

**NIPISSING FOREST RESOURCE MANAGEMENT / VERMILION FOREST MANAGEMENT  
2003 PLANTING TRIALS -FINAL REPORT (2007)**

Project Name:	NURSERY STOCK SIZE																		
Crop(s)	PW03NWEa-A2(2-yr) – 36 mm Jiffy																		
Factor(s)	Average Crop Height (cm): <ul style="list-style-type: none"> <li>• SHORT = 12 cm Initial Height</li> <li>• TALL = 18 cm Initial Height</li> </ul>																		
Rationale	<p>Size specifications for nursery stock have been debated since we started growing containerized tree seedlings for reforestation in the 1970's. Since morphological features of a tree are easy to measure, they had been adopted as the main measure of acceptability for the nursery to target. However, over the years the system has evolved to include physiological features, such as nutrient content and root regeneration potential, as measures of seedling quality. Currently, both morphological and physiological measures are used to determine the suitability of nursery seedlings for reforestation.</p> <p>From 2001 to 2003, a population of white pine was grown (for Nipissing Forest Resource Management) in different greenhouses at Webb's Greenhouses. The crop was divided into 2 populations based on the location at the nursery, since one group was significantly larger (on average) than the other. Physiologically (nutrient status), the two populations were similar (Table 1).</p>																		
Methods	<p>For this project, sites were selected at the Gurd Tree Improvement Centre (old field) and the McConnell Lakes Research Area (operational plant site).</p> <p><u>Table 1. Foliage samples were analyzed for nutrient levels prior to planting.</u></p> <table border="1"> <thead> <tr> <th>Population</th> <th>N %</th> <th>P %</th> <th>K %</th> <th>B ppm</th> <th>Fe ppm</th> </tr> </thead> <tbody> <tr> <td>SHORT</td> <td>1.3</td> <td>.18</td> <td>.50</td> <td>15</td> <td>89</td> </tr> <tr> <td>TALL</td> <td>1.2</td> <td>.18</td> <td>.50</td> <td>14</td> <td>75</td> </tr> </tbody> </table> <p>Seedlings were randomly selected from each of the above populations and replicated planting trials were established at each site; 5 replications of 10 trees each (total of 50 trees / treatment / crop type).</p> <p>Field measurements (growth and health) were taken at establishment (spring 2003) and at the end of the 1<sup>st</sup> (fall 2003), 2<sup>nd</sup> (2004), and 5<sup>th</sup> (2007) growing seasons.</p> <p>The operational site (McConnell) received a herbicide release treatment (backpack foliar spray) late in 2005.</p> <p>Data was analyzed using Sigma Stat software. In addition to comparing nursery populations with significantly different <u>average</u> heights, planted seedlings were divided into height classes based on initial heights after planting (&lt;=9 cm, 91-130 cm, 131-180 cm, &gt;180 cm) for further analyses.</p>	Population	N %	P %	K %	B ppm	Fe ppm	SHORT	1.3	.18	.50	15	89	TALL	1.2	.18	.50	14	75
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Summary	<p>The SHORT population of white pine nursery stock performed as well as or better than the TALL population. At the 'operational' site the SHORT population was significantly larger in stem volume after 5 growing seasons (Fig. 1, Photo 1). At the 'old field' site survival was higher for the SHORT population after 5 years (94 vs. 80 %) (Fig. 2).</p> <p>After dividing the planted seedlings into 4 groups at the 'old field' site, we found that the smaller seedlings (&lt;9 cm initial height) and the tallest seedlings (&gt;18 cm initial height) were significantly shorter after 5 years than seedlings that started out between 13 and 18 cm (Fig. 3). This may have been the result of;</p> <ul style="list-style-type: none"> <li>• Smaller seedlings within a given population may be genetically predisposed to slower growth.</li> <li>• The larger seedlings may have outgrown their container. In Jiffy's this likely means that too many roots were outside the container when separated. Earlier root trimming may have helped these seedlings.</li> </ul> <p>The difference in performance between the two sites suggests that earlier tending may have benefited the white pine at the operational site.</p>																		

**Results.**

- At the open field site (Gurd), **SHORT white pine** have caught up to the TALL seedlings, and have survived better (94 vs. 80 %) up to 5 years (Fig. 1).
- At the operational site (McConnell) early results (5 growing seasons) indicate that **SHORT white pine** seedlings are the same height as TALL, but are significantly larger in stem volume (Photo 1, Fig. 2). Survival of the two groups is similar at this site (>90%).
- The white pine in this trial are performing better at the ‘open field’ site compared to the ‘operational’ site (20 % taller and 3.8X the stem volume).

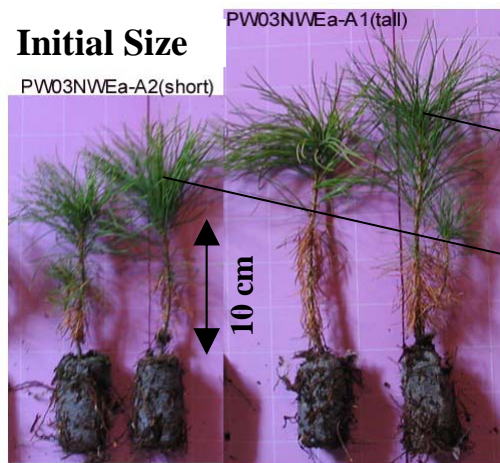
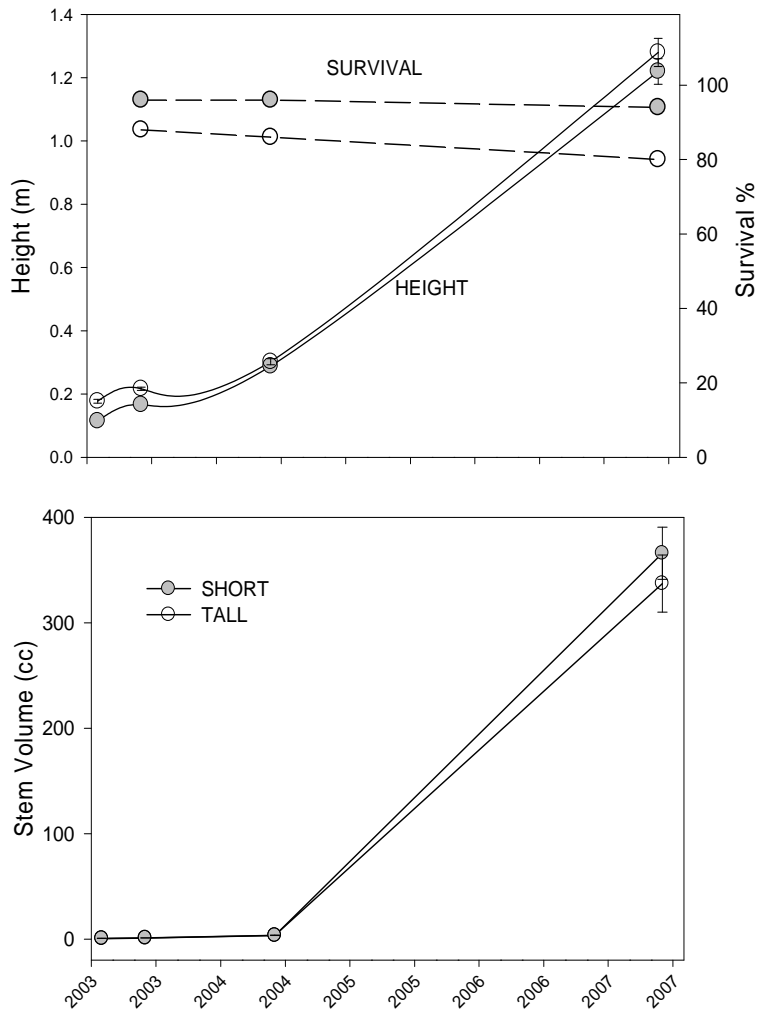
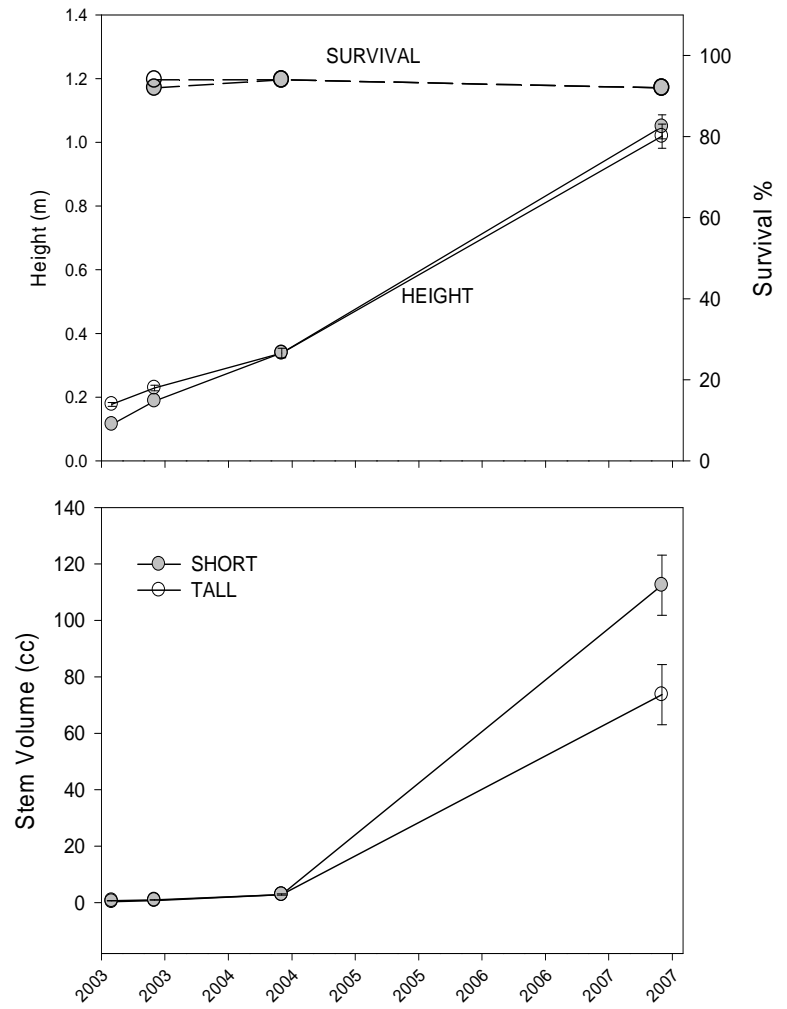


Photo 1. Field performance of White Pine from SHORT and TALL nursery crop populations at the ‘operational’ site (McConnell).

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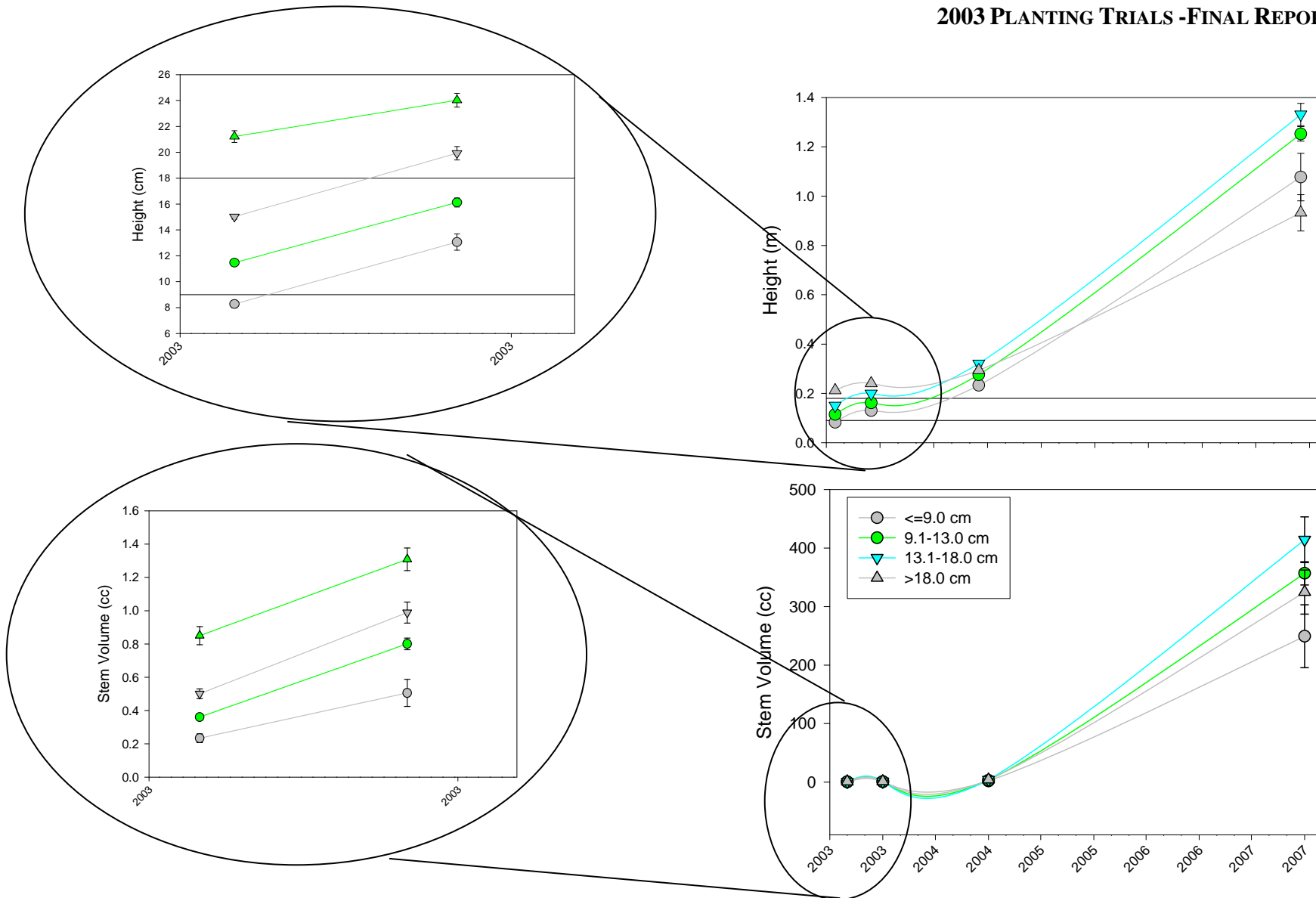


**Figure 1.** After 5 years at the ‘old field’ site (Gurd), the SHORT population of **white pine** is similar in size to the TALL population, but has better survival (94 vs. 80 %).



**Figure 2.** After 5 years at the ‘operational’ site (McConnell), the SHORT population of **white pine** is the same height as the TALL population, but is significantly larger in stem volume. Survival is similar at this site (>90 %).

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**Figure 3.** White pine seedlings that were initially ‘Short’ (<9cm) and ‘Tall’ (>18 cm) have not performed as well as seedlings that started out between 9 and 18 cm.

2003 Project # 5  
Nursery Stock Size  
5<sup>th</sup> Year Results.

