

Expert helps solve 80-year mystery, as team identifies fungus killing Torreya trees

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Jason Smith, an associate professor with the University of Florida's Institute of Food and Agricultural Sciences, poses with a wild Florida Torreya tree at Torreya State Park in Liberty County, Fla., in this undated file photo. Smith is part of a research team that identified a pathogen responsible for killing adult Torreya trees since the 1930s. The culprit is a fungus, which the team described in a recent issue of the journal *Mycologia*. Credit: Adam Black

(Phys.org)—An 80-year search for a tree killer has ended, says a University of Florida forest pathologist who helped identify the fungus that virtually wiped out the Florida Torreya and fears it may threaten other species.

The [fungus](#) infects more than 90 percent of wild Florida Torreyas in

their native range, which covers parts of North Florida and South Georgia close to the [Apalachicola River](#), said Jason Smith, an associate professor with UF's School of [Forest Resources](#) and Conservation, part of the Institute of Food and [Agricultural Sciences](#).

Smith is part of a research team that discovered the fungus, *Fusarium torreyae*, and formally described it in the journal *Mycologia*. Personnel from Atlanta Botanical Garden and the state [Department of Environmental Protection](#) are also involved.

"Over the years, the most common hypothesis was that a disease was killing *Torreyia*," Smith said. "But nobody had pinned down the cause until now. Now we hope to use this information to conserve the species and make some progress toward re-establishing the tree in its native range."

The Florida *Torreyia* is a primitive evergreen related to pines and firs. Once logged for its rot-resistant wood, the tree began dying off in the 1930s. Today, it's one of the world's rarest [tree species](#), found primarily in *Torreyia* State Park in Florida's Liberty County.

Though all adult Florida *Torreyas* are gone, the species may continue to survive in the wild in a stunted form. Many of the remaining *Torreyia* stumps send up healthy young shoots that survive until the fungus infects and kills them, usually about the time the shoots are 3 feet tall. A mature Florida *Torreyia* tree can be 75 feet tall.

A few of the wild specimens are disease-free, and Smith says one of the research team's priorities is to conduct [genetic testing](#) to determine whether those trees possess natural resistance to the fungus. If so, it may be possible to induce resistance in other Florida *Torreyas* through conventional breeding or other means.

The team is also raising healthy Florida Torreya from seed. Some are being returned to the wild, but their prospects are uncertain. After extensive surveying, the researchers concluded that the fungus is present throughout the tree's native range.

To give those transplanted specimens a fighting chance, the researchers carefully select and prepare planting sites, amending soil and removing vegetation that might compete for sunlight.

"There's some hope," Smith said. "If we can reduce the stress on the tree by growing it under different conditions, we might be able to boost its [natural resistance](#) to the fungus."

The team also plans to analyze the fungus and investigate ways to manage it. Researchers believe the pathogen is not native to the United States, but determining its origins could be difficult. The *Fusarium* genus is large and widely distributed around the globe, and scientists believe many species remain undetected in their natural habitats.

If the fungus' natural habitat is found, researchers may be able to pinpoint natural enemies useful in controlling the disease.

Ironically, Smith's biggest concern about the fungus doesn't even concern the Florida Torreya tree. He's afraid it will infect Fraser fir and red spruce trees, economically important species shown to be highly sensitive to the fungus.

Those trees grow in the Appalachian Mountains, several hundred miles north of the Florida Torreya's native range. In theory, they should be safe. However, a group of environmental activists has been raising Florida Torreya trees and planting them in the wild, including parts of Georgia, North Carolina and Tennessee.

The activists say they believe the species was once native to the Southern Appalachian Mountains and want to re-establish it there. But Smith is worried they'll end up introducing the fungus.

"Almost all the cultivated *Torreya* trees we've seen have been infected," he said. "So we're concerned that one of these *Torreya* being planted in the Appalachians could end up leading to infection of spruce and fir [trees](#). The consequences could be disastrous."

Provided by University of Florida

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