To:  Colleen Wood  
      Sx Trial Coordinator  
      Silviculture Branch  
      Victoria, B.C.

From:  FD #7

Date:  MAY 16 1990

Our File:  
Your File:  

Re: Final Report on Sx Trial SX8640IV

The final remeasurement of this trial has been completed. Looking at the Working Plan for this trial I note the commitment to 10 trees in each trial. The actual number was 6.

I cannot find the time to work out the statistics involved in an Analysis of Variance test which could properly be applied to this trial. If you like, I can send you the raw data and you can have someone, or some computer do it.

I have worked out the means that the 90% confidence limits for each treatment and some patterns developed. The pattern of growth loss has been different for diameter growth than for height growth.

Diameter Response

The diameter response to phosphorous alone appears, if anything, to be slightly negative. The 50kg./ha. dose appeared to lower growth 11% had the 80kg./ha. dose increased the growth 7%. I believe that if ANOVA were conducted the difference would not be significant. The response to phosphorus alone two years ago appeared to be clearer and more strongly negative. The 50kg./ha. dose showed a stronger negative response than the 80kg./ha. however. This indicates that the response to fertilizer is now wearing off.

The diameter response to nitrogen alone was positive. A 33% increase in growth was experienced over four years compared to the control's growth. This is very close to the response two years ago and I believe it is significant.

The largest and more dramatic diameter response was to the nitrogen and lower dose phosphorus treatment. There was a 71% increase in growth compared to the control over four years. This difference has increased from the 63% difference from two years ago. There was also a positive relationship for the nitrogen and higher dose phosphorus treatment, but not as large, and has decreased since two years ago.

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HEIGHT RESPONSE

The pattern of response in height was slightly different than in diameter. There was no significant difference between the first level of phosphorus only and the control, but there was a substantial negative response to the higher phosphorus dose (-29%). The pattern in diameter is the reverse for these two treatments.

The four-year height response to Nitrogen only was strongly positive (+42%), but substantially less than the 109% response of two years ago.

The best response was to the nitrogen and first level of Phosphorus treatment. This is also true for diameter response. Two years ago the response was 192% and now the response has tailed off the 75% more growth compared to the control growth.

For the nitrogen and the second level of phosphorus the response was positive but not quite as good as for nitrogen only.

DISCUSSION

It would appear that the response to the various fertilizer treatments follows a roughly similar pattern for diameter and height. Phosphorus alone appears to have, if anything, a negative effect on growth if no nitrogen is added to it. Good response is achieved from nitrogen only, but the best results are obtained if some phosphorus is added to it. It would appear that the effect of the fertilization, while still evident, is wearing off.

The site which was chosen for the trial was severely burned in the fall of 1974. As a result, the site probably has a severe deficiency of nitrogen and is also deficient in phosphorus and other micro-nutrients. As a result the site is now growing trees along a low site curve rather than a poor one. The site was originally rated poor, as far as I can tell. Now, fifteen years following planting the trees are only 2.6m tall on average. That's only 17 cm a year. Now the growth on the growth on the control averages only 10 cm/yr in height. The best treatment only brings this to less than 20 cm. This is still less than the Regional stocking standards for a free-growing tree on a similar site.

Looking at the cedar and hemlock which have naturally established on the site, I think that they are looking fairly vigorous and healthy. They are not as tall as the spruce, but likely will surpass them in the next five years.
I believe that this trial has succeeded in demonstrating a positive response to fertilizer in Sitka spruce documented elsewhere. However, I think that operational fertilization cannot at this time be justified from a strictly forestry point of view. I recommend that we wait until the natural regeneration is about the same size as the spruce and space the stand to favour the natural regeneration. That is when fertilization should be conducted. It would concentrate growth on the crop trees plus increase the nutrient capital of the site.

Sandy McRuer, RPF

Sandy McRuer,
District Silviculturist
Port Alberni Forest District
Four-Year Height Growth of Sitka Spruce Following Six Fertilizer Treatments (showing means and 90% confidence limits)

Treatment: $P_0 N_0, P_1 N_0, P_2 N_0, P_0 N_1, P_1 N_1, P_2 N_1$
Four-Year Diameter Growth of Sitka Spruce Following Six Fertilizer Treatments
(showing means and 90% confidence limits)