

Have you ever wondered what the effect of starter fertilizer placement and rate has on grain sorghum yields?

Results of an ongoing study at the North Central Kansas Experiment Field near Belleville helps answer this question. The study area was a Crete silt loam soil and the soil test phosphorus (P) level (42 ppm) was in the high range. There were two tillage systems, no-till and reduced tillage (spring disc and harrow three weeks prior to planting) and two starter fertilizer placement methods using six combinations of nitrogen and phosphorus (0 N 0 P₂O₅; 0 N and 30 lb P₂O₅; 30 lb N and 0 P₂O₅; 15 lb N and 30 lb P₂O₅; 30 lb N and 30 lb P₂O₅; 45 lb N and 30 lb P₂O₅). The starter fertilizer placement methods were dribble (applied in a band on the soil surface 2 inches to the side of the row) and 2x2 (two inches to the side and two inches below the seed) at planting. After planting, all plots received additional 28 % urea ammonium nitrate (UAN) to total 140 lb N/a.

The three-year average sorghum yields were similar for no-till (116 bu/a) and reduced tillage (113 bu/a), but the 2x2 starter placement (117 bu/a) was 6 bu/a better than the dribble method (111 bu/a). However, in 2001 there were no differences between the dribble and 2x2 placement treatments. Averaged over both tillage systems and starter placement methods, grain sorghum yields were maximized using a starter fertilizer with either 30 or 45 lb N and 30 lb P₂O₅/a. Also, these same rates reduced the number of days from seedling emergence to mid-bloom.

What's the bottom line?

Seeing a yield response to starter fertilizer is interesting when you consider the soil test P levels were in the high range where we wouldn't normally expect to see a response. However, reduced tillage systems that leave more residues on the soil surface cause soil temperatures to be cooler, which results in poor root growth and P uptake. Thus, we see yield responses to starter fertilizer applications in reduced tillage and no-till systems. The 2x2 starter placement compared to the surface dribble placement has significant water quality ramifications. Placing the starter fertilizer below and to the side of the seed reduces the chance of fertilizers being lost with surface runoff after a rain. This is in contrast to the common practice in reduced tillage and no-till systems of using surface applied fertilizers which results in more nutrients (and pesticides) being lost with runoff.

For details about this study see:

Kansas Fertilizer Research 2001. P. 37-39. K-State Research and Extension Report of Progress 885.

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