

Effects of Postharvest Holding Treatments on Transplant Success of Landscape Conifers

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Project Results Update

Unlike in 2004, the photosynthesis measurements for 2005 showed that there was not a significant difference in photosynthetic rates 2 years following the fertilization treatment.

There was however a significant difference in the growth in height and branch length between the fertilization treatments as seen in figure 2. There is evidence that shows that “the contribution of increased leaf photosynthesis (on a leaf area of weight basis) to growth responses to fertilization is small (Landsberg and Gower 1997).” Therefore although there was significantly greater growth in the compost and spike fertilization treatments compared to the control we would not necessarily expect to see great photosynthetic rates in these treatments. The uptake of luxury nitrogen in the trees appears to be stored as amino acids in the foliage rather than as rubisco (Yoder *et al* 1994, Landsberg and Gower 1997, Waring *et al* 1992).

Figure 1 Photosynthesis rate had significant difference between treatments for 2004 ($F=6.89$, p value $<.0001$), but no significance was found in 2005.

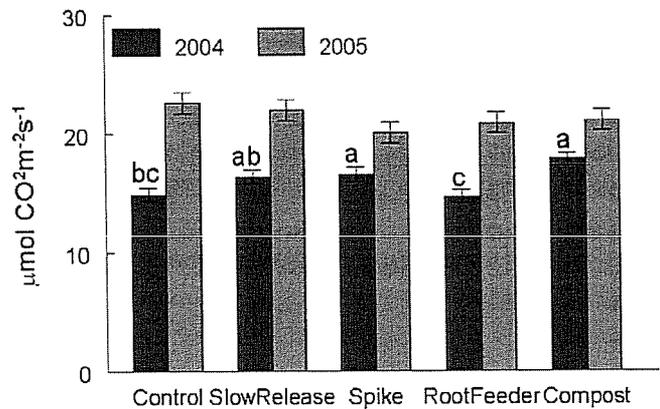
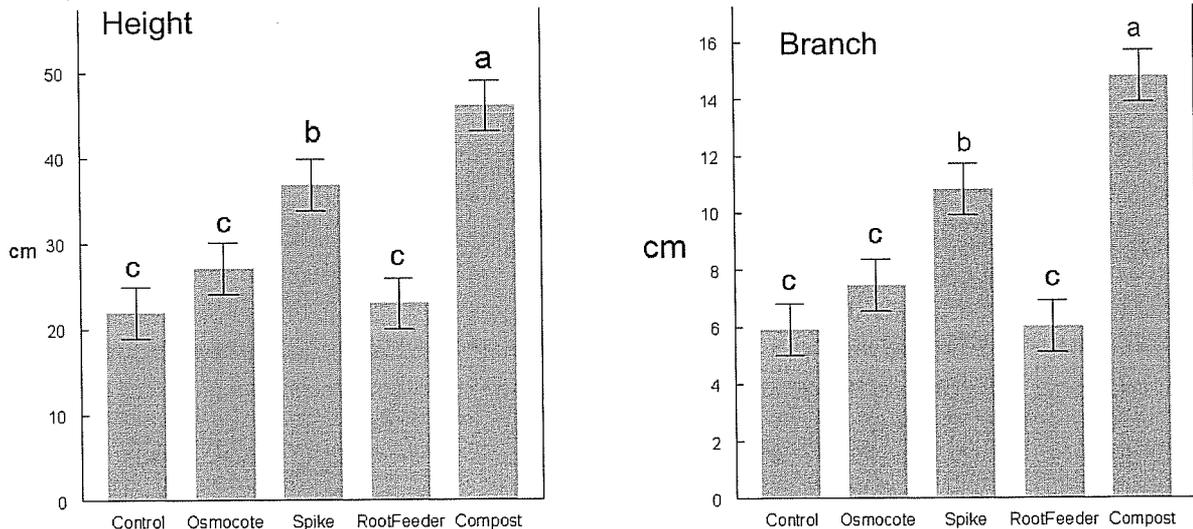


Figure 2 Increase in tree height and increase in branch length showed significant differences between fertilization treatments. (Height $F=2.64$ P value 0.0051; Branch Length $F=3.69$ P value 0.0003)



If there indeed was an increase in amino acids in the foliage this may support the findings that there was greater insect performance in the fertilization treatments that would have had great amounts of nitrogen available to the trees. Waring et al. found that as a result of increased foliar amino acids spruce budworm larvae needed to consume less foliage to develop to maturity (1992). The nitrogen analysis of the foliage is still being processed.

The significant increases in tree height and branch length for at least two of the fertilization treatments and lack of significant differences in stem growth (caliper) seen in 2005 growth for this project seem to concur with other findings. Fertilization of trees has been shown to cause a relative shift of growth from leaves to branches and from stems to branches (Satoo and Madgwick, 1982). Also, the growth results for the bio-solid compost treatments are in agreement with other studies on bio-solid versus chemical fertilization. Prescott & Blevins (2005) showed that bio-solid compost effects on growth are may be greater and last longer than chemical fertilizers, especially on nutrient poor sites.

Ongoing research for this project involves foliar monoterpene analysis and the soil and foliar carbon and nitrogen ratios. Upon completion of this analyses an enhanced understanding of the effects of fertilization on tree health after transplantation should help nurserymen better manage balled and burlapped conifers.

Research analyses shall be completed in by the end of the year. Final completion of thesis project is projected in April 2006.