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Research Report

A look at recent TREE Fund funded studies

Autumn 2025

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Cultivating Innovation

Optimizing Tree Responses to Root Pruning in Mature Trees

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Co-PI Andrew R. Benson, PhD
2021 Jack Kimmel International Grant Program, in partnership with Canadian TREE Fund

In this study, we investigated how different root pruning methods and seasonal timing affect the responses of mature *Platanus* × *acerifolia* trees. While branch pruning has been widely studied, there is far less research on how trees respond to root pruning. Our goal was to improve understanding of the biological responses of tree roots to different pruning strategies, particularly in terms of root regrowth and wood discoloration (as a surrogate for decay).

To explore this, we selected thirty-two mature *Platanus* × *acerifolia* trees in Christchurch, New Zealand. To these trees, we applied four different root pruning treatments. We pruned roots either just before the summer growing season or just before winter dormancy. Additionally, we made cuts in two different locations: either internodally, leaving a stub with no side roots, or at a junction, where we retained a subordinate side root. This created four distinct treatment groups: internodal pruning before summer, internodal pruning before winter, junction pruning before summer, and junction pruning before winter. Each tree had three roots severed, and after three years, we analyzed new root formation and measured wood discoloration at the pruning sites.

We found that roots pruned internodally produced more new roots than those pruned at a junction. Among all treatments, roots pruned internodally just before summer produced the highest number of new roots and recovered the greatest proportion of the severed root's cross-sectional area.

Completed April 2025. For more on this research, visit www.treefund.org/archives/21113.

A TREE Fund Webinar on this project will take place on November 4, 2025. See website to register.

Assessing the Mechanical, Physiological, and Carbon Accounting Effects of Different Pruning Regiments

Stella Dee, University of Massachusetts, Amherst
Co-PI Dr. Brian Kane
2022 Asplundh – Hyland R. Johns Endowed Research Grant Program

Our results suggest that low to moderate intensities of pruning have significant effects on the invertebrate community associated with the tree, and that the nature of these effects can be dependent on both pruning type (removal versus reduction) and species. The effect of low to moderate intensities of arboricultural pruning on biomechanical sway properties appears to be statistically absent, while the effect of such pruning on leaf area index (LAI) is minimal.

There appear to be species-dependent differences in resource allocation, causing some species to prioritize epicormic regrowth while others prioritize wound occlusion. These differences between responding to pruning via epicormic regrowth versus wound occlusion appear to have ramifications for the ecological response as it relates to the invertebrate community; in some species, reduction pruning appears to cause more epicormic regrowth and attract a higher quantity of herbivorous invertebrates. Higher LAI and greater quantities of deadwood in the tree may also be associated with greater quantities of herbivores. Pruning has the potential to decrease the ratio of predatory:herbivorous invertebrates associated with the tree, especially closer to the time at which pruning took place. These effects occur even when pruning takes place in the dormant season and can last for at least two years following pruning.

Completed April 2025. For more on this research, visit www.treefund.org/archives/23143

A TREE Fund Webinar on this project will take place on December 9, 2025. See website to register.

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Light-side of the Termites: Distance Effect of Termite Nests on Tree Growth and Pathogen Resilience of Tree Species in Taman Botani at UMT

Dr. Petr Heděnec, Institute for Tropical Biodiversity and Sustainable Development, University Malaysia Terengganu (Malaysia)

2023 Jack Kimmel International Grant Program, in partnership with Canadian TREE Fund

Termites are often seen as pests, but in tropical ecosystems, they play an important and often overlooked role in maintaining healthy soils and supporting plant life. This project, supported by the TREE Fund, investigated whether termite nests in tropical urban parks can positively affect nearby trees by improving soil quality and reducing harmful fungi that cause plant diseases. Our study focused on two common types of termites: Macrotermes, which build large nests and farm fungi inside their mounds, and Globitermes, which build smaller mounds without fungal farming. We carried out our research in two public parks in Malaysia—Taman Botani at Universiti Malaysia Terengganu and Taman Tasik Kuala Nerus. We monitored the growth of selected tree species and collected soil samples at different distances (0, 5, and 10 meters) from termite nests to understand how the presence of termites affects tree health, soil nutrients, and fungal communities.

Soils directly around termite nests had noticeably different physical properties. For example, the electrical conductivity (a sign of nutrient movement and salt content) was higher near nests than farther away. We also found that the texture of the soil changed — with more silt and less sand near nests. These effects were more visible in areas with active environmental conditions, like those closer to the coast. Despite changes in soil properties, tree growth did not differ significantly based on proximity to termite nests during our monitoring period. This suggests that it may take longer to see a measurable impact on tree size, or that other environmental factors are more important in the short term.

Completed August 2025. Research also presented at SOILS 2025 International Soil Science Conference. For more on this research, visit www.treefund.org/archive/23150

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