

Susceptibility and Yield Response of Sixty-nine Soybean Varieties to Frogeye Leaf Spot and Southern Root-knot Nematode, 2025

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The southern root-knot nematode (*Meloidogyne incognita*) is a major threat to soybean production and is the most yield-limiting plant-pathogenic nematode in the Mid-South. It is found in nearly all soybean-growing counties in Arkansas and can cause significant grain yield losses (>70%) when a susceptible variety is planted in a field with a high population density of southern root-knot nematode (RKN).

This report summarizes the susceptibility of 69 commercially available soybean varieties to the southern RKN that are marketed as suitable for production in southern RKN fields. Varieties were divided into 7 experiments (Table 1 to 7) based on maturity group. Varieties were planted in a randomized complete block design with four replications per entry. Plots consisted of 4 rows, 30 ft long, spaced 30 in. apart, and separated by a 5-ft fallow alley. Plots were planted on 3 June at a seeding rate of 150,000 seeds/A. Six root systems were arbitrarily sampled at the R5 growth stage to estimate for galling which was used to determine susceptibility to the southern RKN. The final nematode population (Pf) density averaged 211 second-stage juveniles (J2)/100 cm³ soil at harvest across all experiments. This density is well above the damage threshold of 60 J2 per 100 cm³ soil.

Weather conditions were favorable for frogeye leaf spot (FLS) development during the 2025 growing season. FLS severity was visually assessed on 8 September based on a 0-9 index scale (0 = no disease and 9 = severe disease) in the upper 1/3 of the canopy.

The two center rows of each plot were harvested on 9 Oct (maturity group IV) and 21 Oct (maturity group V). These results and those on the [UA variety testing website](https://www.uaex.uada.edu/farm-ranch/pest-management/plant-disease/publications.aspx) can be helpful for variety selection for the 2025 cropping season.

Reports from previous trials (2016 to 2024) are available on the UADA website at <https://www.uaex.uada.edu/farm-ranch/pest-management/plant-disease/publications.aspx>

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.

What else is important: Variety susceptibility can vary between years as varieties are evaluated in different fields each year. For example, Asgrow 'AG56XF2' had an average gall rating of 18.4 in this trial, however, it had an average of 3.5 in last year's trial. 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. For example, Pioneer 'P46Z53E' would have a lower gall rating and greater yield than Pioneer 'P42Z50BLX', but not Delta Grow 'DG48XF70', if planted in the same field. Consult the cross-reference guide for soybean varieties to ensure different varieties selected are not the same genetics.

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. 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 several MG IV soybean varieties in a southern root-knot nematode-infested field. The soil texture was sandy loam soil (48% sand, 46% silt, and 6% clay). (Pf = 361 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root system galled ^c	Maximum percent root system galled ^d	Yield (bu/A)
Agrigold 4884E3	1.0 e ^e	9.8 ab	15.4 ab	74.4 a
Pioneer P46Z53E (check)	5.5 a	1.1 b	1.8 b	69.1 ab
NK44-Q5E3S	0.5 e	15.9 ab	23.9 ab	68.6 ab
Delta Grow DG48XF80	1.0 e	16.1 ab	26.6 ab	66.6 abc
Pioneer P45A81E (check)	0.3 e	13.9 ab	21.3 ab	65.6 abc
Revere 48-F72	1.3 de	12.3 ab	25.6 ab	65.4 abc
Delta Grow DG46E30	2.8 cd	13.5 ab	23.1 ab	62.0 abc
Delta Grow DG49XF70	0.8 e	20.4 a	34.4 a	61.4 abc
Revere 42-E22	0.3 e	17.2 a	28.4 a	57.7 abc
Armor 48E45S	5.0 ab	19.7 a	31.9 a	53.4 bc
Delta Grow DG48XF70 (check)	5.3 ab	24.6 a	35.6 a	52.7 bc
Armor 46-F15S	3.8 bc	23.6 a	38.8 a	47.6 c

^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety.

^b Frogeye severity was based on a 0-9 scale where 0-1 = VR, 2-3 = R, 4-5 = MS, 6-7 = S, 8-9 = VS across the entire plot in the upper 1/3 of the canopy.

^c Average root-knot nematode susceptibility was based on the average percentage of root system galled where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS.

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

^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.

Table 2. Field performance of several MG IV soybean varieties in a southern root-knot nematode infested field, experiment 2. The soil texture was silt loam soil (36% sand, 63% silt, and 2% clay). (Pf = 284 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root system galled ^c	Maximum percent root system galled ^d	Yield (bu/A)
NK49-U9E3S	0.8 c ^e	7.3 bc	10.5 bc	67.6 a
Revere CT4925E3S	0.5 c	13.3 abc	19.4 abc	65.3 a
Delta Grow DG43X65	0.5 c	14.6 abc	25.4 abc	63.4 ab
Armor 49E15S	1.3 bc	14.2 abc	21.0 abc	63.3 ab
Pioneer P46Z53E (check)	5.8 a	2.8 c	4.5 c	63.0 ab
Pioneer P42Z50BLX	6.8 a	3.5 c	5.5 c	60.2 ab
GoSoy GS493E22N	3.0 b	12.1 abc	20.8 abc	59.3 ab
Innvictis B4845ES	1.0 c	22.8 ab	40.6 ab	58.6 abc
Armor 46-F35S	1.3 bc	16.4 abc	25.6 abc	56.4 abc
Innvictis B4Z05E	0.8 c	19.9 abc	26.9 abc	50.9 bcd
Delta Grow DG47E20	6.3 a	15.1 abc	21.9 abc	46.5 cd
Delta Grow DG48XF70 (check)	5.8 a	33.8 a	43.8 a	40.6 d
^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety. ^b Frogeye severity was based on a 0-9 scale where 0-1 = VR, 2-3 = R, 4-5 = MS, 6-7 = S, 8-9 = VS across the entire plot in the upper 1/3 of the canopy. ^c Average root-knot nematode susceptibility was based on the average percentage of root system galled where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS. ^d Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the two most severe roots from each replication. ^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.				

Table 3. Field performance of several MG IV soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was sandy loam soil (47% sand, 47% silt, and 6% clay). (Pf = 139 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root system galled ^c	Maximum percent root system galled ^d	Yield (bu/A)
Delta Grow DG47E70STS	4.3 a ^e	18.3 cde	33.0 bcd	64.9 a
Pioneer P46Z53E (check)	6.0 a	3.1 e	5.4 e	61.9 ab

Innvictis B4553E	0.3 c	20.3 bcd	30.0 bcd	61.6 ab
Great Heart Seed GT-4595XFS	0.8 bc	8.2 de	12.0 de	60.8 ab
Armor 47E46S	1.3 b	28.5 abc	40.6 abc	60.0 ab
Delta Grow DG49E90	4.0 a	13.3 cde	22.5 cde	59.0 ab
Delta Grow DG46E10	5.5 a	3.3 e	5.3 e	58.9 ab
Innvictis B4075ES	0.8 bc	20.5 bcd	33.1 bcd	55.9 abc
NK49-N7XF	1.0 bc	40.0 a	53.1 ab	48.2 abc
Delta Grow DG47XF90	1.0 bc	43.0 a	63.1 a	46.7 bc
Delta Grow DG48XF70 (check)	5.0 a	35.6 ab	49.4 ab	40.5 c
Armor 48-F55S	1.0 bc	34.4 ab	45.0 abc	39.9 c
^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety. ^b Frogeye severity was based on a 0-9 scale where 0-1 = VR, 2-3 = R, 4-5 = MS, 6-7 = S, 8-9 = VS across the entire plot in the upper 1/3 of the canopy. ^c Average root-knot nematode susceptibility was based on the average percentage of root system galled where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS. ^d Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the two most severe roots from each replication. ^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.				

Table 4. Field performance of several MG IV soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was silt loam soil (40% sand, 55% silt, and 6% clay). (Pf = 123 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root system galled ^c	Maximum percent root system galled ^d	Yield (bu/A)
Pioneer P43Z44SE	6.0 ab ^e	3.5 fg	6.4 e	69.1 a
Stine E3-49EE21	4.8 bc	11.1 d-g	18.8 cde	68.2 a
Progeny P4724XFS	2.0 cd	7.8 efg	11.3 de	68.0 a
Stine XF-45FF92	1.8 d	13.8 c-f	23.8 cde	65.1 ab
Pioneer P46Z53E (check)	5.8 ab	2.5 g	4.0 e	64.0 ab
Revere CT4413E3S	1.0 d	22.4 b-e	36.3 bc	64.0 ab
GoSoy GS492E26NSE	5.0 ab	26.0 bcd	32.5 bcd	58.0 abc
Revere CT3933E3	7.3 ab	12.8 c-g	21.3 cde	51.8 bcd
Revere 47-E74	4.8 bc	29.8 abc	39.4 abc	45.9 cd
Delta Grow DG48XF70 (check)	4.8 bc	38.8 ab	49.4 ab	44.5 cd
Pioneer 48A14 (check)	5.3 ab	47.6 a	60.6 a	43.4 cd
NK48-A8XFS	7.8 a	23.3 bcd	31.3 bcd	38.5 d

Table 5. Field performance of several MG V soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was silt loam soil (45% sand, 49% silt, and 6% clay). (Pf = 275 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root system galled ^c	Maximum percent root system galled ^d	Yield (bu/A)
Pioneer P53Z60LX	1.8 b ^e	1.8 c	2.6 b	73.1 a
Pioneer P52A14SE (check)	1.0 bc	2.1 c	3.0 b	70.8 a
Great Heart Seed GT-5214X	0.0 c	1.8 c	2.5 b	66.2 ab
Asgrow AG55XF5	0.3 c	4.1 bc	8.4 ab	62.9 ab
Revere CT5293E3	1.3 bc	18.9 ab	31.3 a	62.1 ab
Innvictis B5015ES	0.5 bc	7.0 abc	11.4 ab	58.6 abc
NK52-M2XF5	1.8 b	21.1 a	31.3 a	57.5 abc
NK50-W4E3S	0.7 bc	9.8 abc	13.3 ab	57.1 abc
Delta Grow DG52E30	5.8 a	2.0 c	3.4 b	56.6 abc
Armor 50E36S	0.8 bc	15.9 abc	26.6 ab	56.4 abc
Asgrow AG52XF5	5.8 a	3.9 bc	6.0 ab	50.0 bc
Revere 51-F31 (check)	0.8 bc	15.8 abc	21.9 ab	41.6 c
^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety. ^b Frogeye severity was based on a 0-9 scale where 0-1 = VR, 2-3 = R, 4-5 = MS, 6-7 = S, 8-9 = VS across the entire plot in the upper 1/3 of the canopy. ^c Average root-knot nematode susceptibility was based on the average percentage of root system galled where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS. ^d Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the two most severe roots from each replication. ^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.				

Table 6. Field performance of several MG V soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was silt loam soil (38% sand, 59% silt, and 4% clay). (Pf = 140 second-stage juveniles/100 cm³ soil.)

Variety ^a	Frogeye leaf spot severity ^b	Average percent root	Maximum percent root	Yield (bu/A)
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		system galled^c	system galled^d	
Progeny P5525XFS	0.5 bc ^e	2.2 c	3.8 c	85.1 a
Revere X55F92	0.3 c	7.0 bc	12.0 abc	83.3 a
Armor 54-F25	0.3 c	2.7 c	4.3 c	82.9 a
Pioneer P56A71	0.5 bc	2.5 c	4.9 c	80.9 a
Pioneer P52A14SE (check)	1.0 bc	1.5 c	2.6 c	79.6 a
NK56-Z6XFS	4.8 ab	1.5 c	2.5 c	69.9 ab
Armor 54-F34	1.8 bc	6.3 bc	9.8 abc	67.2 ab
Asgrow AG56XF2	2.3 abc	18.4 ab	28.1 ab	66.8 ab
Asgrow AG54XF5	5.0 ab	3.0 c	5.0 bc	64.6 ab
Delta Grow DG55XF23	5.3 ab	6.4 bc	10.9 abc	64.1 ab
Asgrow AG55XF0	7.0 a	3.5 c	6.6 bc	48.9 bc
Revere 51-F31 (check)	0.8 bc	30.3 a	41.9 a	37.5 c
^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety. ^b Frogeye severity was based on a 0-9 scale where 0-1 = VR, 2-3 = R, 4-5 = MS, 6-7 = S, 8-9 = VS across the entire plot in the upper 1/3 of the canopy. ^c Average root-knot nematode susceptibility was based on the average percentage of root system galled where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS. ^d Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the two most severe roots from each replication. ^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.				

Table 7. Field performance of several MG V soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was silt loam soil (40% sand, 54% silt, and 6% clay). (Pf = 157 second-stage juveniles/100 cm³ soil.)

Variety^a	Frogeye leaf spot severity^b	Average percent root system galled^c	Maximum percent root system galled^d	Yield (bu/A)
Revere X62F52	0.5 cd ^e	7.8 cde	14.5 bcd	87.5 a
Asgrow AG54XF6	0.3 d	4.0 e	7.6 d	85.2 a
Pioneer P52A14SE (check)	1.0 cd	2.4 e	4.1 d	78.52 ab
NK58-Y9XF	3.0 a-d	5.3 de	8.9 cd	75.2 abc
NK58-B8E3S	0.3 d	32.7 a-d	44.4 abc	62.3 a-d
Delta Grow DG52XF90	1.5 bcd	40.5 abc	51.0 ab	58.4 b-e
Revere 5735XFS	7.3 a	16.0 a-e	25.6 a-d	56.0 b-e
Innvictis A5813XF	7.3 a	13.0 b-e	21.9 bcd	54.5 b-e
Progeny P5751XFS	6.0 ab	3.8 e	6.4 d	54.3 b-e
Delta Grow DG47XF90	1.0 bcd	39.0 ab	50.0 ab	52.1 cde

Pioneer 48A14 (check)	4.0 abc	39.6 ab	48.1 ab	45.8 de
Revere 51-F31 (check)	0.5 cd	48.3 a	63.8 a	41.6 e
^a Roundup Ready, Enlist, Xtend, & Xtend Flex variety. ^b Frogeye severity 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. ^c Average root-knot nematode susceptibility was based on the average percentage of root system galled for all roots evaluated where 0-1.0 = VR, 1.1-4.0 = R, 4.1-9.0 = MR, 9.1-20.0 = MS, 20.1-40.0 = S, 40.1-100.0 = VS. ^d Maximum root-knot nematode susceptibility was based on the average percentage of root system galled for the two most severe roots from each replication. ^e Means with different letters within a column indicate a significant difference at $\alpha = 0.05$ according to Tukey's HSD test.				

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