

Short Communication

Effect of some abiotic factors on population buildup of *Idioscopus clypealis* (Lethierry) in western Uttar Pradesh

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Abstract: *Idioscopus clypealis* (Lethierry) is commonly known as mango leaf hopper. The hopper reduces mango production by causing non setting of flower and dropping of immature fruits. The first appearance of hoppers (0.12 and 0.16) on the branches of mango trees was recorded in February, which is correlated with increase in maximum (23.89°C and 24.29°C) and minimum temperature (11.46°C and 11.88°C) and decrease in relative humidity (88.15% and 86.85%). Peak hopper population (5.88 and 6.46) was recorded in May on temperature range of (40.34°C and 40.88°C) and (27.22°C and 27.62°C) as maximum and minimum, which was very high, whereas, relative humidity was very low (55.80% and 55.09%). With the increase in maximum and minimum temperature and decrease in relative humidity, hopper population raised. Thus, maximum and minimum temperature positively affected the hopper population, whereas, relative humidity had negative effect, but rainfall showed no significant effect, as it was fluctuating.

Key words: *Idioscopus clypealis* (Lethierry), Population, Temperature, Relative humidity, Rainfall
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Introduction

The mango, *Mangifera indica* (Linn.) is grown in India in large extent and is considered as a king of all the fruits. The largest producer state of mango is Uttar Pradesh. In proportion to its area of cultivation, its production is very low due to insect pests. Among the mango pests, mango hoppers are most serious and widespread pests throughout the country. *Idioscopus clypealis* (Lethierry) is most common and destructive species of hoppers, which cause heavy damage to mango crop. Large number of nymphs and adults of the hoppers, puncture and suck the sap from tender shoots, inflorescence and leaves of mango crop, which cause non-setting of flowers and dropping of immature fruits, thereby reducing the yield. Hoppers also excrete a secretion, called honey dew. In moist weather, it encourages the development of fungi like *Meliola mangiferae* (Earle), resulting in growth of sooty mould on dorsal surface of leaves, branches and fruits. This black coating interferes with the normal photosynthetic activity of the plant, ultimately resulting in non-setting of flowers and dropping of immature fruits. This damage is called as Honey Dew Disease. Hoppers remain active throughout the year in cracks and crevices of mango trunk, but they are recorded on twigs, when young leaves and inflorescence are available (Patel *et al.*, 1994). Through many workers (Sood *et al.*, 1971; Dalvi and Dumbre, 1994; Hiremath and Hiremath, 1994; Dwivedi *et al.*, 2003) have provided data on seasonal incidence and influence of weather parameters on the development of the hoppers, but information pertaining to its development in local environment is lacking. Hence detailed studies were carried out to determine the effect of some abiotic factors on population buildup of *Idioscopus clypealis* (Lethierry) in Western Uttar Pradesh.

Materials and Methods

In the present study hoppers were collected from mango orchards of two districts viz. Bareilly and Badaun of western Uttar

Pradesh. Hoppers were collected by bag trap method (Verghese and Rao, 1987) and sweep method. Meteorological data from April 2004 to March 2005 on maximum and minimum temperature, relative humidity and rain fall of selected sites was collected from Meteorological Station, Lucknow.

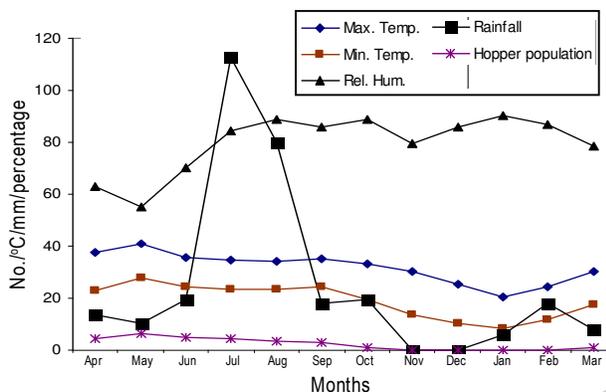
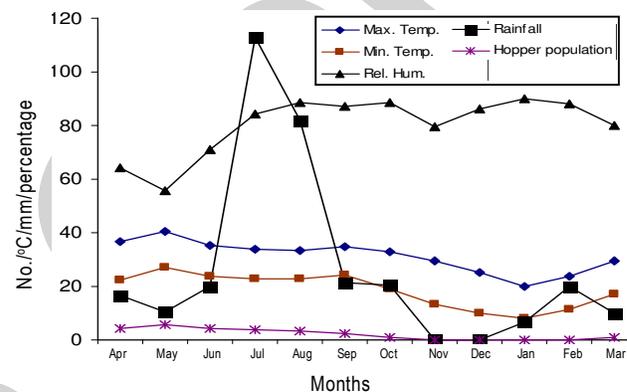
Results and Discussion

It was observed (Table 1, Figs. 1, 2) that in the month of January when no hopper was seen on the mangoes in both the research sites, the mean maximum (20.02°C and 20.45°C) and minimum temperature (8.02°C and 8.34°C) were very low, while, the relative humidity was comparatively very high (90% and 90.01%) and rainfall was also very low (6.44 mm and 5.7 mm). During the month of February when the hoppers started appearing, mean maximum temperature (23.89°C and 24.29°C) and minimum temperature (11.46°C and 11.88°C) also started rising; whereas, the relative humidity (RH) showed slight decline (88.15% and 86.85%). However, rainfall (RF) showed slight fluctuation in its value (20.21 mm and 17.83 mm). The increase in the hopper population (HP) was found to be associated with the flushing of inflorescence, as this species of hoppers bred only on inflorescence. The peak of hopper population (5.88 and 6.46) was recorded in the month of May in both the study areas and it was seen that at this time mean maximum temperature (40.34°C and 40.88°C) and mean minimum temperature (27.22°C and 27.62°C) were extremely high. However, relative humidity was very low (55.80% and 55.09%). On the other hand rainfall showed great fluctuations (10.65 mm and 10.08 mm). From June onwards hopper population started declining (4.24 and 4.76) with that mean maximum temperature (35.40°C and 35.63°C) and mean minimum temperature (23.73°C and 24.50°C) also decreased; whereas, relative humidity increased (71.08% and 70.39%) and rainfall showed fluctuations (20.23 mm and 19.38 mm).



Table - 1: Effect of abiotic factors on population buildup of *Idioscopus clypealis* (Lethierry) in different environmental conditions of western U.P. (April 2004 to March 2005)

Months	Bareilly					Badaun				
	Max. temp.	Min. temp.	R.H.	R. F.	H. P.	Max. temp.	Min. temp.	R.H.	R. F.	H. P.
April	36.7	22.41	64.35	16.68	4.36	37.46	22.72	62.87	13.73	4.56
May	40.34	27.22	55.8	10.65	5.88	40.88	27.62	55.09	10.08	6.46
June	35.4	23.73	71.08	20.23	4.24	35.63	24.5	70.39	19.38	4.76
July	34.02	22.86	84.1	112.85	3.62	34.48	23.38	84.17	112.45	4.24
August	33.51	23.05	88.39	82.13	3.26	33.94	23.35	88.94	80.16	3.62
September	34.54	24.23	87.12	21.25	2.36	35.19	24.54	85.96	18.19	2.72
October	32.68	19.13	88.73	20.64	1.02	33.37	19.56	88.77	19.59	1.12
November	29.5	13.25	79.55	0.0	0.0	30.2	13.85	79.65	0.0	0.0
December	25.13	9.96	86.31	0.0	0.0	25.56	10.11	85.89	0.0	0.0
January	20.02	8.02	90	6.44	0.0	20.45	8.34	90.01	5.7	0.0
February	23.89	11.46	88.15	20.21	0.12	24.29	11.88	86.85	17.83	0.16
March	29.32	17.31	80.13	9.85	0.92	30.44	17.58	78.76	8.04	1.16

**Fig. 1:** Comparative study of effect of abiotic factors on population buildup of *Idioscopus clypealis* (Lethierry) in Bareilly**Fig. 2:** Comparative study of effect of abiotic factors on population buildup of *Idioscopus clypealis* (Lethierry) in Badaun

From these observations, it can be concluded that population of *Idioscopus clypealis* (Lethierry) is strongly affected by temperature and relative humidity, which is in accordance to the findings of Palo and Garcia (1935), Dalvi and Dumbre (1994), Fletcher and Dangerfield (2002) and Dwivedi *et al.* (2003). Mean maximum and mean minimum temperature have positive effect on hopper population, as reported by Sen and Prasad (1954), Sood *et al.* (1971), Patel *et al.* (1994) and Babu *et al.* (2002). Relative humidity has negative effect on hopper population, which is in conformity with the findings of Tandon *et al.* (1983), Hiremath and Hiremath (1994) and Pezhman and Radjabi (2002).

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