INHERITANCE AND LINKAGE ANALYSES OF ENZYME SYSTEMS IN EASTERN COTTONWOOD LEAF TISSUE

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Twenty-eight enzyme systems of Populus deltoides full-sib progenies were resolved by starch gel electrophoresis of expanding leaf tissue extracts. Seventeen enzyme systems were shown to be monomorphic, including first reports (in Populus) for ALD, CTO, FDP, GR, G3PD, MPI, MDR, NADH, PPO and TPI. Of the 11 polymorphic systems studied, the mode of inheritance for ADH, AK-1, AK-4, EST-4, and G6PD were initially determined in this study.

Linkage analyses, conducted on 29 pairs of simultaneously heterozygous loci found in the progenies of five controlled crosses, suggest that AK-1 and EST-4, PER-1 and G6PD, AC0-1 and PGI-2, G6PD and ACO-1, PGI-1 and IDH-2, 6PGD-1 and PGI-1, 6PGD-1 and ACO-1, PER and ADH, PGI-1 and PER-1 are located on different chromosomes and segregate independently. Two linkage groups (AC0-1 and IDH-2; PGI-2 and G6PD) were detected at recombination frequencies of 0.182 and 0.333, respectively. These may be the first linked groups detected in any Populus species.