Response of Sweet Corn to Fertilization with Copper and Zinc

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In a series of fertilizer test plots in 1940 with sweet corn, the application of copper and zinc sulfates with 200 pounds per acre of 3-18-9 fertilizer in the hill was included. During the growing season the corn receiving copper sulfate was noticeably darker green in color than corn without the copper sulfate. The zinc sulfate also appeared to produce a somewhat darker color but to a lesser degree. Ears were harvested at the canning stage and it was found that the copper sulfate increased yields about 30% and zinc sulfate about 10% over 3-18-9 alone. These differences were highly significant statistically.

The methods of experimentation have been described in detail in a previous communication of these results. In all of the experiments reported here, a yellow hybrid corn, the Bantam sweet corn, growing on soil which occurs near Delhi, Calif. They state that zinc deficiency symptoms observed, although, as stated previously, in some cases on Miami silt loam a color in the leaves of the corn receiving copper sulfate was observed. The application of copper sulfate was noticeably darker green in color than corn without the copper sulfate. The zinc sulfate also appeared to produce a somewhat darker color but to a lesser degree. Ears were harvested at the canning stage and it was found that the copper sulfate increased yields about 30% and zinc sulfate about 10% over 3-18-9 alone. These differences were highly significant statistically.

The favorable results obtained in 1940 led to continued experimentation with copper and zinc sulfates during certain seasons over a period of eight years. The results at times have been somewhat erratic, particularly on some soil types, and in certain years. However, they appear to be sufficiently significant to justify reporting, and the results from six different fields are given here.

Since Mazé (2) first reported on the essential nature of zinc for corn in 1914, a number of investigations dealing with zinc deficiencies and the use of zinc as a fertilizer element have been conducted. These have recently been summarized by Stiles (5) who lists the results of various investigators regarding the essentiality of zinc for 58 different species of plants. Barnette et al. (1) in 1936 found white bud in corn, a zinc deficiency symptom, to be widespread in corn fields of northern, northwestern, and central Florida. They show that increases in yield of field corn of from about 30% up to over 500% were obtained from the application of zinc sulfate along the corn row. This treatment also completely corrected the white bud condition. Reed and Beck (3) observed zinc deficiency symptoms in Golden Bantam sweet corn growing on soil which occurs near Delhi, Calif. They state that zinc deficiency curtails the production of cobs and kernels more than that of stalks, leaves, and husks.

Since 1933 when Russell and Manns (4) reported increased yields of corn on Sassafras loam from the application of copper sulfate, few if any additional reports of similar work with corn have been reported, although copper has been shown to be beneficial in the field to a number of other crops, particularly in Florida.

**RESULTS**

The yield data, given in Table 1, show the exception of the Carrington silt loam the inclusion of 5 or 10 pounds of copper sulfate per acre fertilizer gave a significant increase in yield each year, ranging from approximately 5% to approximately 40% of the useable ears. The inclusion of 10 and 20 pounds of copper sulfate in the fertilizer resulted in slight increase in yield in three experiments on Miami silt loam, the highest being 45% in 1942. In 1941, a negative though not significant decrease was obtained. In 1943 on Miami silt loam the slight increase in yield was not significant, although it on the Carrington number 3.

In none of the fields were typical zinc deficiency symptoms observed, although, as previously, in some cases on Miami silt loam a color in the leaves of the corn receiving copper sulfate was observed. The application of copper sulfate was tried alone and in combination with zinc sulfates in some of the experiments. The favorable results obtained in 1940 led to continued experimentation with copper and zinc sulfates during certain seasons over a period of eight years. The results at times have been somewhat erratic, particularly on some soil types, and in certain years. However, they appear to be sufficiently significant to justify reporting, and the results from six different fields are given here.

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