

# Rapid #: -15402166

CROSS REF ID: **718244**

LENDER: **AFU :: Main Library**

BORROWER: **DLM :: Main Library**

TYPE: Article CC:CCL

JOURNAL TITLE: Entomon

USER JOURNAL TITLE: Entomon.

ARTICLE TITLE: Biology of Eoerysa flavocapitata - a delphacid insect pest on sugarcane in India.

ARTICLE AUTHOR: Chatterjee, P.B. and D.K. Choudhuri.

VOLUME: 4

ISSUE: 3

MONTH:

YEAR: 1979

PAGES: 263-267

ISSN: 0377-9335

OCLC #: 2811620

Processed by RapidX: 11/7/2019 11:31:22 AM



This material may be protected by copyright law (Title 17 U.S. Code)

---

**ILL: -15402166**



**ILLiad TN: 1289644**



**Borrower: RAPID:DLM**

**Ship via: Odyssey**

**Service Level: Regular**

**Odyssey: 206.107.43.75**

**Email: ILL@hawkins.lib.udel.edu**

Lending String:

**ISSN: 0377-9335**

**OCLC: 2811620**

ILL - AFU  
UNIVERSITY OF ARKANSAS  
UNIVERSITY LIBRARIES  
365 N MCILROY AVE  
FAYETTEVILLE AR 72701-4002

**RETURNED Postage Guaranteed**

NEW: Main Library  
Interlibrary Loan  
University of Delaware Library  
181 South College Avenue  
Newark, DE 19717-5267

Date: 11/7/2019 10:09:31 AM

**Call #: QL461 .E98576 v.3-4  
1978-79**

Location: **Library Annex**

Volume: 4

Issue: 3

Year: 1979

Pages: 263-267

**Journal Title:** Entomon

**Article Author:** Chatterjee, P.B. and D.K.  
Choudhuri.

**Article Title:** Biology of Eoeurysa flavocapitata - a  
delphacid insect pest on sugarcane in India.

**Notice: This material may be protected by  
Copyright Law (Title 17 U.S. Code)**

**Maxcost charge:**

**Patron:**

Initials: \_\_\_\_\_  
Shelf: \_\_\_\_\_ Per: \_\_\_\_\_  
Sort: \_\_\_\_\_ ILL: \_\_\_\_\_

**Bad Cite:** \_\_\_\_\_  
Years checked \_\_\_\_\_  
Table of Contents / Index \_\_\_\_\_

## BIOLOGY OF *EOEURYSA FLAVOCAPITATA*-A DELPHACID INSECT PEST ON SUGARCANE IN INDIA

P. B. CHATTERJEE<sup>1</sup> & D. K. CHOUDHURI

Department of Zoology, Burdwan University,  
Golapbagh, Burdwan, India

(Received 30 September 1978)

Biology of *Eoeyrysa flavocapitata* MUIR (Homoptera: Delphacidae), a recently recorded insect pest of sugarcane crop from West Bengal is studied in specially prepared cages fixed on sugarcane leaves. Mating is found to occur on the leaf-surface any time of the day. Following a pre-oviposition period of 4-7 days oviposition occurs on the leaf, tissues bordering the midrib being the favourite site. Total number of eggs laid by a single female varies from 143-234. Incubation period varies from 8-11 days. There are five nymphal instars and for completion of their development they take 16-24 days. Life-span of the adult male and female is found to vary from 6-10 days and 24-36 days respectively. Also mentioned is the behaviour of nymphs and adults in respect to crop-damage.

(Key words : *Eoeyrysa flavocapitata*, delphacid pest on sugarcane, biology)

### INTRODUCTION

Sugarcane, an important commercial crop, is subject to attack by a host of insects of which Fulgoroidea forms a pre-eminent group. Thus BOX (1953) listed the occurrence of more than 150 species of Fulgoroidea in the world. The occurrence of *Eoeyrysa flavocapitata* (Homoptera: Delphacidae) on sugarcane in the northern part of West Bengal, India was first recorded by CHATTERJEE (1971). Prior to him QADRI (1963) and MIRZA & QADRI (1964) recorded this insect from Bangladesh which is adjacement to West Bengal. Recent surveys of sugarcane fields by the present authors reveal that *Eoeyrysa flavocapitata* has spread from the agro-ecological barrier of North Bengal to other sugarcane growing areas of West Bengal. In view of growing economic importance of *Eoeyrysa flavocapitata* as a

pest of sugarcane, studies on the biology of this insect were undertaken

### MATERIALS AND METHODS

The studies on the biology of *Eoeyrysa flavocapitata* were carried in insect cages made of nylon mosquito-netting which was wrapped over slotted polythene tubes measuring 15 cm long with 6 cm diameter. Such cage was securely fixed on the second and third young leaves of the sugarcane plant and on freshly emerged adult female with three males of *E. flavocapitata* were released in it. Each cage was examined daily and if egg-slits were noticed, the cage with insects inside was slipped along the leaf and transferred and fixed on a fresh cage. In order to study the fecundity of the ovipositing females, it was necessary to dissect the marked egg-slits.

### OBSERVATIONS

*Mating and Oviposition:* Mating occurs on the leaf any time of the day. The female undergoes a pre-oviposition period of 4 to 7 days. The oviposition occurs in the leaf; the tissues bordering the mid-rib being the favourite site. The tops of the egg clusters

<sup>1</sup> Entomologist, Operational Research Project, Pandua, Hooghly, West Bengal.

are covered with a waxy material secreted by the females. A characteristic reddish colour develops in the affected tissues around the site of oviposition or "egg slot". The eggs are laid in batches and the number of eggs per slit may vary from 2 to 10. After about 14 days the oviposition stopped in most individuals. The total number of eggs laid by a female over a period of about two weeks may vary from 143 to 234.

The eggs (Fig.1) are elongate—cylindrical, and measure from 0.91 to 1.2 mm  $\times$  0.26 to 0.33 mm. The incubation period occupies 8 to 11 days and the insect passes through five nymphal instars to become adult.

### Nymphal stages

#### *First instar nymph* (Fig.2)

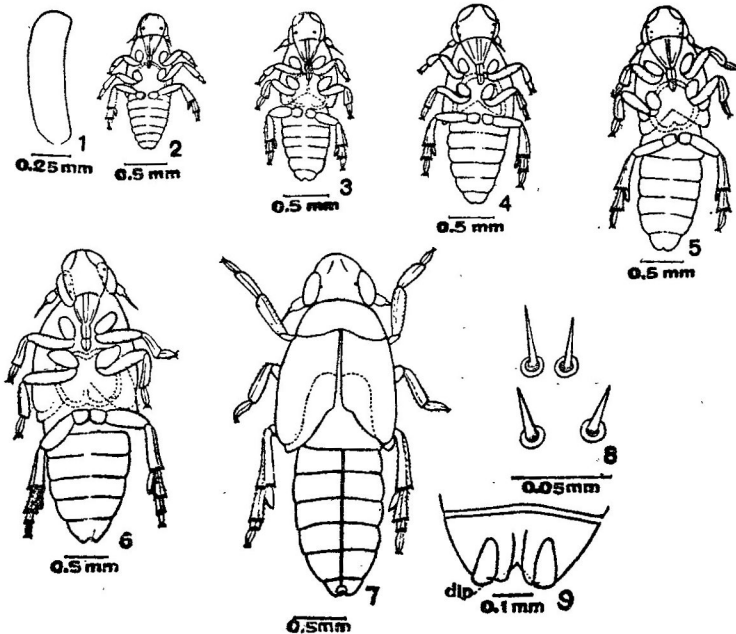
Just hatched nymphs are almost sedentary, slender and the colour of the body is dull white. The eyes are reniform, prominent and castaneous. There is a faint median

longitudinal carina on the abdominal pleurite and a depressed line on the tergum.

In the head, the vertex occupies the largest area, being longer than broad at base. It is divided by a faintly developed epicranial sulcus, lateral to which are situated the rather bulging eyes. The ocelli are indistinct. The antenna is three-segmented with unequal sized scape and pedicel. The bulbous ring joint fits into the anterior depression of pedicel which projects anteriorly as setaceous flagellum.

The thorax is carinate. The prothorax is broad dorsally and slightly elevated than the pterothorax. The mesothorax is the largest segment. The wing buds do not develop on the notum, and like typical delphacids, the coxa of the metathoracic leg is almost spherical and provided with fine denticles on the inner margin.

In the abdomen, the tergum and the pleurosternite are well discernible but the



Stages in the development of *Eoerysa flavocapitata*.

laterotergite is rather indistinct. The first and the second abdominal segments are fused and hence only nine segments are apparent. The last abdominal segment which is dark in colour is notched caudally. A pair of processes develop on the dorsolateral hindmargin of the ninth segment and extends through the middle of the tenth segment (Fig.9).

The sensory pits "Borstengruben" (Fig. 8) occur on the body of all nymphal instars. A pit consists of a roundish depression in the cuticle, and a true hair. The hair grows from the basal membrane located in a roundish basal wall at the posterior and slender side of a pit. The pit appears to function as a sense organ for humidity.

The total length of the body varies from 1.22 to 1.35 mm and the maximum breadth at the abdomen varies from 0.38 to 0.43mm (average of 10 nymphs). The duration of the first instar nymph varies from 4 to 6 days.

#### *Second instar nymph* (Fig. 3)

The second instar nymph is almost creamy yellow in colour. The end of the rostrum is, however, dark and the tibia and tarsus are cinereous grey in colour. The caudal part of the abdomen is dark. The pro- and mesothoracic legs are darker than the metathoracic one. The thoracic pleura can be demarcated into episternum and epimeron. The rudimentary anterior wing-buds faintly appear as lateral lobes on the mesonotum. The second instar nymph measures  $1.93 \times 0.52$ mm.

The duration of the second instar varies from 3-4 days.

#### *Third instar nymph* (Fig. 4)

The basic body colour of the third instar nymph is straw yellow, and the eyes are chocolate brown. The legs in general take

more brown colour, particularly the pro- and mesothoracic ones. The meso- and methathoracic wingpads start developing conspicuously. Laterally the mesothoracic wing pad out-stretches the metathoracic one. On the ninth abdominal segment five apodemal struts are discernible. This stage lasts 2-4 days. The nymphs measure  $2.50 \times 0.65$ mm

#### *Fourth instar nymph* (Fig. 5)

The vertex and the frontal region are cinereous brown. A sordid white band marks the clypeo-frontal area and there is a dark semicircular spot in the frons close to the fronto-clypeal sulcus. The rostrum is almost black and the intersegmental lines on the abdomen assume deep suffusion. The tips of the tibial spurs and the calcar turn almost piceous. Each of the pair of processes on the abdominal end is unsegmented, subquadrate and rugose-verruculate on the outer margin. The fourth instar nymph takes 3-4 days for its development and it measures  $3.25 \times 0.80$ mm.

#### *Fifth instar nymph* (Figs. 6,7)

The vertex of the fifth instar nymph is fuscous and without the Y-shaped carina on the vertex. The basic colour of the thorax and the abdomen is lemon yellow except for the lateral part of the eighth and ninth abdominal segments which are light black. On the postero-median aspect of the inner side of the trochanter, fine serrations become prominent. The apex of the hindwing descends to the fourth abdominal segment and in the late nymphal stage, tracheation in the wing is discernible. The hair bearing granules in the forewing are conspicuous.

In the abdomen only nine segments are discernible, the last two segments being fused together with a wide notch in the

TABLE 1. Relative length (mean  $\pm$  SE) of femur and tibia of hindleg of nymphs in mm and number of spines on spur (average of 10 specimens).

Nymphal stage	Femur	Tibia	Spines of spur
First instar	0.19 $\pm$ 0.007	0.21 $\pm$ 0.007	1
Second instar	0.37 $\pm$ 0.011	0.42 $\pm$ 0.010	3
Third instar	0.42 $\pm$ 0.011	0.48 $\pm$ 0.010	8
Fourth instar	0.49 $\pm$ 0.014	0.56 $\pm$ 0.012	14
Fifth instar	0.56 $\pm$ 0.010	0.64 $\pm$ 0.011	16

middle of the caudal segment. The weakly developed third valvulae in the female is visible.

The fifth instar nymph takes 4-7 days for transformation into adult and it measures 4.0  $\times$  1.08mm

#### *Nymphal period*

The total nymphal period covers 16-24 days.

#### *Life-span*

The longevities of the adult male and female vary from 6 to 10 days and 24 to 36 days respectively.

The relative length of femur and tibia of the hindleg of different nymphal instars and the number of spines on the spur are presented in Table 1. It is apparent from Table 1 that the lengths of both femur and tibia increase two times while the nymph transforms from first to second instar but increase in length in subsequent instars is much less.

#### *Behaviour of nymphs and adults and damage*

Both the nymphs and adults live concealed within the young leaf sheaths of sugarcane. The population gradually builds up with the vegetative growth of sugarcane

and the peak population is noticed in months from September to December. Both the nymphs and adults suck the plant sap. Owing to continuous feeding and oviposition, red streaks develop continuously in and around the injured tissues. The streaks coalesce to form bigger lesions. Extensive drainage of sap devitalises the plant. The excretory product or honey dew secreted by both nymphs and adults attracts black ants. Eventually sooty mould develops on the honey dew, the black coating of which interferes with the photosynthesis and transpiration of the plant.

#### DISCUSSION

The studies include life-history, measurements of body parts of different nymphal instars and behaviour of a delphacid insect *Eoerysa flavocapitata* which has been recently recorded as a new pest of sugarcane. The information on the biology of *E. flavocapitata* by MIRZA & QADRI (1964) is extremely meagre. Hence, detailed studies on the biology of allied delphacid insects by other workers need to be considered for an appraisal of the present work.

URBINO (1927) while working on the life-history of *Perkinsiella vastarix* (BREDDIN) in the Philippines noted that the interval

between the emergence of adult female and first oviposition on sugarcane varies from 2 to 15 days and that the incubation period of eggs from 14–17 days. Further, 3–4 days are required for completion of each of the five nymphal stages. In the present study the interval between the emergence of adult female and first oviposition was found to range from 6 to 10 days and the incubation period from 8 to 11 days. The life-histories of two other sugarcane delphacids viz., *Perkinsiella saccharicida* and *Saccharosydne saccharivora* as reported by GUAGLIUMI (1953) and WILLIAMS (1957) from Venezuela and Mauritius respectively also fairly agree with the present observations.

The present work also deals with differential growth pattern of some important morphological features as found in different nymphal instars. Many of these characters were earlier used for taxonomic purpose by FENNAH (1963) in his study on the delphacid species-complex. WILLIAMS (1957), RAATIKAINEN (1967) and METCALFE (1969) took into account certain changes in the morphological characteristics in successive instars of delphacid insects to determine the different stages of insects. Metcalfe (1969) also noted that the differentiation of the forewing buds relative to those of the hindwing and to the thorax is important in each instar. The present study on *E. flavocapitata* while forming a basis for conducting studies on other taxa, can be used with advantage for determination of different instars.

## REFERENCES

Box, H.E. (1953) *List of sugar-cane insects*, Commonwealth Inst. Ent., London.

- CHATTERJEE, P.B. (1971) Occurrence of *Eoerysa flavocapitata* MUIR (Delphacidae) on sugarcane in India. *Indian J. Ent.*, **33**: 220.
- FENNAH, R.G. (1963). The delphacid species-complex known as *Sogata furcifera* (HORVATH) (Homoptera: Fulgoroidea). *Bull. ent. Res.*, **54** (1): 45–79.
- FENNAH, R.G. (1969). Damage to sugarcane by Fulgoroidea and related insects in relation to the metabolic state of the host plant, 367–389, *In: Pests of sugar-cane*, (ed. WILLIAMS et al.) (Amsterdam Elsevier Pub. Co.
- \* GUAGLIUMI, P. (1953) El saltahoja de la cana de ajucar *Saccharosydne saccharivora* WESTW. y la fumagina en Venezuela (The sugarcane leaf hopper, *Saccharosydne saccharivora* and sooty mould in Venezuela). *Boln tec. Inst. nac. Agric. Venez.*, **7**: 1–82.
- METCALFE, J.R. (1969) Studies on the biology of sugarcane pest *Saccharosydne saccharivora* (WESTW.) (Hom., Delphacidae). *Bull. ent. Res.* **59**: (3) 393–408.
- MIRAZA, R.P. & M.A.H. QADRI (1964) Black leaf hopper of sugarcane of Rajshahi, East Pakistan. *Univ. Stud, Univ. Karachi*, **13**: 31–34.
- QADRI, M.A.H. (1963) Sugar-cane pests of East Pakistan. *Scientist*, Karachi, **6**: 46.
- RAATIKAINEN, M. (1967) Bionomics, enemies and population dynamics of *Javesella pellicida* (E.) (Hom., Delphacidae). *Ann. agr. Fenn.*, **6** (27): 1–149.
- URBINO, C.M. (1927) The sugar-cane leaf-hopper *Perkinsiella vastatrix* BREDDIN (Delphacidae: Homoptera). *Philipp. Agric.*, **16**: 337–347.
- WILLIAMS, J.R. (1957) The sugarcane Delphacidae and their natural enemies in Mauritius. *Trans. R. ent. Soc. Lond.*, **109**: 65–110.