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STUDY OF UZI FLY, *EXORISTA BOMBYCIS* (LOUIS) INFESTATION DURING REARING OF MULBERRY SILKWORM IN DIFFERENT SEASONS IN KARNATAKA

Fouzia Bari*, Rakesh Kumar[1] and Lavannya V[1]

Department of Entomology, Uttar Banga Krishi Vishwavidyalaya, Pundibari 736165, West Bengal, India
[1]Department of Entomology, UAS Bangalore, Bengaluru 560065, Karnataka, India
*Email: barifouzia92@gmail.com (corresponding author): https://orcid.org/0000-0002-0054-5938

ABSTRACT

Present investigation was carried out during summer and rainy seasons under laboratory conditions at the Department of Sericulture, Chintamani UAS (B) during 2012-13. Rearing of bivoltine silkworm hybrid CSR_2 X CSR_4 in different seasons reveals that rainy season open rearing is found to be susceptible for Uzi infestation as compared to summer season under protected and open rearing. Uzi fly incidence on top position tray was observed significantly maximum in rainy season open rearing as compared to summer season open batch and least observed in summer season protected rearing. Longevity of the uzi fly is reported to be negatively correlated with weather parameters such as temperature; higher the temperature lower the adult longevity. Experimental observation revealed that rearing of silkworm in summer with all the precautionary measures under protection is suitable for more yield of cocoon with least uzi fly infestation in Karnataka.

Key words: Uzi fly, bivoltine, infestation, damage, cocoon, mulberry, rainy season, summer season, open rearing, protected rearing

India is the second largest producer of silk in the world with the unique distinction of being the only country producing all the five known commercial silks. There are several factors that influence silk production, in which insect and non-insect pests are the important component and, among the insects that attack silkworm, the most important are the Tachinid parasites which are commonly known as uzi fly and belong to order Diptera (Bhattacharya et al., 1993). There are at least four species of uzi fly that attack silkworms viz., Japanese uzi fly, *Crossocosmia sericariae* (Rondani); Hime uzi fly, *Ctenophorocera pavida* (Meigen); Tasar uzi fly, *Blepharipa zebina* (Walker) and the Indian uzi fly, *Exorista bombycis* (Louis). Among the four species of uzi fly, Indian uzi fly *E. bombycis* has well established itself in southern states of India and can cause loss of 10-20% to sericulture industry (Dandin et al., 2001). *E. bombycis* is a larval endoparasitoid of the mulberry silkworm. It causes crop loss of more than 20% in the rainy season followed by winter (11-15% loss) and summer seasons (1.0 – 3.0% loss) (Krishna Rao, 2009).

In this context, the present investigation was carried out to evaluate the incidence of uzi fly in different seasons in Karnataka under laboratory conditions.

The experiment was conducted on uzi fly, *E. bombycis* to study the infestation and damage caused by uzi fly for silkworm rearing during two different seasons i.e., summer and rainy season in the year 2012-13 at Department of Sericulture, College of Sericulture, Chintamani, University of Agricultural Sciences, Bangalore, Karnataka.

Experimental race taken for the study was bivoltine hybrid of the silkworm (CSR_2 X CSR_4)

The freshly egg laying of experimental race CSR2 X CSR4 were kept in incubation at 25 °C till hatching, after hatching they were brushed with feathers and kept in a rearing tray and fed with tender and chopped mulberry leaves. Silkworm larvae were reared up to third moult in conventional leaf feeding method. After the third moult, the larvae were divided into 2 batches and each batches with three replications. Each replication was maintained with 400 larvae in each rearing tray. One batch was treated as control (protected rearing), whereas experiment was conducted by taking all precautionary measures in the rearing room to prevent the entry of uzi fly. Another batch was considered as experimental (open rearing) where rearing was conducted under uncontrolled condition in a rearing room, where no precautionary measure was taken to prevent the entry of uzi fly, and rather than there had been the provision for uzi fly to oviposit. Oviposition of uzi fly on reared silkworm larvae and their subsequent development of

maggot had been studied elaborately and recorded. During the whole experiment the Oviposition behavior of uzifly was marked meticulously. All the rearing data of the experiment as well as relative humidity and temperature maintained in the rearing room were recorded during the experiment. Incidence of uzi fly and also the pattern of oviposition were recorded in every experiment along with control in the respective seasons. Pattern was recorded on the basis of position of the rearing tray placed in the rearing room serial wise from top to bottom.

Study of uzi fly, *E. bombycis* infestation during rearing of mulberry silkworm in different seasons in Karnataka was undertaken to overcome the infestation of uzi fly in silkworm in context of open and protected rearing observation as detailed in tables, along with observation of weather parameters and effect of seasonal fluctuation.

Investigations from the study revealed that the infestation caused by uzi fly, *E. bombycis* (Louis) during rearing of mulberry silkworm, *Bombyx mori* L. is significantly lower (2.0%) in the fifth instar silkworm larvae and 1.25% in pupal stage in protected rearing of summer season, compared to open rearing of summer season (Table 1). The data obtained from open rearing of summer season revealed that uzi fly infestation started at the beginning of 4th instar affecting 8.0% of the silkworm larvae. Uzi fly infestation at 5th instar was 10.33% and in pupal stage 8.67% infestation was recorded. In case of rainy season, uzi fly infestation was significantly higher i.e., 4.33% in the 5th instar silkworm larvae and 3.16% infestation in pupal stage of protected rearing, compared to open rearing of rainy season (Table 1), whereas in the open rearing the uzi fly infestation started at the beginning of 4th instar affecting 9.83% of the larvae and in the 5th instar 15.33% infestation and in the pupal stage 16.25% infestation were observed. The uzi fly infestation was least in the summer season protected rearing in 5th instar larvae (2.0%) as well as pupal stage (1.25%), whereas in open rearing the uzi fly infestation started at the beginning of 4th instar (8%) and in 5th instar (10.33%). These results indicated that an uzi infestation got higher in the rainy season as compared to the summer season. These results are in accordance with Narayanaswamy, 1991. According to him, incidence reached the maximum during the monsoon season i.e., from June to September and least in summer (February to May). According to him the longevity of the uzi fly is reported to be inversely proportional to temperature i.e., higher the temperature lower the adult longevity.

However, the tendencies of uzi fly oviposition more on the top trays (Table 2) as soon as it enters, instantly gets attracted to the top trays and then moves

Table 1. Observation of uzifly infestation in summer and rainy season

Stages of Silkworm	Uzi infestation (%)			
	Summer season		Rainy season	
	Protected rearing	Open rearing	Protected rearing	Open rearing
3rd instar	0	0	0	0
4th instar	0	8.0	0	9.83
5th instar	2.0	10.33	4.33	15.33
Pupation stage	1.25	8.67	3.16	16.25
Total infestation	3.25	27.0	7.49	41.41

Table 2. Incidence of Uzi fly in different tray position in open and protected during summer and rainy season

Tray Position (top to bottom)	% Incidence of Uzi Fly in summer season in different rearing conditions		% Incidence of Uzi fly in rainy season in different rearing conditions	
	Protected rearing	Open rearing	Protected rearing	Open rearing
1st position	5	25	8.5	38.5
2nd position	4.5	23	6	32
3rd position	4	20.5	5	29.5
4th position	3	16	4	24
5th position	2.5	12.5	3.5	18
6th position	1.5	6.5	2.5	10.5
Total	20.5	103.5	39.5	152.5

downwards. The single gravid fly lays eggs not more than 2 to 3 per silkworm larvae, so that it can cover the maximum population. Incidence and infestation of uzi fly in cocoon stage in the tune 1.25% and 3.16% in protected rearing and 8.67% and 16.25% in open rearing in summer and rainy season, respectively. It clearly indicated that in these cases oviposition time was during the spinning stage of the larvae only because the fly egg after hatching enter into the spinning larvae and metamorphosed into maggot within a week, by this time the silkworm larvae managed to spin the cocoon and maggot escaped from the cocoon by damaging the larva or pupa inside, through a small puncture by the release of enzyme cocoonase and thus metamorphosed into pupa outside the cocoon. In reality, the favorable environmental conditions are conducive for the exponential growth of uzi fly population as recorded 27% and 41.42% infestation, respectively in experimental batch in summer and rainy season since temperature 29-35°C and 28-33 °C, respectively in summer and rainy and relative humidity 70-80% and 72- 82%, respectively in summer and rainy were at optimum level for the growth and development in Karnataka. These results are in accordance with Sarkar et al., 2020. He reported that the rainy season is more prone to uzi fly attack than summer.

Karnataka is the leading silk producing state of the country due to favorable climatic conditions for silkworm rearing as well as host plant production. Moreover, silkworm rearing is continuous throughout the year alternated with seed crop and commercial crop. It can be concluded from the experiment that protected rearing is more beneficial than open rearing where no precautionary measures are indicated to prevent uzi fly. Best silk yield can be obtained in the summer season following the protected rearing practices.

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