

## Different tree species use the same genes to adapt to climate change, researchers find

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Oct. 3, 2016 – An international research team from six universities, including Virginia Tech, is working to better understand how trees - one of Earth's most vital renewable resources - adapt to changing climates.

Recently the team discovered that two distantly related tree species use the same genes to adapt to the range of temperatures in their geographical region. Their results were published Thursday in the journal *Science*.

[Jason Holliday](#)<sup>[1]</sup>, an associate professor of forest genetics and biotechnology in the Department of Forest Resources and Environmental Conservation in the [College of Natural Resources and Environment](#)<sup>[2]</sup> and a [Fralin Life Science Institute](#)<sup>[3]</sup> affiliate, and Haktan Suren, a doctoral candidate from the same college in the genetics, bioinformatics, and computational biology program, are part of the team investigating how trees adapt to different climatic conditions.

"A central question in biology is: how repeatable is the evolutionary process? One way to address this question is to study different species adapting to similar environments and ask whether the same genetic solutions enable that adaptation," said Holliday, who is also one of the study's co-authors, along with Suren.

After five years and with the help of more than 30 people, the team studied two different conifer tree species, lodgepole pine and interior spruce, which are widespread in western parts of the United States and Canada. They collected seed from more than 250 locations in western Canada and then sequenced more than 23,000 genes in each tree.

Their large-scale analysis revealed that both pine and spruce use the same suite of 47 genes to adapt to geographic variation in temperature and to appropriately time acquisition of cold hardiness - a trait that allows plants to tolerate the adverse conditions of winter.

This discovery was surprising due to the evolutionary distance between the two species - they began evolving independently more than 140 million years ago, when they shared a common ancestor. Similar species often evolve similar traits, but the extent to which similarities at the genomic level amount to similar observable traits in different species had not been tested until now. ([continue reading.....](#)<sup>[4]</sup>)

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### Links

[1]. <http://frec.vt.edu/people/holliday/>

[2]. <https://cnre.vt.edu/>

[3]. <http://fralin.vt.edu/fralin-home-page.html>

[4]. <https://vtnews.vt.edu/articles/2016/09/092316-fralin-trees.html>