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# Response To Starter Combinations Varies With Corn/Sorghum Hybrids

Kansas first-year trials using fluid combinations suggest responses can be economical for some hybrids, even on soils that are not low in available nutrients.

**Summary:** Starter fertilizer containing N and P increased V-6 dry weight compared to no-starter check for all corn hybrids tested under reduced-till conditions. Grain yield of two corn hybrids (Pioneer 3563 and DeKalb 646) did not respond to starter, regardless of elemental composition. Starter containing N and P increased grain yield of Pioneer 3346 and DeKalb 591 by 54 and 50 bu/A, respectively, compared to check. Additions of sulfur (10 lbs/A) to starters produced an additional increase in V-6 dry weight for all hybrids, and grain yield increases for Pioneer 3346 and DeKalb 591. Additions of K and Zn to starters did not produce additional benefit. Starters containing N and P increased grain sorghum yield of DeKalb 40Y and 48 by 22 and 25 bu/A, respectively. Yield of two grain sorghum hybrids (Pioneer 8699 and Northrup King KS 735) did not respond to starters. Additions of K, S, and Zn did not significantly increase dry matter production or yield for any grain sorghum hybrid.

Conservation tillage production systems are being used by an increasing number of farmers in the central Great Plains. Early-season growth is often poorer in conservation tillage than in conventional tillage. Cool

responded well to starters containing only N and P while others did not. Little is known about variability in responsiveness of corn and grain sorghum to starters containing a full range of nutrients.

Objectives of these experiments were:

- determine the variability in starter responsiveness between corn and grain sorghum hybrids grown under reduced tillage conditions
- ascertain whether variability in starter responsiveness between corn and grain sorghum hybrids is influenced by starter composition.



**V-6 stage—corn**  
Starter combination. Figure 1 shows how the combination of N and P improved V-6 stage dry matter

production of all hybrids tested, compared to check. Note how additional response was achieved with inclusion of sulfur in the starter mix. However, introduction of K and Zn into the mix did not result in any additional V-6 stage dry matter production. soil temperatures at planting can reduce nutrient uptake of crops. Fertilizer placed in proximity to the seed at planting can alleviate the detrimental effects of cool soil temperatures on plant growth and development. Previous research at the North Central Kansas Experiment Station found that some corn and grain sorghum hybrids grown in reduced-till

production of all hybrids tested, compared to check. Note how additional response was achieved with inclusion of sulfur in the starter mix. However, introduction of K and Zn into the mix did not result in any additional V-6 stage dry matter production.

Hybrid. The differences in response of hybrids to starters are also shown in

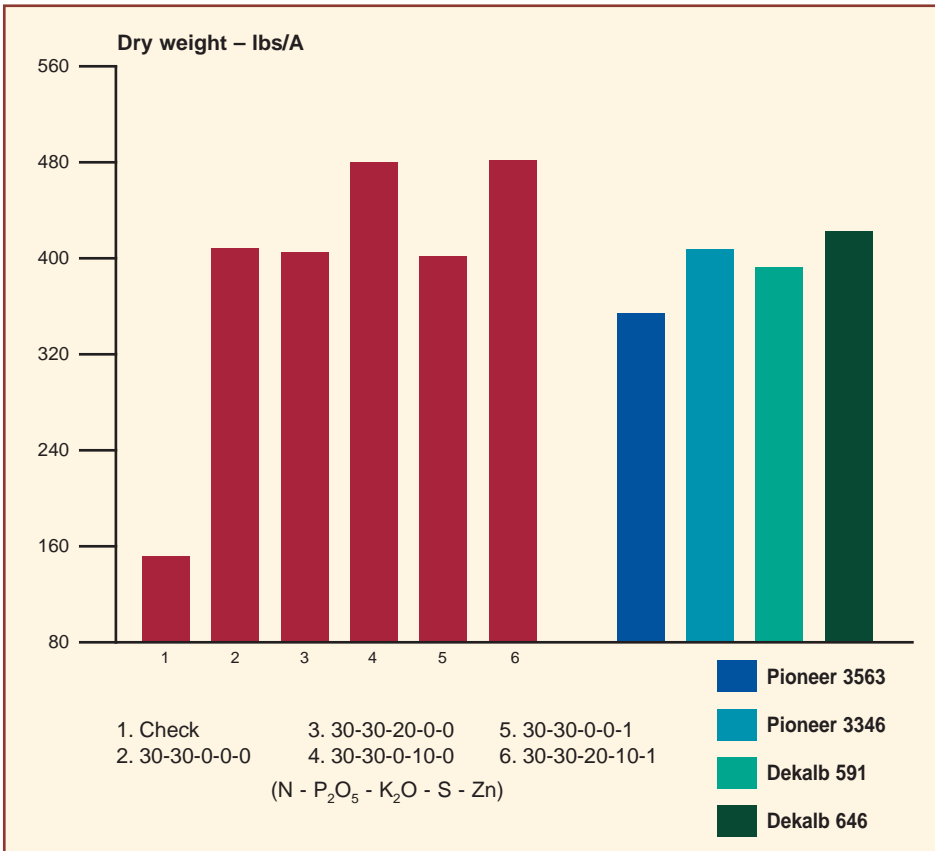


Figure 1. Starter combination effects on V-6 stage whole plant dry weight of corn hybrids, Gordon and Pierzynski, Scandia, KS, 1996.

Figure 1. Of the four hybrids tested, DeKalb 646 showed the best response, producing 66 lbs/A more than Pioneer 3563, which gave the lowest response.

#### Yield—corn

As can be readily seen in Figure 2, two hybrids (Pioneer 3563 and DeKalb 646) did not respond to starters. This is

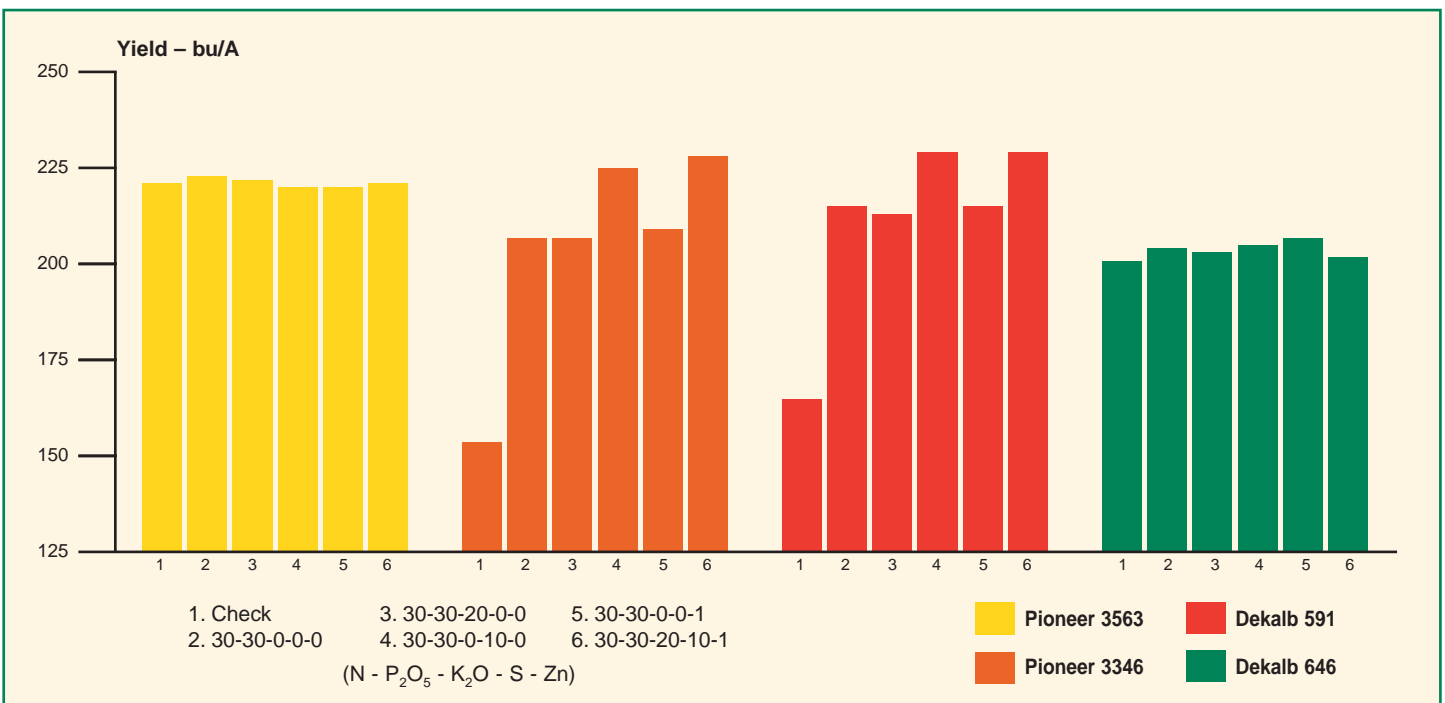


Figure 2. Starter combination effects on yield of corn hybrids, Gordon and Pierzynski, Scandia, KS, 1996.

consistent with previous studies using these hybrids. However, starters containing N and P increased grain yield of Pioneer 3346 and DeKalb 591 by 54 and 50 bu/A, respectively, when compared to check. Introduction of sulfur into the starter mix produced an additional 18 bu/A for Pioneer 3346 and 16 bu/A for DeKalb 591, when compared to NP starters.

#### V-6 stage—sorghum

*Starter combination.* Figure 3 shows again how the combination of N and P increased V-6 dry matter in all grain sorghum hybrids compared to check. However, note that inclusion of K, S, or Zn in the starter mix did not significantly improve V-6 dry matter production on this medium-textured silt loam soil.

*Hybrids.* As can be seen, DeKalb 48 responded the best of the four hybrids selected in this trial (Figure 3).

#### Yield—sorghum

Starters containing N and P increased grain yield of DeKalb 40Y and 48 by 22 and 25 bu/A, respectively, compared to check (Figure 4). Grain yield of Pioneer 8699 and Northrup King 735 did not respond to starters. As can be seen,

introducing K, S, and Zn into the mix did not significantly affect grain yield, when compared with N and P alone.

### Conclusion

Results of this work suggest that responses to starter fertilizer can be economical for some hybrids, even on soils that are *not* low in available nutrients, particularly when corn or grain sorghum is planted in a high-residue production system.

### Procedure

*Sites.* For corn, location was a farmer's furrow-irrigated field in the Republican River Valley near Scandia, Kansas, that had been in ridge-till four years prior to study. For grain sorghum, it was the North Central Kansas Experiment Field near Belleville. This site had been in no-till production three years prior to our experiment.

*Soil* on farm near Scandia was a Carr sandy loam with a pH of 7.2, organic matter content of 1.0 percent, Bray-1 P of 21 ppm, and exchangeable K of 280 ppm in the surface 6 inches. At Belleville, soil was Crete silt loam with a pH of 6.5, organic matter content of 2.5 percent, Bray-1 P of 44 ppm, and exchangeable K of 350 ppm in the top 6 inches.

*Placement.* Starter was applied two inches to the side and two inches below the seed at planting.

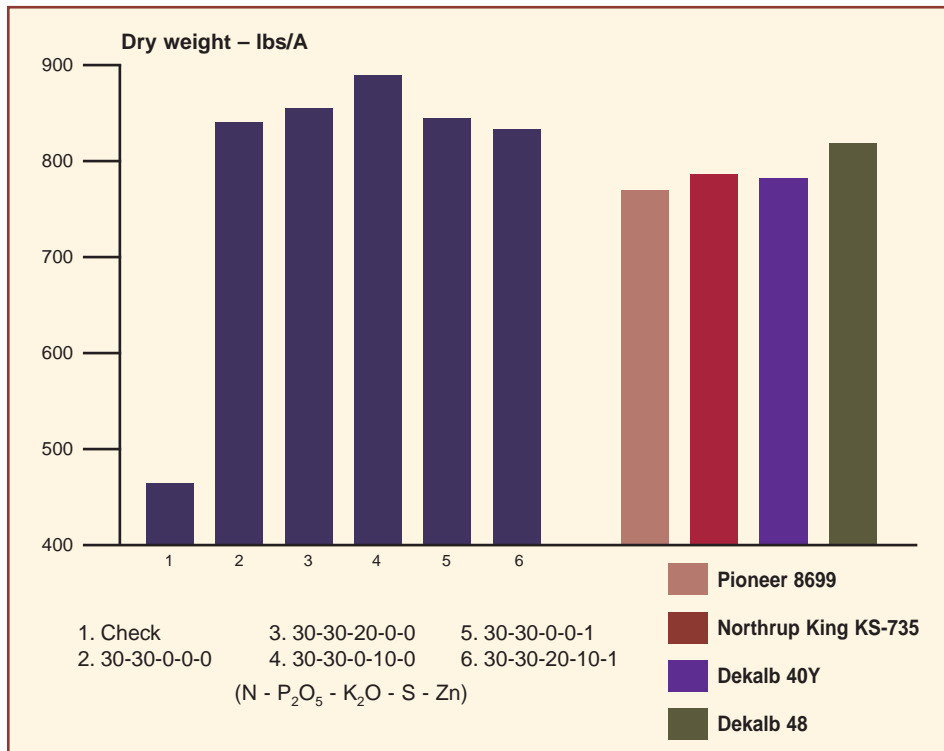


Figure 3. Starter combination effects on V-6 stage whole plant dry weight of grain sorghum hybrids, Gordon and Pierzynski, Belleville, KS, 1996.

*Planting.* Corn was planted April 23 at 30,000 seeds/A. Grain sorghum was planted on May 24 at 64,000 seeds/A. Immediately following planting, N was balanced on all plots to give a total of 200 lbs/A in the corn study and 150 lbs/A in the grain sorghum study.

*Fertilizer.* N source was 28% UAN, P

source was 10-34-0, K source was KCL, S source was ammonium thiosulfate, and Zn source was a liquid Zn-NH<sub>3</sub> complex.

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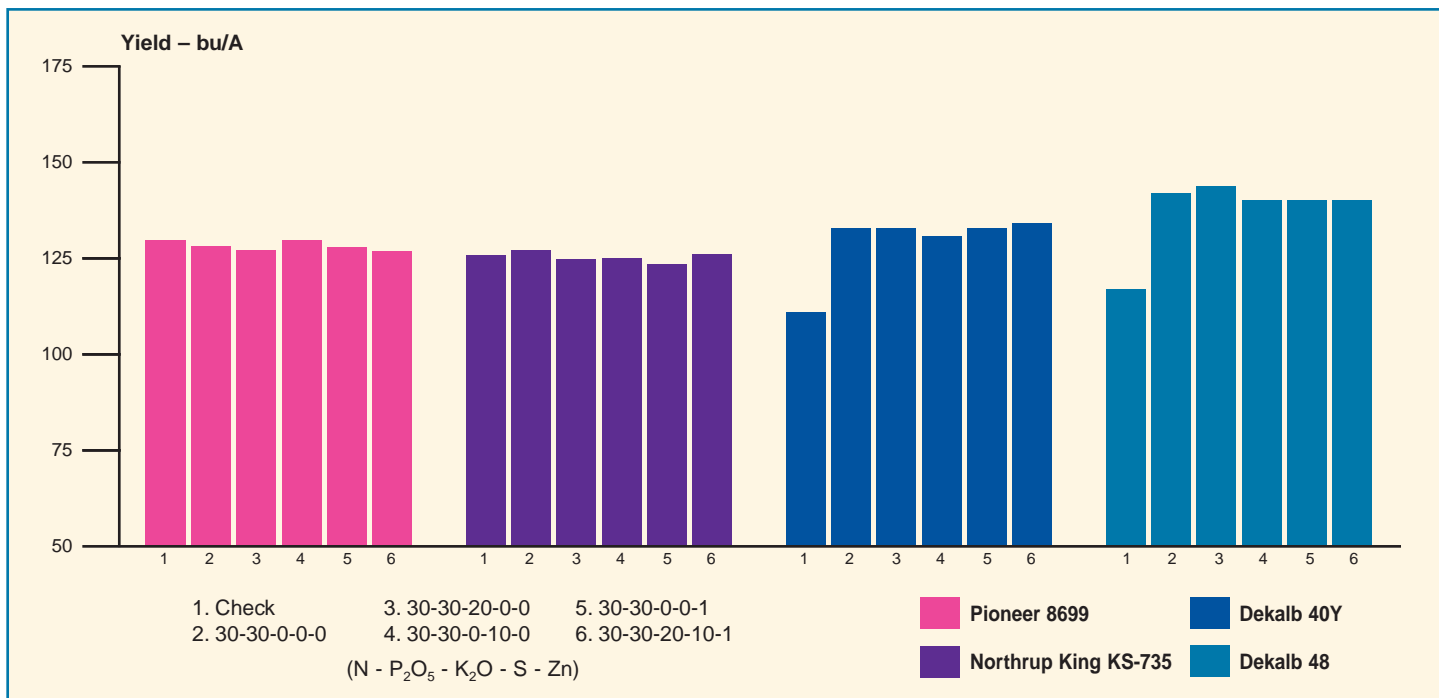


Figure 4. Starter combination effects on yield of grain sorghum hybrids, Gordon and Pierzynski, Belleville, KS, 1996.