

Using phyto-recurrent selection to choose *Populus* genotypes for phytoremediation of landfill leachate

Jill A. Zalesny^{1,2,*}, Ronald S. Zalesny Jr.², Adam H. Wiese², and Richard B. Hall¹

¹Iowa State University, Ames, IA, USA; ²USDA Forest Service, Rhinelander, WI, USA

Information about the response of *Populus* genotypes to landfill leachate irrigation is needed, along with efficient methods for choosing genotypes based on leachate composition. We irrigated poplar clones during three cycles of phyto-recurrent selection to test whether genotypes responded differently to leachate and water, and to test whether our methodology had merit as a tool for plant selection during remediation. Fifteen belowground and aboveground traits were evaluated. Twenty-five clones were tested in cycle 1, while the best 12 genotypes were evaluated in cycles 2 and 3. Eight clones were selected and currently are being tested in an *in situ* landfill study (cycle 4). Overall, clones responded differently to irrigation treatments, with certain genotypes exhibiting better belowground and aboveground growth with water than leachate. However, growth was greater with leachate irrigation for some clones. In addition, differences between treatments within clones decreased with days after planting (DAP). There were no treatment differences for number of leaves, height, and root length at the end of cycle 2 (45 DAP) or cycle 3 (30 DAP). Our results supported the extensive variation in clonal responses to leachate irrigation, along with the need and efficacy of using phyto-recurrent selection to choose superior genotypes.

SRWC Production Systems for Wood Production, Bioenergy and Environmental Services



Pasco, Washington, USA
September 25-28, 2006