# Field Mycology

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# Field Mycology

*Field Mycology* is a quarterly publication produced by the British Mycological Society, available as an open access online journal and in printed magazine format. It covers all aspects of fungal identification, recording, collection and conservation, catering to all levels of expertise.

It focuses primarily on the wild fungal diversity of the British Isles, including the United Kingdom, the Republic of Ireland, the Isle of Man, and the Bailiwicks of Guernsey and Jersey (Channel Islands). Reports and examples of the practice of field mycology from elsewhere may also feature, where they are of relevance and interest to the field mycology community. However, articles describing taxa which are new to science will only be considered for publication if their holotypes were collected within the British Isles.

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Instructions to authors can be found on the publication website:

https://fieldmycology.org/index.php/journal/about/submissions

The Editorial Team will be reviewing and updating these instructions over the course of 2025. In the meantime, authors are encouraged to look to the back issues of *Field Mycology* for inspiration and examples of typical article style, structure and formatting.

Authors are welcome to contact the Editorial Team, via the email address above, with any pre-submission enquiries. In the case of articles dealing with taxa that are new to science or new to the British Isles, the Editorial Team requests that a pre-submission enquiry is made in advance of submitting the manuscript, so that consideration can be given to suitability for publication in *Field Mycology* and any necessary arrangements for scientific review.

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# Field Mycology

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Back cover: The rarely recorded cup fungus *Phaeohelotium nobile*, surrounded by ice crystals, at Dillington Carr, Norfolk, January 2025. A short report of the Norfolk Fungus Study Group's survey at this site can be found on page 16. Photograph © Mike Ball.

# EDITORIAL

## The waiting is over

In a development which is both exciting and terrifying, in equal measure, it falls to me, your new interim editor, to introduce Volume 26: Issue 1.

As someone who has been working in the biodiversity sector for over ten years, my main motivation for taking on this role was the opportunity to share the extraordinary work that the field mycology community is doing: generating valuable observation data and advancing knowledge of fungi.

Of course, field mycology is so-called because it *starts* in the field. Further detailed observations are added later with the use of microscopy and imaging technology, sometimes days or even years later, if material is preserved in a private collection or an institutional fungarium. This publication has always played an important role in showing people *how* to study fungi and it's on all of us to make sure that continues. If you have expertise that you would be willing to share as a guest writer for a 'species portrait' or through an introductory article on a particular genus or group of fungi, do get in touch.

Nowadays, some field mycologists are augmenting their morphological observations with molecular data: 'DNA'. The discoveries that the British Mycological Society's DNA barcoding network is making – working in garages, spare rooms and on kitchen tables – are ground-breaking and transforming our understanding of fungi at an ever-quickening pace. The British Mycological Society (BMS) has decided to make Field Mycology fully open access, enabling us to more readily share field mycologists' discoveries with the world.

Being someone who pursued mycology initially as a hobby, I am also motivated by a desire to share the joy and wonder of fungi, their beauty and enigmatic characters. I know that the field mycology community counts many skilled photographers and photomicrographers among our number. I would welcome submissions for 'feature focus' pieces, showcasing amazing and lesser-seen field characters and morphological features of fungi.

Fungi are useful, fascinating and beguiling, and yet have been largely disregarded in the current nature conservation paradigm. I imagine that's something many people reading this will want to change, so it's good to hear from Matt Wainhouse and Rich Wright in this issue about recent efforts to drive fungus conservation forward and their intention to make this a regular feature.

The Field Mycology publication has always been a space for speaking to these different motivations of the field mycology community. I am therefore happy and more than a little relieved to present this issue to you, with a wide variety of articles.

I would not have had the confidence to take on the editor role without the generous encouragement of Geoffrey Kibby. I gather field mycology (in the lower-case form) continues to more than occupy his time. I hope we'll be hearing more about his discoveries and publication projects in future issues.

I don't think I could have got past my initial feelings of terror, at the prospect of taking on editorial responsibilities, without the support of Alick Henrici and Martyn Ainsworth who have remained very involved in shepherding this issue to publication; David Harries, Jeanette Maddy and Marcus Yeo have also been providing practical input through the editorial team, all of which I have much appreciated.

Many changes have been made behind the scenes to bring you this issue, under entirely new production and distribution arrangements. The BMS Council – informed by advice from the relevant committees – has been very positively engaged in making necessary strategic and financial decisions. The BMS's Executive Officer, Emma Thompson, and her wonderfully efficient team in the BMS Office have also been key players in bringing this issue to your screen or letterbox.

I can explain more about the new publishing arrangements in a future issue, if people want to know. For now, my hope is that, for long-time readers, Field Mycology will still feel familiar; and for new readers it will be easier to find and provide a way in to field mycology for the fungi-curious.

I hope you enjoy reading this issue. If you do, please commend it to all your mycologically-minded friends and relations, so we can regain the publication's previous circulation, online and in print.

*Clare Blencowe*

Fig. 1. The mycophilic lynx which prowls the frontispiece of Battarra's *Fungorum agri Ariminensis historia* (1755). Because your editor loves this li'l guy. Public domain image courtesy of Biblioteca del Real Jardín Botánico, RJB-CSIC (CC BY-NC-SA 4.0).

# Fungal Portrait: 101

## *Chromocyphella muscicola* (Fr.) Donk

Peter R. Smith[1]

Fig. 1. *Chromocyphella muscicola* on moss. Photograph © Peter R. Smith.

### Description

Etymology: Latin *musci* = with moss + *cola* = dwelling.

**Basidiocarps**: cup- to disc-shaped, 1–5 mm in diameter and in length, often dorsally attached. **Stipe**: reduced to absent. **Cap surface**: silky to pruinose, finely hairy at the margin, white to cream. **Hairs**: at the cap margin about 25–44 x 4.5–6 µm, cylindrical, flexuose, angled and branched, somewhat cystidia-like. **Cap cuticle**: a trichodermal cutis, with golden-brown encrusting loosely attached granular pigments but these are sometimes absent. **Clamps**: present. **Tramal hyphae**: regular. **Hymenium**: smooth, wrinkled or with much reduced gills, first cream but soon cinnamon to rust brown. **Basidia**: 4-spored. **Cystidia**: absent. **Spores**: rust-brown. 8–10 x 6.5–8.5 µm, Q = 1.1–1.4, subglobose to broadly ellipsoid, sometimes slightly angular, verrucose, moderately thick-walled, some with a brown, slightly dextrinoid plage. **Substrate**: on epiphytic mosses on the bark of trees, or on liverworts, especially near water where there is a constant high humidity. It sometimes spreads onto apparently bryophyte-free substrate but bryophytes are always nearby.

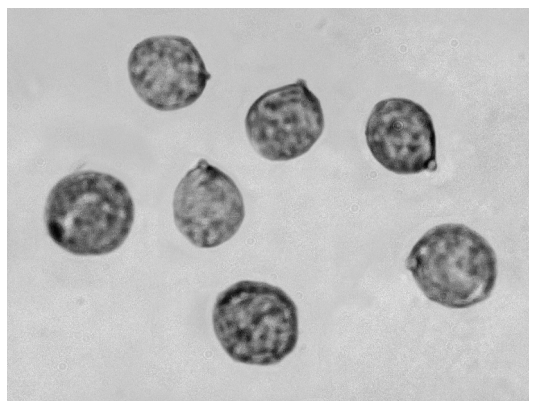

Fig. 2. A black and white image of *Chromocyphella muscicola* spores. Photograph © Peter R. Smith.

*Chromocyphella muscicola* (Fr.) Donk (Fig. 1) is one of the easiest cyphelloid fungi to identify. It is the only cyphelloid species of *Chromocyphella* so far recorded in Britain and is the only British brown-spored cyphelloid species that is parasitic on bryophytes. It also has some other distinctive features, especially the subglobose to broadly ellipsoid sometimes slightly angular, verrucose, moderately thick-walled spores (Fig. 2). The basidiocarps usually remain more or less bell shaped and they nearly always hang downward to allow the spores to fall out of the cups. The pale hymenium gets distinctively speckled brown as the spores ripen. Like all other bryophytic cyphelloids it should be searched for in December, or January if not too cold. It is often associated just with mosses; however, it is a species that is equally at home on liverworts (front cover). Sometimes it can spread onto woody substrates that are supporting mosses or liverworts but is never far away from them, and in such cases a possible connection to the bryophytes cannot be dismissed. It appears to be relatively widespread and common in Britain and seems to have particularly good years. In one such year I decided to purposefully search five sites across Derbyshire, which I thought would have the right habitat of moss-covered branches in humid environments such as over streams and near waterfalls etc. (Fig. 3). I looked at a different site each day for five days, in the middle of December, limiting each search to about one hour and I found it at all five sites.

Moreno *et al*. (2017), in a multigene study, have shown that this genus properly belongs in Hymenogastraceae close to *Flammula*. There they also described a new agaricoid species *C. lamellata* with fully formed gills found in Tenerife. In 2018 this species was also found in Scotland, on moss on *Picea sitchensis*, this was noted in Update 8 of CBIB, but currently lacks a published account. It is also known from Germany and the Netherlands, and two years ago also from France, reported in Lagrandie & Cochard (2024). At least two other European *Chromocyphella* species are known, *C. meloana* Gruhn *et al*. (2023), and *C. pinsapinea* Moreno *et al*. (1985), they are both easily distinguished from *C. muscicola* by smaller less globose spores and *C. meloana* also by its initial corticioid habit.

## References


Gruhn, G., Moreno, G., Mougues, Y. & Alvarardo, P. (2023). A new species in *Chromocyphella* from France. *Nordic Journal of Botany* (6). https://doi.org/10.1111/njb.03918.

Lagrandie, J. & Cochard, H. (2024). Découverte de *Chromocyphella lamellata* en Normandie. *Bull. Soc. Mycol. France* 140 (3,4) 259–263.

Moreno, G., Ortega, A & Honrubia, M. (1985). *Chromocyphella pinsapinea* sp. nov. (Crepidotaceae, Agaricales) in Spain. *Boletín de la Sociedad Micologica Castellana* (10): 84.

Moreno, G., Prieto, M., Esteve-Raventos, F. & Olariaga, I. (2017). Phylogenetic assessment of Chromocyphellaceae (Agaricineae, Basidiomycota) and a new lamellate species of *Chromocyphella*. *Mycologia* 109 (4): 578–587. https://doi.org/10.1080/00275514.2017.1377586.


[1] Contact via editorial address

Fig. 3. A typical habitat for *Chromocyphella muscicola* on a moss-covered *Salix* branch over water. Arrows point to the basidiocarps but they cannot be seen at this distance. Photograph © Peter R. Smith.

# *Cortinarius oreoborealis*: first British record

Helen Baker & the Grampian Fungus Group[1]


Fig. 1. Two specimens of *Cortinarius oreoborealis* from Dinnet, Aberdeenshire. A & B illustrate one specimen; C & D illustrate the other, 18 August 2023. Photos © Helen Baker.

In August 2023, I came across two groups of large, orange-capped webcaps about 10 m apart in wet downy birch (*Betula pubescens*) woodland alongside Clarack Loch near Dinnet, Aberdeenshire. My initial impression was that they most closely resembled a *Myxacium* around *C. mucosus* or *C. mucifluus*, but those species are pine (*Pinus* spp.) and spruce (*Picea* spp.) associates respectively and so I collected two specimens, one from each grouping. Once home, I attempted to key the specimens using Kibby & Tortelli (2021), but without success, although the closest match was to *C. septentrionalis*. Due to this uncertainty, I decided to extract and amplify DNA (ITS region) from one specimen and send it for sequencing (BMS Sequencing Grant, University of Aberystwyth).

The resulting ITSf1 sequence was 655 bp long and of good quality so I compared it to reference sequences in both the Unite database (UNITE.ut.ee) and GenBank (www.ncbi.nlm.nih.gov/genbank/). The Unite database comparison returned the most similar sequence as *C. septentrionalis*, but it was relatively low similarity at 98.91% (UDB016169, collected in Estonia, associated with spruce and birch). Running the sequence through the BLAST comparison function of GenBank produced a slightly different outcome, highlighting closest similarity to *C. oreoborealis* (e.g. MW911728, 99.02% similarity, collected in China, and NR_153071, Type, 98.84% similarity, collected in Spain, associated with *Betula pubescens*). This latter species was not included in Kibby & Tortelli, and the different results from the two comparisons led me to search for more information. I came across an open access paper by Cadiñanos *et al.* (2016), describing two new species, including *C. oreoborealis*, which was found associated with birch and Scots pine (*Pinus sylvestris*). Based on this paper and the comparison results, I collated publicly available ITS sequences and ran a simple phylogenetic analysis that included our specimen (Fig. 2), which confirmed that it clustered with the *C. oreoborealis* type specimen (NR153071) along with a couple of other sequences of this species.

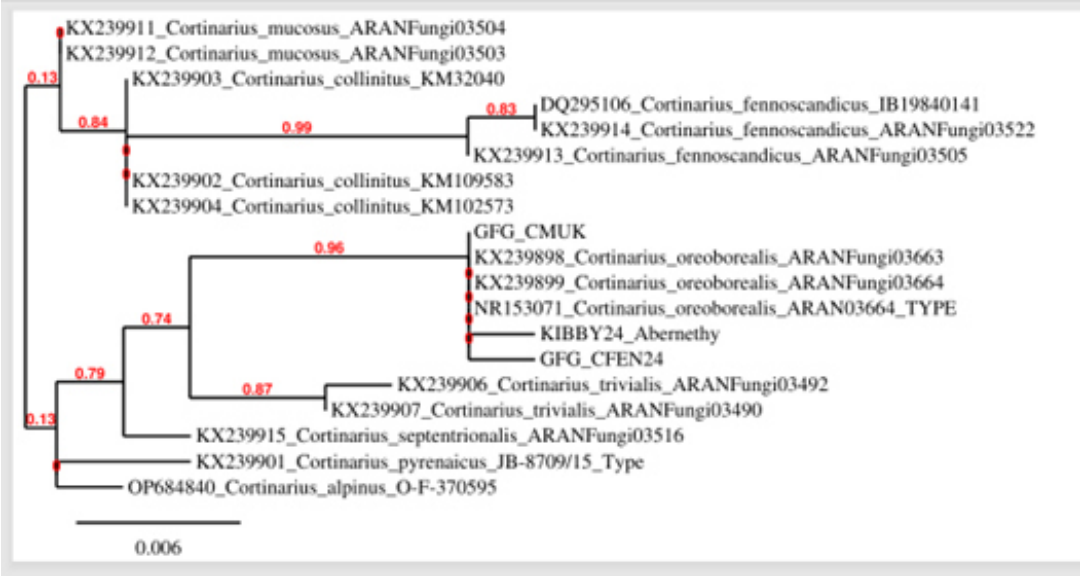


Fig. 2. Phylogenetic analysis of Grampian Fungus Group specimen (GFG_CMUK) compared with selected sequences from Cadiñanos *et al.* (2016) and similar sequences from GenBank (using one click method in Phylogeny.fr). This phylogeny also includes two specimens collected in 2024 (GFG-CFEN and KIBBY24_Abernethy, shown in Fig. 4.).

## Description

*Cortinarius oreoborealis* Cadiñanos, M.M. Gómez & Ballarà

**Cap:** 60–85 mm, tawny-orange to dark orange, viscid, low-convex with slightly inrolled margin (Fig. 1). **Gills:** Full-length gills thin, emarginate, with alternate half-length gills, both separated by vestigial gills at cap edge. Beige with greyish-lilac tones in mature specimens (Fig. 3). **Stem:** 120–150 mm long by 15–18 mm wide, proportionately very long compared with cap diameter, cylindrical, cream without any lilac colouration, smooth at apex and with pronounced ochre to brown floccose bands in lower half or towards base. **Spores:** 10–15 × 6–7.6 µm (from Cadiñanos *et al*., 2016), amygdaliform, moderately verrucose (not illustrated). **Odour:** nil.

## Similar species

The most similar species to *C. oreoborealis* macroscopically appears to be *C. septentrionalis*, which has a bright orange cap and is also a birch associate, and for which there is just one British record in the FRDBI (associated with *Betula* spp., Inverey, Braemar, Aberdeenshire, 21 August 2010). Gill colour could be a useful distinguishing characteristic, with *C. septentrionalis* described as having pale greyish buff to grey-brown gills (Kibby & Tortelli, 2021), and the stem is perhaps whiter and less floccose, but can be lilac flushed. *Cortinarius fennoscandicus* is another upland birch associate, but has a much duller orange-brown cap with olive tones and lilac colouration in the stem (Kibby & Tortelli, 2021); there are no British records (FRDBI). In mixed *Pinus-Betula* forests confusion might also occur with *C. mucosus* (Orange Webcap), which is a pine associate, but gill colour (pale greyish-buff to grey-brown) and spore shape (narrow amygdaliform, Q =2.0) (Kibby & Tortelli, 2021), plus a relatively short, white, less floccose stem are probably useful characteristics to separate the species.

Since the first collection was made in 2023, two additional specimens have been sequenced; one collected by the author on 11 September 2024 about 100 m from the 2023 collection (GFG_CFEN in Fig. 2), and another collected by G. Kibby, M. Tortelli, F. Hampe and C. Soler on 28 August 2024 in Abernethy Forest, Easterness (vc96) (KIBBY24_Abernethy in Figs. 2 and 4).

Fig. 3. Gill detail photo taken under artificial light. Photo © Helen Baker.

Fig. 4. *Cortinarius oreoborealis* from Abernethy Forest, Easterness (vc96), 28 August 2024. Photo © Mario Tortelli.

**Acknowledgements**

Thanks to Geoffrey Kibby, Martyn Ainsworth and Alick Henrici for reviewing a draft of this paper. Geoffrey Kibby kindly shared the ITS sequence and photograph of the specimens they collected in 2024 for inclusion in this paper. We are also grateful for support from the British Mycological Society Sequencing Grant and Caron Evans at the University of Aberystwyth.

## References

Cadiñanos Aguirre, J. A., Gómez Arenaza, M. M. & Ballarà, J. (2016). *Cortinarius oreoborealis* y *Cortinarius pyrenaicus*, dos nuevas especies del género *Cortinarius*, sección *Myxacium*. Journal des J.E.C. 18: 39–65.

Kibby, G. & Tortelli, M. (2021). *The genus Cortinarius in Britain*. fieldmycol@yahoo.co.uk.

[1] GFG c/o hollywatt@aol.com

# *Phragmidium mexicanum* (Uredinales: Phragmidiaceae)

## a neophyte rust established in Britain, with notes on its European distribution

Paul A. Smith[1], Brian Spooner[2] & Arthur Chater[3]

**Abstract**

We report recent records of the introduced rust *Phragmidium mexicanum* infecting *Potentilla indica* in Britain and, through published sources since its initial discovery in Europe in 1952, summarise its global distribution and review the spread of records of it in Europe.

**Introduction**

A dozen species of *Phragmidium* Link (including *Frommeëlla* Cummins & Y. Hirats.; see McCain & Hennen 1990; Yun *et al*., 2011) are currently known from Britain, all infecting members of the Rose family (Rosaceae) (Henderson 2004, Legon & Henrici 2005, Woods *et al*., 2024). They are characterised by multi-celled, pigmented teliospores, which (at least to those of a certain age!) resemble a spaceship from old Flash Gordon films. They include the most commonly recorded fungus on mycological forays, *P. violaceum*, infecting brambles *Rubus* spp. Three of them occur on species of *Potentilla*: *P. fragariae* on *Potentilla sterilis* (also reported on *Fragaria vesca*), *P. potentillae* on *Potentilla anglica*, *P. argentea*, *P. tabernaemontani*, and *P.* spp. cult., and *P. tormentillae* on *P. erecta* and *P. reptans*. Recently, a rust on leaves of *Potentilla indica*, a neophyte not previously known as a host in Britain, has been collected from at least two sites in Wales (Woods *et al*., 2024), and in England from the Royal Botanic Gardens, Kew in Surrey. This rust is referrable to *Phragmidium mexicanum* (Mains) H.Y. Yun, Minnis & Aime, described from Mexico and not yet formally reported from Britain. A description of British material is given, and the wider distribution of the rust and its spread in Europe considered. Parasites reported from the sori are noted, and other taxa described or reported from *P. indica* are also briefly noted.

**_Phragmidium mexicanum_**

As well as the set of British species which may infect both native and introduced hosts, a neophyte species has followed its host *Potentilla indica* (Yellow Strawberry, formerly *Duchesnea indica*) to Europe, where it was first detected in August 1952 (Viennot-Bourgin 1954). McCain & Hennen (1990) and Poelt & Zwetko (1991) describe the complicated taxonomic history of rusts on *P. indica*. *Phragmidium mexicanum* is named after *Fragaria mexicana*, to which the type host was first ascribed, only later being reidentified as *Po. indica* (McCain & Hennen, 1990). It has been through several generic placements (*Kuehneola*, *Frommea* (*nomen inval*.), *Frommeëlla*) but, following the work of Yun *et al*. (2011), now seems to be settled in *Phragmidium*. Its correct name is therefore *Phragmidium mexicanum* (Mains) H.Y. Yun, Minnis & Aime.

McCain & Hennen (1990) resolved part of the taxonomic confusion by describing two varieties, the type var. *mexicanum* with slightly shorter and wider teliospores than var. *indicae*, and with one fewer cell (2–4 rather than 3–5), and uredinia without paraphyses. However, subsequent records seem consistently to be of var. *indicae*, so the importance of the differences remained to be demonstrated, or supported by an investigation of DNA. Yun *et al*. (2011) argued that the differences between the varieties represent variable characters and were not of taxonomic importance, so that there is only a single species-level taxon. We follow this approach here.

Poelt & Zwetko (1991) also highlight the conundrum of the origin of the rust. *Po. indica* has a wide native distribution covering much of eastern Asia, but has also been widely introduced around the world, and is now found in both anthropic and seminatural habitats. *Ph. mexicanum* s.l. was, however, described from Mexico, so it is not known whether the rust originated in the New World or the Old World.

**_Phragmidium mexicanum_ in Britain**

*Ph. mexicanum* was first detected in Britain by AOC in 2018 in Penglais Dingle, Aberystwyth, below the University Botany Garden, vc46, and subsequently also by Ray Woods in Insole Court Gardens, Llandaff, Cardiff, vc41, and these appear in the compilation of parasitic microfungus records in Woods *et al*. (2024).

During a field meeting of the British Plant Gall Society to Kew Gardens on 31 August 2024 (Spooner 2024), a rust on *Po. indica* was noted (Figs. 1 & 2). Though mostly uredinial, a few telia were present and it can clearly be ascribed to *Ph. mexicanum*. This appears to be

a new record for England, and a first for the Royal Botanic Gardens, Kew. As several other authors note, it is likely that *Ph. mexicanum* is overlooked, and has actually been present in Britain for some time. Hopefully, this article will draw attention to it and encourage further reports. The rust may prove to be fairly frequent and widespread in Britain, though a recent inspection of four sites in Cardiganshire where the host is also known found the rust to be absent.

Fig. 1. *Phragmidium mexicanum* infecting *Potentilla indica*, Kew Gardens, 31 August 2024.
Photo © P. A. Smith.

Fig. 2. *Phragmidium mexicanum* infecting *Potentilla indica*, Kew Gardens, 31 August 2024.
Photo © P. A. Smith.

*Phragmidium mexicanum* (Mains) H.Y. Yun, Minnis & Aime, *Mycologia* 103(6): 1452 (2011)
*Frommea mexicana* Mains, *Bull. Torrey Bot. Club* 66: 618 (1939)
*Frommeëlla mexicana* (Mains) McCain & Hennen, *Mycotaxon* 39: 250 (1990)
*Phragmidium duchesneae* (Arthur) P. Syd. & Syd. *Monogr. Uredin.* (Lipsiae) 3(1): 93 (1912) [1915]
*Kuehneola duchesneae* Arthur, *N. Amer. Fl.* (New York) 7(3): 185 (1912)
*Frommea duchesneae* (Arthur) Arthur, *Bull. Torrey Bot. Club* 44: 504 (1917)
*Frommeëlla duchesneae* (Arthur) Yohem, Cummins & Gilb., *Mycotaxon* 22(2): 452 (1985)
*Uredo duchesneae* (Arthur) McCain & Hennen, *Mycotaxon* 39: 252 (1990)
*Frommeëlla mexicana* var. *indicae* McCain & Hennen, *Mycotaxon* 39: 251 (1990)
*Frommea obtusa* f. *duchesneae* (Arthur) Arthur, *Manual of the Rusts in United States & Canada*: 93 (1934).
Type: on *Potentilla indica*, from Veracruz, Mexico

The following description is based on the three Kew collections cited:

Aecia lacking. Uredinia hypophyllous, densely scattered, minute, orange to orange-yellow; urediniospores subglobose, finely echinulate, 17–19 x 15–17 µm. Telia brown, scattered amongst uredinia, minute, sparse in material examined; teliospores (33–) 50–110 x (19–) 22–25 µm, yellow-brown, smooth, 1–6-septate, wall somewhat thickened, 3–4 µm, at the apex, obtuse to bluntly conical, broadest at centre; pedicel short, non-hygroscopic. Basidia present, sparsely septate, thin-walled, slightly curved, c. 70 x 7–9 µm, sterigmata c. 10 µm long. Basidiospores few, ellipsoid, c. 9 x 4 µm. Paraphyses not seen.

**Specimens examined**: vc17 Surrey, Kew, Royal Botanic Gardens, Quercetum, on leaves of *Potentilla indica* under *Quercus rugosa*, 31 Aug. 2024, B.M. Spooner & P.A. Smith, K-M 1444352; same locality, 12 Sept. 2024, B.M. Spooner, K-M 1444392; same locality, 31 Oct. 2024, B.M. Spooner, K-M 1444391.

**Other specimens reported**: Wales, vc41 Glamorgan, Cardiff, Llandaff, Insole Court Gardens, ST15011766, 15 Jul. and 14 Dec. 2024, R. Woods; vc46 Cardiganshire, Aberystwyth, Penglais Dingle, below University Botany Garden, by muddy footpath in wooded ravine, SN59308200, 50m, 23 Oct. 2018, A.O. Chater, det. R.N. Stringer.

This is an autoecious rust, completing its life cycle on a single host species. Telia (Fig. 3) develop later than the uredinia, being largely absent from leaves collected in late September, but present on those collected later in October and in early November.

Fig. 3: Teliospores of *Ph. mexicanum*. Photo © A.O. Chater.

## Wider distribution of *Ph. mexicanum*

Now known to be virtually cosmopolitan and probably present wherever the host occurs, whether native or naturalised. Much of the recorded distribution is given by Fraiture & Vanderweyen (2007) and by Yun *et al.* (2011). It is known from Africa (Yun *et al*., 2011); Asia, including China (Tai, 1979; Zhao *et al*., 2021), Korea (Yun *et al*., 2011), and Pakistan (Fahad *et al*., 2018); Australia (Fahad *et al*., 2018) and New Zealand (McKenzie, 1998); Europe (see below); Mexico (Mains, 1939) and N. America (Arthur, 1912; Cummins & Stevenson, 1956); and S. America, including Argentina, Brazil, and Colombia (Hennen *et al*., 2005). The account by Solano-Báez *et al.* (2021), claiming a first record of this rust from Mexico, evidently overlooked the re-identification of the type host as *P. indica* and is hence superfluous.

## European distribution

It would be interesting to assess the spread of *Phragmidium mexicanum* in Europe. It has probably been present for some considerable time, though not been widely known or reported. Published records are, nevertheless, interesting, but may represent the spread of knowledge about this taxon more than they represent the spread of the fungus itself.

*Ph. mexicanum* was first reported in Europe from Denguin, near Pau in the Pyrénées-Atlantiques department (at low altitude) by Viennot-Bourgin (1954), but then seems to have escaped the attention of mycologists until it was discovered in several localities around Graz, Austria in 1988-1990 (Poelt & Zwetko, 1991), with a further Austrian locality in Poelt & Zwetko (1997). It is also known from the Azores (Gjaerum & Dennis, 1976; Dennis *et al*., 1977, as *Frommea obtusa*; Spooner & Butterfill, 1999) and Madeira (Gjaerum, 1970, 2001 (as *Frommeëlla duchesneae*); Fraiture & Vanderweyen, 2007). In mainland Europe it was next detected in Switzerland in 2000 (Berndt & Brodtbeck, 2022, without details) and then Czechia in 2002, at the botanic garden of Masaryk University, Brno (Müller, 2003), and as with the Austrian find, once alerted to its presence it proved to be widespread, but not ubiquitous – Müller (2006) found it in 7 out of 13 localities searched where the host was present.

A further extension was to Poland, originally at Kraków in August 2004, and then elsewhere in 2006 and 2008 (Wołczańska & Piątek, 2010). Fraiture & Vanderweyen (2007) reported *Ph. mexicanum* from the national botanical garden of Belgium on 8 June 2007, and then (again) in several more localities in Belgium quickly thereafter. They also report a previously unpublished record from the garden of the Natural History Museum in Karlsruhe, southern Germany, by Markus Scholler.

The next records are from near the Slovenian Forestry Institute, Ljubljana, Slovenia in 2008 (Piškur & Jurc, 2017) and from Ukraine, in the Botanical Garden of Odessa National University in September 2009 (Tykhonenko & Korytnyanska, 2012). Both the reporting

articles include electron micrographs of the uredinia, and the latter also has light microscope pictures of the urediniospores and teliospores. There are, however, many more occurrences in GBIF (2024), including from (with the year of the earliest record in brackets) Germany (2003), Hungary (2024), Netherlands (2012), Portugal (other than Macronesia) (2014), Russia (2022) and Spain (2001). In particular there are very many records from the Netherlands, where it is clearly widespread when systematically recorded.

## Parasites

Fraiture & Vanderweyen (2007) reported uredinia of *Ph. mexicanum* to be infected by two hyperparasitic fungi, *Eudarluca caricis* (Fr.) O.E. Erikss. and *Lecanicillium muscarium* (Petch) Zare & Gams. The former is a widespread parasite of rust fungi, with a very broad host range, so its occurrence is not particularly surprising. The latter, on the other hand, is a more curious record, this being an entomopathogenic species, not otherwise recorded from rust sori. The identification was, however, tentative. *L. muscarium* was described from Norfolk, as *Cephalosporium muscarium* Petch, the anamorph of *Akanthomyces muscarium* and used now as a biocontrol agent for whitefly. Larvae, probably of a *Mycodiplosis* sp. (Diptera: Cecidomyiidae), such as are commonly present on sori of many rusts as well as of powdery mildews (Erysiphales), were also noted feeding on the urediniospores of *Ph. mexicanum*. None of these have so far been recorded on British collections of *Ph. mexicanum*.

*Phragmidium mexicanum* differs from other rusts on *Potentilla* in its host species and, especially, in characters of the urediniospores, telia and teliospores (Henderson, 2004).

Although the common host of *P. mexicanum* is *Po. indica*, it has also been recorded from *Potentilla hebiichigo* in Korea (Yun *et al.*, 2011).

One other taxon has been described from *Po. indica*:

*Phragmidium duchesneae-indicae* P. Zhao & L. Cai, *Fungal Diversity* 110: 1007 (2021).

Uredinia lacking paraphyses. Urediniospores echinulate, globose to broadly ellipsoid or obovoid, 13–19 x 11–17 µm. Telia brown to black, paraphyses absent; teliospores brown to black, 2–4-septate, 66–91 x 17–27 µm, pedicels hygroscopic.

Described from China.

## Discussion

*Ph. mexicanum* has been recorded in a wide scatter of countries and localities across Europe, but mostly rather sporadically. In the Netherlands, however, it is clearly widespread, and we suspect that this will be true in other places if there is systematic recording of the rust. The UK can now be added to the list of countries where *Ph. mexicanum* is known. It is interesting that so many of the published finds have been made in and near botanical gardens and similar institutions. We suspect that this results from a combination of *Po. indica*, as an introduced species, being relatively likely to be found in gardens, and people with the skills to recognise the rust visiting such places more frequently.

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# *Entoloma ammophilum* and *Entoloma coracis*

## Two New Species of Pinkgill for the UK

Andrew Donegan[1], Colin Doull[2], Will Brantingham[3], Yannah Drury[4] & Stuart Fraser[5]

Fig. 1. Part of the SSSI site, indicating the survey habitat. Photo © Will Brantingham.

### Introduction

In September 2024, we carried out a CHEGD focused survey of the Burn of Midsand, part of the Dunnet Links SSSI in Caithness. We were optimistic, given the geography and the known ecology of the site, along with preliminary records, that the site would be a haven for unusual CHEGD fungi. This proved to be very much the case, and along with many other finds the survey recorded over twenty species of Hygrophoraceae (waxcaps), and a number of species of *Entoloma*, *Microglossum*, *Geoglossum* and *Clavulinopsis*.

Some of our samples were subsequently sent for DNA sequencing. The results showed that two of our finds, both members of the *Cyanula* subgenus of *Entoloma* with collybioid fruiting bodies, had ITS region DNA sequences which were closely aligned to those of species hitherto unknown in the UK. A comparison of ecological, macromorphological and microscopic features was then carried out, and confirmed the finds as *Entoloma ammophilum* and *E. coracis*, both of which are new additions to the funga of the British Isles.

### Ecology

Both species were found on the same SSSI grassland site. The Burn of Midsand is a coastal grassland at the very northern tip of Scotland, with sandy calcareous soil, and bordered by Dunnet Community Forest, a primarily coniferous woodland. The site is designated for its grassland flora, including the Scottish endemic *Primula scotica* (Scottish Primrose), and *Salix repens* (Creeping Willow) appears in abundance across the site.

Fig. 2. *E.coracis in situ* cap. Photo © Colin Doull.

### *Entoloma ammophilum*

This species was described from the Netherlands in 2021 (Crous *et al*., 2021), from coastal grassland with calcareous soil and *Salix repens*, very similar to our site. Our specimen was a solid match to the holotype in terms of both macromorphological and microscopic features. In many respects it is rather nondescript in the field for those of us who don't often dive into *Entoloma* identification. The translucently striate cap with a very dark, minutely squamulose centre and the bicoloured stipe (a dark blue towards the base and brown at the apex) are obvious field ID clues which can be seen in the image provided below. The spores were measured at 9.4–10.8 x 7–8.3 µm, which is a good match to the type description. DNA sequencing of the ITS region revealed a 100% match to the data obtained from the type specimen, leaving no doubt as to its identity, and confirming *E. ammophilum* as new to the UK.

Fig. 3. *E. ammophilum in situ*, showing characteristic features and habitat. Photo © Colin Doull.

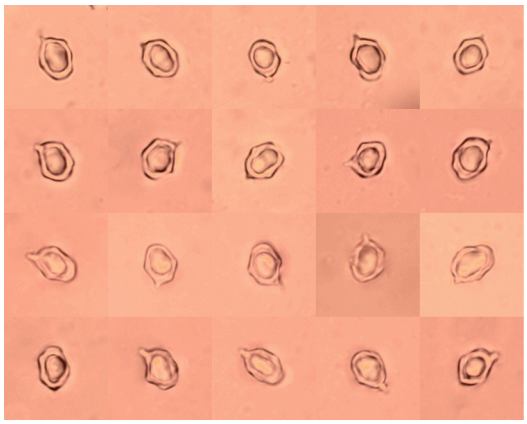

Fig. 4. A collection of spores of *E. ammophilum*, in Congo red. Photo © Colin Doull.

### *Entoloma coracis*

This species was also described in 2021, incidentally in the same paper as *E. ammophilum*, from Norway (Crous *et al*., 2021). In terms of field identification characteristics, the tomentose cap which had broken up into squamules, black spotting on the gills with age, and the fibrillose stipe with abundant basal mycelium are all field ID clues for the species. The habitat in this case was a little more incongruous, with the literature revealing a known preference for 'thermophilic' calcareous grasslands in the Mediterranean, with its presence also noted in both deciduous and coniferous woodlands (Crous *et al.*, 2021 & Voto, 2024). As ever with *Entoloma*, field ID characteristics alone are generally insufficient for species level ID, but the spore sizes were a fair match at 9.5–10.6 x 6.7–7.7 µm, and the characteristic cheilocystidia were found on the gill edges, which distinguish this species from lookalikes. ITS sequencing revealed the specimen to be a 99.85% match to the type, confirming this species for the UK.

Fig. 5. *E. coracis* underside photo. Photo © Colin Doull.

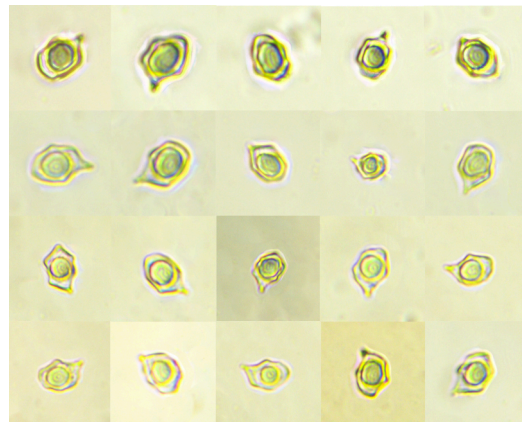

Fig. 6. A collection of spores of *E. coracis*, in Congo red. Photo © Colin Doull.

*E. coracis* is noted in the literature to bear a strong resemblance to *Entoloma corvinum* (Crous *et al.*, 2021) a species which is ostensibly well recorded in the UK. This latter species is indicated very clearly in the latest treatments of genus *Entoloma* to be a strictly Alpine species (Nordeloos *et al.*, 2022). Therefore, it is plausible that older fungarium specimens which were collected in habitats other than this could belong to *E. coracis*. This was the case with some records of putative *E. corvinum* made in Italy, which were reassigned after careful examination of the cheilocystidia (Voto, 2024). During the writing of this paper it has also come to our attention that there may be some existing records of *E. coracis* from Northern Ireland, dating to 2021. (per David Mitchel of the Northern Ireland Fungus Group, social media posts.)

**Acknowledgements**

Our thanks go to members of the *Entoloma* Facebook group, for guidance and notes of caution on interpreting our sequence data and providing information about the species described, and Alvalab, for their prompt provision of ITS data on our finds.

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# *Freezing fungi*

Tony Leech[1]

Autumn may be the most popular time for fungus forays but in recent years the Norfolk Fungus Study Group has organised recording forays in every month of the year. Contrary to expectations, more than 25 members attended the foray at Dillington Carr near Dereham, Norfolk in January 2025.

Despite ice crystals making it difficult to pick out fungi, sharp eyes (and subsequent work) produced a list of 104 species, including one first county record, *Ionomidotis fulvotingens*, and three second records for the county, *Phaeohelotium nobile* (see back cover), *Neodasyscyphus cerina* and *Daldinia decipiens*.

Although ascomycetes predominated, 14 gill fungi were recorded and Norfolk's Lichen Recorder, Rob Yaxley, added 38 lichen species.

Fig. 1. Norfolk Fungus Study Group at Dillington Carr near Dereham. Photo © Mike Ball.

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# The curious case of the *Coprinellus* that turned out to be a *Psathyrella*

Yvonne Mynett[1], Mark Joy[2] & Derek J. Schafer[3]

As Sherlock Holmes knew well, a new clue when investigated thoroughly can cast remarkable light on older findings and reveal things that were previously missed. We describe here an example that we puzzled over during the British Mycological Society's 2022 Spring Meeting at Cranfield, the clue (as is often the case these days) being a DNA sequence. The taxonomy behind the detective story we describe below was fully and clearly published in Update 11 of the Checklist of British and Irish Basidiomycota in 2023 but we thought the following account would be of interest to readers, if only to illustrate that attending BMS fungal recording meetings provides a valuable and enjoyable opportunity to discuss and explore such issues with fellow field mycologists!

YM looked at a tiny dark-spored agaric growing on deer dung found by MJ in East Norfolk, north west of Norwich. The deer dung was collected on 1 January 2022 from Houghen, St. Faith's Common, grid reference TG178172, and incubated to see what might emerge. The fruitbodies fruiting from 12th January were very tiny, the caps a maximum of 2 mm high (Fig. 1) making microscopy a little difficult.

However, the microscopic characters (Fig. 2) were clear and, with sphaerocysts in the veil and lageniform pileocystidia (setules) in the cap, similar lageniform cheilocystidia, caulocystidia and very small spores, it keyed out in the Coprinoid keys (Uljé, 2005; Nagy *et al*., 2012) to *Coprinellus parvulus*, a species described in Uljé & Keizer (2003) as *Coprinus parvulus* and combined in *Coprinellus* in Házi *et al*. (2011). DJS looked at the dried Norfolk collection, found the same characters and agreed that it was this species. It had not been reported as found in Britain. Study of additional collections from Norfolk by YM and DJS and a re-read of the original Uljé & Keizer (2003) paper did show that this species was somewhat different from other setulose *Coprinellus* species. Differences included few widely spaced lamellae, small lageniform cystidia and other cells that were much smaller than generally found in *Coprinellus*, as we had noted in our collection.


Fig. 1. Fruitbodies: A, B, growing on dung © Mark Joy; C, dried herbarium specimen © Derek Schafer.

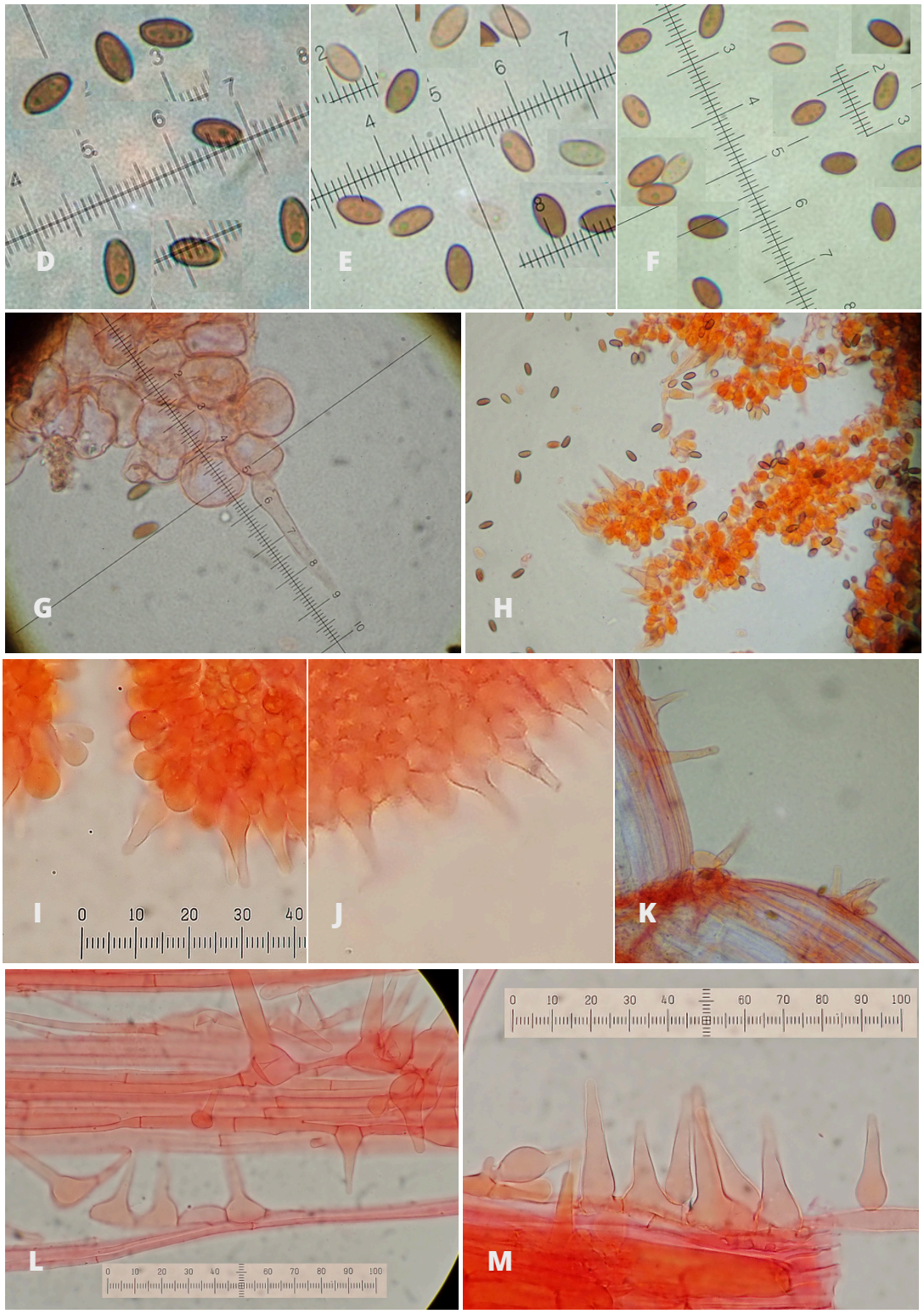


Fig. 2. D, E, F, Spores; G, veil cells and pileocystidia on cap; H, I, J, cheilocystidia; K, L, M, caulocystidia. Scale division 1 µm. when present. © Yvonne Mynett: D, E, F, G, H, K; Derek Schafer: I, J, L, M.

So, *Coprinellus parvulus* new to Britain would be an exciting find but clearly would benefit from a DNA sequence to fully justify that status. Nagy *et al*. (2012) had included the holotype in their study of setulose *Coprinellus* species but their ITS and ß-tubulin sequences were too noisy to be included in their phylogenetic analysis and there were no other sequences of *Coprinellus parvulus* on GenBank. Sequencing our collection would provide useful information, although we expected there to be no matching sequences of this species.

YM was part of a DNA barcoding group in Norfolk that produced an ITS sequence for the collection. The result was conveyed to us when we were at the BMS meeting at Cranfield in 2022. Brian Douglas, who had a copy of this ITS sequence, told us, when asked, that it was *Psathyrella tenuicula*. YM responded with "I didn't send any Psathyrellas to be sequenced!"

Dash! Another misidentification! Where had we gone wrong?

*Psathyrella tenuicula* was described by Karsten in 1879 as *Psathyra tenuicula* and transferred to *Psathyrella* following type studies by Örstadius and Huhtinen (1996). We seized DJS's copy of the 2005 checklist of British and Irish Basidiomycota (CBIB), finding *Psathyra tenuicula* listed as a *nomen dubium*, included in "British Basidiomycetae" by Rea (1922) but not in Kits van Waveren's *Psathyrella* monograph (Kits van Waveren, 1985). Where else might we look to cast some light?

The details on GenBank of the published sequences that matched the Norfolk material included a reference to a paper by Larsson & Örstadius (2008). DJS had previously looked at this paper several times and it was the paper that combined *Psathyrella conopilus* into *Parasola* and *Psathyrella marcescibilis* into *Coprinopsis*. Searching now for *P. tenuicula*, we found that the paper had a full description of *Psathyrella tenuicula* placing it in a *Psathyrella* section there called "*Cystopsathyra*". This section also included *P. sphaerocystis*, a P.D. Orton species described

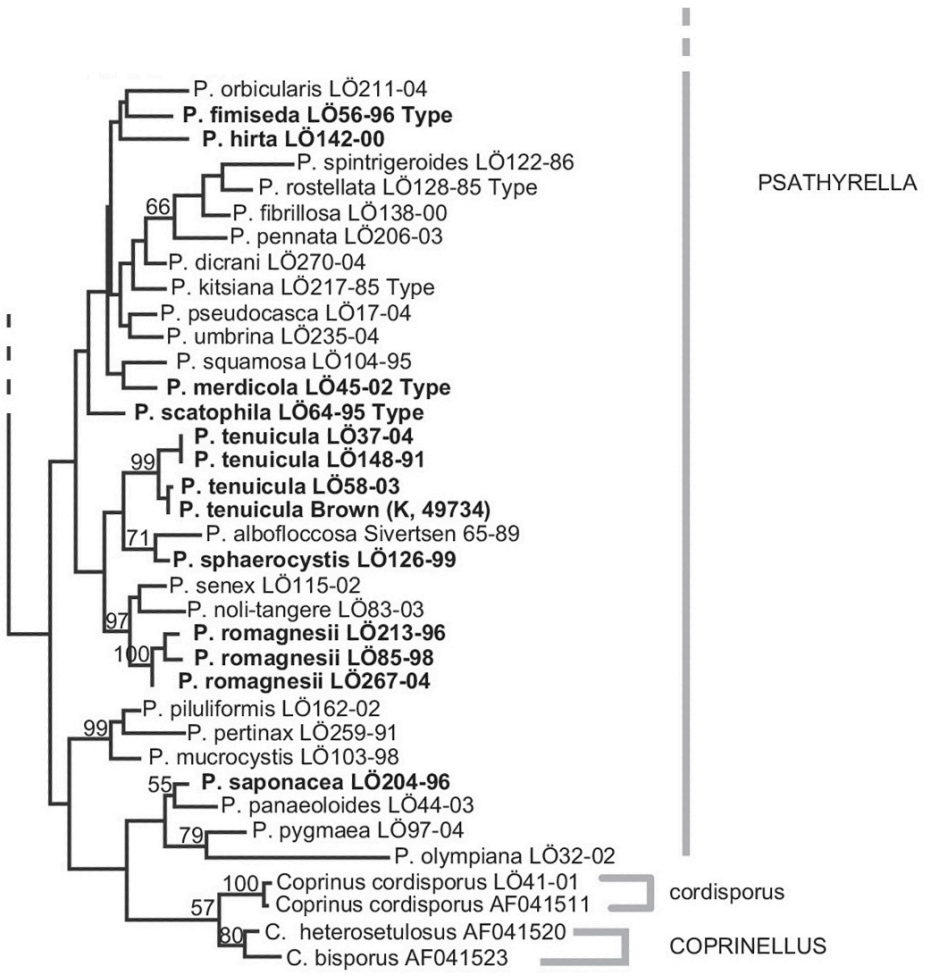


Fig. 3. Extract of part of phylogram (p.1170) from Larsson & Örstadius (2008).

from Britain in 1964 that differs from *P. tenuicula* by having broader spores and lacking pubescent cap and stipe. All of this was supported by molecular phylogeny. Where did this leave *Coprinellus parvulus*?

To our surprise, we found that the paper had considered this and provided cogent arguments for *Coprinellus parvulus* being a later synonym of *Psathyrella tenuicula*. DJS had not noticed this in earlier reading and it had apparently not been picked up by Species Fungorum or other papers on *Coprinellus*. CBIB in 2005, we discovered later, was also unaware that *Psathyra tenuicula* had been updated to *Psathyrella tenuicula* in the paper by Örstadius and Huhtinen (1996). The fourth update of CBIB (2009) had subsequently taken the 2008 paper into account with the following comment:

"Now with a modern interpretation and combination in *Psathyrella*. Listed as British by Rea (1922) and (consequently?) by Larsson & Örstadius [Mycol. Res. 112(10): 1165-1185 (2008)], but without voucher material."

So, accepting that the Norfolk collection is *Psathyrella tenuicula*, is it the first British record? Checking through the records in the Fungal Records Database of Britain & Ireland (FRDBI), we found none listed. However, looking again at the Larsson & Örstadius (2008) paper, we saw that one of the collections of *Psathyrella tenuicula* that they had sequenced was labelled with the voucher references "Brown K49734 or Brown K, 49734". Not obvious as a Kew number, which would have been "K(M)49734", but worth further investigation?

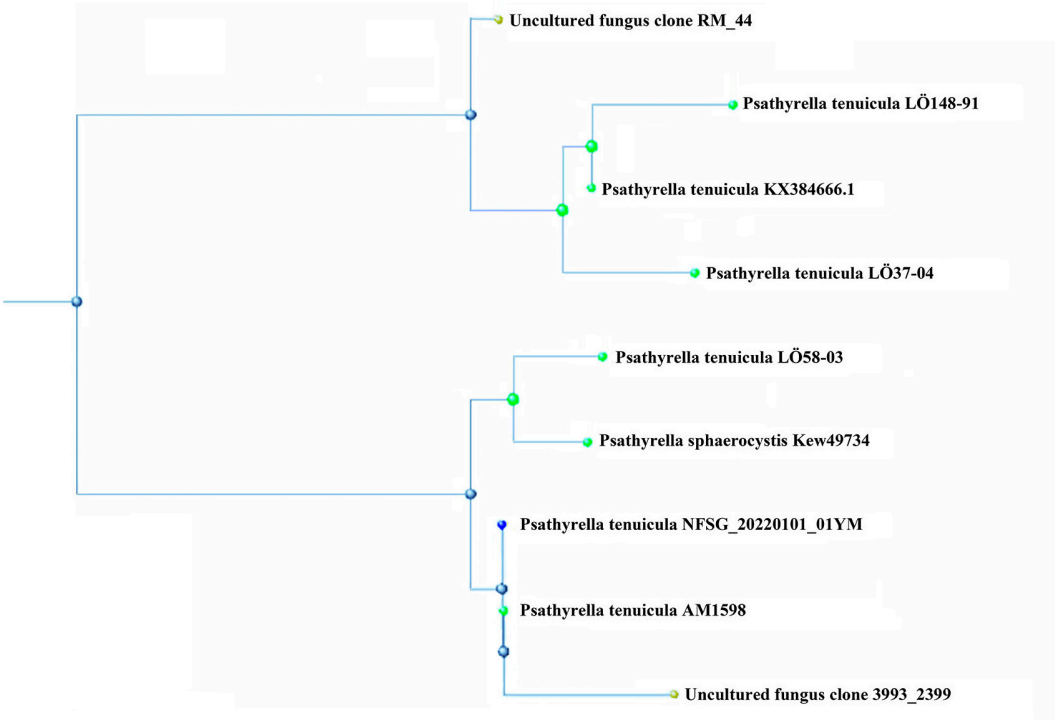


Fig. 4. GenBank phylogram of Norfolk *Psathyrella tenuicula* collection based on ITS sequences.

Table 1. Sequences and specimens used in this study.

| Taxon name | Country | Year | Collector/ Identifier | Voucher# | Sequence locus ITS |
|---|---|---|---|---|---|
| Uncultured fungus clone | Poland | | | Clone RM_44 | MK796503.1 |
| Psathyrella tenuicula | Sweden | | Leif Örstadius | LÖ148-91 | DQ389705.1 |
| Psathyrella tenuicula | France | 2016 | Pierre Ivaldi and Francis Fouchier | | KX384666.1 |
| Psathyrella tenuicula | Sweden | | Leif Örstadius | LÖ37-04 | DQ389704.1 |
| Psathyrella tenuicula | Sweden | | Leif Örstadius | LÖ58-03 | DQ389706.1 |
| Psathyrella tenuicula (as P. cf. sphaerocystis) | England | 1997 | Ted Brown (C), Nick Legon (I) | K(M)49734 | DQ389707.1 |
| **Psathyrella tenuicula** | **England** | **2022** | **Yvonne Mynett** | **NFSG_20220101_01YM** | **OR999124.1** |
| Psathyrella tenuicula | Germany | 2013 | Andreas Melzer | AM1598 | MK045710.1 |
| Uncultured fungus clone | Lithuania | | | Clone 3993_2399 | MW215932.1 |

Back to FRDBI! This was a Ted Brown collection, K(M)49734 from Burnham Beeches in 1997, identified by Nick Legon as *Psathyrella* cf. *sphaerocystis* but shown by the 2008 paper to be *P. tenuicula*. This was the reason why the 2008 paper considered *P. tenuicula* as British, not its earlier listing by Rea. So *P. tenuicula* is British from this find at Burnham Beeches. Nick Legon expressed some doubts about K(M)49734 labelling it as *P.* cf. *sphaerocystis* and was not aware of the more recent *P. tenuicula* publications.

Finally, before we relegate the Norfolk collection to just the second such record, there is another issue to consider. Larsson & Örstadius (2008) treated *P. tenuicula* in a broad sense because the phylogenetic clade, reproduced above (Fig. 3) from their 2008 paper, divided into two branches. These were recognised as potentially reflecting a complex of at least two species. However, a full resolution of the complex would need to consider previously described species such as *Psathyrella minima*, *P. berolinense*, *P. coprinoides* and *P. granulosa* and find characters to distinguish what the sequencing reveals. Larsson & Örstadius referred to *P. tenuicula* in this broad sense. The complex was also indicated in the major analysis of Psathyrellaceae by Wächter & Melzer (2020). The paper recognised two clades in the phylograms, labelling them /tenuicula A and /tenuicula B.

Our phylogram is shown in Fig. 4, the Norfolk collection being NFSG_20220101_01YM and the details of the material sequenced set out in Table 1. The sequence of the Norfolk collection nests in clade /tenuicula B, along with the Kew collection. So, the Norfolk record does seem to be the second of both *Psathyrella tenuicula* in the broad sense and of whatever name attaches to clade /tenuicula B if the complex is resolved into two species by further study. If, on the other hand, there are more than two species found to make up the complex, the Norfolk collection might still be the first of one of them!

We await with interest the results from anyone prepared to take on the challenge of sorting out the complex. Such is the joy(?) of biological recording in the DNA age!

**Acknowledgements**

We convey our grateful thanks for help in this study to: Norfolk DNA Group; Brian Douglas at RBG Kew; Darwin Tree of Life Barcoding the Broads Project; and Sam Rowe at the Earlham Institute, Norwich. We are also grateful to Alick Henrici, Martyn Ainsworth at Kew and Leif Örstadius for providing many helpful comments.

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# Two genera of ascomycota new to Epping Forest

Mario Tortelli[1], Claudi V. Soler[2] & Lucy Cava

Fig. 1. *Pseudopithyella minuscula* growing on × *Hesperotropsis leylandii* debris. Epping Forest, 21 December 2023. Photo © Claudi V. Soler.

On a mid-winter walk in Epping Forest, Essex, on 21 December 2023, two groups of tiny ascomycete fungi were found thanks to the extremely sharp eyes of one of our party (LC). The colour, the very small size of the fruit bodies and their substrate were unusual to us, more used to finding larger fungi on or under deciduous wood. They were growing on and near Leyland Cypress × *Hesperotropsis leylandii* debris lying on bare soil. Conifers of any type are a very uncharacteristic occurrence in Epping Forest; when they do occur they are likely to have been introduced, as happened in the nursery of experimental conifers planted by the foresters in the area known as The Warren, where these two interesting finds were made. We were, therefore, keen to pursue their identity, in anticipation of new records for the Forest.

## *Pseudopithyella minuscula*

The first collection (Fig. 1 & 2) was a group of tiny red cups, not more than 2 or 3 mm in diameter, mounted on a small white stem and growing on the discarded scaly leaves of what we took to be last year's fallen and quite rotted × *H. leylandii* branchlets. To all three of us it seemed to recall a minute version of *Sarcoscypha coccinea* and hence 'Tiny Scarlet Elf Cup' became its working name pending further investigation. The first clue came from looking up *Sarcoscypha* in Fungi of Temperate Europe (Læssøe and Petersen, 2019) and finding the much smaller genus *Pithya* described as rather small, more or less orange and, most interestingly of all, "decomposers on conifers". More specifically, *P. cupressina* is recorded (on FRDBI) as growing mainly on decayed twigs of *Juniperus* species, another genus of Cupressaceae.

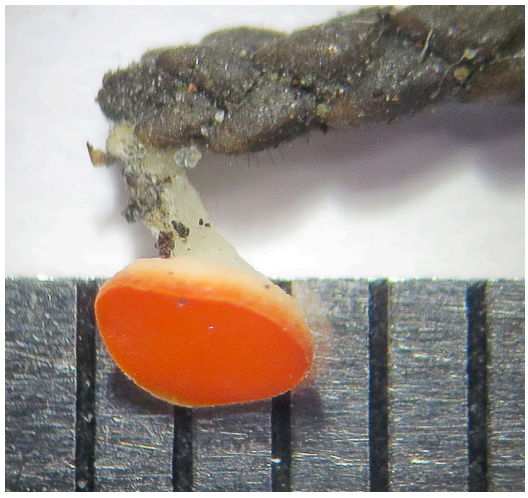

Fig. 2. *Pseudopithyella minuscula*. Epping Forest, 21 December 2023. Photo © Claudi V. Soler.

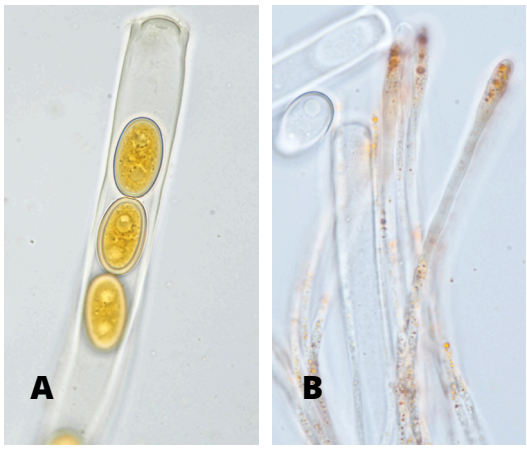


Fig. 3. *Pseudopithyella minuscula*, cropped micrographs taken at x1000. A: ascus in Baral's iodine. B: paraphyses in water. Images © Claudi V. Soler.

The more promising-looking genus *Pseudopithyella* came to light from the Fungi of Great Britain and Ireland website, in particular *P. minuscula*, the only species known in Britain. It was established (CVS) that the microscopical structures of this unknown-to-us genus matched perfectly those of our own collection. The elliptical spores of *Pseudopithyella minuscula* and the reddish colour seem the main difference from a second species *P. cupressina* which is more orange and has globose spores. For further information regarding the latter species check Dennis (1978) and Spooner (2002).

There are no records of *Pseudopithyella minuscula* on the FRDBI which might have made our collection a UK first. However, according to the Fungi of Great Britain and Ireland website it has been reported from East Kent and East Suffolk.

## Description

*Pseudopithyella minuscula* (Boud. & Torrend) Seaver
Syn. *Plectania minuscula* (Boud. & Torrend) Le Gal
Syn. *Sarcoscypha minuscula* Boud. & Torrend

**Apothecia** discoid, flat topped 2–3 mm in diameter, shortly stipitate. **Hymenium** smooth reddish-orange in colour. The margin is a paler concolorus narrow band. **Stipe** whitish to hyaline, 1–2 mm long, slightly widening at the apex to support the disc. **Asci** sub-operculate, 8-spored, 150–250 x 10–14 µm, thick-walled, more or less cylindrical, slightly narrowing towards the base and truncated at the apex which recalls the points of a crown (Fig. 3A). **Ascospores** ellipsoid, uniseriate, 14–16 x 8–9 µm, smooth, hyaline, usually with two large guttules. **Paraphyses** slim, shaped like a matchstick, 150–200 x 2–4 µm, wider at the apex with orange granular content (Fig. 3B). **Habitat** found growing attached to decayed and partially buried × *Hesperotropsis leylandii* debris lying on bare soil under a single tree.

**Specimen examined:** K-M001442637. Sequence data is accessioned on GenBank: PV409555.

Fig. 4. *Pseudoboubovia benkertii* growing on × *Hesperotropsis leylandii* debris. Epping Forest, 21 December 2023. Photo © Mario Tortelli.

### *Pseudoboubovia benkertii*

Our second collection (Fig. 4), also spotted by LC, was a small cluster of tiny yellow discomycetes, growing only centimetres away from the *Pseudopithyella* and again growing connected to the partially buried and decayed × *Hesperotropsis leylandii* leaf debris. The waxy, pale-yellow discs had a vaguely greasy look, the circular margin becoming more irregular as they reached their maximum size of 4–5 mm; macroscopically looking like some kind of *Hymenoscyphus*. We were not making any progress on keying out the species and it was decided that the best thing to be done was to pursue this collection via a DNA analysis. The results were not conclusive but suggested *Pseudoboubovia benkertii*, another unknown-to-us genus. Again, we checked the Fungi of Great Britain and Ireland website and confirmed that the macroscopic and microscopic characters fitted perfectly. This collection also represents a new record for Epping Forest, a new record for Essex and the third British record. The first record, according to the FRDBI is from Anglesey on 10 August 2020, on bare soil under a *Cupressus* hedge, reported in Field Mycology (Aron, 2023). The second, from Cornwall on a conifer stump, was made only a month earlier than ours.

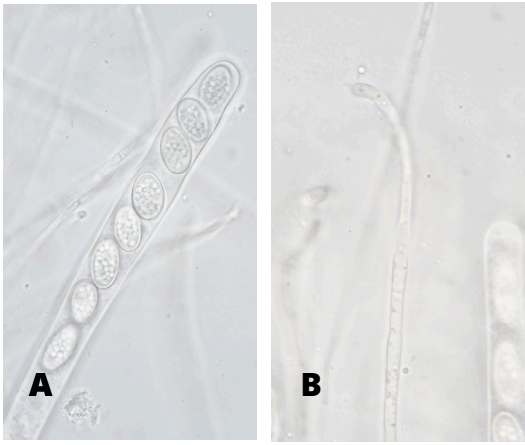


Fig. 5. *Pseudoboubovia benkertii*, cropped micrographs taken at x1000. A: ascus in water. B: paraphysis in water. Images © Claudi V. Soler.

### Description

*Pseudoboubovia benkertii* (B. Perić) U. Lindem, *et al*.
Syn. *Kotlabaea benkertii* B. Perić

**Apothecia** sessile, smooth, waxy, pale yellow to straw throughout, regularly discoid when young, becoming more irregular and slightly wavy with age. **Hymenium** concolorous with the rest of the fruitbody. **Asci** 8-spored, 200–250 x 10–14 µm, operculate, cylindrical, slightly tapering towards the base, thin-walled, with a more or less obtuse apex not bluing in iodine (Fig. 5A). **Ascospores** ellipsoid, 15–17 x 9–10 µm, smooth, thick-walled, hyaline, with multiple small oil droplets.**Paraphyses** septate, 150–275 x 2–3 µm, slim, bent at the apex but not swollen, with indistinct contents (Fig. 5B). **Habitat** growing attached to buried and decayed × *Hesperotropsis leylandii* debris on bare soil under a single tree.

**Specimen examined:** K-M001444660. Sequence data is accessioned on GenBank: PV394771.

Adding a new species to a site list is not such an unusual occurrence, although even this does become a little harder in sites which have been extensively surveyed, such as Kew Gardens or Epping Forest. Adding two new genera in one visit is definitely a little more unusual.

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# An introduction *to Russula*

Iona Fraser[1]

Fig. 1. *Russula sanguinaria* (Bloody Brittlegill). This is a common sight under *Pinus*, but one of dozens of red species of *Russula*, requiring work to confirm. Photo © Max Mudie.

*Russula* species are, I think, the Marmite of the field mycology world. Although they have been despised or avoided by so many mycophiles because of the relative difficulty of achieving species identification, I have always loved them. I am not sure whether this is because of, or in spite of, their awkwardness – but, either way, these ubiquitous and often rainbow-coloured jewels brighten up any woodland walk. If you haven't already spent some time at least attempting to identify them, then I am here to convince you to try.

Determining a species ID with a *Russula* can be a frustrating and painstaking process which can sometimes remain inconclusive even with microscopy. They can, however, appear deceptively simple earlier on in one's journey! I think most of us feel we can easily identify them at least to genus, but having seen mistakes made (most commonly with *Rhodocybe gemina*), I thought it was worth including a brief description of the genus as a whole.

*Russula* species are very variable in stature, but (as a morphological sweeping statement), they are generally quite squat, with shortish stipes compared to their cap width, simple unornamented stipes, gills ranging from white to ochre/orange, and smooth caps. I often think that if you asked a child to draw a mushroom, you would likely get something resembling a *Russula*. There are approximately 150 species in Britain.

In English they are commonly known as 'Brittlegills', due to the tendency of most (though not all) species to have fragile/friable lamellae. Due to the exceptions to this rule, I think that a better genus indicator, for beginners and improvers, is how the stipe breaks. The majority of trama (flesh) cells of *Russula* species are generally quite globose, sitting on top of one another like a stack of oranges in a greengrocers. This is quite different to the trama cells of the majority of other genera, whose long, thin cells are more like a bunch of asparagus. The result of this structural difference is that where many mushroom stems will pull apart like string cheese, or at least tear raggedly with some long fibres remaining, *Russula* stems, by contrast, will break cleanly, with the sturdiest, densest among them snapping like a stick of chalk.

When flicking through a basic field guide, it is often easy to find something that looks 'just like' the mushroom in your hand, but the truth is rather more complex. As an introduction to the genus, in the front of his key – 'The Genus *Russula* in Great Britain' (2017) – Geoffrey Kibby shares a quote from Anna Maria Hussey (1855):

"If we know of any one, who in the pride of intellect spurned all mental tasks as mere play, we would tame him by insisting on his mastering, classifying and explaining the synonymes of the genus *Russula*."

This quote was pointed out to me over a decade ago, when I was given an earlier edition of Kibby's book by the very encouraging Ken Burgess. He found me at the end of a residential foray and informed me that if I insisted on trying to identify every *Russula* I found, then I would need it. It was excellent advice, so consider this me passing it along: 'The Genus *Russula* in Great Britain' (Kibby, 2017) really is an essential resource, should you be as enthusiastic/daft as I was.

While the key does sometimes split species on microscopic differences, I think it is well worth following the process even as somebody who does not (yet!) use microscopy for identification. There are some which will be possible to key out using only morphology, and others which will lead you to a point where the remaining options are easier to separate using morphological differences.

As with any field identification, looking at the whole mushroom is rarely going to be helpful, and the 'checklist' approach suggested for any morphological identification is never more essential than here. It can feel rather daunting, especially after a few failed attempts, to tackle *Russula* species on macromorphology alone, but it is at least sometimes possible. With this in mind, I share a useful (but likely not exhaustive) checklist for the genus *Russula*, below; it contains some information that wouldn't be as important in other genera.

Once you are fairly sure you are working with a *Russula* species (for which see above), these are the specific features you will need to consider…

## *Russula* checklist

| | |
|---|---|
| **Habitat** | *Russula* species are mycorrhizal, which means they grow in relationships with certain plants, usually trees. Making a note of the tree species that are growing within about 5–10 m can be extremely helpful or even essential for reaching an ID. |
| **Size/Stature** | For the purposes of the key, size is the width of the cap of the mushroom, but it is also useful to note the overall stature. Is your mushroom very stout and squat, with a stipe much shorter than its cap diameter, or gracile and leggy – slim and much taller than it is wide, for example? |
| **Colour** | *Russula* are often extremely variable, even within the same species, but a broad observation on whether your specimen is reddish, greenish, purplish etc., or a mixture, is still important to note. It is also useful to check whether the stipe is white or flushed with colour. |
| **Bruising / colour change** | Some species of *Russula* will bruise different colours when damaged and/or with age. Trying to observe specimens of differing maturity, and also deliberately damaging them, can provide valuable information. |
| **Smell** | Some species of *Russula* smell of very little, but others have extremely distinctive scents which can narrow things down very quickly. From pelargonium (garden geraniums), to old shellfish: these mushrooms really are a sensory experience! |
| **Taste** | It comes as a surprise to many that one of the important identifying features of *Russula* species (and some other fungi) is taste. We are not talking about eating them in a meal, but a test referred to as 'nibble and spit' – this involves taking a small bite, chewing it for 20 seconds or so at the front of our mouth, and then spitting it out. Providing you remember the last step, this is a safe test, and will tell you whether your Brittlegill is mild, bitter, acrid or hot – or something completely different. For example, just last year we were delighted to find a species which tasted distinctly of menthol. |
| **Peeling of the cuticle** | This test is, again, specific to *Russula*. One of the important features to observe is the degree to which the cuticle peels. This means peeling the 'top skin' from the edge of the cap (margin) toward the middle. The amount of "peelability" is expressed as a fraction of that distance, so a half-peeling *Russula* measuring 10 cm across, would only peel 2.5 cm (or halfway toward the centre of the cap). |
| **Spore colour** | While spore colour can be really helpful if you don't know which genus you have found, it is rarely necessary for identifying a mushroom, once you have an experienced eye: the morphological features are usually enough. Spore colour is important with *Russula*, though, and for this you will want to make a proper spore print (Fig. 2). |
| **Chemical reactions** | For many of us, field reagents were the first step on the slippery slope into microscopy, and they are particularly helpful in this genus.<br>If you don't already, I would recommend carrying the following items on your forays: $FeSO^4$ (ferrous sulphate/iron salts), available as either a solution or in crystal form, I prefer the latter; guaiac (a solution of guaiacum resin in alcohol); and KOH (potassium hydroxide). These are available online in small dropper bottles, which are practical for use in the field. There are others which are useful for determining particular species (e.g. ammonia, which is mentioned below). If you are looking for specific species then you may want to research which chemicals you might need in advance. These are mostly used by placing a drop (or rubbing a crystal) onto the stipe, but do check your literature first: some chemicals need to be applied differently to identify species. |

**Making a spore print**

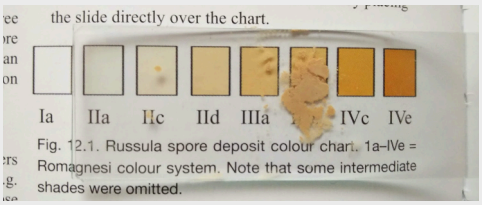


Fig. 2. A small heap of spores on a glass slide being compared to a standard colour chart. Photo © Clare Blencowe.

To make a spore print, you will need to remove the cap (or a piece thereof) from the mushroom, place it gills down on paper or glass. I always print onto a microscope slide; but the glass or Perspex from a picture frame would do. This enables you to move the print over dark or light backgrounds to better visualize it. Cover this with a cup or bowl and leave for a few hours to overnight. When it is done, you will need to scrape the spores into a little pile (a knife back or a credit card work well) and then compare to a colour chart. There is one in Kibby (2017).

Once you have checked all of the above, you may be able to name the species you have found. Some species will also have unique feature which will separate them from other, similar species. This could be anything from forking or anastomosing gills, a very distinct smell or taste, a cuticle which falls short of reaching the margin, or even a veil. These checks can be completed on a case-by-case basis, once you have narrowed down the potentials.

Having essentially said it is all but impossible to identify *Russula* in the field, I would like to share a few species with distinctive combinations of features. I like to think that this makes them a little more friendly. These are excellent species to keep a look out for and to use for honing your skills. You will certainly find you can add a few more to the list yourself, as you become more familiar with the genus.

Fig. 3. *Russula vesca* (The Flirt). Showing the pellicle stopping short of the margin, resembling bared teeth. Also the gills forking near the stipe. Photo © Virn Stothers.

### *Russula vesca* (The Flirt)

A rather distinctive mid-sized *Russula*. This species can have a mixture of dusky/dirty pinks and greens – and is often described as being 'the colour of old ham'. It has gills that are much more flexible than most *Russula* species and often forking right next to the stipe, is very white/pale in both stipe and gills. Its extra special feature which aids field ID is that its cap cuticle doesn't quite reach all the way to the very edge of the cap. This means that the edges of the gills are exposed, which is the source of two of its English common names; 'The Flirt' (lifting its skirt to show you a little flash of gill), and the 'Bare Toothed Brittlegill'. This combination of features is usually enough to identify it without further study.

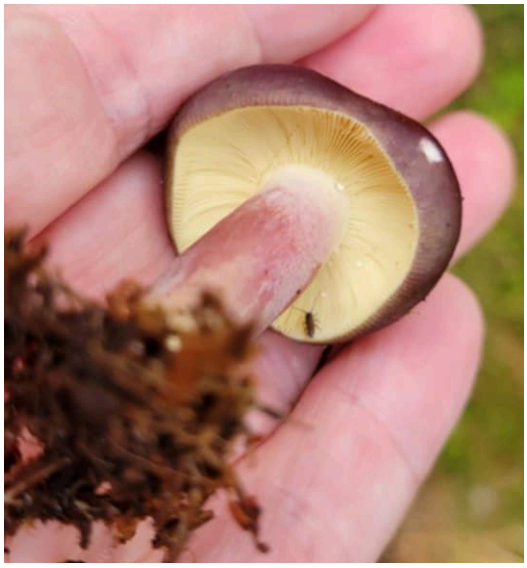

Fig. 4. *Russula sardonia* (Primrose Brittlegill). The gills are a beautiful soft primrose yellow. Photo © Virn Stothers.

### *Russula sardonia* (Primrose Brittlegill)

This strikingly attractive species is a beautiful wine red on the cap (although green and yellow forms are also known, and not uncommon), flushed with a slightly paler version of the same on the stipe. When turned over, the gills are the softest primrose yellow! The colour combination, alongside habitat (mycorrhizal only with species of *Pinus*), and a very hot/spicy 'nibble and spit' test, are enough to identify the most common colour form. If you think you have found them, and you like a little chemistry experiment, then try dripping ammonia onto the gills for certainty (or to impress your mycophile friends) and wait for them to turn bright pink.

### *Russula nigricans* (Blackening Brittlegill)

The most common of the multiple blackening *Russula* in my local area, this is also the least complicated. While it is extremely variable in stature and colour, depending on maturity, it has a relatively short checklist of features. This *Russula* begins dirty white/mottled brown and neat as a button, before becoming huge, undulating and bruising rosy reddish then black on damage, turning completely black as it

Fig. 5. *Russula nigricans* (Blackening Brittlegill). Showing the blackening that gives it its common name, and the thick, widely spaced gills which distinguish it from similar species. Photo © Will Brantingham.

matures. It is extremely stocky in stature, with a shorter stipe than its cap width, and has extremely widely spaced, thick gills. These gills are even more brittle than most other brittlegills – they crumble dramatically into pieces akin to big, flaked almonds upon rubbing, and may ping off a fair distance in the process. This last feature gives certainty to your ID of the species in the field.

*Russula nigricans* is not a fussy friend, as it associates with a range of trees, but it does have a rather pickier couple of occasional hitchhikers: if you are really lucky, you may just find it (or one of the other blackening species) with an *Asterophora* species hitching a ride. *Asterophora lycoperdoides* (Powdery Piggyback) and *A. parasitica* (Silky Piggyback) are parasitic fungi which grow only on the mature fruiting bodies of blackening *Russula* species (and some species of *Lactarius*). They are worth looking for, as they are an absolute treat to behold (Fig. 6).

I hope this meander through the genus *Russula* has encouraged you to be less intimidated by them. Even if you still feel intimidated, please know that you are in good company in your plight!

Thankfully, they are pretty, even if we can't put a name to them.

Fig. 6. *Asterophora parasitica* (Silky Piggyback) growing on the blackened gills of an old *Russula* sp.. Photo © Virn Stothers.

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# Feature focus: *Hemimycena tortuosa*

Max Mudie[1] & Clare Blencowe[2]

Fig. 1. Water droplets on the pileus and stipe of a small *Hemimycena* mushroom, growing on a substrate of decaying wood (possibly *Betula*).

Photo © Max Mudie.

Occuring mostly on moist bark of deciduous trees, *Hemimycena tortuosa* (Dewdrop Bonnet) can display this most striking feature: the retention of water droplets on the stipe and pileus, caught in the spirally twisted caulo- and pileocystidia.

*H. tortuosa* is not the only species of *Hemimycena* that can be found covered with clear droplets but this field character could give you a clue to look for the distinctive cystidia under the microscope.

See https://www.inaturalist.org/observations/265942291 for more observation details.

**The equipment and technique**

OM System OM1 with OM M.Zukio 90mm f/3.5 Macro Lens. Natural light. Focus stacked image consisting of 52 frames, processed in Helicon focus, cropped in Photoshop.

Focus stacking was used to achieve detail and clarity at this magnification. As this subject was reflective I opted to use natural light, thus taking advantage of the reflections without adding hot spots created by additional lighting.

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# Fungal Futures: Conservation news and views

Matt Wainhouse (Natural England)[1] & Rich Wright (Plantlife)[2]

We're excited to launch a new regular feature on fungal conservation in the UK. Feedback from Field Mycology readers showed that there was a keen enthusiasm to know more about conservation efforts for fungi in the UK. Perhaps this is unsurprising, last year a survey of field mycologists by the Biological Records Centre found that conservation was a strong motivation for recording fungi, coming a very close second to science and research (Amy *et al*, In Press).

For six years Shelley Evans' regular column, Conservation Corner, kept field mycologists in the loop on all matters fungal conservation. Now, nearly 20 years after it ended, we'll be taking inspiration from Shelley's feature to report back to the field community about what is happening in fungal conservation. We'll celebrate the incredible diversity of our fungi while also highlighting the challenges that come with safeguarding these organisms, too often overlooked in the conservation paradigm. It will be a space to communicate what the agencies and non-governmental organisations (NGOs) are up to, reporting on exciting practical conservation stories and research projects, through to musings on what new policies might mean for fungi and field mycologists alike.

Importantly, we recognise that fungal conservation does not happen without field mycologists, whose data, insight and experience underpin all our efforts for a fungi-rich future. Thus we believe it is crucial for field mycologists to be part of the conservation conversation. Dialogue is important and we encourage you to get in touch with us.

Our hope is that the column will inspire readers to advocate for fungi.

## New Beginnings for Fungal Conservation in the UK...

Dull as it may seem, it's probably useful in this first episode to set out what the conservation landscape is looking like for fungi. Environmental policy and legislation has been a tricky beast to keep atop of, let alone trying to interpret what it means for fungi. In the post-Brexit landscape our four countries have lost the EU as an umbrella organisation on environment matters. This is leading to new and divergent governance structures and policies in the devolved nations. But as Tennyson put it, "The old order changeth, yielding place to new", and so we see the rise of the Global Framework on Biodiversity which may help to stop us drifting too far apart. Nonetheless differences are evident for fungi in the emerging biodiversity strategies being prepared by each devolved country. On species recovery, England's Environment Improvement Plan purged the only mention of fungi from its first iteration, the 25-Year Environment Plan, under its Goal of Thriving Plants and Wildlife. In contrast, the Scottish Biodiversity Delivery Plan 2024-2030 has

Fig. 1. The beautiful and rare *Chrysomphalina grossula*, amongst many other fungi, has not yet had its conservation status assessed. Photo © Rich Wright.

actively avoided entrapment in the exclusive language of flora and fauna, stating in its draft Biodiversity Strategy that definitions were amended to replace "animals and plants" with "organisms" to include other taxa such as fungi. Go Scotland! They have also committed to revising the species of principal importance on the Scottish Biodiversity List which currently includes 161 fungal species, more than the other three devolved countries combined.

Fig. 2. *Polyporus umbellatus*, one of our larger rare fungi, was included on the Scottish Biodiversity list. Photo © Rich Wright.

In England, we have seen the publication of the first of the Local Nature Recovery Strategies. These local nature recovery plans emerged from the Environment Act and will set the trajectory for regional conservation planning. The West of England combined authority have pipped the other 47 LNRS areas to the post (West of England Combined Authority, 2024). The first consultation draft from May 2024 stated, "there is a lack of data on the abundance and distribution of fungi in the area covered". We know well that this area has extensive records, perhaps some of the best recorded sites in the UK, such as Tyntesfield which has a dense annual recording programme, and Dolebury Warren, now recognised as one of the richest grassland fungi sites in England. LNRS guidance from Natural England is that strategies should adopt broad taxonomic coverage when setting their priorities. So, it is a relief to see this feedback was accepted and the published version included eight species of fungi. It is clear there are some dataflow issues as well as a lack of appetite to look for data or ask informed organisations. Work at Plantlife is currently under way to address this by supporting all LNRS areas with a list of fungal species of conservation concern, tailored to their area, along with management advice and advocacy for fungi. A number of field mycologists have already contributed to these to make their local strategies fungi-inclusive. However, it's clear that some Responsible Authorities could do with a nudge from local groups and specialists to point out important sites, and lobby for rare species and the inclusion of fungi in every LNRS.

One exciting prospect in this barrage of new policy is that the conservation status of a species (i.e the Red List status) may finally have some teeth in decision making. In England, an ambitious legally binding target to reduce extinction risk (of all taxa) by 2042 has put Red Lists at the heart of conservation planning. The two official Red Lists for fungi, Boletes and Lichens, even form part of the Extinction Risk Indicator by which the Government will measure its performance against this target. Tensions over Red Listing are understood and Natural England has been working to come up with a way to move things forward. Put simply: no Red Lists, no funding. The imperative couldn't be clearer. Work on a grassland fungi Red List (where the threat cannot be overstated) and an update to the Boletes will begin later in the year. We strongly encourage field mycologists to support this important work.

One of the big challenges facing fungal conservation in the UK is who will do it? Taxonomically inclusive policies could be great for fungi, but they are meaningless unless the conservation organisations actively engage in fungal conservation. Birds have the RSPB, inverts have Buglife, but who is the vociferous voice of fungi? Over the last year Plantlife has leapt into action to start filling this void. Fungi have always been part of their mandate, but even they would admit they have been quiet on fungi until recently. Now with two recently employed mycologists, Rich Wright and Aileen Baird, Plantlife is set to become champions (or is that champignons?) of fungal conservation. Plantlife is now leading the creation of a new Network for Fungus Conservation, bringing together a consortium of organisations and individuals from government institutions, NGOs, major landholders, academia and the field mycology community. The Network aims to strengthen collaboration between its partners and provide not just a voice, but the practical action that fungal conservation needs. The structure of this new Network is being developed but it already feels like an immensely exciting step forward.

## ... And abroad

The UK Government has shown some uncharacteristic leadership in fungal conservation on the world stage. At COP16 in Cali, Colombia, Secretary of State for Environment Steve Reed co-launched a 'Pledge for fungus conservation' with his Chilean counterpart Maisa Rojas. The Pledge encourages national governments to recognise Funga alongside Flora and Fauna in their domestic policies and legislation and

integrating "concrete measures for their protection into National Biodiversity Strategy and Action Plans and by promoting mycology as an essential science for future conservation measures" (Chile and UK, 2024).

Fig. 3. The Chilean Minister of the Environment, Maisa Rojas, and Secretary of State for Environment, Food and Rural Affairs, Steve Reed, signing the Fungal Conservation Pledge at COP16. Photo © Giuliana Furci, Fundación Fungi (Fungi Foundation).

Casting cynicism aside, this is an exciting moment for fungal conservation in the UK and the world. The 'Orphans of Rio', as Prof. Hawksworth once described them, have been adopted! Well, almost. The Pledge did not get the signatures it needed to make it onto the Convention on Biological Diversity (CBD) agenda. For its part, the UK does at least appear to be taking its international commitment on the Pledge seriously. Chile and UK are continuing to work together to persuade more countries to sign up in time for COP17 later this year in Armenia. The growing list of fungal advocates now includes Colombia, Benin, Spain, Mexico, Costa Rica, Peru, Ecuador, Cambodia, Guinea, Germany and Italy.

Several months later, the pertinent question is how much UK GOV will push for the institutional change that the Pledge demands of the four environment agencies. The Government's public gestures on nature have been troubling. The vulnerable and voiceless have long been easy targets for politicians. So, while bats and newts are the fall guys for a faltering economy, and the agencies in all four countries are facing tough cuts, it remains to be seen whether the Pledge will keep fungal conservation buoyant through the coming storm. In spite of this, our feeling is that we are witnessing a step change in fungal conservation, but it's on us all to continue to campaign for fungi, to make sure the Pledge leads to action, not platitudes.

Elsewhere on the global stage, the UK is pushing for amendments to the Convention on International Trade in Endangered Species (CITES) so that it formally recognises fungi at COP20 in Switzerland. Fungi have been recognised by CITES since 2002, but since then no fungi have been proposed let alone listed. Listing was likely hampered by the lack of IUCN Global Red List Assessments. In 2015, there were just five species (four lichenised and one non-lichenised fungi), but with credit to the Global Fungal Red List Initiative (Mueller, Dahlberg and Krikorev, 2014) and an international network of supporting mycologists, more than 800 species have been assessed, with almost half considered threatened (IUCN, 2025). The UK's recommendations to the Parties of CITES aim to remove fungi from the patronage of plants and to recognise them as their own kingdom. Despite concerns about rampant foraging, the UK does not have a burgeoning trade in endangered fungi but is expected to propose, or support proposals on behalf of non-UK species. Chinese Caterpillar Fungus *Ophiocordyceps sinensis* (Winkler, 2010), listed as Vulnerable due to harvesting and trade, is tipped to be the subject of the inaugural proposal.

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# Dr Irene Ridge 1942–2025: an obituary

Fig. 1. Irene Ridge at the North West Fungus Group residential foray in Keswick, 2018. Photo © Paul F. Hamlyn.

Irene was born in Clitheroe in 1942. Following a secondary education at Clitheroe Royal Grammar School, she went up to Somerville College, Oxford in 1961 where she studied Botany, Biochemistry and Zoology. It was whilst at Oxford that she met her husband, John. In addition to being a dedicated and enthusiastic scholar, Irene joined the Queen's College dramatic society where she was able to show how accomplished an actor she was. After graduating with a prestigious first class honours degree in Botany and obtaining a PhD, she secured a position in the early seventies with the Open University, lecturing in Biology.

Although Irene remained with the OU until she retired in 2002, by the nineties she had moved with John back to Lancashire. Irene commuted weekly to Milton Keynes, but nevertheless threw herself into local life. In 1990 she became honorary reserve manager for the Salthill and Crosshills Quarries in Clitheroe. Irene also joined North West Fungus Group (NWFG) not long after it was founded by Rita Cook in 1994. In 2004 she became its Chair and remained so until 2021, an amazing 17 years piloting the group. At the end of the 90s she began volunteering with Lancashire Wildlife Trust (LWT), assisting in practical conservation tasks at Moor Piece Nature Reserve. Irene took the opportunity to record the fungi she found and, over the years, led NWFG on a number of recording forays there. She and John also bought an adjacent piece of land to extend the area of the reserve. In 2018 LWT awarded Irene a long-service volunteering certificate. In 2003 Irene became a magistrate and eventually chaired the local bench.

Irene was a scientist and a teacher. I believe that's why the fungal kingdom was of such interest to her. Its complexity, beauty, identification challenges and need for its value to be more widely appreciated, enabled Irene to channel both of those great strengths into what was an enduring commitment to field mycology. When asked recently when she became interested in fungi, she said she couldn't really remember, but thought it might have started when she was a teenager. A close friend of Irene's since college days, Dr Marlene Behennah, remembers several holidays in the South West which included fungal foraying.

Irene was a firm believer in sharing her knowledge of fungi. Indeed at the NWFG's 30th AGM in 2024 she said, "Spreading the word about fungi is an important part of the justification for NWFG — as well as enjoying and learning about them ourselves". For many years, doing just that, Irene led numerous guided forays for the general public and gave talks to local natural history and conservation groups. She also invested much time and effort in the development of new field mycologists and conservation volunteers through microscope workshops, identification courses and mentoring. During the pandemic she even led a Zoom session on identifying *Mycena* species. Having become something of an expert in the Geoglossaceae, she sought to share that expertise too through the development of a guide for beginners which included a key that is still in use, in an updated form, today.

Irene was a long-standing member of the British Mycological Society and regularly attended the annual week-long residential forays. She participated in the BMS waxcap grassland project in 1996, her own site subsequently being rated amongst the top 12 in the country at the time. When the BMS inaugurated UK Fungus Day (UKFD), she was keen that we supported it and so began our ongoing NWFG commitment to this event. In 2021 Irene exchanged her role as Chair for one as Education & Outreach Officer and organised several successful UKFD family events at Mere Sands Wood, an LWT reserve.

Irene has left behind a group of capable field mycologists in NWFG. Following her example, we will continue recording species, developing new mycologists and spreading the word about the value of the fungal kingdom whenever possible. Irene has also left a significant collection of fungal records and vouchers, which will be available to conservationists, taxonomists and other researchers long into the future.

Irene was held in high esteem and warm regard in NWFG. Her kindness, good humour, patience and extensive knowledge of fungi will be greatly missed by ourselves, and by many others in the wider Mycology community who also knew her.

Jeanette Maddy, North West Fungus Group

# Book Reviews

## Flora of Lichenicolous Fungi

## Volumes 1 – Basidiomycetes

**Paul Diederich, Ann M Millanes, Mats Wedlin, James D Lawrey**
Luxembourg National Museum of Natural History, 2021
ISBN: 978-2-919877-26-3
Hardback 351 pp.
£38.00 from www.summerfieldbooks.com and other booksellers.

## Volumes 2 – Hyphomycetes

**Paul Diederich, Damien Ertz, Uwe Braun**
Luxembourg National Museum of Natural History, 2024
ISBN: 978-2-919877-27-0
Hardback 544 pp.
£42.00 from www.summerfieldbooks.com and other booksellers.

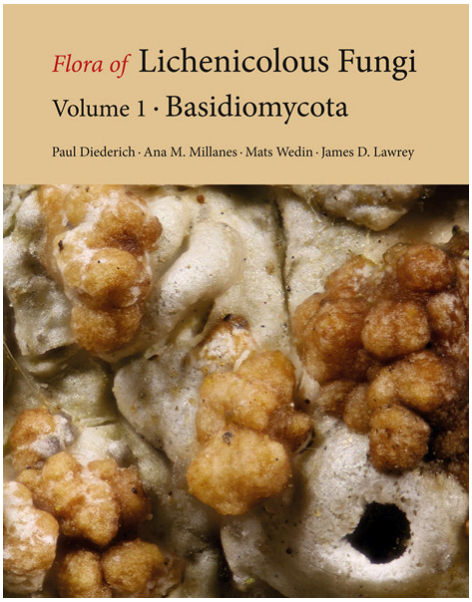
Over the last ten years, interest in the fungi that grow on lichens has been increasing, both amongst lichenologists and amongst mycologists.

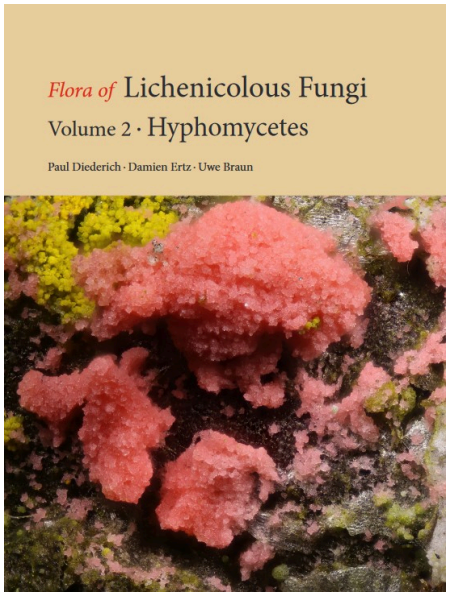
However, literature has been mainly limited to research papers. It has been difficult to find, and in some cases it has been locked behind pay walls. Some of the lichen websites and the *Fungi of Great Britain & Ireland* website have useful descriptions of lichenicolous fungi – but only of those species which have come to the attention of the website authors. There has been an almost total lack of modern keys and no identification handbooks.

But this is changing. A group of authors, led by Paul Diederich, has set out to (temporarily!) solve these problems. Aiming high, they have not just set out to write a national or regional flora; they've set out to give a modern and up-to-date account of lichenicolous fungi across the entire world!

And the most remarkable decision the authors have made, has been to tackle first the most obscure, and often avoided, sub-groupings of lichenicolous fungi: the basidiomycetes and the hyphomycetes.

Field mycologists will be shocked to hear basidiomycetes described as 'obscure' but in lichenicolous fungi terms they are. Very few lichenicolous basidiomycetes are macro-fungi. Some of them form a hymenium with recognisable basidia and basidiospores on their lichen hosts but many are only known as bulbils with few characters for a mycologist to work with. Yet in *Volume 1* of the *Flora of Lichenicolous Fungi*, Paul Diederich and his team have pulled together all that is known about the group. They've given a key to the whole group, keys to each genus and keys by host lichen; they've either built or shown phylogenies; they've described each species in detail and illustrated the descriptions with



both macroscopical and microscopical photos and, where helpful, with line-drawings; and they've mapped each fungus' distribution across the globe.

In *Volume 1* they covered 197 species of basidiomycetes including three new genera, 74 new species, one new subspecies and three new combinations.

*Volume 2* of the *Flora of Lichenicolous Fungi* deals with hyphomycetes that grow on lichens in the same way. Here we find descriptions of lichenicolous fungi that produce their spores on exposed conidiophores, whether singly, in synnemata, or in sporodochia. *Volume 2* is rather thick with treatments of a total 296 species and one variety, across 101 genera. Most of these are ascomycetes but a few basidiomycetes fit into this group.

Of the fungi covered, 271 species and one variety are considered obligate lichenicolous fungi, while a further 25 species are either facultatively lichenicolous or may not be feeding on the lichens they have been found with. Within *Volume 2* four new genera, 53 new species, 11 new combinations, two new lectotypifications, and 13 new synonymies are published.

Now enthusiastic hunters of lichenicolous fungi have the literature they need – at least for these two rather less popular sub-groups. The ascomycete specialists who feel most comfortable looking at fungi with a larger number of stable characters within pycnidia, apothecia, perithecia and other sexual fruiting bodies must wait longer.

But… just as the Welsh Microfungi Group has increased the recording of many of the UK's biggest groups of plant pathogens, these volumes will allow people to tackle two sub-groups of lichenicolous fungi that were simply too difficult to start with previously. Instead of worrying about where to find descriptions of basidiomycete or hyphomycete lichenicolous fungi, the main problem now will be all the specimens that don't seem to match to any of the available descriptions – simply because they're new to science and don't have names yet!

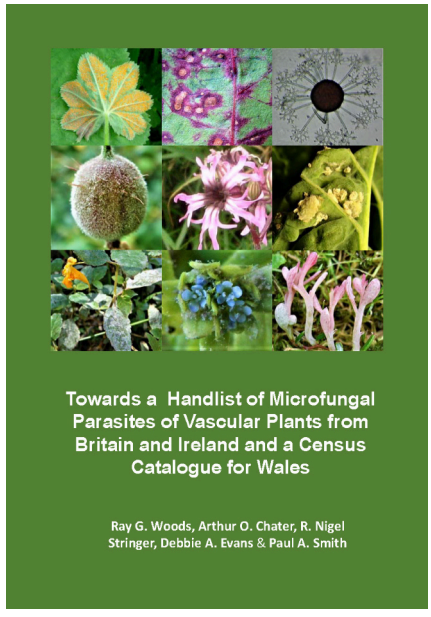
Volumes of the *Flora of Lichenicolous Fungi* are being produced in hardback format but are also being made freely available as pdf downloads. Please visit: https://www.mnhn.lu/science/flora-of-lichenicolous-fungi/?lang=en.

Fay Newbery

## Towards a Handlist of Microfungal Parasites of Vascular Plants from Britain and Ireland and a Census Catalogue for Wales

**Woods, R.G., Chater, A.O., Stringer, N., Evans, D.E. & Smith, P.A.**
Aberystwyth: A.O. Chater, 2024
ISBN 978-0-9565750-6-7
Softback 393 pp.
£12 + £4.00 p&p. Also available online for free download at: https://www.aber.ac.uk/waxcap/links/index.shtml

This is the latest contribution to the ongoing inventory of plant-pathogenic microfungi and fungus-like organisms in Wales. It is a substantial and impressive-looking account, already the sixth title in the series and just ten years since the first, a census catalogue and red list of Welsh rust fungi, was published. This, and the others, which have covered smut fungi, downy mildews and white blister rusts, powdery mildews, and white moulds, have been produced in support of the Global Strategy for Plant Conservation published in 2002, aiming to further knowledge of the range and distribution of British species of fungi as well as other groups of organisms. It recognises the many gaps in knowledge of the distribution and host relations of so many of these, which are important ecologically as well as commercially in agriculture and horticulture. It aims to encourage wider study of these fungi and further recording, available records for most species being at present insufficient to allow meaningful conservation assessments. The present work collates from the five previous publications all the host plants, and their associated pathogens, but also adds a



considerable number of others notably Taphrinales (Ascomycetes), some Basidiomycetes (Exobasidiales, *Herpobasidium* and *Ceratobasidium*) and Chytridiomycetes (Chytridiales – *Cladochytrium* and *Olpidium*, Synchytriales – *Synchytrium*, and also *Physoderma*, sometimes now referred to Physodermatales but here to Blastocladiales). Around 6000 records covering a total of over 1300 species from 2400 host taxa are included, and as a result the book runs to a bulky 393 pages. Unlike the others, which were ring-bound A4 publications, this one is a perfect-bound A5.

The work attempts to provide the most up-to-date listing possible with regard to the names and delimitation of the pathogens involved. Due especially to the influence of DNA sequencing, much has changed in recent years in the taxonomy of the organisms involved, especially with regard to species delimitations and host ranges, and such changes are ongoing. The standard identification texts are now frequently unreliable and records in the available databases require considerable revision in places. To achieve this, some difficult taxonomic decisions have necessarily been made. These particularly affect the rusts, for example those on *Salix* with 14 species of *Melampsora*, including a couple of yet unresolved taxa, now recognised. There are other examples, and the situation is unlikely to yet be stable.

The book includes, as usual, a Preface, Acknowledgements, and Introduction. These give the background to the project, the methodology, current situation, and future aims. Just brief notes on identification of the pathogen groups involved are given, with references to the most useful works recommended to take this further. The many records on which the lists presented have been prepared involve a variety of datasources. These include the usual fungus databases, notably the *Fungal Records Database of Britain and Ireland* (FRDBI), as well as some which include records for horticultural or commercial plants, hybrids and cultivars, though these are comparatively limited. Host cultivars have been included as far as possible as they are considered necessary to achieve a better understanding of host susceptibility. Other sources, such as the database held by the Royal Horticultural Society, might add further information, particularly on plants of horticultural interest.

There is a synopsis given of the parasite groups involved, although Plasmodiophorales, including *Ligniera* and *Plasmodiophora*, are omitted, and explanatory text for the tables and Welsh vice-counties list.

The great bulk of the book comprises two extensive tables or lists – the first by host genus and species, in alphabetical order, with their parasites, covering 183 pages; the second, another 188 pages, comprises the parasites list, also in alphabetical order, and their recorded hosts including, as far as possible, hybrids, cultivars, and horticultural plants. For each of them is given, as far as the records allow, their distribution for each of the 13 Welsh vice-counties, and their recorded wider distribution in England, Scotland, and Ireland. Inevitably, the source for any given record included in these lists is not specified.

The book concludes with a References section and an Appendix. The references, as noted, are general ones to recommended identification guides for the various groups, including to the host plants, and to the main works consulted. The Appendix provides an introduction to each of the six Orders which are here newly dealt with.

Although this work includes around 1300 taxa, such is the huge diversity of fungi that many other pathogenic species are yet to be appraised. It is an ongoing but enormous task although, given the progress to date in just a decade, quite likely to see further progress.

The front cover shows a block of nine coloured images which illustrate examples of the most damaging and economically important fungi and fungus-like groups; four more appear on the back cover. This is a well-produced publication, providing here as comprehensive a reference as is currently possible to the included pathogens and all their recorded host taxa for Britain, not otherwise readily available. The present work will prove valuable to anyone with an interest in plant pathogens, or fungal recording and identification. It is excellent value as hard copy and, as an added bonus once again, is available online for free download.

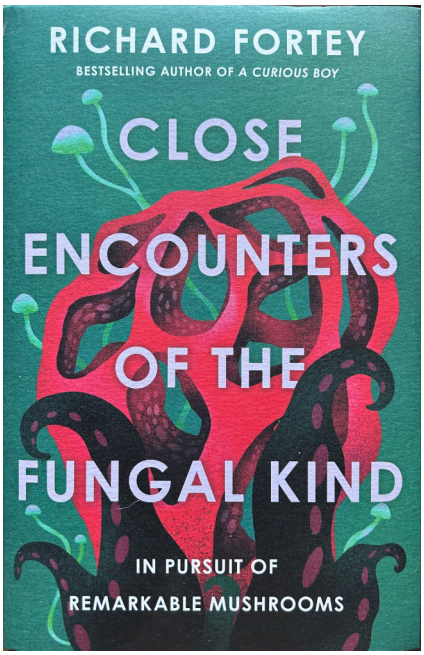
Brian Spooner

*Ed.* I heard the news while this issue of Field Mycology was being prepared that one of the authors of this publication, R. Nigel Stringer, died at home on 20 December 2024. He had been taking a lively interest in the new arrangements for publication of Field Mycology.

## Close Encounters of the Fungal Kind: In Pursuit of Remarkable Mushrooms

### Richard Fortey

William Collins
ISBN 978-0-00-863968-6
Hardback 320 pp.
£18.95 from all good book sellers




Richard Fortey has already published nine books. He is best known for several reflecting his distinguished career as a palaeontologist at the London Natural History Museum, crowned with presidency of the Royal Geological Society. But this is the first to centre on another lifelong interest, his passion for fungi.

His book begins in northern Italy with memories of a visit to the small town of Borgo Val di Taro and its annual Porcini festival centred on *Boletus edulis*. From there it takes us on a mycological journey stretching from the temperate climes of England to the subtropical rainforests of South Australia, taking in along the way such highlights as the ugliest, the smelliest, the deadliest and the most luminous of fungi.

Chapters cover a broad range of topics. For instance fungi on dung, fungi parasitic on other fungi, and the fungi of old oak trees each get a chapter. The dung fungi he turned to when COVID precluded wider foraying. A wide variety of species could be coaxed out of any herbivore dung kept in suitable conditions of temperature and moisture (it doesn't stink like carnivore dung).

The fungal parasites tend to be less easily found. He tells of going 55 years without seeing *Volvariella surrecta*, the well known but rare parasite of *Clitocybe nebularis*. Even then it was his wife who found it. Furthermore it was in the middle of a nettle patch practically on their own doorstep.

For the oaks we get an account of the polypore *Buglossoporus quercinus* which curiously only flourishes on oak trees that are a few hundred years old, and thus favours Windsor Great Park and Epping Forest (though also e.g. Richmond Park which doesn't get a mention).

Whilst reading the book, the huge amount of information, delivered with such passion, began to feel as if the author had been holding it all in for some time and had finally given himself the green light to let it all go. This was indeed confirmed at the end of the book where he says that it wouldn't have been written were it not for the encouragement of friends.

The book ends back in Italy, but this time on a British Mycological Society foray based in Cuneo, high in the subalpine eastern flank of the country. It was for Fortey the perfect foray and he labelled it 'Perfetto' in his 2010 diary. Everything seemed to come together: weather, fungi, food and people. This book has much more of all these good things. I highly recommend it to all field mycologists. Perfetto!

Andy Overall

*Ed.* Richard Fortey died on Friday 7 March 2025 after a short illness, as this issue was in its final stages of preparation. He is pictured here at the end of a successful foray at the Aston Rowant Nature Reserve in Oxfordshire. An obituary will feature in a future issue. Photo © Linda Seward.[1]

[1] An incorrect caption was included in the online version of this article from 24/04/2025 to 11/05/2025 which was corrected before the printed copy went to press.

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