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Research Article

Seasonal incidence of sapota bud borer, *Anarsia achrasella* Bradley on sapota

R. Vijayaraghavendra*, K. Basavanagoud.

Department of Agricultural Entomology, College of Agriculture,

UAS Dharwad, Karnataka, India -580005.

ABSTRACT

Studies on seasonal incidence of sapota bud borer, *Anarsia achrasella* Bradley (Pyralidae: Lepidoptera) infesting sapota Manilkara achras (Mill.) Forsberg were carried out at sapota new orchard of Agriculture College, Dharwad, University of Agricultural Sciences, Dharwad, Karnataka, India during 2013–2014. Observations were recorded from four sapota genotypes *viz.,* Cricket ball, Kalipatti, DSH-1 and DSH-2. The bud borer was active throughout the year with a varying degree of infestation. Among four different genotypes of sapota, the incidence of bud borer damage was more in cricket ball (10.24 %) followed by Kalipatti (9.64 %) varities whereas on hybrids it ranged from 7.33 to 8.07 per cent. Across the genotypes, the mean percentage of bud damage was highest incidence of 12.06 % in March and lowest in October 2.34 %. Bud borer incidence was more during dry period *i.e.* (January to May) and it was less during the remaining period (rainy season *i.e.* from July to October). A study on correlation of bud borer with weather parameters indicated that there was a significant and positive correlation between bud borer damage and maximum temperature. Rest of the weather factors had no influence on pest population during the period of study.

Keywords: seasonal incidence, sapota borer, genotypes and weather parameters.

INTRODUCTION

Sapota (*Manilkara achras* (Mill.) Farsberg, syn. *Achras zapota* Linn.) belongs to family Sapotaceae is a native of Mexico. It is one of the most adoptable tropical fruit crops and it has been found to thrive under varied soil and climatic conditions. India is considered to be the largest producer of sapota in the world and it is being cultivated in an area of about 163.9 thousand ha with a production of 1495.0 metric tonnes[1.] Out of the total fruit production in India, Karnataka ranks first contributing 25 per cent of total production of sapota[1]. The total area of sapota grown in Karnataka is about 31.7 thousand ha with an annual production of 373.7 lakh metric tonnes with a productivity of 11.8 metric tonnes per ha[1].

Among the various factors affecting the yield of fruit crop damage caused by insect pests is important. More than 25 insect pests attack sapota (Butani[2]). Among these, chiku bud borer is a major and regular pest causing damage to the sapota crop in North Karnataka districts. The larvae attack the flower buds resulting in a considerable flowers dropping.

As per the report of Jayanthi *et al.*[4], the larva of *A. achrasella* could damage up to 36.9 - 46.6 buds before reaching pupation. Hence, an investigation on seasonal incidence of the bud borer on sapota in relation with different meteorological parameters was carried out.

MATERIAL AND METHODS

To study the seasonal incidence of sapota bud borer, observations were done in sapota new orchard of Agriculture College, Dharwad, University of Agricultural Sciences, Dharwad, Karnataka, India. Observations were recorded from four sapota genotypes *viz.*, Cricket ball, Kalipatti, DSH-1 and DSH-2. No insecticidal application was done during the period of study. The observations were recorded at 15 days intervals from June 2013 till May 2014. The observation was recorded from five medium sized trees from different genotypes. Randomly selected sapota tree was marked with white paint for recording observations. From each of the tree ten

twigs were selected and in each twig all the flower buds were observed for the incidence of bud borer. The number of total and damaged flower buds per twig of each variety was counted for computing the percentage of infestation by using formula:

$$\text{Percent flower buds damaged} = \frac{\text{Number of damaged flower buds}}{\text{Total number of flower buds observed}} \times 100$$

RESULTS AND DISCUSSION

The larva of *A. achrasella* was found damaging flower buds throughout the year. During the investigation larva was found boring into flower buds at the base of the contents inside so that a bored hole is seen on flower buds (Fig 1). It feeds on unopened flower buds and contents of ovary. Usually one larva was found in each infested flower bud and all stages of larvae were found boring flower buds resulting in considerable loss of buds and flower buds of sapota were found to dry up and drop down. The seasonal incidence of bud borer on four different genotypes of sapota was observed throughout the year.

The incidence of bud borer (Table-1) was more in Cricket ball 10.24 % followed by Kalipatti 9.64 %, DSH-1 8.07 % and DHS-2 (7.33 %) bud damage. Across the four genotypes, the mean percentage of bud damage was ranged from 2.34 to 12.06 percent. Maximum incidence (12.06%) was recorded during March whereas lowest incidence (2.34%) was recorded during October. The perusal of the data clearly reveals that the bud borer incidence was more during dry period *i.e.* (January to May) and it was less during the remaining period (low during rainy season *i.e.* from July to October).

Table 1
Seasonal incidence of sapota bud borer, *Anarsia achrasella* damage during 2013-14 on different genotypes

Sl. No.	Month	Fortnight	Per cent flower bud				Mean
			Cricket Ball	Kalipatti	DHS-1	DHS-2	
1	June-2013	I	12.33	9.93	7.41	8.33	**8.01**
2		II	5.61	7.50	6.54	5.28	
3	July	I	5.40	6.53	5.26	6.07	**6.14**
4		II	5.22	4.85	4.01	5.30	
5	August	I	5.16	3.52	2.81	4.48	**3.53**
6		II	4.26	3.63	2.63	3.85	
7	September	I	3.58	4.07	3.09	3.15	**3.85**
8		II	4.87	5.24	3.80	3.09	
9	October	I	6.13	8.78	4.18	4.07	**2.34**
10		II	7.89	6.41	7.91	2.56	
11	November	I	10.22	7.75	6.76	5.82	**4.44**
12		II	13.46	8.23	8.29	7.02	
13	December	I	11.11	9.64	7.52	8.18	**7.00**
14		II	10.82	11.25	6.38	8.52	
15	January-2014	I	13.82	11.61	9.54	9.91	**8.39**
16		II	12.74	11.85	11.25	10.37	
17	February	I	17.56	13.32	12.26	10.55	**9.71**
18		II	15.29	14.13	14.58	12.40	
19	March	I	19.25	17.91	13.95	16.50	**12.06**
20		II	17.23	16.58	14.36	15.55	
21	April	I	14.81	15.26	13.95	8.07	**9.09**
22		II	10.52	14.30	9.80	6.12	
23	May	I	9.30	8.63	8.15	5.33	**9.26**
24		II	9.25	10.50	9.28	5.50	
	Mean		**10.24**	**9.64**	**8.07**	**7.33**	

Table 2
Correlation co- efficient between sapota bud borer, *Anarsia achrasella* and weather parameters during 2013-14

Weather data / Varieties	Maximum temperature (°c)	Minimum temperature (°c)	Morning Relative humidity (%)	Evening Relative humidity (%)	Rain fall (cm)
Cricket ball	0.546**	-0.154	-0.691**	-0.639**	-0.429*
Kalipatti	0.606**	-0.051	-0.687**	-0.622**	-0.342
DHS-1	0.652**	0.02	-0.665**	-0.578**	-0.269
DHS-2	0.757**	-0.096	-0.813**	-0.759**	-0.455*

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Fig 1
Symptoms of damage, larva of *Anarsia achrasella* on sapota flower buds

These results are in line with the findings of Dongre[3] was reported maximum bud damage during second fortnight of March and Sathish *et al.*[5], was reported minimum incidence during first fortnight of October to maximum during second fortnight of March. Rasiklal[7] *et al.*, reported that bud damage was more during January to May month. Correlation of bud borer with weather parameters indicated that there was a significant (Table-2) and positive correlation between bud borer damage and maximum temperature in all genotypes (r= +0.54(Cricket ball), 0.60 (Kalipatti), DHS-1 (0.65) and DHS-2 (0.75)) which is in agreement with the findings of Sushil Kumar and Bhatt[6]. Sathish[5] *et al.*, reported that there was a significant and positive correlation between bud borer damage and maximum temperature. Rest of the weather factors *viz.*, minimum temperature, relative humidity and rain fall had no influence on pest population during the period of study.

CONCLUSION

The activity of bud borer observed throughout the year with peak activity during March. Clearly indicates that there was influence of weather factor i.e. maximum temperature was played an imported role on bud damage of *A. achrasella* on sapota.

REFERENCES

1. Anonymous, 2014, Indian Horticultural Data Base, *National Horticultural Board*, Gurgaon, India, pp. 125.
2. Butani DK, Insect and Fruits. Periodical Expert Book Agency, Delhi, 1979, pp. 87-94.
3. Dongre, MS, Biology of chiku moth, *Nephopteryx eugraphella* Ragonot (Lepidoptera: Phycitidae), extent of damage caused by major pests and framing of crop pest map on sapota. *M.Sc. (Agri.) Thesis*, Navsari Agricultural University, Navsari, Gujarat, 2011.

4. Jayanthi, PDK, Verghese, AR., Honnamma, R. and Nagaraju, DK, Damage potential and seasonality of the sapodilla bud borer. International Journal of Tropical Insect Science. 2006, 26 (2): 86 – 91.
5. Sathish Ravulapenta, Jemla Naik, D, Niranjana Kumara B, Seasonal incidence of chiku bud borer (*Anarsia achrasella* Bradley) on sapota under hill zone of Karnataka. *International* Journal of Advances in Pharmarcy, Biology and Chemistry, 2014, 3(1): 21-23.
6. Sushil Kumar and Bhatt RI, Seasonal incidence and population dynamics of major lepidopterous insect pests of sapota in relation to major abiotic factors, Journal of Applied Zoological Researches. 2002, 13(1): 6- 9.
7. Thumar Rasiklal K, Board Parbhatbhai K, Dabhi Manishkumar R and Korat Dhirubhai M, Effect of weather parameters on activity of chicku bud borer, Anarsia achrasella Bradley on sapota, African Journal of Agricultural Research. 2015, 10(11) : 1192-1196.