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Seasonal Incidence of Jasmine Leaf Webworm, *Palpita unionalis* (Pyralidae: U. T. of Puducherry)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The seasonal incidence of *P. unionalis* was studied under *in situ* and in light trap collections. Under *in situ*, the seasonal incidence of jasmine leaf webworm, *P. unionalis* was recorded at weekly intervals based on per cent leaf and bud damage respectively from February 2012 to January 2013. The damage by *P. unionalis* was higher during January 2013 (18.08%) and lower per cent damage was recorded during May 2012 (1.13%). The multiple regression coefficient of weather parameters under *in situ* against the incidence of leaf webworm, *P. unionalis* in terms of per cent leaf damage showed a positive correlation with morning relative humidity, bright sunshine hours and a negative correlation with the maximum and minimum temperature, evening relative humidity and rainfall. In the light trap collections of leaf webworm, *P. unionalis* moths, a positive correlation was observed with the evening relative humidity, bright sunshine hours and a negative correlation with the weather parameters viz., maximum and minimum temperature, morning relative humidity and rainfall.

Keywords: Seasonal incidence; *in situ* and light trap collections; *Jasminum sambac*; *Palpita unionalis*.

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1. INTRODUCTION

India is the home for many species of jasmine and three of jasmine species i.e., *Jasminum sambac* Aiton, *Jasminum auriculatum* (Vahl.) and *Jasminum grandiflorum* L. which have been mentioned in ancient Tamil literature way back to 500 B.C. to 200 A.D. In India, jasmine is cultivated throughout the country. The term jasmine is derived from the Arabic Persian word "Yasmin" with a meaning of "gift from god".

It is generally a woody shrub, climber or a trailer with two hundred species mostly from Asia, Europe and Africa. It is native to tropical and warm temperate regions. In India the cultivation of jasmine is done majorly in the states like Tamil Nadu, Karnataka and Andhra Pradesh [1]. In Tamil Nadu, *J. sambac* is cultivated in the districts of Madurai, Ramanathapuram, Kanyakumari, Tirunelveli, Dindugal, Coimbatore and Salem [2]. It was stated that the commercially important species grown for cut flowers and perfumery industry are *J. sambac*, *J. grandiflorum* and *J. auriculatum* [3].

Jasmine prefers full sun to partial shade and a warm site. Jasmine can be grown on all soil types, well in moist, well drained, sandy loam to clayey garden soil with moderate level of fertility. Well drained sandy loams and red loams are ideally suited for its cultivation. They give good yield in low rainfall conditions [4].

2. MATERIALS AND METHODS

To study the seasonal incidence of the bud worm, *P. unionalis*, a supervised field experiment

was conducted in the established plants of jasmine during February to January at.

Eastern farm of PAJANCOA and RI, Department of Horticulture, Karaikal, U. T. of Puducherry. The experiment was conducted in an area of 24.60 × 8.50 square meter with a spacing of 1.25 × 1.25 m and the variety used was *J. sambac* (Gundumalli single mogra). The population of the *H. duplifascialis* was collected in the light trap daily and the incidence of pests *in situ* on ten randomly selected bushes was recorded at weekly intervals.

The recommended dose of fertilizer 60:120:120 g/plant of N:P:K and FYM @ 10 kg/plant were applied twice once after pruning and again during June – July.

2.1 Statistical Analysis

The per cent data recorded for leaf and flower damage was converted into corresponding angular transformation (Arcsin) if the values ranged from 0 to 100 for statistical analysis (Snedecor and Cochran, 1967) [5]. The data obtained from the laboratory and field experiment were analysed in a completely Randomized Block Design and a simple Randomized Block Design respectively by "F" test for significance as described by Panse and Sukhatme [6]. Critical difference values were calculated at 5 per cent probability level and the treatment mean values of the experiments were compared using Duncan's Multiple Range Test (DMRT) [7].



Fig. 1. Study Area

3. RESULTS

3.1 Occurrence of *Palpita unionalis* - *in situ*

The seasonal incidences of jasmine leaf webworm, *P. unionalis* was worked out based on the per cent leaf damage and are presented in Table 1. It was found that the per cent leaf damage ranged from 1.13 to 18.08 per cent from the month of February 2012 to January 2013. The per cent leaf damage was higher during January 2013 (18.08%) followed by February 2012 (17.04%), December 2012 (15.66%) and November 2012 (15.26%). A lower per cent leaf damage was recorded during May 2012 (1.13%) and similar trend was continued up to September 2012. It was found that the per cent leaf damage by *P. unionalis* was low during April 2012 to September 2012.

3.2 Influence of Weather Factors on the Seasonal Incidence of Jasmine Leaf Webworm, *Palpita unionalis* - *in situ*

The results on the multiple regression coefficients of weather parameters against the incidence of leaf webworm, *P. unionalis* are furnished in Table 2. The *in situ* count of *P. unionalis* under field conditions was recorded at weekly intervals from February 2012 to January 2013 and average monthly incidence of pests was regressed against the respective average weekly and monthly weather parameters.

The regression equations of the incidence of jasmine leaf webworm, *P. unionalis* on *J. sambac*

based on per cent damage, weekly and monthly average weather parameters showed a good and statistically significant R^2 value of 0.807 and 0.943 respectively. It was found that, among the weather parameters a positive correlation was observed with the morning relative humidity, bright sunshine hours and a negative correlation with the weather parameters *viz.*, maximum and minimum temperature, evening relative humidity and rainfall.

3.3 Occurrence of Jasmine Leaf Webworm, *Palpita unionalis* (Hubner) in Light Trap Collections

The result on the occurrence of jasmine leaf webworm, *P. unionalis* in terms of light trap catches of adult moths are presented in Table 3. The light trap collections were recorded daily from February 2012 to January 2013 and average weekly and monthly incidence of pests was regressed against the average weekly and monthly weather parameters.

It was found that the regression equations of the average number of jasmine leaf webworm, *P. unionalis* collected in the light trap based on weekly and monthly average weather parameters showed a good and statistically significant R^2 value of 0.662 and 0.908 respectively. It was found that, a positive correlation was obtained with the evening relative humidity, bright sunshine hours and a negative correlation with the weather parameters *viz.*, maximum and minimum temperature, morning relative humidity and rainfall.

Table 1. Seasonal incidence of *Palpita unionalis* in jasmine – *in situ*

Sl. No.	Month and Year	Percentage of incidence (Mean of ten plants Leaf webworm, <i>Palpita unionalis</i> (% leaf damage)
1.	February 2012	17.04
2.	March 2012	8.52
3.	April 2012	2.68
4.	May 2012	1.13
5.	June 2012	2.36
6.	July 2012	2.65
7.	August 2012	2.80
8.	September 2012	3.93
9.	October 2012	7.92
10.	November 2012	15.26
11.	December 2012	15.66
12.	January 2013	18.08

Table 2. Multiple regression coefficients of weather parameters against the incidence of jasmine leaf webworm, *P. unionalis* on jasmine during February 2012 – January 2013 - *in situ*

Sl. No.	Source	Pests	Regression equation	R ²
1.	Weekly count	Leaf webworm, <i>P. unionalis</i>	$Y=70.808-0.891X_1-0.115X_2+0.048X_3-0.149X_4+0.065X_5-0.134X_6$	0.807**
2.	Monthly count	Leaf webworm, <i>P. unionalis</i>	$Y=112.100-1.044X_1-0.244X_2-0.237X_3-0.103X_4-0.089X_5-0.053X_6$	0.943**

** = Significant at P=0.01

X_1 = Maximum temperature X_4 = Evening relative humidity
 X_2 = Minimum temperature X_5 = Bright sunshine hours
 X_3 = Morning relative humidity X_6 = Rainfall

Table 3. Multiple regression coefficients for the jasmine leaf webworm, *Palpita unionalis* in light trap catches from February 2012 – January 2013

Sl. No.	Source	Pests	Regression equation	R ²
1.	Weekly count	Leaf webworm, <i>P. unionalis</i>	$Y=10.605-0.414X_1-0.458X_2-0.757X_3+0.752X_4-0.149X_5-0.349X_6$	0.662**
2.	Monthly count	Leaf webworm, <i>P. unionalis</i>	$Y=25.585-0.987X_1-0.001X_2-0.428X_3-0.282X_4+0.234X_5-0.020X_6$	0.908**

** = Significant at P=0.01

X_1 = Maximum temperature X_4 = Evening relative humidity
 X_2 = Minimum temperature X_5 = Bright sunshine hours
 X_3 = Morning relative humidity X_6 = Rainfall

4. DISCUSSION

The seasonal incidences of leaf webworm, *P. unionalis* and budworm, *H. duplifascialis* under *in situ* were recorded at weekly intervals based on per cent leaf damage from February 2012 to January 2013.

It was found that the damage by leaf webworm, *P. unionalis* was higher during January 2013 (18.08%) and lower per cent damage was recorded during May 2012 (1.13%). The correlation between per cent damage of leaf webworm, *P. unionalis* with weather parameters showed a positive correlation with morning relative humidity, bright sunshine hours and a negative correlation with the maximum and minimum temperature, evening relative humidity and rainfall.

In the light trap collections of leaf webworm, *P. unionalis*, the regression equation against the weather parameters showed significant R² values of 0.662 and 0.908 based on weekly and monthly observations respectively. It was also found that a positive correlation was obtained with the evening relative humidity and bright sunshine hours while a negative correlation was observed with the weather parameters *viz.*, maximum and minimum temperature, morning relative humidity and rainfall.

In the present study, it was found that the incidence of leaf webworm, *P. unionalis* was higher during February 2012 (17.04 and 19.45%) and the incidence was in a decreasing trend up to August 2012. The percentage incidence of *P. unionalis* was increasing trend from September 2012 to January 2013. Higher per cent damage was recorded during February 2012, November 2012 to January 2013. It was concluded that the percentage incidence of *P. unionalis* was higher during the month of November to February.

Vanitha [8] stated that the incidence of leaf webworm, *P. unionalis* was found to increase gradually from the month of June to December. The present findings are in conformity with the above research findings.

5. CONCLUSION

The multiple regression coefficient of weather parameters against the incidence of leaf webworm, *P. unionalis in situ* based on per cent leaf damage showed a positive correlation with morning relative humidity, bright sunshine hours and a negative correlation with the maximum and minimum temperature, evening relative humidity and rainfall. The damage by *P. unionalis* was higher during January 2013 (18.08%) and lower per cent damage was recorded during May 2012 (1.13%).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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