

Water usage and establishment success of *Populus* during phytoremediation of landfill effluent

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Poplars are ideal for phytoremediation because of their exceptional water usage and biomass production. Assuming these traits are proportional to remedial benefit, our objectives were to test the: (1) water usage of poplars planted as a biological filter of landfill effluent and (2) efficacy of growing poplars in landfill effluent in a greenhouse treatability study.

The transpiration per tree over 18.5 days in 2002 (n=15) and 2003 (n=9) was 14.3 and 60.3 L·d⁻¹, respectively. The estimated transpiration assuming a 50-day growing season in 2002 and 2003 was 1,202,459.6 and 5,063,530.5 L·ha⁻¹, respectively. Water usage (sap flow rate) was 0.006 and 0.011 cm·s⁻¹ for trees of mean cross sectional area of 69.3 and 159.4 cm² in 2002 and 2003, respectively.

A split-split plot design was used to test two treatments (effluent and control), 6 clones, and 4 dates (28, 42, 56, and 70 days after planting-DAP). Treatments, applied every 2 days beginning 42 DAP, differed (LSD_{0.05}) for height, diameter, and number of leaves at 56 and 70 DAP, with effluent trees exhibiting the greatest growth. Stem and leaf dry weight were different and greatest for effluent trees; however, root dry weight did not differ and was greatest for control trees.

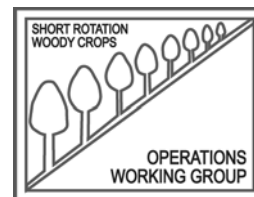
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