Deficiencies of other micronutrients in vegetable crops in Delaware are rare or have never been seen. If such problems are suspected, contact your County Extension Agent.

ADDITIONAL INFORMATION

Additional information may be obtained from University of Delaware Cooperative Extension Service offices in Newark, Dover, and Georgetown.

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SOIL TESTING LABORATORY
110 WORRILOW HALL
NEWARK, DE 19717-1303

SOIL TEST NOTES

NOTE 7: Fertilizing Vegetable Crops

SOIL MANAGEMENT

Proper liming and fertilization, good tillage practices, crop rotation, additions of annual increments of organic matter, and adequate irrigation are all necessary in a good soil management program for vegetable crops. Using winter cover crops and periodically resting the land through the use of summer cover crops between vegetable plantings can be effective in preventing the deterioration of proper soil structure that is vital for maintaining high levels of production.

Intensive cropping, working the soil when it is too wet, and excessive traffic from heavy-tillage equipment have severely damaged many soils. These practices cause the soils to become very hard and compact, resulting in poor seed germination, loss of transplants, and shallow root formation by surviving plants. Compacted soils are also very difficult to irrigate. Consequences include poor plant stands, poor crop growth, low yields, and loss of income. Subsoiling in the row may help improve aeration and drainage of soils damaged by several years of excessive traffic from heavy-tillage equipment.

SECONDARY AND MICRONUTRIENT ELEMENTS

Calcium, magnesium, and sulfur are included in the secondary element group. Calcium may be deficient in some soils that have not been properly limed, where excessive potash fertilizer has been used, and/or where crops are subjected to drought stress. Because of the high calcium and magnesium requirements of cucurbits (melons, squashes, cucumbers, etc.) it is recommended that a minimum of 1000 lbs. of limestone per acre be applied whenever the soil pH is less than or equal to 6.0. The only exception to this would be when the previous lime credit is 1000 lbs. or more. Sidedress applications of calcium nitrate ($Ca(NO_3)_2$) to certain vegetable crops (cucurbits, tomatoes, and peppers) at a rate of 100 lbs. per acre will help avoid calcium deficiency in the form of blossom end rot.

Magnesium is the most likely of these elements to be deficient in vegetable soils. Dolomitic or high magnesium limestone should be used when liming soils that are low in magnesium. When lime is not needed on low-magnesium soils, a soluble magnesium fertilizer, such as magnesium sulfate (epsom salts), should be applied. Magnesium may also be applied as a foliar spray in emergency situations.

Sulfur is not known to be deficient in vegetable crop soils in this area. Sulfur deficiencies may develop with the continued use of high-analysis fertilizers that are low in sulfur content. The use of ammonium sulfate as a nitrogen source in fertilizer blends will help avoid sulfur deficiencies.

BORON IS THE MOST WIDELY DEFICIENT MICRONUTRIENT IN VEGETABLE CROP SOILS. Deficiencies of this element are most likely to occur in the following crops: asparagus, most bulb and root crops, cole crops, and tomatoes. Table 1 (from Extension Bulletin 137, "Commercial Vegetable Production Recommendations") lists boron recommendations for various crops based on soil test results. DO NOT EXCEED THE RECOMMENDED RATES OF BORON BECAUSE EXCESSIVE AMOUNTS CAN BE TOXIC TO CERTAIN CROPS.

Manganese deficiency often occurs in plants growing on soils that have been overlimed. A foliar application of 1 to 2 lbs. per acre of actual manganese in 20 to 50 gallons of water or 8 to 10 lbs. per acre of actual manganese in a fertilizer band will usually correct the deficiency. Do not apply lime or poultry manure to such soils until the pH has dropped below 6.5.

Molybdenum deficiency in cauliflower (whiptail) may develop when this crop is grown on soils more acid than pH 5.5. An application of 0.5 to 1 pound of sodium or ammonium molybdate per acre will usually correct this deficiency. Liming acid soils to a pH of 6.0 or above will usually prevent molybdenum deficiencies in vegetable crops.

TABLE 1. Boron [illegible]

Interpretation of Boron Soil Tests

Soil Test	Low	Medium	High
ppm	0.0-0.35	0.36-0.70	>0.70
lbs B/ac	0.0-0.70	0.71-1.40	>1.40

Crop	Boron Recommendations (lbs B/ac)
Beets, [illegible] squash,	2 / 1 / 1 ½ / 1 / 0