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A study on insect faunal diversity from Indas, Bankura, West Bengal

M Rafiqul Amin
Assistant Professor, Department of Zoology, Indas Mahavidyalaya, Indas, Bankura, West Bengal, India

Abstract
The present study was conducted from different villages of Indas block of Bankura district from West Bengal where insect faunal diversity has not been investigated earlier. The study has recorded 14 insect fauna (Beetle, Dragonfly, Moth, Spider, Butterfly and Antlion) belonging to 8 families, 14 genera and 12 species during May 2022 to October, 2022. Family Nymphalidae and Libellulidae were monitored as dominating taxons, succeeded by Chrysomelidae Tetragnathidae, Uraniidae, Papilionidae, Myrmeleontidae and Eupterotidae. Fertile low-lying plains of Indas in Bankura district aids in favourable growth of the plant and vegetables that accentuates the chances of elevation of pest population. Adoption of proper pest management strategy and awareness among farmers can excavate the avenues for sustenance of insect faunal diversity and inhibiting the expeditious growth of pest population simultaneously.

Keywords: insect faunal diversity, Indas, pest management, awareness

Introduction
Insects are the most omnifarious group of animals. They subsume more than a million described species (Chapman, 2006) [3]. *Distoleon sambalpurensis* has been reported from Darjeeling district of West Bengal, India by Ghosh (2000) [8]. From Purba Midnapore district of West Bengal, *Junonia lemonias* and *Euploea core* have been recorded (Hajra *et al*., 2015) [13]. Lemon butterfly, *Papilio demoleus* has been documented from Chinsurah, Hooghly, West Bengal (Mandal, 2016) [20]. *Leucauge decorata* has been recorded from Darjeeling, Jalpaiguri and North 24 Parganas districts of West Bengal, India by Sen *et al.* (2015) [33]; Raychaudhuri et al (2016) [29]; Saha *et al*. (2016) [29] and Saha *et al*. (2017) [30]. Incidence of *Aulacophora foveicollis* has also been recorded in pointed gourd and bottle gourd from Nadia district of West Bengal, India by Ghule et al. (2015) and Bhowmik and Saha (2017) [30]. Raha *et al.* (2017) has reported *Eupterote fabia* from West Bengal. *Danaus chrysippus* has been further observed from Birbhum district of West Bengal, India by Pandit *et al.* (2018) [26]. *Micronia aculeata* has been reported from West Midnapore district of West Bengal, India by Nayak and Sasmal (2020) [22]. Furthermore; Dwari and Mondal (2018) [6] and Ghosh (2022) [7] have recorded *Pantala flavescens*, *Trithemis pallidinervis*, *Crocothemis servilia* and *Brachythemis contaminata* from Bardhaman, Hooghly and Howrah districts of West Bengal. *Papilio demoleus*, *Euploea core*, *Danaus chrysippus* have been reported from Bankura town, West Bengal, India by Nayak, 2020 [22]. But no study from Eastern part of Bankura district of West Bengal has been available for diversity of insect fauna. So, the present study investigates diversity of insect fauna from different villages of Indas block in Bankura district of West Bengal, India.

Materials and Method
A field survey was carried out in and around different villages of Indas block (23°09'00"N 87°37'00"E) of Bankura district of West Bengal, India during the month of May 2022 to October, 2022. Beetle, Dragonfly, Antlion, Moths and Butterflies found in day and evening period were taken into consideration for the samples of study. Sweep net (Dragon fly, Butterfly, Beetle and Spider) and Light trap (Antlion and Moths) were used to collect the afore-mentioned insects. Observed insects were photographed with the help of digital camera. Insects were identified based on the digital photographs with the help of available literature (Ghosh, 2000; Harsh, 2014; Saha et al., 2016; Tiple, 2018; Jahnavi et al., 2018; Abdullahi et al., 2019; Nayak and Sasmal, 2020; Wankhade et al., 2021 and Ghosh, 2022) [8, 5, 29, 22].

Results and Discussion
In the present study total 12 species of Beetle, Dragonfly, Moths, Spider and Butterflies and 2 genus of Antlion and Moth (Table 1) were found from different villages of Indas block of Bankura district of West Bengal. Family Nymphalidae (4 species) and Libellulidae (4 species) were monitored as the dominating taxons, succeeded by Chrysomelidae (1 species), Tetragnathidae (1 species), Uraniidae (1 species), Papilionidae (1 species), Myrmeleontidae (1 genus) and Eupterotidae (1 genus).

Table 1: Checklist for insect fauna found in Indas Block, Bankura during May 2022 to October, 2022.

No.	Family	Species	Author, Year
1	Chrysomelidae	*Aulacophora foveicollis*	Lucas, 1849
2	Libellulidae	*Pantala flavescens*	Fabricius, 1798
3	Libellulidae	*Trithemis pallidinervis*	Kirby, 1889
4	Libellulidae	*Crocothemis servilia*	Drury, 1773
5	Libellulidae	*Brachythemis contaminate*	Fabricius, 1793
6	Tetragnathidae	*Leucauge decorata*	Walckenaer, 1842
7	Eupterotidae	*Eupterote* sp.	Hübner, 1820
8	Uraniidae	*Micronia aculeata*	Guene᾽e, 1857
9	Nymphalidae	*Danaus chrysippus*	Linnaeus, 1758
10	Nymphalidae	*Junonia lemonias*	Linnaeus, 1758
11	Nymphalidae	*Acraea terpsicore*	Linnaeus, 1758
12	Nymphalidae	*Euploea core*	Cramer, 1780
13	Papilionidae	*Papilio demoleus*	Linnaeus, 1758
14	Myrmeleontidae	*Distoleon* sp.	Banks, 1910

In the present investigation, Butterflies (Family: Nymphalidae) viz. *Danaus chrysippus*, *Junonia lemonias*, *Acraea terpsicore* and *Euploea core* and Dragon flies (Family: Libellulidae) viz. *Pantala flavescens*, *Trithemis pallidinervis*, *Crocothemis servilia* and *Brachythemis contaminata* were observed to be greater in number of species as compared to *Aulacophora foveicollis* (Family: Chrysomelidae), *Micronia aculeata* (Family: Uraniidae), *Papilio demoleus* (Family: Papilionidae) and *Leucauge decorata* (Tetragnathidae) . 1 antlion like *Distoleon* sp. and 1 moth like *Eupterote* sp. were also found but their species were not determined.

Fig1: *Aulacophora foveicollis*

Fig 2: *Pantala flavescens*

Fig 3: *Trithemis pallidinervis*

Fig 4*: Crocothemis servilia*

Fig 5: *Brachythemis contaminate*

Fig 6: *Leucauge decorate*

Fig 7: *Eupterote sp.*

Fig 8: *Micronia aculeata*

Fig 9: *Danaus chrysippus*

Fig 10: *Junonia lemonias*

Fig 11: *Acraea terpsicore*

Fig 12: *Euploea core*

Fig 13: *Papilio demoleus*

Fig 14: *Distoleon sp.*

The adult *A. foveicollis* consumed voraciously leaves, flower buds and flowers of pumpkin (*Cucurbita maxima*), bottle gourd (*Lagenaria siceraria*), cucumber (*Cucumis sativus*), water melon (*Citrullus lanatus*), ridge gourd (*Luffa acutangula*), pointed gourd (*Trichosanthes dioica*) and ash gourd (*Benincasa hispida*) (Das and Ishahaque, 1998; Khan *et al.*, 2012) [5, 18]. *P. flavescens* was reported from Tamil Nadu and Punjab by Manikandan et al. (2022) and Sharma and Joshi (2007) [34] respectively. From West Bengal; *P. flavescens*, *T. pallidinervis*, *C. servilia* and *B. contaminata* have been identified by Dwari and Mondal (2018) [6] and Ghosh (2022) [7]. *Leucauge decorata* was reported from West Bengal by Sen *et al.* (2015) [33]; Raychaudhuri *et al.* (2016) [29]; Saha *et al.* (2016) [29] and Saha et al. (2017). *E. fabia*, *E. lineosa*, *E. mollifera discrepans* were described by Gurule and Nikam (2013) from Maharashtra. *M. aculeata* has also been recorded from Maharashtra and West Bengal by Wankhade *et al.* (2021) [37] and Nayak and Sasmal (2020) [22] respectively. *D. chrysippus* has been identified as an important pest on *Calotropis procera* in Bushehr-Iran (Golestaneh *et al.*, 2009) [11]. *J. lemonias* has also been observed from Bhopal, Madhya Pradesh by Harsh (2014) [15]. *J. lemonias* utilized *Ruellia tuberosa* for oviposition (Harinath *et al.*, 2016) [14]. *Turnera subulata* and *Passiflora foetida* were reported as host plants of *A. terpsicore* (Gideon et al., 2016) [10]. *E. core* was recorded from Uttar Pradesh and Maharashtra by Abdullahi *et al.* (2019) [1] and Tiple (2018) [36] respectively. *Adenium obesum* and *Nerium indicum* acted as host plants for *E. core* (Terdalkar *et al.*, 2019 [35] and Das *et al.*, 2012) [4]. *E. core* behaved as polyphagous insect for Apocynaceae (dogbanes and oleanders), Asclepiadaceae (milkweeds), Moraceae (figs) (Kehimkar 2008; Kunte 2000; Palot and Radhakrishnan 2001) [17, 19, 25]. *Citrus limon*, *Citrus grandis*, *Citrus aurantifolia*, *Murraya koenigii*, *Aegle marmelos* acted as host plants for *P. demoleus* (Patel *et al.*, 2017) [27]. *Distoleon sambalpurensis* was reported from West Bengal by Ghosh, 2000 [8].

Butterflies like *P. demoleus*, *E. core* and *D. chrysippus* have been recorded from Bankura town of West Bengal, India by Nayak, 2020 [22]. Nayak, 2021 [24] has also recorded moths viz. *E. bifasciata* and *E. undata* from Gangajalghati of Bankura district in West Bengal, India. In the present study; Butterflies like *P. demoleus*, *E.* core, *D. chrysippus*, *J. lemonias* and *A. terpsicore*, and moths like *Eupterote* sp. and *M. aculeata* were observed in different villages of Indas block in Bankura district of West Bengal. Central part of Bankura district is occupied by Bankura town, while Gangajalghati is placed in northern part of Bankura district. Indas is located in eastern part of district Bankura. A minimal change in distribution of Butterflies and Moths were revealed between central-northern and eastern parts of Bankura district. Existence of marginal incongruity of Moths and Butterflies diversity in between central-northern part and eastern part of Bankura district of West Bengal is evident. Central-northern parts of Bankura district belong to dry laterite zones, whereas eastern portion corresponds to fertile low lying alluvial plains. So, topographical conditions are entirely different in two sides of Bankura district. It may affect insect faunal diversity between two zones.

Conclusion

Only diversity of moths and butterflies has been reported from central and northern parts of Bankura district of West Bengal, India. To date reports about insect faunal diversity in eastern part of Bankura district of West Bengal are not available. *D. chrysippus*, *J. lemonias*, *A. terpsicore*, *E. core*, *P. demoleus* and *A. foveicollis* are considered as important pests of different plants and vegetables in Indas. Fertile low-lying plains of Indas in Bankura district aids in advantageous growth of the plant and vegetables that accelerates the chances of elevation of pest population. So, adoption of proper pest management practices and awareness among farmers has to be intensified for sustenance of insect faunal diversity and inhibiting the alacritous growth of pest population synchronously.

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