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Impact of Environmental Factors on Population of Idioscopus Clypealis (Hemiptera: Cicadellidae) on *Mango Mangifera Indica* L.

KEYWORDS: Mango Jassid, *Idioscopus clypealis*, population, environmental factors, Temperature, humidity, rain fall.

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ABSTRACT *Idioscopus clypealis (Hemiptera: Cicadellidae) is a serious pest of mango Mangifera indica Linn. in Kolhapur region of Maharashtra. Both Indigenous and Hybrid varieties are badly affected by the Jassids. Jassids suck the cell sap and inject toxins into the flowering and fruiting bodies as result these bodies drop down and cause 80- 90% damage to crop by yield. Environmental factors indicated that increase in temperature and decrease in humidity resulted in increase in population of I. clypealis. However, rain fall have less impact on the population dynamics of the Jassids on mango.*

INTRODUCTION

Mango *Mangifera indica* Linn. is one of the major fruit crop of India which is also cultivated in almost 87 countries of the world including China, Indonesia, Thailand, Philippines, Mexico, Pakistan, Brazil, Bangladesh, and USA. (Tharanathan, 2006; Ashok kumar, 2015). It can grow under tropical and subtropical conditions. Although mango is king of fruits it is attacked by a very large number, 492 species of insect pests. Out of which 12 species are causing several damage to mango in India (Butani, 1979). Pickles, chantey, mango juice, squash, jam, custard powder coffee, etc. are important products prepared from mango for day to day use in human diet.

Amongst the various insect pests mango Jassids *Idioscopus clypealis* (Leth.) (Hemiptera: Cicadellidae) is worst and rank first as far as damage to crop is concern. It is responsible for dropping down of flowering and fruiting bodies of the crop and make crop sterile in severe infestation. Review of literature indicates that Jassids of mango are studied by Sood *et al*. (1971), Tandon *et al*. (1983), Dalvi and Dumbre (1994), Hiremath and Hiremath (1994), Pezhman and Rajabi (1999), Dwivedi *et al*. (2003), Anitha *et al*. (2009), Joshi and Sanjay Kumar (2012), Choudhary *et al*. (2012), Saeed *et al*. (2013) etc. Jassid population fluctuations on mango with respect to environmental factors will add great relevance in designing ecofriendly control measures. Hence, the present work was under taken.

MATERIALS AND METHODS

The studies were conducted in three orchards of Kolhapur districts namely Hatkanangale, Kolhapur and Radhanagari during the years 2014- 2015. The population of adult Jassid was counted with the help of insect net with three sweeping at weekly interval. While nymphs were counted on three inflorescences and metrological data such as temperature, humidity and rainfall was collected and correlated with the insect populations.

Meteorological features of Kolhapur-

Kolhapur is located between 15^0 to 17^0 North Latitude and 73^0 to 74^0 East longitude with an uneven rain fall 700 mm to 6000mm and temperature range 9^0C - 40^0C, relative humidity 55% - 85%.

RESULTS

Results recorded in table 1 and 2 indicated that during the monsoon, jassid population on the mango was relatively low than in blooming season (summer). There was two peaks of population of jassids in the year on mango namely in September and in April. During September- October Jassids damaged tender leaves (fig. 2). After September, in winter, adults were entered into hibernating stage and found sitting on the tree trunk and on branches of the mango. From February to May- June both nymphs and adults were noted on the crop as cell sap suckers of blooming and fruits of mango. However, from June onwards the adults were found sitting on bark of the tree trunk (fig.1) in large number. Similarly, in cold months October to January adults were found sitting on the bark of the tree trunk in thousands. However, in winter jassids entered in hibernating stage. During the observations, it has been noted that the population of jassids was increased with increase in temperature and reduction in relative humidity. However, rainfalls have less impact on the population dynamics of jassids since, they get shelter from the under surface of the leaves during the rains. The reduction in population of jassids was also related to availability of suitable food source.

Table- 1. Occurrence of adult *I. clypealis* on mango during fruiting season

Months	Adults (Number/3 sweeps)	Nymphs (Number/ twig)	R.H. (%) (Min.)	Temperature (^{0}C) (Max.)	Rainfall (average mm)
February	17	-	60	31	0
March	38	140	65	32	1
April	45	218	65	32	3
May	42	110	55	35	18
June	46	81	65	32	54

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Table – 2. Occurrence of adult *I. clypealis* on mango during monsoon period

Months	Adults	Nymphs	R. H.(%) (Min.)	Temperature (^{0}C) (Max.)	Rainfall (mm)
July	7	29	65	29	128
August	12	122	65	28	143
September	15	150	65	30	79
October	4	67	60	32	22
November	4	-	60	33	0

DISCUSSION

The population of *Idioscopus nitidus* (Walker) was strongly affected by temperature and relative humidity (Joshi and Sanjay Kumar, 2012). According to Joshi and Sanjay Kumar (2012) the population of *I. nitidus* remained low during the winter and started appearing with the panicle emergence. Meteorological factors viz. temperature, humidity and rainfall affected the mango hopper population. Peak hopper population (5.57) was recorded in temperature range of (37.10^{0}C) as maximum, whereas, relative humidity was very low (48%). With the increase in temperature and decrease in relative humidity, hopper population raised. Thus, temperature positively affected the hopper population, whereas, relative humidity had negative effect, but rainfall showed no significant effect, as it was fluctuating. Babu *et al.* (2002) also reported that the mean maximum and mean minimum temperature have positive effect on hopper population. Many workers (Dalvi and Dumbre, 1993; Dwivedi *et al.*, 2003; Tandon *et al.*, 1983) also reported that the relative humidity had negative effect on hopper population. These findings are in agreement with present results.

Pezhman (2005) studied the effect of environmental factors on population fluctuation of mango hopper *I. clypealis* in south east Iran. The population fluctuations of the insects were studied by weekly sampling, using sweeping net on mango trees in two regions viz.- Minab and Siahoo from middle of August 1995 to August 1996. The maximum and minimum population densities were recorded in April- May and December- January in Minab respectively. In both regions, the effect of average temperature and relative humidity per cent on pest population density was significant at 5 % probability level. The effect of average temperature was more important. The relation between increasing population density and relative humidity was negative in the above case study.

Ashok Kumar (2015) recorded that the population of *Amritodus atkinsoni* Leth. was maximum in the first week of April which continuously increased and reached to minimum in the last week of May. A considerable reduction was found in the population from April to May. In first peak, *A. atkinsoni* showed an increase from March onwards and it also reached its peak in May in the survey. After this, population of *A. atkinsoni* showed a fall and then a second peak was recorded in its population in the month of August, after which population of *A. atkinsoni* showed a fall till the end of December, then the hopper disappeared. The present study will be helpful for designing timely and ecofriendly control measures for jassids on mango.

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Fig.-1. *I. clypealis* resting habitat (Tree trunk)

Fig.-2. *I. clypealis* damaging tender leaves in monsoon.

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