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Factors influencing infestation of sugarcane Early shoot borer *Chilo infuscatellus* Snellen

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ABSTRACT

Field experiments were conducted in the Agricultural Research Station, Perumallapalli, Chittoor district during 2002-2003 with a view to study the factors influencing incidence of early shoot borer in sugarcane i.e., time of planting, spacing adopted and ratoon crop. January planted crop recorded low cumulative incidence (34.73%) of early shoot-borer than February and March planted crop. Low incidence of the pest (23.79 and 18.23%) when wider spacings of 120 and 150 cm and high incidence (41.50 and 34.89%) when narrow spacings 60 and 90 were followed. Ratoon crop influenced the incidence of early shoot borer to a little extent, where it carries over pest incidence seasonally from one crop to the other.

Key words : Factors, Sugarcane, Early shoot borer *Chilo infuscatellus*

INTRODUCTION

Early shoot borer *Chilo infuscatellus* Snellen is a key pest of sugarcane. The pest infests rainfed sugarcane crop severely taking a toll of over 70 per cent shoots (Prasada Rao *et al.,* 1991) Time of planting, playing a vital role in reducing the incidence of early shoot borer (Murthy, 1953). Sugarcane planted during December to February escaped from severe early shoot borer incidence (Sithanantham *etal*. 1975) where as when planted during March to May suffered greater borer infestation (Thirumurgan, 2001). Narrow spacing (<90 cm) increased the early shoot borer damage than wider spacing (120 and 150 cm) (Avasthy and Varma, 1979). Ratoon crop also acted as the seasonal carrier of early shoot borer from one season to the other (Saikia and Roy, 1998). The present investigation was planned to study the influence of all these factors that influence the incidence of early shoot borer in the South zone of Andhra Pradesh.

MATERIALS AND METHODS

To study influence of time of planting on the incidence of early shoot borer, planting of sugarcane, variety Co 6907 was taken up in three different months, January, February and March 2003. Total number of tillers and number of dead hearts present in 9 m^2 area were counted for calculating the per cent incidence.

$$\text{Per cent incidence of early shoot borer} = \frac{\text{Number of deadhearts}}{\text{Total number of tillers}} \times 100$$

This data was taken from initial incidence of 30 DAP upto the peak incidence of the pest at 120 DAP. Dead hearts were pulled out immediately after every count so that the next formed dead hearts can be counted easily and cumulative per cent incidence was calculated by taking the progressive total number of dead hearts and tillers. Average of ten replications of 9 m^2 crop area was taken.

To study the influence of spacing on the incidence of early shoot borer, sugarcane variety 93V297 was planted at four different spacings i.e., 60, 90, 120 and 150 cms with 12, 8, 6 and 5 rows respectively in a plot of size 36 m^2 area. Per cent incidence of early shoot borer was documented at 30, 60, 90 and 120 DAP, their cumulative incidence was then calculated at 120 DAP. Average of ten replications of 9m^2 areas was taken.

With a view to study the influence of ratoon crop on the incidence of early shoot borer, per cent incidence of early shoot borer was noted in the ratoon crop of variety 93V297, plant crop (93V297) adjacent to ratoon crop and a plant crop (93V297) far away from ratoon crop. Data was taken in 9m^2 area with five replications at fortnight intervals from initiation of incidence to the end of incidence.

RESULTS AND DISCUSSION

Time of planting :

In all times of three planting, there was a significant difference in the per cent incidence of early shoot borer, when initial observations were made on 30 DAP, highest incidence of 13.28 per cent in March planted crop and lowest incidence of 5.18 per cent in January planted crop

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was observed. At 60 DAP, highest incidence of 18.28 per cent was observed in March planted crop and low of 8.04 per cent in January planted crop. At 90 DAP, maximum pest of incidence 14.36% was observed in February planted crop, whereas January planted crop recorded lowest incidence (10.81%). At the peak period of pest occurrence, i.e., at 120 DAP, maximum incidence of 15.22 per cent in January planted crop and minimum incidence of (5.09%) in March planted crop was recorded. When cumulative incidence was calculated the maximum incidence (41.4%) was observed in March planted crop and minimum incidence (37.98%) was observed in January planted crop (Table 1). High incidence of early shoot borer in March planted crop was due to synchrony of peak activity of *Chilo infuscatellus* with the vulnerable stage of the pest as observed by Mali (1990), Prasada Rao *etal.*, (1991), Duhra *etal.*, (1993), Jena and Patnaik (1996) and Thirumurugan *etal.*, (2001).

Table 1: Influence of time of planting on the incidence of sugarcane ESB, *C. infuscatellus*

Time of planting	* Per cent incidence in $9m^2$ area				Cumulative per cent incidence of 120 DAP
	30 DAP	60 DAP	90 DAP	120 DAP	
January	5.13	8.04	10.81	15.22	34.73
(7-1-2003)	(13.05)	(16.43)	(19.19)	(22.95)	(36.06)
February	8.26	11.44	14.36	10.00	37.98
(7-2-2003)	(16.74)	(19.73)	(22.30)	(18.43)	(38.06)
March	13.28	18.28	13.15	5.09	41.41
(7-3-2003)	(21.39)	(25.33)	(21.22)	(13.05)	(40.05)
F-test	Significant	Significant	Significant	Significant	
SEM	0.552	0.529	0.444	0.470	
C.V.%	3.73	3.05	2.49	2.30	
C.D at 5%	1.571	1.507	1.264	1.340	

*Average of 10 replications
Figures in parentheses are angular transformed values

Spacing :

When 60 cm spacing was adopted, there was no significant increase in pest infestation in the early crop growth period i.e., upto 60 days and a significant increase could be seen from 90 days to 120 days when the 90 cm was taken as optimum. When a spacing of 120 and 150 cm were adopted, there was significant decrease in the incidence of early shoot borer from 90 days onwards when compared with 90 cm. Highest cumulative per cent (41.50%) was observed in 60 cm spacing and lowest cumulative per cent (18.23%) was observed in 150 cm spacing. The cumulative increase of 6.61 per cent could be observed at 60 cm and cumulative decrease of 11.1 and 16.66 per cent at 120 and 150 cm respectively when compared to 90 cm (Table 2). Maximum incidence of early shoot borer at 60 cm spacing might be due to the availability of more host plant material in a given area, as well as compactness of the crop stand that favours the pest incidence. This might be also due to the seed rate that ultimately result in more plant density which favoured the early shoot borer incidence. The present results are in comparison with the observations made by Avasthy *etal.*, (1969), Avasthy and Varma (1979) Bains and Devray (1981) and Venkatachalam (1994).

Ratoon crop :

Incidence of early shoot borer started from mid February in ratoon crop with an initial pest incidence of 0.86 per cent, which gradually increased and reached to a maximum of 4.72 per cent (25.76% cumulative incidence) in the last week of May. From May onwards, pest incidence decreased and became almost nil during mid-July. In plant crop adjacent to ratoon crop, initially infestation of 1.73 per cent was observed in mid-March, which later gradually increased and reached a maximum of 8.32 per cent (40.97% cumulative incidence) by second week of June. From June onwards there was a slow decline in pest incidence and no incidence was observed by second week of August. In plant crop away from ratoon crop, initial incidence of 0.95 per cent during mid March and maximum of 7.32 per cent (35.37 cumulative incidence) was observed during second week of June and there was no incidence of early shoot borer by second week of August (Table 3).

The results revealed that initial incidence of early shoot borer was observed in ratoon crop during February, when the plant crop stage was not vulnerable or ready for pest infestation. When the plant crop was at susceptible / suitable stage of the pest, more incidence was observed

Table 2: Influence of spacing against sugarcane ESB, *C. infuscatellus* incidence in the variety, 93 V297

Spacing (between rows)	* Per cent incidence in 9 m^2 area				Cumulative per cent incidence of 120 DAP	Cumulative increase / decrease of ESB at 120 DAP
	30 DAP	60 DAP	90 DAP	120 DAP		
60 cm	4.00 (11.54)	7.04 (15.34)	14.13 (22.06)	19.96 (26.57)	41.40 (40.11)	+ 6.61
90 cm	3.19 (10.30)	6.08 (14.30)	11.07 (19.46)	16.96 (24.35)	34.89 (36.21)	
120 cm	2.77 (9.63)	4.14 (11.68)	6.11 (14.30)	13.01 (21.13)	23.79 (29.20)	-11.1
150 cm	2.12 (8.33)	3.08 (10.14)	5.62 (13.69)	10.32 (18.72)	18.23 (25.25)	-16.66
F-test	Significant	Significant	Significant	Significant		
SEM	0.427	0.464	0.455	0.333		
C.V%	3.54	3.24	2.69	1.69		
CD at 5%	1.208	1.312	1.286	0.943		

*Average of 10 replications
Figures in parentheses are angular transformed values

Table 3 : Influence of ratoon crop on incidence of sugarcane ESB, *C. infuscatellus* in the variety, 93V297

Date of observation	* Per cent incidence in 9 m^2 area		
	Ratoon crop	Plant crop adjacent to ratoon	Plant crop away from ratoon crop
14-2-2003	0.86	-	-
28-2-2003	1.65	-	-
14-3-2003	2.37	1.73	0.95
29-3-2003	3.40	3.95	2.89
13-4-2003	3.96	5.42	4.82
28-4-2003	4.19	6.81	6.21
12-5-2003	4.60	7.20	6.43
27-5-2003	4.72 (25.76)**	7.54	6.75
11-6-2003	4.10	8.32 (40.97)**	7.32 (35.37)**
26-6-2003	1.86	6.20	6.05
10-7-2003	0.75	4.31	4.20
25-7-2003	-	2.32	1.85
09-8-2003	-	1.21	0.88

*Average of five replications
** Cumulative per cent incidence of ESB at peak period

inplant crops than in ratoon crop. However, high cumulative per cent incidence (40.97%) of early shoot borer was recorded in plant crop remaining adjacent to the ratoon as compared to that of 35.37 per cent in other plant crop away from ratoon crop. This difference of 5.6 per cent of early shoot borer between the two plant crops might be due to the carry over of pest from ratoon crop to the adjacent plant crop. Similar observations are recorded by Mahla and Chaudhary (1997) and Saikia and Roy (1998).

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