



Optimal Soil Conditions for Growing Christmas Trees

The main characteristics of interest for Christmas trees are Phosphorous (P), Potassium (K), Calcium (Ca), Magnesium (Mg), and pH. Nitrogen (N) is also important (especially nearing harvest time) but is highly mobile in soils and therefore must be requested as part of a special soil package (alternatively, N concentration in needles can be obtained from a tissue test).

Nova Scotia soils are typically acidic. Balsam fir will grow in soils with **pH levels** between 4 and 6, however the recommended levels tend to fall between 5 and 5.5.

Soil **Organic Matter** helps soil to hold water and nutrients, which is essential to seedling establishment. Values over 4% are acceptable and in lots with adequate ground cover, usually exceeded.

Phosphorous supports seed germination and root development

Potassium supports growth and disease resistance

Calcium helps plants deal with environmental stress and disease; it also supports absorption of nutrients

Magnesium is a component of chlorophyll and supports the desirable green colour of foliage



Province-wide soil and tissue sampling on Nova Scotia Christmas Tree lots were conducted as part of the Calibration and Correlation of Soil Nutrient Status with Needle Nutrient Concentration in Christmas Tree (Balsam Fir) Lots and Development of Enhanced Fertilization Guidelines research project in 2019 and 2020. The project was conducted under the Canadian Agricultural Partnership's Industry Driven Research and Innovation funding distributed by the NS Department of Agriculture. In the fall of 2020, the Christmas Tree Research Team, associated with the Christmas Tree Council of Nova Scotia submitted a total of 1,098 samples, representing more than 500 trees, to the Nova Scotia Department of Agriculture's Analytical Laboratory in Bible Hill, NS. Tree quality evaluations were also conducted and based on high performing trees; optimal soil conditions were established.

Liming Soils to Raise Soil pH

Nova Scotia soils are characteristically acidic (have low pH). The average soil pH of NS Christmas Tree lots is 4.45. Balsam fir prefers a pH within the range of 5.5 to 6.0. To raise soil pH, you will need to add lime. There are two options for liming types, dolomitic and calcitic lime, both will help to raise soil pH. The difference is that dolomitic lime contains some magnesium, as well as calcium. Calcitic lime contains only calcium.

Magnesium is needed to support tree growth, however too much of it will tie up calcium. For Christmas Tree production, Mg ranges of 115-200 kg/ha are optimal. The average in NS Christmas Tree lots is 77.96 kg/ha. Your lots had adequate Mg, so we have recommended calcitic lime.

Lime can be applied annually at a low rate, as it takes the soil some time to adjust. We recommend applying lime only once every two years. Ideally, lime should be incorporated into the soil. Obviously, this is not practical for a Christmas tree lot therefore, we recommend applying lime in the spring time when a weather change is predicted. The shifting of the soil will help to incorporate the lime. Alternatively, lime can be applied in the fall just prior to a light rain.

Fertilizer Considerations

Optimal soil conditions will change each year as the Research Team collects additional soil samples. Additionally, since a crop is not necessarily harvested every year from a Christmas tree lot, the optimal nutrient conditions will not change with a crop cycle. Never apply fertilizers that are heavy in Nitrogen and/or Phosphorous prior to a rain event. These elements are highly mobile in soils and application during wet conditions or prior to rain fall will result in nutrient loss and contamination of the surrounding environment.

