Recommended Minimum Soil Test Levels for Christmas Trees in Vermont
UVM Modified Morgan Soil Test

	Units on soil test report	Optimum Range	Target
Soil pH		Balsam Fir (5.0 - 6.0) Fraser Fir (5.3 - 5.8)	5.8 5.5
Nitrogen	Not Reported		90-110 lb N/ac or: 1 oz. N/tree
Avail. Phosphate	(ppm P)	4.5 - 6.5	6
Potash	(ppm K)	75 - 125	100
Magnesium	(ppm Mg)	35 - 60	>35
Calcium	(% Ca)	50 - 55%	50%
Aluminum	(ppm Al)	<70	<70

Nitrogen:
Fertilizer N lb/ac = 90 to 110 lb/ac N (this equals 1.09 oz/tree N at 5'x5' tree spacing)
To avoid salt injury and improve fall color, apply 2/3 N in spring and 1/3 N in early fall.

Phosphorus:
Fertilizer P_2O_5 lb/ac = (6 - soil test ppm) x 2.27 x 2
(if UVM soil test ppm<6, limit application to Max. 100 lb/ac P_2O_5, Min. 40 lb/ac P_2O_5)
Lime to raise pH will also make more P available from soil

Potassium:
Fertilizer K_2O lb/ac = (125 - soil test ppm) x 2.4 x 2
(If UVM soil test ppm<125, limit each application to Max. 100 lb/ac K_2O to avoid salt injury to roots.
On very sandy soils limit to 50lb/ac K_2O for each application)

Soil pH:
Lime - Chart describes tons per acre to apply to move to desired target pH if mixed in top 6" of soil only.
Only use the full rate of Lime if plowing/harrowing into soil when establishing a new plantation.
Limit applications to established stands at one-quarter (1/4) of recommended rate in any one year.
Use Hi-Mag Lime (Dolomitic Limestone) if soil test Magnesium (ppm Mg) is <35 ppm.

Soil test pH (water)	Soil test Al (ppm)	Lime (lb/ac) to apply to increase soil 0.1 pH value at different Aluminum levels in soil	Soil test pH (typical examples)	Lime (lb/ac) (1/4 rate) to apply for target pH 5.5 (sample calculations)
<5.5	0-40	500	4.2	500 x 13 x .25 = 1625 lb/ac
	41-70	500		
	71-100	667	4.2	667 x 13 x .25 = 2167 lb/ac
	101-150	667	4.4	667 x 11 x .25 = 1834 lb/ac
	151-200	667	4.7	667 x 8 x .25 = 1334 lb/ac
	>200	667	5.5	667 x 0 x .25 = 0 lb/ac

Samples to:
University of Vermont
Agricultural & Environmental Testing Laboratory
Jeffords Hall, Room 262
Burlington, VT 05405-1737

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Recommended Foliar Sampling and Analysis for Christmas Trees in Vermont

- General status of tree nutrient content for fertilizer recommendations in established plantings.
- Specific Micro-nutrient imbalances to monitor corrective treatments in established plantings.

1. Sample in late October when trees have gone dormant for the winter.
2. Select and tag 10 to 15 trees which are average for all trees in field to be tested.
3. Sample only current growth from the top one-third (1/3) of each tree.
4. Break two or three branches 6" long from each tree. Place in a paper bag.
5. Remove all needles from the stems (fresh or after drying).
6. Fresh needles must be sent the same day to testing lab. You can also dry needles in a warm spot (up to 150^0 in the oven) before sending to lab.
7. Label the sample using lab form with name, address, type of tree, what test to run. A standard test includes N,P,K,Ca,Mg,Al,B,Cu,Fe,Mn,Zn (Maine or Vermont).
8. Send to analytical lab with payment.

Foliar Analysis - Optimum Test Values and Ratios for Balsam Fir & Fraser Fir Christmas Trees

Nutrient	Minimum	Optimum	**Your Test**	Optimum Ratio	**Your Ratio**
	---------- % ----------			(% Nutrient ÷ % N)	
N - Nitrogen	1.8	2.0		1:1	
P - Phosphorus	0.20	0.25		> 0.10:1	
K - Potassium	0.60	0.75		> 0.35:1	
Ca - Calcium	0.60	0.80		> 0.35:1	
Mg - Magnesium	0.10	0.15		> 0.06:1	
	---------- ppm ----------				
Mn - Manganese	200	500		0.025:1	
Fe - Iron	70	80		0.004:1	
B - Boron	25	35		0.002:1	
Zn - Zinc	20	60		0.003:1	
Cu - Copper	4.5	5.5		0.0003:1	
Mo - Molybdenum	0.10	0.85		0.00004:1	
S - Sulfur		1620		0.09:1	
Cl - Chlorine		5.5		0.0003:1	
Na - Sodium		0.45		0.00003:1	

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Granger,C. 1991. Provisional balsam fir nutrient element standards. Maine Forest Service.

Kelly, R. et al. 1996. Christmas tree fertilizer information. Report by silviculture committee. NH-VT Christmas Tree Association. VT Forest Parks & Recreation, Morrisville, VT.

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