

Field Performance of One Hundred Five Soybean Varieties Against the Southern Root-knot Nematode and Frogeye Leaf Spot, 2025

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A comprehensive disease screening program has been conducted by the University of Arkansas System, Division of Agriculture, Extension Plant Pathology since 1990, thanks to support by the Arkansas Soybean Promotion Board. A combination of field nurseries and greenhouse experiments are used to evaluate all varieties that are entered in the Official Variety Testing Program to major diseases of concern in Arkansas. The diseases evaluated and reported here during the 2025 cropping season was the southern root-knot nematode (*Meloidogyne incognita*) and frogeye leaf spot (caused by *Cercospora sojina*). Some 105 soybean varieties were planted on 3 June in single row, 11-ft long plots at 150,000 seeds per acre in a silt loam soil (42% sand, 52% silt, and 6% clay) field near Kerr, AR. The moderately root-knot nematode-resistant check, Pioneer P46Z53 and susceptible check Delta Grow DG48XF70 were included in the experiment. Varieties were arranged in a randomized complete block design with three replications. Three roots were arbitrarily sampled from each plot at the R4 to R5 growth stage to determine nematode susceptibility. Susceptibility was based on the percent root system galled (1.1-4.0% = resistant (R), 4.1-9.0% = moderately resistant (MR), 9.1-20.0% = moderately susceptible (MS), 20.1-40.0% = susceptible (S), 40.1-100.0% = very susceptible (VS)). Frogeye leaf spot severity was visually assessed on 29 August at R6 to R7 growth stage based on a 0-9 index scale (0-1 = R, 2-3 = MR, 4-5 = MS, 6-7 = S, and 8-9 = VS) in the upper 1/3 of the canopy.

The final nematode population (Pf) density averaged 211 second-stage juveniles (J2)/100 cm³ soil at harvest across the experiment. This density is considered severe for soybean production in Arkansas. The post-harvest threshold for southern root-knot nematode on soybean in Arkansas is 60 J2 per 100 cm³ soil. Weather conditions were favorable for frogeye leaf spot and disease severity was greater than previous years. Southern stem canker is also part of the comprehensive disease screening project but not included in this report.

What else is important: Variety susceptibility can vary between years as varieties are evaluated in different fields each year. Therefore, do not assume that a variety will respond as MS in a field with sandier soil texture that causes more plant drought stress under hot summer

conditions. It is notable that selecting a variety that is less susceptible will ensure a greater yield than a more susceptible one in a nematode infested field.

Additional data on root-knot nematode and frogeye leaf spot varieties before making final variety selections at the following link <https://arkansascrops.uada.edu/posts/disease/2025-soybean-rootknot-nematode.aspx>. Consult the cross-reference guide for soybean varieties to ensure different varieties selected are not the same genetics <https://www.uaex.uada.edu/farm-ranch/crops-commercial-horticulture/soybean/2025-soybean-cross-reference-guide.pdf>.

New for 2025: A column was added for maximum percent root system galled (i.e., nematode susceptibility) to show the most severely galled roots, which may occur in some fields where nematode densities are high. The two maximum gall ratings from each replication were averaged together and reported.

Why is final nematode population density or “Pf” important? The timing for these samples would be comparable to fall nematode samples collected in commercial fields. Therefore, soybean varieties would expect to perform similarly when the nematode population density AND soil texture class (e.g., sandy loam) was similar. Overall, individual varieties will show a greater percentage of root system galled or susceptibility when grown in soils with a greater percentage of sand and nematode densities that are similar to the final nematode densities reported here. Furthermore, and more importantly, grain yield for individual varieties will decrease with increased drought stress AND when nematode densities are similar to that reported.

Table 1. Field performance of 105 soybean varieties against the southern root-knot nematode. The final nematode density after harvest was 211 J2/100cm³ of soil, which is high and likely cause significant yield losses on a susceptible variety.

Variety	Technology	Maturity	Average percent root system galled ^b (1 year data)	Average Southern root-knot nematode susceptibility ratings ^b (1 year data)	Maximum percent root system galled ^c (1 year data)	Maximum Southern root-knot nematode susceptibility ratings ^c (1 year data)	Frogeye leaf spot severity ^d (1 year data)	Frogeye leaf spot susceptibility ratings ^d (1 year data)
AG43XF5	XtendFlex	4.3	28.9	S	33.3	S	1	VR
AG44XF4	XtendFlex	4.4	55.0	VS	60.0	VS	0	VR
AG45XF3	XtendFlex	4.5	41.1	VS	50.0	VS	8	VS
AG46XF3	XtendFlex	4.6	43.3	VS	53.3	VS	8	VS
AG47XF2	XtendFlex	4.7	33.3	S	48.3	VS	4	MS
AG48XF2	XtendFlex	4.8	30.0	S	41.7	VS	5	MS
AG48XF3	XtendFlex	4.8	26.1	S	30.0	S	7	S
AG48XF5	XtendFlex	4.8	39.9	S	47.3	VS	0	VR
AG49XF4	XtendFlex	4.9	40.0	S	56.7	VS	0	VR
AG50XF5	XtendFlex	5.0	43.3	VS	51.7	VS	4	MS
AG52XF5	XtendFlex	5.2	11.0	MS	12.7	MS	7	S
AG56XF2	XtendFlex	5.6	5.1	MR	7.0	MR	1	VR
Armor 44-F46S	XtendFlex	4.4	40.6	VS	53.3	VS	1	VR
Armor 45-E56	Enlist E3	4.5	30.6	S	38.3	S	0	VR
Armor 45-F86S	XtendFlex	4.5	35.6	S	41.7	VS	0	VR
Armor 46-F15S	XtendFlex	4.6	35.6	S	41.7	VS	3	R
Armor 47-E46S	Enlist E3	4.7	33.3	S	45.0	VS	1	VR
Armor 47-F66S	XtendFlex	4.7	43.9	VS	48.3	VS	0	VR
Armor 48-E45S	Enlist E3	4.8	20.3	S	33.3	S	6	S
Armor 48-E95	Enlist E3	4.8	42.2	VS	48.3	VS	6	S

Armor 48-F25S	XtendFlex	4.8	49.4	VS	56.7	VS	6	S
Armor 48-F55S	XtendFlex	4.8	35.0	S	46.7	VS	1	VR
Armor 49-E15S	Enlist E3	4.9	13.9	MS	16.7	MS	0	VR
Armor 50-E36S	Enlist E3	5.0	24.4	S	26.7	S	0	VR
Armor 54-F25	XtendFlex	5.4	5.9	MR	9.0	MR	0	VR
Armor 54-F34	XtendFlex	5.4	14.4	MS	26.0	S	0	VR
Axis 4625XFS	XtendFlex/STS	4.6	52.2	VS	56.7	VS	3	R
Axis 4815XFS	XtendFlex/STS	4.8	36.1	S	50.0	VS	1	VR
DELTA GROW DG46E30	Enlist E3	4.6	31.7	S	36.7	S	0	VR
Delta Grow DG48XF70 (check)	XtendFlex	4.8	28.3	S	38.3	S	5	MS
DELTA GROW DG48XF70STS	XtendFlex/STS	4.8	62.8	VS	70.0	VS	5	MS
DELTA GROW DG48XF80	XtendFlex	4.8	28.3	S	35.0	S	0	VR
DELTA GROW DG49E30STS	Enlist E3	4.9	28.9	S	40.0	S	6	S
DELTA GROW DG49XF70STS	XtendFlex/STS	4.9	53.9	VS	61.7	VS	0	VR
DELTA GROW DG55XF23	XtendFlex	5.5	6.6	MR	8.7	MR	8	VS
DONMARIO DM47F44S	XtendFlex/STS	4.7	40.0	S	51.7	VS	1	VR
DONMARIO DM48F53	XtendFlex	4.8	23.9	S	28.3	S	0	VR
Dyna-Gro S43XF85S	XtendFlex/STS	4.3	22.6	S	30.0	S	1	VR
Dyna-Gro S46XF26S	XtendFlex/STS	4.6	51.1	VS	60.0	VS	4	MS
Dyna-Gro S47ES36	Enlist E3/STS	4.7	15.9	MS	23.3	S	1	VR
Dyna-Gro S48ES56	Enlist E3/STS	4.8	37.8	S	45.0	VS	0	VR
Gateway 457XFS	XtendFlex	4.5	28.9	S	36.7	S	2	R
Gateway 479XFS	XtendFlex	4.7	38.9	S	46.7	VS	5	MS
Gateway 487XFS	XtendFlex	4.8	46.7	VS	56.7	VS	1	VR
Innvictis A4534XF	XtendFlex	4.5	26.1	S	30.0	S	0	VR
Innvictis A456XF	XtendFlex	4.5	9.2	MS	11.0	MS	0	VR
Innvictis A4642XF	XtendFlex	4.6	32.2	S	36.7	S	6	S
Innvictis A4755XF	XtendFlex	4.7	35.6	S	45.0	VS	0	VR

Innvictis A4862XF	XtendFlex	4.8	36.7	S	43.3	VS	1	VR
Innvictis A4924XF	XtendFlex	4.9	45.6	VS	53.3	VS	7	S
Innvictis A5445XF	XtendFlex	5.4	6.8	MR	10.7	MS	0	VR
Innvictis B4553E	Enlist E3	4.5	25.7	S	32.7	S	0	VR
Innvictis B4744E	Enlist E3	4.7	20.6	S	23.3	S	5	MS
Innvictis B5115E	Enlist E3	5.1	22.2	S	30.0	S	0	VR
Integra XF4454S	XtendFlex	4.4	47.8	VS	51.7	VS	6	S
Integra XF4585S	XtendFlex	4.5	46.7	VS	50.0	VS	0	VR
Integra XF4634S	XtendFlex	4.6	27.2	S	36.7	S	4	MS
Integra XF4875S	XtendFlex	4.8	29.4	S	38.3	S	0	VR
Pioneer P43Z44SE	Enlist E3/STS	4.3	4.1	MR	5.7	MR	6	S
Pioneer P44Z67BE	Bolt, Enlist E3	4.4	26.1	S	31.7	S	1	VR
Pioneer P45Z75E	Enlist E3	4.5	43.3	VS	50.0	VS	0	VR
Pioneer P46Z26E	Enlist E3	4.6	28.3	S	33.3	S	0	VR
Pioneer P46Z53E (check)	Enlist E3	4.6	2.3	R	3.3	R	5	MS
Pioneer P47Z15BE	Bolt, Enlist E3	4.7	41.1	VS	50.0	VS	1	VR
Pioneer P48Z73E	Enlist E3	4.8	30.6	S	35.0	S	0	VR
Pioneer P49Z02E	Enlist E3	4.9	29.4	S	34.0	S	4	MS
Pioneer P50Z95E	Enlist E3	5.0	39.4	S	45.0	VS	4	MS
Progeny 4604XFS	XtendFlex/STS	4.6	42.2	VS	50.0	VS	5	MS
Progeny 4623XF	XtendFlex/STS	4.6	52.2	VS	56.7	VS	6	S
Progeny 4724XFS	XtendFlex/STS	4.7	6.8	MR	11.0	MS	0	VR
Progeny 4734XFS	XtendFlex/STS	4.7	35.6	S	41.7	VS	0	VR
Progeny 4824XF	XtendFlex	4.8	30.6	S	36.7	S	5	MS
Progeny 4842XFS	XtendFlex/STS	4.8	52.2	VS	60.0	VS	6	S
Progeny 4848XF	XtendFlex	4.8	54.4	VS	65.0	VS	7	S
Progeny 4947XFS	XtendFlex/STS	4.9	63.9	VS	71.7	VS	0	VR
Progeny 4999E3S	Enlist E3/STS	4.9	23.9	S	28.3	S	6	S

Progeny 5056XFS	XtendFlex/STS	5.0	30.0	S	40.0	S	5	MS
R23PR-00033E	Enlist E3	5.0	34.4	S	43.3	VS	6	S
R23PR-00036E	Enlist E3	4.5	23.7	S	31.7	S	5	MS
R23PR-00037E	Enlist E3	4.9	54.4 ^a	VS	63.3	VS	5	MS
R23PR-00038E	Enlist E3	4.8	46.7	VS	56.7	VS	6	S
R23PR-00043E	Enlist E3	4.3	27.3	S	40.0	S	7	S
R23PR-00045E	Enlist E3	4.4	36.7	S	43.3	VS	6	S
R23PR-00055E	Enlist E3	4.5	46.7	VS	51.7	VS	6	S
R23PR-00058E	Enlist E3	4.6	49.4	VS	56.7	VS	8	VS
R23PR-00067E	Enlist E3	5.1	47.2	VS	56.7	VS	6	S
R23PR-00068E	Enlist E3	4.7	16.4	MS	23.3	S	6	S
R23PR-00091E	Enlist E3	4.4	26.7	S	35.0	S	4	MS
R23PR-00100E	Enlist E3	4.4	17.8	MS	30.0	S	6	S
Revere 39-F94	XtendFlex/STS	3.9	27.8	S	31.7	S	7	S
Revere 44-F44	XtendFlex/STS	4.4	36.1	S	41.7	VS	1	VR
Revere 46-F17	XtendFlex/STS	4.6	22.8	S	30.0	S	0	VR
Revere 47-E74	Enlist E3	4.7	27.2	S	33.3	S	5	MS
Revere 47-F77	XtendFlex/STS	4.7	48.3	VS	58.3	VS	6	S
Revere 48-F72	XtendFlex	4.8	19.4	MS	30.0	S	0	VR
Revere 49-F36	XtendFlex/STS	4.9	30.9	S	35.0	S	0	VR
Revere 51-F31	XtendFlex	5.1	53.3	VS	63.3	VS	0	VR
Revere 53-F84	XtendFlex/STS	5.3	34.4	S	40.0	S	0	VR
Revere CT4925E3S	Enlist E3/STS	4.9	19.8	MS	25.0	S	0	VR
USG 7435XFS	XtendFlex/STS	4.3	55.6	VS	68.3	VS	1	VR
USG 7466ETS	Enlist E3/STS	4.6	20.9	S	28.3	S	5	MS
USG 7476XF	XtendFlex	4.7	52.8	VS	58.3	VS	0	VR
USG 7487XFS	XtendFlex/STS	4.8	38.9	S	43.3	VS	0	VR
USG 7494ETS	Enlist E3/STS	4.9	43.3	VS	53.3	VS	8	VS

USG 7495XFS	XtendFlex/STS	4.9	48.3	VS	51.7	VS	2	R
USG 7543XF	XtendFlex	5.3	52.2	VS	58.3	VS	0	VR

^a Data are averages of three replications arranged in a randomized complete block design.

^b Root-knot nematode susceptibility was based on percent root system galled, whereas 0-1.0% = very resistant, 1.1-4.0% = resistant, 4.1-9.0% = moderately resistant, 9.1-20.0% = moderately susceptible, 20.1-40.0% = susceptible, 40.1-100.0% = very susceptible.

^c Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the single most severe root from each replication.

^d Frogeye susceptibility was based on a 0-9 scale (0 = no disease and 9 = severe disease) across the entire plot in the upper 1/3 of the canopy.