Relative Potential of Corn and Sorghum for Grain Double Cropped after Wheat

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Summary

Eight grain sorghum hybrids and seven corn hybrids were grown double crop after wheat under similar production practices at the Safford, Arizona, Experiment Station. Seven of the eight sorghum hybrids produced grain yields above the highest yielding corn genotype, indicating that grain sorghum has a greater potential under the general environmental conditions of this test.

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Introduction: The long growing seasons with moderate winters at the lower elevations in Arizona make possible the double cropping of warm season grain crops after cool season crops on the same land area. There are different environmental requirements among and within plant species for optimum production. There are also great variations in environments among Arizona crop production areas. The combination of these two sources of variability of plants and of the environment makes it necessary to select particular plant species and/or genotypes for optimum production in a particular Arizona environment.

Materials and Methods: The purpose of this test was to evaluate corn and sorghum for greatest potential for grain production in the Safford, Arizona area.

Seven corn hybrids with a range of maturity were compared with eight grain sorghum hybrids also with a range of maturity. The entries of these two species were grown in the same field double crop after spring wheat. Both corn and sorghum were treated the same relative to seed bed preparation, fertilization, and irrigation which was applied as needed for near optimum production.

All entries were replicated four times in 4-row plots 25 feet long. The center 2 rows were harvested for yield.

The seed bed preparation of spring wheat stubble that had been harvested in early June was as follows: double disc; double ripped at 90° angle; lilly-rotaria twice; pre-plant fertilizer applied; rowed out; pre-irrigated; lilly-rotaria once; and then planted in moisture on 28 June 1982.

Fertilizer applied during the season was 90 lbs of N pre-plant followed with 50 lbs of N from urea in irrigation water on 17 Aug. 1983.

Twenty-four acre-inches of irrigation water was applied during the season. Eight acre-inches were applied pre-plant on 18 June with 4 acre-inches being applied on each of 4 dates: 5 Aug., 17 Aug., 1 Sept., and 9 Sept.

Both corn and sorghum plots were hand harvested on 21 Oct. 1982. The ears and heads from these respective plots were air dried to a uniform moisture and then shelled or threshed as appropriate.

Results and Discussion: Grain yield and other agronomic data are presented in Tables 1 and 2.

The highest yielding hybrid sorghum, Asgrow Corral, produced 7378 pounds of grain per acre, which was 1271 pounds more grain than produced by DKXL72AA, the highest yielding corn hybrid at 6107 pounds per acre. There are differences in value of corn and sorghum grain but they are quite similar in general feeding value. In this test this year it appears that any but the lowest yielding sorghum hybrid would have been a better choice to grow than any of the corn hybrids.

The range in yield from highest to lowest of the 8 sorghum hybrids was 1320 lbs or 17.9% of the highest yield. The range in yield from highest to lowest of the 7 corn hybrids was 2088 lbs or 34.2% of the highest yield. If the lowest yielding corn hybrid is eliminated from this calculation, the 6 remaining corn hybrids had a 1082 lb range which was 17.7% of the highest yield. Thus, the corn and sorghum genotypes tested had similar magnitudes of variation for production under this environment. From this we could assume that the selected corn entries (except for the lowest) and the sorghum entries represented equally broad ranges in genetic adaptation for production from genotypes available.

Table 1. Grain yield per acre and other agronomic data of eight grain sorghum hybrids grown as a double crop after spring wheat at Safford, Arizona. 1982.

Entry	Days to 50% bloom	Ht to top of head (in.)	Threshing %	Grain yield per acre (lbs.)
Asgrow Corral	64	53	82.5	7378
Asgrow H 8012	68	52	84.9	7166
Asgrow Double Tx	70	56	81.6	7146
Asgrow H 796	70	48	81.5	7128
Asgrow Mustang	68	44	85.8	7059
Asgrow Topaz	70	48	84.1	7004
Asgrow Dorado E	61	46	84.3	6482
Asgrow Colt	72	48	79.5	6058

Average yield of all entries = 6928

Table 2. Grain yield per acre and other agronomic data of seven corn hybrids grown as a double crop after spring wheat at Safford, Arizona. 1982.

Entry	Days to pollination	Ht to top of tassel (in.)	Ht to ear base (in.)	Grain shelling (%)	Bushel test wt. (lbs.)	Grain per acre (lbs.)
DK XL 72AA	67	102	43	82.0	54.5	6107
DK XL 73	69	86	35	80.2	57.8	5563
DK XL 362AA	66	90	34	82.6	55.2	5393
DK XL 25A	61	82	30	82.4	59.0	5181
DK XL 14AA	60	94	34	81.2	60.0	5031
DK XL 72B	68	92	33	81.6	55.8	5025
DK EX 6969	66	90	35	78.6	54.2	4019

Average yield of all entries = 5188

Sorghum, Pearl Millet and Corn Grown for Grain Production Under Double-Crop Rainfed Conditions at Marana, Arizona

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Summary

Four hybrids of each of the warm season crop species, sorghum, pearl millet and corn, were grown under irrigated and rainfed double crop conditions. Sorghum was the greatest grain producer under both irrigation and rainfed treatments. Sorghum and millet suffered equal reductions in grain yield percentagewise from rainfed moisture stress. Corn was reduced in yield severely. Hybrids within species ranked similarly for grain yield under irrigation and rainfall. The percent change in days to 50% bloom, plant height and bushel test weight between irrigation and rainfed treatments was almost identical among species.

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Introduction: Irrigation water shortages and its high cost make investigation of ways to reduce use or cost of water very desirable. About half of the annual rainfall for the Tucson and Marana area (5 to 6 inches) falls in about a 2 to 3 month period in July, August and September. Warm season crops such as sorghum, corn and pearl millet can be planted late in a double crop situation and make use of