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Seasonal incidence of mango hopper *Amritodus atkinsoni* Leth.

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Abstract

Field experiment entitled “Study of seasonal incidence of mango hopper *Amritodus atkinsoni* Leth” was conducted during 2018-19 in the farm of Horticulture section, NARP, Shenda Park, Kolhapur, (Maharashtra) with the objective to study the seasonal incidence of mango hopper. The study revealed that incidence of the mango hopper was noticed from month of Sept. corresponding to 36 M.W, 2018 the population was (1.19 hoppers/panicle) and started gradually increasing from 37 to 41 M.W. The incidence was 3.43 hoppers/ panicles in 41st M.W. The peak incidence of mango hopper was found to be in the 49th M.W i.e. (12.31 hoppers/panicle). Increase in temperature and sunshine resulted in the migration and take hoppers from panicles and shoot to shelter and trunk. The incidence of mango hopper was positively correlated with bright sunshine while it was and negatively correlated with maximum temperature, minimum temperature, relative humidity and rainfall, respectively.

Keywords: mango hopper *Amritodus atkinsoni*, *Mangifera indica*

Introduction

Mango, *Mangifera indica* L. is an important fruit crops of India and occupies important place in horticultural wealth and economy of country. This crop is cultivated since 4000 years ago in Asia and believed to be having its origin in South East Asia. Its utility occupies prime position among all the fruit crops grown in India hence called as “King of Fruits.” due to its nutritional richness, unique taste, flavor and medicinal importance. Subtropical countries such as India Bangladesh, Bhutan and Pakistan are leading countries in mango production. India is the largest producer of mango with production of 184.31 lakh tones in area of 25.16 lakh ha (Anonymous, 2014) ^[2] and productivity of 7.3 MT/ha. There are several mango varieties grown in the country and Maharashtra is well known for production of mangoes like alphonso, pyri, kesar, ratna, sindhu, but carabao mango, known in the international market as the “Manila Super Mango,” is the most popular. Piko and Indian varieties rank next to carabao variety in terms of production volume and popularity. Mangoes help to lower the cholesterol and the fiber content is a wonderful aid to digestion regularity and they are rich in the vitamins A and C. Ripe mangoes may have a variety of colors, being red, orange, green to yellow when ripe (Tharanathan *et al.*, 2006) ^[11]. They provide more carotenoids than other fruits, they are also low in calories. Ripe mangoes have a pleasant fruity aroma and will yield slightly to pressure. Mangoes are eaten as raw, cooked, frozen, preserved or dried. Ripe mangoes are used for confectioneries, ice-cream, and bakery products while unripe mangoes (usually the Indian variety) are a good source of juice. The demand for processed mango is increasing, as seen in the proliferation of mango products in super markets and groceries. Out of important insect species infesting mango, the cicadellids (Jassids) popularly known as ‘Mango hoppers’ have been recognized as the most noxious insect pest causing damage almost every year throughout the country, which causes heavy damage to mango crop (Adnan *et al.*, 2014). The different mango hopper species are serious at flowering and fruiting stages and could cause yield loss up to cent per cent (Prabhakara *et al.*, 2011) ^[5]. Mango orchards are subjected to the attack of several insect pests, among them hopper infestation is major yield limiting factor which affect the productivity and quality of mango fruits, the three important species of mango hoppers viz., *A. atkinsoni*, *I. clypealis* and *I. niveosparsus*. Mango hopper *Idioscopus niveosparsus* Leth is the major pest infesting to the mango crop in Maharashtra state specially in South Konkan Region (Munj *et al.*, 2018) ^[4]. In Maharashtra Kesar and Alphonso these varieties generally followed by farmers. The reason for low productivity of Alphonso in Konkan region are high incidence of pest and diseases due to hot and humid climate. Among insect pest, mango hopper is the number one serious and destructive pest of mango.

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Apart from causing menace in various states of India, the hopper pest has been found prevalent in most of tropical and subtropical countries in South East Asia. Damage is caused by both nymphs and adults by sucking the sap from tender leaves, inflorescence as a consequence of which inflorescence and fruits if any set, fall prematurely. Mango hoppers secrete honey dew which facilitates the development of sooty mold on twigs, leaves and inflorescence. Due to sooty mold photosynthetic activity adversely affected and ultimately fruit setting is also affected (Raut *et al.*, 2018) [4].

Materials and Methods

The present investigation, entitled “Study of seasonal incidence of mango hopper *Amritodus atkinsoni* Leth”, was conducted at the Horticulture Farm NARP, Shenda Park, Kolhapur during Sept. 2018 to Feb. 2019. The field selected for experiment was medium black type with medium fertility and the land was levelled with adequate drainage. Kolhapur has subtropical climate and average rainfall of 1195 mm. It is situated on 569 meter (1867 ft.) above mean sea level. It lies between 16.41° North to 74.13° East latitude with maximum temperature of 40°C and minimum of 11.4 °C. Experiment was conducted on Kesar variety of mango at NARP, Shenda-park, Kolhapur. The orchard was planted at 4m x 3m spacing which was 5 years old.

To study the seasonal incidence of Mango hopper, *Amritodus atkinsoni* Leth. the observation was recorded on the basis of meteorological data. The observations for studying the seasonal incidence was recorded from Sep. 2018 to Feb. 2019. The observations were recorded on weekly basis method suggested by Pushpalatha *et al.*, (2011) [5] and Sarode and Mohite (2016) [9] of infestation on panicles at weekly basis throughout the season September 2018 to Feb 2019. Five panicles from each trees was selected and the hopper population was observed on weekly basis.

The correlation of different weather parameters in relation with population of mango hopper was calculated.

Results and Discussion

The data on number of leaf hoppers per panicle under field conditions along with weather parameters *viz*; temperature (Maximum and Minimum), relative humidity (Morning and Evening), rainfall and bright sunshine hours are presented in Table 1 and Correlation between mango hopper, *A. atkinsoni* incidence along with weather parameters are presented in Table 2.

The observations on incidence of mango hopper revealed that

infestation started from September 7 onward (1.19 hoppers/ panicles) when the temperature, relative humidity and rainfall were 27.72 °C, 88.28 percent and 4.55 mm, respectively. The incidence of the mango hopper started gradually increasing from 37 to 39 M.W corresponding to the 2nd week of September to 4th week of September. The incidence was (1.83 hoppers/panicle) in 39th MW, when the temperature and relative humidity was 35.15 °C and 86.57 per cent, respectively. The peak incidence of mango hopper was found to be in 49th M.W i.e. 12.31 hopper/ panicle when the temperature and relative humidity was 30.1 °C and 74.71 per cent, respectively. High humidity in the morning favours the multiplication of mango hopper.

The correlation coefficient between the hopper population on panicle and corresponding weather parameters during 2018-19 was found to be negatively associated with (x=-0.40) for maximum temperature, (x=-0.59) for minimum temperature and (x=-0.39) for morning relative humidity (R.H.1), (x=-0.003) for evening relative humidity and (x=-0.28) for rainfall, respectively and positively correlated with bright sunshine (x=0.127)

Increase in temperature and sunshine resulted the migration and take hoppers from panicles and shoot to shelter and trunk. However, some contradictions in the effect of some parameters on hopper populations can be attributed to the fact that fluctuated whenever and not homogeneous occurrence of sudden rainfall.

Population of *A. atkinsoni*. Leth started increasing with the beginning of flowering season in the month of Oct. To Dec. The results are agreement with Rahman *et al.*, (2015)

These results are in agreement with, Pushpalatha *et al.*, (2008) [6]; Kumari *et al.*, (2009). and Debanath *et al.* (2013) [3] also revealed that highest number of mango hoppers were recorded during 49th M.W., on primary branch followed by leaves and inflorescence and correlation-coefficient studies revealed that significant negative influence of relative humidity and positive influence of maximum temperature on the population of mango hoppers. Sarode and Mohite (2016) [9] revealed that the incidence of the mango hopper started gradually increasing from 2nd week of September to 4th week of September corresponding to 37 to 39 M.W. The incidence was (18.22 hopper/5 panicles) in 39th M.W., when the temperature and relative humidity was 33.30c and 93 per cent, respectively. The peak incidence of mango hopper was found to be in 44th M.W i.e 45.76 hoppers/5 panicles when the temperature and relative humidity was 31.20 c and 88 per cent, respectively.

Table 1: Seasonal incidence of mango hopper *Amritodus atkinsoni* L

Month	M.W.	Number of mango hoppers/ panicle	Max. Temp. (°C)	Min. Temp. (°C)	R.H.1 (%)	R.H.2 (%)	Rainfall (mm)	Bright Sunshine (Hrs.)
Sept 2018	36	1.19	27.72	19.55	88.28	84.71	4.55	3.3
	37	1.71	30.44	18.82	80.57	73.42	0	0
	38	1.83	31.3	19.6	79.42	63	126.3	0.5
	39	2.01	35.15	22.71	86.57	58	12.65	3.7
Oct 2018	40	2.28	32.5	15.24	81.71	52.71	2.2	4.2
	41	3.43	33.45	14.04	84.28	49.14	2.3	6.5
	42	3.98	32.01	13.38	83.71	56.42	12.5	4.8
	43	4.71	32.02	13.14	79.85	53.42	27	2.7
Nov 2018	44	5.36	31.07	12.42	74	51	0	2
	45	5.61	32.02	12.95	78.28	51.71	8.4	7.3
	46	6.51	32.38	11.82	65.85	32.57	16	8.1
	47	8.92	33.07	12.71	76.28	63.14	0	7.4
	48	11.64	30.1	11.57	69.57	52.57	0	6.6
Dec 2018	49	12.31	30.1	12.95	74.71	61.64	0	5.5

	50	11.71	30.25	11.75	71.42	58.85	0	3
	51	10.56	27.27	14.51	80.42	41.41	0	4.6
	52	10.31	29.06	16.46	76	52.37	0	6.5
Jan 2019	1	8.16	30.3	12	85	37	0	8.5
	2	6.61	30.7	12.3	98	29	0	9
	3	6.59	31	14.2	85	36	0	9.3
	4	4.72	29.9	13.7	88	34	0	9.3
	5	3.58	29.6	14.5	85	31	0	8.1
Feb 2019	6	3.48	32.5	13.2	82	27	0	10.1
	7	3.54	33	15.5	74	24	0	9.7
	8	3.63	35.1	17.3	72	22	0	9.9
	9	4.03	34.3	14.9	82	22	0	10.3

Table 2: Correlation between mango hopper, *A. atkinsoni* Leth incidence with weather parameters.

Sr. No	Meteorological Parameters					
	Max. Temp.	Min. Temp.	Relative Humidity Morning	Relative Humidity Evening	Rainfall	Bright Sunshine
	Correlation coefficient values					
1	-0.40*	-0.59*	-0.39*	-0.003*	-0.28*	0.127

* = Significant at 5 per cent level

Conclusions

The meteorological data revealed that incidence of the mango hopper was noticed from month of September corresponding to 36 M.W, the population was 1.19 hoppers / panicle and started gradually increasing from 37 to 41 M.W. The incidence was (3.43 hoppers/ panicle) in 41st M.W., when the temperature and relative humidity was 33.45^oc and 84.28 per cent, respectively. The seasonal incidence of mango hopper observed from Sept.2018 to Feb. 2019. The peak population of mango hopper observed in the 49th M.W. (12.31 hoppers/panicles). The correlation coefficient between the hopper population on panicle and corresponding weather parameters during 2018-19 was found to be negatively associated with ($x=-0.40$) for maximum temperature, ($x=-0.59$) for minimum temperature and ($x=-0.39$) for morning relative humidity (R.H.1), ($x=-0.003$) for evening relative humidity and ($x=-0.28$) for rainfall, respectively and positively correlated with bright sunshine ($x=0.127$)

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