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Commercial Corn Varieties Are Not A Good Host For The Peanut Root Knot Nematode (*Meloidogyne arenaria*)

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Introduction: Corn has historically been an important rotation partner with peanut in the Wiregrass Region of Alabama. As corn production declined here due to low commodity prices, the occurrence of damaging and hard to control outbreaks of the peanut root knot nematode (*Meloidogyne arenaria*) has intensified. While corn has not listed as a host for the peanut root knot nematode, questions about the host status of corn with other root knot nematode species have been raised. The objective of this research project is to assess the host status of selected commercial corn varieties to the peanut root knot nematode in a simulated production setting.

Materials and Methods: The sites selected for this trial in 2005 and 2006 previously was cropped for peanut for three consecutive years and supported a very high population of the peanut root knot nematode.

2005 - On 15 March, the plot area was paratilled and then turned with a moldboard plow. Fifteen corn varieties were planted on 6 April in a Dothan fine sandy loam (OM<1%). The plots were fertilized on 19 April with 30 lb/A of nitrogen and 60 lb/A of phosphorus and potassium. A broadcast application of 180 lb/A of ammonium nitrate plus 20 lb/A of sulfur was made on 16 May. Weed control was provided by a post-plant broadcast application of Atrazine at 2 qt/A on 28 April. Plots were irrigated on 27 May, 28 June, and 28 July. The experimental design was a randomized complete block with four replications. Individual plots consisted of two 30 foot rows arranged on 3 foot centers. Soil samples for a nematode assay were taken on 24 June and 1 October. Plots were harvested on 14 September.

2006 - On 16 March, the rows were laid off with a KMC strip tillage rig. The plots were fertilized on 17 March with 40 lb/A of actual nitrogen and 60 lb/A of potash. Plots were top-dressed with 120 lb/A of actual nitrogen plus 20 lb/A of sulfur on 28 April. Weed control was provided by a post-plant broadcast application of Atrazine at 2 qt/A on 4 April. Plots were irrigated on 27 May, 31 May, 8 June, 14 June, 5 July, 13 July, and 17 July. The experimental design was a randomized complete block with four replications. Individual plots consisted of two 30 foot rows arranged on 3 foot centers. Soil samples, which were collected for a nematode assay on 13 April and 29 August, were process using the sugar flotation method. Plots were harvested 26 August.

Weather Conditions: In April and May 2005, temperatures, which were below the historical average for this site, probably slowed corn growth and also reduced expected yields. In addition, rainfall totals for the above months were also below average. As indicated by the frequent irrigation events in 2006, monthly rainfall totals were well below the historical average for May, June, and July. In addition to the lack of rain, afternoon temperatures were well above the historical levels for that same time frame. At times, the heat stress was so severe that a damaging leaf scorch was seen on some cultivars.

Results: In 2005, differences in peanut root knot nematode larval populations were noted between corn varieties in late June and again after harvest (Table 1). For all corn varieties, peanut root knot larval counts after harvest were much lower compared with the counts recorded in late June. While significant differences in the reproductive index (Rf/Ri) for were found between corn varieties, index values, which ranged from 0.0 to 0.41, showed that little if any reproduction of this nematode occurred on the corn varieties screened.

Overall corn yields were low in 2005 (Table 1). Yield for Pioneer 31N26, Pioneer 31G66, DKC 69-71, and Agra Tech 755R was higher than those recorded for only Pioneer 33V15 and Croplan 830. Growing conditions and not nematodes had the biggest impact on the less than anticipated corn yield.

Results of the April 2006 sampling show that low populations of the peanut root knot nematode were present (Table 2). Differences in larval counts that were observed in April between corn varieties were not significant. With the exception of DKC 69-72, peanut root knot larval counts were lower at the August compared with April sampling date. On DKC 69-72, the August larval count of 29.5 is still well below the damage threshold for root knot nematode on corn. For the majority of the corn varieties, the reproductive index for the peanut root knot nematode was zero (0). In other words, this nematode is not reproducing on the root of those corn cultivars that have an index value of zero. For those few cultivars that have an index value above zero (0) but below 1.0, the level of peanut root knot reproduction is minimal. Volunteer peanuts or other broadleaf weeds such as morning glory and not corn may be the source of the peanut root knot larvae found at the August sampling date.

For the second consecutive year, corn yields were much lower than anticipated. Despite irrigation, the hot, dry weather conditions throughout the late spring and early summer are largely responsible for the less than anticipated corn yields (Table 2). Differences in yield were noted between corn varieties. Pioneer 31G66 and SS 859CL yielded less than DK697 and DKC 69-71. Otherwise, corn yields were similar.

Summary: Very low reproductive index values, which show that field and sweet corn varieties are very poor hosts for the peanut root knot nematode, makes this crop an excellent rotation partner with peanut and a valuable tool for suppressing populations of this destructive and difficult to control peanut pathogen.

Table 1. Corn yield and reproduction of peanut root knot and ring nematode on those selected commercial field corn varieties.

Corn Variety	Peanut Root Knot Larvae Count		Nematode	Yield bu/A
	Pi	Pf		
Pioneer 31N26	42.0	0.5	0.01[W]	72.2 ab
Pioneer 31G66	33.5	4.0	0.41	74.5 a
Pioneer 33V15	55.0	12.5	0.30	52.4 d
Pioneer 34M54	26.5	2.5	0.41	63.1 abcd
Pioneer 31G97	28.0	0.0	0.00	63.0 abcd
DK697	70.0	0.0	0.00	69.4 abc
DKC 69-71	39.0	3.5	0.14	61.4 abcd
DKC 69-72	38.5	0.0	0.00	72.1 ab
DKC 67-60	27.5	1.5	0.03	65.8 abcd
Garst 8200 YG1	41.0	2.0	0.04	60.6 abcd
Dyna Gro 58K22	46.0	1.0	0.03	63.3 abcd
Agra Tech 755R	44.5	1.0	0.03	74.2 a
Southern States 859CL	39.0	6.5	0.11	60.2 abcd
Croplan 830	43.5	2.5	0.23	56.1 cd
Agra Tech 719RR	27.0	3.5	0.16	57.5 bcd

[z]Pi = number of nematodes per 100 cc soil from initial or first nematode assay.
[y]Pf = number of nematodes per 100 cc soil from samples collected shortly have corn harvest.
[x]Nematode Reproduction Index Ratio = adjusted Rf/Ri ratio.
[w]Mean separation with columns was according Fisher’s least significant difference (LSD) test, P=0.05.

Table 2. Yield of selected field and sweet corn varieties and reproduction of the peanut root knot nematode on those varieties.

Corn Variety	Peanut Root Knot Larvae Count[z]		Nematode	Yield bu/A
	Pi[y]	Pf[x]		
Pioneer 31N26	18.0	1.5	0.16	78.3 ab[w]
Pioneer 31G66	9.5	0.0	0.00	67.8 b
Pioneer 33V15	18.5	6.0	0.99	71.4 ab
Pioneer 34M54	20.0	0.0	0.00	72.5 ab
Pioneer 31G97	9.3	0.0	0.00	71.2 ab
DK697	6.5	3.0	0.50	84.7 a
DKC 69-71	10.0	1.0	0.07	85.6 a
DKC 69-72	14.5	29.5	1.05	74.2 ab
DKC 67-60	3.3	0.0	0.00	79.2 ab
Croplan 799	11.0	3.5	0.19	76.4 ab
Croplan 851	8.5	0.0	0.00	67.8 b
Croplan 1167	13.0	2.5	0.14	76.1 ab
Southern States 859CL	17.5	0.0	0.00	67.0 b
Golden Queen[v]	14.5	0.0	0.00	--
Silver Queen[v]	10.7	0.0	0.00	--

[z]Number of peanut root knot larvae (J2) per 100 cc of soil processed using the sugar flotation method.
[y]Pi = number of nematodes per 100 cc soil from initial or first nematode assay.
[x]Pf = number of nematodes per 100 cc soil from second sample taken after harvest.
[w]Means in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test, P=0.05).
[v]Sweet corn varieties.