

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

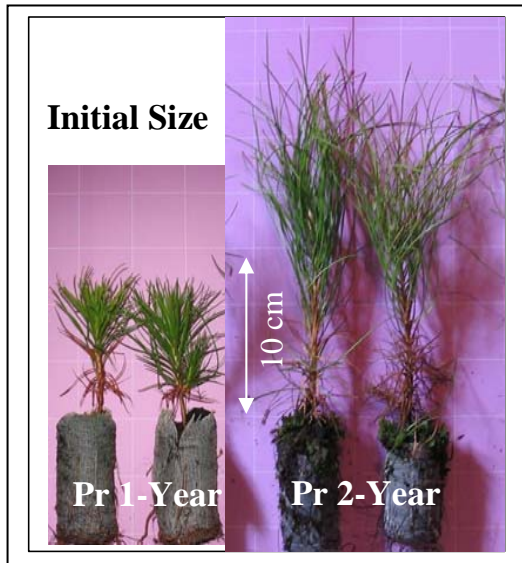
Project Name:	Crop Age
Crop(s)	PR03NWE(2-yr) – 36mm                      PR04NWEa(1-yr) – 36mm PW03NWEa-A2(2-yr) – 36 mm              PW04NWEa-A1(1-yr) – 36 mm SW03NWE(2-yr) – 30mm                      SW04NWE(1-yr) – 30mm
Factor(s)	1 year old stock 2 year old stock
Rationale	<p>In general, we think that larger 2-year old stock should perform better in the plantation with less tending, since these trees are taller and thicker at planting time. However, it may be that the smaller, perhaps more vigorous 1-year old stock would grow faster after planting and eventually catch up to the 2-year stock.</p> <p>The advantages of using 1-year stock relate to operational efficiencies. The planning forester does not have to project as far ahead and the nursery would not have to maintain the crops as long. However, the nursery facility must be able to sow the 1-year crop earlier, which requires more heat.</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>Foliage samples were analyzed for nutrient levels prior to planting.</p> <p>Seedlings were randomly selected from each of the above crops 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), 3<sup>rd</sup> (2005), and 5<sup>th</sup> (2007) growing seasons.</p> <p>Data was analyzed using Sigma Stat software, standard t-tests.</p>
Summary	<ul style="list-style-type: none"> <li>• At time of planting 1-year old stock was much smaller than 2-year stock for white spruce (Fig. 7) and red pine (Fig. 1). For white pine, 1-year seedlings were almost as tall as 2-year stock, but were not as robust (Fig. 4).</li> <li>• At the <u>operational site</u> (McConnell) early results (5 growing seasons) indicate that 1-year old planting stock can perform well in plantations of white pine, red pine, and white spruce in the Great Lakes St. Lawrence forest region. <ul style="list-style-type: none"> <li>○ For white pine and red pine, the 2-year seedlings are slightly larger, but this difference is not significant.</li> <li>○ For white spruce, although 1-year old seedlings were <u>much</u> smaller initially, they have caught up and passed the 2-year stock by the end of the 5<sup>th</sup> year.</li> </ul> </li> <li>• At the open field site (Gurd), 2-year old white pine and red pine remain significantly larger than 1-year old seedlings after 5 years. The 1-year old white spruce have caught up to the 2-year seedlings after 5 years.</li> <li>• For red pine, there is a very large difference in survival favouring the 1-year old seedlings. However, the 2-year stock had a root problem at the nursery</li> </ul>

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	<p>(documented in other reports at the time of planting). The seedlings for this trial were selected before the problem was identified, resulting in some damaged seedlings being planted.</p> <ul style="list-style-type: none"> <li>• Although this test shows that 1-year old seedlings can perform as well as or better than 2-year stock in an <u>operational plantation</u>, we should be cautious before discontinuing the larger 2-year stock. <ul style="list-style-type: none"> <li>○ There are many factors affecting the quality of nursery stock, and it is possible that the 2-year stock growing schedule could be adjusted to produce higher quality, more vigorous stock at the scheduled shipping time. <ul style="list-style-type: none"> <li>▪ For example, in the Jiffy container, it is possible that many roots had grown outside the container, and may have been trimmed too late to allow new roots to develop before overwintering.</li> </ul> </li> <li>○ Also, this test found that 2-year old pine seedlings grew faster on the open field site, suggesting that 2-year stock has more growth potential. It may be that with less competition, the older seedlings may more easily realize their potential.</li> <li>○ It is possible that white spruce are more sensitive to root trimming. A larger container, combined with the proper time of trimming, may produce a high quality 2-year white spruce seedling.</li> </ul> </li> </ul>
<p>Related Demonstrations</p>	<ul style="list-style-type: none"> <li>• Trials established in spring 2004 <ul style="list-style-type: none"> <li>○ Container Size – Red Pine – 1-year stock – J30 vs J36 mm</li> <li>○ Container Size – White Pine – 1-year stock – J30 vs. J36 mm</li> <li>○ Crop Age – Red Pine – J36 mm – 1-yr vs. 2-yr planting stock</li> <li>○ Crop Age – White Pine – J36 mm – 1-yr vs. 2-yr planting stock</li> </ul> </li> <li>• Trials established in spring 2005 <ul style="list-style-type: none"> <li>○ Crop Age – Red Pine – 1-yr (J30 mm) vs. 2-yr (J36 mm)</li> <li>○ Crop Age – White Pine – 1-yr (J30 mm) vs. 2-yr (J36 mm)</li> </ul> </li> <li>• Trials established in fall 2006 <ul style="list-style-type: none"> <li>○ Container Size / Crop Age – Red Pine – 1-yr (J30, J36mm) / 1.5-yr (J30, J36mm)</li> </ul> </li> </ul>

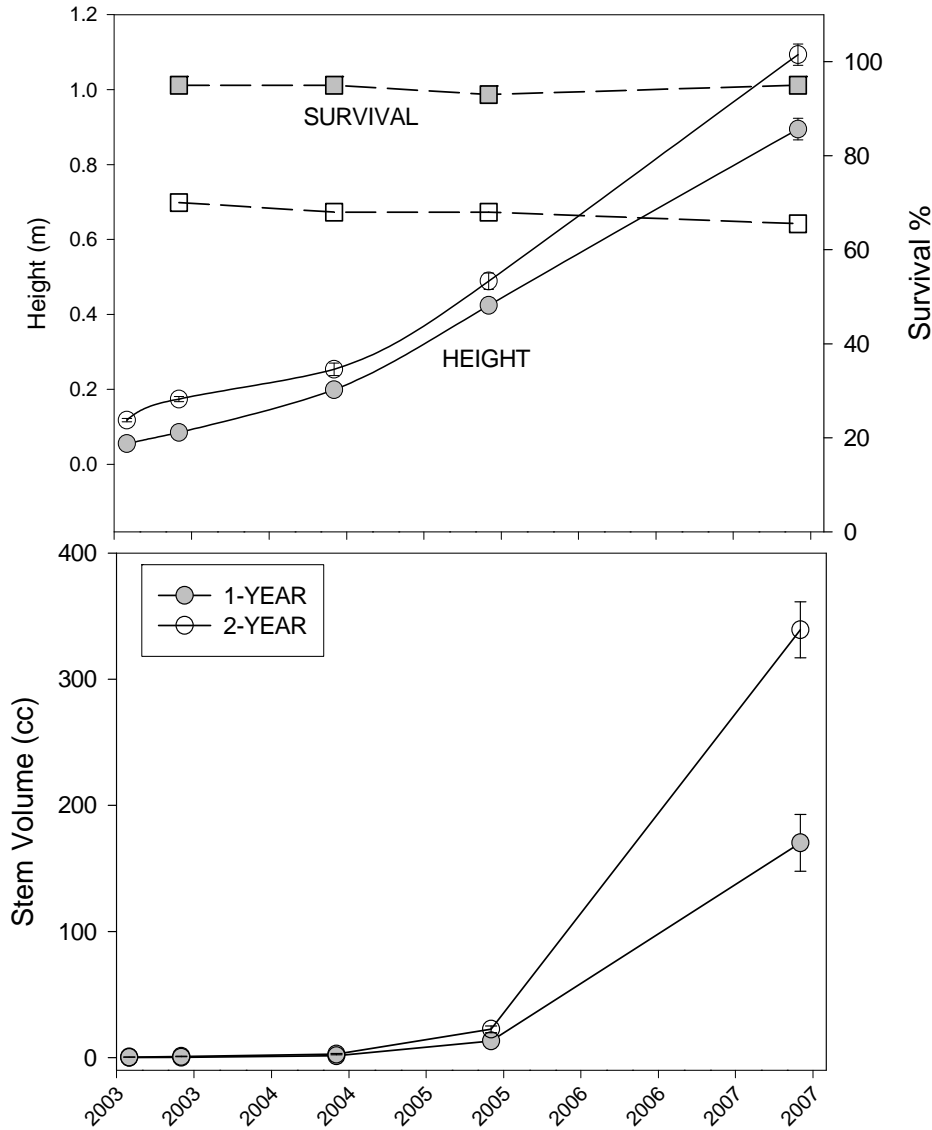
**Red Pine Results (Figs 1 -3).**

- At time of planting, 2-year old seedlings were significantly larger than 1-year old seedlings (Fig. 1).
- At both sites, 1-year seedlings survived much better than 2-year old seedlings (90% and 60% resp.) (Figs. 2 and 3).
- At the ‘old field’ site (Gurd), 2-year seedlings remain significantly larger after 5 growing seasons (similar to white pine) (Fig. 2).
- At the operational site (McConnell), the 1-year old seedlings are similar in size to the 2-year old seedlings (2-yr slightly larger) (Fig. 3).

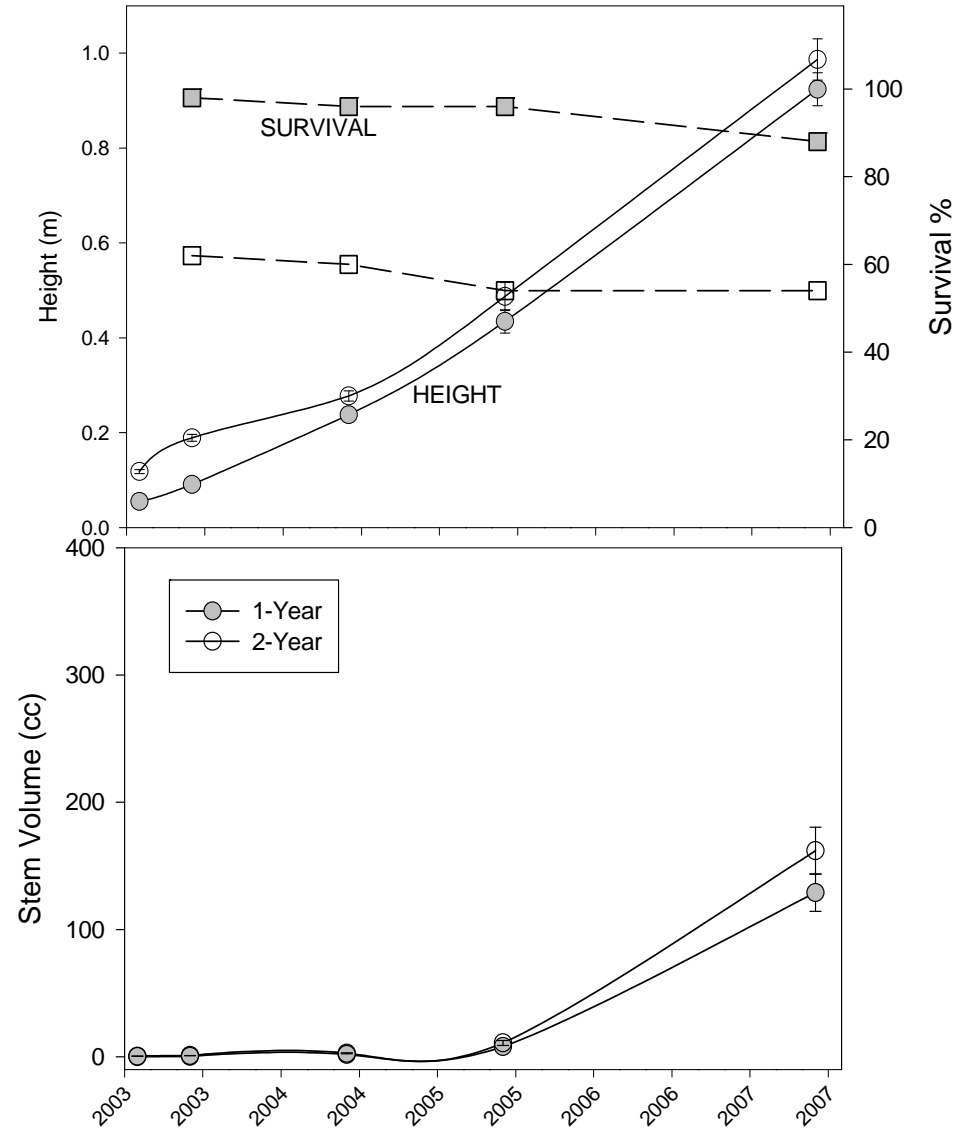


**Figure 1.** Field performance of 1-year vs. 2-year old Red Pine planting stock.

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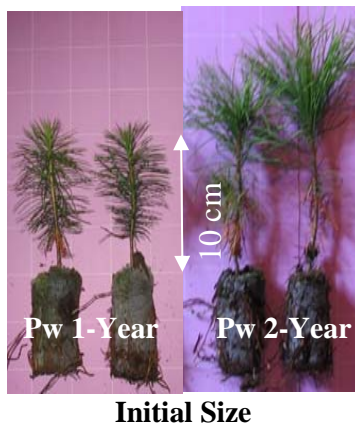
**Figure 2.** Two-year Red Pine stock has grown faster at the open field site (Gurd) during the first 5 years, however, survival is much lower.



**Figure 3.** After 5 years, 2-year Red Pine stock is not significantly larger than 1-year stock at the operational site (McConnell), and survival is much lower.

**White Pine Results (Figs. 4-6).**

- Initially, 1-year and 2-year seedlings were similar in size but the 2-year trees had more foliage (see photo in figure 4).
- At the Gurd site, survival was 96 vs. 87% comparing 1-year to 2-year planting stock, after 5 growing seasons. However, in this case the 2-year seedlings are significantly larger (stem volume and height) after the 5<sup>th</sup> year (Fig. 5).
- At the McConnell site, survival for 1-year and 2-year white pine was similar after 5 growing seasons (~85%) (Fig. 6). At this site the 2-year old seedlings were slightly larger but the differences are not considered significant (Figs. 4 and 6).

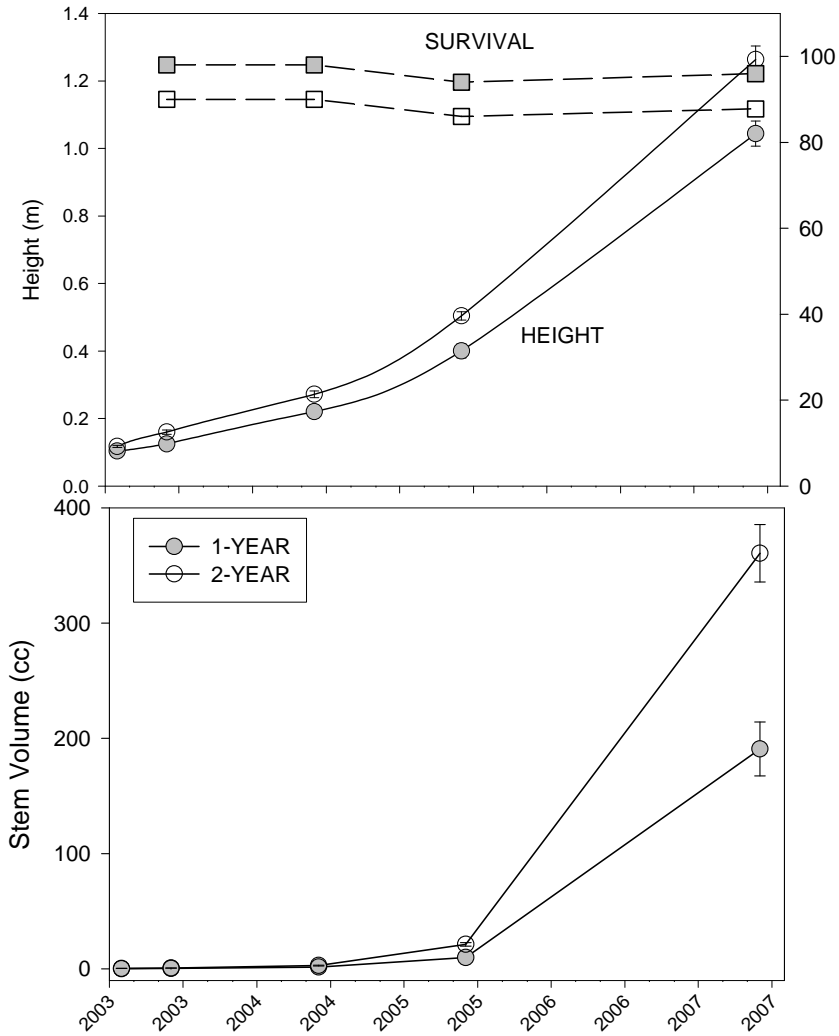


**Initial Size**

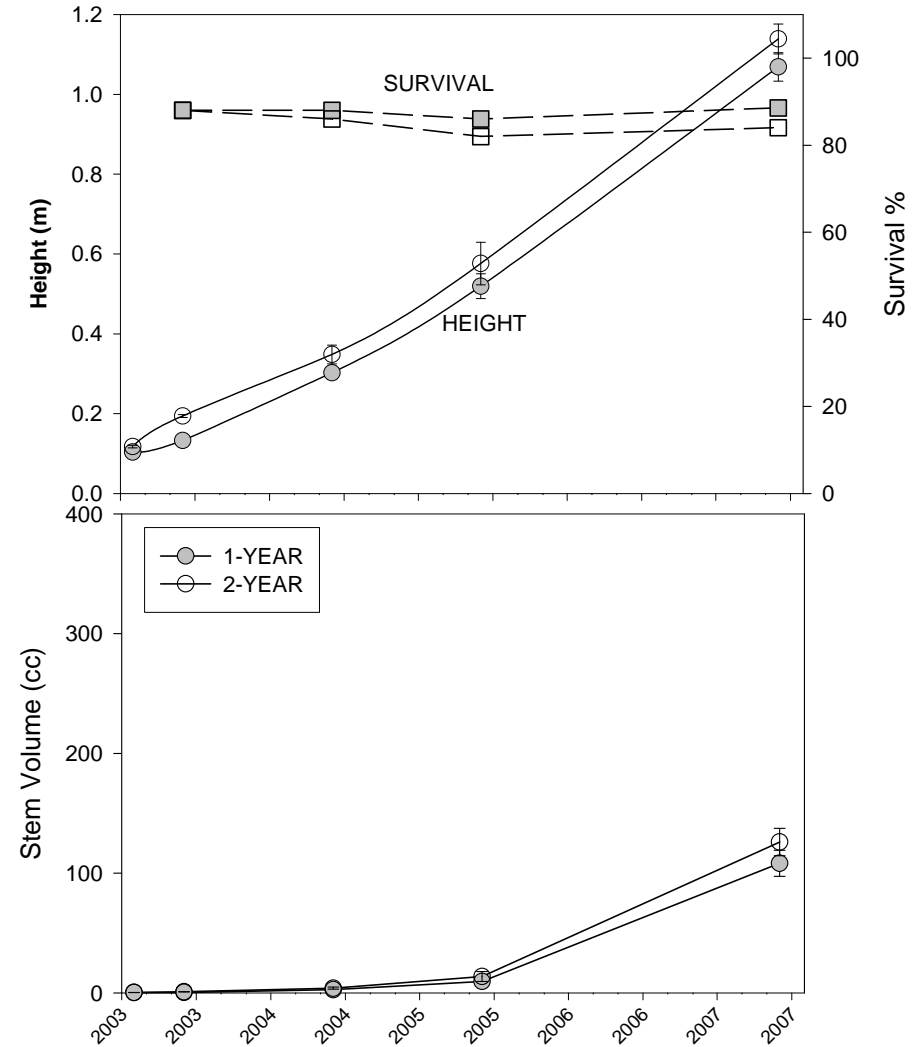


**Figure 4.** Field performance of 1-year vs. 2-year old White Pine planting stock.

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**Figure 5.** Two-year White Pine stock has grown faster at the open field site (Gurd) after 5 years, and survival is high (>85%) for both stock types.



**Figure 6.** After 5 years, 2-year White Pine stock is not significantly larger than 1-year stock at the operational site (McConnell), and survival is high for both stock types (>84%).

**White Spruce Results (Figs. 7-9).**

- At time of planting, 2-year old white spruce seedlings were much larger than 1-year old seedlings (Fig. 7)
- At the open field site (Gurd), 1-year old white spruce has caught up to the 2-year seedlings after 5 years. Survival is low for both stock types at this site (~50%) (Fig. 8)
- At the operational site (McConnell), after 5 growing seasons, 1-year old seedlings have caught up and passed the 2-year seedlings (Figs. 7 and 9). Survival for both stock types remains over 80%.

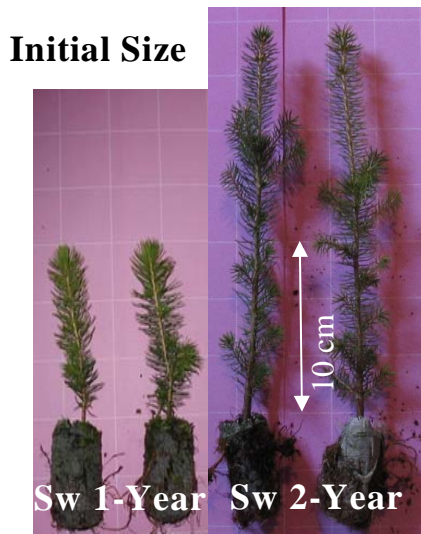
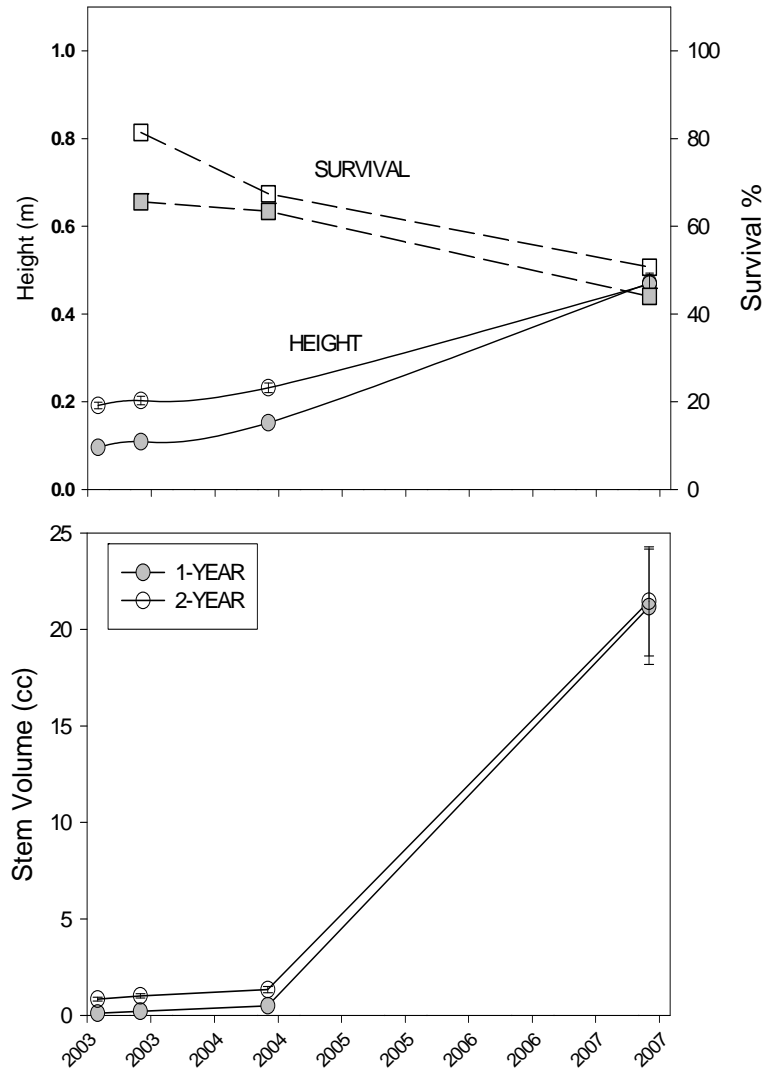
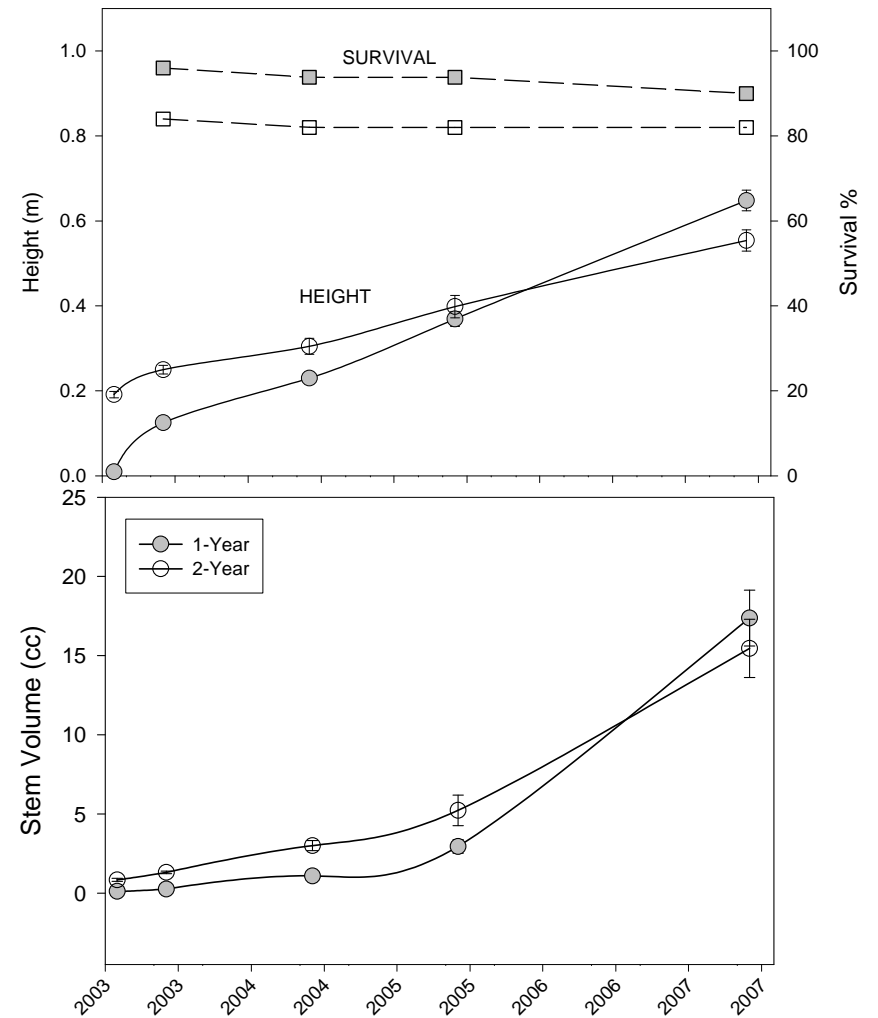


Figure 7. Field performance of 1-year vs. 2-year old White Spruce planting stock.

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**Figure 8.** After 5 years, 2-year White Spruce stock is the same size as 1-year stock at the open field site (Gurd), and survival is low for both stock types (>50%).



**Figure 9.** At the operational site (McConnell), although 1-year old White Spruce seedlings were much smaller initially, they have caught up and passed the 2-year stock after 5 years. Survival is >80% for both stock types.