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MANAGEMENT OF *HELICOTYLENCHUS MULTICINCTUS* IN SUGARCANE WITH INTERCROPS AND ORGANIC AMENDMENTS

by

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Summary. Field experiments were conducted for three years to determine the effect of intercrops and organic amendments for the management of the spiral nematode *Helicotylenchus multicinctus* in sugarcane. Significant reduction in spiral nematode infestation was observed in sugarcane plants intercropped and incorporated with either marigold (*Tagetes erecta*) or daincha (*Sesbania aculeata*) coupled with the application of either pressmud (25 t/ha) or neem cake (2 t/ha). The treatments also enhanced the yield and quality of canes.

Sugarcane is an important commercial crop cultivated in the tropical and sub tropical regions of India. About 31 genera of plant parasitic nematodes are associated with the crop and some species of a few of them viz., *Pratylenchus*, *Helicotylenchus*, *Tylenchorhynchus*, *Meloidogyne* and *Hoplolaimus* cause damage to the crop (Mehta, 1992). At the Sugarcane Research Station, Sirugamani, cane fields were found to be severely infested with the spiral nematode *Helicotylenchus multicinctus*. Earlier studies have demonstrated the beneficial effect of intercropping for the management of nematode infestations in other situations (Naganathan *et al.*, 1988; Prasad *et al.*, 1992). Also, organic amedments when incorporated in the soil have been successful in nematode control (Singh *et al.*, 1985; Mehta *et al.*, 1994). Therefore the effect of intercropping and organic amendments in the management of *H. multicinctus* was investigated in sugarcane.

Materials and methods

A field experiment comprising ten treatments, each replicated three times, was arranged in a randomised block design in a field infested with *Helicotylenchus multicinctus* (Cobb) Golden (Tables I, II). Uniformly sized, two budded sugarcane (*Saccharum officinarum* L.) setts cv. CoSi 86071 were planted at 80 cm spacing between the rows in plots 4x5 m. Two days later seeds of the intercrops marigold (*Tagetes erecta* L.) and daincha (*Sesbania aculeata* Poir.) were sown at a distance of 20 cm alongside the setts. The intercrops were allowed to grow with the sugarcane crop and were incorporated in the respective plots 60 days after sowing. The organic amendments pressmud at 25 t per ha and neem cake at 2 t per ha were applied at the same time as the intercrops were incorporated.

Soil samples were taken from the experimental plots before the treatments were applied

to establish the initial population density of *H. multicinctus*. Thereafter soil and root samples were collected at 90, 180, 270 and 360 days after planting the crop. Nematodes were extracted from soil samples by Cobb's sieving method combined with Baermann funnel and from root samples by mistifier technique.

The number of tillers per sett was recorded 90 days after planting. The quality parameters viz., brix, sucrose and commercial cane sugar (CCS%) were estimated from cane samples by the small mill test (Chen, 1985) in the tenth month and cane yield was recorded.

Results and discussion

Significant reduction in the population of *H. multicinctus* occurred in sugarcane plants intercropped and incorporated with either marigold or daincha coupled with the application of either pressmud (25 t/ha) or neem cake (2 t/ha) 60 days after planting sugarcane (Table I). There was no recovery of nematodes from root samples which may be due to the ecto parasitic behaviour of the spiral nematode. Significant increase in tiller production and cane yield was recorded. The treatments also enhanced the quality of cane by increasing the brix, sucrose and commercial cane sugar percentage (Table II).

Reduction in nematode population was observed even upto harvest and this may be due to the combined effect of both intercrops and organic amendments. The results of the experiment repeated during the year 1996-97 and 1997-98 were very similar to those obtained during 1995-96. This supports the view that the eco-friendly use of intercropping and organic amendments can be effective in management of

TABLE I - *Effect of intercrops and organic amendments on the infestation of* Helicotylenchus multicinctus *in sugarcane.*

Tr. No.	Treatment	Initial population of nematodes (250 cc soil)	Nematode population days after planting (250 cc soil)			
			90	180	270	360
T_1	Marigold intercropping and incorporation	352.0	227.7	248.7	290.7	337.0
T_2	Daincha intercropping and incorporation	341.3	275.0	259.3	303.3	347.7
T_3	Pressmud 25 t/ha	360.7	270.0	239.0	296.3	319.3
T_4	Neem cake 2 t/ha	349.7	272.3	263.3	294.7	326.7
T_5	T1+T3	345.0	175.0	173.3	184.7	217.3
T_6	T2+T3	348.3	195.3	177.3	188.0	230.3
T_7	T1+T4	340.3	182.0	183.3	191.0	225.7
T_8	T2+T4	350.3	213.0	176.3	193.3	235.3
T_9	Carbofuran 3G 1.5 kg a.i./ha	362.3	148.0	175.0	196.7	227.0
T_{10}	Control	352.3	525.3	575.7	665.0	682.7
SEM		–	8.5	9.7	9.9	11.8
CD		–	25.6	29.2	30.1	35.3

TABLE II - *Effect of intercrops and organic amendments on plant growth, quality and yield of sugarcane.*

Tr. No.	Treatment	No of tillers/ plant	Brix (%)	Sucrose (%)	CCS (%)	Cane yield (t/ha)
T_1	Marigold intercropping and incorporation	8.3	19.0	15.9	11.4	130.3
T_2	Daincha intercropping and incorporation	7.3	18.7	15.6	11.4	127.8
T_3	Pressmud 25 t/ha	8.3	18.3	15.3	11.3	131.7
T_4	Neem cake 2 t/ha	8.0	18.0	15.1	11.6	132.3
T_5	T1+T3	11.3	20.3	18.7	13.6	152.3
T_6	T2+T3	10.7	19.7	18.3	13.7	150.3
T_7	T1+T4	10.3	20.0	18.5	13.9	152.8
T_8	T2+T4	10.3	20.3	18.7	13.7	150.7
T_9	Carbofuran 3G 1.5 kg a.i./ha	11.3	19.7	18.5	13.8	151.3
T_{10}	Control	7.3	18.0	15.2	10.9	114.8
SEM		0.6	0.3	0.4	0.1	3.9
CD		1.7	1.0	1.2	0.3	8.2

the spiral nematode in sugarcane. The intercropping and incorporation also add 10 to 12 t biomass/ha which helps to improve the physico-chemical properties of soil (Mahendran, 1994).

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