From Forest Nursery Notes, Summer 2009

101. Defining post-flood survival of planted oak seedlings using odds ratios. (ABSTRACT). Coggeshall, M., van Sambeek, J. W., and Warmund, M. R. HortScience 44(4):1080. 2009.

growing in autoclaved fine sandy soil in a green house. There were three treatments: 1) a well watered control where both root zone halves were well watered (WW) with 50% ET_c (total = 100% ET_c), 2) one half of the root zone consistently irrigated with 100% ET_c while the other received no water (fixed PRD = FPRD), or 3) one half of the root zone irrigated with 100% ET_c while the other was allowed to dry but the wet and dry halves were regularly switched (alternated PRD = APRD). Shoot growth did not differ among treatments. APRD and WW plants maintained similar patterns of root growth whereas the FPRD wet side resulted in the highest root growth and length. There were no treatment effects on specific root length (m g^{-1}). Root length remained at the same levels in WW and FPRD dry side. Transient drought stress tended to increase net assimilation of CO_2 (A_{CO2}) and leaf transpiration as midday gas exchange rates were higher before irrigation than after irrigation. In addition, leaves above the dry side of the FPRD and above the temporarily dry side of the APRD had higher net gas exchange than WW plants. Leaf WUE did not differ among treatments but APRD and FPRD seedlings used 1.8% to 8.5% less water than the WW seedlings.

4:15–4:30 pm

Effect of Soil Moisture Level on Root and Shoot Growth of *Ligustrum japonicum* and Their Relationship to Free Amino Acid to Nonstructural Carbohydrate Ratios

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Ligustrum japonicum grown in 11.0 L containers were transplanted into elevated cross-shaped rhizotrons using a commercial container substrate. After a short acclimatization phase, plants were subjected to two constant moisture levels, 30 and 70% of drained saturated capacity. Substrate moisture levels were maintained using capacitance probes for four months after transplanting. Capacitance probes were relocated approximately every three weeks to the edge of the actively growing root tips. Both root and shoot tips were sampled periodically for free amino acids and total nonstructural carbohydrates. The effect of soil moisture levels on root and shoot growth will be reported. Changes in the free amino acid to nonstructural carbohydrate ratios will be discussed in relationship to episodes of root and shoot growth.

4:30–4:45 pm

Defining Post-flood Survival of Planted Oak Seedlings Using Odds Ratios

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For many planting scenarios, it is desirable to estimate the number of seedlings that need to be planted on flood prone sites to achieve management goals, based upon species flood tolerance ratings and desired stocking levels. However, previous assessments of flood tolerance for a range of oak species used in such plantings in Missouri have been inconsistent. Therefore, the objective of this study was to assess the flood tolerance of seven different oak species by examining the survival rates of newly planted seedlings in response to four flood treatments over two sampling dates. A total of 2713 one-year-old seedlings of seven native oak species were planted in an outdoor, multi-channel flood tolerance laboratory located at the University of Missouri Horticulture and Agroforestry Research Center in New Franklin, MO in March 2005. End of season survival was determined in September 2005 (15 weeks post-flood) and in June 2006 (45 weeks post-flood). Survival data were analyzed using SAS PROC GENMOD, which provided for an analysis of species and flood treatment differences in survival rates based upon calculated odds ratios over two sampling dates. In this study, an odds ratio compared the probabilities of seedling survival rates between two species by calculating the antilog (e^x) of an estimate (= Logit P_i) value that represented the difference between two species least square means. These values were interpreted as the likelihood of one species to survive 15 weeks, or 45 weeks, post-flood versus the alternate species. Conversely, such odds ratios indicated the number of seedlings that would need to be planted of the less flood tolerant species for every seedling representing the more flood tolerant species to obtain the same survival at either 15 or 45 weeks post-flood. Survival rates based on odds ratios differed for non-flooded and flooded seedlings in both a flood tolerant (swamp white oak) and flood intolerant species (northern red oak) at 45 weeks post-flood, which clearly demonstrated the longer term impact of flooding on survival rates in response to flooding. It is recommended that an odds ratio approach be used as a management tool when making decisions on deploying specific species in adequate numbers across flood prone sites.

Specified Source(s) of Funding: University of Missouri Center for Agroforestry

4:45–5:00 pm

Soil Respiration and Soil Analysis Under American Sweetgum (*Liquidambar styraciflua*) as Affected by Pavement Type

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Placing impermeable pavement around existing trees can cause declines in tree growth and health due to reduced water infiltration and soil surface gas exchange. Using pervious concrete, with greater water infiltration and gas permeability, could be a good alternative. The purpose of this study was to test soil respiration, root growth and soil extract chemistry in root zones of American sweetgum (*Liquidambar styraciflua*) as affected by pavement. The experimental setup consisted of twenty-five sweetgum trees, with root zones covered by standard concrete (5 plots), pervious concrete (10 plots) or left uncovered (control, 10 plots). Each plot was outfitted with access points for soil respiration measurements. Soil respiration was measured monthly on two access holes per plot, with three sub-measurements per access hole. Data collected from February 2008 to January 2009 indicated that soil respiration correlated with seasonal soil temperatures. We observed tremendous variability in soil CO_2 efflux rates within treatments. Maximum rates of CO_2 efflux per plot were extremely high in both concrete treatments (up to 350 $\mu mol \cdot m^{-2} \cdot s^{-1}$ of CO_2), while maximum rates in the control treatment reached up to 45 $\mu mol \cdot m^{-2} \cdot s^{-1}$ of CO_2 per plot. This was likely an experimental artifact as collar depth (15 cm) may have exceeded the capacity of the equipment. Rates were generally higher for standard concrete than pervious and considerably higher for both concrete treatments than the control. It is likely that pavement