ENTOMON 41(3) : 183-188 (2016)
Article No. ent. 41304

Oviposition of *Helopeltis antonii* (Hemiptera: Miridae) on *Psidium guajava* fruits

C. Swathi and P. N. Ganga Visalakshy*

Division of Entomology and Nematology, ICAR - Indian Institute of Horticultural Research, Bangalore 560 089, India. Email: gangesv@iihr.res.in

ABSTRACT: Detailed studies on the oviposition behaviour of *H. antonii* on different types of guava *Psidium guajava* fruit from April to December that corresponds from fruiting to harvesting period was carried out in 2015.A shift in the egg laying pattern in relation to availability of fruits of different types were recorded during the season. Maximum number of eggs /fruit was recorded on un matured scabby cracked fruits in the initial season of fruiting which shifted to ripe scabby fruits with the advancement of season. However data analysis on the egg laying for the entire season recorded significantly more number of eggs /fruit on un matured scabby cracked fruits. Co- relation between the availability of fruit type and number of eggs resulted in a positive linear curve with R^2 value = 0.97 indicating that un matured scabby and cracked fruits contain more eggs than other types of fruits screened.

Key words: *Helopeltis antonii*, egg laying, *Psidium guajava* fruits

INTRODUCTION

Guava, *Psidium guajava* L, (Family: Myrtaceae) a native of tropical America, introduced in 17th century is a major horticultural fruit of India (Menzel, 1985). *Helopeltis antonii Signoret* (Hemiptera: Miridae) commonly denoted as tea mosquito bug is an economically important pest causing significant marketable yield loss of guava. Besides guava, it is a major pest of cashew, cocoa and have an array of alternate hosts such as avocado, pomegranate, Singapore cherry, custard apple, grape wine, drumstick, silk cotton, spices (Devasahayam and Nair, 1986; Sunil Kumar, 2000), and many other forest trees such as neem (Miller, 1941; Stonedahl, 1991). Nymphs and adults sucks the sap from terminal shoots, young leaves and flower buds and young fruits (Balasubramanian and Kalyanasundaram, 1972). Sucking the sap from terminal shoots causes drying thereby affecting flowering and fruit setting. In the course of desaping, the insect injects saliva causing lesions leading to formation of scab appearance on fruits (Abraham and Nair, 1981; Geeta and Naik,2004). During field visits, *H.antonii* could be collected in large numbers from un-matured scabby cracked fruits. Inspection of un-matured fruits under a binocular microscope revealed presence eggs of tea mosquito bug. This study was carried out to determine the egg-laying behaviour of tea mosquito bug in relation to different types of guava fruits.

MATERIALS AND METHODS

The samples for the study were collected from a guava orchard at Indian Institute of Horticultural

* Author for correspondence

Research, Bangalore,(12°58'N; 77°35' E), India. The orchard consisted of fifty trees of cv. *Allahabad safeda* of 12 years old. This variety was observed to be susceptible to *H.antonii* based on the earlier field observations and hence selected for the study. In addition to the scabby on fruits infected by the feeding of *H.antonii*, scab of fruits is a inflicted disorder on guava that also was considered as one of parameters for the present study. Thus six type of fruits were selected for the study namely i. Un-matured healthy non- scabby, ii.Un-matured scabby iii. Un-matured scabby cracked, iv. Ripe scabby, v. Ripe non-scabby and vi. Ripe scabby fallen.

Twenty fruits of each type were collected randomly at fortnightly intervals and brought to laboratory for observation. The study was carried out from April to December months of the year 2015 that coincides with fruiting to harvesting of fruits.

The field collected fruits described above were individually examined under the binocular microscope and the number of eggs per fruit was recorded. These were totalled and average eggs/ fruit / fortnight was calculated. The data on number of eggs laid in different types of fruits /sample / fortnight was compiled to obtain the number of eggs/ fruit/month. For statistical analysis the original values were converted to square root values and subjected to ANNOVA for LSD. Co-relation and the R^2values between the type of fruits and number of egg laid were worked out.

RESULTS AND DISCUSSION

Egg laying in relation to different types of fruits across the months of April to December is given in Fig.2. Eggs were recorded in all types of fruits except in un-matured scabby and un-matured non-scabby (healthy). Egg laying on fruits started in the month of April and was recorded till December that coincided with harvest of the fruits. Egg laying was recorded in cracked fruits from fruiting to harvesting stage. In all other types of fruits egg laying was recorded from august onwards. About 4.4 eggs/fruit was recorded in April that increased to 7.4, 8, 11 and 15.4 eggs /fruit in June, July and August months respectively. Highest number of 17 eggs /fruit was recorded in the month of September which decline in the following months

In August and September months un-matured scabby cracked fruits recorded 15.4 to 17 eggs that were statistically significant to other types (Table-1). In October a shift in the egg laying from

Table 1. Egg laying pattern of *H.antonii* in different types of *Psidium guajava* fruits from April to December

S .No	Types of fruits	No. of eggs /fruit (months)					
		Aug.	Sept.	Oct	Nov	Dec.	Mean
1	un-matured scabby and cracked	15.4(4.0)[a]	17(4.2)[a]	7.8 (2.9)[b]	4.6 1.9)[c]	2.0(0.9)	8.3 (2.9)[a]
2	Ripe scabby	6.6(2.6)[c]	13.3(3.7)[b]	15.2(3.95)[a]	5.2(2.5)[b]	0 (0.7)	4.5(1.8)[c]
3	Ripe healthy	4.0(1.9)[d]	4.0(2.0)[c]	6.4(2.6)[c]	3.6(1.9)[d]	0 (0.7)	2.9(1.5)[d]
4	Fallen ripe scabby	9(3.0)[b]	13.2(3.7)[b]	14.6(3.9)[a]	8.4(2.6)[a]	0(0.7)	5.7(2.1)[b]
	CV	32.14	20.46	20.3	6.06	NS	39.8
	CD @0.05%	1.3	1.0	1.0	0.5	-	0.8

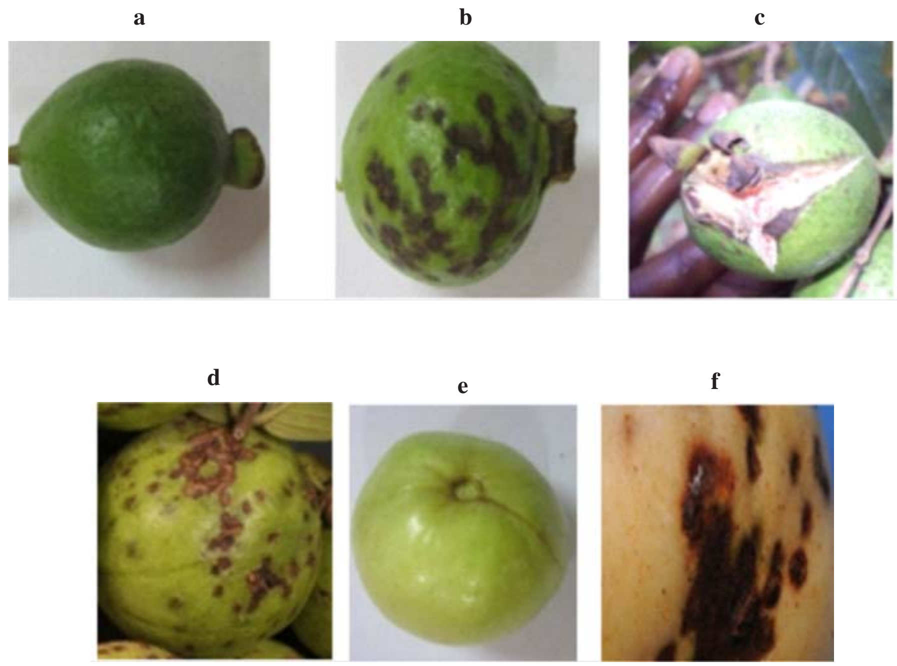

Fig. 1. Portrayal of the six types of fruits selected for the study

a) Un-matured non -scabby
b) Un-matured scabby
c) Un-matured scabby and cracked
d) Ripe scabby
e) Ripe healthy (non scabby)
f) Ripe scabby fallen

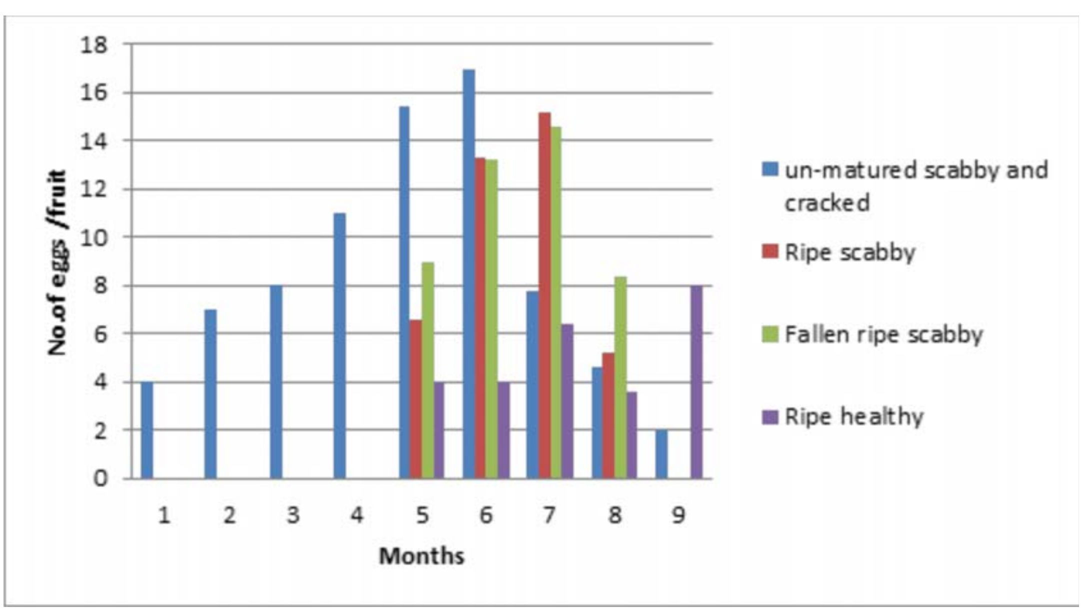

Fig. 2. Egg laying of *H.antonii* in different types of fruits from April to December

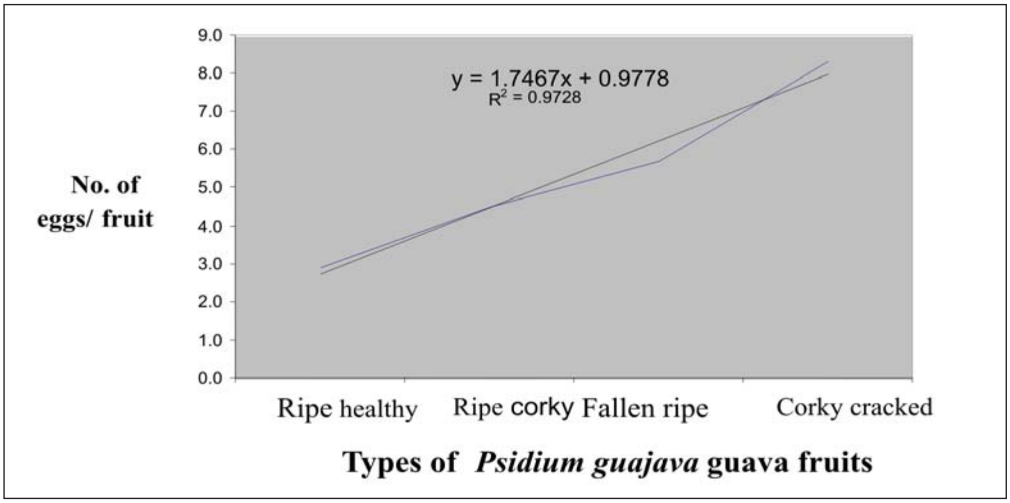

Fig. 3. Co-relation between fruit types of *Psidium guajava* and egg laying of *H. antonii*

Fig. 4. Eggs laid in diiferet portion of *Psidium guajava* fruit
a. in cracked portion; b. on fruit surface; c. on calyx

un-matured scabby cracked fruits to ripe scabby fruits was recorded. A mean value of 15.2 and14.6 eggs /fruit in ripe scabby on tree and fallen ripe scabby respectively. In December the egg laying in all types of fruits were reduced and were not significant statistically. Analysis of mean number of eggs for the entire season from April to December recorded a mean value of 8.3 eggs / un-matured scabby and cracked that was statistically significant to other types of fruits screened. Ripe healthy fruits were least preferred.

Co-relation analysis worked out between the dependent variable of fruit type and independent variable of .eggs/ fruit for the season resulted in a positive linear co-relation with an R^2 value of 0.97 indicating that un-matured scabby and cracked fruits are most preferred (Fig.1c)

Egg laying behaviour

Eggs were laid singly and in groups. Eggs were either inserted inside the soft portions of fruits or laid externally on fruit. On cracked fruits, eggs are laid inside the cracked portion in continuous linear manner (Fig.4).Eggs are inserted into the soft tissues and on the outer ridges of the cracked portion of fruits. However the number of eggs laid inside the cracked part was more than laid eggs on the ridges. In ripe fruits, eggs were laid singly or in groups in the soft feeding scars, externally on fruits and even on the calyx portion (Fig -4b&c).A maximum number of 14eggs /cluster could be recorded. *H.antonii and* other *Helopeltis spp* are reported to insert their eggs singly or in a sequence into the soft tissues of plant parts such as tender shoots, mid ribs of apical leaves of its host plants (Bhat *etal.,* 2010; Ganga Visalakshy and Mani, 2010; Ritu Muhammad *etal* 1983,Sundaraju, 1996)This is the first report of recording eggs of *H. antonii* on external surface of fruits. Similarly oviposition of *H.antonii* on guava fruits is not yet reported.

Non chemical methods such as field sanitation and semio- chemicals are considered as effective components in IPM of insect pests. The present observations provide future researchable leads in the management of *H. antonii* on guava. Further research on the impact of field sanitation by removing scabby and cracked fruits is being initiated to develop effective IPM for *H. antonii* on guava.

ACKNOWLEDGEMENTS

The authors acknowledge DBT for providing financial support to carry out the research work under the project Evaluation of indigenous strain of fungal pathogen *Beauveria bassiana* against *Helopeltis*spp on guava, cashew and tea**.** We also thank to Director, Indian Institute of Horticulture Research, Bangalore, for providing necessary facilities.

REFERENCES

Abraham C. C. and Nair G. M.(1981) Effective management of the tea mosquito bugs for breaking the yield barriers in cashew. Cashew Causerie, 3 (1):6-7.

Balasubramanian M. and Kalyanasundaram P. (1972) Studies on the incidence of tea mosquito bug, *Helopeltis antonii* on guava varieties. AUARA Annamalai University Agricultural Research Annual, 4-5:158-161

Bhat P.S. and Ravi Prasad T.N. (2010). Tea mosquito bug and its management in cashew Directorate of cashew research technical bulletin no. 19: 4-7.

Devasahayam S. and Nair C. P. R. (1986).The tea mosquito bug *Helopeltis antonii* Signoret on cashew in India. Journal of Plantation Crops,14: –10.

Ganga Visalakshy P.N. and Mani M. (2010) *Beauveria bassiana*: a promising entomopathogen of guava mosquito bug *Helopeltis antonii* Signoret. Journal of Biological control. 25(2):150-151.

Geeta R. Patil and Krishna naik (2004) .Studies on the Seasonal Incidence of Tea Mosquito Bug on guava Cultivars. Karnataka Journal Agricultural Science,17 (2): 339-340.

Menzel C.M. (1985) Guava: an exotic fruit with potential in Queensland. Queensland Agriculture Journal, 111: 93-98.

Miller N.C.E. (1941) Insects associated with cocoa (Theobroma cacao) in Malaya. Bulletin of Entomological Research, (32):1-15

Ritu Muhammad and Khoo K.C. (1983) A technique for rearing the cocoa mired *Helopeltis theobromae* Miller, in captivity. Newsletter Malaysian Plant Protection Society, 7(11): 8-10

Stonedahl G.M. (1991) The Oriental species of *Helopeltis* (Heteroptera: Miridae): A review of economic literature and guide to identification. Bulletin of Entomological Research, 81: 465-490.

Sundararaju D. (1996) Studies on *Helopeltis* spp. With special reference to *H.antonii* Sign. in Tamil Nadu. *Ph.D. thesis. T.N. A.U.,* Coimbatore, India. Pp 210.

Sunil Kumar (2000) Studies on seasonal incidence and loss estimation in guava due to tea mosquito bug,*Helopeltis antonii* Signoret (Hemiptera: Miridae). M.Sc.(Agri.) thesis., University of Agricultural Sciences, Dharwad: 51.

(Received 21 March 2016.; accepted 04 July 2016; published 15 September 2016)