF OMPHALINA GET HERNIAS

Thanks for the latest OMPHALINA. Accidents happen, *Pluteus* is misspelled in the Table of Contents.

Adolf Ceska

Dear Adolf,

Thanks for letting us know. Please rest assured this will never happen again. The Ass. Editor in charge of TOC and the Poofreader have both been fired. Summarily. Without the help of sharp-eyed readers, we could never get rid of all the useless deadwood and parasites we have on staff, and likely should continue having mispellings and typpos on our pages. Never again!

ed–

In OMPHALINA 7(1):13 you speculated about the spelling of Tuckermannopsis with 2 N-s, based on Tuckerman with 1 N. At one time I wrote a note on this convention in Mycokeys:

> Intentional latinization of names by doubling the final consonant was started by Linnaeus, naming Sparrmannia in honour of Sparrman, Burmannia in honour of Burman, etc. This is accepted by the Code (see Art. 60).

By the way, a few days ago I fell on a slippery street and broke my ankle, so that my leg is now in a cast and I must work at home. I can still write!

Teuvo Ahti

Dear Teuvo,

Thank you for this clarification. It is good to know that one need not look into some of the more sinister corners of our collective soul for some reasons we do not understand. We are very glad there is a much more logical explanation than the one the author stumbled upon, and are grateful that you pointed it out.

Along with Foray participants, who have met you, and readers, who have read your contributions, we wish you speedy and comfortable healing, and are also happy that you can still write! Keep it up!

ed–

The recent Omphalina was another masterpiece!

Tony Wright

Dear Tony,

Whenever anybody says a nice thing about an OMPHALINA issue, we can't help but open it up to see what struck the fancy of the kind correspondent. We read the whole thing through, even though we already know every word in it. Can't stop ourself—or is it ourselves? As you can imagine, this takes a lot of time. If readers want to be respectful of our time in the future, not one nice word about OMPHALINA!

ed–

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