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CANADIAN POPULATIONS OF *MAGNOLIA ACUMINATA* HAVE LOW LEVELS OF GENE FLOW

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-Adapted from *The Plant Press*

Magnolia acuminata, the cucumber tree, is not the social type. Even where it is widespread, it is never abundant, existing in small populations throughout its range. The northern end of the species distribution lies in Ontario, Canada, where around 200 trees occupy fragmented habitats consisting of small populations of no more than 50, and usually fewer, mature trees. It is considered endangered in Canada and critically imperiled in Indiana, Oklahoma, and Florida. Concerned about its lonely distribution, National Museum of Natural History botanist Elizabeth Zimmer joined Trent University biologists Cara Budd and Joanna Freeland to investigate the tree's genetic diversity using DNA microsatellites, comparing Canadian populations with each other and with populations in the United States (across the heart of *M. acuminata*'s range). Their findings were published in *Conservation Genetics*. "For other groups of plants with this distribution," comments Zimmer, "in some cases you see there have been bottlenecks, and that's a stronger warning that you have to manage plants."

As it turns out, the northern populations of *M. acuminata* in Canada have lower levels of genetic diversity than populations across the United States. Zimmer explains, "may not be pollination that maintains genetic diversity, it may be seed dispersal." The beetle species that pollinate the trees likely do not disperse as far as other major pollinating animals, but the plant's seeds are likely dispersed greater distances by birds or in some cases waterways. However seeds must find suitable habitat to germinate, which can be a challenge in today's altered and fragmented environments.

Canadian populations have little gene flow between them; many alleles are found only in one population or another. The trees are long-lived, not reaching fertility until they are 30 years old, and the genetic information in older trees may not represent the state of populations today. This is confirmed by lower levels of genetic diversity found in *M.*

acuminata saplings. The information gathered in the study indicates that the most effective way to protect genetic diversity in peripheral populations is to protect the habitat and dispersers that could facilitate the exchange of seeds between populations.

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