

Research Article

## Seasonal incidence of chiku moth (*Nephoteryx eugraphella* R.) in relation to weather parameters

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### ABSTRACT

The field studies on seasonal incidence of chiku moth (*Nephoteryx eugraphella* R.) in relation to weather parameters under north Gujarat condition showed that infestation of chiku moth (*N. eugraphella* R.) was appeared more or less throughout the year. The larval population was minimum in first and in second week of May, it increased gradually and reached maximum in the second week of September and then dropped down gradually. Larval population had significantly negative correlation with maximum temperature, while morning relative humidity, evening relative humidity and rainfall were found favourable for pest population in the field.

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## INTRODUCTION

In India the cultivation of chiku is mostly confined to the Gujarat and Maharashtra state. In Gujarat state, the area under sapota increases year after year. It was only 1500 hectares in 1974-1975 and occupied 24586 hectares with production of 245295 metric tones in 2004-2005. In North Gujarat about 4676 hectares area with an annual production of 467.25 metric tones was recorded in 2004-2005 (Anonymous, 2005). Like any other crop chiku tree are also attacked by number of insect pests. Among them *Nephoteryx eugraphella* R., a chiku moth is the most destructive pest of chiku. It was first reported by Hampson (1896). The caterpillar feeds on leaves, often on buds and flowers; sometimes on tender fruits also. The pest is active throughout the year. However, considering the importance of *Nephoteryx eugraphella* R., to provide a sound base for pest management quantitative aspects of seasonal population build up and incidence of chiku moth (*N. eugraphella* R.) on sapota was carried out under prevailing agro-climatic conditions. The present investigation has been undertaken in north Gujarat condition.

## MATERIALS AND METHODS

With a view to studying the seasonal incidence of chiku

moth (*Nephoteryx eugraphella* R.) in relation to weather parameters under north Gujarat condition on sapota. In orchard randomly 10 trees were selected and tagged. The number of larvae of chiku moth (*N. eugraphella* R.) and other observations were recorded at weekly interval on 20 twigs on one tree. The total number of larvae / twigs and per cent twig damaged were recorded. from the Horticultural Instructional Farm of C.P. College of Agriculture, S.D. Agricultural University, Sardarkrushinagar.

For correlation study, the data on different weather parameters *i.e.* temperature (maximum, minimum), relative humidity (morning, evening), rainfall and sunshine hours as recorded by the meteorological observation of Chimanbhai Patel College of Agriculture, S.D.A.U., Sardarkrushinagar for different standard meteorological weeks of 2005-06 were obtained and they were correlated with the larval population to study their specific impact on the pest population.

## RESULTS AND DISCUSSION

The findings of the present study have been presented in the following sub heads :

### Seasonal incidence :

So far infestation of *N. eugraphella* R. on sapota leaves

in concerned (Table 1), it was throughout the year and remained between 5 to 33 per cent. However, it was below 10 per cent during II week of March to II week of July, between 10 to 20 per cent during III week of November to I week of March and between 20 to 40 per cent during I week of August to II week of November. The highest infestation (33.50 %) on leaves was reported on the II week of September, 2005 while lowest infestation (5 %) was in the I week of May, 2006. Thus, infestation of the pest on leaves were higher *i.e.* more than 20 per cent on leaves during monsoon, moderate (between 10 to 20 %) during winter and lower (below 10 %) during summer.

**Table 1 : Seasonal incidence of chiku moth (*N. eugraphella* R.) on sapota during 2005-06**

Sr. No.	Month and year	Week	Per cent infestation on shoots	Larval population per 100 shoots
1.	June 2005	IV	7.50	0.50
2.	July 2005	I	9.00	1.00
3.		II	9.00	1.00
4.		III	12.00	2.00
5.		IV	15.00	2.00
6.		V	18.00	2.75
7.	August 2005	I	21.00	4.00
8.		II	28.00	5.00
9.		III	32.00	4.25
10.		IV	33.00	8.00
11.	September 2005	I	31.00	8.50
12.		II	33.50	9.00
13.		III	31.00	8.00
14.		IV	30.10	7.00
15.	October 2005	I	28.00	6.00
16.		II	29.50	6.50
17.		III	27.00	5.00
18.		IV	26.00	4.00
19.		V	27.00	6.00
20.	November 2005	I	24.00	4.66
21.		II	23.00	4.00
22.		III	18.00	3.50
23.		IV	11.00	4.00
24.	December 2005	I	12.00	3.00
25.		II	14.80	3.20
26.		III	12.80	3.20
27.		IV	10.50	3.50
28.	January 2006	I	11.20	3.60
29.		II	10.80	3.20
30.		III	10.40	3.20

Table 1 Contd....

Contd.... Table 1

30.		III	10.40	3.20
31.		IV	14.00	3.60
32.		V	15.00	4.00
33.	February 2006	I	13.00	3.50
34.		II	12.00	3.00
35.		III	11.00	3.50
36.		IV	10.00	3.00
37.	March 2006	I	11.00	3.00
38.		II	9.00	2.50
39.		III	8.00	3.50
40.		IV	8.00	3.20
41.	April 2006	I	7.00	2.50
42.		II	6.00	2.00
43.		III	7.00	1.50
44.		IV	8.00	1.60
45.		V	6.00	0.50
46.	May 2006	I	5.00	0.00
47.		II	7.00	0.00
48.		III	8.00	1.00
49.		IV	9.00	2.00
50.	June 2006	I	9.50	1.50
51.		II	10.50	2.00
52.		III	9.00	1.50

The larval population of *N. eugraphella* R. (Table 1) also followed the same trend of fluctuation of the infestation of pest on leaves indicating close correlation of damage by the larvae with its population. Larval population was higher (5 to 9 larval per 100 shoots) during II week of August to V week of October, it was moderate (5 to 2 larvae per 100 shoots) during I week of November to I week of April, while lower (up to 2 larvae per 100 shoots) during II week of April to IV week of July.

The higher infestation by *N. eugraphella* R. on sapota leaves has been reported in August (Sran and Sandhu, 1979a), September to November (Jhala *et al.*, 1986), January (Patel, 1990), September to January (Patel *et al.*, 1993), monsoon (Patel, 1996), November (Patange *et al.*, 1997). The higher number of larvae per twig has been reported in June to November (Sran and Sandhu, 1979), August (Anonymous, 1985 and Anonymous, 1986), September (Anonymous, 1986), June (Anonymous, 1989). Larval population per twig has been reported minimum in December to May (Sran and Sandhu, 1979). The present finding on larval population per 100 shoots and per cent infestation mostly tallied with the above reports. However, the variation reported in higher activity of this pest on leaves during different years of study might be due to the

**Table 2 : Correlation co-efficient between larval population of chiku moth (*N. eugraphella* R.) with abiotic factors (n=50)**

Sr. No.	Temperature °C		Relative humidity (%)		Sunshine (hours/day)	Rainfall (mm)
	Maximum	Minimum	Morning	Evening		
	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>
1.	- 0.27652 *	-0.03534	0.26895	0.16904	-0.05166	0.15618

\*indicates significance of value at P=0.05

effect of weather parameters and other ecological factors.

### Correlation studies:

Studies on effects of various weather parameters on the incidence of chiku moth (*N. eugraphella* R.) were carried out. The correlation coefficient values presented in Table 2 indicated that the larval population of chiku moth (*N. eugraphella* R.) exhibited significant and negative correlation with maximum temperature ( $r = - 0.27652$ ). Similarly negative correlation with minimum temperature ( $r = - 0.03534$ ) and sunshine hours ( $r = - 0.05166$ ) was observed. While positive correlation was observed with morning relative humidity ( $r = 0.26895$ ), evening relative humidity ( $r = 0.16904$ ) and rainfall ( $r = 0.15618$ ). The peak larval population was recorded during II week of September (9 %), when maximum temperature was 34.10 °C, minimum temperature was 25.80 °C, morning relative humidity was 91.70 per cent, evening relative humidity was 67.40 per cent, sunshine hours per day was 5.50 hours and rainfall was 56.00 mm. The chiku moth (*N. eugraphella* R.) population was minimum at the I week of May (0.0 %), when maximum temperature was 41.90 °C, minimum temperature was 24.50 °C, morning relative humidity was 77.66 per cent, evening relative humidity was 24.50 per cent, sunshine hours per day was 9.80 hours and rainfall was 0.00 mm. The pest population was gradually increased with increased in morning, evening relative humidity and rainfall. The maximum, minimum temperature and sunshine hours were at negative effect on pest population.

Thus, maximum temperature, minimum temperature and sunshine hours adversely affected on the abundance of chiku moth (*N. eugraphella* R.) but morning relative humidity, evening relative humidity and rainfall favoured the development of chiku moth (*N. eugraphella* R.) on sapota during study period. Patel *et al.* (1993) reported positive correlation of chiku moth infestation with minimum and average temperature, evening and average relative humidity where as correlation with maximum temperature, morning relative humidity, bright sunshine hours, maximum temperature, mean relative humidity, morning and afternoon vapour pressure deficit. Similarly, Shushilkumar and Bhatt (2002) reported that infestation had significantly negative correlation with minimum temperature, average temperature, evening relative humidity, average relative humidity and the rainfall. The present result are more or less inconformity with above reports.

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