

Leaf, Woody, and Root Biomass of *Populus* Irrigated with Landfill Leachate

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Poplar (*Populus spp.*) trees can be utilized for ecological leachate disposal when applied as an irrigation source for managed tree systems. Our objective was to evaluate differences in tree height, diameter, volume, and biomass of leaf, stem, branch, and root tissues of *Populus* trees after two seasons of irrigation with municipal solid waste landfill leachate or well water (control with added N, P, K). The trees were grown at the Oneida County Landfill located 6 km west of Rhinelander, Wisconsin, USA (45.6 °N, 89.4 °W). Eight clones belonging to four genomic groups were tested: NC13460, NC14018 [(*P. trichocarpa* Torr. & Gray × *P. deltoides* Bartr. ex Marsh) × *P. deltoides* 'BC₁']; NC14104, NC14106, DM115 (*P. deltoides* × *P. maximowiczii* A. Henry 'DM'); DN5 (*P. deltoides* × *P. nigra* L. 'DN'); and NM2, NM6 (*P. nigra* × *P. maximowiczii* 'NM'). Mortality for each treatment was 22% across the 2005 and 2006 growing seasons. The total aboveground biomass averaged 1.57 Mg ha⁻¹ and ranged from 0.51 to 2.50 Mg ha⁻¹. The treatment × clone interaction was significant for height, total tree dry mass, aboveground dry mass, belowground dry mass, and dry mass of the leaves, stems + branches (woody), and lateral roots ($P < 0.05$). The BC₁ and DM genomic groups expressed broad clonal variation with genotypes performing differently for treatments. In contrast, the NM and DN genomic groups were stable across treatments, and the clonal response to irrigation treatments was similar. NC14104 had greater biomass when irrigated with leachate compared with water, while NC14018 grew better with water than leachate. Overall, these results are instrumental to researchers and resource managers when making decisions and clonal selections for future leachate remediation projects.



***Poplar culture:
a collaborative effort from clone to mill***

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