Chloride Suppresses Corn Stalk Rot

By Jospeh R. Heckman

Research in New Jersey continues to indicate that chloride (Cl) may have a significant role in suppression of stalk rot in corn.

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 Cl fertilizers was first obtained from field experiments in New York during the 1950s. Field experiments were recently conducted in New Jersey to evaluate the economic importance of Cl to corn grown under high yield conditions. Chloride fertilization was found to significantly decrease stalk rot in one of two years while producing significant yield increases. In 1992, 11 percent of the control plants were affected by stalk rot versus only 4 percent of the plants receiving Cl.

To further evaluate Cl effects on the incidence of stalk rot, another study was conducted in 1994 at the Rutgers Plant Science Research Station in Adelphia, NJ. The experiment attempted to provide a maximum yield environment by use of irrigation, narrow rows (12 in.) and high plant population (43,560 plants per acre; Pioneer Hybrid 3245). Applications of nitrogen (N), phosphate (P_2O_5) and potash (K₂O) totaled 500, 268 and 405 lb/A for the season, applied at planting and during the growing season. Boron (B), copper (Cu), manganese (Mn) and zinc (Zn) were also supplied at planting. Adequate sulfur (S) was assured by supplying N as ammonium sulfate.

The control used potassium sulfate (K_2SO_4) to supply a constant amount of K (405 lb K₂O/A). Chloride at a rate of 360 lb Cl/A was provided by potassium chloride (KCl). Equal amounts of potassium (K) were supplied to each treatment. Stalk rot was evaluated at harvest by examining

the first fully elongated internode above the brace roots.

Results

Less than half as many plants had stalk rot where Cl was applied, as shown in **Table 1**. The difference was highly significant statistically (p < 0.001). The moisture content of the stover was greater in plants fertilized with Cl. Chloride helps plants retain water and slightly delays plant maturity. Chloride may reduce stalk rot by preventing premature death of corn plants.

Table 1. Effect of CI fertilization on corn grain yield and stalk rot, 1994.

| Treatment, Ib CI/A | Stalk rot, % | Grain yield, bu/A | Ear moisture, % | Stover moisture, % |
|-----------------------|--------------------|-------------------------|-----------------------|--------------------------|
| 0 | 20 | 244 | 28.2 | 69 |
| 360 | 9 | 253 | 28.7 | 73 |

Although previous experiments at Adelphia in 1990 to 1992 showed significant yield increases from Cl fertilization, the 1994 yield increase of 9 bu/A was not statistically significant. These yields were determined by hand harvest. If they had been determined by machine, the harvest losses from the zero Cl treatment would have been larger because of lodging.

Potassium chloride (KCl, 0-0-60) contains 45 to 47 percent Cl. Corn also needs adequate K to produce strong stalks. Corn growers experiencing problems with stalk rot and lodging may want to evaluate their fertilizer program for both K and Cl. Soil tests and plant analysis should be used to determine the amount of K to apply. 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 applications of KCl are advised where leaching is a problem. ■

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