



Distant Species Produce Love Child After 60-Millon-Year Breakup

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Found on a forest floor in the French Pyrenees, this shin-high fern is the offspring of two distantly related groups of plants that split into separate lineages some 60 million years ago. Photo courtesy of Harry Roskam.

DURHAM, NC - A delicate woodland fern discovered in the mountains of France is the love child of two distantly-related groups of plants that haven't

interbred in 60 million years, genetic analyses show.

For most plants and animals, reuniting after such a long hiatus is thought to be impossible due to genetic and other incompatibilities between species that develop over time.

Reproducing after such a long evolutionary breakup is akin to an elephant hybridizing with a manatee, or a human with a lemur, said co-author Kathleen Pryer, who directs the Duke University Herbarium.

Led by Pryer and Carl Rothfels of the University of California, Berkeley, the study appears online today and in the March 2015 issue of the journal *American Naturalist*.

The pale green fern was found growing wild on a forest floor in the Pyrenees and eventually made its way to a nursery, where researchers plucked several fronds and extracted the DNA to pinpoint its parentage.

To their surprise, genetic analyses revealed that the fern was the result of a cross between an oak fern and a fragile fern -- two distantly

related groups that co-occur across much of the northern hemisphere, but stopped exchanging genes and split into separate lineages some 60 million years ago.

“To most people they just look like two ferns, but to fern researchers these two groups look really different,” Rothfels said.

Other studies have documented instances of tree frog species that proved capable of producing offspring after going their separate ways for 34 million years, and sunfish who hybridized after nearly 40 million years, but until now those were the most extreme reunions ever recorded.

“For most plant and animal species, reproductive incompatibility takes only a few million years at the most,” Rothfels said.

The sex lives of ferns may help explain why divergent fern lineages remain compatible for so long, the researchers say.

Fern sex is no different from hanky panky in many other creatures in that it requires a union between sperm and eggs. But whereas many other plants rely on birds, bees or other animals to play matchmaker, all ferns need is wind and water.

Plants that require pollinators to reproduce may have a harder time rekindling the spark after calling it quits, especially if the animals they rely on to do the deed are picky about flower shape, size or other traits that may have changed over time.

“It’s tempting to think that there’s something special about flowering plants that gives them a competitive advantage, but these results raise a different possibility,” Rothfels said.

Namely, for ferns and other plants that don’t rely on animal matchmakers, reproductive incompatibility -- a key condition for one species to split into two -- may simply evolve more slowly. That might help explain why flowering plant species outnumber ferns by 30 to one, even though ferns have been around longer.

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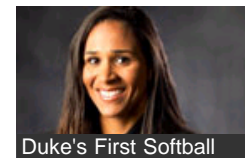
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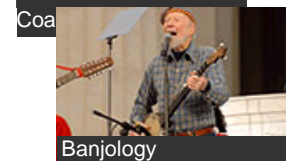
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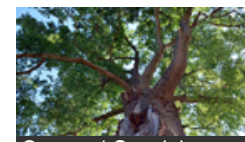
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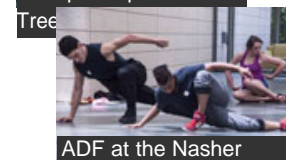
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