

**FIELD TRIAL OF TIME-OF-PLANTING FERTILIZERS,
Year 2**

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INTRODUCTION

During the 2001 growing season Brinkman & Associates Reforestation Ltd. contracted the MOF Surrey Nursery to undertake field trials of 7 time-of-planting fertilization treatments. The treatments tested were:

- No Fertilization (Control)
- Nutripak 16 gram 25-9-9
- Spectrum Pacific “Teabag” 16 gram 25-9-9
- Agriform Tablets
- 15 ml Fish Based Fertilizer
- 30 ml Fish Based Fertilizer
- 60 ml Fish Based Fertilizer

The design of the trial is detailed in the first year report. Results from the first year of the trial showed striking differences between the treatments:

- The three treatment levels of the fish based fertilizer, and the Agriform Tablets, showed clearly positive results, with trees showing decreased signs of planting shock, increased height & calliper growth, and an extended growing season. The best results were achieved with the 30 & 60 ml fish based fertilizer treatments. All treatments showed enhanced root growth, but some root asymmetry was noted with the Agriform Tablet
- The Nutripak treated trees showed reduced planting shock, and somewhat increased growth rates for both the top and roots, as compared with the control, but also some increase in mortality.
- The trees treated with the Spectrum Pacific product showed very high levels of mortality, highly asymmetrical root growth in surviving trees, and no growth enhancement

During the second year of the trial, answers were sought to a number of critical questions:

- Would the growth enhancing effects of the successful treatments continue for another year?
- Would the trees treated with the Nutripak product, which apparently still contained a significant amount of fertilizer, show a significant increase in growth rates in the second year?
- Would there be further mortality from any of the treatments?

TRIAL RESULTS

1. Survival

None of the treatments showed significant further mortality in the second year. One tree which was performing very poorly, and appeared likely to die, was noted in the control group. Apart from that tree, all trees remaining after the first year were still growing.

2. Foliage Condition

In the first year, the untreated control trees showed significant chlorosis, typical of planting shock, as did a few of the trees treated with the Nutripak and the Agriform Tablet. By the end of the second growing season, all of those trees had recovered, and displayed good foliage color and form. The trees treated with the fish fertilizer appeared to be a somewhat deeper green than the other trees, but the difference was slight.

3. Height Growth

The difference in height between the treatments which had been noted in year 1 continued in year 2. Differences were relatively dramatic, and very visible in the field. The three following photos demonstrate the difference in height and overall size:



Picture 1 : Control (Left) and Nutripak (Right), Sept 10 2002



Picture 2 : 15ml Fish Fertilizer (Left) and Agriform Tablet (Right)



Picture 3 : 60 ml (Left) and 30 ml (Right) Fish Fertilizer Treatments

The visual impression was confirmed by the data, which showed that variations in total height increment over the two growing season between the various products were dramatic. Although height growth for all treatments increased in 2002, as would be expected, the treatments which performed better in 2001 increased their advantage in 2002. Chart 1 shows the relative height increment over the two years for the various treatments.

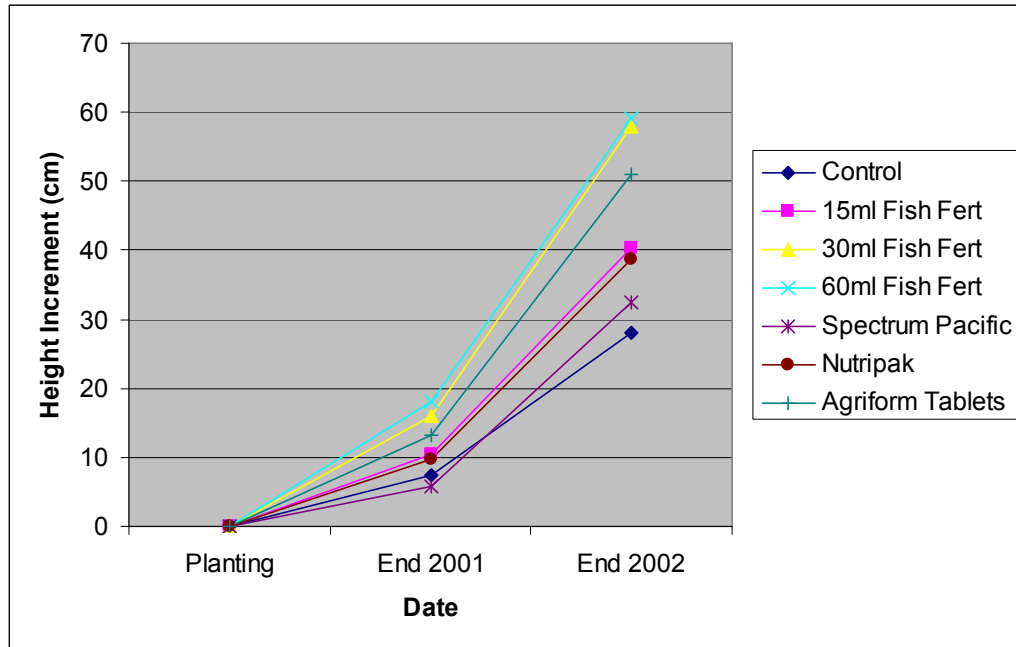


Chart 1 : Height Growth of the Various Treatments

It should also be noted that after the substantial mortality associated with the Spectrum Pacific Teabags in 2001, only three trees remained to be sampled in 2002, as compared with over 30 trees for all the other treatments. As a result the Spectrum Pacific results are not regarded as highly reliable.

4. Caliper Growth

Trial results in terms of stem caliper followed a similar pattern to that noted for tree height. As Chart 2 shows, the range of calipers was significant, and those treatments which performed better in year 1 generally increased their lead in year 2:

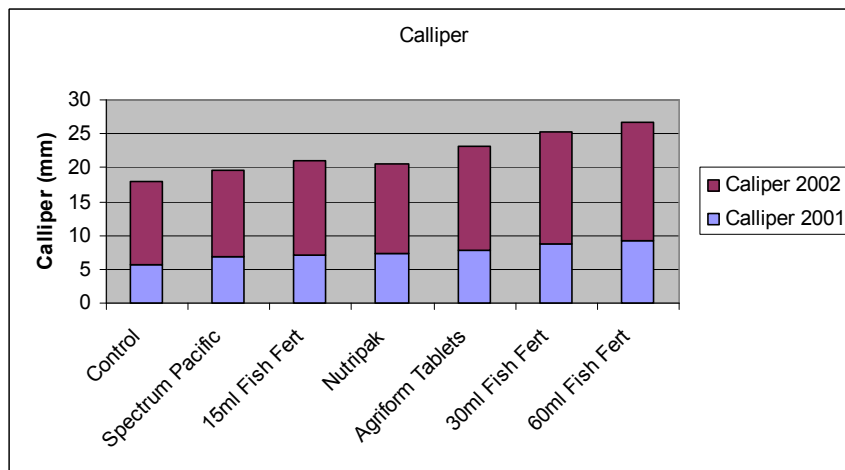


Chart 2 : Stem Root Collar Caliper by Treatment

5. Root Form & Fertilizer Condition

Roots of all the trees were well established by year 2, to the point that excavating the complete roots systems of many of the trees became difficult. The somewhat better established roots associated with the fish fertilizer treatments in year 1 resulted in more larger roots for these treatments in year 2. However, most of the treatments showed very robust root systems.

The only exception to this rule was the trees treated with the Nutripack, where an increased bias in root development away from the packs was noted. However, only two trees were excavated this year, to preserve trees for the third year of the trial, and the results may not have been representative.

The only fertilizer product which was still evident was the Nutripack. Excavated Nutripacks still had about 45% of their original fertilizer present in them by weight (about 6.5 grams of dry fertilizer from the original 14.5 grams). However, it is probable that the remaining material contained a higher percentage of the fillers than the original material, so probably the majority of the nutrients had escaped the pack. Thus over two growing seasons we estimate that about 8 grams of fertilizer had escaped per tree. This relatively low total amount would appear to explain the relatively poorer performance of the Nutripack treated trees as compared with most of the other treatments. The contents of the Nutripacks when excavated consisted of a significant portion of highly concentrated fertilizer in solution, as well as remaining solids.

Given that this is an irrigated site, where relatively consistent mobilization of the fertilizer would be expected, it would appear that for the Nutripack product to be successful, fertilizer release rates would have to be substantially increased, while at the same time ensuring that root burning did not occur. Given the highly concentrated solution present within the package, nutrient release during drought periods carries a significant risk of root burning.

SUMMARY

In the first year of this trial, the fish based fertilizers appear to provide superior growth results in planted trees when applied in the correct position and amount. The Agriform Tablet also appeared to provide excellent results. The Nutripak product was potentially associated with some mortality, and did not provide as much of a first year boost as the other products, although it had clearly eliminated chlorosis and other superficial signs of planting shock. The Spectrum Pacific Teabag product caused extensive mortality, poor root form, and did not assist growth.

We had anticipated that year two results might look different than year 1 results. We theorized that the performance of the Nutripack treated trees would improve, relative to the other treatments, due to the amount of fertilizer left in the pack. This performance improvement did not occur, however. To date it appears that the trajectory of tree growth was largely established in year 1. The cause for this, however, is not clear. It is possible that residual increases in macronutrient content in the soil are still present. On the other

hand, it is also possible that the enhanced root network and photosynthetic capacity resulting from the superior year 1 treatments is driving growth in year 2.

The current intention is to maintain this trial through year 3. Residual increases in macronutrient content in the soil should no longer be a factor by that time, allowing us to assess whether the larger trees resulting from the more successful treatments will continue to outperform the control trees.