

CHARACTERIZATION OF ARSENIC UPTAKE UNDER PHOSPHORUS SUFFICIENT AND DEFICIENT CONDITIONS IN SHRUB WILLOW (*SALIX* SPP.) CLONES OF DIFFERING AS SENSITIVITIES

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Hydroponic studies of phosphorus (P) and arsenic (As) uptake by plants consistently demonstrate that the presence of P results in less As uptake. Transport of the structurally analogous ionic forms of these elements occurs via phosphate transporters, which are encoded by a multigene family. A second consensus result is that As nontolerant species or populations accumulate more As at a faster rate than As-tolerant counterparts. We hypothesized that a P-deficient (-P) pretreatment would increase phosphate transporter activity, thus increasing As uptake when introduced in hydroponic culture. We also hypothesized that an As nontolerant willow clone would have higher tissue As concentrations than a tolerant clone. A 2×2×2×2 factorial experiment was designed to investigate As uptake in shrub willow (*Salix* spp.) clones of varying As tolerances in relation to P status. When As was added without P, the As nontolerant clone, 00X-026-082 (*S. eriocephala*), wilted within 1 day of As exposure, while the tolerant clone, 99202-011 (*S. viminalis* × *S. miyabeana*), took 6 days to wilt, reinforcing previously established relative tolerances. Clonal differences may also represent differing intracellular P concentrations to maintain homeostasis. In contrast to results from other species, the presence of P increased As concentration and content in both willow clones. This result may have been related to slower As uptake or increased plant nutrition and biomass in +P treatments. The duration of As exposure complicates interactions between factors, as the time scale of the treatment was longer than the time scale of initial membrane transport kinetics.

KEY WORDS: biomass, hydroponics, phosphate, phytoremediation

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