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 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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The Editorial Team has been reviewing these instructions over the course of 2025 and plans to update them in 2026. 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.

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Front cover: Depicts the spiral ornamentation of immature and mature ascospores of *Spirodecospora melnikii* along with the amyloid reaction in Melzer's reagent (see article on page 132). Micrograph © Jacques Fournier.

Back cover: *Scytinostroma portentosum* on a fallen *Populus* branch, found by Kerry Robinson, Hertfordshire, 25 February 2025. For a report on identifying another occurrence of *S. portentosum*, in Surrey, see article on page 126. Photograph © Claudi V. Soler.

EDITORIAL

This year's BMS Autumn Open Meeting, hosted at the Royal Botanic Gardens Kew (RBG Kew) on 29 November, was topped off with an awards ceremony featuring a hat-trick for field mycologists. The Fungal Outreach Award went to Cameron Diekonigin, the Field Mycology Award to Penny Cullington and a BMS Benefactors' Medal was awarded to Alick Henrici (for more details visit https://www.britmycolsoc.org.uk/awards.html). It was a joy to hear about the exceptional contributions that all three awardees have made to mycology, and a boon for this publication to see our longest-standing member of the editorial team, Alick Henrici, picking up such a fine and weighty medal for outstanding service to the British Mycological Society (Fig. 1). The award citation emphasises Alick's role in establishing Field Mycology as a high-quality and well-respected publication, working alongside former Senior Editor, Geoffrey Kibby (himself a recipient of a Benefactors' Medal in 2024).

As is usual at such events, Alick had been invited to say a few words to the mycologists that were assembled that day. I thought FM readers might indulge me in echoing them here…

Alick was instrumental in production of the Checklist of British and Irish Basidiomycota (CBIB) (Legon & Henrici, 2005) and reflected on this as his "most useful" contribution to mycology. He reminded us that checklists are only really useful for as long as they are *maintained*. Thanks to Martyn Ainsworth's commitment to the task, CBIB still is being maintained—but longer-term investment is needed to ensure this remains a useful and accessible resource into the future. Of course, a checklist cannot be produced in isolation: it depends upon having information readily available in fungal recording databases such as the BMS's Fungal Records Database of Britain and Ireland (FRDBI) and in well curated collections such as the Kew Fungarium. Alick applauded the good relations between the BMS and RBG Kew at a working level—through the auspices of people like Stuart Skeates working on FRDBI (for the latest on that, see: Skeates & Blencowe, 2025) and Lee Davies, Fungarium Collections Manager at RBG Kew (Davies, 2024)—while also wishing for greater collaboration at a strategic level, drawing in whoever it is that holds the purse strings.

Fig. 1. Alick Henrici with his Benefactors' Medal.

I thought it worth putting these words out on the wires of Field Mycology, just in case anyone reading this has a surplus of money that they would like to invest in the essential infrastructure that underpins the practice of field mycology. One could consider it match-funding to the 40-odd working years already donated by Alick Henrici.

Clare Blencowe

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Fungal Portrait: 104

Hygrocybe reidii Kühner (Honey Waxcap)

David Harries[1]

Hygrocybe reidii (Honey Waxcap) was described by Robert Kühner (1976) based on type material collected in the French Alps. The specific epithet was chosen to honour Dr. Derek Reid who, at the time, was the head of mycology at the Royal Botanic Gardens, Kew. Prior to this publication, there had been some confusion with conflicting interpretations of the species *Hygrophorus marchii* (see Kibby & Ainsworth, 2008). Kühner's interpretation established our current understanding of the species as detailed by Boertmann (2010).

H. reidii produces small to medium-sized fruitbodies (cap diameter 10–50 mm) which are red to reddish-orange (Fig. 1) with a dry, matt, occasionally felty, surface. The cap margin is often crenate (scalloped) giving a distinctive appearance. The gills are paler than the cap, and broadly attached to the stipe with some examples tending towards decurrent. The colour of the smooth, dry stipe is similar to the cap, sometimes paler, especially towards the base. The spores are ellipsoid or ovoid and measure 6.5–8.5 × 4.0–5.0 µm.

The species gets its common name from a sweet honey-like smell obtained when a sample is crushed or stored in a closed container. This provides a useful field character which helps to separate it from otherwise similar species.

H. reidii is widely distributed in the UK, particularly in unimproved grasslands and nutrient-poor amenity grassland including cemeteries and lawns, and forms part of the waxcap-grassland assemblage. Sites that are able to support waxcap-grassland species have declined both in their extent and quality across Europe in recent decades. Factors influencing this decline include agricultural intensification, scrub encroachment and the development of sites. In recent years this last category has included the threat of forestry expansion onto nutrient poor grassland sites. In view of these threats, *H. reidii*, along with a number of other waxcap-grassland species, has been assessed at a global level against the IUCN Red List of Threatened Species criteria.

Fig. 1. Typical collection of reddish-orange fruitbodies. Inset illustrates red examples.

Although meeting the threshold for a Vulnerable species in Europe, *H. reidii* is currently lodged as Data Deficient globally pending further molecular studies and survey work in North America (IUCN, 2025).

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Bryophilous ascomycetes

a primer for mycologists

George R. L. Greiff[1]

Abstract

Ascomycetes on bryophytes are generally under studied. This is partly because bryologists find mycology challenging, while mycologists find bryophytes challenging. The minute size of many bryophilous ascomycetes hinders their detection, added to by their specific, sometimes hidden, microniches on their host plants. Despite being a rather difficult discipline, the study of bryophilous ascomycetes can be highly rewarding, with plenty of undescribed species and interesting interactions. This brief review serves as a primer for the study of bryophilous ascomycetes by field mycologists. It highlights some common yet overlooked species that are likely to be found on mycological forays and discusses some of the methods used for the identification and processing of bryophyte-fungal samples.

Introduction

Mosses, liverworts and hornworts represent the three bryophyte groups of land plants. Despite numbering around 25000 species globally and with over 1000 species in Britain and Ireland (Blockeel *et al.*, 2014), these plants are generally under-studied and under-valued in comparison to their vascular counterparts. Indeed, Ellis & Ellis' foundational "Microfungi on Land Plants" does not include bryophytes, and only a handful of species are listed in their later work on "Microfungi on Miscellaneous Substrates" (Ellis & Ellis, 1985; 1988). Bryophytes interact profusely with other organisms, particularly fungi (Döbbeler, 1997; 2002), ranging from relationships with mycorrhiza-like fungi to parasites (Davey & Currah, 2006; Rimington *et al.*, 2020). The unique, often simple morphology of bryophytes is mirrored by many of the fungi that interact with them, with many fungal structures being tiny and difficult or impossible to see with the naked eye.

Although representatives from across the fungal kingdom interact with bryophytes, my work focuses mostly on parasitic, fruitbody-forming ascomycetes. The fruitbody-forming species fall into two well-known ascomycete groups, the pyrenomycetes and the discomycetes; i.e. species that produce ascospores in closed structures versus open, disc-like fruitbodies respectively. The pyrenomycetous species are generally very small and are unlikely to be spotted unless searched for, while some of the discomycetous species can grow to be large enough to be noticed with the naked eye. The latter include *Neottiella rutilans* (Fig. 1A) and *Octospora humosa* as the largest, up to 10 mm diam., followed by the likes of *Roseodiscus formosus* (to 4 mm diam.), other species belonging to *Octospora* (generally <4 mm, Fig. 1B), and *Bryoscyphus atromarginatus* (to 4 mm diam., Fig. 1 C). The Moss Ear, *Chromocyphella muscicola*, is a basidiomycete that strongly resembles an ascomycete, while the bluish Elf-ear lichen, *Normandina pulchella*, often growing among epiphytic bryophytes, is not strictly bryophilous (Fig. 1D). On the smaller side, *Bryochiton monascus* has almost microscopic fruitbodies (about 50 µm diam.) with a single 8-spored ascus produced inside. It is possible to spot many of even the very small species in the field using a hand lens with a light source, though finding some species requires random collection and screening of the potential host bryophyte under a stereomicroscope.

The definition of bryophilous

As described by Döbbeler (1997), bryophilous is an umbrella term for a variety of species that are unified by shared ecology. This makes them akin to lichenicolous, aquatic or coprophilous fungi. As such, systematically diverse fungi make up this group, ranging from chytrids to mushrooms, but ascomycetes are by far the most species-rich group. However, bryophilous ascomycetes are not simply associated with bryophytes in a loose sense, they are obligate interactors. In this sense, species considered to be bryophilous are dependent on bryophytes, usually directly, for their nutrition. Parasitism ranges from biotrophy, where infections cause little or no obvious symptoms, to necrotrophy, where hosts are killed and conspicuous necroses are formed. Evaluation of bryophily follows close examination of the host-fungus interface by microscopic magnification, where bryophilous fungi display diverse and intimate associations with host plant cells (Döbbeler, 1997). A vast array of hyphal

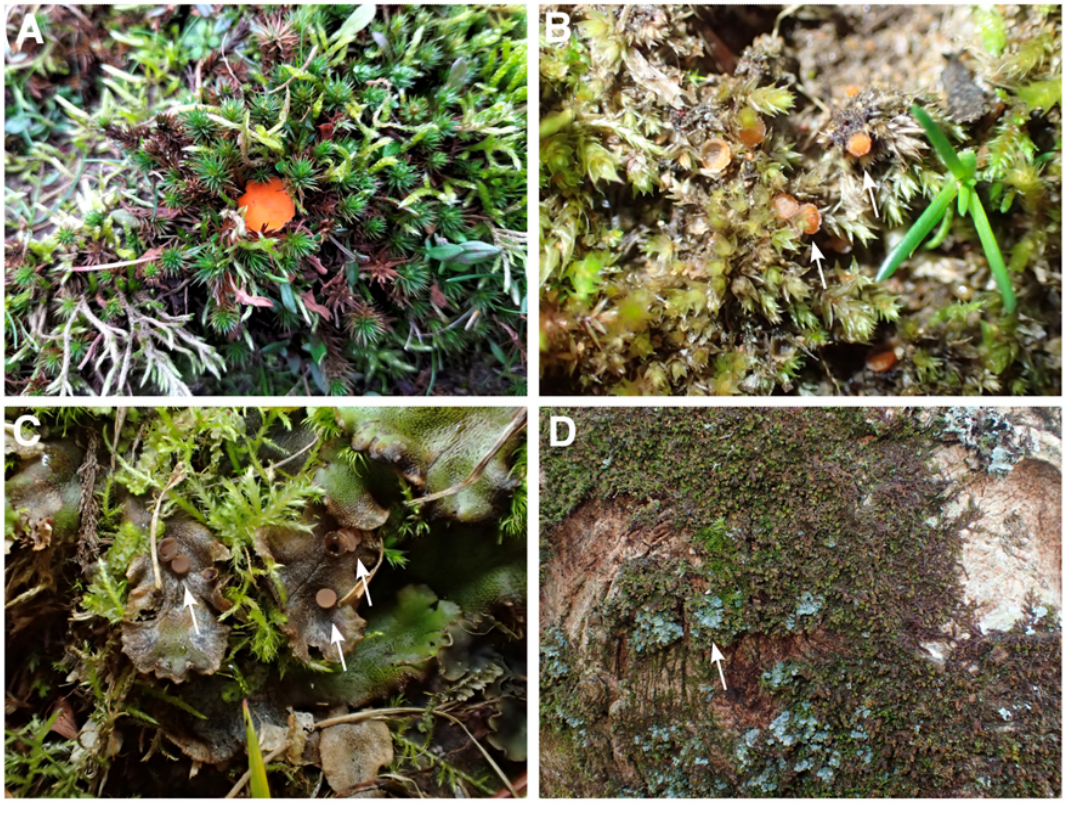

Fig. 1. Some of the larger bryophilous ascomycetes and an imposter. A *Neottiella rutilans* on *Polytrichum juniperinum*. **B** *Octospora axillaris* on *Tortula acaulon*. **C** *Bryoscyphus atromarginatus* on *Marchantia polymorpha*. **D** *Normandina pulchella*, a lichen imposter growing with epiphytic *Frullania dilatata*. Photographs © George R. L. Greiff.

morphologies may be readily observed in the mycelia of bryophilous fungi. This is a particularly appealing part of their study, aided by the fact that most bryophytes have leaves that are only one cell layer thick, enabling easy visualisation of hyphae in the cells / hyphal features.

Studying bryophilous ascomycetes in the field

My best advice for anybody wishing to find bryophilous fungi in the field is to use a hand lens with a light source. The impact that the increased contrast has on spotting the fruitbodies of these tiny ascomycetes cannot be overstated. Species like the orange *Bryocentria brongniartii* on reddish-green plants of *Frullania dilatata* stand out when illuminated but can be very difficult to see under a regular lens. Generally, humid places like ravines, woods and stream banks are good places to find species, especially the smaller pyrenomycetes. Discomycetes like *Octospora* and *Lamprospora* can typically be found during the colder seasons on disturbed ground among their hosts, and others, like *Pithyella chalaudii*, on the hosts themselves. In *Octospora* and relatives, the fungi attack stems or leaves of their hosts, or parasitise the underground parts of the plant, the rhizoids, sometimes even causing galls, so one should not neglect collecting the adjacent plants as well as the fruitbodies spotted.

The host identity almost always helps with identification, with many parasites being specific to single host species or a group of related hosts. A good place to start for mycologists is to select a well-known host species and examine its fungi to familiarise themselves with some of the fungal species, particularly when it comes to scale. The British Bryological Society's Field Guide (Atherton *et al.*, 2010) is a very useful resource for identifying bryophytes, as are resources on the Society's website. The next part of this review describes some common bryophytes and fungi that are frequently present on them.

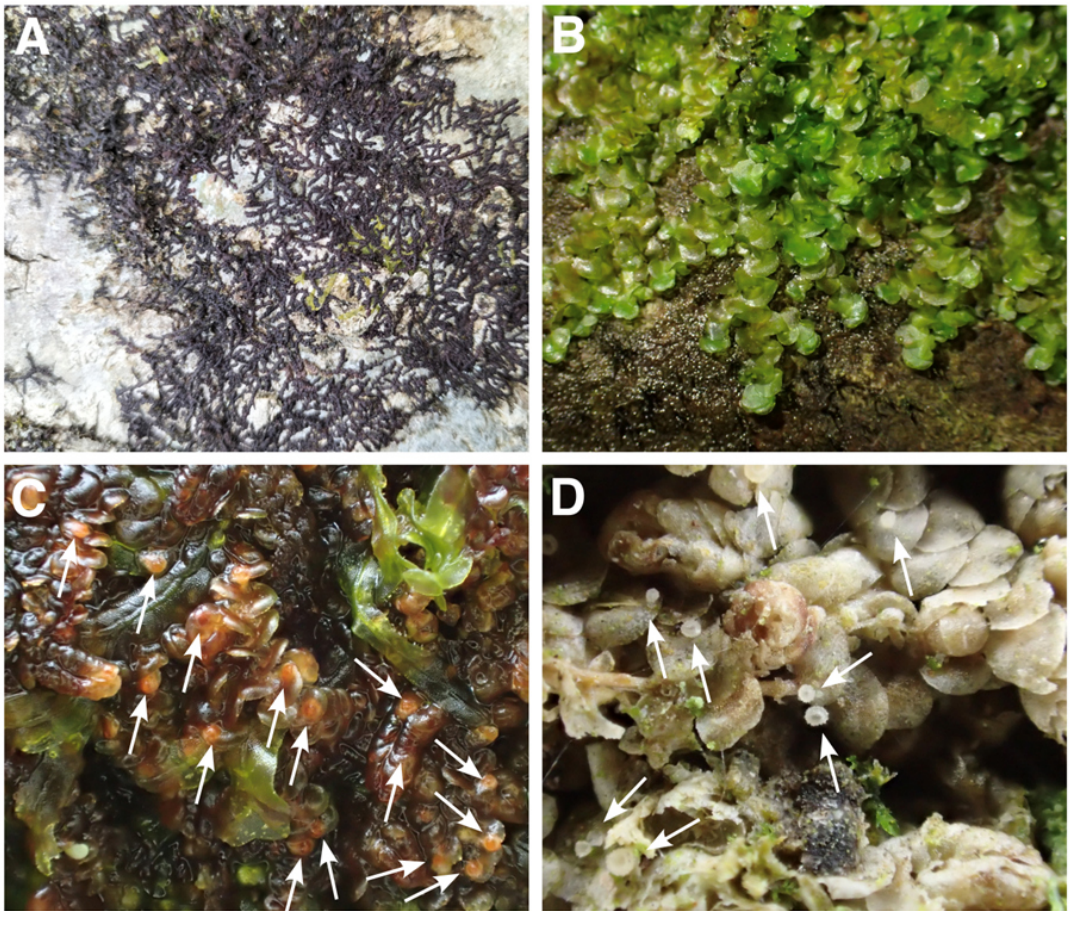

Fig. 2. *Frullania dilatata* and two parasitic ascomycetes photographed in the field. A, B Normal variation in healthy *F. dilatata* showing a range of plant phenotypes from blackish dry plants (A), to bright green hydrated plants (B). **C** Perithecia of *Bryocentria brongniartii* erupting from below the leaves (arrowed). **D** Apothecia of *Pithyella chalaudii* on bleached host plants (arrowed). Photographs © George R. L. Greiff.

Frullania dilatata

Ascomycetes on epiphytic liverworts in south England were my gateway into the realm of bryophilous fungi. *Frullania dilatata* (Fig. 2A, B) is a common leafy liverwort that is often infected with fungi and is present in woodlands across Britain and Ireland, though it may be replaced by its more oceanic cousin, *F. tamarisci*, in western regions. In 2021, I wrote a guide to studying bryophilous ascomycetes on *F. dilatata*, highlighting several common fungi that may be found on it (Greiff, 2021). These include *Bryocentria brongniartii* (Fig. 2C), *Periantria frullaniae* and *Pithyella chalaudii* (Fig. 2D). *F. dilatata* has been reported to harbour 10 unique ascomycetes, even in a small region of Tuscany in Italy (Döbbeler, 2006), making it a useful plant to introduce one to a range of different fungal morphologies.

Plagiochila asplenioides and *P. porelloides*

The *Plagiochila asplenioides* aggregate, including the smaller *P. porelloides* (Fig. 3A), is one of the best host groups for bryophilous ascomycetes in Europe and North America (Döbbeler, 1978; Marsh *et al.*, 2010; Döbbeler *et al.*, 2023). It is good for tiny black pyrenomycetes in particular. *Epibryon plagiochilae* (Fig. 3B), resembling tiny sea urchins, is the most common fungus on both species of *Plagiochila*. It is a good example of the size of many bryophilous ascomycetes and introduces one of the most abundant and successful bryophilous genera, *Epibryon*. *Octosporella jungermanniarum* is an especially showy species on these plants and is well worth searching for in the spring when it can be abundant (Fig. 3C, D).

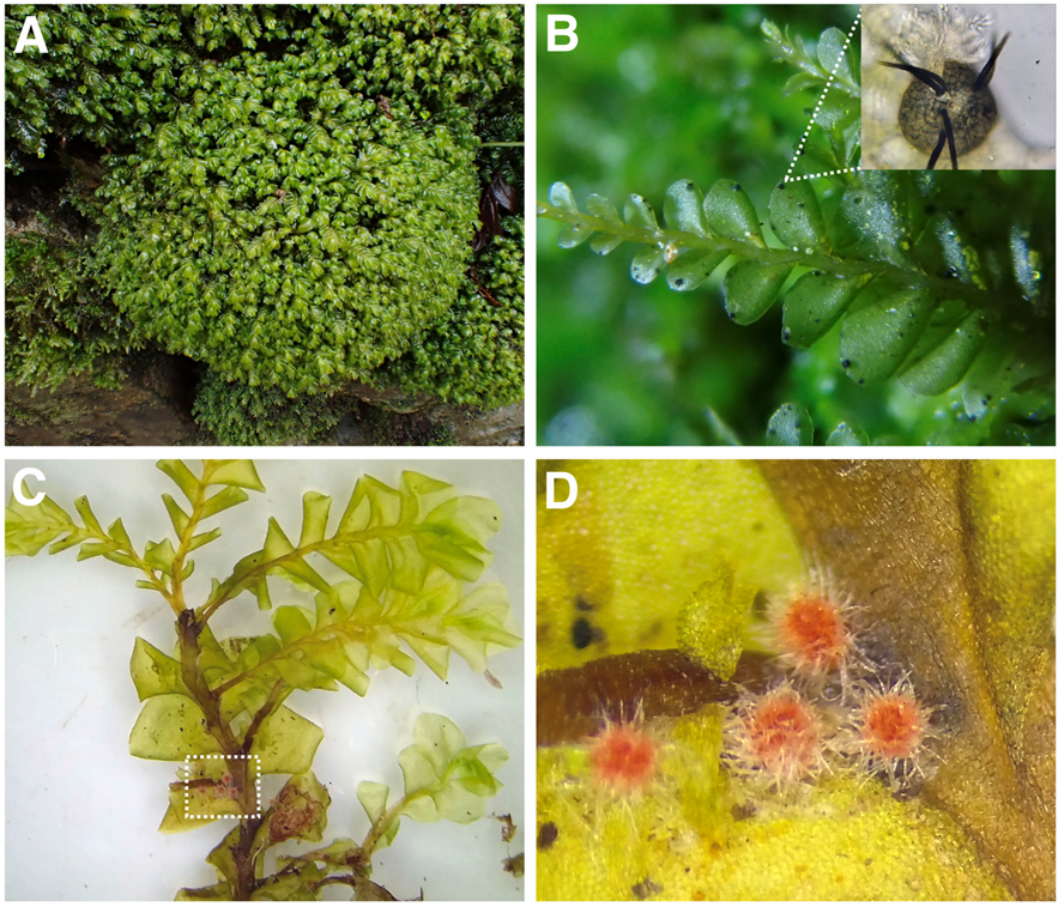

Fig. 3. *Plagiochila asplenioides* and *P. porelloides* are good hosts for bryophilous ascomycetes. A Large patch of *P. porelloides* that is profusely infected with *Octosporella jungermanniarum* and *Epibryon plagiochilae* (neither large enough to see in this photo, which serves to illustrate the tiny scale of the fungi). **B** *Epibryon plagiochilae* on *Plagiochila porelloides* leaves; inset shows a sea urchin-like ascoma ruptured to release asci and spores in water at 1000× magnification. **C** A cluster of *Octosporella jungermanniarum* ascomata on *P. asplenioides*; region with fruitbodies indicated. **D** Magnified ascomata of *O. jungermanniarum*. Photographs © George R. L. Greiff.

Polytrichum commune and *P. formosum*

Polytrichum, or haircap mosses, are familiar to many naturalists as ever-present species in bogs and woods (Fig. 4A, B). *Polytrichales* host some of the most remarkable and specialised bryophilous ascomycetes (Döbbeler, 1985) linked to the rather unique morphology of most polytrichalean leaves, which are multiple cell layers thick compared to the single cell-layered leaves of many other bryophytes (see Fig. 4C–E). *Polytrichum* leaves are typified by being boat-shaped with a lower parenchymatous layer upon which plates of photosynthetic cells (called lamellae) are positioned parallel to the orientation of the leaf (Fig. 4D). The spaces between the lamellae are ideal for fungal colonisation (Döbbeler, 1985). Out of the very many species found in these leaves, *Epibryon interlamellare* (Fig. 4C–E) is likely present on almost every collection of *Polytrichum commune* and *P. formosum*, particularly on the mid to lower leaves of the plant (Döbbeler, 1978). Like *E. plagiochilae* on *Plagiochila*, it resembles a minute sea urchin, and it is best appreciated under a compound microscope.

Learning more

A further challenge to studying bryophilous ascomycetes is that there are few modern floras or fungal guides covering the species. The most comprehensive accounts of these fungi are monographs by Racovitza (1959) and Döbbeler (1978), as well as a recent North American

overview (Döbbeler *et al.*, 2023). The bryophilous *Pezizales*, with around 30 species of *Octospora*, *Lamprospora* and other genera recorded in Britain and Ireland (*e.g.*, Yao & Spooner, 1995; 1996), have been shown to be hyperdiverse and likely number in the hundreds (Janošík *et al.*, 2023). Additional information can be found at https://bryophilous.co.uk/, a website I created to contain a curated list of British and Irish species, along with photographs of most of the named taxa found to date. Many species do not have published colour photographs, so one of my aims was to upload my observations to serve as a gallery of open access information. The ultimate objective is to produce a monograph of all British and Irish species. It is hoped that the photographs and general descriptive information will be helpful in the interim, though it is by no means comprehensive.

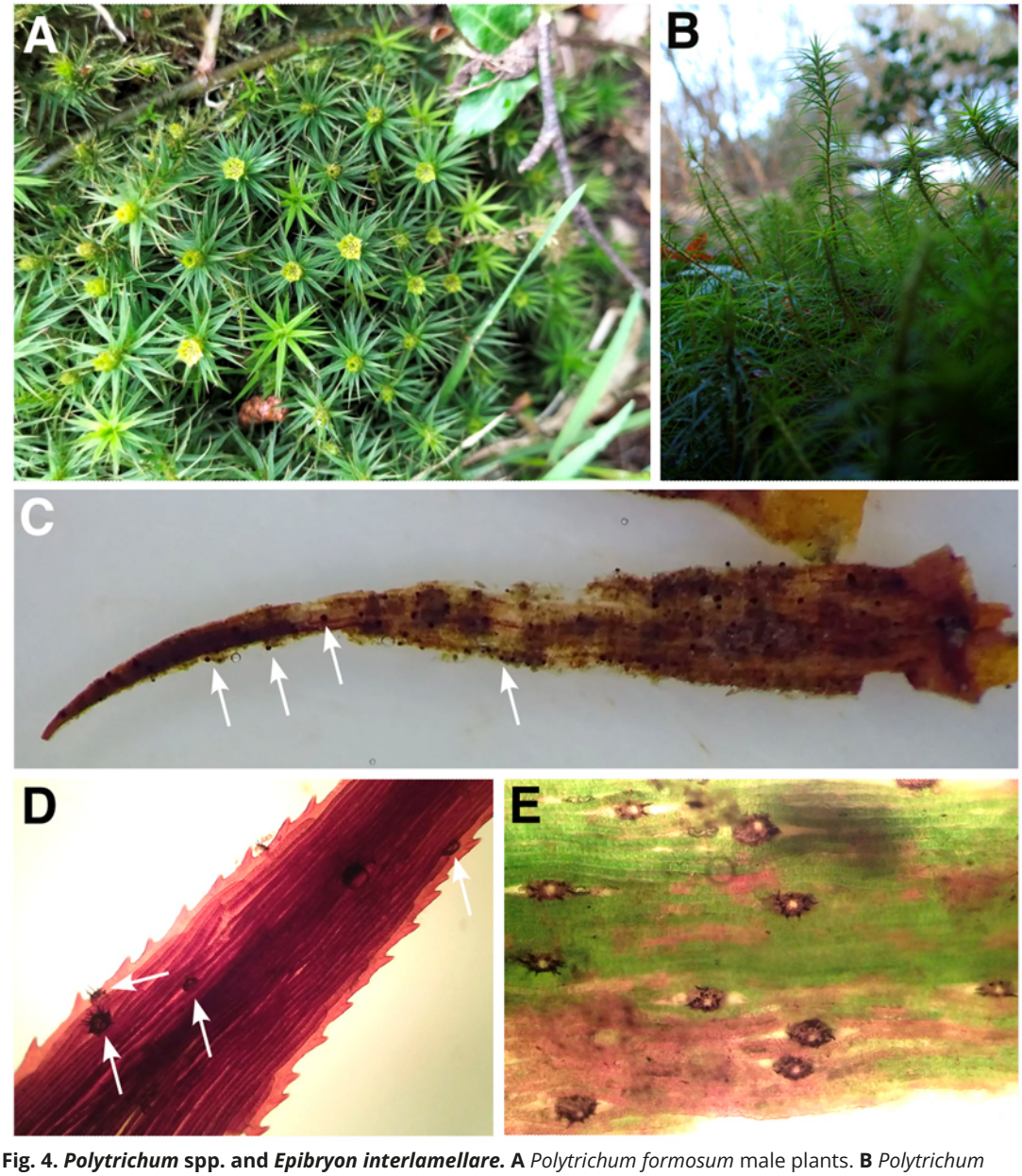

Fig. 4. *Polytrichum* spp. and *Epibryon interlamellare*. A *Polytrichum formosum* male plants. **B** *Polytrichum commune*. **C** Leaf of *Polytrichum* cf. *commune* with dozens of minute fruitbodies (four indicated with arrows). **D** Micrograph of a segment of a *P. formosum* leaf showing the plate-like lamellae and indicating four *E. interlamellare* fruitbodies that have developed between them. **E** Ten *E. interlamellare* ascomata on a *P. formosum* leaf. Photographs © George R. L. Greiff.

Sample processing and molecular biology

Fortunately, no specialist equipment is needed to process samples of bryophilous ascomycetes and their hosts. Samples can be air-dried for 24 hours or longer until thoroughly desiccated and put into labelled paper packets (see Greiff, 2021). In this respect, they are treated exactly like bryophytes. Although it is best to examine fungi when they are fresh, particularly discomycetes, specimens can be dried for later. Specimens can survive for centuries if stored correctly. Vouchers can be periodically frozen in sealed polythene bags for a few days to kill any invertebrates that eat the fruitbodies. It is best not to keep specimens wrapped in kitchen roll or toilet paper in their paper packets as these eventually degrade and the fibres can coat the specimens. Specimens that are not completely dry will get covered in generalist moulds that confound the analysis of the plant-fungal interface and also prevent the sample from being used for Sanger sequencing methods that require clean specimens.

For sequencing, I have had no problems using rehydrated material that has been dried for several years. I have a much scaled-down approach for DNA barcoding that works fairly well and has been optimised specifically for generating these data from tiny fungi. I am very grateful to the BMS for providing small grants that aided in the development of this method, which has featured in four publications so far. I described these molecular methods in detail in Greiff (2024) and I am happy to provide a copy of that paper to anyone who is interested in trying out the technique.

Concluding remarks

The study of bryophilous ascomycetes requires patience and a dual life in the micro realm. Fieldwork can be very slow, as a single small ravine could trap the bryo-mycologist for several hours as potential host bryophytes are carefully scrutinised with a hand lens. Byophilous ascomycetes are a challenge and working on them can be a labour of love. However, their study can be highly rewarding in terms of discovering novel species, records and host preferences, where every excursion seems to push the frontiers of knowledge. Not only are many of these fungi beautiful and intricate when we reach their level, but they have incredibly diverse lifestyles and morphological adaptations. Overall, studying bryophilous ascomycetes opens up a different world. It not only provides detailed perspectives on microscopic interactions, it also shines a light on species that are understudied and often ignored.

Acknowledgements

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You say *Alnicola*, I say *Naucoria*...

Alick Henrici[1]

Let's make the whole thing clear, or at least clearer than it is in most books. Some head their treatment *Naucoria* (*Alnicola*), others *Alnicola* (*Naucoria*). Most say nothing at all on why they feel they have to mention a second generic name. All are treating the same genus, largely confined to *Alnus* (Alder), though some adopt broader species concepts than others. The treatments widely used in Britain reflect their country of origin. The British, the Scandinavians and the Germans all call it *Naucoria*. The French and the Swiss call it *Alnicola* (as do the Americans). This despite a century of editions of a very detailed Code of Nomenclature designed to promote global nomenclatural conformity!

The following notes were triggered by the publication in the last issue of FM (Overall, 2025) of the first British record of *Alnicola salabertii*, recently described and as yet lacking a combination in *Naucoria*. Presumably it will get one in due course. The details I summarise are largely taken from extensive discussions in Reid (1984) and Singer (1986), who both explain the cause of the disagreement at some length.

Naucoria dates from 1871 when Kummer in one slim volume promoted many of the tribes of Fries's vast genus *Agaricus* to separate genera. It had been one such tribe with seven species allocated to it in Fries's Systema. *Alnicola* was described by Kühner in 1926, though later Kühner & Romagnesi (1953) contrived to have it both ways, treating *Alnicola* as one of five subgenera within a very broadly defined *Naucoria*. None of this means *Naucoria* has to win.

A genus has to have a designated type species. Other species belong only if considered sufficiently similar to that type species. Neither Fries nor Kummer chose a type for *Naucoria*. Early versions of the Code ruled that in such cases the first species listed was deemed to be the type. This didn't work well. Too often that first species was far from typical. The rules were changed. The type in such cases is now ruled to be the first species specifically chosen by a later author. This in the case of *Naucoria* is the cause of the trouble.

Fries's seven species were all fairly minimally described, though typical of his day, leaving problems for later mycologists to solve. At a time when the big beasts of basidiomycete nomenclature were Rolf Singer in Chicago and M.A. Donk in Leiden they selected different members of Fries's seven species to be type. Singer (1936) advocated *Naucoria centunculus*, Donk (1949) advocated *N. escharoides* (later orthographically corrected to *N. escharioides*), even though its description was

vague enough for it to have since been quite widely interpreted as what is now *Tubaria conspersa*. Singer (1975) rejected his own earlier proposal, as it meant that the name *Simocybe* would disappear and become the 'true' *Naucoria*. But he was adamant that any species so vaguely described could only be treated as a *nomen dubium* and hence its genus likewise. This remained his view and in Singer (1986), the final version of his magnum opus, he retains his verdict: "There can be no doubt whatsoever that the original *A. escharoides* is a species which might be a *Tubaria*, but might as well be almost anything". He was nevertheless "sorry to find no legal way to save the classical genus *Naucoria*".

More recently Moreau (2005) has provided a detailed nomenclatural revision of the genus that the French and others have been calling *Alnicola* for the last 80 years. He newly proposed *A. luteolofibrillosa* as type, as several earlier proposals all failed for reasons that can be found in his paper by those who feel a need to know. This is a species that occurs in Britain but is one of the less common ones that are Alder-specific. It isn't clear whether his researches will contribute to any further decline in the use of *Naucoria* as a generic name in a swathe of N. European countries.

Incidentally, while the meaning of *Alnicola* is clear enough, *Naucoria* offers few clues. I take this opportunity to recommend two sources that supply details to enlighten the etymologically curious: Rea (1922) and the four volumes of Ludwig (2001–2017). Both derive *Naucoria* from the Latin *naucum*, but unfortunately this is said by Rea to mean 'a flock of wool' while for Ludwig it means 'a nutshell'. The Latin dictionary I then consulted favours Ludwig: literally a nutshell, but figuratively anything very small.

Postscript:

There are two major groups within this genus, readily distinguished on cystidial shape. Most species have narrowly pointed so called 'urticoid' cystidia, the rest having cystidia with a broadly rounded apex. It seems the DNA evidence is now all in favour of splitting off the latter group into yet another new genus. Once more we are reminded of A.A. Pearson's oft quoted observation: "There is no finality in mycological study".

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Galerina discreta: a species new to Britain

Ben Garden[1] & Andrew Donegan[2]

Abstract

Galerina discreta is introduced as new to Britain, based on a collection made in Hull, England. A detailed morphological description of the species and phylogenetic analysis are provided. Taxonomically significant morphological characteristics are discussed.

The find

Galerina Earle is a genus of basidiomycetes whose members are often orange-brown and associated with mosses; the deadly 'Funeral Bell', *Galerina marginata*, probably being the most notorious. A collection of *Galerina* was made by one of the authors (AD) in Hull, in December 2024, and coded BG0030. This was a small to medium mycenoid species of *Galerina* that was discovered fruiting amongst moss on a stone wall (Fig. 1). Photographs of this collection were shared on social media and met with considerable interest, particularly due to the unusual substrate on which it was found. It was speculated that AD's collection could be *Galerina similis* but this was far from clear—further investigation was required.

Morphological description of the collection

Pileus: 1–2 cm conical-campanulate; rose-honey brown with striations spanning two thirds of the pileus from the margin; margin straight to slightly flared; surface smooth, finely punctate on the disc. **Lamellae**: adnate to decurrent; moderately distant; slightly crenulate; concolorous with pileus, or yellow-ochre. **Stipe**: 2–3 cm; cylindrical, sometimes with sub-bulbous base; generally concolorous with pileus, or dull ochre-brown with grey hints; sandy to caramel colours at the base; evanescent, longitudinally striate white veil fibres throughout the stipe. **Habit**: usually solitary, though occasionally found in close pairs. **Odour**: mildly raphanoid. **Taste**: not observed. **Spores**: (8.6–)9–10.3(–11) × (4.6–)5.1–6.6(–7.1) µm, Me = 9.6 × 6.2 µm and Qe = 1.6; 20 measured; smooth to weakly ornamented; broadly ellipsoid-ovoid; thin-walled with many collapsed (Fig. 2). **Basidia**: 30–40 × 8–10 µm; mostly 4-spored, some 2-spored basidia observed; cylindrical to clavate; slightly constricted at base; no basal clamps observed. **Cheilocystidia**: 23–60 × 2.8–5.6 µm.

Fig. 1. The Hull collection. Photograph © Andrew Donegan.

Polymorphic, often slender, tibiiform-lecythiform, often with long subflexous necks. Indistinctly to distinctly capitate. **Pleurocystidia**: absent. **Pileipellis**: composed of parallel cylindrical hyphae 5–14 µm in width; terminal hyphal cells cylindrical with rounded tips; pileocystidia lecythiform to squat sub-capitate tibiiform, sometimes subflexous; similar in size to cheilocystidia but some slightly broader. **Caulocystidia**: Similar to cheilocystidia in shape and size, occurring singly or sometimes forming dense groups; apex sometimes forked (Fig. 3). **Clamps**: absent.

Habitat: on a moss-covered stone wall of a cemetery, associated with *Grimmia pulvinata*.

Our investigations

We began reviewing the literature and discovered that *Galerina similis* is primarily found in arctic/alpine regions of Europe and recorded as very rare. Pierre-Arthur Moreau (pers. comm.) suggested our collection could be *Galerina discreta*, which is also very little known but has been found in lowland habitats. Both species share mossy stone habitats and similar macromorphology. *Galerina similis* is the species with most similarities to *G. discreta*, with *G. graminea* and *G. arctica* also sharing some characteristics.

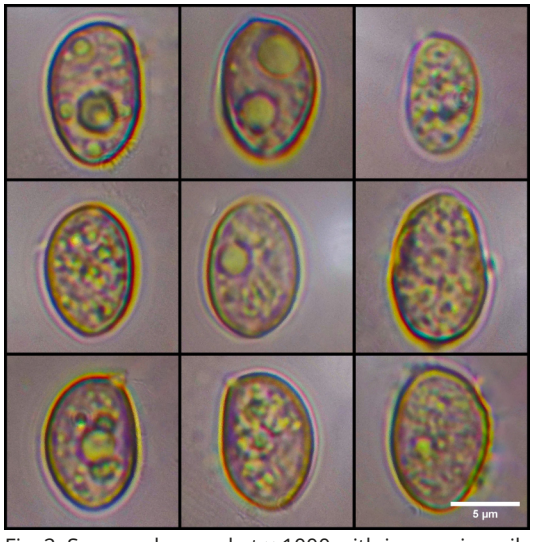

Fig. 2. Spores observed at × 1000 with immersion oil. Micrographs © Ben Garden.

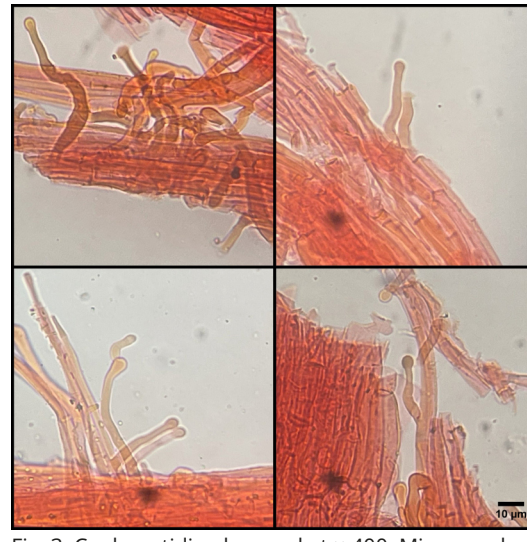

Fig. 3. Caulocystidia observed at × 400. Micrographs © Ben Garden.

Literature searches on *G. similis* and *G. discreta* revealed three highly relevant papers: Rommelaars (2013; 2014) and de Haan (2014). These papers recorded the first findings of *G. discreta* in the Netherlands and Belgium respectively. Rommelaars actually described the first finding of *G. similis* in the Netherlands, only to renounce this in his second article and correct his find to the first record of *G. discreta* instead! The three papers highlighted the differences between the two species: the altitudes in which they are found and differences between their spores, cheilocystidia and caulocystidia. Unfortunately, we did not have access to any *G. similis* material, so we could not conduct a first-hand comparison between our collection and this species.

We compared microscopic observations of *G. discreta* and *G. similis* from previous reports of these species. *Galerina similis* has more slender, ellipsoidal spores than *G. discreta*, which has broader ovoid-ellipsoidal spores that are thin-walled and prone to collapse. Recorded variation in spore size amongst different collections of both *G. similis* and *G. discreta* could cause confusion. The spores of de Haan's (2014) *G. discreta* collection had an average size of 9.2 × 6.5 µm while those of Horak *et al.*'s (2009) *G. discreta* holotype collection ranged from 9–11.5 × 6–8 µm. Horak *et al.*'s measurements corresponded well with our collection. There is evidently a slight overlap in both spore size and shape between *G. similis* and *G. discreta*. However, they remain distinct due to the generally longer and broader spores of *G. discreta* that are also prone to collapse.

De Haan observed a difference in the shape of the cheilocystidia between the two species: those of *G. discreta* were slimmer, almost cylindrical and indistinctly capitate in comparison to those of *G. similis*, which are squat, often lecythiform and distinctly capitate. This also applies to the caulocystidia. Both the cheilocystidia and caulocystidia of our collection match well with Horak *et al.*'s (2009) and de Haan's (2014) descriptions.

DNA sequence data for *G. discreta* was available for comparison with our collection but none for *G. similis*. However, from the data in the three articles, we were fairly confident that the collection we had made was one of *G. discreta*, which belongs in *Galerina* subgenus *Tubariopsis*.

Our collection was then sent to Mycota Labs, USA, for nanopore sequencing to confirm or disprove our suspicions. We obtained sequences of the ITS1, 5.8S, and ITS2 regions. The assembled sequence was uploaded to GenBank (accession number PV855305). We analysed the sequences with NCBI BLAST (Altschul *et al.*, 1990). The closest match was derived from a collection of *G. discreta* made by Senn-Irlet, one of the coauthors of the name, from the holotype locality (accession number KR606031.1) with 99.85% similarity (1/689 gaps); as this collection was from the type locality it is classed as a topotype. We repeated the sequence analysis with UNITE massBLASTer (Abarenkov *et al.*, 2024) and the same sequence KR606031 was the closest match. This confirmed our suspicions that we had found *G. discreta*.

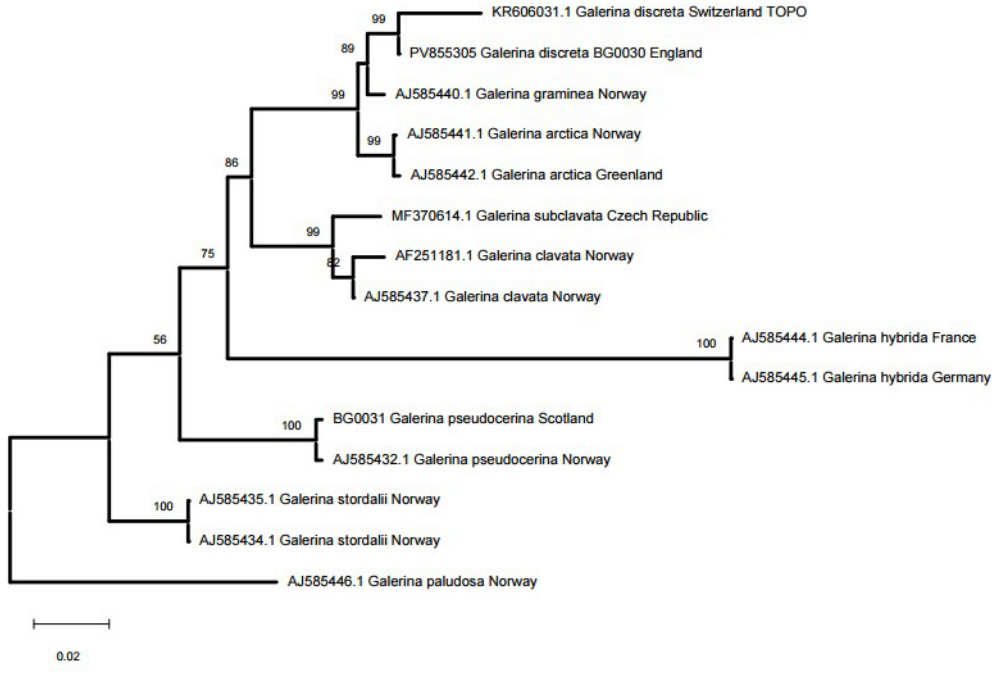

Fig. 4. Phylogenetic tree (Maximum Likelihood with bootstrap support) inferred from sequences of the ITS and 5.8S regions of European *Galerina* species in subgenus *Tubariopsis*. 'TOPO' indicates sequenced Swiss topotype collection. Prepared by Ben Garden.

A Maximum Likelihood phylogenetic tree (Fig. 4) was created using MEGA 12 (Kumar *et al.*, 2018). We included closely related European *Galerina* species within subgenus *Tubariopsis*, with *G. paludosa* set as an outgroup. We could not include *G. similis* in this as there were no comparable DNA sequence data for that species.

Unfortunately, no material remains from our collection after microscopy and DNA sequencing. We aim to make another collection from the same location in the upcoming autumn 2025 fungi season to obtain material to submit to the Kew Fungarium.

Conclusion

Galerina discreta E. Horak, Senn-Irlet, Curti & Musumeci was originally described from Switzerland by Horak *et al.* (2009) and has been recorded amongst moss on stone walls, asbestos and corrugated iron roofs. It has since been recorded in the Netherlands (Rommelaars, 2014) and Flanders (de Haan, 2014).

After searching GBIF and FRDBI, we found no evidence of it having been previously recorded in the UK, either under this name or as *G. similis*. We can therefore confidently assert that the Hull collection is *Galerina discreta* and the first record of this species in Britain. This is based on its habitat and elevation, morphology and molecular data. The microscopic features of the broad ellipsoid-ovoid spores and polymorphic lecythiform-tibiiform, subcaptitate cheilocystidia and caulocystidia confirm *G. discreta* and rule out *G. similis*.

Although this is the first recorded British collection, *G. discreta* may well have been found prior to our investigation but misidentified as a closely related species due to similar morphological characteristics and therefore not examined further. Furthermore, it is not easily found, or perhaps often missed, due to its occurrence in unusual places for fungi such as on stone walls and roofs. The unusual substrate preference is characteristic too and should help with identification in the field.

An important objective for future research should be the sequencing of material identified as *G. similis*, in order to determine whether that taxon is a genetically distinct species or sufficiently polymorphic to embrace the more recent *G. discreta* as a synonym. André de Haan's microscopic observations on the two species suggest the latter is unlikely.

Acknowledgements

We would like to thank Alfred Drummond-Herdman, for the time spent in helping revise the article, and Stephen Russell at Mycota Lab for his assistance in sequencing the collection.

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A second locality for *Puccinia ferruginosa* in Britain

Chris D. Preston[1]

The rust *Puccinia ferruginosa* P. Syd. & Syd. was first found in Britain in 2022, growing on the leaves of small plants of *Artemisia vulgaris* (Mugwort) along the edge of a sandy maize field at Soham, Cambridgeshire. The report of its occurrence (Preston *et al.*, 2023) has not, to my knowledge, been followed by further discoveries, suggesting that it is a genuinely uncommon species rather than a cryptic species which, once drawn to the attention of mycologists, proves to be widespread. This is not unexpected, as the microcyclic *P. ferruginosa* has long been familiar to continental mycologists, distinguishable in the field from another rust species which is more frequently found on *A. vulgaris*, the hemicyclic species formerly known as *Puccinia tanaceti* and now segregated as *P. artemisiella*. Were it frequent in Britain, *P. ferruginosa* would in all likelihood have been reported long ago.

On 19 September 2025, however, I encountered a second population of *P. ferruginosa*, 82 km east of the Soham site. It grew in a fallow field bordered on two sides by maize fields near Wenhaston (TM433744), East Suffolk (vc25). There was a large population of *Artemisia vulgaris* in the field but the plants were small (0.6–0.85 m high) and perhaps flowering for the first time; they differed from the more robust specimens of this perennial species with numerous taller flowering stems which are typically found on roadside verges and other more stable ruderal habitats. The telia of

Fig. 1. Habitat of *Puccinia ferruginosa* near Wenhaston, 19 September 2025. Photograph © C.D. Preston.

P. ferruginosa I found were all present on the leaves of short, vegetative shoots of the host rather than on the leaves of flowering stems. Some of the infected leaves also supported chasmothecia of the powdery mildew *Golovinomyces artemisiae*.

This second locality for *P. ferruginosa* has striking similarities to that at Soham. It is also on very sandy soil, in this case on the Suffolk Sandlings rather than the Breckland fringe of Cambridgeshire. Though both sites were by maize fields, there is presumably no direct link between the maize and the rust; it seems more likely that farmers choose to grow maize in the places where the rust is also found, areas of sandy soil in some of the driest places in Britain (Sanford & Fisk, 2010). At both Soham and Wenhaston *P. ferruginosa* was parasitising a population of *A. vulgaris* which was regenerating after ploughing (Fig. 1), and in both cases short vegetative shoots were preferentially infected. Although it is much too early to conclude that *P. ferruginosa* is restricted to a narrower range of habitats in Britain than its host, the newly discovered site is at least consistent with this possibility.

Fig. 2. Leaf spots caused by *P. ferruginosa* on the upper side of an *Artemisia vulgaris* leaf, showing a distorted area of leaf, Wenhaston, 19 September 2025. Photograph © C.D. Preston.

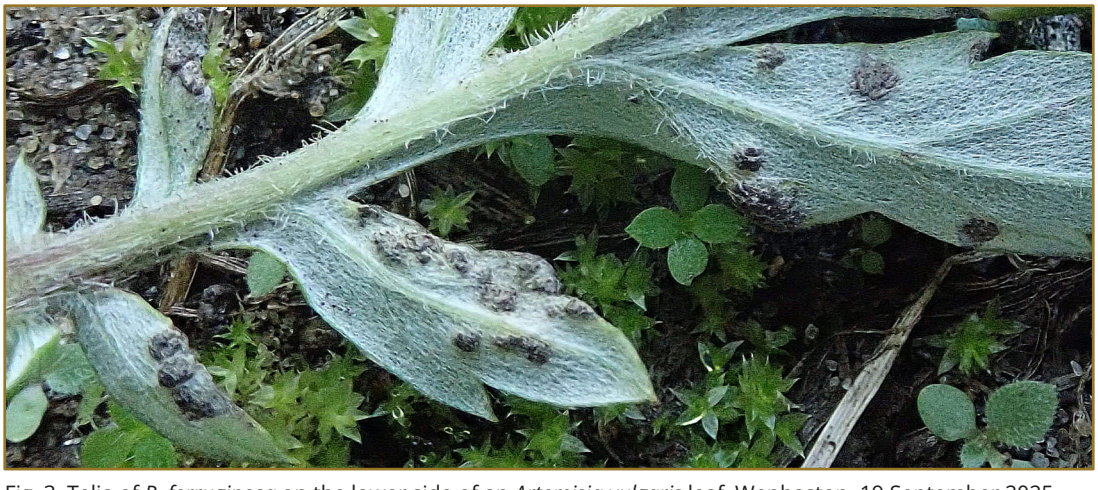

Fig. 3. Telia of *P. ferruginosa* on the lower side of an *Artemisia vulgaris* leaf, Wenhaston, 19 September 2025. Photograph © C.D. Preston.

Fig. 4. Uredia of *P. artemisiella* on the lower side of an *Artemisia vulgaris* leaf, Wenhaston, 19 September 2025. Photograph © C.D. Preston.

The leaf spots caused by *P. ferruginosa* were blackish brown on the upper side of the leaf and in some cases the leaf surface was slightly depressed; at least one leaf was distorted by a telium growing on or alongside a nearby vein (Fig. 2). There were 4–10(–37) telia of *P. ferruginosa* on the lower side of infected leaves, though individual telia are difficult to count as they tend to coalesce; they were 0.5–2.5 mm in diameter (but elongated and up to 6 mm long when growing along a leaf vein), protuberant and had a firm, irregular, wart-like surface (Fig. 3). *Puccinia artemisiella* infected *Artemisia vulgaris* elsewhere in this field and along the edge of nearby maize fields. I found only uredia of this rust here (Fig. 4). *Puccinia ferruginosa* lacks uredia. The fewer, larger, more raised telia of *P. ferruginosa* distinguish it from the more numerous, smaller telia of *P. artemisiella* when they are present. Voucher specimens of *P. ferruginosa* (Preston 6847) have been deposited in the Cambridge University herbarium (CGE) and Kew fungarium (K-M001447317).

The Soham *P. ferruginosa* had longer teliospores than those previously described from the continent, and indeed those directly measured by Nigel Stringer from German material (Preston *et al.*, 2023). Comparative measurements of Wenhaston spores shows that they are intermediate in this respect, and their length spans all but the extremes of the range of the other material (Fig. 5). This suggests that the initial difference we noted in spore size is not likely to be of taxonomic significance.

Acknowledgements

In writing this note I have been mindful of the late Nigel Stringer, who I greatly enjoyed working with on the Soham material, and whose enthusiasm and expertise is so greatly missed by students of British rust fungi. Thanks also to Arthur Chater and Jake Dalzell for their scrutiny of this note.

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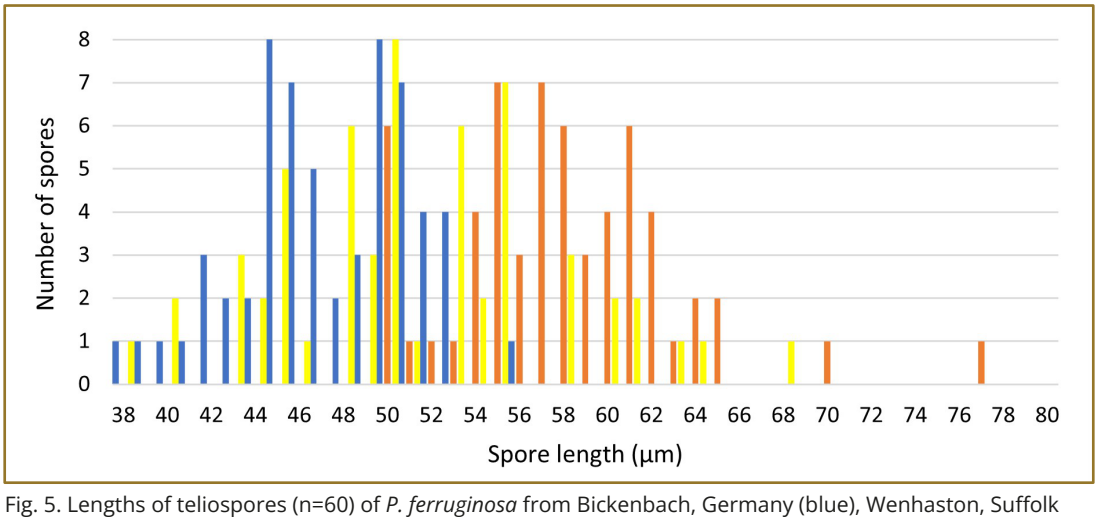

Fig. 5. Lengths of teliospores (n=60) of *P. ferruginosa* from Bickenbach, Germany (blue), Wenhaston, Suffolk (yellow) and Soham, Cambridgeshire (orange).

Scytinostroma portentosum

identified the hard way

Robert Skipper[1]

Fig. 1. Resupinate fungus on fallen branch. Image © Robert Skipper.

To be honest I am not someone who would normally get too excited by whitish resupinate fungi, but this spring had been so dry that my local patch of Surrey downland had become virtually a fungus-free zone so the appearance of a large mass of whitish fungi in the middle of May, albeit of resupinate form, was more of a pleasure than usual. The specimens covered a significant area of three fallen branches from a deceased Sycamore (Fig. 1) and further inspection revealed more specimens covering one side of the still standing trunk up to a height of about 2 metres (Fig. 2) as well as the lower surface of its one remaining branch.

Under the circumstances, despite some misgivings, I felt obliged to take a sample to see what I could make of it.

My identification of resupinate fungi has only had a modest success rate and I have developed no clear strategy for their examination, but I usually start by noting some of the main characteristics. In this case these would include **thickness**: 1–1.5 mm, **colour**: whitish but darkening considerably on wetting to something closer to raw sienna, **margin**: abrupt, **surface**: firm and smooth with a

Fig. 2. Resupinate fungus on standing but deceased Sycamore. Image © Robert Skipper.

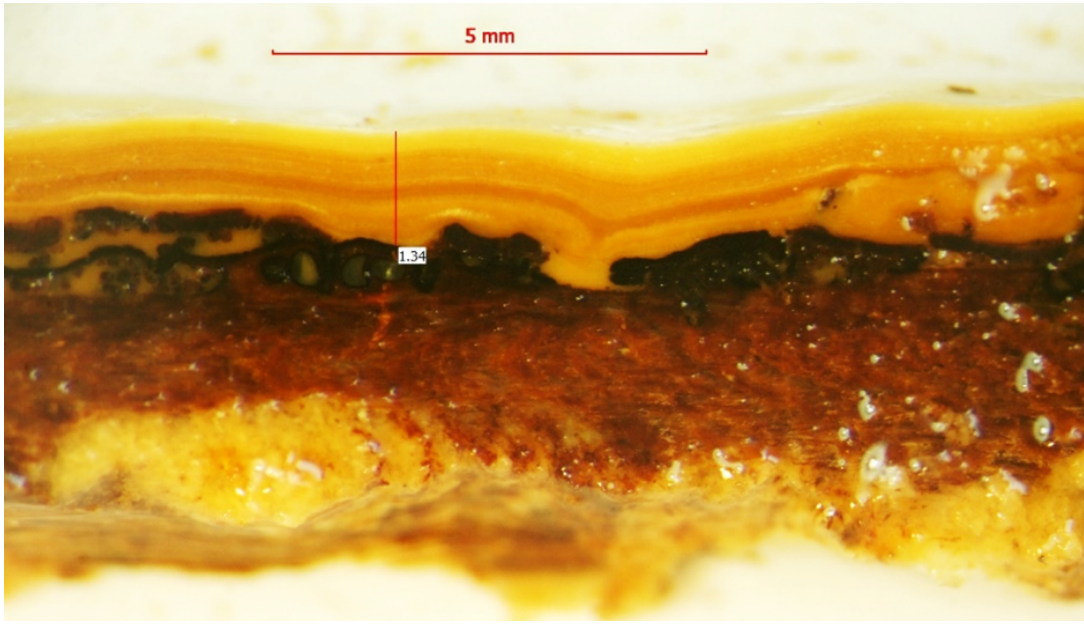

Fig. 3. Section mounted in water showing layered structure. Image © Robert Skipper.

few nodules and large surface cracks. Next, I would collect a spore print, usually by laying part of the specimen over a covered glass slide. Unfortunately, in this case after several attempts, no spores could be obtained using either dry or moistened material.

To get some additional information, I attempted to make thin sections by the simple expediency of making a series of parallel cuts using a sharp razor against a straight edge, excising a small trench below the cuts and selecting the best-looking sections under a stereo microscope. I found the flesh to be quite tough and even the thinnest of my sections were generally opaque under the transmission microscope and failed to provide much additional information other than the subtly coloured layers within the flesh with clusters of rounded crystal inclusions between them and some smaller more angular crystals at the surface (Fig. 3). An examination of a section in Melzer's reagent showed some darkening but mainly towards the top with the surface hyphae showing an amyloid response. Disappointingly, my examination of the sections provided no evidence for the presence of basidia, cystidia or spores.

Squash preparations using smaller amounts of material proved difficult in 3% KOH but using a preparation of 10% was more successful. These squash preparations revealed the flesh to be composed almost entirely of a dense and somewhat chaotic tangle of fine hyphae (monomitic?) along with small crystal fragments. A squash preparation with Congo red was an improvement revealing the hyphae to have clamp connections and to be repeatedly branched in a dendritic fashion but again no spores or basidia were evident (Fig. 4).

At this point I was beginning to feel that the prospects of a positive identification of a whitish resupinate that was completely sterile and showing little internal structure were rather small. However, I pressed on and using fresh material in which I had carefully removed most except the very outermost layer, mounted in 3% KOH with Congo red and with the assistance of a

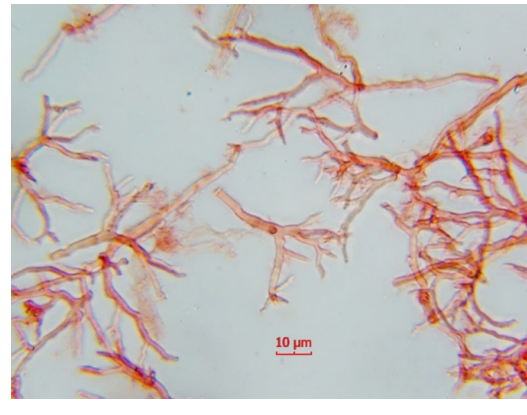

Fig. 4. Squash preparation in Congo red showing branched hyphae at the surface. Image © Robert Skipper.

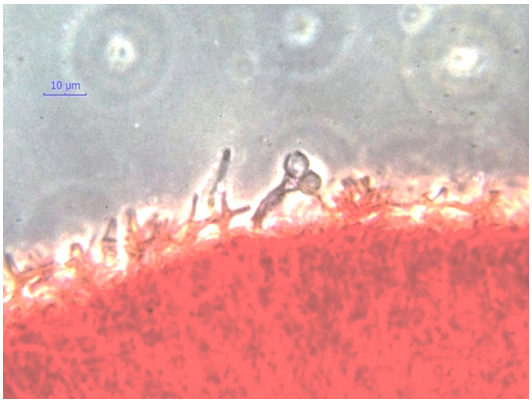

Fig. 5. Spores and basidium on surface of cut sections. Image © Robert Skipper.

phase contrast objective, I did finally spot a single basidium with two spherical spores still attached! (Fig. 5).

I know one basidium is not very much, but it did provide clear evidence of spherical spores roughly 6 × 6 µm and a rather narrow basidial form and this allowed me to go through my rather long list of likely suspects to see what could be eliminated and to my relief only one — *Scytinostroma portentosum* (Berk. & M.A. Curtis) Donk — appeared to meet the bill. A quick check on the internet followed and showed some promisingly similar images but also revealed the English name to be the Moth Ball Crust. This came as rather a surprise as I had not noticed any obvious odour. A quick check with my sample confirmed the lack of odour except for a slight mustiness. However, a small sample I had maintained in damp conditions for a few days did have a weak but distinct odour of naphthalene which convinced me that my identification was probably correct.

It is often surprising what you can find on the internet when investigating a species, and I came across the https://www.aphyllo.net/ website and series of articles under the name "Excerpts from Crusts & Jells". One of these describes *S. portentosum* in detail accompanied by some beautiful drawings and illustrations and comparing these with the images I had obtained left me in no doubt about the identification with or without the smell of moth balls.

This was not a species that I had come across before, but it is included in Hugill and Lucas (2015) where it is described as rare, whereas Læssøe and Petersen (2019) describe it (under *S. hemidichophyticum*) as widespread, occasional, locally common. The NBN Atlas data suggest that this could well be a relatively new arrival in the UK with just 55 records, 53 of these since 1990, the majority appearing to be following the line of chalk south of the Thames. The first records from the UK being in 1989 (Norfolk) and 1991 (Kent). The current FRDBI database now shows over 100 records with these spreading further west and north but still with a possible association with basic soil conditions.

This is a distinctly robust species of resupinate which I believe I would recognise again, but I do intend to re-visit the site in autumn/winter to see if the strong odour of moth balls referred to in the literature does indeed appear. I note that Læssøe and Petersen (2019) also refer to the thin internal layering of the flesh. During summer and times of drought, or just for those with olfactory limitations, this may be a useful guide to its identification.

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Aphyllo.net – Crusts & Jells – by Elia Martini. Last update: 10 June 2025

FRDBI Fungal Records Database of Britain and Ireland. https://www.frdbi.org.uk/

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Læssøe, T. & Petersen, J. H. (2019). *Fungi of temperate Europe*. Vol. 2. Princeton University Press.

NBN National Biodiversity Network Atlas. https://nbnatlas.org/

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Ed. I recall that a fresh specimen of *Scytinostroma portentosum*, with a pungent odour of moth balls, was brought to the BMS field meeting in the Forest of Dean in autumn 2024 by Claudi V. Soler. The team from RBG Kew successfully isolated and cultured that fungus, which smelt even more powerfully in culture than it did as a sporocarp.

See the back cover for a photo of another collection of *S. portentosum* photographed *in situ* by Claudi V. Soler—in its fresh and strikingly stinking state (collection details in caption on p.109).

Psilocybe fuscofulva

a possible war time introduction

Geoffrey Kibby[1], Mario Tortelli[1] & Claudi V. Soler[1]

Fig. 1. *Psilocybe fuscofulva* in deep *Sphagnum* moss, School Wood, Nethy Bridge, Scotland, Sept. 2022. Part of a wooden railway sleeper can be seen at the extreme bottom left of the photo. Photograph © Mario Tortelli.

One of the continuing mysteries of fungal distribution is how alien species first enter these shores and then spread through the country. As an example, one might consider the phenomenal spread of *Agrocybe rivulosa*, first reported in the Netherlands in 2003 and then found in the UK in 2004. Within a few years it had spread to almost every county in England.

To this day I am unaware of any research that has discovered its point of origin. There are several other similar cases such as the recent arrival and continuing expansion of *Favolaschia claudopus*, which has already conquered our western coastal woodlands but has now also been found in the New Forest and even on Hampstead Heath in London! The following however is a case where the source of the introduction is, if not actually certain, highly likely.

During continuing surveys of the woodlands in and around Nethy Bridge, Scotland the authors were taken to a small area of mixed woodland by local naturalist and conservationist, Gus Jones. Of particular interest in this woodland was an area where old, mostly buried railway tracks can be seen emerging through the surface of one of the woodland paths. At one point the track is very moist with deep mounds of *Sphagnum* and other mosses and with the wooden sleepers of the track pushing through at various points.

Gus told us that, during World Wars 1 and 2, Canadian troops were stationed in the area, primarily the Canadian Forestry Corps, harvesting and transporting timber for the war effort. A timber camp and sawmill were established there, hence the railway for the transporting of the timber and a gigantic old sawdust heap also along the same path.

In 2022 when we were there, and again in 2025 a large population of a *Psilocybe* species was found emerging from the moss between the old sleepers

Fig. 2. A second collection of *P. fuscofulva* in the same locality as Fig. 1 but on mossy peat, Sept. 2025. Photograph © Geoffrey Kibby.

(Figs 1 & 2). Its large size and striking appearance led us to believe that identification might be easy but using the dichotomous keys in European literature led us to the little-known *P. medullosa*, but without great confidence in our determination. So, material collected in both years was dried and samples were subsequently processed by CVS using a Bento Lab. The resulting PCR products were then sent to Aberystwyth University for sequencing.

The resulting sequences clearly matched a number of sequences on GenBank labelled as either *P. atrobrunnea* or *P. fuscofulva* with a percentage of similarity reaching 99.17% (Fig. 3). Examination of the descriptions of these species also agreed with our find – but which name should we use?

In a paper by J. Borovička *et al.* (2015) the group of species including *P. medullosa*, *P. atrobrunnea* and *P. fuscofulva* is discussed at length and the results of phylogenetic studies presented. *Psilocybe medullosa* is clearly different and not our species (our sequence only achieved a 97% similarity to sequences of that species included in the paper) and could be discounted, leaving the names *P. atrobrunnea* and *P. fuscofulva* to consider.

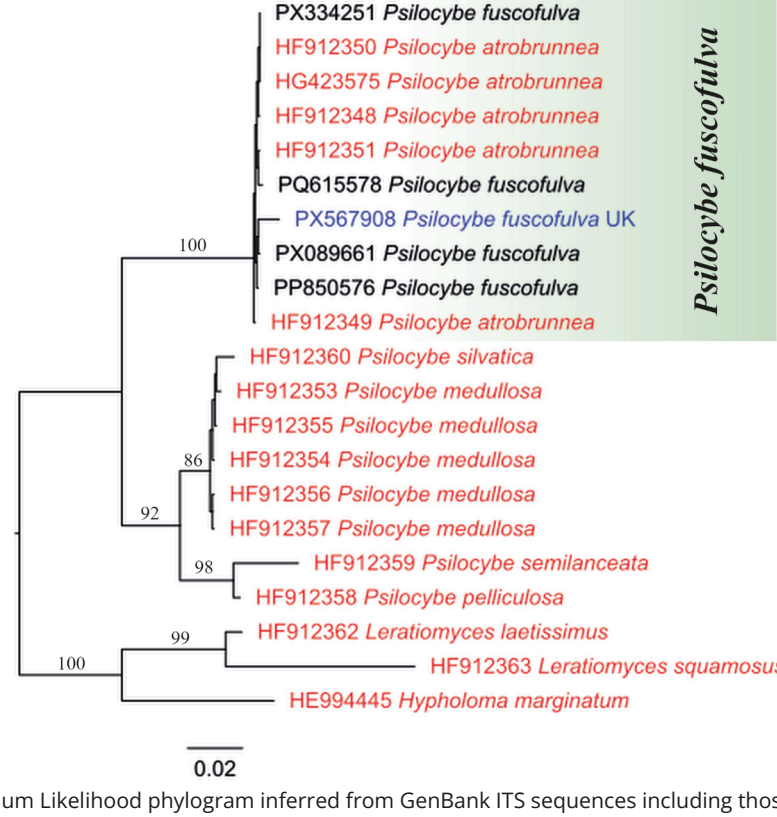

Fig. 3. A Maximum Likelihood phylogram inferred from GenBank ITS sequences including those submitted under the names *P. atrobrunnea*/*fuscofulva*. Our collection is shown in blue, with sequences included in the phylogenetic study by Borovička *et al.* (2015) shown in red. Branch support values are shown where >70%. Phylogram prepared by David Harries.

Fig. 4. Spores of *P. fuscofulva*. Micrograph © Geoffrey Kibby.

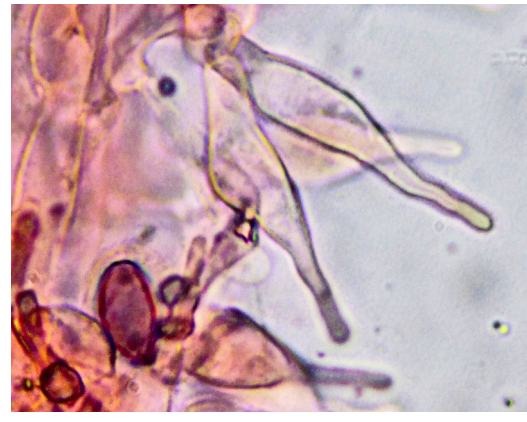

Fig. 5. Cheilocystidia of *P. fuscofulva*. Micrograph © Geoffrey Kibby.

Borovička *et al.* (2015) present a lengthy discussion on the problem of the name *Psilocybe atrubrunnea* (Lasch) Gillet (no type specimen or illustration exists) and conclude it must be considered as a "dubious and ambiguous name". Therefore, they consider the correct name for the species is *P. fuscofulva* Peck, the name we are adopting here for our collections. They say that it has also been recorded in Europe under the name *P. turficola*, also treated by them as a synonym.

P. fuscofulva was described by Peck from North America but according to the above-mentioned paper is also known from European collections. There appear to be no records in Britain under this name nor as *P. atrobrunnea* but there are three collections under the name *P. turficola* in the fungarium at Kew. Whether these latter are indeed the same as our collections will probably need sequencing to confirm. Photographs on FRDBI of one recent collection labelled *P. turficola* by Anthony Hardware is clearly of a much smaller, different species than our Scottish finds.

It is intriguing to consider that this primarily North American species might have been brought in accidentally by Canadian troops during their transporting of timber along the railway. We feel that the fact that the species has not been found elsewhere in this woodland except along the old railway track can be considered as significant.

Description of the collection

GenBank sequence PX567908

Kew voucher K-M001447287

Pileus 2–4 cm across, campanulate to conic-umbonate, dark chestnut-brown to paler reddish brown, orange-brown when fully expanded, moist but not particularly viscid.

Lamellae moderately crowded, greyish olive to darker brown with age, margins whitish.

Stipe 3–5 mm diameter, pale brown with copious pale cream bands over the entire length; no colour change or bluing at all on bruising.

Odour not distinct.

Spores ellipsoid, thick-walled with a germ pore, 9.5–10.2 × 5.4–6.0 µm (Fig. 4).

Cheilocystidia narrowly lageniform to urticoid, approximately 33 µm long, 2–5 µm across at the tip (Fig. 5).

Habitat in deep *Sphagnum* moss mixed with woody debris, twigs, etc, adjoining old railway sleepers and on wet, mossy peat.

School Wood, Nethy Bridge, Scotland. September 2022 & 2025.

It is of interest that this is one of the few (only?) species in the genus recorded as containing no psilocybin or psilocin, chemical components that cause bluing of the flesh when bruised in other species and which have psychotropic properties.

Reference

Borovička, J. *et al.* (2015). Phylogenetic and chemical studies in the potential psychotropic species complex of *Psilocybe atrobrunnea* with taxonomic and nomenclatural notes. *Persoonia* 34: 1–9.

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Spirodecospora (Xylariaceae)

a new genus for Western Europe, characterised by spores with spiralling ornamentation

Tony Hardware[1], Jacques Fournier[2] & David Harries[3]

Abstract

Spirodecospora is a xylariaceous genus occurring on bamboos, characterised by minute, discrete, deeply immersed, nonstromatic ascomata yielding fairly large, distinctive ascospores with a pigmented, spirally ornamented wall. Its known distribution so far is temperate (Japan) to tropical (Hong Kong). A pyrenomycete collected on *Arundinaria* sticks in Devon (UK) proved to match this morphological definition of *Spirodecospora* in all respects. A detailed morphological description of this collection is provided. An ITS sequence obtained from this material supported this view by showing 99.8% similarity to *S. melnikii*, a species known from Japan and Far East Russia on *Sasa*. Our results therefore considerably expand the known geographic range of *Spirodecospora*.

This collection is herein assigned to *S. melnikii*, which may be a synonym of the type of *Spirodecospora*, *S. bambusicola*; DNA data from the type specimen of *S. bambusicola* is not yet available. To explain the unexpected presence of *S. melnikii* in Western Europe, its endophytic origin from live bamboo material imported from Asia is considered.

Keywords: *Ascomycota*, bambusicolous fungi, endophytic fungi.

Introduction

On 03 March 2025 a pyrenomycete fungus was collected from a detached dead culm of the bamboo *Phyllostachys aurea* from the ground at Exmoor Zoological & Conservation Centre, Bratton Fleming, Devon, U.K. (see Fig 1). *Phyllostachys aurea* Rivière & Rivière is also known as Fishpole Bamboo and is native to China. The preliminary microscopy results were shared with J. Fournier, (France), who was able to identify an association with the genus *Spirodecospora* B.S. Lu, K.D. Hyde & W.H. Ho. The material was found to be in the early stages of growth and in good condition and sections were subsequently shared with J. Fournier.

A detailed morphological characterisation of the collection quickly confirmed the generic placement

Fig. 1. *Phyllostachys aurea* present at the host site within Exmoor Zoological Centre. Photo © T. Hardware.

and oriented our first investigation towards *S. bambusicola* B.S. Lu, K. D. Hyde & W. H. Ho, the type and then only species of *Spirodecospora* (Lu *et al.* 1998). Mel'nik & Hyde (2003) replaced this name with their new combination *S. melnikii* (Lar.N. Vassiljeva) K.D. Hyde & Mel'nik, based on the previously published name *Anthostomella melnikii* Lar.N. Vassiljeva (1990). Our collection appears to be the first reported record of *Spirodecospora* in western Europe with all other records of this genus recorded in China (Lu *et al.*, 1998, Liu *et al.* 2025), Japan (Sugita *et al.* 2022) or Far Eastern Russia (Vassiljeva 1990; Mel'nik & Hyde 2003). Sugita *et al.* (2022) suggested that the two taxa were not synonymous, but there are no DNA data available for *S. bambusicola* and the morphological evidence they gave is not convincing. As DNA from our sample closely

matched that of several collections of *S. melnikii* and the two host genera (*Arundinaria* and *Sasa*) are quite closely related, we are content to use that name for the British collection.

Based on molecular phylogenetic analyses of DNA sequence data of three regions (ITS, LSU and *rpb2*), Sugita *et al.* (2022) established the new family *Spirodecosporaceae* R. Sugita & Kaz. Tanaka within *Xylariaceae*, provided sequence data for *S. melnikii* and recognised *S. paramelnikii* R. Sugita & Kaz. Tanaka and *S. paulospiralis* R. Sugita & Kaz. Tanaka as distinct species based on both molecular and morphological evidence. Four further species were added from Chinese collections by Liu *et al.* (2025), though regrettably none of the host species were identified.

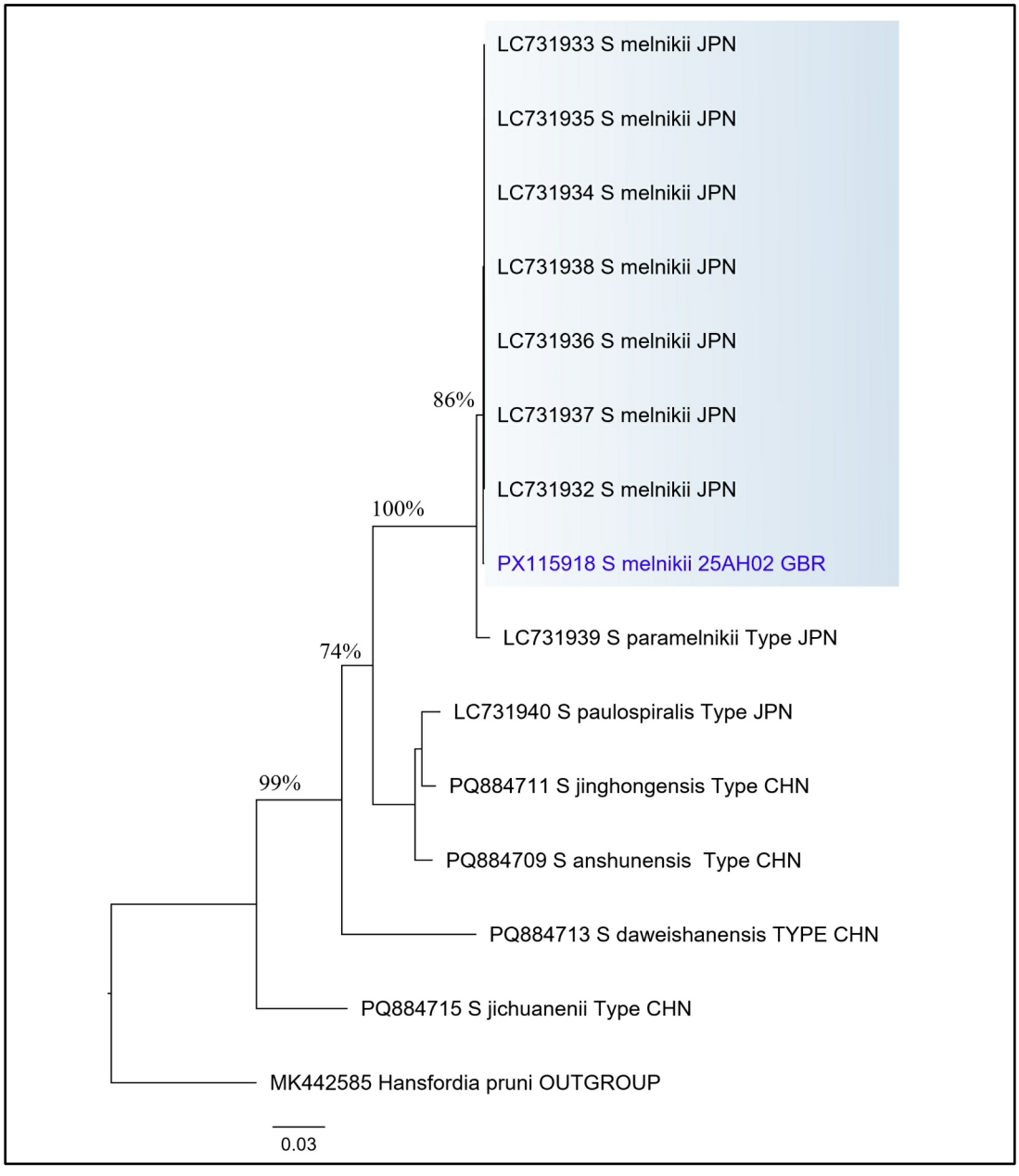

Fig. 2. Phylogenetic tree of sequences published on GenBank. Three-letter ISO codes are used to indicate country of collection.

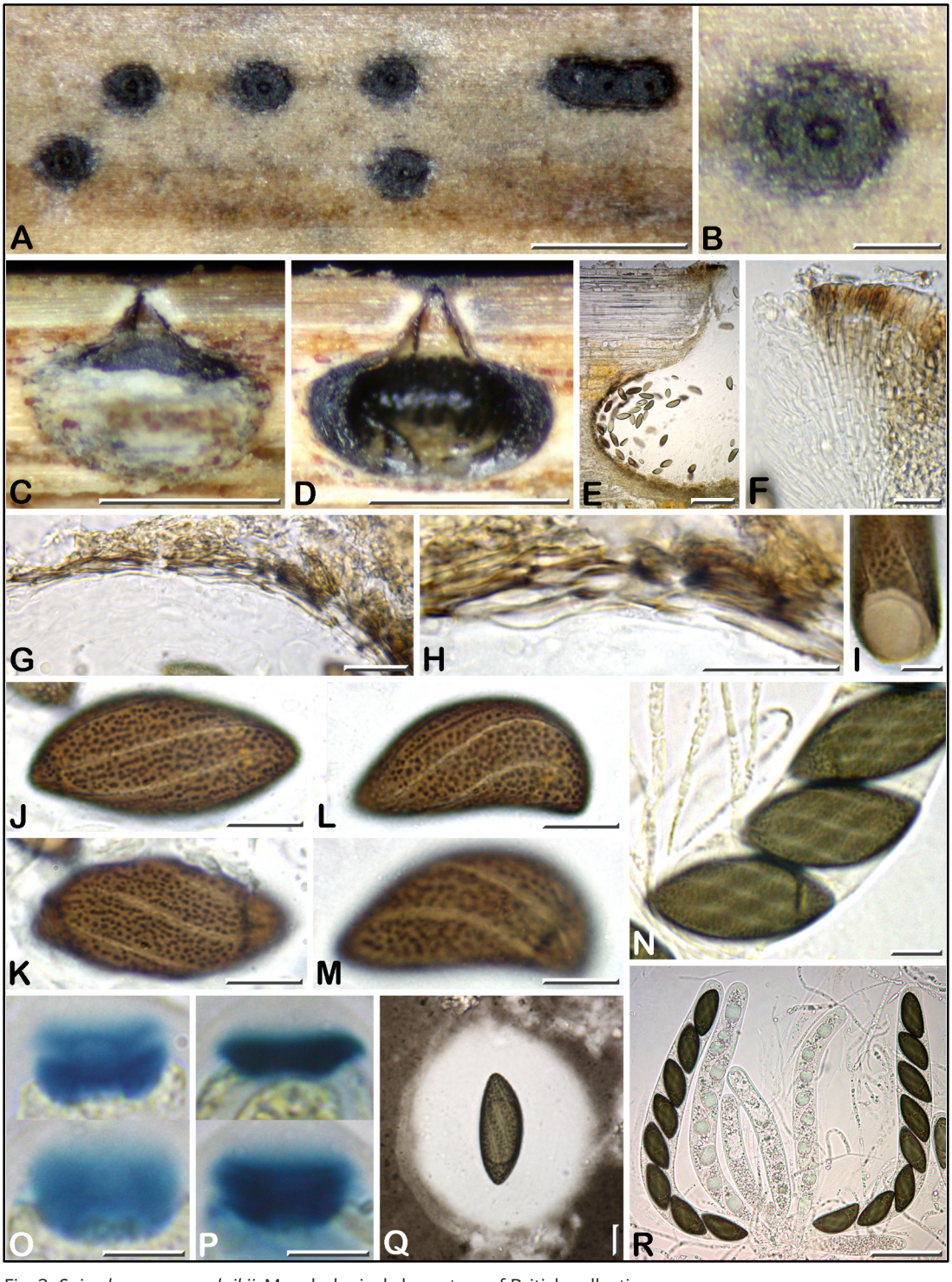

Fig. 3. *Spirodecospora melnikii*. Morphological characters of British collection.

A-R: K-M001445782. **A:** Ostiolar discs on host surface, separate or occasionally in contact; **B**: Ostiolar disc in close-up showing a central pore; **C**: Immersed ascoma visible after splitting of the substrate, showing necrotic fibres around its lower half; **D**: Ascoma in vertical section, note the bleached wood around the neck; **E**: Ascoma in vertical section showing a thin peridium; **F**: Ostiolar region in vertical section showing periphyses lining the canal (left) and palisadic hyphae with thick-walled brown cells forming the superficial disc;
cont. p.135 ...

Materials and methods

Morphological characterisation

The general protocols regarding macro- and microscopic observations, ascospore measurements, photography and illustrations follow Fournier *et al.* (2018). In addition, ascospore ornamentation was studied after mounting in heated chloral-lactophenol and Indian ink to show a gelatinous sheath. Spore illustration includes showing upper and lower spore sides to prove the existence of fully spiralling linear crests and granular bands around each spore. Subapical apparati are shown using Melzer's reagent and separately using Lugol's solution.

Voucher material has been deposited in the Fungarium of the Royal Botanic Gardens, Kew under the specimen number K-M001445782.

Phylogenetic methods and results

A portion of the original collection of host material was forwarded to David Harries for sequencing through the British Mycological Society (BMS) DNA barcoding programme.

DNA extraction, PCR amplification and sequencing

A single ascoma was excised from the substrate and DNA extraction performed using an alkaline-PEG200 method (Chomczynski & Rymaszewski, 2006). The molecular marker region (ITS1-5.8S-ITS2) was amplified using primers ITS1F and ITS4 (Gardes & Bruns, 1993) using a Bento Lab thermal cycler (Bento Bioworks Ltd, London, UK). The PCR product was forwarded to Aberystwyth University for Sanger sequencing at the IBERS Genomics Facility.

A BLAST search was performed on the sequence using the GenBank database (https://www.ncbi.nlm.nih.gov/genbank/) and gave a 99.8% match to a series of sequences named *S. melnikii* (Lar.N. Vassiljeva) K.D. Hyde & Melnik, 2003.

A maximum likelihood phylogenetic tree (Fig. 2) was constructed based on the ITS sequences listed in Sugita *et al.* (2022) together with additional sequences published on GenBank and the subject sequence, GenBank PX115918.

Taxonomic part

Class: *Sordariomycetes*

Order: *Xylariales*

Family: *Xylariaceae*

Genus: *Spirodecospora*

Spirodecospora melnikii (Lar.N. Vassiljeva) K.D. Hyde & Mel'nik (2003)

≡ *Anthostomella melnikii* Lar.N. Vassiljeva (1990)

?= *Spirodecospora bambusicola* B.S. Lu, K.D. Hyde & W.H. Ho (1998)

Ascomata perithecial, non-stromatic, deeply immersed, appearing on host surface as small loosely scattered black dots, separate or rarely in contact, flush with the surface. Perithecia subglobose to depressed-spherical, 420–550 µm high including a conical neck 200–240 µm high and a venter 200–260 µm high, 450–620 µm diam. Peridium 11–18 µm thick, brown, comprised of 3–4 layers of flattened, thin-walled cells textura prismatica 7–9 µm long, 2.5–3.8 µm wide, inwardly 18–20 µm long × 3–3.2 µm wide, wall 1–1.2 µm thick, irregularly pigmented; amorphous necrotic cells adherent to the lower half of the periderm, forming a whitish to light brown crust visible when splitting the substrate tangentially to a perithecium. Ostiolar neck broadly to narrowly conical, thin-walled, periphysate, the surrounding host tissue bleached in the upper half beneath the surface. Ostioles discoid, black, 170–180 µm diam. not prominent above host surface, pierced by a minute central pore, composed by palisadic hyphae ending into dark brown, tightly packed, slightly swollen cells.

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cont. from p.134... **G, H**: Fusiform and flattened, irregularly pigmented and thin-walled cells of the lateral peridium; **I**: Obliquely cut ascospore showing superficial warts and linear crests (E-I all in heated chloral-lactophenol); **J, K**: Same ascospore with focus on upper side (J) and lower side (K) showing the ornamentation fully spiralling around the spore axis; **L, M**: Same ascospore in side view, with focus on upper side (L) and lower side (M) showing the ornamentation fully spiralling around the spore axis; **N**: Submature ascospores with intermediate focus showing both upper and lower spiralling pale crests (note the guttulate paraphyses); **O**: Subapical apparati (J-O all in Melzer's reagent); **P**: Subapical apparati in Lugol solution; **Q**: Ascospore featuring a wide gelatinous sheath, in Indian ink; **R**: Mature and immature subsessile asci, in 1% sodium dodecyl sulphate.

Scale bars: A, C, D = 0.5 mm; B, E = 100 µm; F, G, H = 20 µm; I, O, P = 5 µm; J-N, Q = 10 µm; R = 50 µm. Plate © J. Fournier.

Dichotomous key to known *Spirodecospora* taxa (to facilitate their comparison, ascospore dimensions are given as mean values)

1– Ascospores non-verrucose, narrowly fusiform with a single, straight, short, central linear ridge, 21.7 × 6.8 µm	*S. jichuanenii*
1–Ascospores verrucose, broadly ellipsoid-inequilateral, with 3 almost straight to spiralling long ridges	2
2–Ascospores with almost straight to faintly spiral ornamentation	3
2– Ascospores with spirally arranged ornamentation	4
3–Ascospores 19.2 × 10.5 µm	*S. jinghongensis*
3–Ascospores 31.6 × 12.5 µm	*S. paulospiralis*
4– Ascospores lacking a gelatinous sheath, 30.7 × 15.3 µm	*S. anshunensis*
4– Ascospores featuring a conspicuous gelatinous sheath	5
5–Ascospores 61.8 × 26.1 µm	*S. daweishanensis*
5– Ascospores significantly smaller, less than 40.2 × 16.4 µm	6
6–Ascospores 40.2 × 16.4 µm	*S. paramelnikii*
6–Ascospores slightly smaller, less than 36.5 µm long	7
7–Described from Far East Russia and Japan on *Sasa* and on *Bambusa* in UK	*S. melnikii*
7–Described from Hong Kong on *Bambusa* and possibly different	*S. bambusicola*

	Host	**Geographic origin and climate**	**Authors**	**Extreme values (µm(**	**Mean values (µm)**
S. bambusicola holotype	*Bambusa*	Hong Kong tropical	Lu *et al.* 1998	28–45 × 11–15	36 × 14
S. melnikii K-M001445782	*Arundinaria*	Devon (UK) temperate	Present study	33.1–38.7 × 13.8–15.6	35.5 × 14.8
Anthostomella melnikii holotype	*Sasa*	Far East Russia temperate	Vassiljeva 1990 (in Mel'nik & Hyde 2003)	(30–)33–36(–39.6) × 14–16.5	34.5 × 15.3
S. melnikii LE212430	*Sasa*	Far East Russia temperate	Mel'nik & Hyde 2003	32–38(–42) × 12.5–15	35 × 13.8
S. melnikii	*Sasa*	Japan temperate	Sugita *et al.* 2022	30–36.5 × 12–17	33.9 × 13.7

Table. 1. Synopsis of ascospore dimensions from known collections of *S. melnikii* and *S. bambusicola* reported in literature, in correlation with their host affiliation, geographic origin and climate (adapted from Mel'nik & Hyde, 2003).

Paraphyses copious, filiform, 2–2.8 µm wide, sparingly septate, simple, hyaline, minutely guttulate with refractive content, longer than asci.

Asci unitunicate, cylindrical, short-stipitate to subsessile, (6–)8-spored, 210–256 × 20.5 × 28.4 µm (N = 10), with a massive subapical ring wider than high, varying from wedge-shaped with a flat base to basally convex, bluing more strongly in Lugol's solution than in Melzer's reagent, also varying in dimension and shape depending on the medium, 4.1–5.7 × 7.2–9.4 µm (Me = 5.1 × 8.5 µm, N = 22) in Melzer's reagent, 3.3–5.3 × 7.1–8.7 µm (Me = 4.4 × 7.9 µm, N = 25) in Lugol's solution.

Ascospores: (31.7–)33.1–38.7(–40.7) × (12.7–)13.8–15.6(–16.3) µm, Q = (2.1–)2.2–2.7(–2.9); N = 60 (Me = 35.5 × 14.8 µm; Qe = 2.4), ellipsoid-inequilateral to slightly fusiform, with mostly narrowly rounded to subacute ends, olivaceous brown in the fresh state, turning medium to dark brown upon drying, the wall conspicuously ornamented by minute dark brown warts densely distributed around two to mostly three whitish narrow parallel ridges arranged in a spiral configuration, continuous and extending over the entire ascospore; surrounded by a wide mucilaginous sheath 14–19 µm best seen by contrast in Indian ink and lacking polar appendages.

The distribution pattern of the warty ornamentation and linear whitish ridges is the key characteristic of the genus *Spirodecospora* but was perhaps not fully understood. Microscopic investigations carried out in Melzer's reagent to provide clearest images showed that, by combining focusing on the upper side and on the lower side (Fig. 3 J–M) or focusing on the intermediate zone, bands of warts and whitish ridges are continuous all around the spore and cross each other at stable angles forming a strikingly regular and most unusual pattern (Fig. 3 N). See also the illustrations of ascospores of *S. daweishanensis* in Liu *et al.* (2025: 62).

Discussion

Taxonomic status

Assessing the taxonomic status of our collection was facilitated by the distinctive and unique morphology of ascospores quickly leading us to the genus *Spirodecospora* after consultation of Lu & Hyde's world monograph of *Anthostomella* (Lu & Hyde, 2000) and checking its original description in Lu *et al.* (1998). At this time and until the first revision of the genus by Sugita *et al.* (2022), the genus was monotypic and represented by *S. bambusicola*, the type species (Lu *et al.*, 1998).

When aware of a collection on *Sasa* from Kunashir island in Far East Russia, published by Vassiljeva (1990) under the name *Anthostomella melnikii* (Lar.N. Vassiljeva), K.D. Hyde & Mel'nik (2003) assessed it was not an *Anthostomella* Sacc. but could not be morphologically distinguished from *S. bambusicola*. They became therefore synonyms but the epithet *melnikii* having priority, they proposed the new combination *S. melnikii* (Lar.N. Vassiljeva), K.D. Hyde & Mel'nik (2003) to name the type species of *Spirodecospora*.

Sugita *et al.* (2022) interpreted differently the minor morphological differences between collections on *Bambusa* and *Sasa* listed by Mel'nik & Hyde (2003), assessed them as significant and emphasised the importance of host affiliation and geographic origin as good separators setting *S. melnikii* apart from *S. bambusicola* as a distinct species. Oddly enough, the status of *S. melnikii* in MycoBank changed very recently from synonym of *S. bambusicola* to *S. melnikii* replacing *S. bambusicola*. However, the type species of *Spirodecospora* is still *S. bambusicola* in MycoBank (accessed 10/09/2025) and according to the curator, K. Bensch, the update of *S. melnikii* was made based on Mel'nik & Hyde (2003) and Sugita *et al.* (2022) papers but both interpretations remain possible until sequence data become available (pers. comm. 01/09/2025). *Spirodecospora bambusicola* is likewise still accepted as the type species by Index Fungorum where no synonymy with *S. melnikii* is suggested (accessed 10/09/2025).

We do agree that sequence data are required to clearly evaluate whether *S. melnikii* is distinct from *S. bambusicola* but the status of both species as distinct is challenged by the observations made during this study. Sugita *et al.* (2022) stated: "We identified our specimens collected on *Sasa* spp. as *S. melnikii* based on the smaller ascospore size and the host plant". We summarised in Table 1 available information on ascospore dimensions reported by different authors for collections assigned either to *S. melnikii* or *S. bambusicola*. This shows a fairly wide variation range of extreme and mean values which, due to a wide overlap, does not clearly show significant differences and appears uncorrelated with host, location or climate. For example, our collection from UK having an ITS sequence with 99.8% similarity to *S. melnikii* is on *Bambusa*, not *Sasa*, which contradicts the taxonomic importance of

host affiliation put forward to support the separation of these two species.

We therefore assign our collection to *S. melnikii* in agreement with Mel'nik & Hyde (2003) but with reservations about its taxonomic difference from *S. bambusicola* defended by Sugita *et al*. (2022).

Supposed endophytic origin

With the highly disjunct distribution of *S. melnikii* revealed by our finding, ranging from South East Asia to Western Europe, some questions naturally may arise about how this could happen. Numerous examples can be found in literature about macrobasidiomycetes featuring a widely disjunct distribution, usually explained by ectomycorrhizal species having followed their host through the soil embedding their roots and successfully transplanted in a suitable environment.

The ecology of pyrenomycetous microfungi is radically different in relying on the presence of fungal mycelium within live host tissues without damaging them. This is termed endophytism and is well documented in all ecosystems and plants worldwide, including bamboos, e.g. Giba *et al*. (2020). It seems therefore reasonable to explain the presence of this exotic fungus by its presence as an endophyte within the bamboo material imported from Asia (most often China and India) and naturally developing with its host in this suitable part of UK enjoying mild and rainy winters. Asian bambusicolous pyrenomycetes are countless and one can predict numerous discoveries of interest on these hosts in the future in this region.

Acknowledgments

We wish to thank the British Mycological Society for the DNA process and sequencing results, where this work has been part of the British Mycological Society's DNA barcoding programme. We gratefully acknowledge Dr. Konstanze Bensch (Mycobank) for her nomenclatural advice. We also wish to thank Dr. Paul Cannon for his assistance and review of this paper.

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Fungal Futures: Conservation news and views

Matt Wainhouse[1] & Rich Wright[2]

A new Network for Fungal Conservation

As we all know, superhuman powers of observation and memory recall are the foundation skills of any field mycologist. Readers will of course remember our mention, back in our first article in FM 26(1), of the beginnings of a new Network for Fungal Conservation (NFC). Since those early spores landed, the emerging Network has held two preliminary meetings, hosted by Plantlife, which brought together fungi leads from each of the UK's devolved nation conservation agencies (Natural Resources Wales, NatureScot, Department of Agriculture, Environment and Rural Affairs (DAERA), and Natural England), alongside specialists from the Royal Botanic Gardens, Kew (RBG Kew), Cardiff and Aberystwyth Universities, and the British Mycological Society.

For some attendees, these meetings were the first of their kind, linking organisations and mycologists who share a common purpose of conserving fungi, each with different but complementary roles. For others, it marked the reopening of an important shared effort and communication channel, one that had remained largely dormant since the unfortunate disbanding of the Fungus Conservation Forum over a decade ago.

These early discussions helped create the Terms of Reference of the NFC, outline its initial ethos, and pave the way for the Network's greatly welcomed inaugural event, hosted jointly by Natural England and Plantlife. Held at Natural England's Bristol offices in mid-September, the meeting brought together over 60 stakeholders representing more than 25 organisations from government, landowners, research, societies, environmental NGOs and other interested organisations (Fig.1).

The morning session featured five keynote talks covering different aspects of fungal conservation. Martyn Ainsworth (RBG Kew) set the scene with 'Fungal Conservation Before the Pledge', summarising progress with protected sites and Red Listing. Lynne Boddy (Cardiff University) highlighted the vital role of decay fungi in driving ecosystems and creating biodiverse habitats. Gareth Griffith (University of Aberystwyth) demonstrated how environmental DNA (eDNA) is revealing hidden fungal diversity in grasslands and its susceptibility to anthropogenic pressures. Sean Cooch (Natural England) provided updates on the development and use of the England Grassland Fungi Database. Finally, Matt Wainhouse (Natural England), Rich Wright (Plantlife), and Aileen Baird (Plantlife) presented a snapshot of where we currently stand in fungal conservation, and why a new Network for Fungal Conservation is essential. The morning session concluded with an eloquent synopsis from Merlin Sheldrake, who reminded us of the heartfelt importance of our purpose: to protect, understand, and raise awareness of these remarkable organisms (Fig. 2). We hope to share some of the talks online shortly.

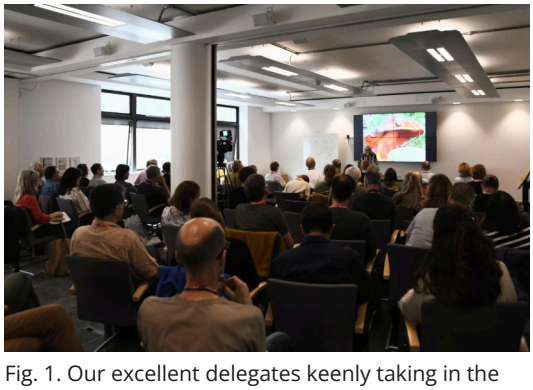

Fig. 1. Our excellent delegates keenly taking in the presentations. © Eleni Vreony, Plantlife.

Fig. 2. The author Merlin Sheldrake and Plantlife's Director of Conservation, Nicola Hutchinson, wrapping up the morning's session. © Eleni Vreony, Plantlife.

The afternoon session comprised two workshops designed to gather thoughts and feedback on key elements of the NFC's objectives and structure. The first workshop focused on what a new strategy for fungal conservation might look like. Four breakout groups explored different core themes: understanding and documenting fungal diversity; conserving fungal diversity; promoting education and awareness; and building capacity for fungal conservation. The outputs from these discussions are feeding directly into the early planning for a new strategy and delivery plan, which we hope will begin to take shape in early 2026.

The second workshop explored how best to shape the NFC itself, and how member organisations could begin taking action, alongside what they would like the Network to provide. Discussions covered the potential aims of NFC working groups and the challenges they may face. Five initial working groups have been proposed: species conservation assessments (*i.e.* Red Listing); assemblages and habitats; practical conservation; policy and legislation; and recording and data flows. In addition, a temporary working group will be established to focus specifically on developing the new strategy.

The results of the day were both inspiring and positive, with many delegates expressing that the event had been valuable and that the Network's potential offers genuine hope for a future rich in fungi. We'd like to extend a huge thanks to all those who attended and made the day so rewarding. The next steps are to convene the working groups, define key objectives, and develop a robust strategy to guide fungal conservation efforts. We look forward to providing further updates as progress continues into 2026.

Fungal data pathways: a new route to making data FAIR

Biological records from field mycologists are the number one source of data on fungi in the UK. The FRDBI alone (British Mycological Society, 2009) holds close to 3.5 million records and counting. The flow of records from recorder to end user is complicated and it is often not clear how records can be accessed and used (Fig. 3). Thus, in the four rounds of State of Nature reports (State of Nature Partnership, 2013, 2016, 2019, 2023), trends in fungi have never been reported due to inaccessibility of data. Recognising this problem, Natural England commissioned the Biological Records Centre to investigate data pathways for fungus records and explore the issues that are preventing fungal data from being used.

Their report, published in September 2025 (Amy *et al.*, 2025), identifies a number of issues, some of which will be of no surprise: accessibility of databases, duplication across recording platforms, taxonomic issues, poorly defined verification standards and data licences that restrict or prevent use[†]. These are not insurmountable problems and the recommendations made in the report suggest how fungal data could be managed differently to meet FAIR data standards (FAIR being an acronym for: Findable, Accessible, Interoperable and Reuseable).

Importantly, the report reached out to the recording community for their views on fungal recording which gave crucial context to the report's recommendations. There was a clear steer from the community on their motivations for recording fungi, enabling Natural England to best reflect these in their work—the data wouldn't exist without the recorder, after all (Fig. 4).

Natural England's Natural Capital and Ecosystem Assessment (NCEA) team are now supporting the BMS to action some of the recommendations from the report. Importantly, this will help mobilise the FRDBI's vast dataset to make it accessible for use by researchers in the UK and globally.

A nod must go out to FM's illustrious editor Clare Blencowe whose own work on fungal data flows (*e.g.* Blencowe, 2018) directly led to this project.

[†] Timely sidenote reminder: if you share your fungus records using one of the fully permissive Creative Commons licences—CC0 (Public Domain) or CC-BY (By Attribution)—they can be used in the broadest sense. For more information about Creative Commons licences, visit https://creativecommons.org/share-your-work/cclicenses/.

Data licencing is a real issue for users. Natural England's grassland fungi maps have been delayed by nearly two years because of restrictive data licences on biological records.

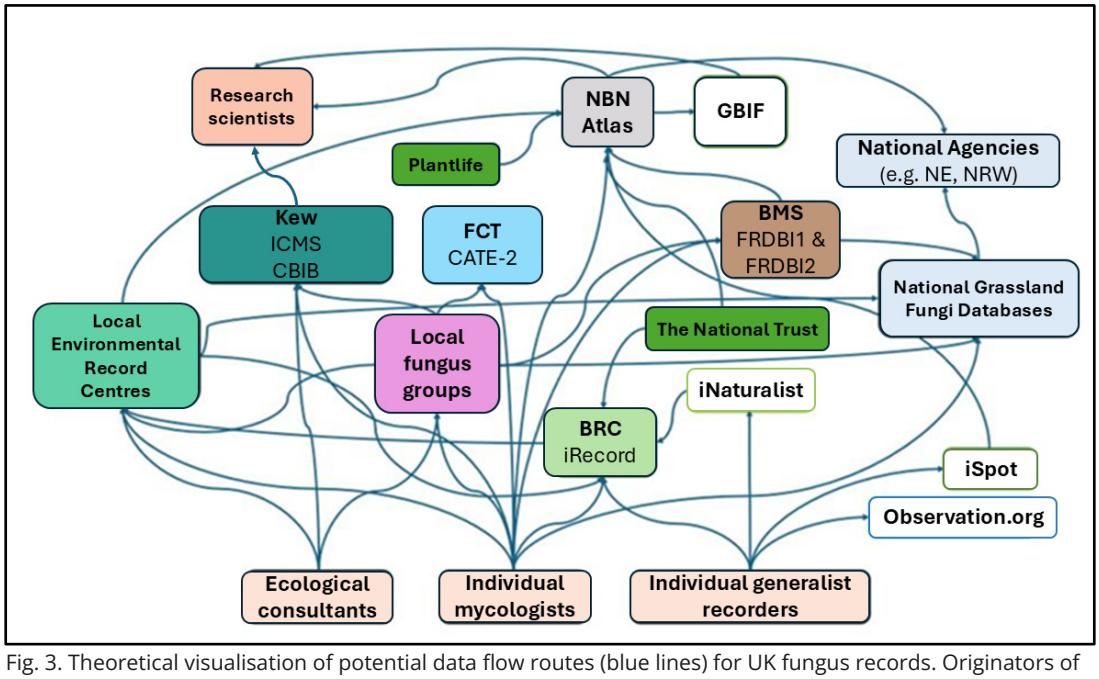

Fig. 3. Theoretical visualisation of potential data flow routes (blue lines) for UK fungus records. Originators of records located at the bottom. Note that no attempt has been made to illustrate the relative quantity of data shared by these different routes and additional routes between nodes may not be represented. Figure adapted from Amy *et al.* (2025).

BMS: the British Mycological Society (https://www.britmycolsoc.org.uk/).

BRC: the Biological Records Centre (https://www.brc.ac.uk/).

CATE-2: the fungus recording database of the Fungus Conservation Trust (https://cate.fungustrust.org.uk/public/).

CBIB: the Checklist of British and Irish Basidiomycota, maintained by Royal Botanic Gardens Kew (RBG Kew). Originally published in 2005 as a book and online database at https://basidiochecklist.science.kew.org/. That database is no longer maintainable and updates are now available at www.fungi.myspecies.info/content/checklists.

FCT: the Fungus Conservation Trust (https://www.fungustrust.org.uk/).

FRDBI: the Fungal Records Database of Britain and Ireland, managed by the British Mycological Society (https://www.frdbi.org.uk/).

GBIF: the Global Biodiversity Information Facility (https://www.gbif.org/).

ICMS: RBG Kew's Integrated Collection Management System, the modern successor to what FM readers may have known as HerbTrack (the Fungarium catalogue database of Kew Mycology).

iNaturalist: a website and global online community for sharing biodiversity observations (https://www.inaturalist.org/), based in the USA.

iRecord: a UK-based website for sharing biological records (https://www.brc.ac.uk/irecord/) operated by the Biological Records Centre as part of their work for the UK Centre for Ecology and Hydrology (UKCEH).

iSpot: a citizen science platform for biodiversity (https://www.ispotnature.org/) run by The Open University, based in the UK.

Local Environmental Record Centres (LERCs): not-for-profit organisations that collect, collate and manage information on the natural environment for a defined geographic area in order to provide various information products and services. (Find your LERC: https://www.alerc.org.uk/lerc-finder.html).

NBN Atlas: the UK's central repository of publicly available biodiversity data (https://nbnatlas.org/) managed by the National Biodiversity Network (NBN) Trust (https://nbn.org.uk/) on behalf of the NBN Network, a collaborative partnership created to exchange biodiversity information.

Observation.org: a global biodiversity platform for citizen science and monitoring (https://observation.org/) based in The Netherlands.

Plantlife: an environmental non-governmental organisation (NGO) working to protect wild plants and fungi (https://www.plantlife.org.uk/).

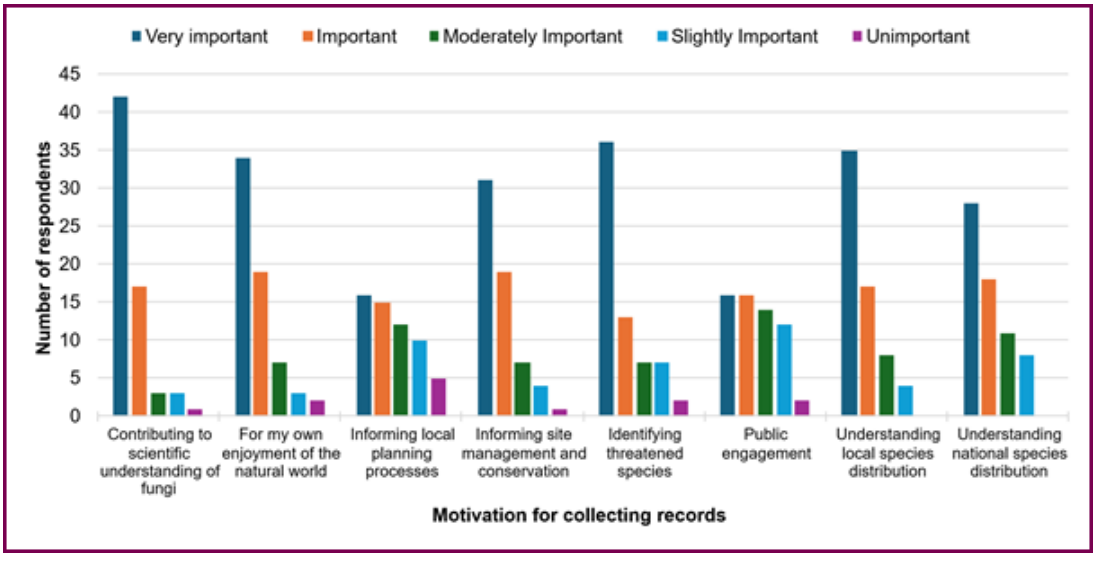

Fig. 4. Motivations for collecting fungus records. Reprinted from Amy *et al.* (2025).

Public Infrastructure Bill: the saga continues

Also in our first Fungal Futures column in FM 26(1) we voiced concerns about the dangers of the Public Infrastructure Bill. This new legislation, as it stands, will in places overwrite our nature law to allow developers to 'pay to pollute' and abandon the current protections given to our threatened habitats and species. Several sensible amendments to the Bill were passed to the Commons from the Lords to limit its scope, but all were rejected. This came in the same week that the influential Environment Audit Committee released its own assessment of the Bill and found that 'nature was not the blocker' to new housing (Environmental Audit Committee, 2025). EAC chair Toby Perkins MP commented that housing and sustainability targets "would not be achieved by scapegoating nature" before undermining the whole report and voting down all key amendments to protect nature.

The saga will continue for months yet, but when fungi already receive short shrift from statutory protections it is hard to see anything other than a trampling for them in the government's cavalcade of 'growth'.

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Call for records of rust and smut fungi

in support of GB Red-listing process

Paul A. Smith[1] & Matt Wainhouse[2]

Fungi have not been prominent in official Red Lists for Great Britain, and there is currently only one non-lichenised fungus group, the *Boletaceae*, that has a Red List officially approved and constructed in accordance with the IUCN Red-listing criteria (Ainsworth *et al.*, 2013). An earlier unofficial and provisional Red List (Evans, 2006) included rusts and smuts, but this is now very out of date. Natural England are currently supporting new Red List exercises for myxomycetes, grassland fungi and a revision and expansion of the bolete (*Boletales*) and lichen and lichenicolous fungi assessments. Now there is an opportunity to begin a process for rusts and smuts, and a small group is working to support this initiative.

One of the first steps is to collate all the existing distributional information. Some of this is already available in national and regional databases, and we expect to extract records from these sources and from iRecord and similar biological recording platforms. There is also information in published sources, and we will draw on these as resources allow for their extraction.

There are sure to be other sources of records which are not known to us or not so readily accessible, and we would like to include as many of these as possible in the data to form the basis of the assessments. There are several ways you can contribute your records:

- add them to FRDBI https://www.frdbi.org.uk/ —please use the CC-BY (or a less restrictive) licence so that they can be easily used for the Red-listing
- put them into iRecord https://irecord.org.uk/
- send them in some electronic form (spreadsheet, database, text file, document) to Paul Smith, pas.vc110@gmail.com. We can probably cope with nearly any format, but if they are in some proprietary software, then please check first, or export to something more standard
- we may be able to digitise a limited number of paper records. If your records are only in this form, and you are unable to add them to FRDBI/iRecord or similar, then please contact Paul to discuss (with a description of the format and an estimate of the number of records involved)

These are roughly in order of ease of access for us, so please choose the earlier options if possible. Whichever of these options you choose, it would be helpful if you could contact Paul to let him know what is happening and, if possible, a rough estimate of the number of records you may contribute. Do not include records that are *already* in the national databases.

We are interested in records for *all* rust and smut taxa, including common ones. The numbers and distribution of records for common species provide valuable information on the intensity of recording in these groups which can help to interpret the records of rarer species during the Red List assessment. Species that are (or have been) common in some areas may nevertheless be in overall decline. “Smuts” includes all the species that have been called smuts, including *Microbotryaceae* (now in the same subphylum as rusts) and *Entorrhizomycota* (now split off as a separate phylum). The taxonomy in use in Britain is currently in flux, with the recent publications of the Welsh Parasitic Microfungus Group (the latest overview of many groups is in Woods *et al.* (2025)) largely following the taxonomy of Klenke & Scholler (2015). This brings us into line with European taxonomy, but means that we will need to assign some records to species based on their host plants. So it is very important to include the host plant information with your records if you have it.

Although we are asking for records for Red List assessment, we would like them to be available for wider use, including (for example) the production of distribution maps, so please donate records for general scientific study. For the same reason we would also be interested in records from the island of Ireland, from the Isle of Man and the Channel Islands even though they are outside the geographical scope of the Red List exercise. If there is a need to protect site information for very rare species, then we can handle that.

It would be helpful if you could process your records by the end of January 2026. The absolute cut-off date for records to be used in the Red-listing project will be 31 March 2026. Thank you in advance for your help.

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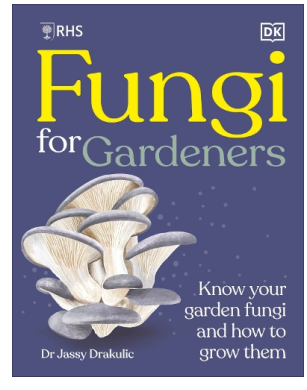
Book review

RHS Fungi for Gardeners

Dr Jassy Drakulic

Illustrated by Amy Child and Rose Holman

Dorling Kindersley (DK) October 2025
ISBN 9780241785812
Hardback 144 pp.
£12.99 from most booksellers



I work as a gardener in a woodland garden in Sussex, but I have been an amateur naturalist for much longer and I know enough about fungi to get by. Having a foot in each camp, so to speak, I would say that today the majority of gardeners are well aware of fungi and the ways they are beneficial in a garden, and a smaller number will be actively interested in field mycology, like me. Undoubtably, there will still be a lot of gardeners, especially among those who work in very formal or intensively managed gardens, who are only aware of fungi as pest species that damage crops or kill woody plants. So, it is great to see this book, from the RHS no less, pushing a pro-fungi stance in gardening—something that is long overdue.

Dr Jassy Drakulic sets out the purpose of the book early on '…this book aims to explain what fungi are, what they do, and how to work with them to get the best from your garden.' So it is established that this is very much an introduction to fungi, purely in a garden setting, and assuming the reader has little to no prior knowledge of fungi outside of a few pest species. The members of the BMS are definitely not the target audience, and I admit that the book is set at a slightly lower level than I had expected. When the book starts off explaining, clearly and succinctly I must add, the basics of what a fungus is—I did have to reset my expectations. I do feel, and this is not the fault of the author, that this RHS book aimed at professional gardeners is assuming a very low level of fungi knowledge in the reader and that does come across as somewhat patronising.

But there's a lot to like here, and overall I was impressed by the book—Dr Drakulic has a knack for taking a very complex topic which is inherently loaded with specialist jargon and making it very accessible to practically anyone, in a manner that is clear, precise and informative. As you would expect from a DK publication, the book is amply illustrated throughout with helpful photographs, diagrams and superb artwork by Rosie Holman

which really complement the text and give the whole book a feel of quality.

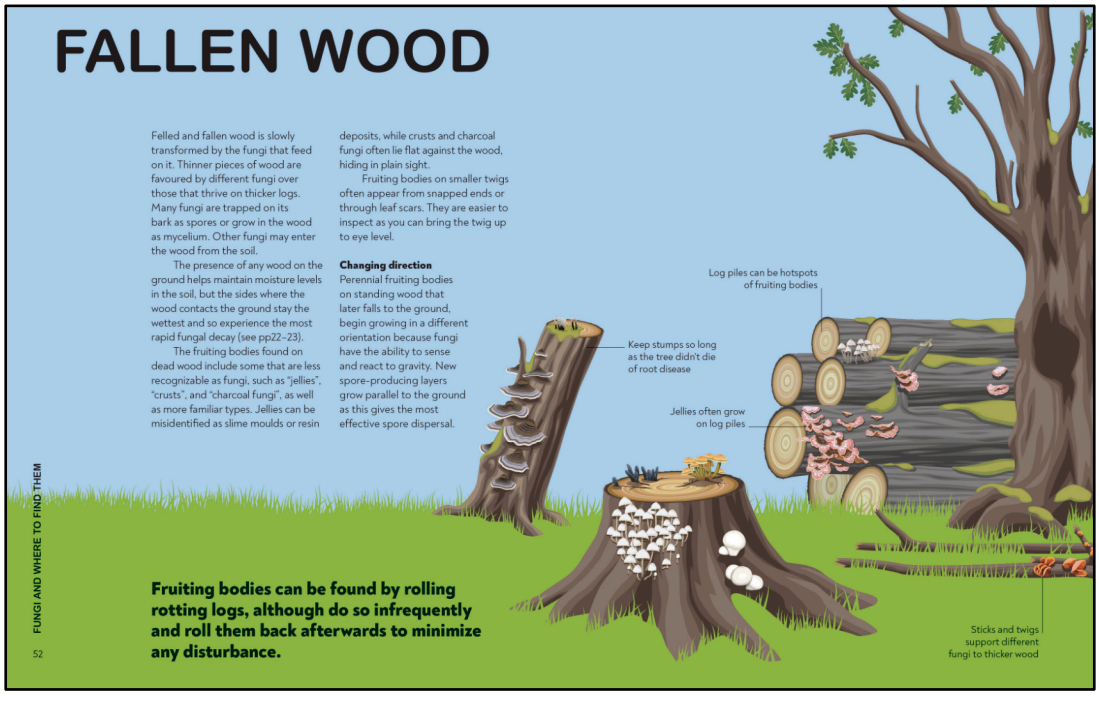
The central part of the book breaks down the garden into fungal habitats, with example fungi for each, in the manner of a science textbook—this establishes that fungi are not just found in dead wood but are integral to all elements of the garden. Woodchip, heartwood, dead trees, fallen wood, leaf litter, grass, soil and mycorrhizal associations all get a chance to shine and the text constantly emphasises the importance of dead material and not being too neat and tidy, which is great. This is what we want to see from the RHS—taking a clear change of direction and championing leaving dead wood and leaves, no-dig methods, low or no fertiliser or other artificial inputs (including highly questionable mycorrhizae soil additives) and promoting the many and varied benefits of wild, native fungal organisms.

It does bring up pathogenic fungi, mainly Honey Fungus *Armillaria mellea*, in fact I lost count of the number of times throughout the book that *Armillaria* was name-dropped—it felt like every few pages! This is presumably because the book is coming from the assumption that most gardeners are only familiar with fungi through the lens of *Armillaria* killing garden plants. The book at least offers some sensible, practical methods of managing pathogens and does at no point recommend use of chemicals—instead suggesting that a healthy garden ecosystem full of healthy plants and healthy fungi is the best defence.

Perhaps to make the book appeal more to gardeners who manage allotments, smallholdings or a kitchen garden there is a whole section at the end of the book about cultivating edible mushrooms in the garden. It is quite informative, and thankfully is clear about the dangers of growing non-native prolific strains of fungi outdoors—it should certainly pique a gardener's interest in growing mushrooms to eat. However, most of these methods are a bit out of reach for the average Joe to attempt in their back garden and seems more aimed at professionals—yet, if I were to start cultivating oysters or morels I would probably just buy a dedicated, much more detailed book on the subject as this is clearly only an introduction. I wouldn't promote this book solely as a guide to mushroom cultivation: its strengths lie elsewhere.

I would genuinely recommend this book to any gardener who is at the very start of their interest in fungi, and it would make an excellent Christmas present for a friend or family member who is into gardening but otherwise has no interest in kneeling in a wet field in October looking at *Entoloma* species through a hand lens. It would in fact benefit the world greatly if everyone had at least the amount of knowledge of fungi that this book gives you by the time you've finished reading it.

Elliot Chandler



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