

## Christmas Trees

### Management Highlights

- Target pH: **5.6** for Douglas Fir.  
                  **6.0** for other cultivars.
- Correct major problems with P and K prior to setting trees. After planting, use a complete fertilizer to supply needed nutrients.
- Watch for Mn and Fe deficiency.

### Introduction

The recommendations given below are designed to supply adequate nutrients to encourage good growth of high market quality in field-grown, Christmas trees. Growth of nursery stock, however, is influenced by many factors beyond soil test results and fertilizer application. Cultivar selection, weather conditions, soil type, weed, insect and disease pressure and management practices are just a few. Growers should use these nutrient recommendations along with field history data, their knowledge of nursery stock production, and conditions from the current growing season to develop an appropriate fertilization program for the crop.

### Soil pH and Liming

The target pH for field-grown Christmas trees is dependent upon the species and cultivar selection and soil type. For Douglas Fir, a target pH of **5.6** is used. For other species and cultivars, the target pH on most Delaware soils is **6.0**. Soils that are higher in organic matter ("black" soils) have a lower target pH (5.6) because organic matter moderates some of the effects of excessive soil acidity (e.g., aluminum toxicity).

The lime recommendation for a specific field is calculated from the soil pH and buffer pH measurements using the steps outlined in *Calculating*

*the Lime Requirement -- Chapter 3, Section 3.4.* Avoid overliming in order to prevent deficiency of micronutrients such as manganese or iron. In most cases, the lime requirement can be met by either calcitic or dolomitic limestone.

*Dolomitic limestone* is recommended if:

- soil test Mg is less than 50 FIVs, or
- soil test Mg is between 50 and 100 FIVs *and less than soil test Ca.*

*Calcitic limestone* is recommended if:

- soil test Mg is greater than 100 FIVs, or
- soil test Mg is between 50 and 100 FIVs *and greater than soil test Ca.*

### Nitrogen Management

Nitrogen (N) recommendations for field-grown Christmas trees are dependent upon the species and cultivars being produced, the height of the trees and the management practices being employed. To avoid plant injury, N *should not* be applied during the first growing season. In subsequent years, apply N in early spring before bud break at the rates given below in Table 1.

Table 1. Nitrogen recommendations for individual field-grown Christmas trees.

Tree Height	N Rate
--- feet ---	--- oz. / tree ---
1 - 3	0.3
4 - 5	0.4 - 0.5
> 5	1.6

Fertilizer can be applied around the drip line of individual trees for 3-4 years without fertilizing row middles, thus reducing the total fertilizer requirement per acre. When fertilizing row middles, apply N at a rate of **150 lbs N/ac**. Avoid over-application of N or undesirable growth may

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result. **CAUTION:** *this is especially true with white pine. To avoid undesirable growth in white pine, N rates should not exceed 20 lbs N/ac.*

When P and/or K are also recommended for a particular field, N can be applied in a complete fertilizer which also meets those nutrient needs.

### Phosphorus Management

Yield-limiting phosphorus (P) deficiency is rarely a concern on Delaware soils. Long-term applications of fertilizers and manures have resulted in P accumulations on many soils that are capable of supplying crop needs for several years with no further additions.

To determine whether P fertilization is necessary for a specific field, conduct a routine soil test. University of Delaware P recommendations for field-grown, Christmas trees are dependent upon the soil test P value and the P requirement of the nursery stock. A summary of those P recommendations is given in Table 2.

Table 2. Phosphorus fertilizer recommendations for field-grown Christmas trees.

P Index Value										
0	10	20	30	40	50	55	60	65	70	0
----- lbs P <sub>2</sub> O <sub>5</sub> / ac -----										
250	225	200	150	100	83	75	63	50	0	

*High application rates of P, which are designed to correct low soil test P, will be most effective when broadcast and incorporated prior to planting trees.* To adjust soil P after planting, use a complete fertilizer. However, when the soil test P value is greater than 65 FIVs, no P is recommended.

### Potassium Management

The need for potassium (K) fertilization of field-grown, Christmas trees is best determined by the use of a routine soil test. Potassium recommendations are based on the the soil test K value and the

K requirement of the crop. A summary of University of Delaware K rates for Christmas trees is given in Table 3.

Table 3. Potassium fertilizer recommendations for field-grown Christmas trees.

K Index Value										
0	10	20	30	40	50	55	60	65	70	0
----- lbs K <sub>2</sub> O / ac -----										
250	225	200	170	130	97	80	65	50	0	

*High application rates of K, which are designed to correct low soil test K, will be most effective when broadcast and incorporated prior to planting trees.* To adjust soil K after planting, use a complete fertilizer. However, when the soil test K value is greater than 65 FIVs, no K is recommended.

### Calcium and Magnesium Management

Calcium (Ca) and magnesium (Mg) needs of field-grown Christmas trees are usually met through routine liming. *Magnesium application is recommended if the soil test Mg value is less than 38 FIVs.* If liming has been recommended, use dolomitic limestone to raise soil pH and increase soil Mg. If, however, liming is not necessary but Mg fertilization is still indicated, apply soluble Mg as Mg sulfate or Mg chloride to increase soil Mg. Appropriate application rates are given below in Table 4.

Table 4. Application rates for soluble Mg as a function of Mg fertility index value.

Mg Index Value									
0	5	10	15	20	25	30	35	40	0
----- lbs soluble Mg / ac -----									
80	70	60	50	50	30	20	10	0	

**Micronutrients**

Manganese (Mn) and iron (Fe) deficiency may occur in field-grown, Christmas trees grown on Delaware soils, most often as a result of over-liming. Maintaining an appropriate soil pH will prevent deficiency in most instances.

Suspected micronutrient deficiency can be confirmed by tissue analysis. Confirmed Mn deficiency can be corrected in season by foliar applications of Mn of 1 to 2 lbs/ac of actual Mn as Mn sulfate, Mn oxide or Mn chelate. Iron deficiency can be corrected by foliar applications of chelated Fe at a rate of 1-2 lbs/ac of actual Fe.

**Other Nutrients**

No other nutrients are known to be limiting to field-grown Christmas trees in Delaware.

**Additional Information**

See Soil Test Notes 1 and 13 (Appendix 7) for additional information concerning nutrient management of field-grown Christmas trees.