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RESPONSE OF CORN TO BROADCAST APPLICATIONS OF ZINC

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Where zinc deficiency in corn occurs on Kentucky soils it has been corrected by applying 3 to 6 pounds of elemental zinc per acre in the row at planting time. In some areas of the state, corn planters with row fertilizer attachments are not generally used, raising the question as to the amount of zinc required when broadcast applications are made.

Through the cooperation of Clarence Mitchell, Area Extension Specialist, a field was located where the 1966 corn crop showed zinc deficiency. Since the field was to be planted in corn (Connecticut 860) in 1967, a field trial with broadcast applications of zinc was conducted.

The Tennessee Valley Authority supplied a 30-0-0 fertilizer with 6 percent zinc, which was used as the zinc source on one set of plots at rates to supply 0, 12, and 24 pounds of elemental zinc per acre. Each treatment was replicated 4 times. A soil sample from the area had a 6.8 pH, phosphorus level of 300++++ and a potassium level of 242 pounds per acre.

On another set of plots, zinc sulfate was used as the source of zinc and applied broadcast at rates to supply 0, 14, 28, 43, 57, and 71 pounds of elemental zinc per acre, with each treatment replicated 3 times. A soil sample from this area showed a 6.7 pH, with phosphorus and potassium levels of 300++++ and 207 pounds per acre respectively.

Nitrogen was applied broadcast on all plots at the rate of 120 pounds per acre at the same time the zinc was broadcast and disked in. No other fertilizer was used.

The average yields for the various treatments (calculated on the basis of 15.5 percent) are shown in the following table:

TVA 30-0-0 + Zn Broadcast		Zinc Sulfate - Broadcast	
Rate/A Elemental Zinc	Bu/A Ave 4 rep	Rate/A Elemental Zinc	Bu/A Ave 3 rep
0	65.3	0	64.4
12	88.5	14	78.2
24	103.3	28	104.6
		43	111.8
		57	99.8
		71	100.1

(To simplify information in this publication, trade names of some products are used. No endorsement is intended, nor is criticism implied of similar products not named.)

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On the basis of these trials it would appear that where zinc deficiency becomes a problem on soils having a high pH with very high phosphorus levels, an application of about 30 pounds of elemental zinc is required when a broadcast application is made. This is much higher than the suggested broadcast rate in the first sentence at the top of page 9 in Circular 613, "Secondary and Micronutrient Element Needs for Field Crops in Kentucky."

In view of information presently available, the most practical method of correcting zinc deficiency in corn is by row placement at planting time. Apparently it will require 5 to 10 times more zinc when a broadcast application is made than when it is placed at the row.

Elemental zinc in the form of zinc sulfate (approximately 33 percent zinc) will probably cost about 60 cents per pound. Three to 6 pounds applied at the row would cost $1.80 to $3.60, compared to $18 per acre for the 30 pounds of zinc applied broadcast.