Susceptibility and Yield Response of Fifty-three Selected Soybean Cultivars to Frogeye Leaf Spot and Southern Root-knot Nematode, 2026

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The southern root-knot nematode (RKN; *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 cultivar is planted in a field with a high population density of southern root-knot nematode.

This report summarizes the susceptibility of 53 commercially available soybean cultivars to the southern RKN that are marketed as suitable for production in southern RKN fields. Varieties were divided into 6 experiments (Table 1 to 6) based on maturity group. Cultivars 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 21 May at a seeding rate of 140,000 seeds/A. Six root systems were arbitrarily sampled at the R5 growth stage to estimate root galling, which was used to determine susceptibility to the southern RKN. The final nematode population (Pf) density averaged 184 second-stage juveniles (J2)/100 cm^3 soil at harvest across all experiments. This density is well above the fall damage threshold of 60 J2 per 100 cm^3 soil in Arkansas.

Weather conditions were favorable for frogeye leaf spot (FLS) development during the 2026 growing season. FLS severity was visually assessed on 26 August (at R5 to R6 growth stage??) 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 12 Oct (maturity group IV) and 22 Oct (maturity group V). These results and those on the UA variety testing website can be helpful for cultivar selection for the 2026 cropping season.

Reports from previous trials (2016 to 2025) are available on the UADA Cooperative Extension Service website at https://www.uaex.uada.edu/farm-ranch/pest-management/plant-disease/publications.aspx

New: The maximum percent root system galled observed was added to the tables. This is an average of the two greatest ratings per plot. This gall rating gives an indication of the most severe galling observed per cultivar, which may occur in some fields where nematode densities are high. The yield difference percentage was added (cultivar yield/ yield of the susceptible check) as an easy reference of yield potential difference over using a susceptible cultivar.

What else is important: Cultivar susceptibility can vary between years as cultivars are evaluated in different fields. For example, Innvictis 'B5015ES' had an average gall rating of 18.0 in 2026 and 7.0 in 2025. Cultivars can also show more galling in fields with more sand content, higher nematode densities, and lower yield with drought stress caused by limited irrigation/rainfall and increasing summer temperatures. Regardless, selecting a cultivar that is less susceptible will have a greater yield than a 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 cultivars to ensure different cultivars 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 cultivars would expect to perform similarly when the nematode population density AND soil texture class (e.g., sandy loam) was similar. Overall, individual cultivars 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 cultivars will decrease with increased drought stress AND when nematode densities are similar to that reported.

Disclaimer: These are disease screening plots and are not managed for maximum yield potential. They are used solely to determine a cultivar's susceptibility to the southern root-knot nematode and other foliar diseases. Therefore, no fungicides are used to manage frogeye leaf spot or other diseases, which may cause a cultivar with a lower root system galling and high frogeye leaf spot severity to yield lower than one with a similar level of root galling.

Table 1. Susceptibility and yield of 9 maturity group 4 soybean cultivars grown in a southern root-knot nematode-infested field, trial 1. The soil texture was silt loam soil (37% sand, 53% silt, and 10% clay). (Pf = 64 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
Pioneer P46Z53E (check)	4.3 a††	6.8 c	12.0 b	49.5 a	118.3
Pioneer P45Z21E	4.5 a	7.1 bc	11.8 b	45.3 ab	100.1
Pioneer P43Z44SE	4.8 a	6.0 c	11.3 b	45.3 ab	100.0
Pioneer P46Z87SE	2.0 bc	9.2 bc	13.0 b	43.1 ab	90.3
Agri Gold G4686XF	0.8 c	18.2 abc	26.6 b	42.7 ab	88.4
NK 47-C6XFS	1.0 c	23.0 abc	33.5 ab	41.2 ab	82.0
Armor 49-E17S	1.0 c	26.5 ab	35.6 ab	40.6 ab	79.0
Innvictis B4553E3S	0.5 c	18.8 abc	31.6 b	35.8 b	57.9
Progeny P4770XF	3.5 ab	11.7 bc	19.1 b	35.6 b	57.0
Innvictis B4956ES	0.5 c	22.3 abc	34.4 ab	35.2 bc	55.5
Pioneer P48A14 (check)	1.8 c	44.3 a	58.4 a	22.7 c	0.0

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check.

†† Numbers within the same column followed by the same letter are not significantly different ($P = 0.05$) according to Tukey's HSD test.

Table 2. Susceptibility and yield of 10 maturity group 4 soybean cultivars grown in a southern root-knot nematode infested field, trial 2. The soil texture was silt loam soil (39% sand, 53% silt, and 8% clay). (Pf = 109 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
NK 44-Y6E3S	0.8 de††	20.1 abc	30.0 ab	54.1	44.7
Pioneer P46Z53E (check)	5.0 a	6.0 c	10.5 b	53.8	43.9
Stine 49EE21	0.3 e	10.3 bc	18.5 ab	49.8	33.2
USG 7497ETS	0.5 e	14.6 abc	23.1 ab	48.6	29.9
USG 7486ETS	3.0 ab	19.9 abc	27.5 ab	46.9	25.4
Armor 47-F47S	0.8 de	21.4 abc	31.9 ab	46.6	24.6
GoSoy GS492E26NSE	2.0 bcd	13.5 abc	21.9 ab	44.9	20.1
USG7485ETS	2.8 abc	27.3 ab	37.9 a	44.6	19.3
NK 49-Z9XFS	0.8 de	18.7 abc	24.8 ab	43.6	16.6
Pioneer P45Z75E	0.8 de	17.3 abc	29.4 ab	40.7	8.8
Pioneer P48A14 (check)	2.5 abc	31.9 a	40.0 a	37.4	0.0
Innvictis B4136ES	1.0 cde	27.4 ab	40.0 a	36.6	-2.1

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture.

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check.

†† Numbers within the same column followed by the same letter are not significantly different ($P = 0.05$) according to Tukey's HSD test.

Table 3. Susceptibility and yield of 7 maturity group 4 soybean cultivars grown in a southern root-knot nematode-infested field, trial 3. The soil texture was loam soil (48% sand, 45% silt, and 8% clay). (Pf = 99 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
NK 49-D7E3S	1.0 b††	8.8 bcd	12.6 bcd	59.6 a	83.4
Pioneer P46Z53E (check)	5.3 a	4.1 d	6.4 d	57.1 a	75.7
Delta Grow DG48XF80	0.5 b	12.8 a-d	16.9 a-d	56.7 a	74.5
Great Heart Seed 4595XF	1.0 b	8.4 bcd	11.8 cd	50.6 ab	55.7
Asgrow AG49XF7	4.3 a	5.8 cd	8.9 d	45.5 ab	40.0
Innvictis A4755XFS	0.8 b	21.6 ab	27.5 abc	42.4 ab	30.5
NK 47-U1XFS	0.3 b	22.8 ab	28.8 abc	41.9 ab	28.9
USG 7488XFS	1.0 b	27.1 a	36.9 a	35.2 b	8.3
Pioneer P48A14 (check)	4.3 a	20.7 abc	31.9 ab	32.5 b	0.0

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture.

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check

†† Numbers within the same column followed by the same letter are not significantly different (P = 0.05) according to Tukey's HSD test.

Table 4. Susceptibility and yield of 10 maturity group 5 soybean cultivars grown in a southern root-knot nematode (SRKN) infested field, trial 4. The soil texture was loam soil (46% sand, 45% silt, and 10% clay). (Pf = 277 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
Pioneer P52A14SE (check)	1.5 b††	2.0 e	3.3 g	54.6 a	208.5
Pioneer P56Z22E	1.0 b	8.5 b-e	12.9 c-f	49.7 ab	180.8
NK 58-Y9XF	0.8 b	7.8 de	12.3 c-f	47.5 abc	168.4
Revere 5429E3	0.8 b	8.7 b-e	11.8 ef	46.2 abc	161.0
Stine 52EG09	5.0 a	8.4 cde	12.5 def	43.0 a-d	142.9
NK 52-M2XFS	1.3 b	19.6 abc	28.5 a-d	42.5 a-d	140.1
Asgrow AG56XF2	0.3 b	14.6 bcd	18.9 a-e	39.4 a-d	122.6
Pioneer P56A71E	1.3 b	5.0 de	7.5 fg	38.9 a-d	119.8
Revere 5735XFS	5.8 a	11.5 bcd	15.4 b-f	34.6 bcd	95.5
Asgrow AG52XF5	6.3 a	21.5 ab	30.9 abc	32.8 cde	85.3
Armor 50-E36S	0.5 b	29.8 a	35.0 ab	27.5 de	55.4
USG 7543 (check)	1.0 b	35.1 a	42.0 a	17.7 e	0.0

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture.

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check.

†† Numbers within the same column followed by the same letter are not significantly different (P = 0.05) according to Tukey's HSD test.

Table 5. Susceptibility and yield of 10 maturity group 5 soybean cultivars grown in a southern root-knot nematode-infested field, trial 5. The soil texture was loam soil (44% sand, 49% silt, and 8% clay). (Pf = 173 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
Pioneer P53Z89E	0.5 b††	2.9 de	4.6 de	69.1 a	75.4
Pioneer P52A14SE (check)	1.0 b	2.2 de	3.4 de	66.9 ab	69.8
Revere 55-F92	4.5 a	5.1 cde	8.3 de	66.6 ab	69.0
Asgrow AG55XF5	0.8 b	10.1 bc	16.9 abc	55.1 bc	39.8
Pioneer P51Z31SE	1.0 b	1.6 e	2.4 e	54.1 bc	37.3
Asgrow AG54XF5	6.0 a	7.5 cd	10.8 bcd	52.1 cd	32.2
Innvictis B5015ES	0.8 b	18.0 a	20.1 a	51.7 cd	31.2
NK 54-J9XFS	1.0 b	14.3 ab	19.0 ab	51.0 cd	29.4
Innvictis B5504E	0.8 b	14.6 ab	19.0 ab	48.6 cd	23.4
Delta Grow DG55XF23	6.8 a	5.2 cde	7.8 de	45.8 cd	16.2
Asgrow AG54XFO	6.8 a	6.0 cde	8.9 cde	44.8 cd	13.7
USG 7543 (check)	0.8 b	16.9 a	20.1 a	39.4 d	0.0

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture.

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check†† Numbers within the same column followed by the same letter are not significantly different (P = 0.05) according to Tukey's HSD test.

Table 6. Susceptibility and yield from 7 maturity group 5 soybean cultivars grown in a southern root-knot nematode-infested field, trial 6. The soil texture was loam soil (46% sand, 45% silt, and 10% clay). (Pf = 379 second-stage juveniles/100 cm^3 soil.)

Cultivar	Frogeye leaf spot severity†	% root system galled‡	Maximum % root system galled §	Yield (bu/ac)¶	% yield difference#
Asgrow AG54XF6	0.8 b††	4.8 cd	7.6 de	66.0 a	68.4
Armor 51-F27S	2.0 b	11.7 ab	15.6 a-d	63.4 ab	61.7
Pioneer P52A14SE (check)	1.0 b	0.9 d	1.5 e	62.7 ab	59.9
Progeny P5525XF	1.0 b	5.3 bcd	8.4 cde	58.7 ab	49.7
Innvictis A5226XFS	3.3 ab	15.6 a	18.8 ab	58.3 abc	48.7
NK 52-D6E3	0.8 b	12.0 ab	17.4 abc	54.7 abc	39.5
Revere 52-F12	2.3 b	11.5 abc	16.9 a-d	51.9 bc	32.4
Progeny P5751XF	6.8 a	6.1 bcd	10.5 b-e	45.9 cd	17.1
USG 7543 (check)	0.8 b	17.5 a	20.6 a	39.2 d	0.0

† 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.

‡ Root gall rating severity was based on a percent scale where 0 = no galling and 100 = 100% of root system galled. Southern root-knot nematode susceptibility was based on the percent of root system galled where 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.

§ Maximum percent root system galled was an average of the two most severely galled root systems from each replication.

¶ Adjusted to 13% moisture.

Percent yield difference was calculated by dividing each cultivar yield by the susceptible check.

†† Numbers within the same column followed by the same letter are not significantly different ($P = 0.05$) according to Tukey's HSD test.

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