suelos. Para todas las variedades los beneficios obtenidos con el tratamiento de presiembra continuó notándose en la cosecha derivada de los retoños. Los resultados indican que la piña mejora poco con tratamientos nematicidas una vez dañada por nematodos.

Claves: Combate, Ananas comosus, Pratylenchus, Helicotylenchus, DD, DBCP, Phenamiphos, Nemacur.

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NEMATICIDAL ACTIVITY OF SODIUM AZIDE [ACTIVIDAD NEMATICIDA DE LA AZIDA DE SODIO]. W.D. Kelley and R. Rodriguez-Kabana. Department of Botany and Microbiology, Auburn University, Auburn, Alabama 36830, USA.

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ABSTRACT

Sodium azide (134.5 kg/ha) was compared to methyl bromide (650 kg/ha) for nematicidal activity in field plots over a 2-year period. Plots treated with methyl bromide generally were free of nematodes throughout the study period. Initially, some decrease in nematode numbers was evident in plots treated with NaN3 but none was evident after 24 weeks. Generally, plant parasitic species of nematodes were more affected by NaN3 than were species of predatory or saprophogous nematodes. Data indicate that NaN3 is not an effective nematicide under field conditions.

Key Words: Smite 8-G, nurseries, biocides, Pinus elliottii, slash pine.

INTRODUCTION

Because of their broad-spectrum biocidal properties and lack of toxic residues, sodium and potassium azide have been proposed for use as soil fumigants. Although azides have been shown to have nematicidal activity (1, 2), their long-term effect on nematode populations in field plots has not been reported. The purpose of this investigation was to compare the nematicidal activity of sodium azide (NaN3) with that

of methyl bromide in field plots of slash pine *(Pinus elliottii* Engelm.) seedlings over a 2-year period.

MATERIALS AND METHODS

Field plots were established and maintained for a 2-year period at the Stauffer State Forest Nursery (Alabama Forestry Commission) near Auburn, Alabama. A completely randomized block design with 4 replications per treatment was used in the study; plot size was 1.5 x 4.6 m. In April, azide-treated plots received a granular formulation of NaN3 (Smite 8 G) containing 8% active ingredients (ai) at a rate of 134.5 kg ai/ha. The azide was applied with a calibrated Gandy and incorporated into the top 15 cm of soil with a Roto-tiller. Each plot then was covered with a polyethylene sheet and sealed around the edges with soil. One-half of the plots treated with azide received an identical application of NaN3 in April of the second year. Control plots received no treatment. Plots treated with methyl bromide were tillered, covered with polyethylene, and methyl bromide (MC-2) was applied at a rate of 650 kg/ha.

The plastic sheets were removed after 10 days. All plots were planted with slash pine seed 2 weeks later.

Soil samples for nematode enumeration were collected immediately after removal of the plastic sheets (10 days after treatment); subsequent samples were collected at intervals as shown in Table 1. Samples consisted of 25 randomly collected soil cores taken from the top 15 cm of each plot with a standard sampling tube. The soil cores were composited and each composite was thoroughly mixed and screened through a 4.75 mm mesh sieve prior to processing.

Nematodes were extracted from a 50 cc sub-sample of soil by the molasses flotation-sieve procedure (3), and were counted and identified using a stereoscopic microscope. The nematodes were categorized as either plant parasitic, predatory, or saprophagous species.

RESULTS AND DISCUSSION

Numbers of nematodes in each category at each sampling date for the various treatments are shown in Table 1. As expected, plots treated with methyl bromide were free of nematodes throughout the 2-year period, except for a few predatory and saprophagous species extracted on 2 of the sampling dates. Numbers of nematodes in the control and NaN3-treated plots exhibited seasonal fluctuations, with highest numbers occurring in the fall just before the slash pine seedlings were lifted and lowest numbers occurring in the spring and early summer before roots of new plants were well developed.

Sodium azide was not an effective nematicide. Although some decrease in numbers of nematodes from NaN3-treated plots were observed early after treatment, these differences generally were not evident after 24 weeks. Species of plant parasitic nematodes were more susceptible to NaN3 than were the predatory and saprophagous species. However, number of plant parasitic nematodes in the control and NaN3-treated plots were not different after 34 weeks.

Plots re-treated with NaN3 at the beginning of the 2nd year showed slightly lower nematode counts than either the controls or the plots treated with azide for only one year. However, the decrease was not of the magnitude observed during the first year, and was not as long lasting.

Data show that NaN3 is only slightly active against nematodes under field conditions and it has little potential for use as a nematicide.

Table 1. Numbers of nematodes extracted per 450 cc of soil on each sampling date.[1]

Plot	Weeks After Treatment													
	2[2]	4	8	12	24	34	46	58(2)[3]	60(4)	62(6)	67(11)	74(18)	86(30)	100(44)
	Total Number of Nematodes													
Control	70	322	29	31	191	414	353	167	140	132	100	146	452	389
Methyl Bromide[4]	0	0	0	0	97	0	0	0	0	0	0	0	85	0
NaN3 (1st yr)[5]	54	56	2	0	108	192	290	142	132	135	91	132	464	472
NaN3 (1st & 2nd yr)	97	36	13	4	83	229	272	61	105	110	108	159	371	385
	Total Plant Parasitic Nematodes													
Control	36	130	14	4	29	52	65	16	27	2	2	18	90	108
Methyl Bromide	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NaN3 (1st yr)	20	7	0	0	7	43	45	11	13	9	4	9	72	85
NaN3 (1st & 2nd yr)	20	2	2	0	4	36	47	7	13	0	0	4	47	38
	Total Predatory Nematodes													
Control	16	72	4	7	79	126	99	34	43	67	40	70	110	128
Methyl Bromide	0	0	0	0	0	0	0	0	0	0	0	0	13	0
NaN3 (1st yr)	18	13	0	0	38	34	106	36	27	36	20	67	106	126
NaN3 (1st & 2nd yr)	43	14	2	0	16	54	67	20	27	38	61	76	110	106
	Total Saprophagous Nematodes													
Control	18	120	11	20	83	236	189	117	70	63	58	58	252	153
Methyl Bromide	0	0	0	0	97	0	0	0	0	0	0	0	72	0
NaN3 (1st yr)	16	36	2	0	63	115	139	95	92	90	67	56	286	261
NaN3 (1st & 2nd yr)	34	20	9	4	63	139	158	34	65	72	47	79	214	241

[1]Means of 4 replications
[2]Sampling date at 2 weeks was April 23
[3]Figures in ( ) refer to weeks after the second application of NaN3
[4]Rate of methyl bromide was 650 kg/ha
[5]Rate of NaN3 was 134.5 kg/ha

RESUMEN

La actividad nematicida de la azida de sodio (134.5 kg/ha) fue comparada con la del bromuro de metilo (650 kg/ha) en un experimento de campo de 2 años de duración. Las parcelas tratadas con bromuro de metilo en general se mantuvieron sin nematodos durante el estudio, mientras que en las tratadas con N3Na se observó una disminución inicial en el número de nematodos seguida por una ausencia de diferencias a las 24 semanas entre estas parcelas y las correspondientes al testigo. En general especies fitoparásitas fueron mas afectadas por N3Na que las otras de nematodos depredadores y saprófitos. Los resultados señalan que N3Na no es un nematicida efectivo bajo condiciones de campo.

Claves: Smite 8-G, pinos, almácigos, biocida, Pinus elliottii.

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FLUCTUACIONES ESTACIONALES DE LAS DENSIDADES DE POBLACION DE *Radopholus similis* EN RAICES DE BANANO "VALERY" *(Musa acuminata* AAA) EN LA ZONA BANANERA PACIFICA DE PANAMA [SEASONAL POPULATION FLUCTUATIONS OF *Radopholus similis* IN ROOTS OF "VALERY" BANANA *(Musa acuminata* AAA) IN THE PACIFIC BANANA GROWING REGION OF PANANA]. L. Marcelino, M. Víquez y R. Tarté. Corporación Bananera del Pacífico, Apartado 737, David, República de Panamá, y Unión de Países Exportadores de Banano, Apartado 4273, Panamá 5, Panamá.

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RESUMEN

Un estudio para determinar las fluctuaciones mensuales de las densidades de población de *Radopholus similis* dentro de las raíces de banano "Valery" fué realizado en la zona bananera del Pacífico en Panamá. Se encontraron cuatro picos y cuatro depresiones en las densidades de población del nematodo durante el año. Los picos ocurren en mayo, septiembre, noviembre y enero, siendo precedidos por depresiones en los meses anteriores. El pico mayor ocurre en noviembre, mes que coincide con la máxima precipitación, seguido de mayo, mes que marca el inicio de la época de lluvias. Unicamente las depresiones ocurridas en abril y en agosto fueron precedidas de disminuciones en las densidades de población del nematodo durante tres meses consecutivos, lo cual hace que estos meses sean los más favorables para ejercer el combate de los nematodos mediante aplicaciones de nematicidas.

Claves: dinámica de poblaciones, precipitación, nematodo barrenador.