



Seasonal incidence and weather based forecasting model for mango leaf webber *Orthaga euadrusalis* walker (Lepidoptera: Pyralidae) under subtropical conditions

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ABSTRACT

A field experiment was conducted for two consecutive seasons (2013 and 2014) in Lucknow, Uttar Pradesh to study seasonal incidence and develop weather based forecasting model for mango leaf webber. A wide variation was observed in the leaf webber incidence across fixed plot orchards, standard meteorological weeks (SMW) and between two seasons. The peak incidence of leaf webber was found during the 37th SMW during the year 2013 with 9.7 webs per tree, whereas, in the consecutive season its peak incidence was observed during 38th SMW with 3.5 webs per tree. Mango leaf webber incidence was found to be significant negative correlation with minimum temperature ($r = -0.39^{**}$), wind speed ($r = -0.48^{**}$) and positively correlated with the minimum relative humidity ($r = 0.37^{**}$). Compare to linear models, polynomial models had explained highest amount of variation. Minimum temperature, minimum relative humidity along with wind speed had explained 36 per cent of variation in the leaf webber incidence. Hence, the weather based forecasting model for the leaf webber (Y) for Lucknow region is $Y = 31.90 - 1.35 \times \text{minimum temperature} - 0.72 \times \text{wind speed} + 0.08 \times \text{minimum relative humidity}$ ($R^2 = 0.36$; $F = 4.20$ $p < 0.01$). This prediction model after validation can be utilized in the agro advisories for predicting the incidence and timely management of leaf webber.

Key words: Leaf webber, Mango, Regression model, Seasonal incidence

Mango (*Mangifera indica* L.) is considered as a major fruit crop, popularly known as king of fruits. This crop suffers regularly a huge loss due to ravages of insect pests. Mango leaf webber, *Orthaga euadrusalis* recently has become major limiting factor in mango production regions of Uttar Pradesh, Bihar and other parts in north India (Rajkumar *et al.*, 2013). Leaf webber is a lepidopteran pest, the adult moth do not directly cause any economic damage to the host plant. The larvae of the Pyralid moth are voracious leaf eaters that web together the cluster of leaves in to a colony. A heavily infested tree shows many clusters of webbed and dried leaves, presenting it a conspicuous burnt up appearance (Rafiq and Ranjini, 2011). The extent of damage caused by this pest under favourable conditions was estimated as 35 per cent (Srivastava and Tandon, 1982). Verghese (1998) reported that severe infestation of mango leaf webber results in complete failure of flowering.

Many workers has studied the different aspects of mango leaf webber time to time, that includes biology and incidence of the pest (Haseeb *et al.*, 2000; Singh, 2002; Beria *et al.*, 2008; Reddy, 2013), screening of the germplasm to identify the resistance source (Reddy *et al.*, 2001), exploration of entomopathogenic fungi (Asari *et al.*, 1977), efficacy of neem formulation and insecticides (Singh, 1999; Bhatia and Gupta, 2002). However, management of mango leaf webber is difficult due to the large size of mango tree, micro-ecosystem of the mango orchard in which the pest breeds in active period and

remained in the same orchard during off-season (Shukla *et al.*, 2001). Hence, timely management is the very crucial step to be followed for the effective control of this pest. Studies on population dynamics leaf webber and effect of abiotic factors are very few (Lakshmi *et al.*, 2011; Singh and Verma, 2013). Keeping in this view, the present study was conducted with the objective of quantifying seasonal incidence of leaf webber and develop weather based forecasting model for leaf webber for major mango growing area of Uttar Pradesh.

MATERIALS AND METHODS

A field experiment was conducted for two consecutive seasons (2013 and 2014) in Lucknow, Uttar Pradesh, India at 22 locations. The climate of the experimental site is semi-arid subtropical with hot dry summers and cold winters. Orchards of Mango cv. *Dashehari* of 20-35 years age were selected with planting 10 m $\times$ 10 m. Data on leaf webber incidence was recorded on weekly basis from 5 randomly selected trees in four direction of the tree. Leaf webber incidence was taken by visual counting of number of webs formed by the pest. For analysis, mean number of webs per tree was taken. Concurrently, daily weather data of temperature (maximum and minimum), relative humidity (maximum and minimum), rainfall, wind speed were recorded in the agromet observatory located within the experimental site. Mean weekly data of weather parameters were taken for the analysis.