New fungus is the oldest disease-causing species found to date

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Artistic rendition of the Rhynie Chert in the Early Devonian period. Credit: Victor O. Leshyk

The earliest disease-causing fungus has been discovered within the Natural History Museum's fossil collections. The new fungal plant pathogen, Potteromyces asteroxylicola, which is 407-million-years-old,

has been named in honor of celebrated Tales of Peter Rabbit author, and fungi enthusiast, Beatrix Potter.

The paper, "A fungal plant pathogen discovered in the Devonian Rhynie Chert," has been published in *Nature Communications*

Beatrix's drawings and study of the growth of fungi, which were in some cases decades ahead of scientific research, have garnered her a reputation as a significant figure in mycology.

Potteromyces was discovered in fossil samples from the Rhynie Chert, a crucial geological site in Scotland. The site is known for a remarkably preserved Early Devonian community of plants and animals, including bacteria and fungi.

The new study, completed in collaboration with mycologists at the Royal Botanic Gardens, Kew, suggests that disease-causing fungi, such as ash die-back currently decimating the UK's native ash trees, and fungi which can circulate nutrients that plants and other organisms depend on to survive, have a historical precedent in Potteromyces.

Dr. Christine Strullu-Derrien, Scientific Associate at the Natural History Museum and lead author of the study describing the new species, says, "Although other fungal parasites have been found in this area before, this is the first case of one causing disease in a plant. What's more, Potteromyces can provide a valuable point from which to date the evolution of different fungus groups, such as Ascomycota, the largest fungal phylum."

"Naming this important species after Beatrix Potter seems a fitting tribute to her remarkable work and commitment to piecing together the secrets of fungi."

Christine found the first Potteromyces specimen in 2015. Its reproductive structures, known as conidiophores, had an unusual shape and formation unlike anything seen before.

Equally unusual was the fact this mysterious fungus was found attacking an ancient plant called Asteroxylon mackiei. The plant had responded by developing dome-shaped growths, showing that it must have been alive while the fungus making its attack.

In order for the team to determine that it was indeed a new species, another case of the fungus needed to be found. This is due to the nature of fungi differing greatly between individuals.

The confirmation was achieved when a second specimen was found in the collections of the National Museums of Scotland in another specimen slide from the Rhynie Chert.

"New technology available to us, such as confocal microscopy, has enabled us to unlock more secrets from fossils housed in museum collections, such as those within the Natural History Museum," said Christine.

"When I first started work on the Rhynie Chert, it was only meant to take two or three years," Christine says, "It's now been 12, and I still think there is a lot to discover from this fabulous site.

More information: Christine Strullu-Derrien et al, A fungal plant pathogen discovered in the Devonian Rhynie Chert, *Nature Communications* (2023). DOI: 10.1038/s41467-023-43276-1

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