# Scientists reveal UK farming could be transformed by hidden Epichloë fungus



Scientists at The James Hutton Institute have recently unveiled promising insights into a little-known fungus, Epichloë, which resides dormant within common grasses. As UK farmers grapple with the paradox of rising agricultural pressures and declining resources, this endophytic fungus may emerge as a game-changer, offering potential solutions to several persistent challenges.

Epichloë is celebrated for its capacity to enhance plant resilience against pests and environmental stresses. According to Lorena Rangel, a plant pathologist at the Institute, “Once inside the plant, Epichloë acts like a built-in shield, helping the plant tolerate stress, resist disease, and even deter pests, all without repeated spraying.” This mechanism greatly aligns with the trends in sustainable agriculture, which increasingly favour reduced chemical use to protect both ecosystems and soil health. The fungus achieves these benefits not through grains of chemical but rather through the production of natural alkaloids—substances that bolster plants’ defensive qualities against pest invasions and diseases.

In countries such as New Zealand and the United States, farmers have harnessed specific strains of Epichloë in pasture management to produce robust grasslands while simultaneously safeguarding livestock and crops. Despite its current absence from the UK’s commercial farming landscape, Epichloë has been positively identified in native wild grasses, suggesting untapped potential for cultivation.

UK farmers, while traditionally shielded from severe insect threats and livestock diseases, must now confront new agricultural realities exacerbated by climate change. With increasingly erratic weather patterns and the diminishing efficacy of conventional pesticides, there is a growing impetus to explore alternative pest management strategies. The emergence of Epichloë could be particularly transformative for cereal crops such as wheat, barley, and oats—crops that collectively underpin a £4 billion contribution to the UK economy.

Research reveals that the endophytic fungus could effectively enhance both drought resistance and overall plant productivity. Studies indicate that Epichloë can stimulate growth-promoting hormonal pathways, thereby eliminating the growth–defence trade-off typically seen in plants. This dual benefit—promoting growth while enhancing defence mechanisms—positions Epichloë as a potentially vital tool in modern crop management.

A closer look into its implications reveals that incorporating Epichloë could amplify soil health by fostering beneficial microbial communities. Evidence suggests that grasses infected with this endophyte lead to a more favourable soil fungal and bacterial composition, which can contribute positively to overall plant health and agricultural sustainability.

But the road to commercialisation remains fraught with obstacles. Currently, the UK lacks seed lines infected with Epichloë, and discussions around its potential must contend with a backdrop of conservative agricultural practices and historical reliance on chemical solutions. However, a shift towards sustainable farming practices could prompt a re-evaluation, allowing for natural solutions such as Epichloë to take centre stage.

As farmers and researchers unite to tackle the challenges posed by changing climates and pest invasions, the integration of Epichloë offers a compelling narrative of hope. With appropriate research, collaboration, and field trials, this hidden fungus could redefine agricultural practices across the UK, transforming threats into opportunities.

### Reference Map

1. Article [[1]](https://www.agcc.co.uk/news-article/could-a-hidden-fungus-be-the-future-of-uk-farming)
2. Article [[2]](https://www.cabidigitallibrary.org/doi/10.1079/planthealthcases.2025.0002)
3. Article [[3]](https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.17335)
4. Article [[4]](https://www.mdpi.com/2309-608X/6/4/322)
5. Article [[5]](https://www.mdpi.com/2075-4450/15/10/744)
6. Article [[6]](https://www.maxapress.com/article/doi/10.48130/GR-2021-0007)
7. Article [[7]](https://www.publish.csiro.au/cp/fulltext/CP23149)

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## Bibliography

1. <https://www.agcc.co.uk/news-article/could-a-hidden-fungus-be-the-future-of-uk-farming> - Please view link - unable to able to access data
2. <https://www.cabidigitallibrary.org/doi/10.1079/planthealthcases.2025.0002> - This article discusses the distribution, potential commercial adoption, and possible impacts of the endophytic fungus Epichloë in UK pasture grasses and cereals. It highlights the benefits of Epichloë, such as increased plant vigor and yield through mechanisms like alkaloid production, which enhances resistance to pests and diseases. The article also addresses the absence of Epichloë-infected seed lines in the UK market and suggests that, despite the lack of immediate need, Epichloë remains a promising avenue for research to mitigate pesticide loss, climate change effects, and novel pest introductions in UK agriculture.
3. <https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.17335> - This study examines how Epichloë endophytes can eliminate the growth–defense trade-off in plants. It proposes that the presence of Epichloë endophytes stimulates plant growth by activating hormonal signaling pathways associated with growth, while also producing antiherbivore alkaloids that enhance plant resistance. The research suggests that Epichloë can simultaneously promote plant growth and defense mechanisms, providing a dual benefit to host plants.
4. <https://www.mdpi.com/2309-608X/6/4/322> - This article explores the role of Epichloë fungal endophytes in enhancing the resilience and performance of ryegrass and fescue pastures. It discusses how Epichloë endophytes can improve plant establishment, growth, survival, tillering, and seed production. The study also highlights the interaction between Epichloë and host plant genotypes, influencing growth rates and productivity, and notes that Epichloë can help maintain photosynthesis mechanisms under stress conditions like zinc stress.
5. <https://www.mdpi.com/2075-4450/15/10/744> - This research evaluates the effects of Epichloë fungal endophytes in perennial ryegrass on the feeding behavior and life history of the bird cherry-oat aphid (Rhopalosiphum padi). The study finds that Epichloë endophytes protect plants from insect herbivory by producing bioactive alkaloids, such as peramine and loline alkaloids, which deter feeding and can be toxic to insect pests. The article also notes that while some alkaloids produced by Epichloë can be harmful to livestock, the focus is on their role in insect deterrence.
6. <https://www.maxapress.com/article/doi/10.48130/GR-2021-0007> - This article examines the impact of Epichloë endophytes on the drought tolerance of various cultivated and native temperate grasses. It presents a table summarizing the effects of Epichloë on drought tolerance across different grass species, highlighting physiological and structural changes in host plants in response to drought stress. The study emphasizes the potential of Epichloë to enhance drought resilience in grasses, which is particularly relevant given the challenges posed by climate change.
7. <https://www.publish.csiro.au/cp/fulltext/CP23149> - This study investigates the effects of plant extended phenotypes, specifically Epichloë-infected grasses, on soil fungal and bacterial communities. The research finds that soils with endophyte-infected grasses exhibit altered compositions of associated fungal and bacterial communities, including a reduced abundance of detrimental Ascomycota fungi and an increased abundance of beneficial Glomeromycota fungi. These findings suggest that Epichloë endophytes may influence soil microbial communities, potentially affecting soil health and plant growth.