

Performance of Commercial Grain Sorghum Hybrids in Indiana, 2000

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Sorghum has received serious consideration as a grain crop in some Indiana locations. With adapted hybrids and proper management, sorghum will usually produce higher returns than either corn or soybeans on certain soil types and low rainfall areas, especially if the grain is fed to livestock (see Purdue Extension Publication AY-198). This publication provides producers, seedsmen, extension educators and others with information on sorghum hybrid performance.

A total of 27 hybrids from the 7 companies listed in Table 4 were evaluated at three locations in Indiana. One of the earliest sorghum hybrids to be developed, RS610, and a Purdue cultivar of good agronomic quality and wide adaptation, P954063, were used in each year's trials as standards against which newer commercial hybrids can be compared.

LOCATION OF TRIALS

The three trial locations in 2000 are shown in Figure 1.

Location 1 (Tippecanoe County). The trial was at the Purdue University Agronomy Research Center (ARC) near West Lafayette, on a Chambers silty clay loam soil.

Location 2 (Jennings County). The trial was at the Southeast Purdue Agricultural Center (SEPAC) near North Vernon, on a Avonburg silt loam soil.

Location 3 (Knox County). The trial was at the Southwest Purdue Agricultural Center (SWPAC) near Vincennes, on a Ross loam soil.

TRIAL PROCEDURES

Plots. The plots were arranged in a randomized complete block design with three replications at each location. Each plot consisted of two rows 16 feet long with 30 inch row spacing.

Planting. The seedbeds were prepared by conventional tillage. Location 1 was planted with a John Deere Max-emerge planter. Locations 2 and 3 were planted with a two-row cone planter. The seeding rate was approximately 10 seeds per foot. Plant population was thinned to six plants per foot shortly after emergence resulting in approximately 100,000 plants per acre.

Cultural Practices. Ramrod-atrazine pre-plant or pre-emerge herbicide combination was used for weed control in all locations. Each location was cultivated at least once and hand weeded as necessary. An optimum soil fertility

level was maintained in order to allow maximum hybrid performance.

Harvest. At the two southern-most locations, heads from all plants in a 10-foot section of each row of the two-row plot were hand harvested. The Tippecanoe County trial was harvested with a plot combine. After threshing, grain moisture was recorded and yields adjusted to 13.5 percent moisture.

Information recorded. Half-bloom, plant height and percent bird damage were recorded during the growing season. Half-bloom is the number of days from planting until 50 percent of the plants have shed pollen halfway down the head. Physiological maturity (cessation of dry matter accumulation in the grain) is reached 35-40 days after half-bloom. Plant height is the average height, in inches, from the soil surface to the tip of the head at maturity. Bird damage was measured by visual estimation of the percentage of grain yield lost to bird feeding.

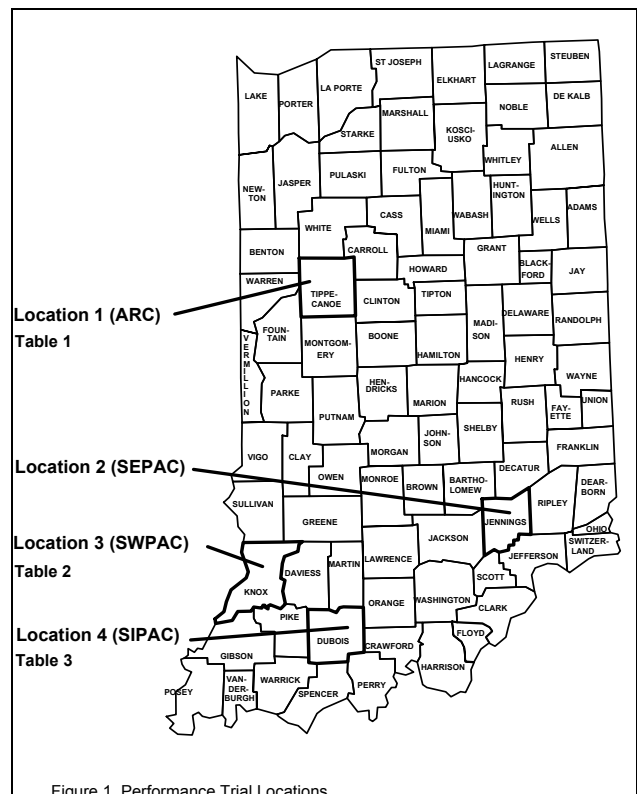


Figure 1. Performance Trial Locations

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RESULTS

Results of the 2000 performance tests are presented by location in Tables 1 through 3. General conditions present at each location are given below.

Location 1 (Tippecanoe County). The hybrids were planted on May 25. Rainfall from April through September totaled 24.58 inches. No lodging or bird damage was observed. A dry spring led to the average planting date. The growing season was fair. The abundance of rainfall during June and July contributed to somewhat lower yields. Growing degree day (GDD) accumulation totaled 3020. Yields averaged 124 bu/acre (6949 lb.), with the highest yielding hybrid averaging 160 bu/acre (8954 lb.). This was one of the lowest yielding tests in the last 20 years.

Location 2 (Jennings County). The hybrids were planted on June 9. Rainfall from April through September totaled 31.04 inches. With the wet early conditions, stand establishment for poor for some hybrids. No bird damage or lodging was observed at this location. Growing degree day (GDD) accumulation totaled 3179. Yields averaged 73 bu/acre (4084 lb.), with the highest yielding hybrid averaging 94 bu/ac.(5273 lb.) This was a below average test, contributed to by the late planting date.

Location 3 (Knox County). The hybrids were planted on June 9. Rainfall from April through September totaled 24.56 inches. Extremely wet conditions in May, June, and July stressed the crop. The trial was also slightly damaged by birds, with the average amount of bird feeding surpassing 20 percent of the potential yield on some hybrids, resulting in the higher than acceptable variability (CV). Growing degree day (GDD) accumulation totaled 3575. Yields averaged 75 bu/acre (4180 lb.), with the highest yielding hybrid averaging 104bu/acre (5807lb.). This was an average to below average test at this location.

DISCUSSION

An analysis of variance was conducted and the Least Significant Difference (LSD) computed at the 5 percent level of significance. The LSD indicates how much one entry must differ from another entry within a location to be reasonably certain that it is a true difference. If the yield difference between the two hybrids is less than the LSD, then other factors must be considered in deciding which hybrids to grow, such as days to flowering. The LSD is given in the same units as the average (i.e. pounds per acre, etc.). An asterisk (*) beside a yield average on a performance table indicates that the yield is not significantly different from the highest yield in the table.

The coefficient of variation (CV) was determined for the traits measured. The CV measures the amount of experimental error relative to the average and indicates

how much error was present. When yields are high relative to the experimental error, the CV will be small.

Growing degree day (GDD). A modified 50 scale was used. GDD equals daily mean minus 50 (below 50 adjust to 50, above 86 adjust to 86). April 1 thru September was recorded.

Participating companies. The companies participating in the 2000 performance trials are listed in Table 4.

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Table 1. 2000 Grain Sorghum Performance Trial, Location 1, Tippecanoe Co.

Brand	Hybrid	Yield lb/acre	Half bloom days	Height in
Warner Seeds	W-818-E	8954 *	79	56
Pioneer	85G85	8419 *	75	54
U A P SEED	DG 751	8406 *	80	52
NC+	7B47	8225 *	77	50
Production Plus+	PP777	8169 *	78	52
Production Plus +	PP799E	7874 *	81	55
NC+	7R83	7844 *	80	56
U A P SEED	DG 762	7685 *	78	51
Pioneer	84G62	7679 *	79	52
NC+	6B50	7665 *	77	52
Production Plus+	PP644	7540 *	79	54
Crosbyton	7431	7427 *	77	56
Triumph	TR438	7416 *	76	53
Pioneer	8522Y	7349	79	55
Warner Seeds	WX-9309	7270	81	54
U A P SEED	DG 763	7208	81	55
NC+	7B29	7196	78	56
Pioneer	8500	7155	75	50
Triumph	TR82G	6872	84	52
Triumph	TR65G	6850	80	54
Pioneer	87G57	6796	73	54
Triumph	TR461	6706	80	50
Triumph	TR464	6662	81	52
NC+	6B67	6577	76	50
Production Plus+	PP333	6497	78	53
Triumph	TR447	6440	80	51
Production Plus+	P599W	6415	80	56
Warner Seeds	WX-93244	6371	82	46
Warner Seeds	W-816-E	6302	80	54
Warner Seeds	WX-99025	6046	80	54
Warner Seeds	W-965-E	5780	81	58
Crosbyton	3068	5510	78	53
-check	RS610	5386	76	50
-check	P954063	1253	84	56
Grand mean		6949	78	53
LSD (5%)		1556	3	8
C.V. (%)		14	3	9

Randomized complete block design: 3 replications.

Yield averages followed by * are not significantly different from the highest Yield average in this table.

Table 2. 2000 Grain Sorghum Performance Trial, Location 3, Jennings County.

Brand	Hybrid	Yield lb/acre	Height in.
U A P Seed	DG 751	5273 *	57
Production Plus+	PP333	4967 *	46
Pioneer	87G57	4964 *	46
Pioneer	8500	4905 *	48
Production Plus+	PP799E	4867 *	57
Pioneer	85G85	4803 *	48
Triumph	TR464	4782 *	53
U A P SEED	DG 762	4753 *	57
U A P SEED	DG 763	4682 *	60
Pioneer	84G62	4647 *	48
Triumph	TR447	4573 *	44
Production Plus+	PP599W	4468 *	54
NC+	7B47	4450 *	46
Triumph	TR65G	4362 *	52
Warner Seeds	WX-93244	4347 *	45
Warner Seeds	WX-9309	4297 *	51
Warner Seeds	W-816-E	4288 *	54
Crosbyton	7431	4197 *	46
Warner Seeds	WX-99025	4115	46
Crosbyton	3068	4080	46
-check	RS610	4027	53
Pioneer	8522Y	3924	51
NC+	6B50	3907	48
NC+	7R83	3745	54
Production Plus+	PP644	3736	50
Production Plus+	PP777	3669	53
Warner Seeds	W-818-E	3590	59
NC+	7B29	3534	50
Triumph	TR82G	3428	58
NC+	6B67	3390	44
Triumph	TR461	3375	54
Triumph	TR438	3296	51
Warner Seeds	W-965-E	3152	50
-check	P954063	1060	48
Grand mean		4084	51
LSD (5%)		1139	3
C.V. (%)		17	4

Randomized complete block design: 3 replications.

Yield averages followed by * are not significantly different from the highest Yield average in this table.

Table 3. 2000 Grain Sorghum Performance Trial, Location 4, Knox County.

Brand	Hybrid	Yield lb/acre	Height in
NC+	7B47	5807 *	47
Pioneer	84G62	5463 *	48
Pioneer	87G57	5181 *	44
NC+	6B67	4988 *	46
U A P SEED	DG 762	4879 *	57
Triumph	TR464	4876 *	53
Warner Seeds	W-816-E	4823 *	53
Pioneer	8500	4762 *	48
Pioneer	85G85	4750 *	47
Crosbyton	7431	4729 *	46
U A P SEED	DG 751	4723 *	56
Triumph	TR82G	4606 *	58
NC+	7B29	4497 *	47
Pioneer	8522Y	4465	50
NC+	7R83	4462	52
NC+	6B50	4409	46
Triumph	TR447	4209	44
Production Plus+	PP777	4036	52
Production Plus+	PP644	4004	49
Production Plus+	PP333	3942	46
Warner Seeds	WX-93244	3880	47
Production Plus+	PP799E	3810	57
Triumph	TR65G	3804	50
Triumph	TR438	3678	48
Warner Seeds	WX-99025	3622	47
Crosbyton	3068	3543	48
Warner Seeds	W-818-E	3487	62
Warner Seeds	WX-9309	3460	54
Production Plus+	PP599W	3454	54
Triumph	TR461	3404	54
Warner Seeds	W-965-E	3384	50
-check	RS610	3231	53
U A P SEED	DG 763	3193	58
-check	P954063	2171	51
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Grand mean		4180	51
LSD (5%)		1323	3
C.V. (%)		20	4

Randomized complete block design: 3 replications.

Yield averages followed by * are not significantly different from the highest Yield average in this table.

Table 4. Entrants in the 2000 Indiana Grain Sorghum Performance Trials

Company	Address
Warner Seeds	Warner Seeds, Inc. P.O. Box 1877 Hereford, TX 79045 806-364-4470.
U.A.P	U.A.P. SEED P.O. Box 2840 Cordova, TN. 38088 901-755-7566
Crosbyton	Crosbyton Seed Co. P.O. Box 429 Crosbyton, TX 7932 806-675-2308
Pioneer	Pioneer Hi-Bred Int'l P.O. Box 308 Tipton, IN 46072 800-258-3579
Triumph	Triumph Seed CO.,Inc. P.O. Box 1050 Ralls, TX 79357 800-530-4789
Production-Plus +	Production-Plus + P.O. Box 1106 Plainview, TX 79072 806-293-3103
NC+	NC+ Hybrids P.O. .Box 428 Colwich,KS 67030-048 316-796-1570