

# INCIDENCE OF LEAF WEBBER (*DIAPHANIA PULVERULENTALIS*) ON MULBERRY – A STUDY

**N. Vijaya Kumari\*, M. Beula Priyadarshini and M. Manjula**

*Dept. of Sericulture, S.P.M. University, Tirupati - 517501*

*Email: annievij28@gmail.com*

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**Abstract:** Leaf webber is one of the major leaf eating pests of Mulberry, the only food source of Silkworm *Bombyx mori*L. Especially during post rainy season in the months of November to January this pest is becoming a major problem in the sericulture areas. This pest lays one or two eggs on each and every leaf of mulberry and the young larvae secretes a silky and gluey substance that binds both the ends of the leaf and make a roll and reside in side the rolled leaf and feed on the leaf. The infestation is resulting in the shortage of leaf for silkworm rearing during this season. Hence the present study which is aimed to findout the intensity of infestation and qualitative loss, helps in taking timely measures to reduce the leaf webber infestation.

**Keywords:** Leaf webber, Mulberry leaf, Qualitative loss, Infestation levels

## INTRODUCTION

**I**ndia is the second largest producer of silk next to China. Mulberry the only food plant of silkworm is prone to various pests and diseases which cause a significant reduction in the yield thereby reducing the silk production. Among the insect pests mulberry leaf webber (*Diaphania pulverulentalis*) is one of the major pests responsible for low yields, predominantly in winter season in many parts of southern states.

Leaf webber has been recorded in mulberry since 1995 predominantly in southern parts of India mainly the major silk producing states of Karnataka, Andhra Pradesh and Tamilnadu. The activity of pest is initiated in the month of June and remain active up to the December. The pest complete several overlapping generation from June to December. The most active period was September to December with mean infestation ranged from 1-2 larvae to 5-6 larvae /leaf. The average leaf yield loss due to leaf Webber is found to be 12.1% (Rajadurai *et al.*, 1999)

The female moth lays 150-200 eggs at the rate of 1 to 2 eggs per apical shoot of mulberry plant and they hatch into larvae after 4 days. The larvae have 5 stages (instars) and then pupate into the soil or in dry leaves. The total lifecycle completes within 17-24 days. The life cycle of leaf webber is comparatively shorter than the other lepidopteran pests of mulberry and it complete 8-10 generations during its occurrence in mulberry (Rajadurai 2003)

## Damage

The larvae defoliate on the apical shoot after webbing the tender leaves together and inhibit the growth of plants. Larvae mainly infests the apical portion of mulberry shoot and binds the tender leaves by secreting silky substance and the larvae remain inside the rolled leaves. The young larvae start feeding on the tender leaves and finally causing

drying of shoots. Hence farmers face shortage of tender leaves to rear chawki (young age silkworms). The present study has been carried out with the following objectives:

- To know the infestation level of leaf webber on mulberry in major mulberry growing areas of chittoor district in Andhra Pradesh.
- To know the impact of leaf webber infestation on mulberry quality of leaf production.

Survey on the incidence of leaf webber:

Objectives of the study: Leaf webber is a major pest during winter season every year in various sericulture villages of Palmaneru mandal which is a major sericulture area in Chittoor district and major losses are being faced by the farmers. Hence the present study has been carried out choosing important major sericulture villages in Palamaneru mandal for two years (2013-14) in winter season (between November –January).

## METHODOLOGY

Survey on the incidence of leaf webber: A survey was conducted to know the incidence of leaf webber on mulberry in the major sericulture villages of Palamaneru mandal in Chittoor district of Andhra Pradesh.

For the present study five villages were selected from Palamaneru mandal. The selected villages are Berupalli, Pengaragunta, T.S.Agrahara, Kothigunta, Thavadapalli. In each village five mulberry gardens were selected for the study. From each garden 50 plants totally 250 plants at random were chosen for the study from each village. Each plant was observed for the presence of leaf webber larvae. The Percentage of infestation was calculated as follows.

Table -1

Percentage of infestation

$$= \frac{\text{Total number of infested plants}}{\text{Total number of plants selected}} \times 100$$

\*Corresponding Author

**Qualitative analysis of leaf webber infested leaves**  
 Total 100 infested leaves were collected at the rate of 20 per village and they were dried and analysed for protein, carbohydrates, phenols and chlorophylls using standard protocols simultaneously keeping control. Table II

## RESULT

The survey was conducted on the infestation of Leaf webber and it was found that all the mulberry

gardens were infested with this pest at more than 90% infestation. Each and every leaf was infested with one or two larvae.

Total number of plants /village =250

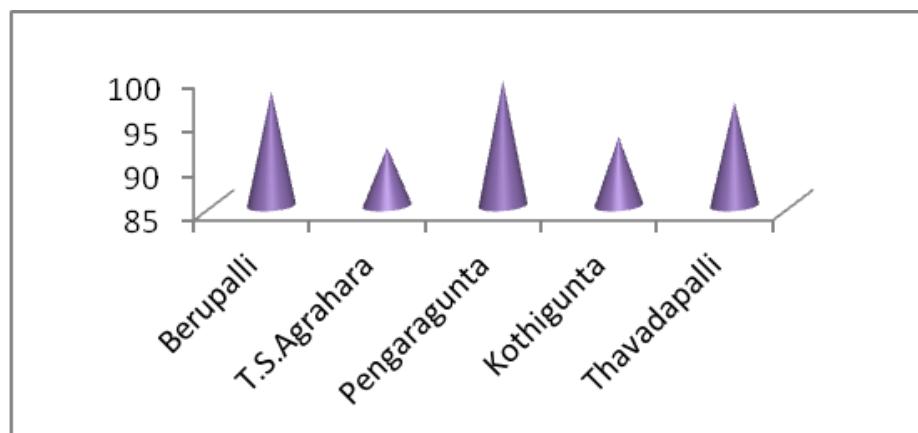
The percentage of infestation was calculated as follows.

$$\begin{aligned} \text{Percentage of infestation} &= \frac{242}{250} \times 100 \\ &= 96.8\% \end{aligned}$$

### Leaf webber infestation in different villages

| S. No. | Name of the village | Number of gardens selected | Number of plants infested | Total number of plants selected | % of infestation |
|--------|---------------------|----------------------------|---------------------------|---------------------------------|------------------|
| 1      | Berupalli           | 5                          | 245                       | 250                             | 98.0             |
| 2      | T.S.Agrahara        | 5                          | 229                       | 250                             | 91.6             |
| 3      | Pengaragunta        | 5                          | 248                       | 250                             | 99.2             |
| 4      | Kothigunta          | 5                          | 232                       | 250                             | 92.8             |
| 5      | Thavadapalli        | 5                          | 242                       | 250                             | 96.8             |

### Graphical representation of leaf webber infestation in different villages



In the present survey it was found that, among 5 villages selected Pengaragunta has shown highest percentage(98.0) of infestation of leaf webber. The farmers are suffering severe leaf yield loss and shortage of foliage for silk worm rearing especially in early instars during post rainy to early winter seasons(October –December). The percentage of

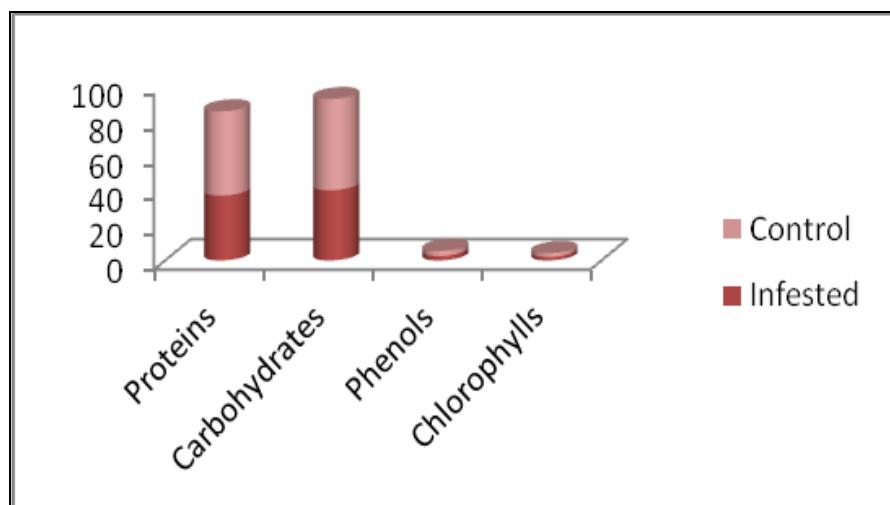
infestation in all the five villages are recorded viz, Pengaragunta (98.0) Berupalli (98.6) Thavadapalli (96.8), Kothigunta(92.8), T.S.Agrahara(91.6%).

To know the impact of leaf Webber infestation on mulberry leaf quality, 100 infested leaves were collected randomly and they were dried and analysed for protein, carbohydrates, phenols and chlorophylls.

### Qualitative analysis of leaf webber infested mulberry leaf

| Mulberry leaves      | Proteins mg/g drywt | Carbohydrates Mg/g drywt | Phenols Mg/gm drywt | Chlorophylls Mg/g drywt |
|----------------------|---------------------|--------------------------|---------------------|-------------------------|
| Leaf webber infested | 37mg                | 40mg                     | 2.5mg               | 1.95mg                  |
| control              | 48mg                | 52mg                     | 2.95                | 2.22                    |
| % loss over control  | 29.08               | 24.92                    | 13.7                | 13.6                    |

### Graphical representation of leaf webber infestation on mulberry leaf quality



Qualitative analysis of infested and healthy mulberry leaves revealed that, the percentage of loss of various metabolites which contribute to quality have shown significant decrease. The loss of protein percentage over control was 29.08, carbohydrates were 24.92, phenols 13.7 and chlorophyll was 13.6%.

**Control measures:** Leaf webber can be managed by following appropriate management methods. Collection and burning of dried leaves from the infested garden. Exposing the hidden pupae to their natural enemies like bird predators by deep ploughing and flooding the land is the best method to minimize the adult emergence. Setting up of light traps helps in attracting the adults and killing those enmass. Hand picking the young larvae and destroying them also one of the best method in practice. Release of the pupal parasitoid, *Tetrastichus howardii* at 20,000 numbers per acre helps in significant reduction in the incidence.

Chemical pesticide spraying of dichlorovos at 1ml/litre of water (200–250 litres of solution/acre) two times at the interval of 10 days is recommended in case of severe infestation. It is advisable to use the mulberry leaves for silkworm rearing 10-12 days after spray of the insecticide.

### CONCLUSION

The present study gives a clear picture about the regular and intense infestation of leaf webber on mulberry which is causing a major leaf yield loss leading to shortage of leaf during peak seasons of rearing. This survey helps as a reference to the people concerned with sericulture as a forecast to take necessary measures to avoid webber infestation by following appropriate precautionary as well as management methods.

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