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Impact of standing vegetation on early establishment of willow cuttings in the flooded area of the Parana River Delta (Argentina)

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Abstract We assessed the growth and survival of a willow clone (*Salix matsudana* × *Salix alba* 'A 13/44') growing under different vegetation management in the flooded area of the Parana River Delta (Argentina) during the first 2 years after planting. Treatments consisted in a combination of practices applied in the row and in the inter-row. In the row (1-m wide) vegetation was manually cut with machete (r-M), treated with glyphosate at 3% (r-H) or maintained undisturbed (r-U); in the inter-row vegetation was crushed with a roller (I-R), treated with glyphosate at 3% (I-H) or maintained undisturbed (I-U). Height, diameter and relative growth rate of the dominant sprout were evaluated. Tree survival was high (96%) and not affected by treatments. Growth was modified by the vegetation control at early stages. Height and diameter were higher in r-H plots compared to r-U plots; both were similar in the I-U and I-H plots but greater than in I-R plots. Early differences in diameter relative growth rate among row treatments were found. Possible mechanisms associated with willow growth responses such as plastic responses under resource limited conditions and amelioration of the microenvironment by the native vegetation are discussed.

Keywords Willow · Weed competition · Growth · Establishment

Introduction

Neighbouring vegetation can affect survival and post-planting performance of tree seedlings through competition for light, water and nutrients (Nambiar and Sands 1993; Balandier et al. 2006). The extent to which vegetation control treatments can improve early establishment depends on the tree species (Wagner et al. 1999), the type and density of neighbouring vegetation (Balandier et al. 2006) and the specific conditions of the site (Tage et al. 1996). Because distance from the target plants reduces the degree of

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