Establishment and Early Growth of *Populus* Hybrids Irrigated with Landfill Leachate

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Hybrid poplar genotypes exhibit great potential for tree establishment and growth when irrigated with municipal solid waste landfill leachate. We evaluated the potential for establishment on leachate-irrigated soils by testing: 1) aboveground growth of hybrid poplar during repeated irrigation with landfill leachate and 2) aboveground and belowground biomass after 70 d of growth. We determined height, diameter, and number of leaves at 28, 42, 56, and 70 days after planting (DAP), along with stem, leaf, and root dry mass by testing six hybrid poplar clones belonging to three genomic groups (i.e. hybrid types): DN34, DN5, I4551 (*Populus deltoides* Bartr. ex Marsh × *P. nigra* L.), NC14104 (*P. deltoides* × *P. maximowiczii* A. Henry), and NM2, NM6 (*P. nigra* × *P. maximowiczii*). The trees were planted in a greenhouse as 20-cm cuttings in a split-split plot, repeated measures design with two blocks, two treatments (whole-plots), six clones (sub-plots), and four sampling dates (sub-sub plots, repeated measure). Treatments were: 1) non-fertilized well water and 2) landfill leachate, applied every other day beginning 42 DAP. The leachate-treated cuttings exhibited greater height, diameter, and number of leaves at 56 and 70 DAP ($P < 0.05$). There was broad variation in clonal responses to leachate treatment for dry mass, with a general trend of leachate-treated cuttings exhibiting greater stem and leaf dry mass ($P < 0.05$), but negligible differences for root dry mass ($P > 0.05$). Genotypic responses to the leachate treatment were clone-specific for all traits. The clonal ranking beginning with the greatest establishment potential was DN34, NM6, DN5, NM2, NC14104, and I4551, with DN34 exhibiting a selection value 30% greater than I4551.

Keywords: genotype selection, hybrid poplar, *Populus deltoides*, *P. nigra*, *P. maximowiczii*, waste management

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