

Grain sorghum reactions to Anthracnose in Table 4. were provided by Dr. TeBeest.

Hybrid Selection

Numerous grain sorghum hybrids are commercially available in Arkansas. Breeding programs exist for the development of high-yielding hybrids that provide desired agronomic characteristics and disease resistance. These hybrids are released yearly, and many are included in the Arkansas Grain Sorghum Performance Testing program.

Hybrid selection is an important management decision for successful grain sorghum production. Yield potential is important, but should not be the primary concern when selecting a hybrid. Other characteristics such as lodging potential, disease reaction, and head exertion should also be considered. Grain sorghum yields are influenced by the hybrid adaptation and by the level of management to maximize the genetic yield potential. No hybrid is superior to all other hybrids under all circumstances. Thus, selecting two or more hybrids is recommended, which not only spreads the risks associated with adverse environmental factors but also benefits management operations such as harvesting.

The performance of any given hybrid will likely differ from site to site each year. While the yield data from all locations may be helpful, the data from the locations closest to your farm may be the most meaningful. Choosing hybrids that perform well at the location representing a soil type similar to yours is also suggested. Hybrid performance differs by location due to disease and environmental factors. By selecting a hybrid with a two- and three-year yield average, a more realistic performance of that hybrid can be evaluated. Therefore, selecting adapted grain sorghum hybrids with a two or three-year yield history is important. (See Table 2.)

Bacterial Diseases

Bacterial Leaf Spot -Bacterial leaf spot is caused by *Pseudomonas syringae* pv. *syringae*. It is common throughout the state, but especially in south Arkansas. Symptoms include small water-soaked spots on the lower leaves, which gradually enlarge into round lesions, usually with reddish borders. On certain varieties, margins die and turn dark brown. As lesions dry out, the centers become tan to off-white. At this stage, leaf spot can resemble other leaf-spotting problems caused by herbicide drift, fungi, etc. Bacterial leaf spot is common in the spring when wet and windy conditions persist, but the disease usually decreases during hot and dry summer weather. The bacterium survives in crop debris and certain weedy grasses. Control measures include crop rotation, destruction of crop residue, good weed control, and planting resistant hybrids.

Bacterial Leaf Streak - Bacterial leaf streak is caused by *Xanthomonas campestris* var *holcicola*. The disease is common throughout Arkansas. Symptoms include water-soaked streaks between the leaf veins that grow to several inches long, and become purple on most hybrids. The streaks often give the leaves a striped appearance when heavily infected. In very susceptible varieties, the stripes join into large blotches, killing the leaf. The disease is most common in the spring under warm wet conditions. It usually becomes less serious during the hot dry summer months. Control measures include crop rotation, destruction of crop residue, and planting resistant hybrids.

Fungal Diseases

Anthracnose - Anthracnose is caused by *Colletotrichum sublineolum* (formerly *C. graminicola*). This disease is very common throughout Arkansas and can be found in most fields near harvest. It is favored by warm temperatures, heavy dews, and frequent rains. Anthracnose can cause death of seedlings, leaves, stems, peduncles, heads and can cause stalk rot and lodging. Anthracnose symptoms include small purple or tan roundish spots, first noticed on foot-tall plants but often becoming much more severe at flowering and later. Serious yield loss may result if heavily diseased fields are not harvested quickly. On resistant hybrids, spots stay 1/8" or less in size. On susceptible hybrids, spots grow quickly to 1/2" or more in size and may develop wide yellow borders. Plant resistant hybrids to minimize damage from anthracnose. Anthracnose may be reduced by plowing down infected crop remains, crop rotation for at least 1 year, and good grassy weed control. Sorghum anthracnose does not affect corn although corn has a similar disease.

TIP! *When the grain reaches the proper moisture, harvest the field. DO NOT WAIT.*

Leaf Blight. Leaf blight is caused by *Exserohilum turcicum* and is widespread in Arkansas. The disease is favored by mild temperatures between 64 - 81 F with heavy dews or rain. It may occur early in the season and continue until grain fill unless slowed by dry weather. On susceptible hybrids under favorable weather, yield losses can approach 50%. The fungus survives on weedy grasses, infected residue, and infested seed. Symptoms include small reddish or tan spots that grow into large elliptical reddish purple or tan lesions, up to 1/2" wide x 1-6" long. The surface of the lesions may become covered with spores of the fungus, turning the surface dark gray. Control options include resistant hybrids, crop rotation, and control of weedy grasses.

Charcoal Rot - Charcoal rot is caused by a soil-borne fungus, *Macrophomina phaseolina*. It is a major disease of soybean, grain sorghum, and corn in Arkansas, especially in non-irrigated fields. High-yielding hybrids appear to be especially susceptible, particularly when drought-stressed. Charcoal rot is noticed late in the season when headed plants lodge, usually in spots or areas of a field. Other symptoms include a dried, stringy appearance of the stem near the soil line (at the fold on lodged plants) and the presence of very tiny black sclerotia in the stem tissue. The fungus is soil-borne and survives as sclerotia. High temperatures and drought greatly increase the disease. Charcoal rot can be reduced by timely and adequate irrigation, proper application of potash fertilizer according to a recent soil test, and use of the recommended amount of nitrogen fertilizer. Resistant hybrids are not available.

Head Blight and Molds- Head blight and molds are caused by several fungi. *Fusarium moniliforme*, *Fusarium semitectum*, *Curvularia lunata*, *Phoma sorghina*, *Helminthosporium spp.* and *Alternaria spp.* are generally considered to be head molds. Also, *Colletotrichum* (anthracnose) can infect heads under certain conditions. Symptoms of head molds include pink, orange or white grains (*Fusarium*); black grains (*Curvularia*, *Alternaria* or *Helminthosporium*); or grains with small black dots (*Phoma* or *Colletotrichum*). Head blight usually refers to the infection of the neck or parts of the head, resulting in the death of the head or various parts. Head blights can be caused by *Fusarium* or *Colletotrichum*. Head blights and molds can be minimized by spreading out planting dates so that not all fields flower and head at the same time. Certain hybrids are less susceptible than others but complete resistance is not available. If head molds are heavy within a field, the grain should be tested before being fed to animals since certain *Fusarium* fungi can produce mycotoxins.

Target Spot - Target spot is caused by *Bipolaris sorghicola*. This is a potentially serious disease that was first noticed in Arkansas at serious levels in 2001, but only in an isolated location. Symptoms include reddish or grayish spots which later develop into irregular or barrel-shaped lesions up to 4" long on leaves. Rarely the spots develop a tan center. The fungus attacks all plant parts and can develop all season. The fungus survives in infected debris or on weed hosts such as johnsongrass.

A few hybrids appear to be resistant and should be planted if the disease becomes a problem. Crop rotation and good weed control are also helpful.

Zonate Leaf Spot - Zonate leaf spot is caused by *Gloeocercospora sorghi*. This is a very common disease throughout Arkansas but is generally minor. Symptoms include very large (1-3") circular lesions that have alternating straw-colored and purple rings. Young lesions are purple blotches that may have tan irregularly shaped spots in the centers. The fungus survives in soil and infected plant debris. During warm and wet weather, pinkish-orange slime containing spores may be

visible on the lesions. The fungus is spread by rain and water and the disease can be severe in wet periods. Moderately resistant hybrids are available for planting. Crop rotation and good weed control (especially of johnsongrass) minimize the disease.

NEW DISEASE!

Sorghum Ergot - Sorghum ergot is caused by a fungus called *Claviceps africanae*. The disease was introduced into the United States a few years ago and has caused significant losses in hybrid seed production fields in certain states. The disease has not caused serious losses in commercial hybrids to date, only in hybrid seed production. Sorghum ergot was first reported in northeast Arkansas in 2000 in a late-planted field of Pioneer hybrid 8313. This hybrid has previously been reported in other states as having sorghum ergot. The disease was not found or reported in Arkansas in 2001. The fungus usually only infects sterile flowers and produces a fungal ergot that oozes spore-filled honey dew attractive to certain flies and other insects. Spores in the honey dew infect other flowers nearby. Ergots gradually mature and turn darker in color but do not grow larger than individual sorghum grains. Control has thus far not been needed in commercial hybrids but the disease will be monitored the next few years in most grain sorghum states. All commercial hybrid seed is treated to minimize the spread of the disease by seed and crop rotation may become important if the problem increases. Planting grain sorghum at recommended dates should help. Planting late is not recommended since lower night temperatures in August can lead to sterile flowers that are more easily infected by the fungus.

Table 1. Yields of Grain Sorghum Hybrids in Arkansas Performance Tests, 2003 ¹

	Keiser ² Irr.	Keiser Nonirr.	Stuttgart Irr.	Rohwer Irr.	Rohwer Nonirr.	Kibler Irr.	Avg.
Brand/Hybrid	-----lbs/acre-----						
ASGROW A571	5386	6761	7636	7241	7522	5184	6622
Croplan Genetics 514	5330	6675	8457	7607	6858	5310	6706
DEKALB DKS53-11	5303	6224	7856	7423	7788	5519	6686
DEKALB DKS54-00	4531	6397	7260	6636	6466	4563	5976
Dyna Gro 732B	2660	4599	5082	5350	6789	5363	4974
Dyna Gro 751B	5346	6912	8485	7116	6702	5258	6637
Dyna Gro 762B	4157	6703	7028	7447	7301	4637	6212
Dyna Gro 780B	5220	6741	7994	6981	6527	5146	6435
Dyna Gro X1738	4144	5857	6024	6070	7008	4856	5660
Dyna Gro X1754	4464	6888	7367	7449	7599	5928	6616
Dyna Gro X17F90	3976	6443	6803	6257	6521	4644	5774
FFR 318	4439	6220	7464	7502	7252	5722	6433
FFR 322	5189	6809	8226	7488	7578	5215	6751
Garst 5440	4743	6212	6968	6962	6876	5630	6232
Garst 5515	4205	6453	7049	6156	6387	5292	5924
Garst 5624	3523	4831	6013	5554	6152	4917	5165
Golden Acres 3694	4575	7358	7399	6692	7279	5274	6430
Golden Acres 444E	5029	6247	7034	6782	6143	5505	6123
Golden Acres X-2027	4446	6786	7774	7251	7538	5343	6523
Golden Harvest H-502	5419	7060	7993	7556	7149	5323	6750
Golden Harvest H-512	4722	5949	7295	6602	6861	5042	6079
Monsanto X204	4267	5562	7289	7216	6917	5500	6125
Monsanto X234	4408	6614	7408	6870	6762	5532	6266
Pioneer Brand 83G15	4767	7150	7857	7913	7999	5080	6794
Pioneer Brand 83G66	5383	6672	7982	8025	7937	5581	6930
Pioneer Brand 84G62	5078	7048	8125	7803	8042	5338	6906
Southern States SS-650	5530	6525	7988	7507	6476	5578	6601
Southern States SS-800	4664	5884	6928	6856	6985	5306	6104
Terral TV1050	4850	6742	7317	6858	7070	5094	6322
Terral TV93S72	4754	6121	6786	6543	7022	5165	6065
Terral TV9421	5356	6454	6739	7213	7289	5667	6453
Terral TV96H81	4735	6734	7944	7463	6894	5145	6486
Terral TV97H17	4204	7158	7993	6818	6541	5435	6358
Terral TVX93S16	5222	7069	7390	7161	6339	5584	6461
Terral TVX94S34	5026	5844	6751	6701	6582	5008	5985
Terral TVX95S201	4529	6313	6674	6212	6604	4829	5860
Terral TVX95S25	4558	6213	7165	7090	7540	5159	6288
Terral TVX96H202	4774	6504	6521	6291	6473	5414	5996
Terral TVX96H23	4912	6521	7625	7020	6463	4504	6174
Triumph TR459	4577	5789	6055	5140	6128	5208	5483
Triumph TR461	4308	6183	6275	7141	6680	5301	5981
Triumph TR82-G	5788	6611	7773	7094	6636	4719	6437
Grand mean	4726	6425	7281	6930	6945	5234	6257
LSD (5%)	972	917	696	755	845	752	.
C.V. (%)	12.7	10.3	6.9	7.9	8.8	10.4	.

¹Keiser = Northeast Research and Extension Center, Stuttgart = Rice Research and Extension Center, Rohwer = Southeast Research and Extension Center - Rohwer Division, Kibler = Vegetable Substation

²Bird damage in this test was greater than the bird damage in the nonirrigated test at this location.

Table 2. Two and Three Year Average Yields of Grain Sorghum Hybrids in Arkansas Performance Tests.

	Keiser Irr.		Keiser Non.		Stuttgart Irr.	Rohwer Irr.		Rohwer Non.	
	2-Year	3-Year	2-Year	3-Year	2-Year	2-Year	3-Year ¹	2-Year	3-Year ¹
Brand/Hybrid	-----lbs/acre-----								
ASGROW A571	5758	6374	6051	6353	7589	7538	7130	7572	6997
Croplan Genetics 514	6043	.	5654	.	7866	7926	.	7360	.
DEKALB DKS54-00	5118	5825	6073	6461	6201	6246	.	6419	.
Dyna Gro 732B	4046	.	4677	.	5963	5324	.	6170	.
Dyna Gro 751B	6053	6542	5543	6155	7917	8009	7401	7177	6984
Dyna Gro 762B	5175	.	5929	.	7106	6932	6433	7140	6871
Dyna Gro 780B	6136	6700	5171	5799	7760	7576	7216	7082	6522
FFR 318	5429	.	5764	.	7275	7366	.	6976	.
FFR 322	5998	6558	5778	6379	7687	7973	7587	7632	7277
Garst 5440	5429	.	5722	.	6723	7318	.	7142	.
Garst 5515	4951	5687	5581	6070	6825	6726	.	6691	.
Golden Acres 3694	5444	6102	6477	6782	7005	6751	.	6957	.
Golden Acres 444E	5882	6506	5791	6328	7119	7150	.	6643	.
Pioneer Brand 83G66	6088	6561	6223	6458	7348	7997	7162	7621	7352
Pioneer Brand 84G62	5963	6769	6758	7276	7555	8429	.	7854	.
Southern States SS-650	6109	6571	5417	5937	7415	7880	7328	7066	6683
Southern States SS-800	5358	6032	5660	6208	6804	7267	6948	7011	6934
Terral TV1050	5842	6479	5216	5953	6817	6994	6585	7307	6852
Terral TV93S72	5373	6116	5536	6002	6747	7103	.	7054	.
Terral TV9421	6045	6598	5700	6283	6809	7472	6850	7083	6902
Terral TV96H81	5325	6220	5741	6311	7660	7677	.	7280	.
Terral TVX95S201	5375	.	5397	.	6541	6907	.	6969	.
Terral TVX96H202	5336	.	5623	.	6453	6856	.	6917	.
Triumph TR461	5482	.	5736	.	6685	7288	7141	7326	7285
Triumph TR82-G	6019	6720	5256	6007	7684	7988	7473	7479	7299

¹Three year averages are calculated from the years 2000, 2002, and 2003.

Brand/Hybrid	Average Plant Height (in.)¹	Average Head Exertion (in.)²	Head Exertion Rating³	Average Head Compactness.⁴
ASGROW A571	55	8	G	3
Croplan Genetics 514	56	7	G	2
DEKALB DKS53-11	54	5	F	3
DEKALB DKS54-00	55	7	G	3
Dyna Gro 732B	51	11	E	2
Dyna Gro 751B	54	6	F	2
Dyna Gro 762B	55	8	G	3
Dyna Gro 780B	56	6	F	3
Dyna Gro X1738	51	8	G	3
Dyna Gro X1754	54	8	G	4
Dyna Gro X17F90	60	7	G	3
FFR 318	55	9	E	3
FFR 322	55	8	G	2
Garst 5440	53	8	G	3
Garst 5515	52	10	E	4
Garst 5624	47	8	G	4
Golden Acres 3694	52	7	G	3
Golden Acres 444E	50	9	E	3
Golden Acres X-2027	55	8	G	3
Golden Harvest H-502	55	6	F	2
Golden Harvest H-512	53	8	G	3
Monsanto X204	54	7	G	3
Monsanto X234	53	8	G	3
Pioneer Brand 83G15	54	4	F	4
Pioneer Brand 83G66	56	7	G	3
Pioneer Brand 84G62	51	5	F	4
Southern States SS-650	55	6	F	3
Southern States SS-800	50	8	G	3
Terral TV1050	54	7	G	3
Terral TV93S72	54	10	E	3
Terral TV9421	51	9	E	4
Terral TV96H81	55	5	F	2
Terral TV97H17	60	6	F	3
Terral TVX93S16	55	9	E	4
Terral TVX94S34	53	10	E	4
Terral TVX95S201	50	9	E	4
Terral TVX95S25	57	9	E	3
Terral TVX96H202	49	9	E	3
Terral TVX96H23	58	7	G	3
Triumph TR459	46	9	E	3
Triumph TR461	55	6	F	3
Triumph TR82-G	56	6	F	3

¹ Average height in inches from the soil surface to the top of the grain head.

² Average distance in inches from the flagleaf to the base to the head.

³ Head Exertion: F = Fair; G = Good; E = Excellent

⁴ Head Compaction Scale:

1 = Head short and oval, rachis branches intermediate in length, 2 = Head long and slender, rachis branches strong and short.

3 = Head elongated and oval, rachis branches beginning to weaken and intermediate in length, 4 = Head elongated and rectangular in shape, rachis branches intermediate in strength and length, 5= Head open and elongated, rachis branches weak.

Table 4. Reaction of Grain Sorghum Hybrids to Anthracnose in 2003.

Brand/Hybrid	Marianna		Pine Tree	
	Rating	Severity	Rating	Severity
Asgrow A571	MS	6.5	MR	1.5
Croplan Gen 514	MS	8.5	R	1.5
DeKalb DKS53-11	MR	4	R	1
Dekalb DKS54-00	MR	3.5	R	1
Dyna Gro 732B	S	8	MS	3
Dyna GroX1738	S	9.5	R	1
Dyna Gro X1754	S	7.5	R	1.5
Dyna GroX17F90	MR	3	R	2.5
Dyna Gro751B	S	8.5	R	1.5
Dyna Gro762B	MS	8	R	1
Dyna Gro780B	MS	7.5	R	2
FFR 318	MR	6	MR	3
FFR 322	MS	6	MS	2.5
Garst 5440	MS	7.5	R	1.5
Garst 5515	MR	2.5	R	1.5
Golden Acres 3694	MS	5.5	R	1
Golden Acres 444E	MS	7.5	MS	2.5
Golden Acres X2027	MS	8	R	1.5
Golden Harvest H-502	MS	7	R	1.5
Golden Harvest H-512	MS	8.5	R	2
Monsanto X204	MS	7.5	R	1
Monsanto X234	MS	6	MR	2.5
Pioneer 83G15	MR	3	R	1.5
Pioneer 83G66	MS	5	R	1.5
Pioneer 84G62	MS	5	R	2
South States SS-650	MS	5.5	R	1.5
South States SS-800	MS	8	R	1
Terral TV1050	MR	6.5	R	1
Terral TV93S72	MS	8.5	R	1
Terral TV9421	MS	9	MS	3
Terral TV96H81	MR	6.5	R	1.5
Terral TV97H17	S	7.5	R	2
Terral TVX93S16	MS	9	MR	3
Terral TVX 94S34	MR	7	MS	2
Terral TVX95S201	MR	4.5	R	1
Terral TVX95S25	MS	7	MS	2.5
Terral TVX96H202	MR	3.5	R	1
Terral TVX96H23	MS	5.5	MR	1.5
Triumph TR459	MS	7	MS	3.5
Triumph TR461	S	9	MS	5.5
Triumph TR82-G	MR	4	R	1.5

Resistance Ratings

All ratings were taken at the hard dough stage. R = Resistant, MR = Moderately resistant, MS = Moderately susceptible, and S = Susceptible

Severity Rating Scale

1.0 = leaf looks healthy with no lesions visible, 5.0 = Lesions cover 25 to 50% of the leaf, 9.0 = entire leaf or plant is infected and dead