Bangladesh J. Sugarcane, 8 : 42 - 47. July, 1986

Effect of Furadan 3G and Ekalux 5G in Controlling Whitegrubs and Nematodes

M.M. Biswas, A. Mannan, R. Kundu, M. Abdullah and M.A.H. Miah[1]
Sugarcane Research & Training Institute,
Ishurdi, Pabna, Bangladesh.

ABSTRACT

The experiment was conducted to find out the efficacy of Furadan 3G (Carbofuran) and Ekalux 5G (Quinalphos) on white grubs and nematode control at Sultanpur Section of Protap Farm of Setabganj Sugar Mills Ltd. during the cropping year 1984-85. The application of Furadan 3G @ 1.0 kg a.i./ha at planting superimposed with the same chemical @ 2.0 kg a.i./ha in March, produced higher yield (63.88 TCH) which was similar to that of standard (64.05 TCH) compared to 24.56 TCH in the untreated plots. Ekalux 5G @ 2.0 kg a.i/ha applied in March complementing the doses of Furadan 3G at planting also significantly reduced grub population. This reduction was considered highly significant and at par with the standard dose of Furadan 3G (Furadan 3G @ 2.0 kg a.i./ha in March and April).

INTRODUCTION

The soil pests like whitegrubs and nematodes in high land specially with sandy soils are causing serious problem to sugarcane. These pest infestations are being reported from different Mill Zone areas in recent years. Several species of whitegrubs and nematodes have been indenitified from south and north western Mills Zones of Bangladesh (SRI Annual Report, 1981 and SRTI Annual Report, 1983). Sugarcane of these areas are vulnerable to these pest attack. These pests are causing severe damage to sugarcane resulting in the partial or total failure of the crops. Experiments were conducted in the grub and nematode prone areas,where Miah *et. al.* (1983) noticed that carbofuran effectively controlled grubs andincreased cane yield. The yield increase was apprehended due to the control of nematodes also thus facilitating better root development with nutrient uptake. They also found that Ekalux 5G showed reduction in grub population followed by Furadan. Efforts were made to control whitegrubs by Bull (1983, unpublished) ; Miah *et.al.* (1983) ; Bull and Cullen (1981) ; Litsinger *et. al.* (1983) and control of nematodes by Gargantiel and Barredo (1982) ; Winchester (1969) ; Waraitch (1980) ; Recuenco (1980) and Serra *et. al.* (1982) independently. The aim of this study was to reduce these grub infestation and to obtain higher cane yield from these problematic areas where grubs cause severe yield loss in heavy soil and where nematode is not a serious problem. Since Furadan 3G was the only pesticide standardized against whitegrub, an alternative chemical was also considered highly desirable. Therefore, Ekalux, an insecticide which already proved to be effective for whitegrub was tested for further study in combination with Furadan so that at the time of emergency or Furadan crisis the whitegrub problem can be tackled atleast in heavy soil which is reasonably free from nematodes. Since Furadan showed promising result on sugarcane root development (Miah and Akhter, 1985) Furadan was used as the basal dose to promote early root development.

---

1 Bangladesh Agricultual Research Council, New Airport Road, Farm Gate, Dhaka-15.

MATERIALS AND METHODS

The experiment was set-up in Sultanpur farm under STSM Ltd. during the cropping year 1984-85, and laidout in completely randomized block design. The land was ploughed with the tractor plough and the total area required for the experiment was 67m x 65m. The plot size was 10m x 10m. There was one buffer row between two plots. The variety used was lsd 2/54. The treatments were used as follows :

A. Furadan 3G @ 1.0 kg ai/ha at planting only.
B. Furadan 3G @ 1.5 kg ai/ha at planting only.
C. Furadan 3G @ 2.0 kg ai/ha at planting only.
D. Furadan 3G @ 1.0 kg ai/ha at planting+Ekalux 5G @ 2.0 kg ai/ha applied in March.
E. Furadan 3G @ 1.5 kg ai/ha at planting+Ekalux 5G @ 2.0 kg ai/ha applied in March.
F. Furadan 3G @ 2.0 kg ai/ha at planting + Ekalux 5G @ 2.0 kg ai/ha applied in March.
G. Furadan 3G@1.0kgai/ha at planting+Furadan 3G @ 2.0 kg ai/ha applied in March.
H. Furadan 3G @ 1.5 kg ai/ha at planting+Furadan 3G @ 2.0 kg ai/ha applied in March.
I. Furadan 3G @ 2.0 kg ai/ha at planting +Furadan 3G @ 2.0 kg ai/ha applied in March.
J. Furadan 3G @ 2.0 kg ai/ha applied twice, once in March and then in April (one month after first application), the standard.
K. Untreated (control).

In the experiment Furadan 3G was applied at varying doses in the trenches before sett placement in all the treatments except the treatment-J (standard) and the control plots. Again Ekalux 5G and Furadan 3G were applied in March in the treatments D,E,F and G,H,I respectively. In the treatment-J, Furadan 3G was applied twice, once in March and in April. March and April application of Furadan 3G and Ekalux 5G was follwed by irrigation. All the treatments were replicated thrice.

Data on grub population was recorded once in June (2.6.85) and again in January (6.1.86) during harvest. Five clumps were randomly selected from every alternate row except the first/tenth rows. The clumps were uprooted by digging with the spade (0.61m x 0.46m x 0.46m) and all whitegrubs (larvae and adults) were counted and recorded. Yield of cane per plot was recorded including canes from 5 stools/plot uprooted for whitegrub at harvest.

RESULTS AND DISCUSSION

Data collected in June '85 showed that different treatments showed different repsonse in reducing the grub population (Table 1). Furadan 3G at different doses in the trenches (treatments D,E, & F)was superimposed with Ekalux 5G @ 2.0 kg ai/ha applied in March gave better response onreducing the grub population than Furadan 3G at different doses applied only at planting. In the other treatment where Furadan 3G @ 1.5 kg ai/ha superimposed with the same chemical @ 2.0 kg ai/ha produced similar response like Furadan 3G @ 2.0 kg ai/ha used as standard (Miah *et. al.* 1983). Furadan 3G at varying doses at planting superimposed with Ekalux 5G (treatments D.E and F) and Furadan 3G @ 1.5 kg ai/ha at planting superimposed with the same chemical (Furadan 3G) @ 2.0 kg ai/ha applied in March showed better performance in reducing the grub population like the standard dose. The treatments where Furadan 3G was

Table 1. Effect of different insecticides on grub population (Mean grub/5 clumps) and cane yield, STSM Ltd. 1985.

Treatments	Grub population recoreded in June '85	Grub population recorded in Jan '86	Yield TCH	Increase (+) or decrease (-) over control (%)
A. Furadan 3G @ 1.0 kg ai/ha at planting only.	41.00 (40.58)+	16.00 (14.97)	48.90**	99.10(+)
B. Furadan 3G @ 1.5 kg ai/ha at planting only.	42.66 (41.73)	13.33 (12.74)	45.25**	84.24 (+)
C. Furadan 3G @ 2.0 kg ai/ha at planting only.	31.22* (29.26)	14.66 (14.44)	50.46**	105.46 (+)
D. Furadan 3G @ 1.0 kg ai/ha at planting and Ekalux 5G @ 2.0 kg ai/ha in March.	15.66** (15.60)	23.33 (22.47)	42.92*	74.75 (+)
E. Furadan 3G @ 1.5 kg ai/ha at planting and Ekalux 5G @ 2.0 kg ai/ha in March.	19.00** (18.92)	18.00 (16.40)	46.10**	87.70 (+)
F. Furadan 3G @ 2.0 kg ai/ha at planting and Ekalux 5G @ 2.0 kg ai/ha in March.	22.66** (20.88)	15.66 (14.36)	51.48**	109.60 (+)
G. Furadan 3G @ 1.0 kg ai/ha at planting and Furadan 3G @ 2.0 kg ai/ha in March.	27.66* (26.32)	17.66 (17.47)	63.88**	160.09 (+)
H. Furadan 3G @ 1.5 kg ai/ha at planting and Furadan 3G @ 2.0 kg ai/ha in March.	16.00** (15.58)	11.00 (10.95)	56.40.**	129.64 (+)
I. Furadan 3G @ 2.0 kg ai/ha at planting and Furadan 3G @ 2.0 kg ai/ha in March.	43.00 (41.60)	26.33 (25.50)	59.90**	143.83 (+)
J. Furadan 3G @ 2.0 kg ai/ha in March and April (the standard).	19.66** (19.54)	13.66 (12.82)	64.05**	160.78 (+)
K. Control (untreated).	61.16 (59.44)	21.22 (19.80)	24.56	
*LSD at 5 % level	2.07		14.04	
**LSD at 1 %. level	2.82		19.05	

+ Figures in parenthesis are retransformed data.

applied @ 2.0 kg ai/ha only at planting gave similar response to that where Furadan 3G was applied in the trenches @ 1.0 kg ai/ha superimposed with the same chemical @ 2.0 kg ai/ha in March. It was observed that Furadan 3G applied in the trenches during plantation @ 2.0 kg ai/ha gave statistically equal response to the treatment where Furadan 3G was applied twice, @ 1.0 kg ai/ha at planting plus 2.0 kg ai/ha at March cumilating to Furadan 3G at 3.0 kg ai/ha. It was thought that due to application of chemicals in different times and doses some of the treatments might bring better performance in reducing grubs and nematodes. Miah *et. al.* (1983) found that application of Furadan 3G @ 2.0 kg ai/ha twice, once in March and again in April effectively controlled the grub population and increased cane yield almost 2-3 times higher than the control. The yield response of this experiment corresponds to that of Miah *et. al.* (1983).

But data collection at harvest on the population of grubs showed no difference among the treatments over the control. It might so happen that Furadan after application int the trenches or side-dressed along cane rows over a period of more than 7 weeks lost its toxic effect on the target pest and the survivors were recorded at the time of cane harvest. The Yield recorded at harvest showed positive response in all the treatments compared to the control (Table 1). Furadan 3G applied at the time of plantation at different doses superimposed with Ekalux 5G @ 2.0 kg ai/ha in March contributed at all no response over the treatments where Furadan 3G was applied at different rates in plantation independently, although Ekalux treated plots showed highly singnificant reduction in grub population over control. Again Furadan applied at varying doses during plantation and superimposed with the same chemical @ 2.0 kg ai/ha showed better yield performance with an yield increase ranging from 35-56 % over different rates of Furadan at plantation. This yield increase obviously indicates the positive response of Furadan on grub population as well as on nematodes except plots treated with Furadan only at planting where some effects of Furadan was observed by yield increse over the control. Virtually the treated plots showed increased cane yield ranging from 74-160 % over the untreated plots in general. Winchester (1969) conducted experiments with Furadan against nematodes who found increased cane yield upto 50-100 % in field tests. Furadan having the properties of killing insect and nematodes produced higher cane yield with Ekalux superimposed in the treatments of Furadan at planting.

Though quantitative analysis of the nematode population was not carried out corresponding to the chemical treatment yet some visual observation were made like uniform plant stand, cane canopy (Figure 1) and observation of the root system (Figure 2) leading to higher cane yield 64.05TCH, compared to 24.56 TCH in the untreated plots.

However, yield recoreded in this experiment showed that Furadan 3G @ 1.0 kg ai/ha at planting superimposed with the same chemical @ 2.0 kg ai/ha in March produced cane almost euqal in tonnage to that of Furadan 3G used as standard. Economically this combination was better than the standard (i.e. 53 kg Furadan/acre) because it requires less quantity of the chemical (39.75 kg/acre) and saves cost of extra labourer invloved in chemical application, irrigation and mulching. In case of Furadan crisis during March, Ekalux 5G @ 2.0 kg ai/ha may be applied in the field treated with Furadan 3G @ 2.0 kg ai/ha at the time of plantation.

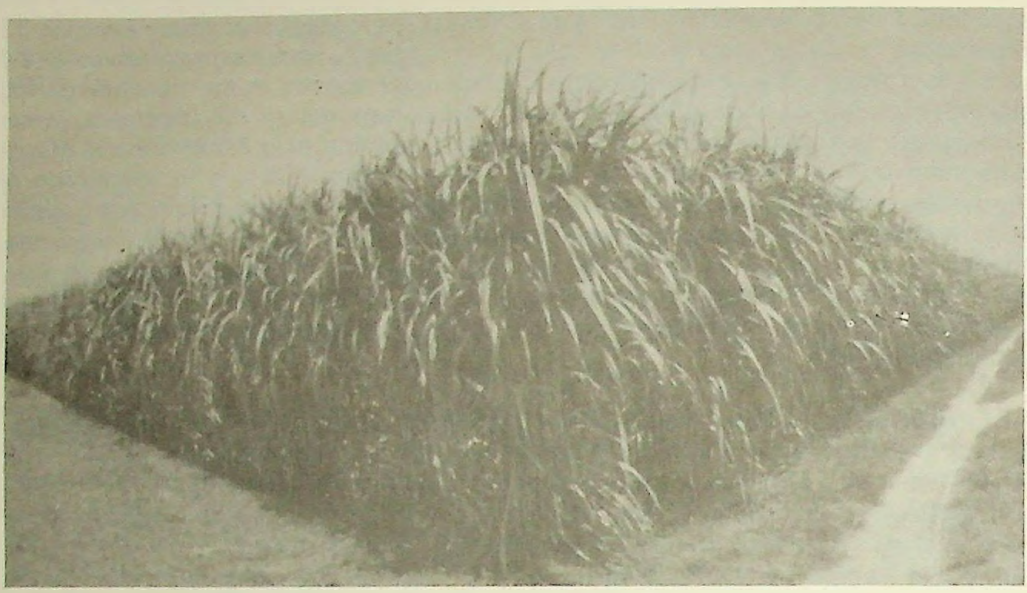

Figure 1. Crop stand and cane canopy on application of Furadan 3G.

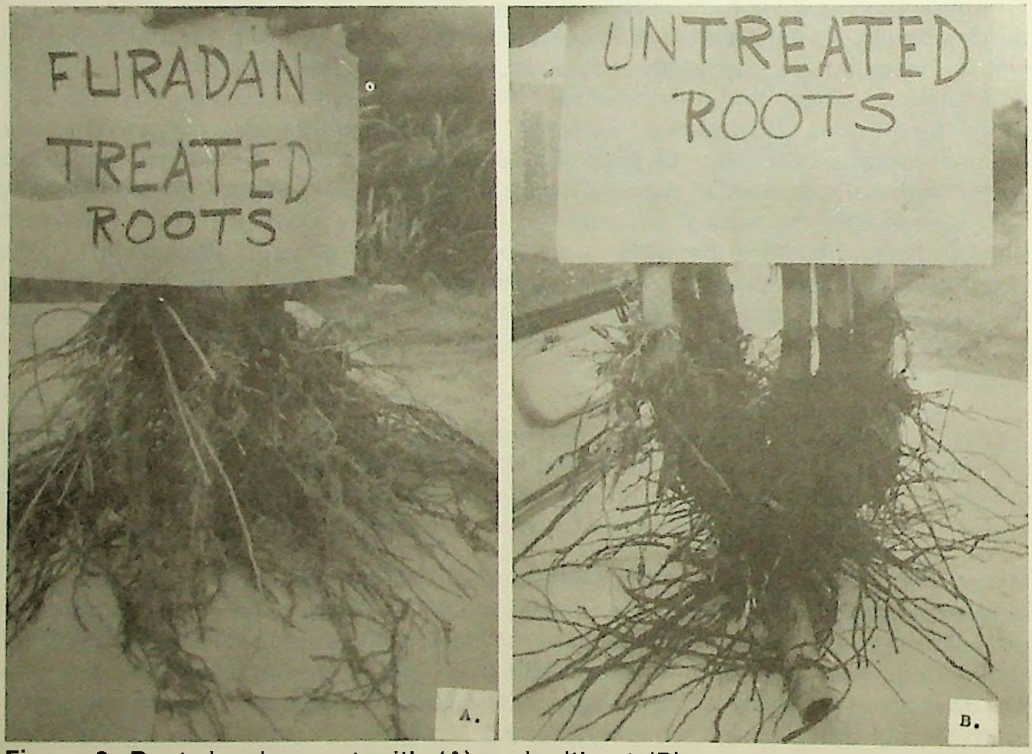

Figure 2. Root development with (A) and without (B) application of Furadan 3G.

In the light of this experimental result it is necessary to conduct further trials with Furadan 3G to fixup the appropriate dose and time of application for the control of nematodes.

ACKNOWLEDGEMENTS

The authors wish to thank the Management of STSM and Mr. A.K. Azad, C.D.O. Pratap farm for all co-operation in this experiment. Sincere thanks are extended to Mr. A. Ghafur, Associate Statistician for statistical analysis and to Mr. Rafiqul Islam for typing the manuscript.

REFERENCES

Bull, T.A. and Cullen, G.R. 1981. Chemical products applied to sugarcane fields. Sugar-Y-Azucar year book. 1981. pp. 48-68.

Bull, R.M. 1983 (unpublished). Furadan x rate of application V.S. *Lepidiota negotoria.*

Gargantiel, F.T. and Barredo, F.C. 1982. Effects of varying rates of carbofuran on nematode population and sugarcane yield. *Philippine Sug. Com. Qrtly.* **2**(7) : 28-34.

Litsinger, J.A. ; Apostol, R.F. and Obusan, M.B. 1983. Whitegrubs, *Leucopholish irrorata* (Colepotera : Scarabaeidae) : pest status, population dynamics and chemical control in a rice maize cropping pattern in the Philippines. *J. Econ. Entomol.,* **76** : 1133-1138.

Miah, M.A. H. ; Khuda, A.K.M.Q.E. ; Alam, M.A. ; Biswas, M.M. and Shahjahan, M 1983. Chemical control of whitegrubs. *Bangladesh J. Sugarcane, 5 : 1-7.*

Miah, M. A.H and Akhtar, S. 1985. Effect of carbofuran on mitotic index of sugarcane. *Ind. J. Agril. Sci., 55* (1) : 55 -56.

Recuenco, J.D. 1980. Control of nematodes attacking sugarcane with nematocides and organic ammendments. *Sugarcane Path. News Letter,* **24** : 32-33.

Serra, R.J. ; Gargantiel, F.T and Barredo, F.C. 1982. Carbofuran imporves sugarcane ratooning. *Sugarcane Path. News Letter,* **28** : 47-50.

SRI Annual Report, 1981, Annual report, Sugarcane Research Institute, Annual Report 1979 & 1980. Ishurdi, Pabna, Bangladesh, pp. 49-60.

SRTI Annual Report, 1983. Sugarcane Research and Training Institute, Ishurdi, Pabna, Bangladesh. Anuual report, 1983. pp. 67-79

Waraitch, K.S. 1980. Effect of some nematocides on sugarcane in the Pubjab. *Sugarcane Path. News letter,* **24** : 29-31.

Winchester, J.A. 1969. Sugarcane nematode control. *In* Nematodes of tropical Crops. J.E. Peachy ed. Commonwealth Agricultrual Bureau . pp. 204-209.