Research Note

EVALUATION OF FOUR NEMATICIDES IN PREPLANT TREATMENTS OF PLANTAIN (Musa acuminata × M. balbisiana, AAB, CV MARICONGO) CORMS[1, 2]

According to Román and Oramas,[3] at least 10 mm of the cortical tissue of plantain corms should be peeled off to remove nematodes from this planting material. However, this practice only reduces the degree of contamination; it does not safeguard against reinfestation and can seriously reduce germination. Also, such deep peeling can be practical only with medium and large corms. Besides, it is a time-consuming and costly operation.

An effective preplant corm treatment that does not involve peeling could be of great benefit to plantain farmers.

Several preplant dips of previously peeled corms are currently used in various countries. Immersion methods include the use of either hot water at 53 to 55° C for 10 to 20 min,[4, 5] a suspension of DBCP (1,2-dibromo-3-chloropropane) and aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-*endo-exo*-5,8-dimethanonaphthalene)[6] at the ratio of 1:2 for 5 min,[7] or a mixture of DBCP and Bordeaux [.2 kg each of copper sulfate (monohydrate) and hydrated lime (calcium hydroxide) plus 12 ml of 1,2-dibromo-3-chloropropane/3.8 liters of water] for 1 min.[8, 9] The corms can

[1] Manuscript submitted to Editorial Board June 5, 1978.

[2] This paper covers work carried out cooperatively between the Science and Education Administration (formerly ARS), USDA, and the Agricultural Experiment Station, Mayagüez Campus, University of Puerto Rico, Río Piedras, P.R.

[3] Román, J., and Oramas, D., 1975. Profundidad de penetración del nematodo *Radopholus similis* en rizomas del plátano, Memorias de la SOPCA, Mayagüez, P.R.

[4] Colbran, R. C., 1967. Hot water tank for treatment of banana planting material, Queensl. Agri. J. 93 (6): 353–54.

[5] Taylor, A. L., 1969. Control of the banana-root nematodes in Fiji, Plant Prot. Bull. FAO 17: 97–103.

[6] This paper reports the results of research only. Mention of a pesticide in this paper does not constitute a recommendation by the USDA or Agricultural Experiment Station of the University of Puerto Rico nor does it imply registration under FIFRA.

[7] Edmunds, J. E., 1969. Banana nematode control, Advisory Bull., Windward Islands Banana Res, Scheme, 11 pp.

[8] Loos, C. A. and Loos, Sarah B., 1960. Preparing nematode-free banana seed, Phytopathology 50: 383–86.

[9] Welhunt, E. J. and Holdeman, Q. L., 1959. Nematode problems of the banana plant, Proc. Soil Sci. Fla. 19: 436–42.

also be coated with a bentonite-nematicide slurry[10] or dipped in emulsible formulations of systemic nematicides.[11]

The effectiveness of one carbamate- and three organophosphorus-based nematicides was tested for preplant treatment of unpeeled corms of the cv. Maricongo. Corms of this cultivar were free of the corm weevil (*Cosmopolites sordidus*) but field infected with a mixed population of the following nematodes: *Radopholus similis, Rotylenchulus reniformis, Pratylenchus* spp., *Helicotylenchus* spp., *Meloidogyne* spp., and *Aphelenchoides* spp.

TABLE 1.—*Effect of various dip treatments on germination and number of nematodes recorded from plantain corms infected with known and suspected plant parasitic nematodes*

Treatment	Germination	Nematode populations in 50 g of corm tissue		
		Before dipping	After dipping	Means of 3 post-planting samples
Ppm	%	*No.*	*No.*	*No.*
Carbofuran 1,400	100	711.1[1]	18.4 b[2]	607.0 a
Carbofuran 2,800	100	671.2	38.4 b	674.6 a
Carbofuran 4,200	95.8	884.5	158.4 b	870.5 a
Fensulfothion 1,400	100	1,011.1	38.4 b	314.8 b
Fensulfothion 2,800	95.8	951.1	47.7 b	176.0 b
Fensulfothion 4,200	87.5	588.7	58.4 b	277.9 b
Ethoprop 1,400	100	1,091.1	38.4 b	423.8 b
Ethoprop 2,800	95.8	1,731.1	0 b	327.6 b
Ethoprop 4,200	100	937.8	0 b	170.2 b
Phenamiphos 1,400	83.3	671.1	58.4 b	331.0 b
Phenamiphos 2,800	91.7	1,611.1	82.9 b	192.6 b
Phenamiphos 4,200	87.5	551.1	18.4 b	232.3 b
Control	95.8	1,260.0	1,260.0 a	—

[1] Nonsignificant.

[2] Values within a column with one or more letters in common do not differ significantly at P = 0.05.

The corms were dipped for 10 min in aqueous solutions of four nematicides at three concentrations. The nematicides used were "flowable" carbofuran (2,3-dihydro-2,2-dimethyl-7-benzofuranyl-methylcarbamate) 480 g/l; and liquid formulations of fensulfothion {*O,O*-diethyl *O*-[4-(methylsulfinyl)phenyl] phosphorothioate}, 720 g/l; ethoprop (*O*-ethyl *S,S*-dipropyl phosphorodithioate), 720 g/l; and phenamiphos [ethyl 4-(meth-

[10] Guerout, R., 1975. Banana corm coating with nematicidal mud: a preplant treatment, Nematropica 5(2): 22.

[11] Pessoa, O., 1973. Estudio evaluativo de cuatro nematicidas sisté/micos en el tratamiento de rizomas de banano (*Musa acuminata,* AAA), Facultad de Agronomía, Universidad de Costa Rica, 59 pp.

ylthio)-*m*-tolyl isopropylphosphoramidate], 360 g/l. The concentrations were 1,400, 2,800, and 4,200 p/m, respectively.

The corm roots were removed before treatment and were randomly distributed into 13 groups of 24 corms, each group corresponding to the 12 treatments and a control. Fifty-g samples of cortical tissue were taken to a depth of about 25 mm before and after treatment from suspected necrotic areas in each corm. These samples were used to determine the number and species of nematodes present.

The corms were planted in the field in a split-plot design with four replications. Sampling intervals were assigned to main plots, and dip treatments to the sub-plots. Plants were fertilized, watered, and weeded according to recommended practices, except that no postplant applications of nematicides were made. Germination was recorded 5 weeks after planting. Roots and corm cortical tissue were sampled 2, 4 and 6 mo after planting.

Nematode populations were high in all corms before treatments and did not differ significantly (table 1).

All dip treatments decreased the initial nematode populations by about 95%. The treatments did not significantly affect germination percentage.

Bimonthly post-plant samplings revealed no significant difference among treatments in the rate of increase in nematode populations; i.e., nematode populations had similar rates of increase throughout the duration of the experiment.

The pooled data of the three post-planting samples showed that nematode counts in all carbofuran treatments were significantly higher than counts in the other treatments (table 1). The apparent failure of carbofuran to maintain the reduced nematode populations suggested that this carbamate did not penetrate as deeply into the unpeeled plantain corms as did the other nematicides.

Further comparisons of the dip treatments with the control were not possible; most of the latter plants succumbed, apparently as a result of their initially high nematode populations.

None of the concentrations tested affected the nematicidal activity of these compounds, whose solubility in water is fairly low.

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