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Chloride Suppresses Corn Stalk Rot: Update

By J.R. Heckman and T.W. Bruulsema

Stalk rots are widespread diseases that reduce corn yield and quality. Lodging caused by stalk rot increases harvest losses and makes harvesting more difficult. Evidence that stalk rot may be reduced by fertilizers containing Cl was first obtained in New York state during the 1950s.

More recently, from 1990 to 1995, field experiments on Cl were conducted in New Jersey. The maximum yield environment used irrigation, narrow rows (12 in. wide) and high plant density (43,560 plants/A). Applications of nitrogen (N), phosphorus (P), and potassium (K) totaled 500 lb/A N, 268 P_2O_5 and 405 lb/A K_2O, applied at planting and during the growing season. Sulfur and micronutrients were also applied.

Chloride (Cl) supply is not generally considered to be a limiting factor for corn production in most field environments. However, more intensive production practices and higher yield levels may increase the need of corn for Cl. This article updates a preliminary report in *Better Crops with Plant Food*, Vol. 79, Issue 2, page 7.

The Cl treatment used KCl (muriate of potash) to supply 360 lb/A of Cl. The zero Cl treatment used potassium sulfate (K_2SO_4). Equal amounts of K were supplied to each. Stalk rot was evaluated at harvest on the first internode above the brace roots.

In the first three years of the experiments, yield responses of 8 to 26 bu/A were measured. The effects of Cl on stalk rots and lodging were noticeable in those years. In 1994 and 1995, significant reductions in stalk rot were measured (**Table 1**).

STALK ROT can be evaluated on corn near maturity using a thumb pressure test.

LODGING RESULTING from stalk rot can cause significant losses at harvest.

TABLE 1. Effect of Cl fertilization on grain yield and stalk rot, average of 1994 and 1995.

Treatment Cl, lb/A	Stalk rot, %	Grain yield, bu/A	Ear moisture, %	Stover moisture, %
0	18	243	29.1	64
360	7	259	29.5	67

The moisture content of the stover was greater in plants fertilized with Cl. Chloride may reduce stalk rot by preventing premature death of corn plants.

Applications should be based on soil and plant analysis. Soil tests for Cl are not commonly available but can be obtained by special request. Because Cl is easily lost from coarse-textured soils by leaching, spring application is advised where leaching is a problem. BC

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Balanced Potassium Fertilization Fights Crop Disease

Plant disease problems are frequently magnified as a result of imbalanced plant nutrition. While plant nutrients are not the direct agent of disease control, they do augment the natural resistance mechanisms in crops.

Of all the plant nutrients, potassium (K) has been associated most often with helping to lower disease severity. That is not surprising considering the characteristics associated with K deficiencies. Those characteristics include thin cell walls, weak stalks and stems, smaller food transport vessels, fewer and less active stomata on the leaves, smaller and shorter roots, sugar accumulation in leaves, and accumulation of unusable nitrogen (N) compounds in stalks and leaves. Each of these lowers the ability of a crop to resist entry and infection by ever-present fungi, bacteria and virus disease organisms. A best management practice is to make sure that fertilization is adequate to avoid K deficiency-induced plant stresses.

Through the years, plant breeding programs have increased crop yield potential. Higher yield levels may increase N fertilizer requirements. It is important to balance higher N use with adequate K to avoid the stresses associated with unbalanced N:K levels. Imbalances occur most often during peak growing periods – the time most critical for building a sturdy plant capable of achieving its highest yield potential.

Healthy plants, free from stress, are much more resistant to disease attack. Use soil and tissue testing to make sure that K is not one of the limiting factors. Along with genetic resistance, a well-balanced fertilization program is the first line of defense against economic losses from crop diseases. BC