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RESEARCH ARTICLE

On the Occurrence and Distribution of the Buprestid Beetles (Coleoptera: Buprestidae) in Mizoram, North-East India

Malsawmdawngzuali Tara[1], K Lalchhandama[1], John Zothanzama[2], C Zothansanga[1], Betsy Zodinpuii[3], Lalramliana[1,3]*

1 Department of Life Sciences, Pachhunga University College, Aizawl, Mizoram, India
2 Department of Biotechnology, Mizoram University, Aizawl, Mizoram, India
3 Department of Zoology, Pachhunga University College, Aizawl, Mizoram, India

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* **Corresponding author**.

lrl_zoo@yahoo.co.in

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Abstract

Objectives: The family Buprestidae or commonly called 'metallic wood-boring beetles' or 'jewel beetles' are a fascinating yet lesser-studied group of beetles under the order Coleoptera. The aim of the present study is to report on the occurrence of Buprestid beetles from Mizoram. **Methods:** The beetles were collected by hand-picking and by setting up light traps in different parts of the state as a part of a study of the biodiversity of Coleoptera of Mizoram during all seasons for a period of 12 months. The collected specimens were first killed and stored in alcohol until they were ready to be examined for identification on a morphological basis following appropriate identification keys. **Findings:** The present study reports the occurrence of 5 species of jewel beetles under 4 genera and 2 subfamilies from the state of Mizoram. The specimens were collected from forested or nearby forested areas. While sampling was carried out in all seasons, the actual collection was recorded between the months of May and September (pre-monsoon and monsoon seasons). **Novelty:** The species which are reported during the study are the first documented record of this family of beetles from the state of Mizoram, North-East India.

Keywords: Buprestidae; Diversity; First report; Mizoram; Occurrence

1 Introduction

Mizoram is a north-eastern state in India situated between 21° 56′N-24° 31′N latitudes and 92° 16′E-93° 26 ′E longitude and covering an area of nearly 21,087 sq. km. The state is sharing domestic borders with Tripura, Manipur, Assam and Meghalaya and international borders with Bangladesh and Myanmar in the west and east respectively. It lies in the Indo-Myanmar biological hotspot region. Despite this, there has been little documentation of its flora and fauna, especially insects and beetles.

The family Buprestidae is commonly called 'jewel beetles' or 'metallic wood-boring' beetles as most members of this family possess a glossy iridescent colored body. The family is among one of the largest families of beetles, with around 15,500 species known

in 775 genera and almost 100 fossil species having been described [1]. The more stunningly coloured jewel beetles are also highly prized by insect collectors around the world as well as their elytra being used for decorations and jewelry in certain countries in Asia like Thailand, Japan and India including the people of Mizoram who use the elytra as part of the traditional headdress worn by the females [2].

Although different scientists have started several studies of different families like Scarabaeidae, Tenebrionidae, Cerambycidae and Cicindelidae from Mizoram, there is no literature available for Buprestidae [3,4]. The National Forest Insect Collection (NFIC), Forest Research Institute (FRI), Dehradun, India is currently housing 71 specimens of jewel beetles in its insect collection collected from different parts of the country but none of the species collected during the present study are included in this even though their distribution has been reported from India [5]. Most of the literature available on the family Buprestidae from India reports the majority of the species belonging to the genus *Agrilus, Anthaxia, Acmaeodera* [6–8]. The present study aims to study and report the occurrence of buprestid beetles from the state.

2 Methodology

The beetles were collected by hand-picking and by setting up light traps in different parts of the state as a part of a study of the biodiversity of Coleoptera of Mizoram. Sampling was carried out in all seasons for a period of 12 months. Permission for the collection of specimens was obtained from the Chief Conservator of Forests, Department of Environment and Forests, Ministry of Environment and Forests, Mizoram (Permit Number: No.A.33011/5/2012-CWLW/197). The collected specimens were first killed and stored in alcohol until they were ready to be examined and studied under Leica S9i KL300 Stereo zoom microscope for identification on a morphological basis following identification keys provided by Hołyński [9] and Kurosawa [10]. Specimens were pinned and properly labelled and finally deposited in the Pachhunga University College Zoological Museum.

3 Results and Discussion

In this study, we have collected and presented 5 species of jewel beetles under 4 genera from the subfamilies Julodinae and Chrysochroinae**.** The specimens were mainly collected from areas that have a higher vegetation cover or nearby forested areas. The calculated Shannon index value is 1.367 and Margalef index value is 1.668 which reveals the good diversity along with the richness and evenness of the species for the buprestid beetles in Mizoram, India.

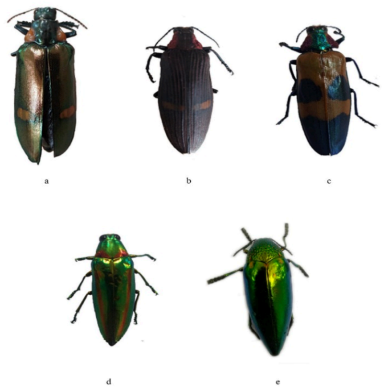

Fig 1. Buprestid beetles of Mizoram (a) ***Megaloxantha bicolor*** **(b)** ***Catoxantha opulenta bonvouloiri*** **(c)** ***Chrysochroa buqueti*** **(d)** ***Chrysochroa rajah*** **(e)** ***Sternocera aequisignata***

Systematic account

Subfamily: Julodinae, Lacordaire, 1857

(a) ***Megaloxantha bicolor nigricornis*** **(Deyrolle, 1864)**

Material examined: PUCMF22030, 1ex, India: Mizoram, N.E. Tlangnuam, Aizawl dist., Betsy Z. Hmar, (21.09.2021).

Distribution: India to Vietnam, Australia and the Philippines.

Remark: Body is dark bronzy-green to dark bluish-green; antennae entirely black. Pronotum dark green with the posterior angles yellowish or brownish ivory or reddish brown with large tubercles extending beyond the middle of the sides at each posterior angle. Legs are blackish with a violaceous or cyaneous tinge. The marking on each elytron is transverse usually not

touching lateral margin; elytral punctuation denser and rather uniform; costae obsolete at the base. The apical emargination of last ventral segment of abdomen in the male is subtriangular.

Subfamily: Chrysochroinae, Lacordaire, 1857

(b) *Catoxantha opulenta bonvouloiri* (Deyrolle, 1861)

Material examined: PUCMF22031, 1ex, India: Mizoram N.E. Tlangnuam, Aizawl dist. Betsy Z. Hmar, (21.09.2021).

Distribution: Northeastern India (Sikkim, Assam, Mizoram), Bhutan, Bangladesh, Burma, Thailand and Laos.

Remark: The dorsal side of the body dull purplish bronzed with head, pronotal sides and metallic parts of sternum cupreous (median parts of metasternum and metacoxae sometimes green); antennae black. Yellow transverse marking on each elytron which are usually long and almost parallel sided, slightly expanding sidewards; suturoapical denticle short. Intercostae usually disappear shortly behind elytral markings; distinct subhumeral angularities. Abdomen may be with or without black spots in anterior angles of sternites.

(c) *Chrysochroa buqueti* (Gory, 1833)

Material examined: PUCMF22032, 1ex, India: Mizoram Pualreng, Kolasib dist., Lalruatthara Hmar (30.07.2020)

Distribution: Thailand, Burma, Malaysia, Indonesia, India

Remark: Pronotum cupreous-red with bright violaceous-blue at vertex and pronotal disk. Elytra slightly widened to midlength and roundedly narrowed to apices and typically ivory over most surface with rounded patch at midlength and narrow margins of blackish-violaceous colour; hind angle of basal ivory zone entering as narrow cuneate intrusion between the dark elytral margin and median spot. Similar wedge of yellow ivory colouration borders the lateroanterior angle of the apical area. Sternum bright red except for the bands on each side of prosternal process which is bluish-violaceous in colour; abdomen and legs blackish-violaceous blue. Frontal pubescence erect, long and yellowish to rufous while that of ventral side is semi-erect medially, recumbent on both sides. Costae slightly elevated but only on apical half and disappear towards base.

(d) *Chrysochroa rajah* (Gory, 1840)

Material examined: PUCMF22033-PUCMF22037, 5ex, India: Mizoram: Kanan veng, Aizawl dist. Tara. M. (23.08.2020); Zemabawk, Aizawl dist. Betsy Z Hmar (25.05.2020); Edenthar, Aizawl dist. Lalramliana (28.07.2020); Pualreng Kolasib dist., Zothansanga C. (30.07.2020); Pualreng Kolasib dist., Zothansanga C., (21.08.2021)

Distribution: Burma, Pakistan, China, India, Laos, Thailand, Vietnam, Indo-China.

Remark: Body is somewhat flattened and parallel sided; dorsal body colouration typically metallic green with cupreous triangular laterobasal patches on pronotum and longitudinal bands on elytra while ventral side is cupreous. Punctuation coarse, dense and rugosely confluent on sides, then much finer and sparse on disk. Elytra slightly widened to midlength and then narrowing along gently arcuate line of increasing curvature; lateroapical margin with series of sharp denticles while apices are conjointly rounded. Costae usually smooth and slightly elevated, sometimes totally eliminated; irregular punctuation. Apex of anal segment narrowly rounded with tiny incision at tip in case of females or broadly paraboloidally emarginate in male.

(e) *Sternocera aequisignata* (Saunders, 1866)

Material examined: PUCMF22038-PUCMF22040, 3ex, India: Mizoram: Zemabawk, Aizawl dist. Betsy Z. Hmar (17.08.2020); Chuhvel, Mamit dist., Albana (04.07.2020); MZU campus Tanhril, Aizawl dist., Tara M. (06.09.2021)

Distribution: Indo-China, Bangladesh, Vietnam, Southern China, Cambodia and India.

Remark: Whole body is metallic green in colour. Antenna serrated and red-brown. Pronotum convex with deep punctures and posterior angles pointed. Scutellum absent. Mesosternum broad and short; metasternum long and broad, anterior margin extends to mesosternum, arrow shaped. Elytra slightly broader than pronotum; small punctured; humeral angle rounded and tip serrated; one yellow spot on each elytron near the humeral angle. Legs red-brown; only five segments are visible in the abdomen; sternite VI with posterior margin emarginated in male and rounded in female. *S. aequisignata* is often confused with its closely related species *S. ruficornis* where the most easily distinguishable character is the legs which are red-brown in the former while it is green in the latter species.

The family Buprestidae is one of the largest families of beetles and India has more than 80 recorded species, despite this, the records and data available are not sufficient in terms of distribution and ecology. The family, as a whole, is more or less neglected when compared with other families like Scarabaeidae and Cerambycidae. In the present study, *Chrysochroa rajah* is found to be the most common species and collected from several locations, followed by *Sternocera aequisignata* while single specimens are collected for *Megaloxantha bicolor, Chrysochroa buqueti* and *Catoxantha opulenta*. There are only a few species such as *Agrilus sp., Acmaeodera sp.* and *Sphenoptera sp.* which have been extensively studied and these species are of economic importance in their status as pests[11,12]. *Sternocera spp.* has also been recently reported to infest on *Acacia senegal* trees from Kalyana Kumathiya enclosure Jodhpur, Rajasthan and much earlier reported on the infestation of *Sternocera chrysis* on the sapwood of *Salvadora persica* in Rajasthan and on *Albizia lebbeck* in Tamil Nadu, India[13].

Although the reported number of species, i.e., 5 species from Mizoram, India, may seem like a small number, this can be attributed to the small area of the state as compared to the larger number being reported from other larger states in India and other parts of the world. At present in India, the collection from the National Forest Insect Collection (NFIC), Forest Research Institute (FRI), Dehradun, India with 71 specimensis the best-maintained collection of Buprestidae. The specimens in the collection of NFIC are collected from all parts of India, but none of the species reported in the present study is included in it and contrariwise we did not collect any of those species which are in the said collection either.

It is also worth mentioning that the sampling was carried out in all seasons, however, specimens were collected only during the pre-monsoon and monsoon seasons. Also, the survey was carried out with the local people from the sites of collection who claimed that the population of beetles in the area is in decline over the previous decade, the reason for which may be due to deforestation and the change in climate in the region. This can be taken into consideration and establish the species as an ecological indicator.

4 Conclusion

This study provides the first faunistic data as well as information on the seasonal occurrence of Buprestid beetles from Mizoram, India reporting 5 species under 4 genera and 2 subfamilies. The study is relevant because it will serve as a reference for future studies of Coleoptera in Mizoram. The study was carried out for a period of 12 months covering all seasons which gives us the given results, but it was done during the pandemic which restricted the study up to a certain extent. We can draw the conclusion that there is still room for additional research that could potentially record more species of buprestid beetles as well as information about their ecology, life cycle, and habitat. This can be done by conducting a study over a larger area and for a longer period. The study can also be supplemented with supporting molecular data for a better understanding of the buprestid beetles.

5 Declaration

Presented in 4th Mizoram Science Congress (MSC 2022) during 20th & 21st October 2022, organized by Mizoram Science, Technology and Innovation Council (MISTIC), Directorate of Science and Technology (DST) Mizoram, Govt. of Mizoram in collaboration with science NGOs in Mizoram such as Mizo Academy of Sciences (MAS), Mizoram Science Society (MSS), Science Teachers' Association, Mizoram (STAM), Geological Society of Mizoram (GSM), Mizoram Mathematics Society (MMS), Biodiversity and Nature Conservation Network (BIOCONE) and Mizoram Information & Technology Society (MITS). The Organizers claim the peer review responsibility

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