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Influence of initial age and size on the field performance of *Larix olgensis* seedlings

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Abstract Quality of seedlings is important for the success of plantations. The field performance of five stock types of Olga Bay larch (*Larix olgensis* Henry) seedlings three seasons after planting was evaluated. High survival rates were achieved for all five types of planting stock in the first-year growing season when weeds were controlled. In the second and third-year growing seasons, significant differences were observed in survival rates among different stocktypes. The 1 + 1 type of Olga Bay larch seedling demonstrated better survival than 1 + 0 type of seedlings. 1 + 1 seedlings with diameter larger than 5.0 mm as well as 1 + 0 seedlings with diameter larger than 4.5 mm were suitable for reforestation. The 1 + 1 stocktype with a root collar diameter between 6.0 and 7.5 mm was considered optimal for the establishment of fast-growing and high-yield plantations. The number of lateral roots > 1 cm in length was the best predictor of field performance, however, the number of first order lateral roots with diameter > 1 mm at the tap root junction (FOLR (D > 1 mm)) was more feasible and sufficiently reliable to predict the field performance of the deciduous conifers. The initial height and root collar diameter of seedlings showed a significant correlation with the field performance for both 1 + 1 and 1 + 0 seedlings in the first and second-year growing seasons and thus can be adopted as an indicator for predicting potential field performance of seedlings.

Keywords Survival · Growth · Seedling quality · Lateral roots · Field performance

Introduction

Seedling quality is a key factor in establishing forest plantations (Duryea 1985; McKay 1996; Wilson and Jacobs 2006). Various studies showed that age and size are two reliable,

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