

Field-grown, Needle Evergreens

Management Highlights

- Target pH: 6.0
- 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, needle evergreens. 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, needle evergreens 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

The University of Delaware recommends a total nitrogen (N) application of 130-175 lbs N/ac or 3-4 lbs N/1000 sq. ft. per growing season for most field-grown, needle evergreens. *For white pine, N rates should not exceed 20 lbs N/ac or undesirable growth may result.* Nitrogen should be applied in early spring (March 1 - April 1). To avoid injury to newly planted trees, **do not apply N during the first growing season.** For established fields, use a complete fertilizer to supply needed N, P₂O₅, and K₂O.

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, needle evergreens 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 1 below.

Table 1. Phosphorus fertilizer recommendations for field-grown, needle evergreens.

P Index Value									
0	10	20	30	40	50	55	60	65	0
----- lbs P ₂ O ₅ / 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, needle evergreens 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 needle evergreens is given in Table 2 below.

Table 2. Potassium fertilizer recommendations for field-grown, needle evergreens.

K Index Value									
0	10	20	30	40	50	55	60	65	70
----- lbs K ₂ 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, needle evergreens 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 3.

Table 3. 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	
----- lbs soluble Mg / ac -----									
80	70	60	50	50	30	20	10	0	

Micronutrients

Manganese (Mn) and iron (Fe) deficiency may occur in needle evergreens grown on Delaware soils, most often as a result of overliming. 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 1-2 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 needle evergreen production in Delaware.

Field-grown Nursery Stock

Additional Information

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