Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

A Eugene Roy
B.Sc. Agriculture, Annamalai
University, Faculty of
Agriculture, Tamil Nadu, India

Dr. S Arivudainambi
Department of Entomology,
Annamalai University, Faculty
of Agriculture, Tamil Nadu,
India

Mango hopper population in different varieties of Mango

A Eugene Roy and Dr. S Arivudainambi

Abstract
To study the population of hoppers in different varieties of mango, a survey was conducted to assess the varietal preference of mango hoppers in the orchard of Annamalai University, Annamalai Nagar, Chidambaram Tamil Nadu, India during May 2019. The mango varieties selected for the study were Neelam, Senthoora, Jahangir, Alphonso, Arka Puneet, Malgova, Suvarnarekha and K-11. The occurrence of mango hoppers was recorded from 1st week of May with corresponding to five standard weeks. High hopper population was recorded at first week of May in K-11 with a mean population of hoppers (152.00 hoppers/5 panicle) and Alphonso (127.60 hoppers/5 panicle). On the other hand low incidence of hoppers was recorded in varieties like Arka Puneet with a mean value of (2.80 hoppers/5 panicle and Suvarnarekha (1.20 hoppers/5panicle) respectively.

Keywords: Incidence, mango hoppers, mango varieties, varietal preference

Introduction
Mango (*Mangifera indica* Linn.) is the most important fruit of Asia. It belongs to the family Anacardiaceae. It is one of the familiar fruits in the world. Being the king of the fruits, it has an amazing flavour with marvellous taste and highly nutritious with the vitamins like A and C. For more than four thousand years it has been cultivated in the southern parts of Asia. Countries like Bangladesh, India and Pakistan cultivates this fruit for commercial purpose. Mango is considered to be the national fruit of India, Pakistan and Philippines. India ranks first in world mango production with 18.43 Million Tonnes (NHB, 2015) [6]. There are 400 insect species inhibits the production and quality of mango (Tandon and Verghese, 1985) [12]. Among them, Mango hopper [*Amirtodus atkinsoni* (Lethierry), *Idioscopus clypealis* (Lethierry), *I. niveosparsus* (Lethierry) and *I. nitridulus* (Walker)] were found severe at flowering and fruiting stages resulting in the reduction in yield which accounts up to 100% (Rahman and Kuldeep, 2007) [8]. Likewise, Sohi (1990) [11] reported that the leafhoppers are the most serious pest of mango causing 20-100 percent loss of inflorescence and thereby loss in yield. Mango hoppers cause most severe and devastating effects since they are monophagous to mango (Pruthi and Batra, 1960) [7]. In mango, during the emergence of new shoots and inflorescence the activity of mango hoppers were at peak (Zagade and Chaudhari, 2010) [15]. In Maharashtra the losses in mango yield were estimated by Godase *et al.* (2004) [2] during (1998, 1999 and 2001) caused by *Idioscopus niveosparsus* and reported the percent losses as (48.3, 53.8 and 54.1) respectively. Studies on species distribution and relative availability of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) were made by Akash Varshney, (2013) [13] at Uttar Pradesh. The nymphs and the adults of the mango hoppers feed on the sap of tender leaves, buds, flowers, flower stalks and fruits by sucking. Heavily infested leaves gets twisted and inflorescence gets dried (Kannan and Venugopal, 2006) [3]. Sen and Choudhury, (1961) [10] reported that infestation by hopper gave a burnt appearance to trees and hoppers also ooze out honey dew like secretion which promotes the development of fungus sooty mould interfering the regular biological activity of the plant like photosynthesis. Peak incidence was noticed after complete emergence of the inflorescence during which the insects drift to the cracks and crevices of the tree trunk (Babu *et al.*, 2002) [1]. Many scholars had studied about the incidence and development of mango hoppers based on weather parameters and seasonal occurrence.
Still there is a requirement to perform research in depth to find out the intensity of the mango hoppers population in different varieties of mango. Similarly it is indispensable to discover the amount of hopper incidence during the flowering and fruiting period in different varieties of mango.

Corresponding Author:
A Eugene Roy
B.Sc. Agriculture, Annamalai
University, Faculty of
Agriculture, Tamil Nadu, India

In perspective of this, the present analyses were made by monitoring the population fluctuation of mango hoppers during the flowering and fruiting stage which coincides during the month of May in different varieties of mango. Hence this study will provide us detailed information about the concentration of hoppers in different varieties; therefore it helps us to facilitate selective planting of mango varieties which are found resistant to hopper resulting in yield improvement.

Materials and Methods
The current study was made in the mango orchard of Annamalai University farm, situated in Annamalai Nagar, Tamil Nadu, India (11.3918° N, 79.7132° E) on crucial fruiting stage in the month of May 2019. Observation on the population of hoppers including adults and nymphs were taken at weekly interval on different varieties of mango such as Neelam, Senthoora, Jahangir, Alphonso, Arka Puneet, Malgova, Suvarnarekha and K-11. The age of the trees varies

from 15 to 20 years at the spacing of 10x10m. During the study period no management practice was adopted. For each sampling, five random panicles or inflorescence were selected. The observations were taken by using the bagging trap method (Verghese and Rao, 1987) [14]. The rearmost end of the inflorescence was completely cloaked by using a polythene bag (60 x 30 cm), inside the bag there was a cotton ball dipped in ethyl acetate. By this method the mango hoppers were collected in the polythene bag and they were brought to the laboratory, the collected hoppers were spread on white board and counted. The observations were taken without any disturbances to stem and branches. Careful counting was taken with the aid of magnifying glass to make the observation very clear and accurate. All observations were taken at 8 to 9am. Observations were made at weekly interval from the first to the last week of May. Then the mean population of the mango hoppers in different varieties of mango were worked out.

Table 1: Varietal preference of mango hopper (at the Month of May)

Sr. No	Variety	Population of hoppers/5 inflorescence				
		Week1	Week2	Week3	Week4	Week5
1.	K-11	152.00 (12.37)[h]	126.00 (11.27)[g]	108.40 (10.45)[g]	96.60 (9.88)[g]	73.80 (8.65)[g]
2.	Neelam	101.40 (10.12)[f]	88.60 (9.47)[f]	71.40 (8.51)[f]	49.20 (7.08)[f]	24.20 (5.01)[e]
3.	Senthoora	77.80 (8.88)[e]	70.80 (8.47)[e]	55.00 (7.48)[e]	38.80 (6.31)[e]	17.40 (4.28)[d]
4.	Jahangir	58.60 (7.71)[d]	52.80 (7.33)[d]	43.20 (6.65)[d]	32.20 (5.76)[d]	21.80 (4.77)e
5.	Alphonsa	127.60 (11.34)[g]	124.80 (11.22)[g]	112.80 (10.68)[g]	93.60 (9.73)[g]	66.00 (8.18)[f]
6.	Malgova	32.80 (5.81)[c]	27.00 (5.28)[c]	17.40 (4.28)[c]	11.40 (3.52)[c]	7.40 (2.88)[c]
7.	Arka Puneet	12.60 (3.68)[b]	9.00 (3.15)[b]	7.20 (2.86)[b]	5.40 (2.52)[b]	2.80 (1.92)[b]
8.	Suvarnarekha	7.20 (2.80)[a]	3.00 (1.97)[a]	1.80 (1.88)a	1.80 (1.66)[a]	1.20 (1.46)[a]
	CD (0.05)	0.367	0.315	0.324	0.204	0.367

Results
The data relating to the mean population of mango hoppers on various varieties of mango per five panicles in Annamalai University orchard farm during May 2019 are presented in Table1.

It was observed that during the month of May at 1st week, the hopper incidence was high in varieties like K-11, Alphonso and Neelam and moderate in varieties like Senthoora, Jahangir and Malgova and meagre in Arka Puneet and Suvarnarekha. A peak mean population of 152.00, 127.60 and 101.40 were noticed in K-11, Neelam and Alphonso respectively during first week of May. A low mean population (1.20 & 2.80) were marked in Suvarnarekha & Arka Puneet respectively.

During the second week the incidence of hopper was in the range of 126.00 to 3.00 in all varieties that were taken into study. Furthermore, the highest mean population (126.00) was noticed in K-11 followed by Alphonso with a mean population (124.00). While other varieties like Neelam, Senthoora, Jahangir and Malgova experienced a fair incidence (88.60, 70.80, 52.80 & 27.00) of hoppers respectively. Remaining varieties like Arka puneet and Suvarnarekha had recorded a low incidence of hoppers (9.00 & 3.00) respectively.

The numerical data on mean hopper population on third week indicates that the range was from 112.80 to 1.80. The maximum hopper population (112.80) was recorded in the variety Alphonso, while K-11 has recorded a mean incidence of 108.40 which is orderly followed by Neelam, Senthoora and Jahangir with average hopper incidence (71.40, 55.00 & 43.20) respectively. However lower incidence (17.40) was noticed in varieties like Malgova. Whereas minimum (7.20 & 1.80) was noticed in varieties like Arka Puneet and Suvarnarekha.

At fourth week the mean population was in the range from 96.60 to 1.66. The peak hopper incidence (96.60 & 93.60) was noticed in varieties K-11 and Alphonso respectively. On the other hand Neelam, Senthoora and Jahangir recorded a moderate hopper incidence (49.20, 38.80 &32.20) respectively. While lower mean hopper incidence (11.40 & 5.40) was recorded in Malgova and Arka Puneet. The least mean hopper population (1.66) was noticed in Suvarnarekha.

The statistics of mean hopper population on final week was in the range from 73.80 to 1.20. The higher mean hopper incidence (73.80) was recorded in K-11. Further the mean hopper population (66.00) was recorded in Alphonso. Previously Alphonso had a peak incidence during the 3rd week. Varieties like Neelam, Jahangir and Senthoora had

recorded an average hopper population (24.20, 21.80 & 17.40) respectively. Minimum mean incidence of hopper (7.40) was recorded in Malgova. The least mean hopper population (2.80 & 1.20) was recorded in varieties like Arka Puneet and Suvarnarekha respectively.

Discussion

In the present study, it has been found that the mean hopper incidence was in Peak incidence in all varieties during the 1st week of May. Akash Varshney, (2013) [13] *Amritodus atkinsoni* (Leth.) showed a rise from the month of March onwards and it also attained its peak population during May. The mean population of hoppers in variety like K-11 and Alphonso reduced from (152.00 to 73.80) and (127.60 to 66.00) respectively. Raut *et al.,* (2018) [9] recorded considerable reduction in hopper population in Alphonso is in line with the present findings. While other varieties like Neelam, Senthoora, Jahangir, Malgova Suvarnarekha, Arka Puneet also showed a gradual decrease of mean hopper population from the second week of May which continued till the last week of May in all varieties. Further the finding also coincides with the finding of Ashok Kumar *et al.,* (2014) [4] who recorded the gradual drop in the hopper population at the end of May at Jhansi (UP). Hence this study concludes that hopper population attained its peak incidence during the 1st week of May in varieties like K-11, Neelam, Alphonso and Senthoora. The mean hopper incidence was found to be high in these varieties throughout the study period. Namni *et al.,* (2017) [5] stated that the entire insect species abundance was highest during April to May. Mango hopper population in the month of May was maximum and coordinated to fruit set. On the other hand the hopper incidence was found to be very least in varieties like Suvarnarekha and Arka Puneet throughout the study period. While the mean hopper incidence in these varieties also dropped gradually from the second week of May and recorded a least hopper incidence at the end of May.

Conclusion

The research on varietal preference of mango hoppers has provided us a proposal about the mango hopper resistant variety during the peak incidence of mango hopper. Therefore it would be helpful for the farmers to plant an cultivate hopper resistant varieties like Suvarnarekha and Arka Puneet thereby reducing the hopper attack which results in healthier tress and increased efficiency of the orchard.

References

1. Babu LB, Maheshwari TM, Rao NV. Seasonal incidence and biology of the mango hoppers. Association for Advancement of Entomology (AAE). 2002; 27:35-42.
2. Godase SK, Bhole SR. Shivpuje PR, Patil BP. Assessment of yield loss in mango due to mango hopper (Indioscous niveosparsus; Hemiptera: Cicadellidae). Indian Journal of Agricultural Research. 2004; 74(7):370-372.
3. Kannan M, Rao NV. Ecological studies on mango hopper, *Amritodus atkinsoni* in Andhra Pradesh as a basis for IPM. Crop Research. 2006; 32:235-238.
4. Kumar A, Swami VP, Amrita Singh A. To Study on the population Dynamics of Mango Hopper *Amritodus atkinsoni* leth. Research Journal of Chemistry and Environmental Sciences. 2014; 2(3):48-51.
5. Namni S, Amin MR, Miah MRU, Rahman MF, Suh SJ. Role of weather parameters on seasonal abundance of insects in a mango-based agroforestry in Bangladesh, with particular reference to mango hopper. Bangladesh Journal of Agricultural Research. 2017; 42(2):197-205.
6. NHB. Indian Horticulture Database-2014 published by National Horticulture Board, Ministry of Agriculture, Government of India, 2015, 302.
7. Pruthi HS, Batra NN. Important fruit pests of North-West India. ICAR Bull. No. 80 (ICAR, New Delhi, India), 1960, 113.
8. Rahman SK, Kuldeep MA. Mango hoppers: Bioecology and management. A Review. Agricultural Reviews. 2007; 28:49-55.
9. Raut PP, Desai VS, Narangalkar AL, Haldankar PM, Dhekale JS, Borkar PG. Journal of Entomology and Zoology Studies. 2018; 6(4):138-141.
10. Sen AC, Chaudhari DP. Attraction of *Idioscopus clypealis* (Leith) (Cicadellidae: Homoptera) to Sticky Colored Traps in Mango Orchard. Indian Agriculturist. 1961; 5(1):85-86.
11. Sohi AS, Sohi AS. Mango leafhoppers (Homoptera: Cicadellidae) -A review. Journal of Insect Science. 1990; 3:1-12.
12. Tandon PL, Verghese A. World list of insects, mites and other pests of mango. Technical Document Indian Institute of Horticultural Research, Bangalore, India. 1985; 5:22.
13. Varshney A. Species composition and relative abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Western Uttar Pradesh. Nature & Environment, 2013; 18(1&2):9-15.
14. Verghese A, Rao GSP. Determination of relevant critical stages for the management of mango hopper *Idioscopus clypealis* (Lethierry). Indian journal of Horticulture. 1987; 4:280-283.
15. Zagade MV, Chaudhari JN. Impact of meteorological parameters on population dynamics of mango hopper in high rainfall zone of Konkan region. Journal of Agrometeorology. 2010; 12(1):111-113.