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Pronotal Colour Variation in *Helopeltis theivora* Waterhouse (Miridae: Heteroptera) in the Sub-Himalayan Dooars Tea Plantation of North Bengal, India

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Abstract: The objective of this work was to record the number of colour variation present in the Dooars population of *Helopeltis theivora*. The colour variation in pronotal area of 100 adult males and 100 females of *H. theivora* was observed under an advanced research microscope after field collection. Results revealed that in the male there were three colour variants, while in the females there were 6 variants.

Key words: *Helopeltis theivora* · Pronotal region · Colour variation · Dooars

INTRODUCTION

The tea mosquito bug (*Helopeltis theivora* Waterhouse, Miridae: Heteroptera) is considered as one of the major pests of tea plantation because it attacks only the young shoot that is the actual crop of tea. It was estimated that 90% of the tea plantations area in the sub Himalayan Dooars tea plantation is affected by this pest alone, which often result in crop loss to the tune of 10-50 % [1, 2]. According to Schuh [3] the morphological characteristic of *Helopeltis theivora* (belongs to the subfamily Bryocorinae, tribe Dicyhini and subtribe Monaloniina) suggested that normally the male insect is a little smaller than female. The head of the insect is brown with a broad yellow stripe and is smaller at the neck. The eyes are brown – black. The insect has long brown antennae that become thinner and darker at the ends farthest from the head. The back of the insect has a small club sticking out of it, shaped like a short pin with the head upwards. The pronotal region of male insect is black in colour and the female has a distinct orange colour. But nowadays, in connection with the information concerning the variation from the basic morphology (pronotal colouration) of *H. theivora* was now observed from different parts of the Dooars tea plantation. The objective of this work was to record the number of colour variation present in the Dooars population of *H. theivora*.

MATERIALS AND METHODS

The colour variation in pronotal area of males and females in the Dooars population was observed by collecting the adults from the field and killing them using cyanide jar. The observation was done under an advanced research microscope. One hundred males and one hundred females' specimen were subjected to observe of the pronotal colour variation.

RESULTS

In the male, there were three colour variants, which were designated as colour varient male - 1 (CVM – I) that was found commonly in the Dooars tea plantations and representing almost 80.25 % of the total population; CVM – II with an occurrence of 15.00 %; and CVM – III showing a low incidence 4.75 %.

In females, six colour variants (CVF – I to VI) were observed. In Dooars CVF-II female population dominated with an incidence of 40.50% followed by CVF-I (20.35%) then CVF-V (17.75%), CVF-VI (11.85%), CVF-III (5.55%) and CVF-IV (4.00%) (Table 1).

DISCUSSION

Regarding the colour variants of *Helopeltis theivora,* 3 variants were recorded in male versus 6 in females. As per the findings of Eastop [4] and Russel [5] the

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Table 1: Incidence of colour variants between male and female of *Helopeltis theivora* collected from Dooars tea plantations

Colour variants of *Helopeltis theivora*	Description	Percent incidence of colour variant in the field (Mean ± SE)
♂Male		
CVM I	Pronotal area completely black	80.25±1.24
CVM II	Pronotal area black with one trench having brown colouration and two brownish dots at lateral side just below the trench	15.00±1.17
CVM III	Pronotal area black with two trenchs having brown colouration one in top and other in middle at the base of scutellum	4.75±1.09
♀Female		
CVF I	Centre area of pronotal area brownish orange with lateral side black and green trench in anterior end.	20.35±1.42
CVF II	Half pronotal area brownish orange (anterior end) and rest half totally black (distal end).	40.50±0.99
CVF III	Centre area of pronotal area brownish orange with two black spots at the distal end.	5.55±0.41
CVFIV	Pronotal area totally brownish orange.	4.00±1.23
CVFV	Major part of pronotal area black with "U" shaped brownish spot at the frontal end	17.75±1.16
CVFVI	Pronotal area black with two trenches having brown colouration at lateral side.	11.85±0.81

CVM – colour variant male; CVF – colour variant female

biotypes usually differ is based on diurnal or seasonal activity patterns, size, shape, colour, insecticide resistance, migration and dispersal tendencies, pheromone differences or disease vector capacities. Mann [6] strongly correlated the colour variation in *H. theivora* with season, wherein he found that males on the average were much darker in summer/autumn (July-October) populations than those of winter/spring brood (November-June), but the females sported a reverse colouration. Colour variability in populations collected from Vietnam, South India and Assam with special reference to head and pronotum was reported by Stonedahal [7]. Mann [6] and Stonedahl [7] found variation in colour pattern in different seasons, but in the present observation, colour variation was found both in males and females in the same season. The colour variation in the Dooars condition is presumably due to pesticide selection pressure.

Importance of pigmentation (melanin contain) in detoxification of insecticide is well established in many pests which consequently impart insecticide resistance to many of them [8]. This was further confirmed when elevated LC_{50} values of *H. theivora* to different insecticides were reported by Roy *et al*. [9, 10]. Further in comparison to Assam varieties, the Dooars specimens were found to be more blackish (melanic), particularly the females population, compared to that of Assam [11]. No reddish-orange variant was observed in the Dooars. However, further in-depth studies are needed for biotypes identification through molecular techniques.

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