

PREDATORY BEHAVIOUR OF EOCANTHECONA FURCELLATA (HEMIPTERA: PENTATOMIDAE) FEEDING ON LARVAE OF HYPOSIDRA TALACA (LEPIDOPTERA: GEOMETRIDAE), A MAJOR TEA PEST OF NORTH EAST INDIA

**Zoology**

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ABSTRACT

Eocanthecona furcellata (Wolff) is an important predator of several pests associated with agricultural crops, especially lepidopteran pest. The predatory behaviours of this insect such as approach and attacking, paralyzing, sucking were recorded. The adult female could paralyze a larvae in 4.7±0.6 seconds and suck the body sap within 95.3±5.0 seconds. First instar nymph preferred only second instar larvae of looper and group feeding was observed. The incubation period was recorded as 7.6±1.1 days and total duration of nymphal stages was 18.4±1.5 days. The longevity of adult male and female were recorded as 30.0±1.9 days and 32.8±0.8 days respectively. The hatchability rate of egg was 94.5% with 96.2% adult survival rate was recorded, when reared on *Coeryra cephalonica*. Moreover this study revealed that, in the absence of main host, *C. cephalonica* could be used as alternative host to mass rear *E. furcellata*, successfully for field release.

KEYWORDS

Predatory Behaviour, *Eocanthecona furcellata*, Tea Looper.

INTRODUCTION:

Perennial monoculture crop tea (*Camellia sinensis* L.), provides shelters, food, microenvironment for breeding for divers species of arthropod throughout the year (Babu *et al.*, 2014). Tea plant foliage is infested by about 167 arthropod species in the tea belt of Northeastern regions of India (Mukhopadhyay and Roy, 2009). The looper stage of the lepidopteran pest *Hyposidra talaca* have migrated and adapted in tea growing area of Darjeeling Terai and the Dooars and Assam causing substantial damage to the crop (Basumajumdar and Ghosh, 2004). Among them some arthropods are considered as pest and some are considered as biological control agents. In the tea ecosystem of Dooars and Darjeeling regions of West Bengal there are 29 species belonging to 28 genera of hemipteran bugs, among them the highest species is of family Pentatomidae have been recorded (Mitra *et al.*, 2018). In order to concise the application of synthetic chemical pesticides, in the tea gardens for the management of lepidopteran tea pests especially *H. talaca*, biological control measures are being adopted worldwide (Mohed *et al.*, 1992 and Gillespie *et al.*, 2000). *Eocanthecona furcellata* (Wolff) (Hemiptera: Pentatomidae) is one of the important predator that has recently included in the field of biological control due to its potential to prey different orders of insect pests such as, lepidoptera, coleoptera and heteroptera (De Clercq, 2000). This predaceous stink bug *E. furcellata* (Wolff) is efficient lepidopteran caterpillar predators in the field of, soybean, beans, vegetable and forest ecosystems found to feeding on fall army worm, *S. frugiperda* in maize (Navarajanpaul, 2002). In the present study, predatory behaviour and stage specific predation of this stink bug while feeding on larvae of *H. talaca* and biology and survival rate on alternative host were studied.

MATERIALS AND METHODS:**REARING OF HOSTS AND PREDATOR:**

Field collected healthy moths of *H. talaca* were, put them into mating and egg laying chamber (glass chimney) with 10% honey solution as food source. After hatching of the eggs, larval stages were reared on tea leaves preferably using TV1 (Tocklai Vegetative 1) under the laboratory conditions (27± 2°C, 70-80% RH and 16:10 LD photoperiod) by following the methodology developed by Babu *et al.*, (2014). Eggs of rice meal moth of *Corcyra cephalonica* were collected from Uttar Banga Krishi Viswavidyalaya, Coochbihar, India and reared on plastic container containing maize powder under the same laboratory conditions as an alternative host of *E. furcellata*. Adult stink bug were collected from the TRA (Tea Research Association) experimental plot and kept into glass chimney for mating and laying eggs containing few tea shoots along with larvae of *H. talaca*. Shade

tree barks were kept inside the mating chamber for egg laying and the egg masses were transferred into separate chamber. Newly hatched first instar and then second instar nymphs of the predator were reared in group. Third, fourth, fifth and adult stages were put into separate Tarson sample container (Diameter 4.3, height 5.4cm) to avoid cannibalism following the method of Lenin and Rajan, (2016) with slight modifications.

PREDATORY BEHAVIOUR OF E. FURCELLATA:

In order to record the predatory behaviour of all the life stages of *E. furcellata* on the different larval instars of *H. talaca*, an experiment was conducted using large petridish (14.5cm in diameter). Each life stage of *E. furcellata* were maintained for 1.5h starved condition and then placed into that petridish with different larval instars of *H. talaca* separately. The time taken by the stink bug for approach attacking, paralyzing and sucking the prey by different life stages of were recorded (Rajan *et al.*, 2017). Mean were calculated by Tukey-Kramer HSD Post-Hoc Test.

STAGE SPECIFIC PREDATION:

Selection of specific stage of larvae of *H. talaca* and predation by different life stage *E. furcellata* were also studied under the same laboratory conditions. Different larval instars like, II, III, IV and V of *H. talaca* were provided to the individual stages of *E. furcellata*. The maximum number of prey consumption and type of feeding were observed at 24h interval.

STATISTICAL ANALYSIS:

Mean of the experiment of predatory behaviour was analyzed by Tukey's multiple comparison test at p<0.05.

REARING OF E. FURCELLATA ON ALTERNATIVE HOST:

From the laboratory rearing conditions 100 eggs were separately put into glass chimney and observed carefully till hatched. Newly hatched first instar nymphal instars were transferred into individual container and head crushed larvae of *C. cephalonica* were provided as food source from the laboratory stock culture. Every nymphal instars were carefully maintained till moulted into adult. Ten pairs of adults were separately put into glass chimney along with sufficient larvae of rice meal moth. After laying eggs onto the previously provided shade tree bark, it was collected and put into separate chimney. The incubation period, each nymphal duration for development, mortality and survival rate of each life stages were recorded at 24h intervals.

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