

# Chemical Control of Early Shoot Borer of Sugarcane

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## ABSTRACT

An experiment was conducted at Shahebganj farm of Rangpur Sugar Mills Ltd, Gaibanda, during 1985-1986, where Dieldrin 20EC and Furadan 3G were applied with different doses and time of application. From data recorded in March all the treatments showed significant reduction of Early Shoot Borer (ESB) compared to check. From data recorded in May it was found that post plantation treatments of Dieldrin 20EC @ 1.0, 2.0 and 2.5 kg ai/ha and Furadan 3G @ 2.0 and 2.5 kg ai/ha and plantation treatment of Furadan 3G @ 1.5 kg ai/ha significantly reduced ESB compared to check. Significant yield increase over check was found only in the post plantation treatments of Furadan 3G. Considering infestation recorded in March and May and yield recorded at harvest, post plantation treatment of Furadan 3G applied @ 2.0 kg ai/ha was found suitable.

## INTRODUCTION

Early shoot borer (ESB) is one of the major shoot borer species in almost all sugar mill zones of Bangladesh. It has been observed to thrive in drier conditions and prefers the absence of rains for their multiplication (Butani, 1961). The borer infests the young sugarcane plants and destroys about 25-50% shoots during hot weather but its damage to cane stalk after the formation of internode is little (Gupta, 1959). He also stated that the borers flourish well at an average maximum temperature range of 96°-106°F and 40-45% mean relative humidity. Due to ESB attack characteristics thick dead heart symptom develops which can be easily pulled out emitting an offensive smell. Padmanabhan *et al.* (1975) found sevidol granules very effective against shoot borer (*Chilo infuscatellus*) applied at the rate of 11.2 kg ha<sup>-1</sup> 35 d after cane plantation. Spraying with 0.02% endrin, if done timely may reduce the population significantly (Butani, 1961). Gupta (1959) stated the control of this pest with 5lb of actual BHC dust per acre by broadcasting along the rows under the clumps. Siddiqui *et al.* (1968) found that soil application of BHC both as post planting and planting time treatments are effective in the control of shoot borer at 1.0 kg ai/ha dose. Sandhu (1982) found that Fensulfothion (Dasanit 5G) significantly controlled this pest.

However, research work to control this pest by chemicals has not been done in Bangladesh and we generally advocate mechanical and cultural practices to growers for controlling this pest. As such it was felt necessary to conduct research work to findout chemical with dose and time of application to control this pest.

## MATERIALS AND METHODS

The experiment was conducted at Shahebganj farm under Rangpur Sugar Mills Ltd during the cropping season 1985-86. Plantation was done with variety Isd-1/53. The experiment was laid out in a randomized block design with four replications and eleven

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treatments. The treatments were Dieldrin 20EC @ 1.0, 1.5, 2.0 and 2.5 kg ai/ha applied at 65-70 d of planting (post plantation treatment); Furadan 3G @ 1.5, 2.0 and 2.5 kg ai/ha applied at 65-70 d of Planting (post plantation treatment); Furadan 3G @ 1.5, 2.0 and 2.5 kg ai/ha applied during plantation (planting treatment) and one untreated (check). Plot size was 12m x 8m. Row to row distance was one meter and that in between two plots and blocks were one buffer row and three meters respectively. Furadan was applied during plantation by broadcasting the required quantity in the trenches just before sett placement. Post plantation application of Furadan was made in furrows prepared on both sides of the cane rows followed by irrigation. Dieldrin was applied by drenching the base of the plant. Data on ESB infestation was taken on the basis of dead heart symptoms developed in March and May, 1986 and each time after taking data the spindle leaves (dead heart symptoms) were removed. For data on yield harvesting was done in January, 1987.

### RESULTS AND DISCUSSION

The effect of Furadan 3G and Dieldrin 20 EC on different parameters varied with doses and application time and the results are discussed below. It is seen from the Table 1 that in the data recorded in March, 1986, all the insecticide treatments significantly reduced ESB infestation compared to untreated (check). There was no significant difference among the treatments of Dieldrin 20EC and also among the treatments of Furadan 3G applied during plantation. However, among the treatments of post plantation application of Furadan 3G the highest infestation was found with the doses Furadan 3G applied @ 1.5 kg ai/ha and there was no significant difference among the treatments Furadan 3G @ 2.0 kg and 2.5 kg ai/ha. There was no significant difference of post plantation treatment of Furadan 3G @ 2.0 kg ai/ha with the treatments of

**Table 1. Effects of different chemicals on Early Shoot Borer infestation.**

| Treatments                                                       | % ESB infestation recorded in March, 1986 (observed mean) | % Effectiveness over check | % ESB infestation recorded in May, 1986 (observed mean) | % Effectiveness over check |
|------------------------------------------------------------------|-----------------------------------------------------------|----------------------------|---------------------------------------------------------|----------------------------|
| Dieldrin 20EC @ 1.0 kg ai/ha applied after 65 - 70 d of planting | 2.3 f*                                                    | 83.9                       | 1.3 bc                                                  | 36.4                       |
| "    1.5    "                                                    | 2.5 f                                                     | 82.4                       | 1.5 abc                                                 | 24.2                       |
| "    2.0    "                                                    | 2.9 ef                                                    | 79.5                       | 1.2 bc                                                  | 41.4                       |
| "    2.5    "                                                    | 2.5 f                                                     | 82.4                       | 1.1 c                                                   | 45.5                       |
| Furadan 3G @ 1.5 kg ai/ha applied during plantation              | 8.6 bc                                                    | 39.1                       | 1.2 bc                                                  | 37.4                       |
| "    2.0    "                                                    | 10.0 b                                                    | 28.7                       | 1.5 abc                                                 | 26.3                       |
| "    2.5    "                                                    | 7.0 bcd                                                   | 49.9                       | 1.5 abc                                                 | 23.7                       |
| Furadan 3G @ 1.5 kg ai/ha applied after 65-70 d of planting      | 8.5 bc                                                    | 39.8                       | 1.9 ab                                                  | 3.0                        |
| "    2.0    "                                                    | 4.7 def                                                   | 66.6                       | 1.0 c                                                   | 50.0                       |
| "    2.5    "                                                    | 5.2 cde                                                   | 63.2                       | 0.8 c                                                   | 57.6                       |
| Untreated (check)                                                | 14.1 a                                                    | —                          | 2.0 a                                                   | —                          |

\* Figures accompanied by the same letters are not significantly different at 0.05 level as per DNMR test.

Dieldrin 20 EC and with the treatment Furadan 3G applied @ 2.5 kg ai/ha during plantation. However post plantation treatment of Furadan 3G @ 2.0 kg ai/ha showed significant difference in reducing ESB infestation with the treatments of Furadan 3G applied @ 1.5 kg and 2.0 kg ai/ha during plantation. Table 1 also shows that overall ESB infestation was the lowest in Dieldrin treatments followed by post plantation Furadan treatments. Post plantation treatments of Dieldrin and Furadan, and Furadan treatments during plantation showed 79.5 - 83.9%, 39.8 - 66.6% and 28.7 - 49.9% effectiveness respectively in reducing ESB infestation over check.

Overall infestation was found to become low at the time of data taken in May, 1986. It was found from the Table 1 that Dieldrin 20 EC applied @ 1.0, 2.0 and 2.5 kg ai/ha; Furadan 3G @ 1.5 kg ai/ha during plantation and post plantation treatments of Furadan 3G @ 2.0 and 2.5 kg ai/ha significantly reduced ESB infestation compared to check. The lowest infestation was found in post plantation treatment of Furadan 3G @ 2.5 kg ai/ha followed by 2.0 kg ai/ha. But there was no significant difference between these two treatments. Also it is found from the table 1 that these two post plantation treatments of Furadan 3G showed no significant difference with the treatments of Dieldrin 20EC and plantation treatments of Furadan 3G. The highest infestation was recorded in the check. It is not clear that why Dieldrin 20EC @ 1.5 kg ai/ha could not reduce ESB significantly where Dieldrin 20EC @ 1.0 kg ai/ha did and also the case with Furadan 3G applied at the time of planting where the dose Furadan 3G @ 1.5 kg ai/ha significantly reduced ESB compared to check but the treatments Furadan 3G @ 2.0 and 2.5 kg ai/ha could not. As Furadan is a short persistent insecticide the overall treatments of this chemical applied during plantation could not significantly control (except 1.5 kg ai/ha) the pest upto May compared to the overall post plantation treatments of Furadan 3G and Dieldrin 20EC. Post plantation treatments of Dieldrin and Furadan, and plantation treatments of Furadan showed 24.2-45.5%, 3.0-57.6% and 23.7-37.4% effectiveness respectively in reducing ESB infestation over untreated (check).

Sandhu (1982) conducted experiment to control borers in sugarcane with Fensulfothion (Dasanit 5G) and Carbofuran 3G. He stated that satisfactory control of the pest was obtained where the incidence was significantly reduced by both Fensulfothion and Carbofuran @ 2.0 kg and 5.0 kg ai/ha, exhibiting 46.4% and 52.9% reduction by these doses of the first chemical and 42.5% and 65.7% by these doses of the latter respectively.

It is found from the Table 2 that there was no significant yield difference with the treatments of Dieldrin 20EC and Furadan 3G applied at planting compared to untreated. Post plantation treatments of Furadan 3G showed significant yield increase over check. But there was no significant difference among the post plantation treatments of Furadan 3G. The highest yield (69.9 TCH) was obtained with the treatment Furadan 3G applied @ 1.5 kg ai/ha followed by Furadan 3G @ 2.0 kg ai/ha (66.2 TCH). Though post plantation treatment of Furadan 3G @ 2.0 kg ai/ha showed second highest yield but table 1 shows that it significantly reduced ESB infestation in both March and May where Furadan 3G @ 1.5 kg ai/ha which showed the highest yield significantly reduced ESB only in March. In general post plantation treatments of Furadan 3G showed best

**Table 2. Effects of different chemicals on yield of sugarcane.**

| Treatments                                                       | Yield recorded at harvest (TCH) | Yield increase/decrease (TCH) over control (+ / -) |
|------------------------------------------------------------------|---------------------------------|----------------------------------------------------|
| Dieldrin 20EC @ 1.0 kg ai/ha applied after 65 - 70 d of planting | 51.4 bcd *                      | + 2.9                                              |
| " 1.5 "                                                          | 56.8 bc                         | + 8.2                                              |
| " 2.0 "                                                          | 43.7 d                          | - 4.9                                              |
| " 2.5 "                                                          | 50.3 cd                         | + 1.7                                              |
| Furadan 3G @ 1.5 kg ai/ha applied during plantation              | 55.8 bc                         | + 7.2                                              |
| " 2.0 "                                                          | 53.9 bcd                        | + 5.3                                              |
| " 2.5 "                                                          | 56.4 bc                         | + 7.9                                              |
| Furadan 3G @ 1.5 Kg ai/ha applied after 65 - 70 d of planting    | 68.9 a                          | + 21.4                                             |
| " 2.0 "                                                          | 66.7 ab                         | + 17.6                                             |
| " 2.5 "                                                          | 65.7 ab                         | + 17.1                                             |
| Untreated (check)                                                | 48.6 cd                         | —                                                  |

\* Figures accompanied by the same letters are not significantly different at 0.05 level as per DNMR test.

performance in contributing yield followed by plantation treatments of Furadan 3G and Dieldrin 20EC. Though all the treatments of Dieldrin 20 EC significantly reduced ESB recorded in March and May (except the dose 1.5 kg ai/ha in May) but it could not contribute to yield. Table 2 also shows that the yield increase/decrease (TCH) over check was (-) 4.9-8.2, 5.3-7.9 and 17.1-21.4 in the treatments of Dieldrin 20EC, plantation treatments of Furadan 3G and post plantation treatments of Furadan 3G respectively. Yield increase in Furadan treatments may be due to the fact that root promoting substance in Furadan caused increased root development through increased mitotic index (Miah and Akhter, 1985) thereby resulting in increased nutrient absorption and better yield.

Considering ESB infestation recorded in March and May and yield recorded at harvest the post plantation treatment of Furadan 3G applied @ 2.0 kg ai/ha gave the best result. However better success may be anticipated if the pesticides are applied after thorough monitoring. Further work in this connection is required to findout precise time, dose and method of application.

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