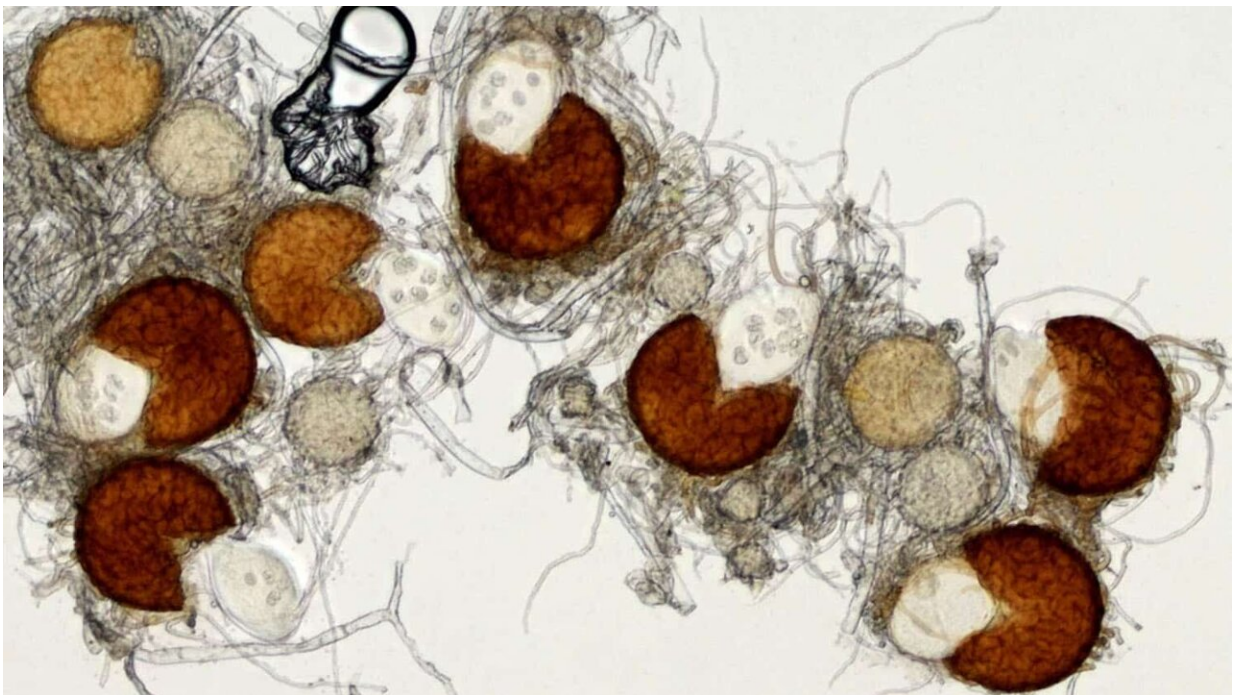


Strawberries crossed oceans—and walked straight into an ambush already waiting underground

May 11 2026, by Matt Shipman



Microscopic image of the fungus powdery mildew that infects strawberries. The round structures are survival structures that help the fungus survive over the winter. In this image, these structures are releasing sac-like bodies that contain the spores. Fine, thread-like filaments surrounding them help the structures attach to the plant. Differences in color reflect different stages of development. Credit: Image by Andrew Paul.

Plant diseases often arise when the pathogens that cause disease are introduced into new territories where native plants don't recognize the pathogen and therefore may have minimal defenses against it. But there's another option.

How often does the reverse happen: a plant gets introduced into areas where the pathogen already lurks in the soil—targeting other plant hosts native to the area—and then "jumps" to infect the newly introduced plant?

A new finding regarding strawberries and raspberries encumbered with [powdery mildew](#) disease in North America, Europe and Asia suggests the latter happens more frequently than we thought.

The study pinpoints the ancestral history of powdery mildew disease caused by different but related fungi. The findings could aid the understanding of how plant diseases arise.

The paper, "[Global Crop Introduction Drives Host Jumps, Turning Native Pathogens into Emerging Diseases](#)," appears in *Proceedings of the National Academy of Sciences*.

"We have this general idea that a pathogen originates in one spot, and then it spreads throughout the world. But what we're showing here is that's not always the case," said Michael Bradshaw, assistant professor of plant pathology at NC State and corresponding author of a paper describing the research.

"What happened in this case is that the pathogen co-evolved on one host pretty closely related to strawberries or raspberries over millions and millions of years, and then when strawberries or raspberries were introduced to the same area, the pathogen jumped hosts."

As its name suggests, powdery mildew disease causes a white, powdery substance to cover host plants, stealing nutrients and retarding photosynthesis while keeping the host alive. Different species of this fungus affect different plants; wheat, hops, grapes and blueberries, among other plants, have been detrimentally affected by powdery mildew.

In the study, Bradshaw and his colleagues examined historic and modern plant leaves plagued by powdery mildew. The collection included 70 samples from North America and Europe; some were more than 100 years old.

The researchers performed genetic testing on fungal samples to trace the history and spread of powdery mildew disease. In North American samples, the powdery mildew *Podosphaera shepherdiae* infects strawberries, while in Europe and Asia a related but different powdery mildew, *Podosphaera fragariae*, plagues strawberries.

"If you're looking under the microscope at these pathogens, the one that infects strawberries in North America looks very different from the one that infects strawberries in Europe," Bradshaw said. "To date, the powdery mildew from Europe still hasn't been found in North America, and vice versa. So that's kind of like the smoking gun: It's not one pathogen spreading throughout the world. These pathogens seem to be already present in these different places."

The study also used molecular clock techniques to show that these two powdery mildew pathogens affecting strawberries on different continents split off from each other more than five million years ago.

Both North American and European powdery mildew pathogens infect plants in the rosaceous family, which includes flowering plants related to roses, strawberries, raspberries, peaches and pears, among others.

"These two pathogens were actually described over a hundred years ago, one of which was described on a plant native to North America," Bradshaw said.

Bradshaw believes these findings—showing that pathogens can jump from a native plant to a newly introduced plant—can be generalized to most plant pathogens.

He also predicts these pathogens will eventually spread in a more traditional way—by traveling on plant material brought across the Atlantic Ocean—and attempt to live and thrive on a new continent.

"Will these two different organisms mate with each other? Will they infect strawberries more when they're both on the plant? Or will they compete with each other for the host's resources and cancel each other out?"

Bradshaw also plans to study more about the powdery mildew on wine grapes and wheat, two important crops affected by other powdery mildew species.

More information: Bradshaw, Michael, Global crop introduction drives host jumps, turning native pathogens into emerging diseases, *Proceedings of the National Academy of Sciences* (2026). [DOI: 10.1073/pnas.2536984123](https://doi.org/10.1073/pnas.2536984123).
www.pnas.org/doi/10.1073/pnas.2536984123

Provided by North Carolina State University

Citation: Strawberries crossed oceans—and walked straight into an ambush already waiting underground (2026, May 11) retrieved 11 May 2026 from

<https://sciencex.com/news/2026-05-strawberries-oceans-straight-ambush-underground.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.