



UI Extension Forestry Information Series

Healthy Forests Need a Good Diet

James A. Moore

In the Inland Northwest, there is increasing concern that forest trees are growing slower and dying sooner. In some regions these losses exceed growth over large areas of land. Trees might not be taking up the proper amounts of the right nutrients. What kind of diet do trees need to stay healthy, productive, and resistant to pest attacks and climatic extremes?

The University of Idaho Intermountain Forest Tree Nutrition Cooperative (IFTNC) has studied tree nutritional requirements at more than 100 experimental fertilization sites throughout the Intermountain Northwest. The IFTNC promotes forest longevity, resilience, and productivity by helping cooperators understand nutrient cycles, conserve native nutrients through appropriate forest management practices, and correct nutrient deficiencies through stand culture, fertilizers, or other soil amendments.

Formerly, the IFTNC emphasized forest fertilization in general. The IFTNC recently attempted to crack the puzzle of high tree mortality. Specifically, they pursued evidence for links between forest nutritional status and forest health problems. They discovered that potassium significantly influences Douglas-fir stands' response to nitrogen fertilization. The cooperative hypothesized that potassium fertilization could help protect trees from disease and insects.

The IFTNC then set up greenhouse trials and field experiments in second-growth, even-aged, managed ponderosa pine stands in western Montana. Fertilization with nitrogen alone produced little response, but plots receiving both nitrogen and potassium responded positively. Eventually they found a fertilizer regime that combines nitrogen with potassium that has prevented increases in tree mortality.

Because of this, the IFTNC's steering committee recently shifted its focus to:

1. Sample root chemistry of existing Douglas-fir and ponderosa pine to ascertain whether various fertilizer treatments effect root chemistry, thereby altering tree susceptibility to root disease.
2. Establish new fertilization experiments in active root-rot infestations to determine if mortality and spread rates can be reduced by improving tree nutritional status.
3. Start new experiments in ponderosa pine stands to see if improved tree nutritional status makes trees more resistant to bark beetle attack.
4. Conduct new fertilization rate trials to estimate an optimum mix of nitrogen and potassium for increased tree growth and decreased mortality.

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About the Author: *Dr. James A. Moore* is a Professor at the University of Idaho and Director of the Intermountain Forest Tree Nutrition Cooperative (IFTNC).

