



ORIGINAL ARTICLE

Host searching and feeding behavior of mango leafhoppers in orchards of western Uttar Pradesh

Akash Varshney

Department of Zoology, Y.D. (P.G.) College, Lakhimpur-Kheri, U.P. India

Email: akash82varshney@yahoo.com

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ABSTRACT

Among the mango pests, mango hoppers are most serious and widespread pests. In north India, two species of mango leafhoppers i.e., *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) are reported. Both adults and nymphs of mango leafhoppers sucked the sap from inflorescence and when it was not available, they thrived on the leaves of mango trees. The damage was mainly caused by hoppers due to sucking of sap from tender shoots, leaves and inflorescence, which ultimately affected the fruit setting. The infested florets turned brown, shriveled and ultimately fall down from the trees, reducing the yield. During feeding, leaf hoppers were found excreting a secretion known as honey dew, which encouraged the development of fungi, resulting in growth of sooty mould on dorsal surface of leaves, branches and fruits. The mango was the only host for the *Idioscopus clypealis* (Leth.); whereas, it was the principal host for *Amritodus atkinsoni* (Leth.), but fig served as a minor host for the hoppers of *Amritodus atkinsoni* (Leth.).

Key words: *Amritodus atkinsoni*, damage, *Idioscopus clypealis*, *Mangifera indica*

INTRODUCTION

The mango, *Mangifera indica* (Linn.) is one of ancient fruit of Indian origin. It is grown in India in large extent and is considered as a king of all the fruits. In India, the largest producer state of mango is Uttar Pradesh; where, 5,38,383 acres area is under mango cultivation and constitutes nearly 90% of the area under the fruits. In the Western part of Uttar Pradesh mango orchards are distributed in large numbers. In proportion to its area of cultivation, its production is very low. Out of many factors responsible for its low productivity, one of the major factors is threat of insect pests, which cause a major loss to mango industry (Kumar, 2015). Among the mango pests, mango hoppers are most serious and widespread pests throughout the country. 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 (Butani, 1993). 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). In north India, two species of mango leafhoppers i.e., *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) are reported so far. Therefore, present study includes feeding behavior, pattern of damage and host searching of both the species of mango leafhoppers in different ecological conditions of Western Uttar Pradesh.

MATERIALS AND METHODS

Both adults and larval instars were observed to study their feeding behaviour in the field as well as the laboratory. The damage caused by adult hoppers and larval instars to the mango crop was observed in the field. To study the host searching of adults, a round tray of 25cm diameter and 6cm height was prepared from galvanized iron sheet and was marked with pencil in to three equal parts. Leaves of three plants-mango (*Mangifera indica*), citrus (*Citrus* spp.) and fig (*Ficus carica*)

were placed at equal distance from the center in each part of the tray (Fig.1). Then, movement of hoppers towards the leaves was observed.

OBSERVATIONS AND DISCUSSION

During the present study, it was observed that both adults and nymphs of mango leafhoppers sucked the sap from inflorescence and when it was not available, they thrived on the leaves of mango trees. Their piercing and sucking mouth parts helped in feeding. Leafhoppers were mainly phloem feeder and their mouth parts passed through the cortical cells to reach the phloem, then the sap was sucked with the help of stylets, which were modified mandibles and maxillae.

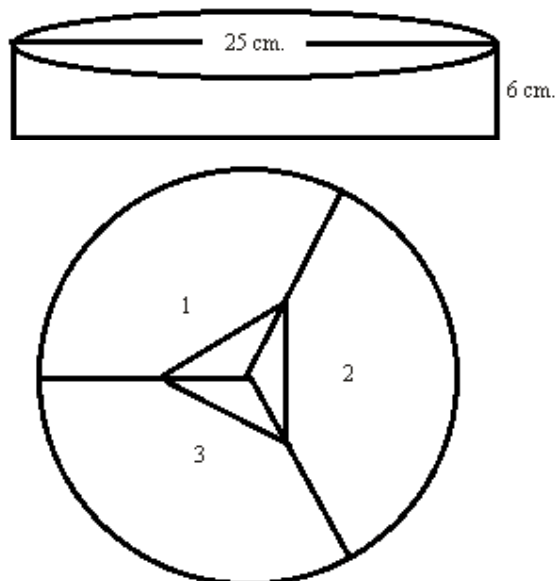


Fig. 1: Cage showing preparation for the study of host preference of mango leaf hoppers

The damage was mainly caused by hoppers due to sucking of sap from tender shoots, leaves and inflorescence, which ultimately affected the fruit setting. The infested florets turned brown, shriveled and ultimately fall down from the trees. During feeding, leaf hoppers were found excreting a secretion known as honey dew, which encouraged the development of fungi, resulting in growth of sooty mould on dorsal surface of leaves, branches and fruits. This black coating interfered with the normal photosynthetic activity of the tree, ultimately resulting in non-setting of flowers and dropping of immature fruits. It was also observed that after some time honey dew dried into a shiny, yellow incrustation, thus, giving an ugly and diseased appearance to the affected parts. A little damage was also noticed to be done by the ovipositor of females to the florets, flowers and tender leaves during the egg laying.

It was evident from the observation on feeding behaviour that both the adults and nymphs of mango leafhoppers sucked the sap from inflorescence and leaves of the mango trees, which ultimately affected the fruit setting and lowers the fruit production which is in concurrence with Atkinson (1890), Singh (1968) and Sohi and Sohi Sr. (1990). During the study, it was noted that at the time of feeding, leaf hoppers excreted a secretion, called 'honey dew', which encouraged the development of fungi, resulting in growth of sooty mould on dorsal surface of leaves, branches and even on fruits and affected the photosynthetic activity of the trees. Butani (1993) named it as 'Honey Dew Disease'. During the present study, a little damage was also noted to be done by the ovipositor of females during the egg laying, which was also reported by Ayyar (1940) and Butani (1979).

To study the host searching of adult hoppers, a laboratory trial with completely randomised design was conducted, for the purpose a round tray of 25cm diameter and 6cm height was prepared from

galvanised iron sheet and marked with pencil in to three equal parts. Leaves of three plants viz., mango (*Mangifera indica*, L.), citrus (*Citrus* spp.) and fig (*Ficus carica*, L.) were placed at equal distance from the centre in each part of tray. 50 adults of *Idioscopus clypealis* (Leth.) were released in each of the two trays of such type and 50 adults of *Amritodus atkinsoni* (Leth.) were released into another two trays. Each tray was covered with a polythene sheet, kept in position by rubber band. Few punctures were made in sheets with pin for aeration. The adults, thus confined, were allowed to migrate and settle to their preferred host.

After 24 hours from release, adult hoppers were counted on the leaves of each plant. During the observations, it was noted that the adults of *Idioscopus clypealis* (Leth.) were found only on the leaves of mango; whereas, the adults of *Amritodus atkinsoni* (Leth.) were mostly found on mango leaves, but some adults were also found on the leaves of fig.

Thus, mango was the only host for *Idioscopus clypealis* (Leth.); whereas, it was the principle host for *Amritodus atkinsoni* (Leth.), but fig served as a minor host for the hoppers of *Amritodus atkinsoni* (Leth.).

The ability to test the hoppers of both the species, to locate their specific host for their survival has been found to be mainly mango in the present investigation. During the experiments on host searching in laboratory, it was found that the adults of *Idioscopus clypealis* (Leth.) were found only on the leaves of mango, indicating that the mango is the only host for this species, which is in conformity with the findings of Sohi and Sohi Sr. (1990), Sharma and Sharma (2011) and Kumar (2015). However, some adults of *Amritodus atkinsoni* (Leth.) were also found on the leaves of fig. Bhatnagar (1974) also reported fig as an alternate host for *Amritodus atkinsoni* (Leth.).

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