2001 Annual Report Presented to the Arkansas Corn and Grain Sorghum Promotion Board

Project Title: Low Input, Ultra-Short Season Corn Production

Principle Investigators: Larry C. Purcell and Earl D. Vories

Impact:
Short-season corn hybrids produced yields in ranging from 150 to 170 bushels per acre with considerably less irrigation requirements than full-season hybrids. Additionally, we were able to produce a second crop of short-season soybean (maturity groups 00 to II) behind the corn crop in a single season with yields ranging from 30 to 45 bushels per acre.

Rationale for this research.
The primary advantage of ultra-short season corn production is that water requirements of short-season hybrids match prevailing long-term rainfall distribution patterns. In most years rainfall is adequate and well distributed in the months of April, May, and June. A ultra-short season corn hybrid (75 to 90 day hybrids) planted in mid-April would be expected to mature with little requirement for irrigation, or certainly decreased irrigation requirements. Other advantages include increased rotational options, and marketing advantages capitalizing on last year's prices for this year's crop.

The purpose of the experiments that we are conducting is to evaluate several hybrids from northern US and Canada for their productivity in Arkansas. Secondly, we are evaluating the population density needed to capture fully yield potential of these short season hybrids.

We conducted two experiments this summer. The first experiment was an evaluation of 10 hybrids at NEREC at Keiser. The hybrids were sown in late April in twin row plots (16 inches apart) on 38 inch beds. Maturity of these hybrids range from 73 to 116 days. 120 pounds of N were applied at planting and then again as a side dressing. Unfortunately, an irrigation pump was not working during June, and the crop yields were very low (50 to 75 bushels/acre). These results are not representative of yield potential.

The second experiment was conducted at NEREC and at the Main Experiment Station in Fayetteville. Three hybrids (rated as 73, 87, and 105 day maturities) were planted in mid-April at densities ranging from 16,000 to 110,000 plants per acre. The purpose of these experiments was to determine the optimum population density to fully express yield potential of these short-season hybrids. These experiments are important because the short-season hybrids produce fewer leaves and require high populations for complete light interception and maximum yield. Nitrogen was applied as described for Experiment I. At Keiser, the inability to irrigate the crop adequately during June

resulted in very poor yields (<70 bushels per acre) and these data will not be discussed further. At Fayetteville, crop emergence was excellent, and the crop was irrigated as required.

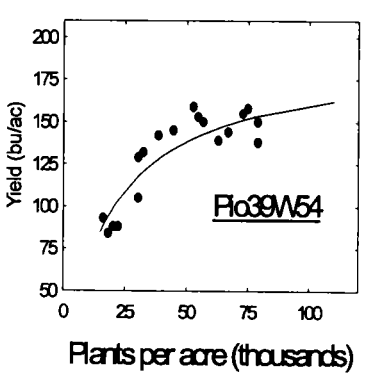
All the hybrids emerged on April 24, 11 days after planting. Table 1 includes developmental data for the hybrids and the total amount of irrigation water required between emergence and black layer formation. Black layer formation differed by 18 days among the hybrids, and irrigation requirement increased from 3.6 inches for the earliest hybrid to 5.2 inches for the latest-maturing hybrid.

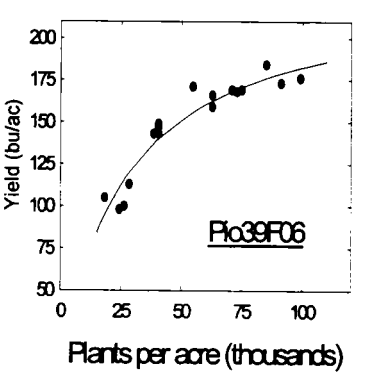
Table 1. Developmental stages for ultra-short season corn hybrids in Fayetteville, 2001. The crop was sown on 13 April and emerged on 24 April.

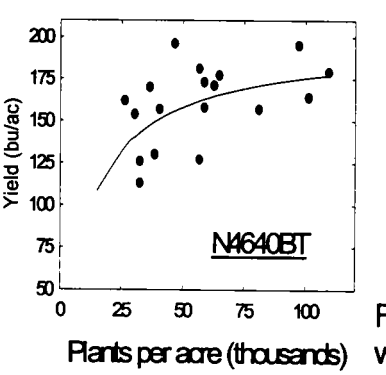
Hybrid	Maturity Rating	Tassel (DAE[1])	Silking (DAE)	Dent (DAE)	Black Layer (DAE)	Harv (DAE)	Irrigation to Black Layer (in)
Pion. 39W54	73 days	46	50	76	82	93	3.6
Pion. 39F06	87 days	55	58	82	87	101	4.2
NK 4640 BT	105	59	61	86	100	112	5.2

[1]DAE, days after emergence

Yields for all three hybrids increased as population density increased up until approximately 50,000 plants per acre. Above 50,000 plants per acre there was little yield increase for any of the hybrids. For each hybrid, the yield for plots having greater than 50,000 plants per acre were averaged. For the earliest hybrid, Pioneer 39W54, yield was 150 bushels per acre; for the 85 day hybrid, Pioneer 39F06, yield was 172 bushels per acre; and for the 105 day hybrid, Novartis 4640BT, yield was 168 bushels per acre.







Follo wing

the harvests of each of the hybrids, five different soybean cultivars were planted. There was one cultivar represented from soybean maturity groups 00, 0, I, II, and IV. Although this research was not funded by the Corn and Grain Sorghum Board, we believe that the ability to produce a second summer crop behind early corn is an opportunity for some producers.

The graph below indicates that with a July 27th soybean planting date (which corresponds to the harvest date of the 73 day hybrid) yield from a second soybean crop from maturity groups I and II ranged from 40 to 45 bushels per acre. For the August 2nd soybean planting date (which corresponds to the harvest date of the 85 day hybrid) yield from a second soybean crop ranged from 35 to 40 bushels per acre depending on maturity group. For the August 14th planting date (which corresponds to the harvest date of the 105 day hybrid) yield for the second soybean crop was 30 bushels per acre or less. For the maturity group II and IV cultivars planted on August 14, frost killed the crop prior to maturity. It should be noted that following the harvests of the second soybean crop, wheat was planted, which would allow the production of a third crop in one year.