



## Applying Zinc in Fluid Fertilizers

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The importance of zinc (Zn) fertilizers for row crop production on some soils has been recognized for many years. Over these years, researchers have described the general situations where a response to this essential micronutrient can be expected. In addition, many trials have been conducted to measure the effectiveness of various sources of zinc on the market.

In the large majority of these trials, the zinc sources were broadcast in either a granular or powdered form. The nature and magnitude of the response to zinc may be dependent upon the particle size of the zinc source. As fluid fertilizers became more popular, there was a parallel development of zinc sources which could be applied with these fertilizers. Therefore, we initiated trials to evaluate the effectiveness of several zinc sources applied in fluid fertilizers. We chose to use suspension materials to eliminate any possible effect of particle size on crop response to this nutrient.

### SOIL pH

Soil pH also affects the availability of zinc. Therefore sites having widely different chemical properties were chosen for the study. Corn was grown under center pivot sprinkler irrigation on both acid and calcerous sands.

In 1974, four zinc sources (EDTA-Zinc, NULEX-Zinc, ZnO, ZnSO<sub>4</sub>) were used to supply 0, 1.5, 3.0 and 6.0 lbs. Zn/acre. These same carriers were used to supply 0, 0.1, 1.0, 3.0 and 6.0 lbs. Zn/acre in 1975. In 1976, the NZN product was added to the study and the 6.0 lb./acre rate of zinc was discontinued. The basic suspension was made for 10-34-0, 28-0-0, 0-0-62, and contained

2.5% clay. The final analysis was an 8-20-6. All zinc sources were added to this suspension to provide the required concentration of zinc. This suspension was applied to the side of and below the seed at a rate of 200 lbs./acre at planting. **Positioning of the fluid fertilizer in this way provided for an ideal relationship between the fertilizer placement and the root system of the corn crop.**

### DOUBLED YIELD

Corn yields were improved by application of fertilizer zinc at the site having an acid pH (Table 1) as well as the sites having a calcerous pH (Table 2). **With placement below and to the side of the seed, only small amounts of fertilizer zinc were needed to produce maximum yield in 1974.** The

positioning of 1.0 lb. zinc per acre in this manner produced maximum yields in both 1975 and 1976. **It's important to point out that the use of 0.1 lb. zinc per acre doubled yields in 1976. When zinc is deficient in soils, only small amounts of zinc are needed if it is placed close to the seed at planting.**

**TABLE 1.** Effect of rate of applied zinc on yield of corn grown on an irrigated sandy soil having an acid pH.

| Zinc Applied Pounds/Acre | Yield Bushels #2 Corn/Acre |
|--------------------------|----------------------------|
| 0                        | 152                        |
| 1.5                      | 170                        |
| 3.0                      | 165                        |
| 6.0                      | 168                        |

**TABLE 2.** Effect of rate of applied zinc on yield of corn on irrigated sandy soils having pH greater than 7.0.

| Zinc Applied Pounds/Acre | Yield Bushels #2 Corn/Acre |      |         |
|--------------------------|----------------------------|------|---------|
|                          | 1975                       | 1976 | Average |
| 0                        | 101                        | 62   | 82      |
| 0.1                      | 107                        | 130  | 119     |
| 0.3                      | 119                        | 135  | 127     |
| 1.0                      | 130                        | 139  | 135     |
| 3.0                      | 122                        | 142  | 132     |

**TABLE 3.** Effect of source of zinc on yield of corn grown on irrigated sandy soils.

| Zinc Source       | Yield Bushels #2 Corn/Acre |            |            |            |
|-------------------|----------------------------|------------|------------|------------|
|                   | 1974                       | 1975       | 1976       | Average    |
| EDTA              | 164                        | 119        | 143        | 142        |
| <b>NULEX</b>      | <b>165</b>                 | <b>125</b> | <b>133</b> | <b>141</b> |
| ZnO               | 161                        | 121        | 132        | 139        |
| ZnSO <sub>4</sub> | 164                        | 114        | 137        | 138        |
| NZN               | -                          | -          | 136        | -          |