

## Seasonal Incidence of Sapota Leaf Webber, *Nephopteryx Eugraphella* Ragonot in Relation to Weather Parameters

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**ABSTRACT:** *Nephopteryx eugraphella* (Lepidoptera : Pyralidae ), commonly known as chiku moth, is a serious pest of sapota. The present studies on seasonal incidence of sapota leaf webber, *Nephopteryx eugraphella ragonot* in relation to weather parameters was conducted during August 2013 to June 2014 at the Horticulture Instructional Farm, TCB College of Agriculture and Research Station, Bilaspur, a constituent College of Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India.

Results revealed that the bud infestation of leaf webber was appeared more or less throughout the year. The minimum bud infestation 10.50 per cent was observed during first week of August, it increased gradually and reached maximum 32.83 per cent bud infestation in the second week October. Bud infestation due to sapota leaf webber had positively correlated with rainfall ( $r = 0.215$ ).

**Key words:** Sapota, *Achras sapota*, Leaf webber, Seasonal incidence.

### INTRODUCTION

Sapota, *Achras sapota* L. is a delicious fruit crop of tropical and subtropical countries. Indian sapodillas are some of the hardiest in the world. In India Sapota is grown in abundance throughout Karnataka, Maharashtra, Gujarat, Tamilnadu, West Bengal, Andhra Pradesh and Chhattisgarh. Various factors are there which affects the yield of Sapota, among which damage caused by insect pests is important. According to Butani [1] more than 25 insect pests attacks sapota. Sapota leaf webber, *Nephopteryx eugraphella* Ragonot is the major pest of sapota. This pest is active throughout the year. It was first recorded on sapota in 1919 at Pusa as reported by Fletcher [2]. The larvae scrap to skeletonize the tender leaves in the terminals that are usually joined together by silken threads. They remain hiding in between the leaves and under loose web of excreta. Later the larvae devour buds, flowers and also bore into the fruits thus reducing the yield considerably as discussed by Sandhu [5]. Considering the economic importance of the pest, its seasonal incidence under plain region of Chhattisgarh were studied.

### MATERIALS AND METHODS

The observations was started from August, 2013 to June 2014, on five medium sized trees of sapota (*cv* Kalipatti) randomly selected from the Horticultural orchard of TCB College of Agriculture and Research Station, Bilaspur, (Chhattisgarh). Trees were tagged for recording the observations. For this purpose, four twigs (North, South, East, and West) from each tree was selected and observed weekly for recording the incidence of leaf webber. Twenty buds were observed from each direction per tree to record the damage caused by leaf webber. The larvae were found boring young and full grown buds resulting in feeding on corolla as well as ovary of buds. The damaged buds remained more conspicuous by having holes. The damaged buds later drop down resulting direct impact on fruit yield. The data thus, obtained were correlated with various abiotic factors and simple correlation coefficient ( $r$ ) was worked out. The per cent infestation due to leaf webber in buds was calculated with the help of the following formula

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$$\text{Per cent infestation} = \frac{\text{Number of damaged buds}}{\text{Total number of buds}} \times 100$$

The data thus, obtained were correlated with various abiotic factors and simple correlation coefficient (*r*) was worked out by using the following formula

$$r = \frac{\text{Cov}(X, Y)}{\sigma_x \times \sigma_y}$$

$$= \frac{\frac{1}{N} \sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\frac{1}{N} \sum (X - \bar{X})^2} * \sqrt{\frac{1}{N} \sum (Y - \bar{Y})^2}}$$

Where,

Covariance of series/variables X and Y is

$$= \frac{1}{N} \sum (X - \bar{X})(Y - \bar{Y}),$$

$\bar{X}$  is the A.M. of a variable X and

$\bar{Y}$  is the A.M. of a variable Y

## RESULTS AND DISCUSSION

Weekly observation, on the incidence of bud damage on sapota, revealed that the infested buds (10.50%) first observed during first week of August. Thereafter, there was sudden decrease in bud infestation (18.50%) during second week of September. The highest bud infestation (32.83%) was noticed during second week of October which coincided with the weather temperature of maximum (29.9°C), minimum (25.5°C) and average (26.2°C), relative humidity of morning (91.4%), evening (80.0%) and average (85.7%), rainfall (51.6 mm) and sunshine hours (4.3 hours/day). After fourth week of April onwards, the bud infestation was gradually decreased upto May and reaching to 16.50 per cent. The bud infestation range (10.5 to 32.83%) was noticed during August to June months. Sapota leaf webber was active from vegetative stage to fruiting stage of sapota and maximum activity of leaf webber was observed during the vegetative stage. The bud infestation had significant correlation with minimum ( $r = -0.427$ ) and average ( $r = -0.317$ )

temperatures. Remaining weather variables were not found to be significantly correlated with bud damage. Similar finding were reported by Jha and Sen-sarma [4] who observed the peak activity of, *N. eugraphella* during October month. Hajare [4] also reported larval population was minimum in first and in second week of May. On the contrary, Hajare [3] reported that the peak activity of chiku moth (*Nephoteryx eugraphella* R.) was observed during second week of September and minimum larval population recorded in first and second week of May. Whereas, Shukla and Patel [6] found the maximum activity of *N. eugraphella* in May-June on flower/bud and in the month of February on leaves.

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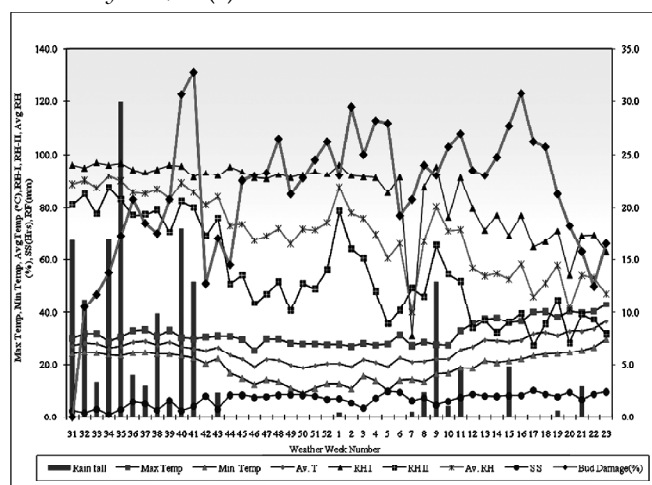


Figure 1: Seasonal incidence of sapota leaf webber on sapota (bud damage) at Bilaspur during 2013-14

Seasonal Incidence of Sapota Leaf Webber, *Nephoteryx Eugraphella* Ragonot in Relation to Weather Parameters

**Table 1**  
Seasonal incidence of sapota leaf webber, *Nephoteryx eugraphella* Ragonot on sapota

SMW*	Temperature °C			Relative humidity (%)			Sunshine (hrs)	Rain fall (mm)	Per cent bud infestation
	Max.	Min.	Avg.	I	II	Avg.			
32	31.7	24.9	28.3	95.0	85.0	90.0	1.8	45.0	10.50
33	31.7	24.6	28.2	97.0	77.6	87.3	3.2	13.1	11.75
34	28.9	23.8	26.4	96.0	87.3	91.7	1.0	67.4	13.75
35	30.6	23.6	27.1	96.7	83.0	89.9	3.1	119.8	17.25
36	32.8	24.6	28.7	94.3	77.1	85.7	6.1	15.8	20.75
37	33.2	24.9	29.1	93.1	77.4	85.3	5.3	11.8	18.50
38	30.9	24.2	27.6	94.4	79.1	86.8	2.8	39.4	17.50
39	33.0	24.3	28.7	96.1	70.4	83.3	6.5	6.2	20.75
40	30.3	23.6	27.0	95.7	82.3	89.0	2.6	71.8	30.66
41	29.9	22.5	26.2	91.4	80.0	85.7	4.3	51.6	32.83
42	30.5	20.4	25.5	93.0	69.0	81.0	8.1	0.0	12.75
43	30.9	22.4	26.7	92.0	76.0	84.0	3.2	9.2	17.00
44	30.8	16.6	23.7	95.4	50.8	73.1	8.5	0.0	14.50
45	29.6	14.6	22.1	93.4	54.0	73.7	8.5	0.0	22.50
46	25.5	12.3	18.9	91.1	43.3	67.2	7.6	0.0	23.00
47	29.8	14.1	22.0	90.7	47.1	68.9	7.9	0.0	23.25
48	29.8	13.4	21.6	92.3	51.6	72.0	8.5	0.0	26.50
49	28.2	11.0	19.6	91.1	40.6	65.9	8.6	0.0	21.25
50	28.0	9.1	18.6	92.4	51.0	71.7	8.5	0.0	22.75
51	28.0	11.0	19.5	93.6	49.0	71.3	8.1	0.0	24.50
52	27.8	12.7	20.3	92.4	56.0	74.2	6.9	0.0	26.25
01	27.9	12.6	20.3	96.1	78.8	87.5	7.1	1.8	23.00
02	27.1	10.8	19.0	92.0	64.0	78.0	5.6	0.0	29.50
03	28.2	15.5	21.9	91.4	60.4	75.9	3.6	0.0	25.00
04	27.6	13.8	20.7	91.1	48.1	69.6	7.3	0.0	28.25
05	28.0	10.0	19.0	85.6	35.6	60.6	9.9	0.0	28.00
06	31.3	13.9	22.6	91.3	40.7	66.0	9.6	0.0	19.25
07	27.4	14.2	20.8	31.0	49.3	40.2	6.4	2.2	20.75
08	28.7	13.4	21.1	87.6	46.1	66.9	7.4	9.6	24.00
09	27.8	16.3	22.1	95.4	65.3	80.4	4.8	51.8	23.00
10	27.6	16.6	22.1	76.4	54.4	70.9	6.2	4.4	25.75
11	32.8	18.6	25.7	91.1	51.8	71.5	7.6	19	27.00
12	35.5	18.4	27.0	79.8	33.8	56.8	8.8	0.0	23.50
13	37.5	21.5	29.5	71.1	36.7	53.9	8.2	0.0	23.00
14	37.6	20.7	29.2	77.2	32.1	54.7	8.0	0.0	24.75
15	36.0	21.4	28.7	69.0	36.3	52.7	8.3	19.2	27.75
16	36.5	22.2	29.4	77.1	39.4	58.3	8.4	0.0	30.75
17	40.0	23.5	31.8	64.8	27.4	46.1	10.2	0.0	26.25
18	40.2	24.2	32.2	66.8	35.3	51.05	8.8	0.0	25.75
19	37.9	24.4	31.2	71.0	44.7	57.85	7.9	2.6	21.25
20	40.4	24.9	32.7	54.1	28.3	41.2	9.6	0.0	18.25
21	39.7	25.5	32.6	69.1	39.1	54.1	6.7	11.6	15.75
22	40.3	26.8	33.6	69.4	37.1	53.25	8.8	0.0	12.50
23	43.0	29.8	36.4	63.0	31.6	47.3	9.7	0.0	16.50
Seasonal mean									22.00

\* SMW = Standard meteorological week.

**Table 2**  
Correlation co-efficient (r) between meteorological parameters and sapota leaf webber, *Nephoteryx eugraphella* Ragonot during 2013 -14

Weather data / Leaf webber	Temperature (°C)			Relative humidity (%)			Sun shine (hours)	Rainfall (mm)
	Maximum	Minimum	Average	Morning	Evening	Average		
Bud damage (%)	-0.132	-0.427**	-0.317*	-0.082	-0.301	-0.228	-0.266	0.215

\* : Significant at 5% level.

\*\* : Significant at 1% level.

