

Cloning of Mature Black Willow Trees via Shoot Organogenesis

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Black willow (*Salix nigra* Marsh.) is the largest and only commercially important willow species in North America. Since this fast-growing tree thrives on floodplains throughout the Eastern United States, it is a potential candidate for phytoremediation of polluted soils. In this study, we initiated adventitious shoot-producing cultures from unexpanded inflorescence explants excised from dormant buds. Explants collected from three source trees growing in Athens, GA were cultured on woody plant medium (WPM) supplemented with three plant growth regulator (PGR) treatments: (1) 0.1 mg/l thidiazuron (TDZ), (2) 0.5 mg/l 6-benzoaminopurine (BAP), or (3) 1 mg/l BAP. Callus induction was observed within three weeks following culture initiation. All three PGR treatments induced adventitious bud formation from all three genotypes. The percentage of explants producing buds ranged from 20% to 92%, depending on genotype and treatment. Although most of the TDZ-treated inflorescences produced buds, these failed to elongate into shoots. Buds on explants treated with BAP elongated into shoots, which were easily rooted in potting mix under high humidity. Shoot regeneration was strongly genotype-dependent, ranging from 7% to 36%, while the number of shoots per explant varied from 1 to 5. The ability of willow inflorescences to produce adventitious shoots may make them suitable targets for *Agrobacterium*-mediated transformation with heavy metal resistance genes for phytoremediation.