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Early shoot and root growth dynamics as indicators for the survival of black poplar cuttings

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Abstract The relationship between early root and shoot formation at the beginning of the vegetation period and cutting survival on sandy and loamy fluvisol for 14 genotypes of black poplars was analyzed. Considerable cutting mortality was observed only within the first 80 days since planting. Intensive root formation in the first 20 days since the planting and vigorous shoot growth and development in subsequent 20 days was observed in easy-to-root genotypes. Coefficients of correlation revealed close relationship between early root and shoot growth and development and cutting survival of tested genotypes. The obtained results could be used in the breeding process, as well as for the design of cultivar-adjusted nursery and plantation establishment technology. Tested shoot characteristics, were found to be especially interesting since they could be measured rapidly, by non-destructive means.

Keywords Nursery and plantation establishment · Cutting rooting · Imbalanced growth

Introduction

Black poplars (section *Aigeiros* Duby) are widely present by nature in the riparian zones of all continents except Australia and Antarctica. Clones of eastern cottonwood (*Populus deltoides* Bartr.) and hybrid species euramerican poplar (*Populus x euramericana* Dode) are widely utilized in the intensive timber and biomass production. Together with European black poplar (*Populus nigra* L.) they are used in poplar breeding programs through intra- and inter-species hybridization. Beside wood production, they are also used in the environmental protection and improvement projects (Zsuffa et al. 1996). Successful rooting of stem hardwood cuttings is one of the important traits for breeding and utilization of black poplars (Zalesny et al. 2005b; Kovacevic et al. 2008). Success of black poplar

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