

Effects of transgenic American chestnut leaf litter on growth and survival of wood frog larvae

[Harrison B. Goldspiel](#), [Andrew E. Newhouse](#), [William A. Powell](#), [James P. Gibbs](#)

First published: 24 August 2018

<https://doi.org/10.1111/rec.12879>

Author contributions: HG, AN, JG conceived and designed the study; HG, AN performed the experiment; HG conducted the statistical analyses and led on writing the manuscript; all authors contributed to manuscript production.

Coordinating Editor: Heather Bateman

Abstract

Biotechnology offers a new approach for the restoration of tree species affected by exotic pathogens; however, nontarget impacts of this novel strategy on other organisms have not been comprehensively assessed. We evaluated the effect of transgenic American chestnut (*Castanea dentata*) leaf litter on the growth and survival of larval wood frogs (*Lithobates sylvaticus*), a forest-dwelling amphibian species widely sympatric with American chestnut, that forage almost entirely on periphyton and litter detritus that accumulate in temporary vernal pools in forests. We reared wood frog larvae on *Castanea* leaf litter (American chestnut genetically engineered for blight tolerance, nontransgenic American chestnut, Chinese chestnut [*Castanea mollissima*], and an American–Chinese chestnut hybrid) and litter from two non-*Castanea*, nontransgenic “control” tree species, coupled with two levels of supplementary food. We observed no differences in growth or survival of wood frog larvae reared on transgenic versus nontransgenic American chestnut leaves. Without supplementary food, wood frog larvae provided leaves from American chestnut (both types) developed faster and grew larger than those exposed to other leaf litter treatments. Results of this study provide preliminary evidence that (1) American chestnut may have formerly been an important source of food for forest-dwelling amphibians and (2) transgenic American chestnut litter generated as part of chestnut restoration efforts is unlikely to present direct novel risks to developing amphibian larvae in the forest environment.