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Fertilization of Christmas Trees in Michigan

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Potential Benefits

The idea of Christmas tree fertilization is not new in Michigan. In the 1960's, research with Scotch pine showed no significant positive response to fertilization. Because other species were not planted extensively, Christmas tree fertilization research was not pursued on other species.

Today, Douglas-fir, Colorado Blue Spruce, Concolor fir, Fraser fir and other species are planted in Michigan as Christmas trees. These species typically have higher site requirements than those of Scotch pine and may benefit from fertilization. Fertilization research has been initiated with some of these species but it will be several years before specific research based fertilizer recommendations will be available.

Use of current cultural techniques such as site selection, seed source selection, species variety selection, chemical weed control and mowing should precede the widespread use of fertilizers. The need for fertilization is decreased when other limiting factors are minimized through the implementation of the proven cultural techniques listed above.

Potential benefits of fertilization can include improved foliar color, longer foliage retention, longer needles, larger buds and faster growth. Indirect benefits resulting from increased overall tree health through fertilization are more difficult to assess.

Weed Control Program

The first step in any fertilization program is a good weed control program. It is imperative that weeds are controlled prior to the time of fertilization. Herbicides are typically the most efficient method for accomplishing weed control.

Plowing and disking, prior to planting, is becoming an accepted practice among Michigan Christmas tree growers. Tillage has a positive impact on tree growth and in some cases the response may be greater than that from fertilization. Tillage improves water infiltration rate, and causes a temporary increase in the level of available soil nutrients. A loosened soil also allows for faster and more prolific root growth. In combination with tillage, the use of pre-emergent herbicides is also an effective method of weed control.

The Importance of a Soil Nutrient Test

Many Christmas tree growers in Michigan fertilize some of their trees. In an ideal situation, fertilizer recommendations would be based on species, tree height, soil nutrient test results and soil type. The amount of growth response for each species would also be known for each recommendation. Lacking this information, recommendations are based on soil test results and educated guesses of growers, county extension agents and extension specialists.

The fertilizer recommendations in Table 1 are provided for your discretionary use. Fertilization during the first growing season is not recommended unless it is a soil incorporated broadcast application before planting. Generally, Christmas tree plantations should be fertilized on an individual tree basis after they have been established. Apply fertilizers 12 inches away from the main stem on young seedlings or along the outside edge of an existing tree crown on older trees. Fertilizers with a 1-1-1 ratio are recommended. Fertilization on an every other year schedule is probably sufficient in most situations.

Soil pH

If soil tests prior to planting indicate that soil pH is substantially below pH 5.0, dolomitic limestone can be used to raise soil pH before planting. Dolomitic limestone also increases the available amounts of both Ca and Mg. County extension offices can provide information on the amount of lime needed to increase soil pH to recommended levels. If soil pH is greater than 7.0 species tolerant to high pH soils should be selected for planting.

Application Rates

Table 1: Recommended Fertilizer Rates¹ for commonly used fertilizer formulations on two general soil textures.

Soil Textures	General Fertilizer Formulations			
	19-19-19	14-14-14 ounces/trees ²	12-12-12	10-10-10
Loams	4	5	6	7
Sands	6	8	9	11

¹ Plantations 2 to 4 years old and 3 feet or less in height.

² Measured on a weight basis.

The rates outlined above equate to approximately 50 and 75 pounds P₂O₅ and K₂O per acre for the loam and sand soil textures, respectively. If soil test results indicate that P and K levels are less than half the amounts listed in Table 2, the recommended rates in Table 1 should be increased by a factor of 1.5. For trees taller than 3 feet, rates in Table 1 should be increased an amount of 1 ounce of fertilizer per foot of tree.

Table 2: Levels for pH, Phosphorus, Potassium and Calcium in Soils Growing Spruce, True fir and Douglas-fir Christmas trees.

Amount	pH	P	K	Ca
Low	<5.0	<30 ¹	<100 ²	<1000 ²
Acceptable	5.0 - 6.0	30 - 50	100 - 175	1000 - 1500

¹ Bray P₁ extraction method

² N ammonium acetate or 0.13 N hydrochloric acid extraction methods