

Efficacy of Furadan 3G on Nematode Control in Sugarcane

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ABSTRACT

Two experiments were conducted during the cropping season 1985-86 in Pratap Farm under Setabganj Sugar Mills Ltd. to study the effectiveness of Furadan 3G at various doses and time combination under irrigated and rainfed condition. Nematode population was reduced to some extent in soil samples from both the experiments. Highest reduction (80.3%) of nematodes was observed in the plot where Furadan 3G was used @ 2.0 kg ai/ha in March and April. The nematode population was found increasing in some of the root samples in both the experiments. Furadan treated plots showed increased cane yield in all the cases which ranges from 48.1 to 87.7% over control plots.

INTRODUCTION

The sandy soils of commercial farms of different sugar mills namely STSM (Setabganj Sugar Mills), TSM (Thakurgaon Sugar Mills), PSM (Panchagar Sugar Mills) and Carew & Company as well as the grower's field under these sugar mills are badly infested with sugarcane nematodes. Several species of soil and root feeding nematodes namely *Pratylenchus* sp. *Helicotylenchus* sp. *Hoplolaimus* sp. *Tylenchorhynchus* sp. and *Aphelenchoides* sp. have been identified from sugarcane fields in Bangladesh (Anon, 1979; 1980). The nematode problem is more acute in STSM and TSM farms. Sugarcane cultivation in these mills farms was threatened by the joint invasion of whitegrubs and nematodes since long, and the yield of canes per acre was reduced to 300 mds or even less. The incidence of nematode infestation is being reported from other cane growing zones of Bangladesh (Miah *et al.*, 1983, 1986) conducted experiments with chemical known as insecticides and insecticide-cum-nematicides in the nematode prone sandy areas and observed that cane production was higher (2-3 times over check) in the insecticide-cum-nematicides treated plots. This yield increase was apprehend due to the control of nematodes and better root development. Several authors carried out experiment on the control of sugarcane nematode with carbofuran showed increased cane yield as well as percentage sugar recovery (Gargantiel and Barredo, 1982; Serra *et. al.*, 1982; Winchester, 1969).

Applicaition of Furadan in the trenches was made for better root development as Miah & Akhter (1985) in their study found that Furadan showed promising response on sugarcane root development.

MATERIALS AND METHODS

Two experiments, one under irrigated and one under rainfed condition were set up in Protap farm under Setabganj Sugar Mills Ltd. in the cropping season 1985-86. The

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experiments were designed in RCB and was replicated 4 times. The land requirement of the irrigated and rainfed experiments were 74 x 40m and 40 x 30 m respectively. The plot size was 8m x 12m having two buffer rows between treatments. The sugarcane variety used in the experiments was L.J.C. The treatments used in the experiment under irrigated condition were as follows :

- A, Furadan 3G @ 1.5 kg ai/ha at planting + April 15th
- B, Furadan 3G @ 2.0 kg ai/ha at planting + April 15th
- C, Furadan 3G @ 1.5 kg ai/ha at January + April 15th
- D, Furadan 3G @ 2.0 kg ai/ha at January +April 15th
- E, Furadan 3G @ 2.0 kg ai/ha in March and April (the standard).
- F, Untreated (control).

The treatments of the experiment under rainfed condition were as under :

- A, Furadan 3G @ 1.5 kg ai/ha at planting + in mid April or at good shower.
- B, Furadan 3G @ 2.0 kg ai/ha at planting + in mid April or at good shower.
- C, Untreated (control).

In both the experiments insecticides were applied as per treatments and irrigation was done as per schedule of the experiments. From both the experiments soil and root samples were collected in monthly interval starting from the application of chemicals in the trenches upto May, '86. Five clumps were randomly selected from each plot to make a composite soil and root samples of the individual plot for laboratory observation on nematode population. From each plot and from each soil samples 100 g soil and whole the root samples were weighed independently and set for nematode extraction. Nematodes were extracted in the laboratory following the modified method of Baermann. In each bottle of extraction 1 ml formaldehyde was added as preservative and then stored in the refrigerator for laboratory observation. Nematode population was recorded from both the experiments.

RESULTS AND DISCUSSION

It is observed from the Table 1 that the treated plots showed reduced nematode population in soil samples in all the treatments over the check (untreated plots). The root samples also showed reducing trend of nematode population in the treatments except the plots treated with Furadan in March and April (standard) where some increased nematode population was observed. Furadan application following different times and methods showed reducing nematode population from soil samples with the effectiveness of the chemical ranges from 27.1 to 80.3% over control. The highest reduction of nematode population (80.3%) only from soil samples was observed in the treatment considered as standard and the reduction was statistically significant over the control. Furadan application in rainfed condition (Table 2) showed slight reduction of nematode population in different treatments from soil samples compared to the control plots but the reduction was insignificant. Surprisingly the nematode population was increased in the root samples following the application of Furadan, and there was no statistical difference among the treatments.

However, yield of sugarcane (Table 1) in all the treated plots showed higher tonnage over the control. Highest production of cane (81.6 MTH) was recorded in the treatment

Table 1. Effect of Furadan 3G on nematode population and cane yield under irrigated condition.

Treatments	Mean nematode population		Yield (MTH)
	Per kg soil	per kg root	
Furadan 3G @ 1.5 kg ai/ha at Planting + April 15th.	324.2 ab*	18580.00 a	66.2 ab
Furadan 3G @ 2.0 kg ai/ha at Planting + April 15th.	207.0 ab	33440.00 a	64.4 ab
Furadan 3G @ 1.5 kg ai/ha at January + April 15th	287.6 ab	23570.00 a	69.5 ab
Furadan 3G @ 2.0 kg ai/ha at January + April 15th.	286.4 ab	23730.00 a	70.1 ab
Furadan 3G @ 2.0 kg ai/ha at March and April (Standard).	87.7 b	32360.00 a	81.6 a
Untreated (Control)	445.0 a	26550.00 a	43.5 b

* Figures accompanied by the same letters are not significantly different at 5% level as per DNMR test.

Table 2. Effect of Furadan 3G on nematode population and cane yield under rainfed condition.

Treatments	Mean nematode population		Yield (MTH)
	Per kg soil	Per kg root	
Furadan 3G @ 1.5 kg ai/ha at Planting + April 15th.	236.1 a*	25170.0 a	74.5 a
Furadan 3G @ 2.0 kg ai/ha at Planting + April 15th.	251.1 a	38590.0 a	76.8 a
Untreated (control).	270.2 a	17530.0 a	46.4 b

* Figures accompanied by the same letters are not significantly different at 5% level as per DNMR test.

where Furadan was applied in March and April over the control plots (43.5 MTH) and found statistically significant. Higher cane production (87.7%) was achieved from same treatment over the control. In other treatments following the application of Furadan at different times and doses increased cane production was obtained ranging from 48.1 to 61.2% compared to the check and there was no significant difference among the treatments. From Table 2 it is also observed that higher cane production was recorded from the treated plots over the control though nematode population from soil samples showed an increasing trend. The yield of canes from the treated plots was statistically significant.

It was critically observed that yield of canes from the treated plots under irrigated and rainfed condition was almost similar. In the experiment under irrigated condition

yield was increased ranging from 48.1 to 87.7% over control and in the experiment under rainfed condition yield increase was 60.5 to 65.6% compared to control plots. Hence the yield response in the experiment under rainfed condition was found better ignoring the highest yield increase (87.7%) in one of the treatments under irrigated condition.

Furadan 3G @ 2.0 kg ai/ha in March and April (Table 1) also showed increasing nematode population per kg root samples although produced 81.6 MTH over control plots (43.5 MTH). Waraich (1980) noticed an increase in the total population of nematodes as well as that of parasitic ones over the period of observation in treated and untreated plots, where he used different chemicals at higher rates even at 5.0 kg ai/ha.

Serra *et al.* (1982) observed that in later months the nematode population increased probably due to the vigorous root development which increased the probability of parasitism. Canes were taken randomly to make a composite sample from each plot for chemical analysis in the mills laboratory and it was found that sugar recovery was higher ranging from 0.16 to 1.29% in canes from Furadan treated plots (personal observation.)

Further study with Furadan 3G against nematodes for fixing a suitable dose with time of application is under experimentation.

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