

Susceptibility and Yield of Forty-four Soybean Varieties to the Southern Root-knot Nematode, 2023

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The southern root-knot nematode (*Meloidogyne incognita*) is the most yield-limiting plant-pathogenic nematode that affects soybean production in the Mid-South. It is found in nearly all soybean counties in Arkansas and can cause significant (>70%) grain yield losses when a susceptible variety is planted in a field with a high population density of southern root-knot nematode (RKN). Forty-four commercially available soybean varieties marketed as suitable for production in southern RKN fields were screened. Varieties were divided into 3 experiments (Table 1 to 3) 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, separated by a 5-ft fallow alley. Plots were planted on 27 May at a seeding rate of 150,000 seeds/A. Six root systems were arbitrarily sampled at the R5 growth stage from non-harvest rows of each plot to assess southern RKN host susceptibility. The final nematode population (Pf) density averaged 916 second-stage juveniles/100 cm³ soil at harvest for susceptible checks across experiments. The density would be considered severe for soybean production in Arkansas. The two center rows of each plot were harvested on 16 Oct. These results and those on the [UA variety testing website](#) can be helpful for variety selection for the 2024 cropping season.

Reports from previous trials (2016 to 2022) are available on the UADA website at <https://www.uaex.uada.edu/farm-ranch/pest-management/plant-disease/publications.aspx>

What else is important: Overall, the severity (percent of root system galled) was better than last year, which indicates a good screen. Keep in mind that varieties may not provide the same yield or disease severity rating in field soils that have a greater percent sand and are drought stressed. However, by selecting a variety that is less susceptible will ensure a greater yield than a more susceptible one in a nematode infested field. For example, “Invictis B4921E” would likely have a lower gall rating and greater yield than “Delta Grow DG4880 GLY”, but not “Progeny P4806XFS”, if planted in the same field. Finally, consult the cross-reference guide for soybean varieties to ensure different varieties selected are not the same genetics.

Table 1. Field performance of several MG IV soybean varieties in a southern root-knot nematode infested field. The soil texture was a sandy loam soil (59% sand, 36% silt, and 5% clay). (Pf = 873 second-stage juveniles/100 cm³ soil.)

Variety ^a	Percent root system galled ^c	Yield (bu/A)
Pioneer 43A42X (Check)	0.1 f ^b	76.7 a
GoSoy GS493E22N	8.6 ef	74.4 a
Pioneer P46A36X	2.5 f	72.9 a
Delta Grow DG49E90	4.9 f	68.4 a
Delta Grow DG4940 (Check)	1.0 f	66.9 a
Invictis B4921E	10.2 def	66.6 a
NK44-Q5E3S	14.8 c-f	61.6 ab
Progeny P4806XFS	28.5 b-e	45.1 bc
Delta Grow DG46XF54	51.1 ab	28.0 cd
Delta Grow DG4880 GLY (Check)	38.7 abc	26.7 cd
Delta Grow DG48XF42	32.5 a-d	26.6 cd
Invictis A4862XF	39.71 abc	25.7 cd
Donmario Seed DM48F53	32.9 a-e	23.1 d
Delta Grow DG44XF75	40.4 abc	23.1 d
Gateway Seed 45XFS	58.8 a	20.1 d
Delta Grow DG49XF29 (Check)	27.33 a-e	19.5 d

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

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

^c Susceptibility categories based on % root system galled: 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.)

Table 2. Field performance of several MG IV soybean varieties in a southern root-knot nematode infested field, experiment 2. The soil texture was a sandy loam soil (49% sand, 46% silt, and 5% clay). (Pf = 455 second-stage juveniles/100 cm³ soil.)

Variety ^a	Percent root system galled ^c	Yield (bu/A)
Pioneer 43A42X (Check)	0.6 g ^b	63.8 a
Delta Grow DG4940 (Check)	0.3 g	60.8 ab
Delta Grow DG46E10	3.4 fg	60.0 ab
Progeny P4444RXS	11.9 efg	59.3 ab
Invictis A4448X	12.8 d-g	57.4 abc
Armor 49-F09	31.5 a-e	43.4 a-d
NK48-A8XFS	17.6 c-g	37.6 bcd
Progeny P4665XFS	34.6 a-d	36.7 bcd
Delta Grow DG4880 GLY (Check)	36.3 abc	36.6 bcd
NK49-T6E3S	25.2 a-f	36.3 bcd
Agri Gold G4650XF	40.8 ab	32.0 cd
Armor 45-F65XF	21.7 b-g	31.3 d
Donmario Seed DM49F62S	28.0 a-e	29.7 d
Delta Grow DG49XF85	33.0 a-e	27.8 d
Invictis A4503XF	44.6 a	25.0 d
Delta Grow DG49XF29 (Check)	31.9 a-e	20.1 d

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

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

^c Susceptibility categories based on % root system galled: 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.)

Table 3. Field performance of several MG V soybean varieties in a southern root-knot nematode infested field, experiment 3. The soil texture was a sandy loam soil (59% sand, 36% silt, and 5% clay). (Pf = 1420 second-stage juveniles/100 cm³ soil.)

Variety ^a	Percent root system galled ^c	Yield (bu/A)
Pioneer P55A49X	3.2 bcd ^b	70.8 a
Pioneer P54A36SX	1.0 cd	68.9 a
Pioneer P52A05X	9.6 a-d	68.6 a
Pioneer P52A14SE (Check)	4.2 bcd	65.3 a
Pioneer P54A54X	3.9 bcd	63.2 a
Pioneer 56A71E	0.7 d	62.4 ab
Armor 55-D57	2.7 bcd	62.1 ab
NK56-Z6XFS	5.7 a-d	60.2 ab
Armor 54-F34	8.1 a-d	60.1 ab
Progeny P5554RX	2.4 bcd	59.6 abc
NK52-D8E3	12.9 a-d	56.9 a-d
Delta Grow DG55XF23	9.0 a-d	46.6 b-e
Invictis A5813XF	6.1 a-d	43.8 c-f
NK52-V1XF	23.3 a-d	43.7 c-f
Progeny P5751XF	2.2 bcd	42.5 def
Armor 51-F29	25.2 abc	38.6 efg
Delta Grow DG52XF22	17.0 a-d	33.0 efg
Invictis A5003XF	39.1 a	32.2 efg
Delta Grow DG53XF95	29.4 ab	30.1 fg
Delta Grow DG51E30 (Check)	29.6 a-d	23.7 g

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

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

^c Susceptibility categories based on % root system galled: 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.)

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