

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

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| Project Name: | Planting Depth |
| Crop(s) | PR03NWE(2-yr) – 36mm PW03NWEa-A2(2-yr) – 36 mm |
| Factor(s) | Planting Depth: <ul style="list-style-type: none"> • SHALLOW = 1-2 cm of plug showing above soil surface • EVEN = top of plug even with soil surface • 25 % of stem buried = top of plug ~ 2.5 cm below soil surface • 50 % of stem buried = top of plug ~ 5 cm below soil surface |
| Rationale | <p>During other surveys, we noticed that white pine and red pine had been planted with the root plug up to 10 cm below the soil surface. Many of these seedlings exhibited stem damage at the soil surface. We also noticed that red pine seedlings planted with the root plug about even with the soil surface were growing well.</p> <p>Other studies, with bare root planting stock, had found that deeper planting, particularly for white pine was preferred. These studies had formed the basis for deeper planting, but with container stock, deep planting may not provide any benefit, and could be a detriment to plantation development.</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 1st (fall 2003), 2nd (2004), and 5th (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, ANOVA tests.</p> |
| Summary | <p><u>RED PINE.</u></p> <p>In general, the planting depths used for red pine in this demonstration resulted in acceptable performance in the plantations. However, the evidence suggests that deeper planting (root plug >5 cm below the soil surface) may be detrimental.</p> <p>Based on the results of this test, it is recommended that red pine seedlings are planted with soil plug just below the soil surface (< 2.5 cm).</p> <p>The difference in performance between the two sites suggests that earlier tending may have benefited the red pine at the operational site.</p> |

WHITE PINE.

As with the red pine, the planting depths used for this demonstration resulted in acceptable performance in the plantations. However, the deeper planted seedlings have grown slower.

Again, the best planting depth is with the root plug just slightly buried; ~ 2.5 cm. Based on the multiple stem possibility, seedlings should never be planted deeper than the lowest lateral branches (Photo 2).

The difference in performance between the two sites suggests that earlier tending may have benefited the white pine at the operational site.

Red Pine Results.

- At the open field site (Gurd), red pine planted with the soil plug even with the soil surface or buried ~2.5 cm are performing better compared to exposed plug seedlings or plugs buried 5 cm (Fig. 1).
- At the operational site (McConnell) early results (5 growing seasons) indicate there is little visual difference in red pine performance based on planting depth (Photo 1). However, seedlings that were planted with about 2.5 cm of the stem buried are significantly larger in stem volume (Fig. 2). Also, survival was lower (<70 %) for seedlings planted with 5 cm of stem buried (Fig. 2).
- Similar to other tests, the red pine in this trial are performing better at the ‘open field’ site compared to the ‘operational’ site (12 % taller and 3X the stem volume).

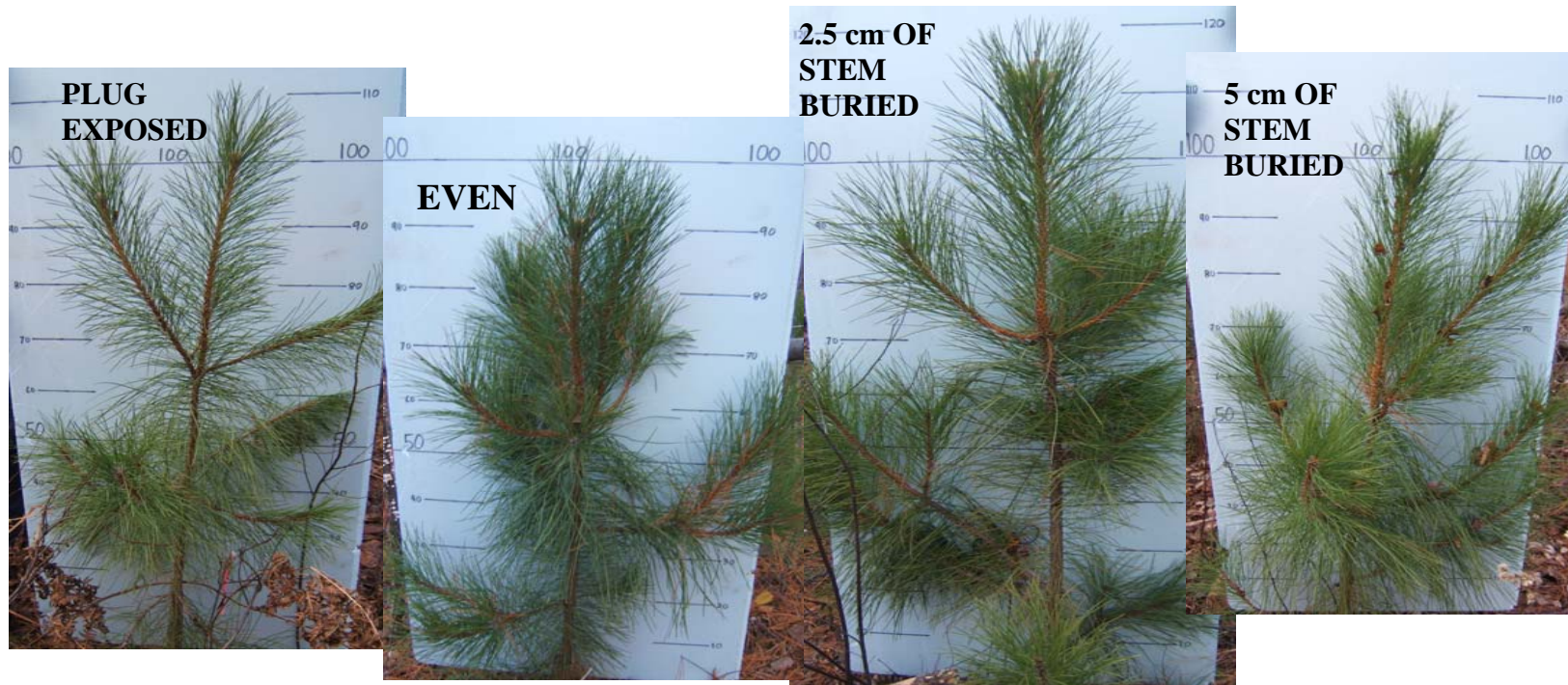


Photo 1. Field performance of red pine planted at various depths at the ‘operational’ site (McConnell).

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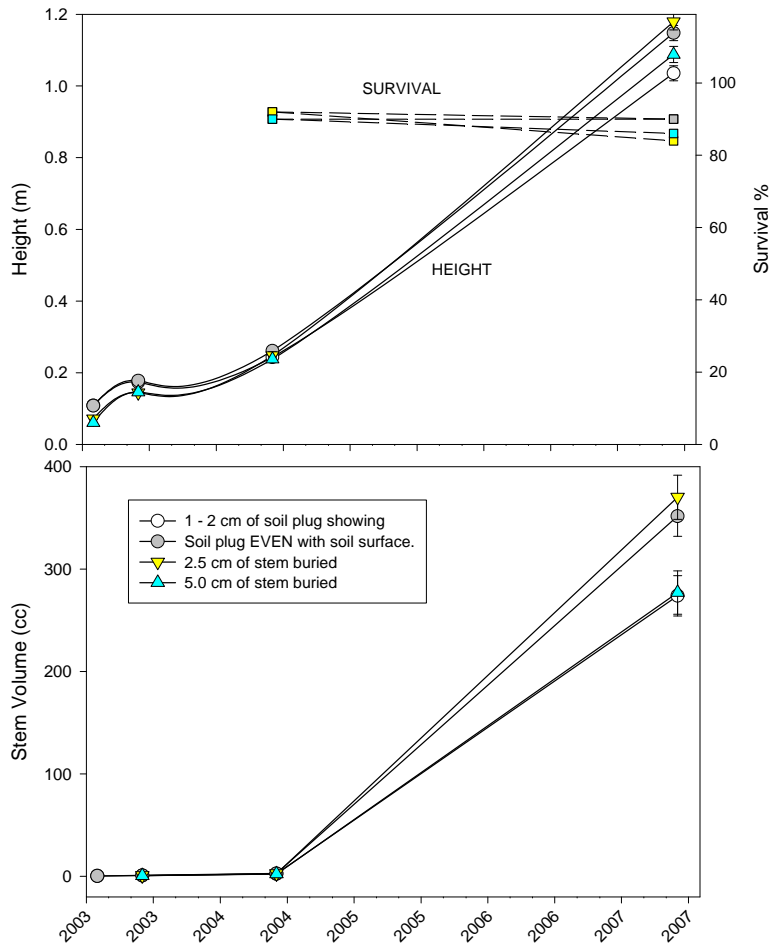


Figure 1. After 5 years at the ‘old field’ site (Gurd), **red pine** planted with the soil plug even with the soil surface or buried ~2.5 cm are performing better compared to exposed plug seedlings or plugs buried 5 cm.

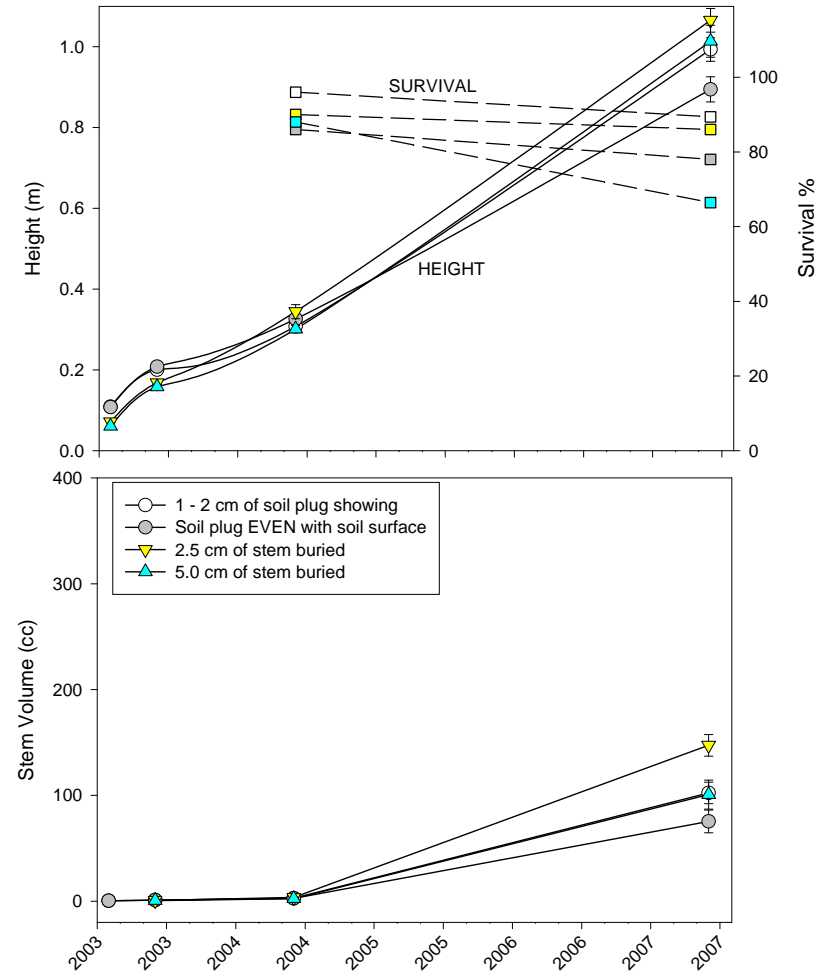


Figure 2. After 5 years at the ‘operational’ site (McConnell), **red pine** planted with the soil plug buried ~2.5 cm are performing better compared to the shallower and deeper planting depths.

2003 Project # 3
Planting Depth
5th Year Results



White Pine Results.

- At the open field site (Gurd), **white pine** planted with the soil plug even with the soil surface or buried ~2.5 cm are performing better compared to exposed plug seedlings or plugs buried 5 cm (Fig. 3).
- At the operational site (McConnell) early results (5 growing seasons) indicate that **white pine** seedlings planted with the plug exposed or even with the soil surface have performed better (Photo 3, Fig. 4). Although the white pine planted deeper have experienced a higher degree of competition, and are significantly smaller, they are still quite healthy (Photo 3) and have survived well (>85%) (Fig. 4).
- Again, the white pine in this trial are performing better at the ‘open field’ site compared to the ‘operational’ site (21 % taller and 5X the stem volume).
- An unexpected result of planting white pine too deep was multiple stems assuming a co-dominant character. This was due to lower branches being forced upward when the bases of these branches were below the soil surface (Photo 2).

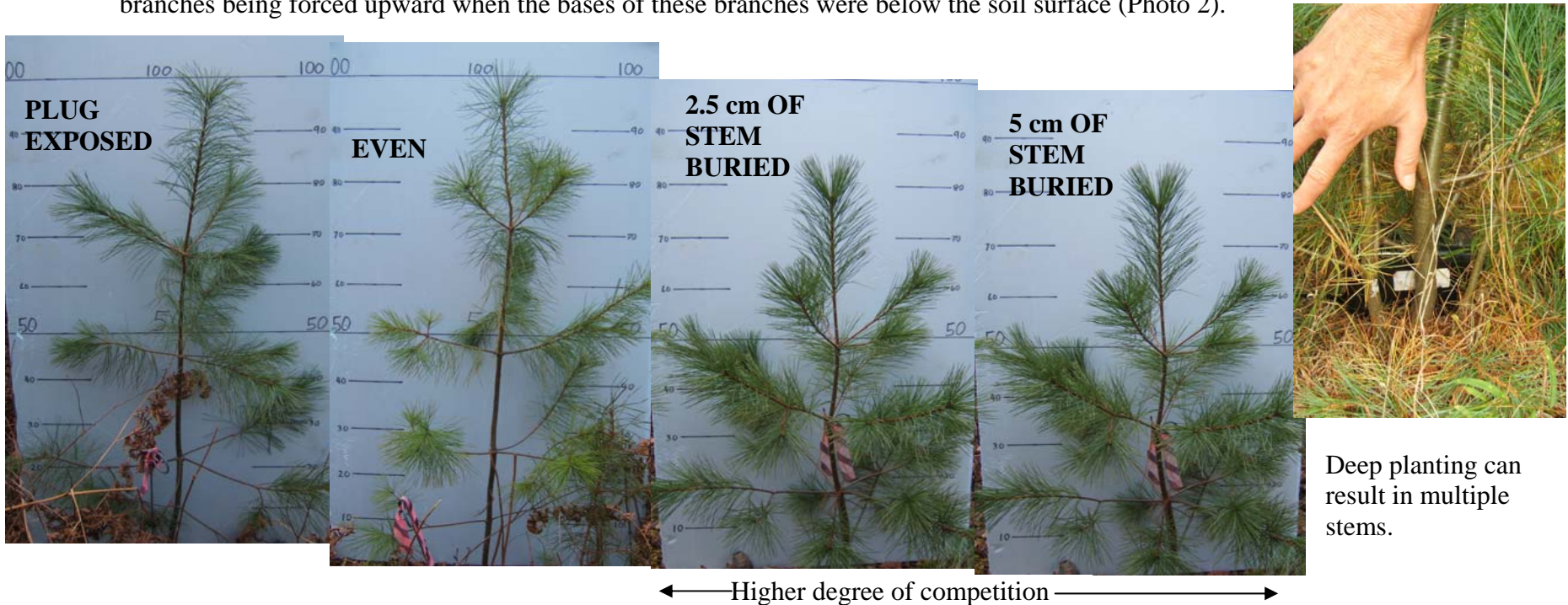


Photo 2. Field performance White Pine planted at various depths at the ‘operational’ site (McConnell). Although the site appeared uniform at establishment, the seedlings that were planted deeper have experienced a higher degree of competition.

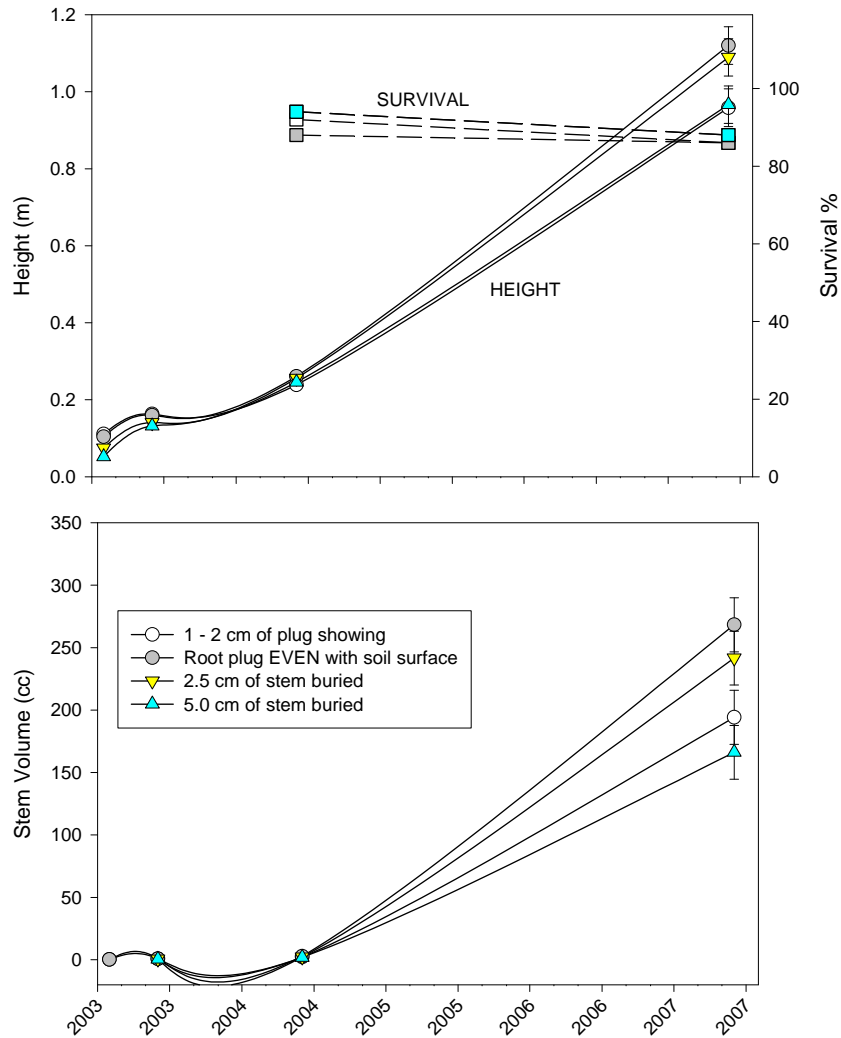


Figure 3. After 5 years at the ‘old field’ site (Gurd), **white pine** planted with the soil plug even with the soil surface or buried ~2.5 cm are performing better compared to exposed plug seedlings or plugs buried 5 cm.

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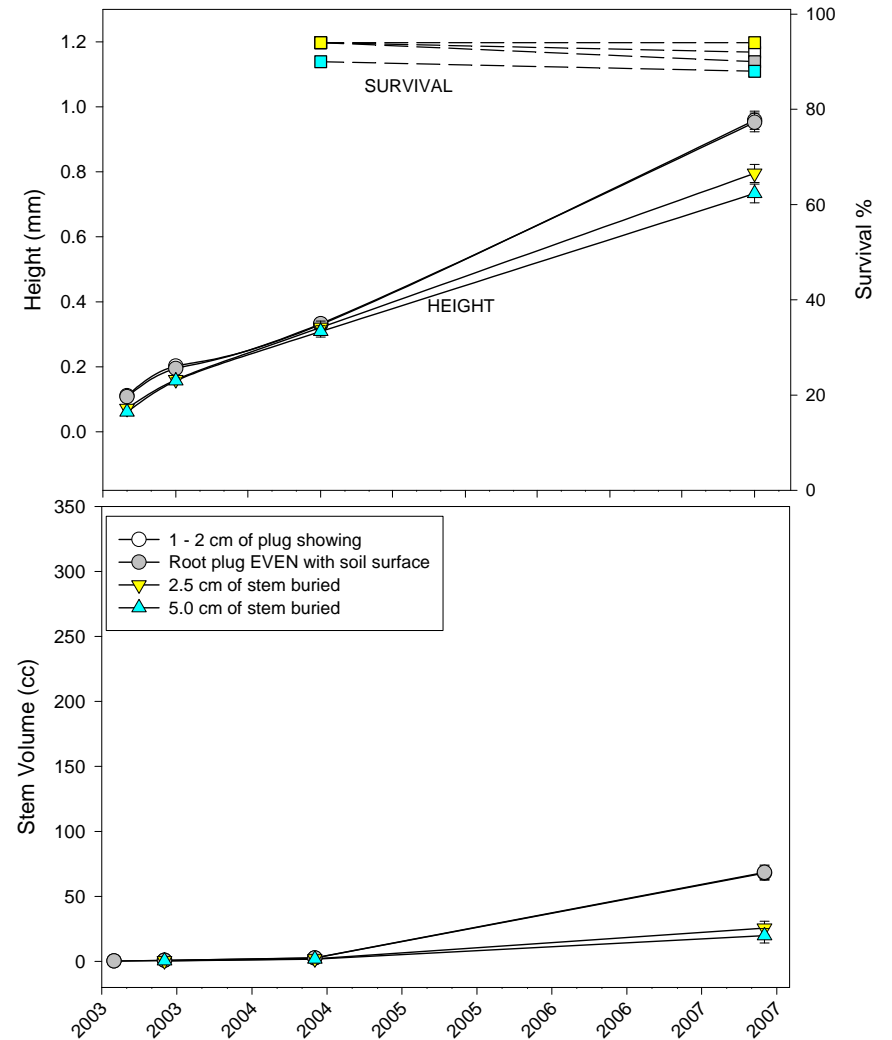


Figure 4. After 5 years at the ‘operational’ site (McConnell), **white pine** planted with the soil plug EVEN with the soil surface or with the plug exposed are performing better compared to the deeper planting depths.

