CALCIUM DEFICIENCY OF CHRYSANTHEMUM

Paul V. Nelson

The following nutritional problem is one I recently had the opportunity to work with in a commercial planting. Although calcium (Ca) deficiency only infrequently develops to the point described in this note, it does occur in mild form with moderate frequency in North Carolina due to acid soils.

SYMPTOMS - Areas of chrysanthemum plants randomly located throughout the field developed light green coloration and mild inter-veinal chlorosis on the young leaves. Then, growth of these plants was greatly reduced along with the development of one-quarter inch wide, greatly thickened, strap leaves at the upper ends of stems (see Figure 1). Following this point all cell development at shoot terminals ceased leaving blunt, rounded ends on primary and lateral stems devoid of any leaf or bud tissue (see Figure 2).

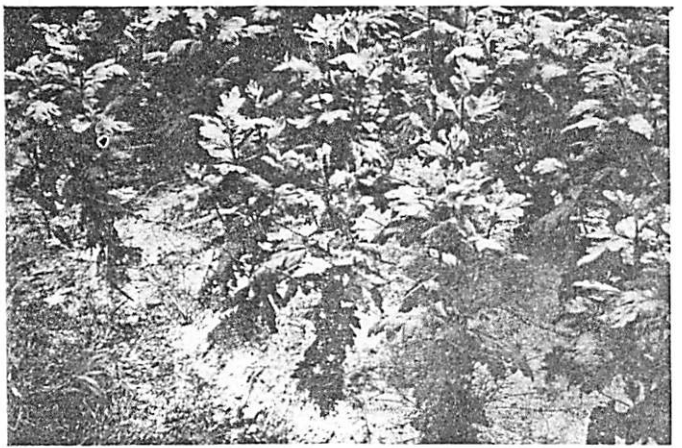

Figure 1

Figure 2

DIAGNOSIS - Visual diagnosis of Ca deficiency is undesirable because implicating symptoms do not occur until permanent damage has developed. Early symptoms of reduced growth, and subsequently reduced yeield, are not indicative of Ca deficiency alone. The pH level of the soil is a good indication of Ca availability. Acid pH levels in soils are almost always associated with low levels of Ca. Direct Ca tests on soil samples will give more positive evidence of the problem. A North Carolina soil test reading below 20 indicates probably Ca deficiency. The equivalent value from the Spurway test is 75ppm. Conclusive evidence for Ca deficiency can be obtained through foliar analysis. Ca levels in the most recently mature leaves of chrysanthemum plants six weeks after planting or pinch should be 1% or above. This value should be increased as the age of the sampled plant increases.

CORRECTION - The most thorough correction of Ca deficiency can be accomplished at the time of soil preparation through the addition of finely ground limestone. Actually, dolomitic limestone should be used in North Carolina (a mixture of calcium and magnesium carbonates) because magnesium, like Ca, tends to be in short supply in acid soils. The rate of dolomitic limestone to use is given in the N. C. soil test report return. In general, 3 lbs. per cu. yd. of soil will raise the pH from 0.5 to 1.0 units depending upon texture and organic matter content. The presence of clay and organic matter usually dictate heavier rates of application.

If correction must be made during a crop, then, calcium nitrate should be substituted for the nitrogen source in the fertilizer program until recovery is realized and then periodically until the end of the crop when a more permanent correction can be made with dolomitic limestone.

NOTE - A preventative fertilization program will lead to greater profits. Make use of soil and foliar analysis testing on a regular basis so you can head off problems before permanent symptoms occur. Foliar analysis kits, including instructions for sample collection and handling, are available from the county extension offices and from the Department of Horticultural Science at N. C. State University in Raleigh. The cost of each sample is $6.25 due at the time of submission of the sample and in the form of a check made payable to the "Department of Horticultural Science".

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