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ORIGINAL ARTICLE

Potential use of papier mâché plugs for eucalypt seedling production in South Africa

JEAN SCHUERMANS[1], JANUSZ ZWOLINSKI[1†], DEAN DA COSTA[2] & PETER GREENFIELD[3]

[1]*Forestry, University of KwaZulu-Natal, PO Bag X01, 3209 Scottsville, South Africa,* [2]*Mondi Group, Pietermaritzburg, South Africa, and* [3]*Crop Science, University of KwaZulu-Natal, P.O. Bag X01, 3209 Scottsville, South Africa*

Abstract

Rooting plugs were made by (1) mixing, pressurizing and gluing papier mâché (plugs), (2) cutting a sponge block, and (3) filling Hessian bags with standard growing medium. These treatments were also compared with three types of container used in commercial nurseries, giving three additional treatments: (4) Unigrow, (5) Sappi 49, and (6) Poly 98 deep. *Eucalyptus dunnii* and *Eucalyptus grandis* plants were raised from seed over 70 days. In each species and each treatment 60 plants were outplanted to determine survival and growth of the trees after 9 weeks. The nursery results showed that plugs yielded the tallest plants for *E. grandis*, and Sappi 49 resulted in the tallest *E. dunnii*. The sponge blocks produced significantly smaller trees in both species. After outplanting, the survival of trees was high for each treatment. There is a need to test performance attributes of the various types of planting stock under stressful site conditions to determine long-term benefits, if any, of producing planting stock in papier mâché plugs. If these studies are concluded successfully, papier mâché plugs could replace peat in commercial forest nurseries, preventing environmental degradation of peat-mined wetlands.

Keywords: *container type, containerized nurseries, root plug, wall-less plug.*

Introduction

The degree of outplanting performance of planting stock determines the success of any establishment operation. Postplanting survival and rate of early growth are the two most obvious measures of regeneration success. Losses in value and volume yield together with increased regeneration costs can be minimized through efficient plantation establishment (Albert et al., 1980). This in turn depends on seedling morphological and physiological characteristics that meet targets associated with favourable performance under an anticipated range of site conditions (Davis & Jacobs, 2005).

Over the past couple of decades, containerized nurseries replaced their bareroot counterparts in many parts of the world, especially where plantation forestry operations depend on effective establishment and the fast growth of trees. Containerized nurseries helped also to accelerate propagation techniques, especially vegetative propagation, and to reduce prices of the planting material of select genotypes of trees. Despite the fact that these objectives had been largely achieved, many planting operations failed owing to early tree dieback or vulnerability to wind in older forest stands, both resulting from root deformations and stem strangulation of the containerized planting stock with roots constrained by hard container walls (Chapman et al., 2003; Rune, 2003). In many studies worldwide the root collar diameter (RCD) of seedlings has been found to correlate strongly with field performance after planting (Thompson, 1985; Bayley & Kietzka, 1997; Jacobs et al., 2005). Diameter of the stem at root collar, however, depends on the amount of space allocated to roots during the nursery stage. The older the seedlings the greater the root collar, but inferior planting stock may result from prolonged cultivation in combination with

Correspondence: J. Schuermans, Forestry, University of KwaZulu-Natal, PO Bag X01, 3209 Scottsville, South Africa. E-mail: 902478740@ukzn.ac.za
†Deceased.

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