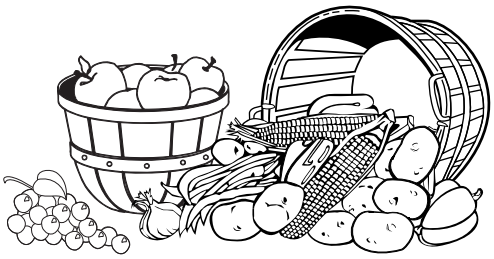
Nutrient Management for Commercial Fruit & Vegetable Crops in Minnesota

Introduction

There are 17 essential nutrients required for plant growth: carbon (C), hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), molybdenum (Mo), chlorine (Cl) and nickel (Ni). Of these 17, all except carbon, hydrogen, and oxygen are derived from the soil. When the soil cannot supply the level of nutrient required for adequate growth, supplemental fertilizer applications become necessary.

Recommendations for fertilizing fruit and vegetable crops in Minnesota are based in part on soil test results. Soil testing provides information on lime and fertilizer needs prior to planting and is particularly well calibrated for nutrients such as phosphorus, potassium, magnesium, calcium, sulfur, zinc, and boron. Soil testing prior to planting takes the guesswork out of making fertilizer recommendations and leads to more efficient nutrient management. Fertilizer recommendations in this bulletin are intended for field-grown fruit and vegetable crops. For container-grown crops, such as transplants or vegetables grown in the greenhouse in pots, different soil tests should be used. Contact the University of Minnesota Soil Testing Laboratory (612-625-3101), for the appropriate form to fill out for container-grown crops or check online at http://soiltest.coafes.umn.edu/

For fertilizer requirements of established perennial crops and for fine-tuning fertilizer needs of annual crops, a combination of soil testing and tissue analysis should be used.



Taking a Soil Sample

Proper interpretation of soil test results for making fertilizer recommendations is dependent on collecting a representative sample. The procedure for taking a meaningful soil sample is summarized below.

Soil samples can be collected any time of the year, although spring and fall sampling are usually the most convenient. If soil test results from a given field are to be compared over the years, it is best that samples be collected at the same time of year.

Each field to be sampled should be divided into uniform areas. Each area should have the same soil texture and color, cropping history, and fertilizer, manure, and lime treatments. One sample should not represent more than 20 acres on a level uniform field, or 5 acres on hilly or rolling land. Samples are most easily collected using a soil tube, soil auger, or a garden spade. To take the soil sample, scrape off all surface residue and litter and take the sample to a depth of 6-8 inches for annual crops and 10-12 inches for perennial crops. Usually 15 to 20 subsamples (one core per subsample) should be collected from randomly selected areas in the field. The soil should be thoroughly mixed in a clean plastic pail and about 1 pint of this mixture should be placed in a sample bag or box.

Samples can be sent directly to the University of Minnesota Soil Testing Laboratory, 135 Crops Research Building, 1902 Dudley Ave., St. Paul, MN 55108. Sample submission forms and other soil testing information can be obtained from: http://soiltest.coafes.umn.edu/

A number of private laboratories also offer soil testing services. Contact your Regional Extension Office or fertilizer dealer for information about commercial laboratories in your area or look in the yellow pages of your phone book under “laboratories.”

The nitrate test on a 0- to 2-foot soil sample can be used for nitrogen recommendations for selected crops grown in western Minnesota on nonirrigated soils. For more information on the nitrate test, refer to the section on nitrogen (**page 13**).