MARITIMES FOREST RESEARCH CENTRE

TECHNICAL NOTE NO. 25

FERTILIZING BALSAM FIR CHRISTMAS TREES IN WILD STANDS

When nitrogen fertilizer is spread beneath a balsam fir, the tree responds to this increase in available food by growing faster, producing longer needles and the following year, more and larger buds (Fig. 1). Needles become a darker green, and the stomata (the twin rows of white breathing pores on the underside of the needles) become whiter and conspicuous - best seen by flicking a branch upward on a sunny day, reflecting a silvery flash off the stomata in the sunlight. Survival of the current year's buds is higher and the life span of individual needles is increased (needles normally live 2-7 years). For the Christmas tree producer, all these changes mean a more attractive and densely foliated tree, either directly or through shearing. The problem is to decide what fertilizer to use; when to apply it and how much!

What Fertilizer?

The fertilizer to use in the Maritimes is ammonium nitrate or urea. Each has its advantages. Ammonium nitrate is more stable but more bulky requiring more volume per pound of actual nitrogen than urea. Urea will dissipate when exposed to sunlight and has been accused, but never actually convicted of causing increases in the numbers of aphids and other sucking insects feeding on fir.

When to Apply?

Fertilizer should be applied in late May and June. Applied too early, the nitrogen will be leached from the soil

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ENVIRONMENT CANADA

MARITIMES

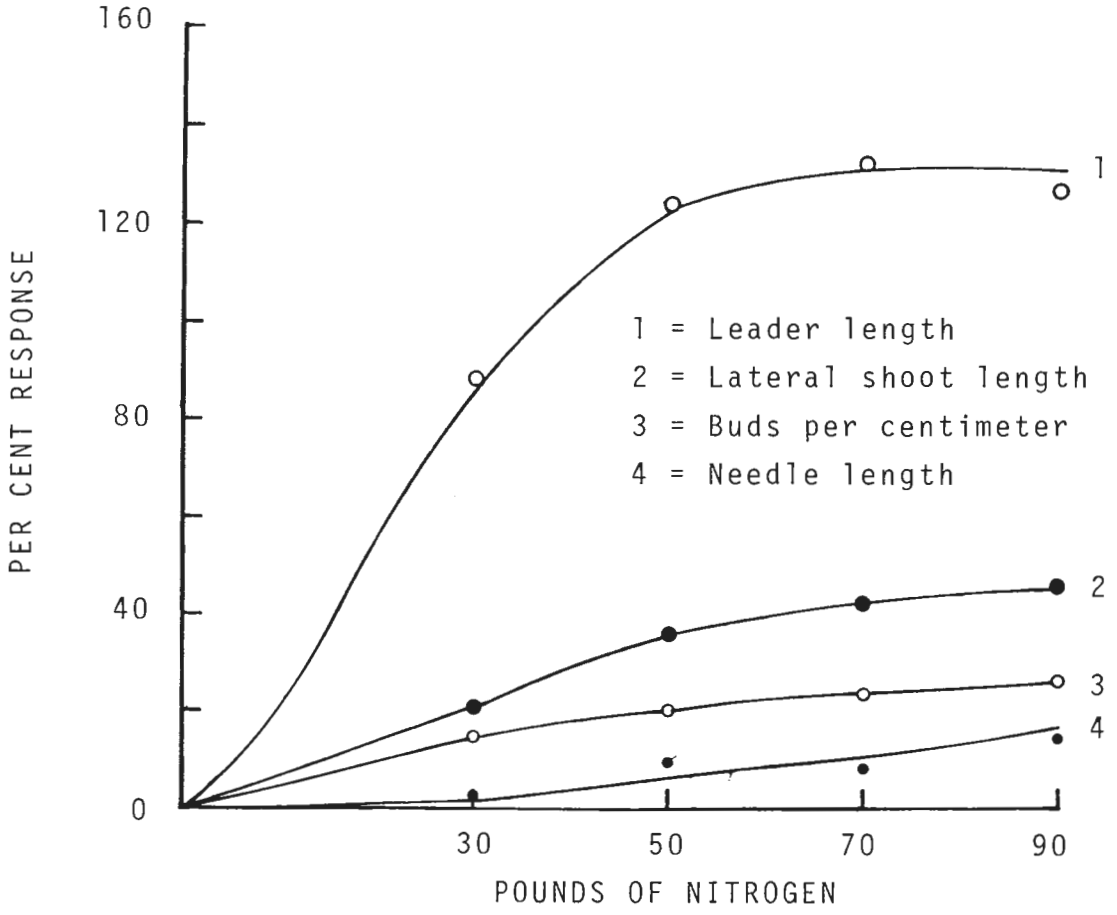

Fig. 1. Average responses of balsam fir one year following broadcast treatment of nitrogen.

by early spring rains and melting snow and carried away in the groundwater before it can be utilized. Applied too late, it may prolong the needle-growing period and cause premature needle drop in late fall as the result of frost-kill.

How Much to Use?

The optimum rate of fertilizer application ranges from 165 to 275 lbs of ammonium nitrate, [122 to 203 lbs of urea] per acre depending on the growing qualities of the site. Optimum application rates and expected results for a range of sites are shown in Table 1. To use the table effectively, first examine the area to be treated and determine if it can be divided into separate sections according to the rate of growth and general appearance of the trees, then sample within each area to determine an index of needle length. Do this by selecting one lateral shoot at breast height on the south side of each sample tree. Pluck 10 needles from the shoot and measure the longest needle (Fig. 2). Sample 10 trees

and average the results to obtain an index of needle length which will serve as a convenient indicator of site quality for balsam fir Christmas trees. Remember that the intent is to fertilize the tree not the site!

But What About Potassium and Phosphorus?

According to studies at this Centre, balsam fir Christmas trees do not respond to large applications of phosphorus or potassium. But each time trees are harvested some of these nutrients are removed with the foliage, and theoretically should be put back. We do not know the exact amount required, but from other studies, we have calculated that 60 lbs each of triple super-phosphate and potassium sulphate will more than replenish the lost nutrients, if applied at least every four years. Alternatively a mix such as 20-5-5 can be applied at 300 lbs per acre every 2nd year or 150 lbs/acre every year.

TABLE I

EXPECTED PER CENT INCREASE IN GROWTH RESPONSE ONE YEAR FOLLOWING FERTILIZATION WITH AMMONIUM NITRATE

	NEEDLE LENGTH			SHOOT LENGTH			LEADER LENGTH		
	TREATMENTS*			TREATMENTS			TREATMENTS		
Needle Index (mm)	1	2	3	1	2	3	1	2	3
< 15.9	36	31	26	102	91	83	188	142	103
16-17.9	24	18	15	81	68	59	143	93	61
18-19.9	12	8	5	51	38	26	65	30	15
20-21.9	6	2	<1	20	8	1	<1	<1	<1
> 22	2	<1	<1	<1	<1	<1	<1	<1	<1

*Broadcast treatments of ammonium nitrate

1 = 275 lb per acre; 4.5 oz per tree (at 1000 trees/acre)

2 = 220 " " " ; 3.5 " " " " " "

3 = 165 " " " ; 2.5 " " " " " "

Fig. 2. Measurement of length of longest needles at the centre of a lateral shoot.

Expectations, Great and Small!

On the average, the Christmas tree producer can expect to add from 1 to 5 mm to needle length. This increase can in theory increase density, usually by about 10%, and in some instances by as much as 20%. The number of internodal buds can be increased from as few as 6 per shoot to anywhere from 16 to 30. A darker green colour response can almost always be expected.

However, except for colour change, some of the trees will not respond to fertilizer. This may be up to 20% of the trees treated at the higher rate and up to 30% at the lower rate and variation will be greatest at the higher rate. More variable than plantations on cultivated land, conditions in wild stands are such that trees side by side are often growing in quite different situations. For example, a tree on a hummock is mostly growing on the remnants of an upturned root of some long-since fallen tree. Its neighbor, growing in the adjacent hollow, persists on thin soil left when the roots were torn from the ground. Often the slope is variable and groundwater and roots wend by hidden obstacles beneath the surface. However, in spite of this variability of wild stands, the Christmas tree producer operating in a wild stand can gain some solace from the certainty that the wild site he has selected is capable of growing balsam fir.

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Technical & Information Services
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