CONCLUSIONES

Los resultados obtenidos indican que en el estado Lara los géneros de nematodos fitoparásitos asociados al cultivo de la caña de azúcar son relativamente pocos. Podría considerarse que los géneros encontrados no sean limitantes al cultivo, sin embargo es conveniente estudiar el efecto que algunos de ellos pudieran tener sobre la caña de azúcar en esta región del país.

ABSTRACT

Seven genera of plant-parasitic nematodes were identified from 150 sugar cane samples from varieties P. R. 980, B. 4362 and B. 49119., taken in the state of Lara, Venezuela. *Aphelenchus, Rotylenchulus* and *Helicotylenchus* were the genera most frequently observed. Other genera found were *Pratylenchus, Tylenchus, Meloidogyne* and *Criconemoides.*
Key Words: new records, ectoparasitic, endoparasitic, reniform, and root knot nematodes.

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RESPONSE OF SOYBEANS AND POPULATIONS OF THE LANCE NEMATODE, *HOPLOLAIMUS COLUMBUS,* TO FUMIGANT NEMATICIDES APPLIED AT PLANTING [RESPUESTA DE LA SOYA Y POBLACIONES DEL NEMATODO LANCEADOR, *HOPLOLAIMUS COLUMBUS,* A FUMIGANTES NEMATICIDAS APLICADOS AL TIEMPO DE SIEMBRA]

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ABSTRACT

Various rates of several fumigants were applied at planting to sandy loam soil in which soybeans were grown. No phytoxicity was observed. Highest yields occurred in plots treated with ethylene dibromide and in plots treated with the highest rate of D-D (65.01 l/ha). These plots also had better ratings, at the flowering and pod-fill stages of growth, for uniformity of stand, heights, and color. Lance nematode populations in

soil and roots were better correlated with yield effects 11 weeks after treatment than after 8 weeks.

Key Words: Control, Telone, 1,3-dichloropropene, halogenated hydrocarbons, EDB, Glycine max, DBCP.

INTRODUCTION

Soybean *(Glycine max* (L) Mer.) production in the southeastern USA is a major component of the agricultural economy. Yields are often suppressed by various nematodes and many growers have responded by applying liquid fumigant nematicides, especially DBCP, behind a subsoiling shank during preparation of the seedbed. This chemical is available now only on a "restricted-use" basis because of the danger to human health. Its future is therefore in doubt since strict regulations govern its manufacture, distribution, and sale. The purpose of this investigation was to compare the nematicidal activity, potential for phytotoxicity, and yield effects of different fumigants and application rates with the standard, DBCP, on soybean.

MATERIALS AND METHODS

An experiment was established in 1978 at Blackville, S. C., near the Edisto Experiment Station of Clemson University. A randomized complete block design was used, with five replications per each of 14 treatments. Plot size was 7.2 x 1.6 m and two rows of 'Bragg' soybean were planted in this area. All plots were subsoiled to a depth of 35 cm except where indicated in the nonsubsoiled check as shown in the tables. Fumigants were injected under the row, at planting time, at a depth of 35 cm in the bottom of the subsoil furrow and soybeans were planted immediately. Check plots received no chemical treatment.

The test area was heavily infested with *Hoplolaimus columbus* Sher (Table 1). Very low populations of *Paratrichodorus porosus* Allen, *Macroposthonia curvatum* Raski, and *Helicotylenchus exallus* Sher were also present. The infestation of the lance nematode was fairly uniform. Cotton and soybean, both excellent hosts of *H. columbus,* were planted in this area previously. Trifluralin (Treflan®) was applied during soil preparation to control common cocklebur, *Xanthium pennsylvanicum* Wallr. Bentazon (Basagran®) was applied at early postemergence.

Soil samples were taken from all plots at the time of chemical treatment, and 8 and 11 weeks later. Twenty subsamples were collected and mixed from each plot and a 500 cm^3 aliquot was processed in the NC-EL semiautomatic elutriator (3). One-fifth of the processed sample was collected on 38 um (400 mesh) sieves. Subsequent preparation was by Jenkins' centrifugal-flotation technique (4). Roots of soybeans were assayed at the 8 and 11 week sampling periods. Root segments from the 500 cm^3 soil samples were collected on 425 um (35 mesh) sieves during the processing of soil for nematodes. Roots were weighed and placed in a chamber in which a fine spray of 100 ppm ZnSO4 solution (1) heated to 27 C was applied for 30 seconds every 2 minutes. Roots were removed and nematodes counted after 4 days.

RESULTS AND DISCUSSION

The initial infestation level (Pi) of *H. columbus* was quite uniform over the test area of 70 x 30 m as shown in Table 1. This Pi was well above damaging levels since a Pi of 20-50/100cm^3 can cause yield reduction of the 'Bragg' cultivar (S.A. Lewis, unpubl.). The highest rates of D-D and Telone II and 9.29 l/ha of EDB caused the greatest

Table 1. Number of *Hoplolaimus columbus*/100 cm³ Varina sandy loam soil at different times after treatment with chemicals applied 35 cm deep behind one subsoiling shank/row immediately preceding planting of soybeans.

Chemical	Rate (l/ha)	Lance nematodes in soil 0 weeks	8 weeks	11 weeks
D-D	27.86	311 az	264 ab	151 a
D-D	46.44	385 a	156 a	69 a
D-D- (1,3-Dichloropropene, 1,2-Dichloropropane and related hydrocarbons)	65.01	399 a	92 a	122 a
Telone II (1,3-Dichloropropenes)	18.57	368 a	176 a	72 a
Telone II	27.86	486 ab	82 a	145 a
Telone II	37.15	401 a	129 a	39 a
Telone II	74.30	343 a	22 a	10 a
Soilbrom 90 EC (ethylene dibromide)	4.63	322 a	113 a	13 a
Soilbrom 90 EC	9.29	486 ab	80 a	31 a
Soilbrom 90 EC	18.57	239 a	277 ab	14 a
Soilbrom 90 EC	37.15	316 a	299 ab	4 a
DBCP 12.1 EC (1,2-Dibromo-3-chloropropane, and other C3 compounds)	6.97	740 b	457 ab	346 bc
Check subsoiled	- -	320 a	731 b	475 c
Check non-subsoiled	- -	340 a	287 ab	311 b

zThe mean of 5 replicates, 20 subsamples/replicate. Numbers followed by the same letter do not differ significantly according to Duncan's multiple range test (P equals 0.05).

nematode population reductions 8 weeks after application. However, the numbers of lance nematodes were statistically different from only the subsoiled (chiseled) check. After 11 weeks, DBCP and the two check treatments had higher lance nematode populations in the soil than all other chemical treatments.

The number of lance nematodes in roots at 8 and 11 weeks did not differ among the treatments of D-D, Telone II, and Soilbrom 90 (Table 2). The plots treated with Telone II at 18.57, 37.15, and 74.30 l/ha and Soilbrom 90 at all rates had fewer lance nematodes in the roots than the DBCP and check subsoiled plots 8 weeks after treatment. At 11 weeks, all rates of D-D, Telone II, and Soilbrom 90 had fewer lance nematodes than the DBCP and non-subsoiled check treatments. Plots treated with Telone II at application rates of 18.57, 37.15, and 74.30 l/ha and all rates of Soilbrom 90 had fewer lance nematodes in the roots than DBCP and both check treatments.

Phytotoxicity symptoms were not observed, though planting immediately followed application of the fumigants. The plots treated with DBCP gave extremely poor yields in two of the replications (Table 3). This chemical usually affords good nematode control and high yields (2). Soilbrom 90 plots give high yields at all treatment rates and the

Table 2. Number of *Hoplolaimus columbus* in soybean roots 8 weeks and 11 weeks after treatment with chemicals applied 35 cm deep behind one subsoiling shank per row immediately preceding planting.

Chemical	Rate (l/ha)	No. in roots from 500 cm^3 soil containing root pieces 8 weeks	11 weeks	No./gm of fresh root wt. 8 weeks	11 weeks
D-D (1,3-Dichloropropene, 1,2-Dichloropropane and related hydrocarbons)	27.86	337 abcz	700 ab	92	159
D-D	46.44	231 abc	264 ab	77	78
D-D	65.01	111 a	291 ab	25	81
Telone II (1,3-Dichloropropenes)	18.57	108 a	161 a	28	35
Telone II	27.86	58 a	304 ab	13	84
Telone II	37.15	280 abc	100 a	88	32
Telone II	74.30	22 a	31 a	6	7
Soilbrom 90 EC (ethylene dibromide)	4.63	124 ab	83 a	32	16
Soilbrom 90 EC	9.29	90 a	145 a	27	31
Soilbrom 90 EC	18.57	40 a	16 a	12	5
Soilbrom 90 EC	37.15	175 ab	43 a	37	9
DBCP 12.1 EC (1,2-Dibromo-3-chloropropane, and other C3 hydrocarbons)	6.97	444 bc	1515 cd	147	330
Check subsoiled	- -	545 c	983 bc	144	217
Check non-subsoiled	- -	242 abc	1844 d	54	473

zThe mean of five replicates, 20 subsamples/replicate. Numbers followed by the same letter do not differ significantly according to Duncan's multi-range test (P equals 0.05).

Table 3. Yield of 'Bragg' soybean (Kg/ha) treated with fumigants applied 35 cm deep behind one subsoiling shank/row immediately preceding planting.

Chemical	Rate (l/ha)	Yield
Soilbrom 90 EC (ethylene dibromide)	9.29	2407.5 az
Soilbrom 90 EC	37.15	2295.1 ab
Soilbrom 90 EC	18.57	2181.6 abc
D-D- (1,3-Dichloropropene, 1,2-Dichloropropane and related hydrocarbons)	65.01	2074.9 abcd
Soilbrom 90 EC	4.63	2014.9 abcd
Telone II (1,3-Dichloropropenes)	37.15	1894.8 bcde
Telone II	74.30	1764.0 cdef
Telone II	27.86	1701.3 cdef
DBCP 12.1 EC (1,2-Dibromo-3-chloropropane, and other C3 hydrocarbons)	6.97	1594.5 def
D-D	46.44	1581.2 def
Telone II	18.57	1481.1 efg
D-D	27.86	1367.7 fg
Check, subsoiled	- -	1347.7 fg
Check, non-subsoiled	- -	1060.8 g

zThe mean of five replicates. Numbers followed by the same letter do not differ significantly according to Duncan's multiple range test (P equals 0.05).

plants were of very uniform height and had excellent color. D-D and Telone II at the rates of 46.44 and 27.86 l/ha and lower, respectively, did not give satisfactory yields in this heavily infested field.

RESUMEN

Soilbrom 90 (BDE) presentó buén control del nematodo lanceador. Lotes preparados con este nematicida produjeron rendimientos mayores a los demás lotes. Generalmente la población de nematodo lanceador en las raíces, 11 semanas después de la aplicación del químico, correspondía con las diferencias de rendimientos entre los tratamientos. Los rendimientos fueron significativamente mayores para todos los tratamientos con Soilbrom 90 y D-D a concentración de 65.01 l/ha, que para los lotes tratados con 18.57 y 27.86 l/ha de Telone II y D-D- respectivamente, y ambos controles. A pesar que los fumigantes fueron aplicados al tiempo de siembra no se presentó fitotoxicidad en ninguno de los tratamientos.
Claves: Combate de nematodos, DBCP, BDE, Telone, 1,3-dicloropropeno, hidrocarburo halogenado, Glycine max.

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