

McGregor Interior Spruce Stock Type Trials – 24 Year Results¹

Executive Summary

Twenty-four years after planting interior spruce, initial stock type selection has made a large difference in potential site volume on a north central B.C. site with high vegetative competition.

Introduction

Various trials were established in the Northern Interior of B.C. between 1967 and 1972 by the Canadian Forest Service to determine the effect of initial stock size on field performance. This paper reports 24-year results from one such trial with interior spruce established northeast of Prince George in the McGregor area. The stock consisted of bareroot (BBR), plug-transplant (PBR) and both one and two-year-old Styroblock™ (PSB) container stock as follows: 1) BBR, 2+0; 2) PBR, 1+1; 3) PSB2, 1+0; 4) PSB2, 2+0; 5) PSB8, 1+0; and 6) PSB8, 2+0. Styroblock™ 2 (192 cavities, 40 ml volume) and 8 (80 cavities, 130 ml volume) are similar to the more common Styroblock™ 211A and 412A, respectively. As can be seen (Table 1), the stock would be considered very sturdy, even by today's standards. Seedlings were summer planted on July 11-12, 1972.

Table 1. Stock size at time of planting.

Container Size	Age	Production Age	Height cm	RCD mm	<u>Height mm</u> <u>RCD mm</u>
Styroblock™ 2	1+0	26 weeks	16.6	3.4	49
Styroblock™ 2	2+0	70 weeks	20.6	5.7	36
Styroblock™ 8	1+0	26 weeks	22.4	4.6	49
Styroblock™ 8	2+0	63 weeks	25.0	8.7	29

This trial consisted of three blocks where each stock type was replicated by one 50-tree row at a 2 x 3 m spacing (within row and between rows respectively). The blocks were slash-burned within two years prior to planting. Vegetative competition was high on these sites, and was already established at the time of planting. One of the sites was blade scarified prior to planting, which resulted in very poor seedling establishment, thus was not measured in October 1996. Average block elevation is 605 m, and the aspect on both blocks was classified as flat, with variable broken topography on one of the blocks.

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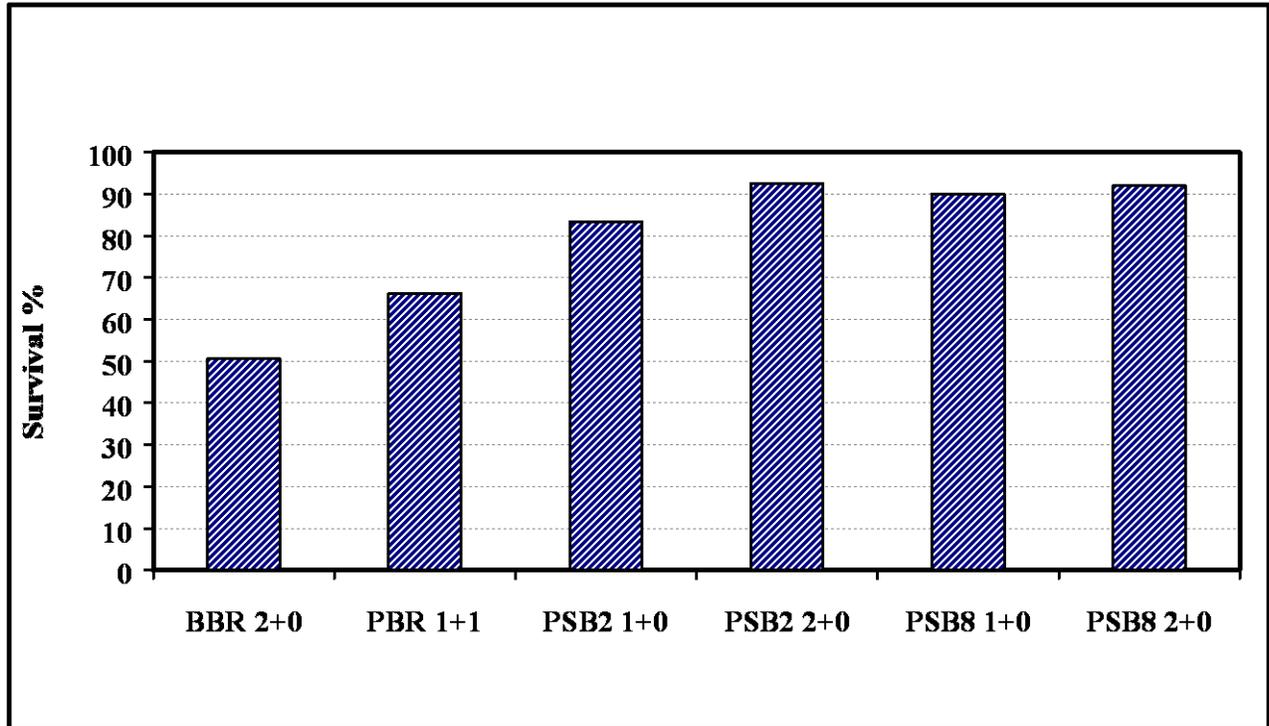


Figure 1. Survival after twenty-four years by stock type.

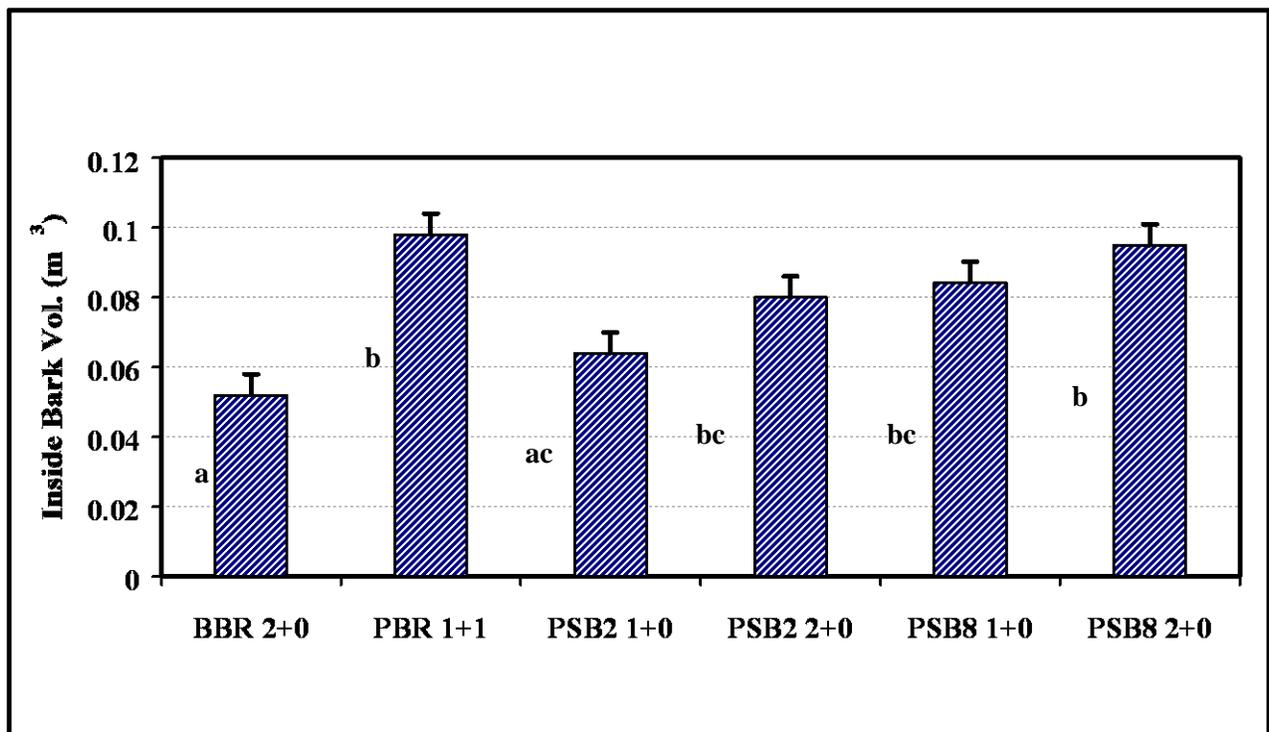


Figure 2. Average tree volume x stock type. Means followed by the same letter are not significantly different.

Survival

As can be seen from Figure 1, survival increased from bareroot < plug-transplant < container stock. The low survival of the bareroot and plug-transplant stock is in stark contrast to the relatively high survival of the container stock, which not including the 1+0 PSB2, was 92%. Also, survival of the 2+0 container stock was slightly greater than that of the 1+0 stock.

Volume – Individual Tree

Volume estimates from the 1996 height and diameter data were constructed (see Figure 2) utilizing equations for juvenile plantations (*Kovats, M. 1977: Estimating juvenile tree volumes for provenance and progeny testing. Can. J. For. Res. 7, 335-342*). When comparing PSB2 and PSB8 of similar ages, and PSB 1+0 vs 2+0, there were no statistically significant growth differences, except with the 1+0 PSB8, which was significantly taller than the 1+0 PSB2 (height data not shown). Comparing all four container size / age combinations, the largest container stock type (i.e. 2+0 PSB8) had statistically significantly greater height, DBH and volume than the smallest container stock type (i.e. 1+0 PSB2). Volume of the bareroot seedlings was significantly less than all stock, except for the PSB2 1+0.

Volume - Site

Using an initial stocking of 1,200 seedlings per hectare, potential volume of these blocks at twenty-four years was calculated using the stock type survival and derived volume measurements (see Figure 3). It can be seen that there are large differences in site volume, as the site planted with the largest initial PSB stock type (i.e. PSB8 2+0) would have over 300% more volume than if planted with the BBR stock.

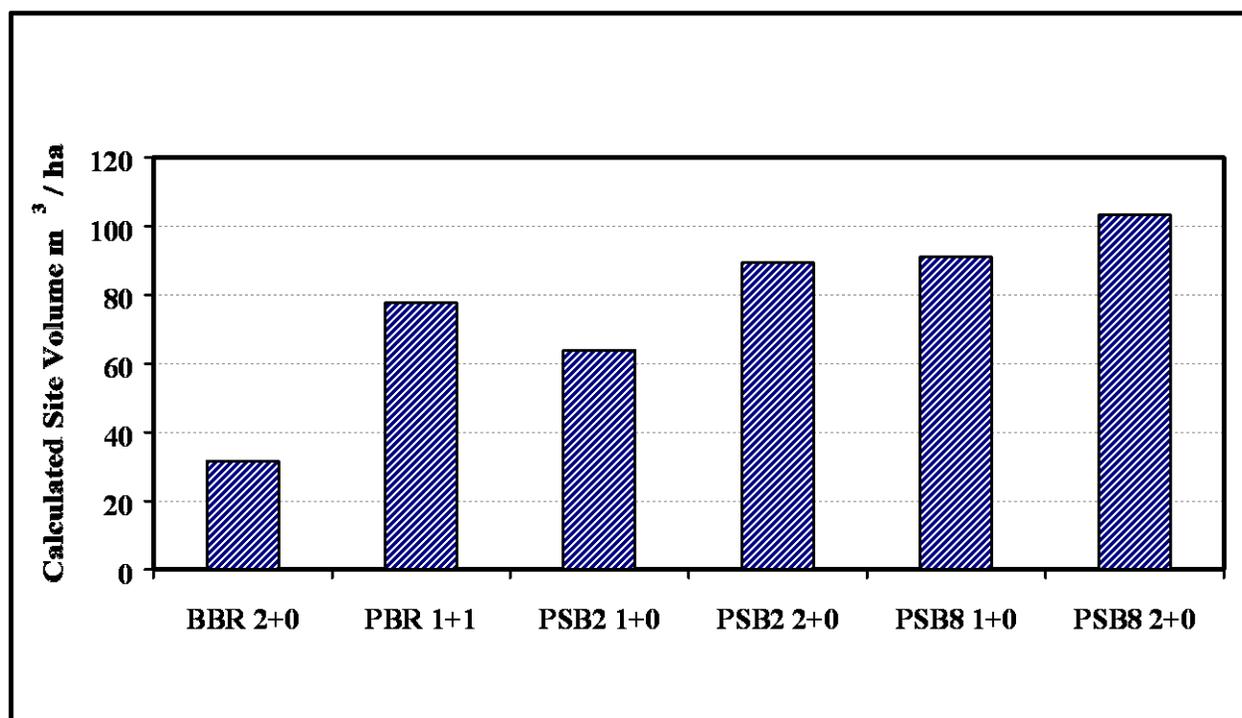


Figure 3. Calculated site volumes per stock type at twenty-four years, based on an initial stocking of 1,200 seedlings per hectare.

Silvicultural Implications

The PBR had good growth, which was not significantly different from the largest PSB stock, but because of its relatively poor survival, resulted in low volume per site. Furthermore, as PBR and especially BRR stock are no longer widely used, they are not considered further in this report. What do these results really mean at the end of the day? If survival and growth are combined to compute volume per site, the long-term implications of initial stock type selection become clearer. In this case, if a larger PSB8 2+0 were chosen over the smaller PSB2 1+0, there would be 62% more volume on these sites twenty-four years after planting. In general, potential site volume among container stock increased as initial stock size increased. However, survival and growth performance of the 2+0 PSB2 was similar to that of the 1+0 PSB8. Part of the reason for this may be due to the fact that these seedlings were grown under experimental conditions, and that the PSB2 had 92% of the height and 124% of the RCD of the usually larger PSB8.

It is generally accepted that nursery effects last only a few years after planting, after which site conditions have a greater influence on tree growth. In other words, stock type is not expected to have an effect on long-term growth rate, but rather, certain stock types can accelerate early growth by helping to alleviate various site limiting factors. On these sites, the larger stock was better able to overcome the competing vegetation. Also, although not part of this discussion, the importance of good microsite selection should not be overlooked, as large variations between stock within the same row were observed, regardless of initial stock size. The bottom line from this trial of interior spruce planted on a high vegetation competition site is that use of larger container stock has resulted in more volume per site at twenty-four years after planting. With different species and on sites with less vegetative competition, the results may differ.