

Fungal Futures: Conservation news and views

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Concerns for fungi in the Planning and Infrastructure Bill

We have a lot to learn in writing fungal news for a quarterly journal, but even more in political commentary. When the inaugural Fungal Futures column was written in January, the political rhetoric was only just beginning to position nature—particularly bats and Great Crested Newts—as impediments to growth and development (Wainhouse & Wright, 2025). By the time *Field Mycology* Volume 26(1) went to print in April, the narrative had sharpened.

In the intervening weeks, the UK Government published the Corry Review into environmental (de)regulation (Corry, 2025) and introduced a new Planning and Infrastructure Bill for England (2025). Now at the centre of widespread concern, Part III of this Bill proposes the creation of a Nature Restoration Levy: a mechanism that would allow developers to make financial contributions in lieu of conducting site-specific ecological assessments and delivering bespoke mitigation (i.e. actions to reduce harm) for species. The model is intended to fund broader conservation work elsewhere. However, this marks a fundamental policy shift where developers can ‘buy out’ of environmental regulation in a move away from the principle of “polluter pays” and towards “pay to pollute.” With the benefit of hindsight, those early swipes at bats and newts seem less like isolated outbursts and more like a poorly orchestrated PR effort to soften the ground for this deregulatory agenda—casting nature as a barrier to economic growth rather than a public good in need of safeguarding.

While the Bill has serious implications for all biodiversity, it is particularly troubling for fungi given their historically marginal status in planning and conservation processes. Leading figures from the conservation, ecology and scientific community—including Prof. Sir John Lawton (author of *Making Space for Nature*), Sir Partha Dasgupta (author of *The Economics of Biodiversity*), Dr Tom Tew (former Chief Scientist, Natural England) (RSK Wilding, 2025), and the Office for Environmental Protection (2025)—have all expressed concern that the Bill weakens existing protections.

Although fungi have rarely been the focus of ecological impact assessments, progress has been made in recent years. Developers, when prompted, do now occasionally include fungi in survey work. These assessments have led to mitigation in select cases, particularly for rare or threatened species and assemblages. Under the new proposals, however, this site-specific consideration would no longer be required, raising the likelihood that fungi will be entirely overlooked.

Many of our rarest fungal species are highly localised, under-recorded, and ecologically specialised. Their survival often depends on ancient substrates and soils, old-growth habitats, or specific host species—conditions that cannot be recreated or offset through generic habitat creation schemes. The proposed system would remove the need for expert-led, detailed field surveys. This presents a clear risk: sites hosting rare or threatened fungi could be developed without their presence ever being recorded, let alone protected. It would significantly undermine progress toward national targets to reduce extinction risk and halt biodiversity loss.

As of early June 2025, the Bill has passed its second reading and committee stage in the Commons (Planning and Infrastructure Bill Committee Stage, 2025). Efforts to amend the legislation have so far been rebuffed. Notably, the government rejected proposals that would:

- Uphold the ‘mitigation hierarchy’, which is the longstanding principle that requires developers to avoid harm first and only cause and compensate for it as a last resort;
- Exclude irreplaceable habitats like ancient woodland from the levy scheme;
- Clarify when and how conservation measures should be implemented, and ensure they actually deliver for nature.

Ministers have argued these changes would reduce “flexibility” and point to protections already present elsewhere. That may be technically correct but the government’s resistance to even modest, reasonable safeguards raises eyebrows. Especially worrying is the Bill’s own impact assessment, which concedes there is “very limited data on how environmental

obligations affect development,” and also concludes that current regulations are sufficient to meet the need of the Bill (Planning and Infrastructure Bill, Annex 10: Nature Restoration Fund, 2025). Concerned? Might be worth contacting your MP.

Global Fungal Red List passes the 1000 milestone

In March this year, global fungal Red Listing took a significant step forward with the publication of 482 new assessments (IUCN 2025), bringing the total to 1,318 species (including 134 lichenised fungi). This is more than double the number assessed in 2022, and marks a hard-earned milestone achieved over the past decade (IUCN 2025). Notably, 411 of these species are now recognised as vulnerable, endangered, or critically endangered, with a further 110 listed as near threatened. This vital work is supported by The Global Fungal Red List Initiative (2025) and a dedicated network of conservation mycologists from around the world.

The threats to fungi are shared across continents, and the main drivers are the same ones we’re facing here in the UK. Of the species assessed globally, 279 are threatened by agricultural and urban expansion, 91 by fertiliser run-off and pollution, 198 by deforestation, and 50 more by climate-driven changes in forest fires (IUCN 2025).

As we’re all too aware, fungi lag far behind other taxonomic groups when it comes to conservation attention and knowledge of diversity. And while this recent Red Listing work is excellent and often arduous, there’s still a huge gap in the number of species assessed. For context: to date, 93,351 animals (including 64,411 vertebrates and 28,940 invertebrates) and 74,751 plants have been assessed, dwarfing the 1,318 fungi (IUCN 2025). Based on the number of currently described species, the underrepresentation becomes even clearer: 84% of vertebrates, 18% of plants, 2% of invertebrates, and just 0.8% of fungi. And that’s based on the estimated 162,521 known fungal species—if we were to extrapolate even to more conservative diversity estimates of two million fungal species globally, the gap would be even more dramatic.

Seventy-seven of the globally threatened species occur in the UK, that means one in eight of the assessed globally threatened species occur here (Fig. 1). Perhaps most significantly, nearly half of these (37) are found in unimproved grasslands,

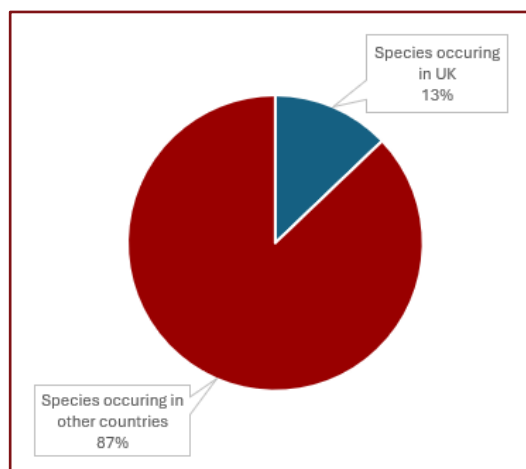


Fig. 1. Percentage of globally Red Listed species occurring in the UK. Seventy-seven of 521 globally species assessed as Near Threatened to Critically Endangered occur in the UK.

reinforcing the global importance of this assemblage. Some of these grassland species are fungi we, as field mycologists, might consider fairly common in the UK, such as *Hygrocybe intermedia* (Fig. 2) or *H. quieta*. However, they are assessed as vulnerable due to the serious global decline of their habitat from anthropogenic pressures. Even here in the UK, where these species might be more frequently encountered, we



Fig. 2. *Hygrocybe intermedia* is globally assessed as Vulnerable. Photograph © Rich Wright.

have seen a historic loss of 97% of lowland meadows—and the fungi that rely on them—just in the period 1930–1984 (Fuller 1987), as a result of land-use change. Even now, unimproved grasslands continue to be lost to agriculture, development and tree planting schemes that often proceed without baseline fungal surveys. This highlights the UK's global responsibility for this habitat and its fungal communities, and the urgent need to further formalise their protection.

There are other globally threatened species that will be familiar to those involved in UK fungal conservation efforts, such as Oak Polypore (*Buglossoporus quercinus*) and some of the stipitate hydroids (*Sarcodon*, *Hydnellum*, *Phellodon* spp.) that feature in Site of Special Scientific Interest (SSSI) assemblages (Bosanquet *et al.* 2018). Others appear on priority species lists for the devolved nations, including Orchard Tooth Crust (*Sarcodontia crocea*), Marsh Honey Fungus (*Desarmillaria ectypa*), and Fragile Amanita (*Amanita friabilis*). But there are also some globally threatened species not yet reflected in UK conservation lists or habitat assemblages, such as Wrinkled Peach (*Rhodotus palmatus*, Fig. 3) or Hoary Rooting Shank (*Paraxerula causseii*), among others.

These global Red List assessments add important weight to our understanding of species found in the UK, providing extra leverage when advocating for the protection of sites and species, and highlighting where priorities should be. This is especially valuable for fungi that currently lack a formal UK Red List status, and it also helps reinforce the case for those already recognised in UK conservation frameworks.



Fig. 3. *Rhodotus palmatus*, a familiar species in the UK, is Near Threatened globally. Photograph © Rich Wright.

Review of fungal assemblages in Welsh SSSIs highlights gaps in the protected sites network

An important but previously unreported development in fungal conservation deserves attention. In December, Natural Resources Wales (NRW) published a review of fungal representation within Sites of Special Scientific Interest (SSSIs) across Wales (Bosanquet, 2024).

The report, authored by Sam Bosanquet, NRW's Specialist Advisor for Bryophytes, Lichens & Fungi, is the first country-level evaluation of existing SSSIs to determine which sites would currently qualify for SSSI selection using the fungal assemblages and threshold values listed in the SSSI Guidelines (Bosanquet *et al.*, 2018). A site reaching the required threshold for one or more assemblage (usually a certain number of species present) can be proposed for designation as a SSSI. Upon designation, which can be a lengthy process and is not guaranteed, the qualifying assemblage(s) are then listed among the “notified features” of the site and can be legally protected.

Drawing heavily on field mycological data from the fungal records database of Britain and Ireland (FRDBI) and using five fungal assemblage types, the Welsh review found that 64 existing Welsh SSSIs had at least one qualifying fungal feature present. However, fungi are only listed as a “notified feature” in NRW's databases for 12 of these sites, underscoring a persistent underrepresentation of fungal interest in statutory site designation. The majority of the qualifying fungal features are based on site assessments using the grassland fungal assemblage (47 sites). The other assemblages used in the review were of oak deadwood fungi (4 sites), stipitate hydroids (3 sites), dune fungi (13 sites) and alder carr fungi (3 sites), the last of which were assessed using a provisional scoring system (Aron, 2019). The review went on to identify a further 129 sites with qualifying fungal features that currently fall outside any SSSI boundaries where they receive little or no protection. This finding points to a significant shortfall in coverage, with many valuable fungal sites vulnerable to degradation or loss.

The SSSI network was designed to represent and protect the best examples of Britain's natural heritage. Yet, as this report clearly shows, fungi remain severely underrepresented within that system. While assemblages within SSSIs designated for their non-fungal features may

receive some protection from changes in land use, site management for those other features may inadvertently harm fungal communities unless their importance is recognised by land managers.

Perhaps even more concerning is the number of high-value grassland fungi sites that lie, unprotected, beyond the boundaries of the SSSI network altogether—a pattern echoed in the other UK nations.

The review also draws attention to sites where the presence of one or more threatened fungal species (assessed on global and/or national scales) would qualify as fungal features in their own right. Particularly notable is the report's frank appraisal of the current impasse in fungal red-listing within Great Britain, including the risks of relying on unratified Red Lists. The findings add to the growing consensus that a revised and authoritative approach to fungal red-listing is urgently needed to inform and support statutory conservation decisions.

This review marks an important step forward in identifying priority areas for fungal conservation within Wales—an approach that could be replicated elsewhere in the UK—and reinforces the need for consistent recognition of fungal biodiversity across UK conservation frameworks.

References

Aron C.E. (2019). Survey of alder woodland fungi in North West Wales, NRW Evidence Report 319, 49 pp. Natural Resources Wales, Bangor.

Bosanquet, S. (2024). A review of non-vascular plant and fungal SSSI features in Wales - Fungi. NRW Evidence Report 370.

Bosanquet, S., Ainsworth, A. M., Cooch, S. P., Genney, D. R., & Wilkins, T. C. (2018). Guidelines for the Selection of Biological SSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 14 Non-lichenised Fungi. JNCC. Available at: <https://hub.jncc.gov.uk/assets/d1fcb171-8086-4f5b-ade5-a34c5edc78c5>

Corry, D. (2025). Delivering economic growth and nature recovery: an independent review of Defra's regulatory landscape. <https://www.gov.uk/government/publications/delivering-economic-growth-and-nature-recovery-an-independent-review-of-defras-regulatory-landscape>

Fuller, R.M. (1987). The changing extent and conservation interest of lowland grasslands in England and Wales: A review of grassland surveys 1930–1984. *Biological Conservation* 40(4). Available at: <https://www.sciencedirect.com/science/article/abs/pii/0006320787901212> [Accessed: 4 June 2025].

IUCN. (2025). First 1,000 fungi on IUCN Red List reveal growing threats. Available at: <https://iucn.org/press-release/202503/first-1000-fungi-iucn-red-list-reveal-growing-threats-iucn-red-list> [Accessed: 4 June 2025].

IUCN. (2025). IUCN Red List Summary Statistics. Available at: <https://www.iucnredlist.org/resources/summary-statistics> [Accessed: 4 June 2025].

Office for Environmental Protection. (2025). Office for Environmental Protection to The Rt. Hon. Angela Rayner MP, 2 May 2025. Office for Environmental Protection.

Planning and Infrastructure Bill. ANNEX 10: Nature Restoration Fund, 1 (2025). <https://www.gov.uk/government/publications/planning-and-infrastructure-bill-impact-assessment>

Planning and Infrastructure Bill (2025). <https://www.gov.uk/government/publications/the-planning-and-infrastructure-bill>

Planning and Infrastructure Bill Committee Stage (2025). <https://bills.parliament.uk/bills/3946/stages/19795/amendments>

RSK Wilding. (2025). RSK Wilding and Others to Members of Parliament, 24 April 2025. <https://www.rskwilding.com/wp-content/uploads/2025/04/250424-letter-to-mps-from-economists-and-ecology-experts-planning-bill-nature-restoration-levy-a-licence-to-kill-nature.docx-1.pdf>

The Global Fungal Red List Initiative. (2025). The Global Fungal Red List Initiative. Available at: <https://redlist.info/en/iucn/welcome> [Accessed: 4 June 2025].

Wainhouse, M., & Wright, R. (2025). Fungal Futures: Conservation news and views. *Field Mycology*, 26(1): 30–32.

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