



Wild Blueberry

FACT SHEET



Lowbush Blueberry Nutrition Series: N-P-K

Fact Sheet No. 223, UMaine Extension No. 2093

The lowbush blueberry is a slow growing woody plant. It spreads by means of an underground horizontal stem called a rhizome. The rhizome also serves as a storage organ for food reserves and nutrients, such as nitrogen. The rhizome and root system makes up about 70% of the mature plant; about 30% of the plant is seen as shoots above ground. Prior to pruning, most of the reserve food made in the shoots has been moved to the rhizome.

Growth of new shoots is dependent on stored food and nutrients and available nutrients in the soil. The roots that develop on the rhizome are not as fine as many other plants. In fact, all plants of the same family (Ericaceae) seem to lack these root hairs. Perhaps to compensate for the lack of root hairs, members of this family of acid-loving plants have fungi associated with their roots. The thread-like body of the fungi extends into the soil and serves to extract and move nutrients into plant roots.

Lowbush blueberries need a balance of nutrients to remain healthy and productive. Dr. Walter Kender grew lowbush blueberry plants without specific nutrients to determine their specific deficiency symptoms. The following is a list of nutrients with a description of their function in the plant and deficiency symptoms:

Nitrogen Functions

Nitrogen (N) is one of the three "major" nutrients needed to support good plant growth. Plants use nitrogen to form amino acids needed in the formation of protein. Nitrogen is also required in the formation of chlorophyll. It governs, to a certain extent, the use of other nutrients and it encourages vegetative growth of the plant.

If nitrogen is applied in excess, a lack of magnesium (Mg) and calcium (Ca) might develop, and excessive vegetative growth may lead to increased winter injury and lower yields.

Deficiency Symptoms

Lack of adequate nitrogen reduces the formation of chlorophyll, which results in pale or yellow green leaves (*chlorosis*). The last green to disappear is along the midrib. Since nitrogen is "mobile", the symptoms appear first in the older leaves. Reddish tints gradually appear at the leaf margins and spread toward the midrib or central vein. In advanced stages, all leaves develop a deep red coloration. Defoliation occurs in severe nitrogen shortage. Leaves are small and overall growth is markedly reduced.

Phosphorus Functions

Phosphorous (P) is used to store and transfer energy within the plant. It is used in forming nucleic acids (DNA, RNA).

Phosphorous stimulates early growth and flowering, promotes fruiting and seed production, encourages root development and balances the effects of excess nitrogen. It also stimulates more vigorous plant growth. Young growing parts contain considerable amounts of phosphorous.

The efficiency of phosphorous uptake seems to increase in the presence of nitrogen.

Deficiency Symptoms

Deficiency symptoms for phosphorous are not as obvious as those of nitrogen. Growth is reduced and foliage is dark green and abnormally small. In advanced stages, large patches of purple appear in the interveinal areas.

Potassium

Functions

Potassium (K) remains in tissues in ionic form and is not used in the synthesis of new compounds as are nitrogen and phosphorous. Potassium is mobile in plants and tends to move from older to younger, more active growing tissue.

Potassium seems to be important in the formation of proteins, carbohydrates (sugar and starch), and chlorophyll. It is necessary for the translocation of sugars and the formation of starch. Potassium stimulates root growth and improves size and quality of fruit.

Deficiency Symptoms

Potassium deficiency symptoms first appear as interveinal chlorosis of the youngest leaves. In advanced stages, the leaf margins turn red and subsequently develop into a marginal leaf scorch (dry, dead tissue) starting at the tip of the leaf.

Nutrient Standards

Levels of nutrient concentrations have been reported by Trevett, and Lockhart & Langille (Table 1). These values will help you evaluate the nutritional status of the blueberry plants in your fields. If the concentrations of nutrients in your blueberry leaf samples are below the satisfactory level you should refer to Wild Blueberry Fact Sheet No. 222 "*Lowbush Blueberry Nutrition Series - Leaf and Soil Sampling Procedures*".

Foliar Nutrient Levels of Lowbush Blueberries *				
Standard Range				
Element	Trevett		Lockhart & Langille	
	<u>MIN</u>	<u>MAX</u>	<u>MIN</u>	<u>MAX</u>
Nitrogen (N)	1.60%	2.00%	1.84%	2.38%
Phosphorous (P)	0.125%	0.222%	0.133%	0.184%
Potassium (K)	0.40%	0.90%	0.54%	0.74%
Calcium (Ca)	0.27%	0.52%	0.37%	0.49%
Magnesium (Mg)	0.13%	0.25%	0.12%	0.15%
Boron (B)	24 ppm	60 ppm	13.60 ppm	22.20 ppm
Iron (Fe)	50 ppm	100 ppm	39 ppm	59 ppm
Manganese (Mn)	750 ppm	1490 ppm	1479 ppm	2394 ppm
Zinc (Zn)	25 ppm	50 ppm	22 ppm	41 ppm
Copper (Cu)	7 ppm	14 ppm	6.40 ppm	9.20 ppm
Molybdenum (Mo)	1.20 ppm	3.30 ppm	0.33 ppm	0.17 ppm
Aluminum (Al)	50 ppm	75 ppm	73 ppm	127 ppm
Sources: Trevett, 1972 and Lockhart & Langille, 1962. * <i>Vaccinium angustifolium</i>				

Prepared by Dr. John M. Smagula, Professor of Horticulture, in cooperation with Tom DeGomez, Extension Blueberry Specialist, The University of Maine, Orono, ME 04469. June 1987.

A Member of the University of Maine System

Published and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914, by the University of Maine Cooperative Extension, the Land Grant University of the state of Maine and the U.S. Department of Agriculture cooperating. Cooperative Extension and other agencies of the U.S.D.A. provide equal opportunities in programs and employment.