

# Starter Fertilizer for No-Till Milo Production

Paul C Hay, Extension Educator

University of Nebraska-Lincoln Soil Specialist Charles Wortmann, et al conducted research on starter fertilizer use in grain sorghum. Starter fertilizer is applied in addition to other required fertilizer for optimal crop growth. We also use band application of a phosphorus (P) fertilizer on a low P soils to enhance yields. Past research in Nebraska on medium and fine textured soils did not find the use of starter fertilizer to be economical, but that research was conducted primarily under tilled conditions.

Results of some studies in other States show a higher probability of milo response to nitrogen(N), P, and sulfur(S) in starter fertilizer under no-till as compared to tilled conditions. Some studies, but not all, find method of placement of starter fertilizer to be important. Soil type and topographic position may be important to response.

Twelve trials were conducted in eastern Nebraska in 2002 and 2003 to determine milo response to starter fertilizer under no-till conditions. The trial sites were all on farmers' fields and selected to represent diverse soils and topographic positions. Planting was when the farmers planted, usually in late May.

Eight starter fertilizer treatments were compared:

1. No starter applied
2. 20 lb N + 20 lb P applied 2" to the side of the row and 2" deep (2x2)
3. 20 lb N + 20 lb P applied over the row
4. 10 lb N + 10 lb P applied in the furrow
5. 20 lb N + 20 lb P + 10 lb S applied 2x2
6. 20 lb N + 20 lb P + 10 lb S applied over the row
7. 10 lb N + 10 lb P + 5 lb S applied in the furrow
8. 10 lb N + 10 lb P + 5 lb S in-furrow application with S supplied from ammonium thiosulfate rather than ammonium sulfate which was the S source in the other treatments.

Results:. Soil pH ranged from 5.3 to 6.1. Soil organic matter ranged from 2.7 to 3.4%. Phosphorus tests ranged from very low to very high and was higher in the 0 to 2" depth (median was 15 ppm) than in the 2 to 8" depth (median = 5.5 ppm). The potassium level was high at all sites.

Milo grain yield was increased with starter fertilizer in only one of the 12 trials. The average yield without starter fertilizer was 91 bu/A and the average yield with the most effective starter fertilizer treatment (10 lb N + 10 lb P applied in the furrow) was 93 bu/A. Including sulfur in the starter did not result in increased yield. Based on the results of these 12 trials, we can not recommend starter fertilizer for no-till milo as a profitable practice at the typical planting dates.

Three trials were conducted in 2004 with an early May planting date at adequate P sites to test the effect of in-furrow application of 10-34-0 as well as the effects of row-cleaning. These trials confirmed the lack of response to starter fertilizer in milo.

Starter fertilizer in this study resulted in earlier maturity and less grain moisture at harvest in one trial, but generally the use of starter fertilizer did not affect grain moisture. A prior University of Nebraska-Lincoln Starter Fertilizer Study showed each of the agronomic traits including early growth response, earlier maturity date, and lower grain moisture at harvest occurred independent of each other in about 50% of trials.

Fertilizers like 10-34-0 are called starter fertilizer. They are also a method to place phosphorous fertilizer in a band with or near the seed in a very efficient manner. Using five gallons per acre of 10-34-0 placed with the seed would yield 19.9 pounds of P per acre. This would be adequate to give top yields in P deficient fields unless they had very low soil test levels. Phosphorus deficient fields can quickly tie up P fertilizer in unavailable forms. Placement close to the seed and in limited contact with the soil increases the likelihood of roots taking up the P and decreases the likelihood of the soil rendering the P unavailable. This might be of greater interest and importance in rented fields with low P soil test values. A way to get top yields without long-term investment in a field the farmer does not own or have remedy to recover the investment if the lease is lost.

Using five gallons of 10-34-0 with the seed places 5.9 pounds of salt per acre with the seed. Salt levels with the seed should be below 7 pounds per acre for milo. University research studies generally show less than ten pounds of salt per acre is acceptable for corn and milo. Most agronomists in the field feel much safer with the 7 pound level. Salt levels need to include the total of nitrogen, potassium, and sulfur levels in the fertilizer. Let's say we used a 8-20-5-5(Sulfur)-0.5 (Zinc) fertilizer at the same 5 gallon rate. This would deliver 10.5 pounds of salt (unacceptable) and 11.7 pounds of P (also unacceptable for low P sites). I am not saying it is a bad fertilizer. If used at a lower rate as a starter it would be okay, but may not pay big dividends in milo. As a P source for deficient fields it may not be high enough in P analysis when placed with the seed. Much higher rates of these fertilizers can be used when placed two to five inches away from the seed.