

# Performance of Commercial Grain Sorghum Hybrids in Indiana, 1998

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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 30 hybrids from the 6 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 four trial locations 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). This location is 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.

**Location 4** (Dubois County). The trial was at the Southern Indiana Purdue Agricultural Center (SIPAC) near Dubois, on a Tilsit silt 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 3 and 4 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.

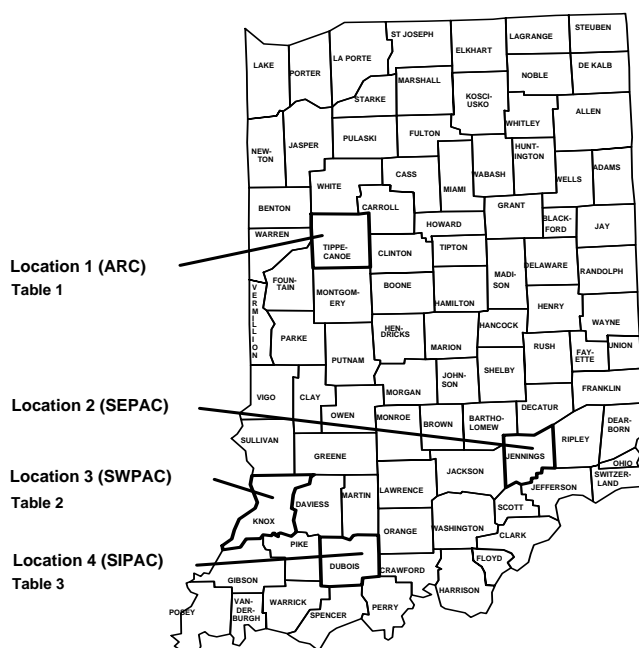


Figure 1. Performance Trial Locations

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## RESULTS

Results of the 1998 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 28 and June 23. Rainfall from April through October totaled 28.67 inches. No lodging or bird damage was observed. A very wet June (8.41 inches of rain), caused flooding. The original trial had to be replanted, hence the second planting date. After this start the growing season was fair. Growing degree day (GDD) accumulation totaled 3735. Yields averaged 109 bu/acre (6095 lb.), with the highest yielding hybrid averaging 130 bu/acre (7269 lb.). This was one of the lowest yielding tests in the last 17 years, equaling the 1988 trial.

Location 2 (Jennings County). No trial was established this year, because of the wet spring.

Location 3 (Knox County). The hybrids were planted on June 25. Rainfall from April through October totaled 36.93 inches. Extremely wet conditions in May and June, followed by normal to drought like conditions in the following months, stressed the crop to some extent. The trial was also 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 4175. Yields averaged 85 bu/acre (4733 lb.), with the highest yielding hybrid averaging 111 bu/acre (6328 lb.).

Location 4 (Dubois County). The hybrids were planted on June 25. Rainfall from April through October totaled 31.62 inches. A small amount of deer damage was observed for some of the hybrids. An early wet season contributed to the late planting date. Growing degree day (GDD) accumulation totaled 3990. Yields averaged 118 bu/acre (6634 lb.), with the highest yielding hybrid averaging 144 bu/acre (8089 lb.).

## 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 through October 31 was recorded.

Participating companies. The companies participating in the 1998 performance trials are listed in Table 4.

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**Table 1. 1998 Grain Sorghum Performance Trial, Location 1, Tippecanoe Co.**

Brand	Hybrid	Yield lb/acre	Half bloom days	Height in
Cargill	737	7269 *	63	47
PROD. +	PP799E	7238 *	63	55
Crosbyton	5789	6787 *	65	49
Crosbyton	1489	6775 *	62	52
PROD.	PP644	6720 *	62	52
Dekalb	DK 53	6610 *	62	54
Crosbyton	9089	6572 *	64	55
Triumph	TR65G	6563 *	65	54
PROD. +	PP777	6543 *	63	52
Cargill	833	6480 *	64	48
PROD. +	PP788E	6433 *	62	53
check	5	6391 *	59	55
check	4	6316 *	63	54
Dekalb	DK 54	6201 *	63	56
Dekalb	DK 47	6171 *	62	49
Cargill	770Y	6169 *	63	47
Triumph	TR82G	6038 *	65	53
Dekalb	DK 45	5889	62	54
Dekalb	DK 55	5866	64	56
check	RS610	5852	57	55
check	3	5673	61	52
Crosbyton	7389	5550	63	50
check	P954063	5530	64	52
PROD. +	PP333	5299	62	48
PROD. +	PP599W	5025	63	51
Cargill	X12027	4941	63	46
check	6	4916	63	56
Crosbyton	1492	4835	63	50
Grand mean		6095	63	52
LSD (5%)		1344	2	2
C.V. (%)		13	2	3

Yields followed by an asterisk (\*) are not significantly different from the highest yield. Copyright Purdue Research Foundation.(1998)

**Table 2. 1998 Grain Sorghum Performance Trial, Location 3, Knox County.**

Brand	Hybrid	Yield lb/acre	Half bloom days	Height in
Pioneer	8522Y	6328 *	61	51
Cargill	833	6218 *	62	50
Cargill	737	6049 *	59	48
Triumph	TR447	6019 *	59	48
Crosbyton	5789	6004 *	64	52
PROD. +	PP788E	5668 *	59	54
Pioneer	8500	5583 *	59	51
PROD. +	PP644	5462 *	60	50
Cargill	X12027	5378 *	62	46
Triumph	TR65G	5084 *	60	50
Triumph	TR82G	4951 *	64	56
Crosbyton	9089	4855 *	62	55
check	4	4840 *	60	52
PROD. +	PP799E	4818 *	63	57
check	P954063	4809 *	66	55
PROD. +	PP599W	4795 *	60	52
Dekalb	DK 45	4718 *	65	52
Crosbyton	1489	4637 *	61	57
PROD. +	PP777	4582	61	52
PROD. +	PP333	4568	60	48
Cargill	770Y	4407	61	50
check	RS610	4362	59	54
Dekalb	DK 47	4282	64	48
Pioneer	84G62	4254	64	52
Dekalb	DK 53	4249	67	52
Pioneer	8699	3978	60	49
Dekalb	DK 54	3938	69	53
Triumph	TR459	3883	67	40
Crosbyton	7389	3848	66	52
Crosbyton	1492	3521	62	53
Dekalb	DK 55	3499	66	54
check	3	1866	69	55
Grand mean		4733	63	52
LSD (5%)		1705	3	4
C.V. (%)		22	3	5

Yields followed by an asterisk (\*) are not significantly different from the highest yield. Copyright Purdue Research Foundation.(1998)

**Table 3. 1998 Grain Sorghum Performance Trial, Location 4, Dubois County**

Brand	Hybrid	Yield lb/acre	Half bloom days	Height in
Dekalb	DK 54	8089 *	63	63
Dekalb	DK 55	7995 *	63	63
Triumph	TR82G	7939 *	62	62
Crosbyton	5789	7888 *	62	60
Triumph	TR65G	7652 *	59	60
Crosbyto	1489	7485 *	62	62
Crosbyto	1492	7476 *	62	59
Triumph	TR481	7394 *	64	59
Dekalb	DK 45	7391 *	63	60
check	13	7306 *	64	63
PROD.+	PP788E	7209 *	59	58
Dekalb	DK 53	7158 *	64	62
Dekalb	DK 47	7130 *	60	56
Triumph	TR462	7042 *	60	58
Crosbyton	9089	7014 *	63	60
PROD.+	PP777	6977 *	62	60
PROD.+	PP799E	6790 *	62	62
Cargill	X12027	6687 *	63	52
Pioneer	84G62	6585 *	62	54
Pioneer	8500	6378	60	56
Cargill	737	6251	60	55
Crosbyton	7389	6250	65	60
Pioneer	8522Y	6208	62	56
PROD.+	PP599W	6174	61	64
Cargill	770Y	6123	60	55
check	P954063	5856	65	57
Cargill	833	5334	63	54
PROD.+	PP333	5266	60	57
PROD.+	PP644	5246	60	56
check	RS610	5127	58	55
Pioneer	8699	4517	60	54
Triumph	TR447	4344	59	51
Grand mean		6634	62	58
LSD (5%)		1638	2	4
C.V. (%)		15	2	4

Yields followed by an asterisk (\*) are not significantly different from the highest yield. Copyright Purdue Research Foundation. (1998)

**Table 4. Entrants in the 1998 Indiana Grain Sorghum Performance Trials**

Company	Address
Agra Tech	Agra Tech Seeds Inc. 559 N. 550 W. McCordsville, In 46055
Cargill	Cargill Hybrid Seeds P.O. Box 5645 Minneapolis, MN 55440
Crosbyton	Crosbyton Seed Co. P.O. Box 429 Crosbyton, TX 7932
Pioneer	Pioneer Hi-Bred Int'l P.O. Box 308 Tipton, IN 46072
Production Plus +	Production Plus + 800 E. 6TH Street Plainview, Texas 79073
Triumph Seed	Triumph Seed P.O. Box 1050 Ralls, TX 79357