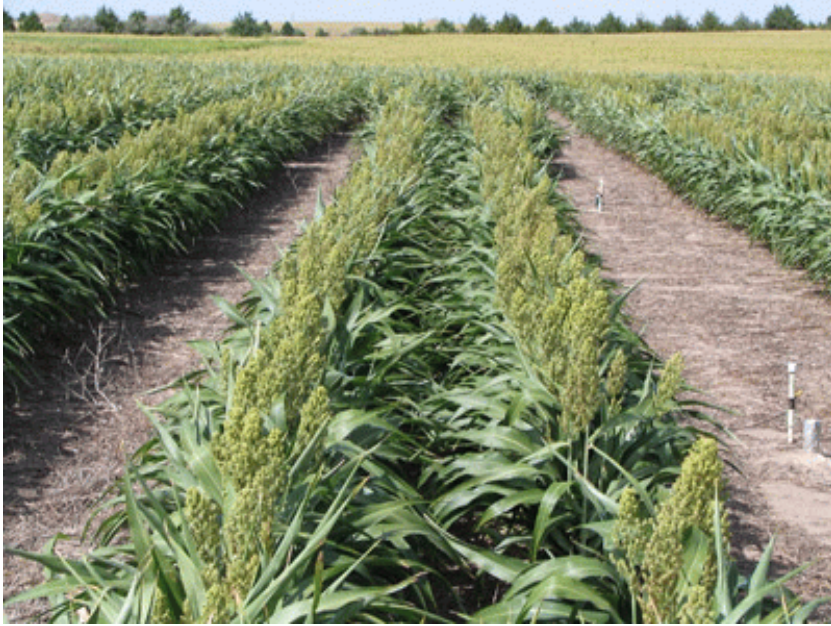


Skip Row Configuration for Rainfed Grain Sorghum in Nebraska

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Introduction:

With sustained drought conditions in Nebraska, crop producers are seeking alternative production systems which can be profitable. Skip-row planting is one strategy which has been suggested to conserve soil water, but has been evaluated in Nebraska primarily for corn. Soil moisture conserved in the inter-row area during the early stages of crop growth can be utilized during productive stages when there is low in-season precipitation. This may reduce the risk of total crop failure due to moisture stress, improve harvest index, grain yield and grain quality. This study will help determine production practices that can make sorghum a viable alternative crop in Nebraska in areas where limited precipitation in the growing season can severely reduce crop production. The objectives of the study were to evaluate the interactions of skip-row planting, plant population, and nitrogen management for grain sorghum production on 1) grain yield and quality; 2) nitrogen use efficiency and 3) soil moisture availability and water use efficiency.

Results:

A research study was conducted in 2005 and 2006 to evaluate the effect of skip row configuration and plant population density on grain sorghum yield and quality. In 2005, a preliminary study was conducted at the University of Nebraska South Central Agricultural Laboratory (SCAL) in Clay County and was continued in Clay County and extended in 2006 to four other counties, Cheyenne, Gosper, Frontier and Hayes, cutting across the precipitation gradient of central to western Nebraska. The treatment design was three row configurations: solid planting where every 30 in. row is planted (S1), plant one row/skip one row (S2), and plant

two rows/skip two rows (S3) and two population densities, 30,000 (P1) and 60,000 (P2) plants per acre. In 2006, four rates of nitrogen were included at the Clay County site - 0, 45, 90 and 135 lb N per acre. Soil moisture status was recorded hourly with Watermark sensors installed at the Clay County site and bi-weekly by neutron probe in access tubes installed to 120 cm depth in all the study sites. In 2005, the lower population gave significantly higher panicle yield than the higher population in each of the three row configurations. At the Clay County site in 2005, the S2 row configuration, on a row basis, had significantly higher (15%) grain yield than S3 and 53% higher grain yield than S1, while S3 had 33% higher grain yield than S1. Grain yield on an area basis ranged from 191 to 127 bu/ac in a decreasing order of S1>S2>S3. Both S2 and S3 had significantly higher grain weight per panicle and higher 100 seed weight than S1. In 2006, dry matter yield at anthesis was significantly influenced by row configuration at all five sites. Crop water use efficiency at anthesis was significantly higher in S1 than S2 and S3 at all sites in 2006.

Discussion:

From two years of skip row sorghum research at SCAL, it is evident that rainfall is normally adequate in south-central Nebraska to produce optimal yield potential when planting every row. There was substantial yield reduction with either of the skip configurations. In 2006, at three of the western locations, skip planting resulting in higher grain yield than planting every row. However, yield at these locations was on the order of 32-64 bu/ac, compared to yields of 127-159 bu/ac at SCAL. Thus, in these environments, skip planting can help avoid crop failure, but will reduce yield potential if rainfall is adequate.