

SHORT COMMUNICATIONS

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Susceptibility of Soybean to *Scutellonema brachyurum*¹

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Abstract: Yield responses of 24 soybean cultivars to *Scutellonema brachyurum* were evaluated in a naturally infested field. Yields between treated and untreated plots were not different ($P = 0.05$) for the nematicide \times cultivar interaction. D-D reduced soil nematode population levels by 93% at 45 days after planting and 59 days after fumigation. *Scutellonema brachyurum* did not cause economic loss on soybean.

Key words: crop loss, D-D, *Glycine max*, nematicide, resistance, *Scutellonema brachyurum*, soybean, spiral nematode.

Scutellonema brachyurum Steiner frequently is associated with cotton (*Gossypium hirsutum* L.) and soybean (*Glycine max* (L.) Merr.) in North Carolina, particularly in the southeastern counties of the state. It causes little damage on cotton (K. R. Barker and J. N. Sasser, pers. comm.); however, its role in association with soybean has not been determined. The objective of this research was to determine the effects of *S. brachyurum* on soybean growth and yield under field conditions.

The experiment was conducted in a sandy loam field in Anson County, North Carolina, naturally infested with an average of 1,842 *S. brachyurum* and 18 *Tylenchorhynchus claytoni* Steiner per 500 cm³ soil. The design was a split plot with cultivars as whole plots and D-D (1,3-dichloropropene, 1,2-dichloropropane) soil fumigation as subplots. Treatments were replicated four times and arranged in a randomized complete block design. The whole plots were 9 m long and 7.4 m wide (eight rows spaced 92 cm apart). Fertilizer (3-9-18 N:P:K) was applied in a 1-2-cm

band approximately 5 cm deep and 5 cm to the side of the row at 230 kg/ha.

D-D (93.5 liters/ha [8.5 ml/m of row]) was injected 20 cm deep in the row through a gravity-flow meter 12 May 1978 and covered with approximately 15 cm of hilled soil. Seeds of 24 cultivars (Table 1) were sown at a rate of 26 seeds/m of row on top of the ridge with hand operated cone planters on 26 May 1978.

Trifluralin (2.3 liters/ha broadcast) was applied before fumigating for control of grasses. Plots were cultivated and hand weeded when necessary. No irrigation was available. All other cultural practices were done according to recommendations for North Carolina (1).

Samples consisting of a composite of 10 soil cores (2.5 cm d \times 15 cm deep) were collected from the root zone in the two middle rows of each subplot at planting and at 69 days after planting. Nematodes were extracted from 500 cm³ soil by elutriation (2) and centrifugal flotation (3). Roots caught on a 70- μ m-pore sieve during elutriation were placed in a mist chamber for 5 days for extraction of migratory endoparasites.

When all cultivars were mature, plants were removed from two middle rows of each subplot and threshed with a stationary plot thresher. All data were subjected to analysis of variance. Means were compared by a least significant difference if the *F* value was significant.

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TABLE 1. Population density of *Scutellonema brachyurum* at midseason and soybean yields from D-D treated and untreated plots.

Cultivar	Maturity group	Yield (g/18 m)		<i>S. brachyurum</i> †	
		Fumigated	Unfumigated	Roots from 500 cm ³ soil	500 cm ³ soil
Bedford	V	1,970	1,575	4	315
Davis	V	2,898	2,455	23	830
Essex	V	2,113	1,523	15	853
Forrest	V	2,405	2,145	35	730
Mean		2,347	1,925		
Centennial	VI	2,000	1,885	46	703
Coker 136	VI	2,133	1,638	6	388
FFR 666	VI	2,340	2,128	75	1,048
Lancer	VI	2,168	1,885	14	328
Lee 74	VI	2,828	2,608	58	1,093
Pickett 71	VI	1,978	2,163	20	1,130
RA 603	VI	2,025	1,970	9	598
RA 604	VI	2,438	2,160	48	1,015
RA 680	VI	1,925	2,180	12	908
Mean		2,204	2,069		
Bossier	VII	2,005	1,993	77	775
Bragg	VII	2,188	1,835	7	750
Coker 237	VII	2,245	2,473	37	1,075
Gasoy 17	VII	2,485	2,605	25	963
Govan	VII	2,305	2,320	73	1,323
RA 71	VI & VII	2,190	2,123	55	705
RA 77	VII	2,525	2,170	65	933
RA 700	VII	2,295	2,308	73	1,045
Ransom	VII	2,338	2,550	40	833
Mean		2,286	2,264		
Coker 338	VIII	2,290	2,220	40	670
Hutton	VIII	2,490	2,513	7	285
Mean		2,390	2,367		
LSD $P = 0.05$		NS	NS	49	NS
$P = 0.01$		NS	NS	54	NS

Fumigated with D-D at 93.5 liters/ha (8.5 ml/m of row). Differences in yield between treated and untreated plots averaged over all cultivars were significant ($P = 0.04$).

† Nematodes were extracted from soil and all roots collected from a 500-cm³ sample.

Only the midseason root population of *S. brachyurum* differed among cultivars ($P = 0.01$) (Table 1). Fewer nematode numbers were in the roots of Bedford, Coker 136, Hutton, Bragg, RA 603, RA 680, Lancer, Essex, Pickett 71, and Davis, than in Govan, RA 700, FFR 666, and Bossier. Nematode numbers from the other 10 cultivars did not differ ($P = 0.05$) from these 14.

Most of the nematodes were in the soil. The root population fraction was 4% of the total *S. brachyurum*. The correlation coefficient between the root population and the total population was +0.64, $P = 0.05$.

The soybean cultivar \times chemical treatment interaction for yield was not different ($P = 0.05$). Yields averaged among cultivars were 151 g/18 m greater ($P = 0.04$) in fumigated than in unfumigated subplots (Table 1). Group V cultivars gave the greatest average response (422 g/18 m) to fumigation with D-D. Group VI cultivars yielded 135 g/18 m more in fumigated soil than in unfumigated soil. There was little difference in yields between fumigated and unfumigated subplots in group VII and VIII soybeans. No rain occurred during the late season when these group VII and VIII soybeans were developing seeds.

Water stress may have masked the expression of yield differences.

The 93% fewer *S. brachyurum* (884/500 cm³ soil in untreated vs. 67 in D-D treated soil) at 45 days after planting and 59 days after treatment should have been adequate control to effect a yield difference due to treatment if the nematode was pathogenic to soybean. Yield differences were not sufficiently large to justify the cost of chemical treatment. These yield differences between treated and untreated plots is evidence that *S. brachyurum* is probably not a significant pest of soybean.

LITERATURE CITED

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