

Seasonal activity of the stalk borer, *Chilo auricilius* in sugarcane*

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1126

ABSTRACT

Two years studies on the seasonal activity of the stalk borer, *Chilo auricilius* Ddgn. at Sugarcane Research Station (O.U.A.T.), Nayagarh, during 1992-93 and 1993-94, revealed that the pest remained active from fourth week of June till November when the maximum temperature remained between 32.5°C and 36.1°C and relative humidity between 71.3 and 79.5%.

It was concluded from the studies that high temperature, high relative humidity and rainfall favoured the pest multiplication. Another interesting feature was that there were four broods of the stalk borer during second week of June to fourth week of January.

INTRODUCTION

Sugarcane and its various by-products, viz., molasses, bagasse and press-mud are extensively utilised in the world for several purposes. Bagasse left-out after the cane crushing is re-cycled as a fuel to generate electricity. It is also used in paper and fibre board industry. Molasses are used as appetiser for live stock. Press-mud is utilised as manure. Fatty liquids of sugarcane stalk are used in preparation of polishes and carbon paper (Ethiranjana and Rao, 1990).

Similarly, sugarcane field attracts an array of 288 pests during its various growth stages (David and Nandagopal, 1986; David and Sithanatham, 1986). The crop loss to the tune of 10.0% by various species of insects in sugarcane has earlier been reported by Srivastava (1983). In Orissa, the stalk borer, *Chilo auricilius* (Lepidoptera: Pyralidae) causes severe damage in sugarcane (Jena *et al.* 1994). The first and the second instar larvae feed on the leaf sheath. The third instar larvae enter into the shoots and internodes of the cane (Kalra and Sharma, 1965).

The damaged internodes in the infested canes show symptoms of reddening within, and sometimes emit rancid odour. In endemic situation, 29% internodes and 75% canes damage, the reductions of gur and khandasari to the extent of 25% and 20% were common phenomena (Gupta and Singh, 1951; Singh *et al.*, 1973; Bharadwaj, *et al.*, 1980).

MATERIALS AND METHODS

Keeping the extent of damage caused by stalk borer in view, two years studies on the seasonal activity of sugarcane variety Co 62175 were undertaken at the Sugarcane Research Station (O.U.A.T.), Nayagarh, during 1992-93 and 1993-94. Three budded setts preferably one third from the cane top of Co 62175 were planted on 10th February of each year in trenches with an inter-row spacing of 75 cm in 10 representative sites of 500 m² area each. All the State recommended intercultural operations were timely adopted. The experimental sites were kept free from pesticides umbrella. The intensity (inter-nodes damage%) of stalk borer was recorded by counting the total number of internodes and number of damaged internodes from 100 infested canes of each representative sites.

The observations commenced from 125 DAP (Days After Planting) corresponding to second week of June and continued upto 350 DAP corresponding to fourth week of January at an interval of 15 days. The data were then converted into percentage of infestation. The data of intensity and meteorological variables were finally pooled across these two years to derive at the conclusion.

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RESULTS AND DISCUSSION

Two years studies on the seasonal activity of the stalk borer on Co 62175 at the Sugarcane Research Station, Mayagharh, during 1992-93 and 1993-94, revealed that the mean maximum temperature during the June second week to January fourth week varied from 29.1-36.1°C and mean minimum temperature varied from 15.7-29.0°C (Table 1, Fig. 1 & 2). The South-West monsoon receded from mid-October. Commensurating with the receding of monsoon, there was declining trend in the level of stalk borer infestation. From December second week, the infestation showed declining trend.

The data further indicated that the pest remained active from June fourth week till November fourth week when the maximum temperature remained between 32.5 and 36.1°C and relative humidity between 71.3 and 79.5%. It was, therefore, concluded that high temperature, high relative humidity and rainfall favoured the pest multiplication. Gupta (1958) from the laboratory studies conducted at the Indian Institute of Sugarcane Research, Lucknow, reported that the temperature of 25-27°C and 65-90% relative humidity favoured the growth and development of the stalk borer. Our findings were more or less similar with the findings of the above author.

Another interesting feature which has been highlighted in Fig. 3 was that there were four broods of the stalk borer during the period from June second week to January fourth week. The first brood emerged around June fourth week, the second around July fourth week and the third around September fourth week and the fourth around October fourth week. Gupta (1958) also reported the occurrence of five broods of stalk borer at Lucknow.

The correlation studies between meteorological parameters, viz., maximum temperature, minimum temperature, mean temperature, relative humidity and rainfall on the activity of the borer was studied for two years (1992-93 and 1993-94). Basing on the pooled data, correlation coefficients were calculated (Snedecor and Cochran, 1967).

It was revealed from the studies that the intensity of attack was positively and significantly correlated with maximum temperature, minimum temperature, mean temperature and rainfall. Although the relative humidity was positively correlated with intensity of attack, the relation was not significant (Table 2).

REFERENCES

- Bharadwaj, S.C., Chaudhary, J.P. and Singh, S.P. 1980. Studies on assessment of losses caused by stalk borer *Chilo auricilius* Ddgn. in sugarcane. Proc. A. Conv. Sug. Techno. Assoc., India, 44: 61-70.
- David, H. and Nandagopal, V. 1986. Pests of sugarcane, distribution, symptomatology of attack and identification. In: *Sugarcane Entomology in India* (Eds. David, H., Easwaramoorthy, S. & Jayanthi, R.). Sugarcane Breeding Institute, Coimbatore, pp. 1-29.
- David, H. and Sithanatham, S. 1986. Integrated pest management. In: *Sugarcane Entomology in India* (Eds. David, H., Easwaramoorthy, S. & Jayanthi, R.). Sugarcane Breeding Institute, Coimbatore, pp. 321-342.
- Ethiranjani, A.S. and Rao, P.N. 1990. Sugarcane in twenty first century. In: *Recent Advances in Sugarcane*. The KCP Ltd., Vuyyuru-521 165, A.P. (India), pp. 10-15.
- Gupta, B.D. 1958. An analysis of the factors underlying heavy incidence of stalk borer, *C. auricilius* Ddgn. in sugarcane. Indian Sug., 8: 209-223.
- Gupta, B.D. and Singh, K.G. 1951. Biology of sugarcane stem borer, *Diatraea auricilia* Ddgn. in Uttar Pradesh. J. Agric. Anim. Husb., U.P., 2: 12-20.
- Jena, B.C., Nayak, N. and Parida, A.K. 1994. Control of sugarcane stalk borer and top borer in Orissa. Coop. Sug., Vol. 26(3): 183-185.
- Kalra, A.N. and Sharma, N.C. 1965. Studies on symptomatology of attack of stalk borer of sugarcane, *Chilo traea auricilia* Ddgn. Indian J. Sug. Cane Res. Dev. 9: 199-200.
- Singh, O.P., Jadav, S.R. and Madan, Y.P. 1973. Assessment of losses in sugarcane caused by stalk borer, *Chilo auricilius* Ddgn. and its economic control. Proc. A. Conv. Sug. Technol. Assoc., India, 39: 31-35.
- Snedecor, G.W. and Cochran, W.G. 1967. *Statistical Methods* (6th Edn.). The Iowa State College Press, Ames Iowa. Oxford & IBH Pub. Co., New Delhi.
- Srivastava, A.S. 1983. Crop losses caused by various pests in Uttar Pradesh and other states. Indian J. Ent., Vol. I (special issue): pp. 97-108.

Table 1. Intensity of attack due to the stalk borer during the different growth stages of crop and meteorological data (1992-93 and 1993-94)

Sl. no.	Period of observation (DAP)	Corresponding week & month	Internodes damaged (%)			Mean temp. (°C)			Mean R.H. (%)	Mean R.F.
			1992-93	1993-94	Mean	Max.	Min.	Mean		
1.	125	II Jun.	0.0	0.0	0.0	37.9	29.0	33.4	62.2	110.1
2.	140	IV Jun.	4.21	3.33	3.77	36.1	27.2	31.7	71.3	193.0
3.	155	II Jul.	5.37	4.17	4.77	34.7	28.9	31.8	78.2	144.2
4.	170	IV Jul.	6.84	6.08	6.46	32.5	27.2	29.9	79.5	159.5
5.	185	II Aug.	6.98	6.83	6.90	33.6	27.6	30.6	76.5	189.5
6.	200	IV Aug.	7.22	6.95	7.08	33.1	27.0	30.0	76.5	223.0
7.	215	II Sep.	8.17	7.45	7.81	32.6	27.3	30.0	79.1	66.0
8.	230	IV Sep.	8.97	8.71	8.84	33.8	27.4	30.6	79.0	32.0
9.	245	II Oct.	9.38	8.96	9.17	34.6	27.2	30.9	78.3	53.0
10.	260	IV Oct.	10.79	9.17	9.98	34.3	26.9	30.6	77.6	34.0
11.	275	II Nov.	10.79	10.39	10.59	33.5	24.6	29.0	73.7	0.0
12.	290	IV Nov.	10.79	11.12	10.95	34.5	21.1	27.8	71.3	0.0
13.	305	II Dec.	10.53	11.07	10.80	30.9	17.5	24.2	70.3	0.0
14.	320	IV Dec.	10.16	10.18	10.17	29.1	15.7	22.4	64.8	0.0
15.	335	II Jan.	9.88	10.07	9.97	32.9	15.8	24.3	68.0	0.0
16.	350	IV Jan.	9.06	9.51	9.28	31.5	19.8	25.7	54.4	0.0

Table 2. Simple correlation coefficient between meteorological parameters and intensity of attack (%) due to the stalk borer (based on mean of 1992-93 and 1993-94)

Parameters	Correlation coefficient (r)
Intensity (%) vs.	
Max. Temp. (°C)	0.603*
Min. Temp. (°C)	0.544*
Mean Temp. (°C)	0.595*
R.H. (%)	0.452 N.S.
R.F. (mm)	0.536*

*Significant at P = 0.05

N.S. = Non Significant

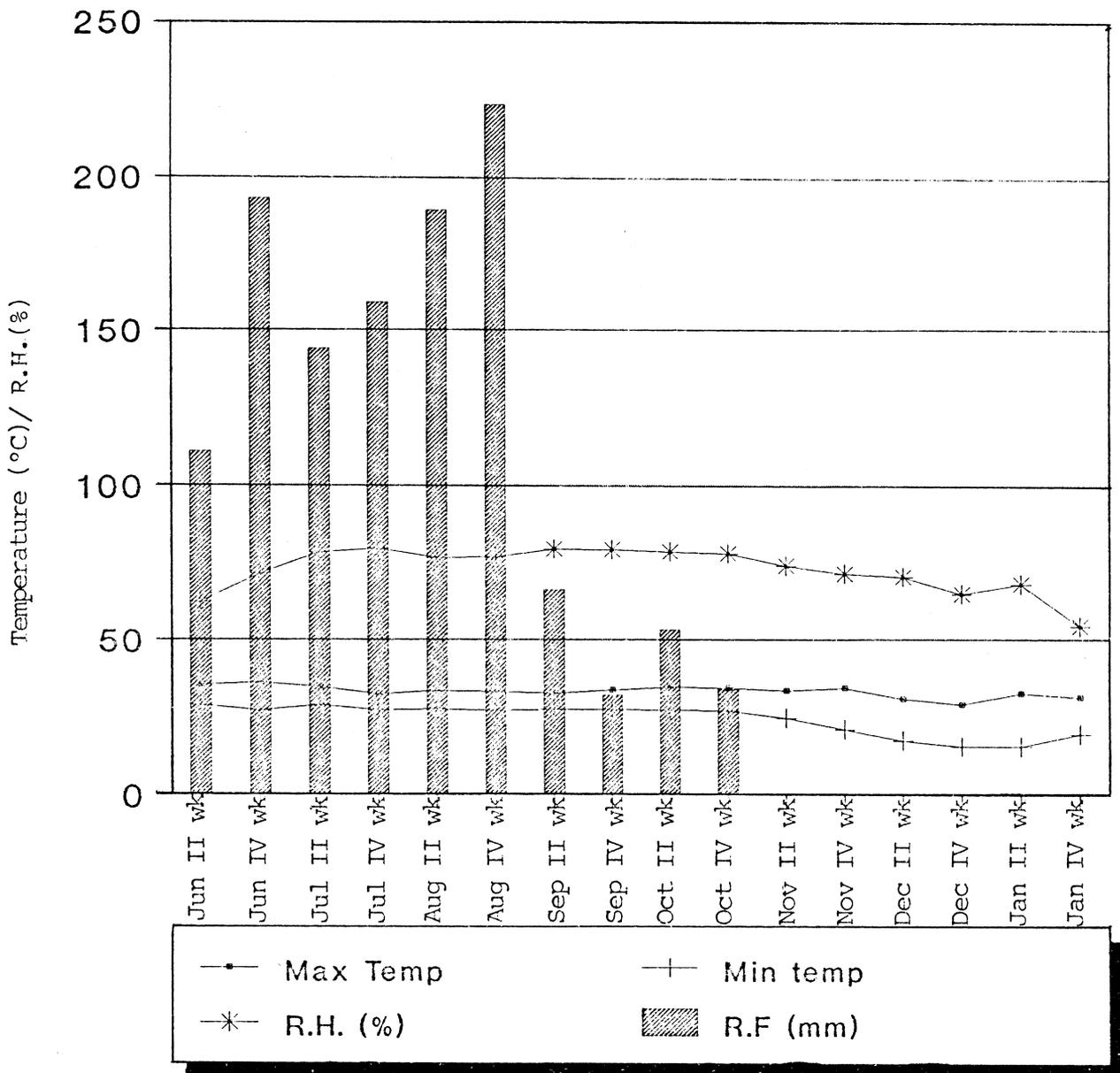


Fig. 1 Meteorological parameters during diff. growth stages of crop (Mean of 1992-93 & 1993-94)

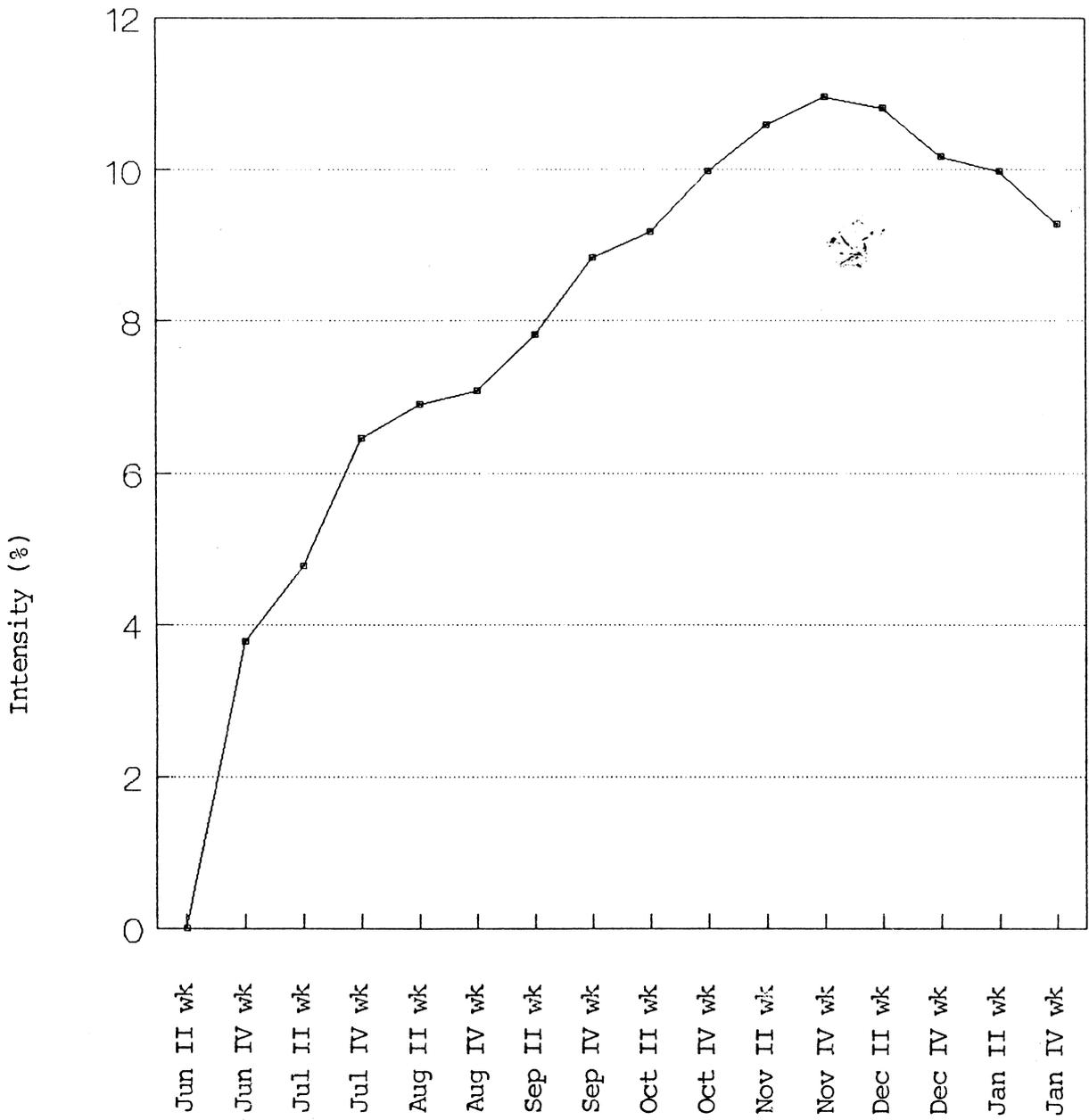


Fig 2. Intensity of attack(%) due to stalk borer during different growth stages of crop(Mean of 1992-93 & 93-94)

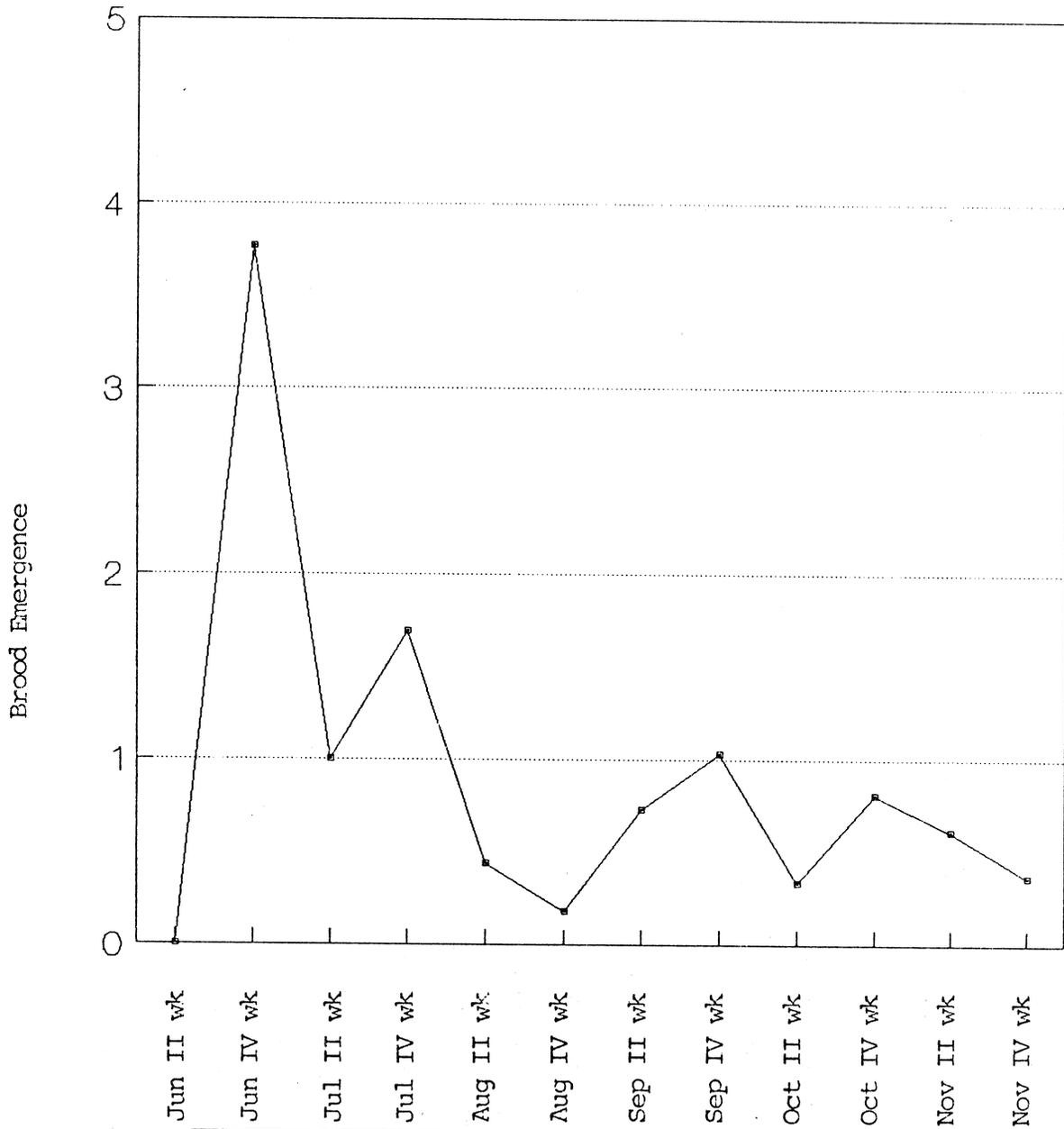


Fig 3 Emergence of stalk borer broods during the sugarcane cropping season