VARIATION IN LATERAL AND BASAL ADVENTITIOUS ROOTING OF *POPULUS* IRRIGATED WITH LANDFILL LEACHATE: SELECTION OF FAVORABLE GENOTYPES FOR ENVIRONMENTAL BENEFITS

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Successful establishment and productivity of short-rotation *Populus* crops depends upon adventitious rooting. Two common adventitious root types from *Populus* cuttings are: 1) *lateral roots* that develop from either preformed or induced primordia; and 2) *basal roots* that differentiate from callus at the base of the cutting in response to wounding. We irrigated 12 *Populus* clones (91.05.02, NC13460, NC13475, NC13680, NC14018, NC14104, NC14106, DM115, DN182, DN5, NM2, NM6) with municipal solid waste landfill leachate or well water (control) and evaluated root initiation (30 days after planting [DAP]) and root growth rate (45 DAP) among irrigation treatments, clones, and belowground portion of the cutting from which roots originated (upper, middle, lower laterals; basals). There were 3 (91.05.02) to 27 lateral roots (NC14018), with a mean of 16 roots, while the range for basal roots was 2 (91.05.02) to 10 roots (NC13680), with a mean of seven roots (44 percent of laterals). Leachate did not generally affect rooting across clones, root origins, and root types, but number of roots was greatest with leachate for NC13475 (40 percent greater than water) and NM2 (44 percent). The percent advantage of number of roots from the middle portion of the cutting relative to other sections was 120 percent (upper), 193 percent (lower), and 24 percent (basal). Overall, leachate did not affect root growth rate, while roots grew 1.5 to 3.4 cm day^{-1}, with a mean of 2.3 cm day^{-1}. Selecting *Populus* genotypes with lateral, basal, or both adventitious root types that thrive with leachate irrigation (i.e., NC13475, NM2) supports increased productivity potential of *Populus* feedstocks for fiber (pulp for paper), energy (cellulosics for ethanol, biomass for electricity), and environmental services (carbon sequestration, environmental remediation) necessary for long-term ecosystem sustainability.

KEY WORDS: phytotechnologies, forest genetics, tree improvement, hybrid poplar, adventitious root types

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