



Uzi Fly Infestation Severity in Muga Seed Cocoons, *Antheraea Assamensis* Helfer and Crop Loss During Chotua Crop in Assam

KEYWORDS

Uzifly, Maggot, Silkworm, Muga, Chotua, Infestation

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ABSTRACT

The uzifly, *Exorista sorbillans* (Diptera: Tachinidae), a major and serious endo-larval parasitoid of Muga silkworm *Antheraea assamensis* Helfer causing a considerable damage to Silkworm crop particularly during November-April. The fly lays eggs on the integument of the worms in the dorsal and dorso-lateral side. After hatching from the eggs, the maggots of the fly penetrate into the larval body and feed on the tissue of the worm. The mature maggots come out of the larvae/pupae and undergo pupation in the rearing field or grainage hall. The uzi infested muga silkworm dies during larval or pupal stage and cause great loss in the yield of cocoons continuously due to its infestation. The peak of uzi fly infestation is more in Chotua crop. The availability of silkworm crops throughout the year enables perpetuation and establishment of the uzi fly in Muga growing areas. This paper attempts to highlight the severity of uzi fly infestation and crop loss due to uzifly infestation during Chotua crop of Muga.

INTRODUCTION

Muga silkworm, *Antheraea assamensis* Helfer (Lepidoptera: Saturniidae), a semi-domesticated sericigenous insect producing golden-yellow silk endemic to Assam and North Eastern India (between 90-97° E Longitude and 22-29°N Latitude). Muga silk worm is polyphagous in nature and feeds on 15 different host plant species, Som (*Persea bombycina* Kost.), and Soalu (*Litsea polyantha* Juss.) being the primary food plants (Arunkumar et al., 2012). The Muga silk accounts 0.55% (126.00 mt) of total raw silk production of 23060 mt in India where the contribution of Assam is 94.25% (118.76 mt.) (Anonymous. 2012). Muga silkworm is multivoltine in nature having six broods in a year namely- Jarua (Nov- Jan), Chotua (Feb- March) link to Jethua Crop (April - May); Aherua (June-July), Bhodia (Aug- Sept) link to Kotia (Sept-Oct.) crop. Muga rearing has only two commercial crops i.e., Jethua and Kotia; two seed crops, i.e., Chotua and Bhodia and two pre-seed crops i.e., Jarua and Aherua. Hazardous inclement climatic conditions coupled with other biotic factors viz., diseases and insect predators, the productivity of the pre-seed and seed crops are low (14-40% crop loss) and even highly uncertain leading to uneconomic crops in certain cases (Chakravorty et al., 2007). As the pre-seed and seed crops are the linkage crop for the production of seeds for commercial crop, it poses a serious threat in the production chain. Seed crop obtained from adverse pre-seed crop affect the rate of multiplication in commercial due to low hatching percentage and also require more cocoons to produce required quantity of DFLs as compared to standard ration of 3:1. Therefore, seed production from pre-seed crop is a major constraint in muga rearing. Apart from diseases, Silkworm pest, Uzifly, *Exorista sorbillans* (Louis) (Diptera: Tachinidae) is a major and serious endo-larval parasitoid of silkworm causing a considerable damage (20-90 %) to Silkworm crops particularly during November-April (Chakravorty et al. 2007). Nearly 50-70% cocoon rejection has been reported in spite of good harvest during winter (February-March) crop (Anonymous. 2006).

A Single female of *E. sorbillans* prefers to lay eggs directly at inter segmental region of the larval body of the silkworm. After hatching, the maggots penetrates into the larval body and starts feeding on inner tissues/fat bodies followed by

pupation in the soil after coming out from the body (Reddy, 2011).

Thangavelu and Sahu (1986) reported that the maggots of Uzi fly exhibited considerable variation in their body size and the maggots developed within *B. mori* larvae were generally smaller in size while those developed within *A. assamensis* larvae were comparatively larger. They also pointed out that the considerably large sized muga silkworm might have provided more suitable niche to the uzi fly maggot than the smaller silkworm.

Maggots develop within the host body and kill the host and finally the full grown maggots emerge out from the silkworm cocoon. The maggot pupates within 7-8 hours and after 10 days the pupae emerged out as flies. The Muga silkworms suffer uzi fly infestation during the Jarua (November-January) and Chotua (February- March) crop season. Most of the muga rearers of Assam are resource poor, marginal or small farmers having very limited land resources and the severe crop loss due to uzi fly infestation severely affects their livelihood.

MATERIALS AND METHODS

Detailed surveys to assess the Uzi fly infestation severity in Muga seed cocoons, *Antheraea assamensis* Helfer and crop loss due to infestation during Chotua crop 2013 were conducted in five Muga growing districts of Assam namely Lakshimpur, Sonitpur, Kamrup, Udalguri and Kokrajhar. Seed cocoons of Chotua crops were collected from three locations each from the selected districts of Assam during 2013 (Figure 1). One thousand seed cocoons from three locations totalling to 3000 cocoons from each district were collected randomly from the entire lot for grainage operation to examine the infestation of seed cocoons by Uzi fly during the season. During the grainage operation the number of good cocoons, dead cocoons and uzi cut cocoons were sorted out separately and calculated the district wise and lot wise uzi fly infestation rate. A structured questionnaire was administered to gather the required information regarding cost involvement at farmers' level including all inputs for rearing. The data so gathered were tabulated and analysed to find out the economic loss at farmers level due to uzi fly infestation.



Figure 1: Location map of study areas

RESULT

Maggots developed within the host body and killed the host and finally the full grown maggots emerged out invariably from the silkworm cocoon (Plate 1 and plate 2). The maggot completed the pupation within 7-8 hours and after 10 days the pupae emerged out as flies (Plate 3 and plate 4).

Severity of uzi fly infestation in harvested Muga cocoons during *Chotua* (February-March, 2013) crop seasons in five selected districts of Assam was found between 2.73 to 33.70%, average being 15.64% (Plate 5 and plate 6, Figure 2). District wise rate of incidence was found 29.37%, 33.70%, 2.73 %, 3.53% and 8.87% for Lakhimpur, Sonitpur, Kamrup, Udalguri and Kokrajhar respectively (Table 1). Based on the field data and estimation of severity of uzi fly infestation on harvested seed cocoons the average crop loss due to uzi fly infestation was 15.64% and the estimated economic loss was Rs. 1190 per 100 DFLs. The highest economic crop loss due to uzi fly infestation was Rs. 2561 per 100 DFL in Sonitpur district and lowest being the Rs. 207 per 100 DFL in Kamrup districts of Assam (Table 2 and Table 3)



Plate 2: Uzi fly larva coming out of infected cocoon



Plate 1: Uzi fly infected dead pupa



Plate 3: Male Uzi fly



Plate 4: Female Uzi fly



Photo 5: Uzi infected pierced cocoon



Photo 6: Uzi infected pierced cocoon lot

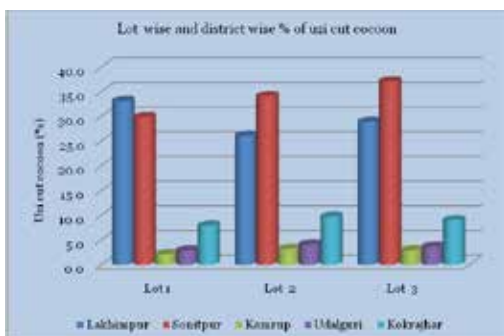


Figure 2: Lot wise and district wise per cent of Uzi cut cocoon

Table 1: Lot wise and district wise % of uzi cut cocoons

Sl. No	District	Lot wise and district wise % of uzi cut cocoons				
		Lot 1	Lot 2	Lot 3	Average	Std
	Lakhimpur	33.1	26.1	28.9	29.37	3.523
	Sonitpur	29.9	34.1	37.1	33.70	3.617
	Kamrup	2.1	3.2	2.9	2.73	0.569
	Udalguri	2.9	4.1	3.6	3.53	0.603
	Kokrajhar	7.9	9.7	9.0	8.87	0.907

Table 2: District wise economics of crop loss due to uzi fly infestation in Chotua crop (February -March) 2013

Sl. No	District	% of crop loss due to uzi fly infestation	Crop loss per 100 DFLs due to uzi fly infestation (in Rupees)
	Lakhimpur	29.37	2232
	Sonitpur	33.70	2561
	Kamrup	2.73	207
	Udalguri	3.53	268
	Kokrajhar	8.87	674
	Average	15.64	1189

Table 3: Economics of crop loss due to uzi fly infestation in Chotua crop (February - March) 2013

Sl. No	Particular	Expenditure (in rupees)
	Number of Muga rearer covered	15
	A. Cost involvement in maintenance of plantation for 50 plants to rear 100 DFLs (in rupees)	400
	B. Cost of disinfectants (Lime, Bleaching powder etc.)	200
	C. Cost of DFLs (Rupees 7/DFL) for 100 DFLs	700
	D. Miscellaneous expenses	200
	E. Total Cost (A+B+C+D)	1500
	Average yield per 100DFLs in Chotua crop (Cocoon in no.)*	4000
	Good cocoons for seed obtained from 100 DFLs (in no.)**	3800
	F. Income from good cocoons per 100 DFLs @ Rs. 2 per cocoon	7600
	Uzi cut cocoons per 100 DFLs @ 15.64% of good cocoons (in no.)***	594
	G. Crop loss per 100 DFLs due to uzi fly infestation @ Rs 2 per cocoon	1188
	H. Income per 100 DFLs after crop loss due to uzi fly infestation (F-G) [G]	6408
	I. Net income (H-E)	4908

* Average yield 40 cocoons per DFL during Chotua crop as per field investigation.

**Average 200 cocoons are flimsy or mute per 100 DFLs as per field investigation.

***.Refer table 1

DISCUSSION

During Chotua crop (February-March, 2013) maximum uzi fly infestation was found in Sonitpur district (33.70%) and minimum was in Kamrup district (3.73%). In the present study it was found that severity of uzi fly infestation in upper Assam (Lakhimpur and Sonitpur) is higher than lower Assam (Kamrup, Udalguri and Kokrajhar) and the similar trend were also

reported by Eswara Reddy *et al.*, (2011), where they found 35.0 % uzi fly infestation in harvested cocoons during Chotua crop in upper Assam. The average crop loss was Rs. 1190 per 100 DFLs during Chotua crop and it was highest in Sonitpur district of Assam which was Rs. 2561 per 100 DFLs followed by Lakhimpur (Rs.2232), Kokrajhar (Rs.674), Udalguri (Rs.268) and Kamrup (Rs. 207). Considering the severity and economic loss incurred by the farmers, Uzifly management at farmers level is utmost important to get good cocoon for seed crop

ACKNOWLEDGEMENT

The authors highly acknowledge the support received from Department of Biotechnology (DBT), Government of India for carrying out research in Muga sector. Authors are thankful to Dr. Banwari Lal, Director, EIB Division, New Delhi for his constant support for publication. The authors also acknowledge the support received from the REC, Sub- Unit, CSB, Kokrajhar and CMG, Ratanpur, Chaygaon during the course of investigation.

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