

Section of Nematology, Sugarcane Breeding Institute, Coimbatore - 641 007, India

EFFICACY OF SOME NEW SOIL AMENDMENTS FOR THE CONTROL OF THE LESION NEMATODE IN SUGARCANE

by

USHA K. MEHTA and P. SUNDARARAJ

Summary. The efficacy of organic amendments *viz.*, naemin, neemark, farmyard manure, press mud and *Calotropis procera* were compared with the chemical nematicide carbofuran for the control of *Pratylenchus zeae* on sugarcane. Application of all treatments increased the growth of plants, as measured by shoot and root length and weight, with neemark giving the best results.

Management of plant parasitic nematode in sugarcane fields of India is a complex problem as the crop is cultivated in extremely varied agroclimatic zones of the country. Consequently different management practices need to be developed suitable to each zone. Addition of organic amendments (Recuenco, 1980), regulation of cultural practices (Anon, 1982) and application of chemical nematicides (Mehta, 1992) effectively control nematodes in sugarcane fields. Filter cake (press mud, PMC), the end waste product from sugar factory, have been shown to decrease also population densities of plant parasitic nematodes and increase the yield of sugarcane by 85% (Harris, 1975).

The efficacy of two newly introduced soil amendments, naemin and neemark, were compared with the application of press mud, farmyard manure, the green leaf component of *Calotropis procera* L. and the nematicide, carbofuran, for the control of *Pratylenchus zeae* Grahm. The results are reported here.

Materials and methods

The experiment was carried out in gauze house in clay pots (1 l capacity) filled with a

sterile sand and soil mix with seven treatments as listed in Table I. The components for each treatment were incorporated in to the soil before filling up the pots and single budded setts of sugarcane (*Saccharum officinarum* L.) cv. CoC 671 were planted in each pot. The experiment was laid out in a completely randomized block design with five replications per treatment. The products tested in the trials were: naemin, a product of Indian Organic Chemicals Limited, Bombay, India, containing nematode predatory micro-organisms on a lignite based carrier and neemark a product of West-Cost Herbochem Private Limited, Bombay, containing active azardiractin in a free flowing granular formulation. Press mud was obtained from a sugar factory, tested after two months curing and farmyard manure in natural form was used. Leaves of *C. procera* were collected from the field and chopped finely for incorporation in the pots.

Forty five days after planting the setts the pots were inoculated with a pure culture of *P. zeae* at the rate of 1000 nematode per pot. Six months after planting the crop was harvested by cutting the stem portion at the soil base. Pots were upturned, roots removed, washed in

TABLE I - Comparative efficacy of soil amendments on the sugarcane characters and *Pratylenchus zeae* populations.

Treatment	Length (cm)		Weight (g)		Nematode population	
	Shoot	Root	Shoot	Root	Shoot (100cc)	Root (10g)
Neemark	116 a	133 a	72.3 b	31.8 a	67 c	50 e
Naemin	94 b	111 bc	34.5 d	17.8 c	69 c	60 e
Pressmud	107 ab	123 ab	64.0 bc	25.1 b	76 c	46 e
Carbofuran	105 ab	121 ab	55.8 c	25.0 b	88 c	92 d
Farm yard manure	108 ab	106 c	90.2 a	29.3 ab	116 b	114 c
<i>Calotropis procera</i> L.	110 ab	105 c	73.7 b	26.2 ab	135 b	188 b
Control	98 b	101 c	36.7 d	15.24 c	171 a	248 a

Numbers followed by same letters are not statistically significant according to Duncan's multiple range test (P=0.05).

running tap water to clear them of the soil particles and fresh root weight and root length recorded. Soil from the pot was mixed thoroughly and 250 ml aliquot taken for estimation of the nematode population. The nematode population from 10 g of roots was also estimated.

Results and discussion

An increase in the growth of stems and roots corresponded with a significant decrease in nematode numbers in all treatments compared with the untreated control (Table I). The maximum decrease in nematode population, both in soil as well as in roots, was recorded with the neemark treatment. This reduction in the nematode population can be attributed to the nematocidal activity of the neem component in 'neemark' as has been reported elsewhere in other neem based products (Siddiqi *et al.*, 1972; Egunjobi and Larrinde, 1975). Naemin also decreased the nematode population proving the efficacy of the antagonistic microorganism.

As previously reported (Dick, 1966) pressmud decreased nematode numbers, probably as the result of increase in organic carbon content of the soil (Orlando *et al.*, 1991). Treatment with farmyard manure and *C. procera* produced the maximum root and shoot weight although

the decrease in nematodes population was not as high as in other treatments.

Addition of neemark, pressmud, naemin and carbofuran proved to be equally efficient in decreasing of nematode population with significantly positive effects on shoot weight of sugarcane when compared with application of carbofuran. These organic products can be easily and effectively substituted for chemical application for control of nematodes thus reducing environmental pollution factors in soil.

Although the nematode control effect with farmyard manure and *C. procera* leaves was not as high as the other treatments it was significantly higher than the control. Increase in shoot weight recorded was high. Hence these products can be used in soils with low organic contents where the nematodes population is high, to enrich the soil, suppress the nematode populations and consequently increase the yield.

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