Julia Kelly

Physiological responses to drought in healthy and stressed trees: a comparison of four species in Oregon, USA

Four tree species in Oregon (USA) were studied to examine physiological and structural responses to drought stress: ponderosa pine (*Pinus ponderosa*) and western juniper (*Juniperus occidentalis*) in a semi-arid ecoregion, and Douglas-fir (*Pseudotsuga menziesii*) and white oak (*Quercus garryana*) in a mesic coastal ecoregion. This investigation compared the response of paired healthy and stressed (<10% and ≥10% canopy loss respectively) trees to drought using leaf and soil water potential as well as tree-ring width data. Stressed trees, as indicated by canopy condition, were expected to be more drought stressed but there was generally no significant difference in leaf water potentials between the two categories, although leaf water potentials did vary markedly among species. In some cases stressed trees showed more variable growth rates and more sensitive responses to climatic variables than healthy trees, suggesting they were predisposed to be more drought stressed than healthy trees.

Keywords: Geography, Physical Geography, Water Potential, Tree-rings, Drought

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