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Funding Source NSF Undergraduate Mentoring in Environmental Biology

Evaluating the relationship between leaf nitrogen concentration and Minolta SPAD-502 meter readings

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Oak trees are deciduous trees that can live for up to 200 years and face a variety of environmental stresses. Like all plants, oak trees need nutrients, which vary under different stress conditions. We study nitrogen as an essential element in the growth of plants. Most nitrogen is found in the chlorophyll molecules of a leaf, and we are interested in understanding how nitrogen concentration varies oak species with different responses to flooding. The objectives of this study are to: (1) Determine the relationship between leaf chlorophyll and leaf nitrogen concentration for five different species of oak tree (bur oak, pin oak, swamp white oak, northern red oak and shumard oak) and (2) assess how flood tolerance affects the above relationship. The relationship between total leaf nitrogen concentration and chlorophyll of bur oak (*Quercus macrocarpa*), pin oak (*Q. palustris*), northern red oak (*Q. rubra*), shumard oak (*Q. shumardii*), and swamp white oak (*Q. bicolor*) were determined. Each tree species was represented by seedlings raised from acorns collected from both upland and lowland sites with the exception of northern red oak, which was represented by seedlings from a single location. A SPAD-502 Meter (Minolta Corporation Ltd., Osaka, Japan) was used to measure chlorophyll in a total of 135 individual seedlings for 5 consecutive weeks. A single leaf was repeatedly sampled on each seedling in each flooded and non-flooded (control) treatment over 5 replications in a greenhouse. The harvested leaves were then oven dried for 72 hours and nitrogen analysis was conducted in the lab by combusting the sample in an induction furnace and measuring the nitrogen via thermal conductivity. Preliminary results indicate a close correlation between chlorophyll and nitrogen content and differing effects of inundation on their relationship.