



E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2017; 5(2): 1196-1199
© 2017 JEZS
Received: 07-01-2017
Accepted: 08-02-2017

N Kasar

Department of Agricultural
Entomology, Bidhan Chandra
Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal,
741252, India

JC Marak

Department of Agricultural
Entomology, Bidhan Chandra
Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal,
741252, India

UK Das

Department of Agricultural
Entomology, Bidhan Chandra
Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal,
741252, India

S Jha

Department of Agricultural
Entomology, Bidhan Chandra
Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal,
741252, India

Correspondence

N Kasar

Department of Agricultural
Entomology, Bidhan Chandra
Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal,
741252, India

Incidence and distribution pattern of leaf webber (*Orthaga exvinacea* Hamp.) on mango

N Kasar, JC Marak, UK Das and S Jha

Abstract

A field investigation was carried out to study the incidence and distribution pattern of mango leaf webber, *Orthaga exvinacea* Hampson during 2012-13 and 2013-14 at mango orchard of Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal. The results indicated that the most active period of mango leaf webber in both years was found from August to December. The distribution study of leaf webs within the tree revealed that western and southern side had more number of webs in comparison to the northern and eastern side respectively. The differences were statistically significant. Correlation results indicated that maximum and minimum temperature had negative and significant effect ($r = -0.796^{**}$ and -0.755^{**} , respectively) on the leaf webber population. However, relationship of morning relative humidity ($r = +0.328^{**}$) was positively significant and evening relative humidity ($r = -0.239$) was negative and non-significant. Total rainfall ($r = -0.370^*$) had negative and significant influence on leaf webber population.

Keywords: Mango, *O. exvinacea*, seasonal incidence, distribution pattern, correlation

1. Introduction

Mango (*Mangifera indica* Linn) is the most important fruit of India and is known as “King of fruits. Though India is the leading producer of mango in the world with an area and production of about 2.52 million ha and 18.43 million tonnes, respectively [1], its productivity is quite less as compared to other mango producing countries. This may be due to a number of reasons viz. climatic conditions, diversity of associated pests and diseases, traditional planting method, poor management of the orchard, problems of alternate bearing of mango trees, etc [2]. More than 250 insect and mite pests are known to attack mango crop at different stages of crop growth, of which about 10% are serious [3]. Among them, mango leaf webber is one of the major pests responsible for low productivity [4]. Two species normally, *Orthaga exvinacea* Hampson and *Orthaga euadrusalis* Walker have been recorded on mango as major pest in India. *O. euadrusalis* has in the recent past become a major limiting factor in mango production in Uttar Pradesh, Bihar and other parts of Northern India [5]. It was first observed as a serious pest of mango in Uttar Pradesh [6]. In West Bengal *O. exvinacea* has been recorded as a pest of mango [7]. It was originally regarded as minor pest but now has attained a major pest status [8]. It has also been reported as an occasionally serious pest of mango tree in south India [9]. The infected trees are conspicuous with numerous webbed leaves and dry apical shoots. Such an attack in most cases prevents flower formation and fruit setting. Heavily infested trees give a burnt look and severe infestation result in complete failure of flowering [10]. To understand the nature and abundance of this pest and thereby assist in evolving effective and timely control schedule, the present study was undertaken to determine the seasonal incidence and distribution pattern of leaf webber (*O. exvinacea* Hamp.) on mango.

2. Materials and Methods

The present investigation was conducted at the mango orchard of Bidhan Chandra Krishi Viswavidyalaya located at Mohanpur in the district of Nadia, West Bengal from May 2012 to April 2014. Observations on seasonal incidence and distribution pattern of mango leaf webber within the tree with respect to the direction were taken from 5 plants (cv. Amrapali). Each plant canopy was imaginarily divided into 4 directions viz. North, South, West, East and number of webs in all the 4 directions were counted and recorded at weekly interval to observe the incidence pattern and distribution pattern of leaf webber in different directions of the tree canopy. The distribution pattern of leaf webber in different directions of the tree canopy was then plotted in randomized block design (RBD).

The meteorological data viz. Maximum temperature, Minimum temperature, Relative humidity I and II and rainfall were collected from the Department of Agrometeorology and Physics, B.C.K.V. from May 2013 to April 2014. Correlation was done with the incidence of mango leaf webber following statistical computer programme.

3. Results and Discussion

3.1. Incidence of mango leaf webber, *O. exvinacea* Hamp.

The incidence of mango leaf webber during 2012-13 and 2013-14 are presented in Fig. 1. From the results it was observed that web formation was not found from May to first week of August. The occurrence of leaf webber was first noticed on the second week of August (0.6 webs/tree and 0.45 webs/tree in 2012-13 and 2013-14 respectively). Thereafter, the population gradually started increasing and the peak incidence was observed during last week of December (8.3 webs/tree and 9 webs/tree in 2012-13 and 2013-14 respectively). From then on, the population started declining and reached negligible level in April. The present findings are analogous with the reports of^[11] that *O. euadrusalis* incidence

started on second fortnight of July and reached its peak by first fortnight of December.^[4] reported that the pest remained active in mango orchard from June to December and completed different over lapping generations during this period and the most active period was September to December.^[12] Found that mango leaf webber (*O. exvinacea*) was first observed during second fortnight of June. The peak incidence (78.0 webs/tree) was recorded during the second fortnight of October. Thereafter, the incidence declined and reached negligible level in January. No incidence was recorded from February to May.^[13] Showed that the peak incidence of the pest was observed during the first fortnight of November (19.4 webs/tree). A gradual increase was observed from the first fortnight of July (2.6 webs/tree) and declined during the second fortnight of January (3.2 webs/tree). Similar findings with the present results were observed by^[14] that the pest activity in the mango orchards began in the months of June and it remain active up to the December, beyond that the activity declined to zero level up to April. The most active periods of the pest was from August to December.

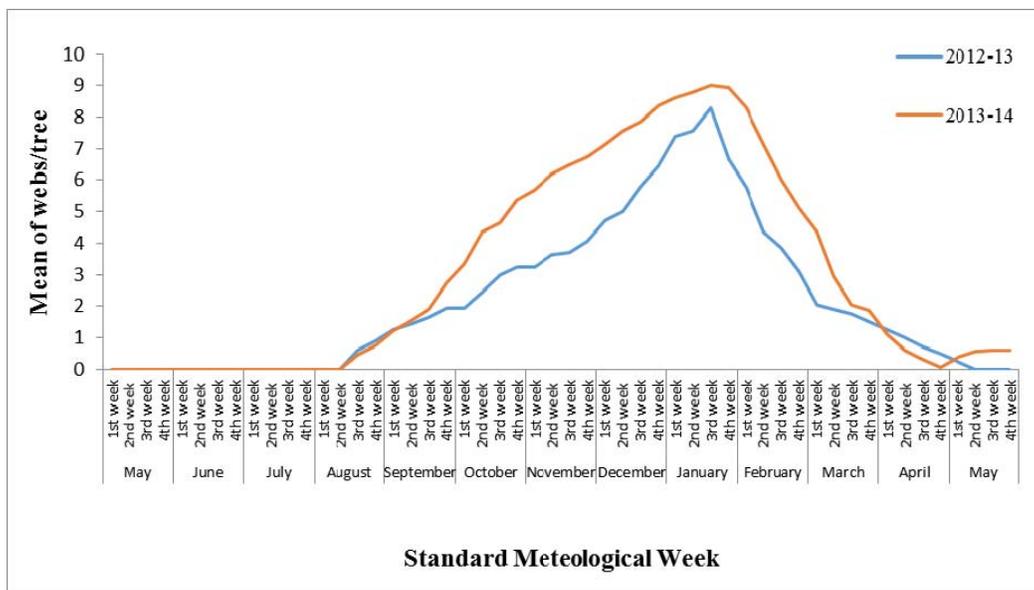


Fig 1: Seasonal incidence of *O. exvinacea* Hamp. during the study of 2012-13 and 2013-14

3.2. Distribution pattern and directional preference of *O. exvinacea* Hamp.

The tree wise data on no. of webs/tree in different directions are given in Table 1. When overall distribution of webs was examined it was found that more no. of webs were present in West (3.80 webs) and South (3.34 webs) directions in comparison to East (1.90 webs) and North (1.49 webs) respectively. From the table it can be seen that the differences between different directions of tree canopy are statistically significant. The findings are partly in agreement with^[5] who found that in case of *O. euadrusalis*, southern side of mango trees had maximum infestation.^[12] also recorded highest no. of webs (*O. exvinacea*) in Southern direction of the tree followed by east and west and the lowest no. of webs was in northern direction. This difference may be due to different canopy temperature within the tree plant. And it can be helpful in sampling design for pest population study on mango plants.

3.3. Correlation between *O. exvinacea* Hamp. And different weather parameters the results (Table 2) indicated that maximum and minimum temperature had negative and

significant effect ($r = -0.768^{**}$ and -0.719^{**} , respectively) on the leaf webber population. However, relationship of morning relative humidity ($r = +0.355^{**}$) was significant and positive and evening relative humidity ($r = -0.213$) had negative correlation and non-significant influence. Total rainfall ($r = -0.287^{*}$) had negative and significant influence on leaf webber population. This is in partial conformity with^[11] who found that number of webs was negatively correlated with maximum and minimum temperature, positively correlated with forenoon relative humidity but not significantly associated with rainfall, evaporation and solar radiation.^[13] Showed a positive relationship between the incidence of the pest and minimum temperature, relative humidity and rainfall, and a negative relationship with maximum temperature. However, the findings of^[4]^[15] contradicts that weather factors viz. temperature (maximum and minimum), rainfall and relative humidity had no direct influence on the activity of the pests and the correlation was non-significant.

Table 1: Distribution pattern and directional preference of *O. exvinacea* Hamp. during two years (2012-13 and 2013-14)

Standard fortnight interval	North	South	West	East
May, 1st	0 (0)	0 (0)	0 (0)	0 (0)
May, 2nd	0 (0)	0 (0)	0 (0)	0 (0)
June, 1st	0 (0)	0 (0)	0 (0)	0 (0)
June, 2nd	0 (0)	0 (0)	0 (0)	0 (0)
July, 1st	0 (0)	0 (0)	0 (0)	0 (0)
July, 2nd	0 (0)	0 (0)	0 (0)	0 (0)
Aug, 1st	0 (0)	0 (0)	0 (0)	0 (0)
Aug, 2nd	0.30 (0.89)	0.85 (1.16)	0.75 (1.12)	0.50 (1.00)
Aug, 3rd	0.70 (1.10)	1.55 (1.43)	1.95 (1.57)	1.05 (1.24)
Sept, 1st	1.05 (1.24)	2.05 (1.60)	3.30 (1.95)	1.55 (1.43)
Sept, 2nd	1.45 (1.40)	2.90 (1.84)	4.65 (2.27)	2.60 (1.76)
Oct, 1st	2.20 (1.64)	4.20 (2.17)	6.70 (2.68)	2.90 (1.84)
Oct, 2nd	2.50 (1.73)	5.20 (2.39)	7.45 (2.82)	3.30 (1.95)
Nov, 1st	2.90 (1.84)	6.50 (2.65)	7.55 (2.84)	3.70 (2.05)
Nov, 2nd	3.90 (2.10)	7.55 (2.84)	8.10 (2.93)	4.55 (2.25)
Dec, 1st	4.20 (2.17)	9.15(3.11)	9.50 (3.16)	4.95 (2.33)
Dec, 2nd	4.65 (2.27)	10.55 (3.32)	10.70 (3.35)	6.30 (2.61)
Jan, 1st	5.05 (2.36)	11.40 (3.45)	12.00 (3.54)	6.10 (2.57)
Jan, 2nd	4.00 (2.12)	8.70 (3.03)	9.50 (3.16)	4.80 (2.30)
Feb, 1st	2.65 (1.77)	5.80 (2.51)	6.85 (2.71)	3.50 (2.00)
Feb, 2nd	1.55 (1.43)	3.85 (2.09)	4.20 (2.17)	1.80 (1.52)
Mar, 1st	0.70 (1.10)	2.85 (1.83)	2.80 (1.82)	0.95 (1.20)
Mar, 2nd	0.20 (0.84)	2.05 (1.60)	1.60 (1.45)	0.15 (0.81)
Mar, 3rd	0.00 (0.71)	0.95 (1.20)	0.80 (1.14)	0.00 (0.71)
Apr, 1st	0.25 (0.87)	0.45 (0.97)	0.35 (0.92)	0.40 (0.95)
Apr, 2nd	0.40 (0.95)	0.30 (0.89)	0.10 (0.77)	0.40 (0.95)
Mean	1.49	3.34	3.80	1.90
SEm (\pm)	0.12			
CD (p=0.05)	0.32			

Figures in parentheses are $\sqrt{n+0.5}$ transformation

Table 2: Correlation studies between incidences of *O. exvinacea* Hamp. And weather parameters during two years (2012-13 and 2013-14) of study

Sl. no	Weather Parameters	r
1	Max. Temperature	-0.768**
2	Min. Temperature	-0.719**
3	Morning Relative Humidity	+0.355**
4	Evening Relative Humidity	-0.213
5	Total Rainfall	-0.287*

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

4. Conclusion

From the present study, it can be concluded that the most active period of *O. exvinacea* was from August to December during 2012-13 and 2013-14 with peak incidence observed during last week of December. Meteorological factors like temperature, humidity and rainfall may play active role in the incidence of *O. exvinacea* and its relationship build up. More number of leaf webs was observed in the western and southern side as compared to the northern and eastern side. These findings may be helpful in evolving effective and timely control methods against this rising pest of mango.

5. Acknowledgement

The authors thank the Department of Agricultural Entomology, Plant Protection Laboratory and University of Bidhan Chandra Krishi Viswavidyalaya for providing facilities and extending their support to carry out the study.

6. References

- National Horticulture Board (NHB). Indian Horticulture Database-2014, Ministry of Agriculture, Government of India, 2013, 14, 91-101
- Biswas BC, Kumar L. Revolution in Mango Production Success Stories of Some Farmers. Fertiliser Marketing News, FAI, New Delhi, 2011, 23.
- Penna JE, Mohyuddin AI. Insect pests (Ed.) Richard E. Litz. The mango botany, production and uses. CAB International, Willingford, Oxon, UK, 1997, 327.
- Singh, Verma. Factors Influencing the Incidence of Mango Leaf Webber, *Orthaga euadrusalis* Hampson, (Pyralidae: Lepidoptera) in Mango and Their Management. Molecular Entomology. 2013; 4(4):22-25
- Srivastava RP. Mango insect pest management. International Book Distributing Co. 6. (Lucknow, India), 1997, 272.
- Tandon PL, Srivastava RP. New records of parasites and predators of important insect pests of mango. Entomon. 1980; 5:243-244.
- Jha S, Paul SK. Lepidopteran pests infesting mango in West Bengal. Insect Environment. 2002; 8(4):159-160.
- Rao AG, Krishna JG, Ayyana T. Studies on the comparative biology of *lamida monocusalis* Walk. on cashew (*Anacardium occidentale* L.) and mango (*Mangifera indica* L.). Andhra Agricultural Journal. 1973; 20:54-62.
- Ayyar TVR. Handbook of Economic Entomology for South India. Govt. Press, Madras, 1940.
- Vergese A. Management of mango leaf webber. A vital package for panicle emergence. Insect Enviroment. 1998; 4(3):7
- Kavitha K, Lakshmi KV, Anitha V, Reddy DR, Sudhakar TR. Influence of weather parameters on the incidence of mango leaf webber *Orthaga euadrusalis* Walker. Journal of Agrometeorology. 2006; 8(1):130-132.
- Reddy CHP, Rejendraprasad P, Umamaheswari T. Seasonal occurrence and distribution pattern of mango

- leaf webber, *Orthaga exvinacea* Hampson (Pyralidae: Lepidoptera). Journal of Applied Zoological Researches. 2002; 13(2/3):129-131.
13. Kannan M, Rao V. Ecological studies on mango leaf webber (*Orthaga exvinacea* Hamp.) in Andhra Pradesh as a basis for IPM. International Journal of Agriculture Sciences. 2006; 2(2):308-311.
 14. Verma R, Singh S. Seasonal Activity of the Mango Leaf Webber, *Orthaga euadrusalis* Walker (Pyralidae Lepidoptera). Insect Environment. 2010; 16(1):22.
 15. Kannan M, Rao NV. Seasonal incidence of lepidopteran pests in relation to weather parameters in mango (*Mangifera indica*). Crop Research- Hisar. 2007; 33(1/3):198-203.