EFFECT OF ABIOTIC FACTORS ON INFESTATION OF UZIFLY (*EXORISTA SORBILLANS* WIEDEMANN) IN DIFFERENT INSTAR MUGA SILKWORM, *ANTHERAEA ASSAMENSIS*

Ranjana Das* and K. Das

* Central Muga Eri research & Training Institute, Central Silk Board, Lahdoigarh, Jorhat, Assam, INDIA.

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ABSTRACT: Infestation of Uzi fly *(Exorista sorbillans)* in muga silkworm was studied in six different crop seasons. Though the infestation was made throughout the year but severity was recorded during *Chatua* (Feb-Mar) and *Jarua* (Dec-Jan) crops with 89.3, and 61.4% infestation and also infestation was started from the 3rd instar silkworm larvae. During *Jethua* (Apr-May) and *Katia* (Oct-Nov) crops, the infestation was recorded 11.3 and 13.3% and infestation was observed in 4th and 5th instar silkworms. However, least number of infestation was recorded in *Aherua* (Jun-Jul), *Bhodia* (Aug-Sep) with 4.7and 3.9% infestation which were observed in 5th instar larvae only. Correlation coefficient analyses between infestation and weather parameters in different crops seasons showed that low temperature and high humidity were positively highly significant for infestation of Uzifly in muga silkworms.

KEY WORDS: *Antheraea assamensis*, crop, *Exorista sorbillans*, Multivoltine, Polyphagous.

The golden silk producer muga silkworm, *Antheraea assamensis* Helfer, is a multivoltine and polyphagous insect. The silkworm can be reared five to six times in a year in different crop seasons (Choudhury, 1970). Due to out door nature of rearing, the silkworm is exposed to various pests and predators in all the seasons with varied intensity of effecting on cocoon production (Thangavalu et al., 1988). The pest spectrum of muga silkworm is complex and plays a major role in limiting the production of silk (Sahu, 2005). Negi & Sengupta (1993) reported that due to infestation of Uzifly around 50-70% cocoons rejected inspire of good harvesting during winter crop. Out of different pests, Uzifly (*Exorista sorbillans*, Wiedemann) is one of the most serious endo-parasite of muga silkworm which caused 20 to 90% crop lost (Anonymous, 2003). This fly has also been reported in other silkworms such as *Bombyx mori, Samia cynthia ricin* and *Antherea royali* and economically lost the crop production (Thompson, 1950; Sarkar, 1980; Patil & Givindan, 1984). Literature survey revealed that no systematic approach has been done on instar wise seasonal infestation of muga silkworm by Uzi-fly in different crop seasons, hence the study was carried out to ascertain a concrete results of infestation in different instar of silkworm in different crop seasons.

MATERIALS AND METHODS

For studying the infestation of the Uzi-fly on muga silkworm, rearing was conducted in six different crop seasons namely, *Jethua* (Apr-May), *Aherua* (Jun-Jul), *Bhodia* (Aug-Sep), *Katia* (Oct-Nov), *Jarua* (Dec-Jan) and *Chatua* (Feb-Mar) in experimental field of Central Muga Eri Research and Training Institute,(CMER&TI) Lahdoigarh, Jorhat, Assam, India. In every rearing, randomly 500 muga silkworms were selected in five different bamboo made 'chalonies' individually from the 10 different locations of rearing field. Percentage of Uzi infestation as well as instar wise infestation was calculated out by using the following formulae:

$$\text{Percentage of infection} = \frac{\text{No of infection of worm}}{\text{Total no worm considered}} \times 100$$

$$\text{Percentage of instar wise infestation} = \frac{\text{No of instar wise infested worm}}{\text{Total no of worm infested}} \times 100$$

Data on infestation in instar wise in different crops seasons along with meteorological parameters were recorded analyzed statistically and presented in Table 1 & 2.

RESULT AND DISCUSSION

The results revealed that uzifly (*Exorista sorbillans*) infestation was recorded throughout the year in muga growing areas but intensity of infestation was variable (Table 1). Maximum infestation was recorded in *Chatua* (Feb-Mar) with 89.3% followed by *Jarua* (Dec-Jan) with 61.6%, *Katia* (Oct-Nov) 13.3% and *Jethua* (Apr-May), 11.3% respectively. Least infestation was recorded during *Bhodia* (Aug-Sep) and *Aherua* (Jun-Jul) crops with 3.4% and 4.7% only. Instar wise higher infestation was recorded during Chatua (Feb-Mar) and *Jarua* (Dec-Jan) crops. In both the crop seasons, infestation was recorded from third instar on wards till ripening with different magnitude. In case of *Jethua* (Apr-May) and *Katia* (Oct-Nov) crops, infestation was observed in fourth and fifth instar where as in *Aherua* (Jun-Jul) and *Bhodia* (Aug-Sep) infestation was recorded in fifth instar only. The results showed that abiotic factors played vital role for occurrence of uzifly in different crop seasons. Heavy infestation was recorded during *Chatua* (Feb-Mar) and *Jarua* (Dec-Jan) and temperature and relative humidity were ranged from 07-29 ^{O}C and 63-81% respectively. However rainfall was recorded 59- 92 mm during that period. During *Jethua* (Apr-May) and *Katia* (Oct-Nov) crops, temperature recorded from 22-33 ^{O}C, relative humidity was 64-88% and rainfall raged from 104-109mm. Highest temperature, relative humidity and rainfall were recorded during *Bhodia* (Aug-Sep) and *Aherua* (Jun-Jul) crops such as, 23-37 ^{O}C, 65-91% and 580-989mm respectively. The results revealed that high temperature, high relative humidity and high rainfall significantly negatively effect on uzifly infestation on muga silkworm where as low temperature, low humidity and low rainfall response positive effect on occurrence and infestation of uzifly in muga silkworm.

From the Correlation coefficient between uzi infestation and different abiotic factors revealed that maximum temperature during *Jethua* (Apr-May), *Aherua* (Jun-Jul),*Bhodia* (Aug-Sep) and *Katia* (Oct-Nov) were negatively effect on occurrence of uzifly (Table 2). Similarly trend of effect was observed in maximum humidity also. On the other hand, rainfall is negatively significant in *Aherua* (Jun-Jul) and *Bhodia* (Aug-Sep) crops. The results indicated that the fly could not multiply during high temperature, high humidity and high rainfall. The temperature both maximum and minimum in *Chatua* (Feb-Mar) and *Jarua* (Dec-Jan) were highly significant on occurrence of Uzifly infestation. Besides this, maximum relative humidity in *Chatua* (Feb-Mar) was highly significant but during *Jarua* (Dec-Jan) was positively significant only. In case of minimum temperature and rainfall during *Chatua* (Feb-Mar) crop was found negative effect on occurrence of the pest.

From the result it was concluded that the environmental factors like temperature, relative humidity and rainfall are main important physical factors which are responsible for occurrence and infestation of Uzifly(*Exorista sorbillans* Wiedemann) during different muga silkworm rearing seasons.

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Table 1. Effect of abiotic factors on infestation of *uzifly* in muga silkworm in different crop seasons.

Crop season	Infestation in different Instar (%)						Tem ^{O}C		R.H. (%)		Rainfall (mm)
	1st	2nd	3rd	4th	5th	Total	Max	Min	Max	Min	
Jethua (Apr-May)	0.0	0.0	0.0	0.4	10.9	11.3	33	22	88	68	190
Aherua (Jun-Jul)	0.0	0.0	0.0	0.0	4.7	4.7	36	23	91	70	580
Bhodia (Aug-Sep)	0.0	0.0	0.0	0.0	3.9	3.9	37	23	89	65	989
Katia (Oct-Nov)	0.0	0.0	0.0	0.7	12.6	13.3	31	22	85	64	104
Jarua (Dec-Jan)	0.0	0.0	10.5	19.6	31.3	61.4	19	07	81	63	92
Chatua (Feb-Mar)	0.0	0.0	16.4	33.9	39.0	89.3	29	20	81	64	59

Table 2. Correlation Coefficient between Uzifly infestation and weather parameters in different crops seasons.

Crop season	Temperature ^{O}C		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	
Jethua (Apr-May)	-0.3783	0.4627	-0.4287	0.3809	0.4927
Aherua (Jun-Jul)	-0.2983	0.4271	-0.3838	0.4792	-0.5326*
Bhodia (Aug-Sep)	-0.4962	0.4751	-0.4873	0.3921	-0.57843*
Katia (Oct-Nov)	-0.3982	0.4132	-0.4725	0.4623	0.4859
Jarua (Dec-Jan)	0.8199**	0.9843**	0.6239*	0.0473	0.2246
Chatua (Feb-Mar)	0.8652**	0.9936**	0.8341**	- 0.0584	-0.0413