



Research Article

SURVEY ON HETEROPTERAN TERRESTRIAL BUGS (ORDER: HEMIPTERA) FROM PANDAVLENI MOUNTAIN OF NASIK, (M.S.), INDIA

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Article History: Received 7th July 2026; Accepted 27th August 2026; Published 31st October 2026

ABSTRACT

This study aims to investigate the diversity, abundance and habitat distribution of terrestrial Heteroptera inhabiting Pandavleni Mountain, Nashik, Maharashtra. Systematic sampling was conducted across major habitats during monsoon, post-monsoon, winter, and summer seasons using hand collection in morning and evening time. Specimens were identified using standard morphological keys and examined for diagnostic characters, with photographic and voucher documentation. The study provided baseline information on the terrestrial true-bug fauna of Pandavleni Mountain and contribute to the documentation of Heteropteran bugs biodiversity in the Nashik region of Maharashtra.

Keywords: Diversity, Heteroptera, Fauna, Mountain, Winter.

INTRODUCTION

The Heteroptera, also known as "true bugs," are one of the largest and most biologically diversified lineages within the order Hemiptera, consisting of around 42,300 known species worldwide, divided into 75-89 families. Their body size ranges between little than 1 mm and 10 cm (Rabitsch, 2010; Henry, 2009). These insects are recognizable by their hemelytrous forewings leathery at the base and membranous at the apex that overlap to form a distinctive "X" or "Y" pattern on the dorsum while at rest. Their piercing-sucking mouthparts, structured into a segmented rostrum that emerges from the anterior or ventral head (Schuh & Weirauch, 2020). The species found in heteroptera can harm plants or crops by eating on the roots, foliage, flowers, fruits, stem, and trunk. Many species, such as reduviidae, have an essential role in medicine as infection vectors. In addition to this, numerous predaceous species are particularly effective against pest species and can help regulate pest populations in agricultural crops (Lambdin *et al.* 2003). The majority of hemiptera are pests of mango, curry leaf, soybean, and other crops (Tara *et al.*, 2014; Tara and Sharma, 2010). On the outskirts of Nashik (Maharashtra), the Pandavleni (Trirashmi Hill) locale is a biogeographically significant transition zone between the northern Western Ghats and the Deccan Plateau.

Pandavleni is predicted to support a richer assortment of terrestrial bugs, due to the habitat's heterogeneity (grassland, scrub, rock outcrops, valley vegetation) and the presence of a variety of host plants (Acacia, Prosopis, Ziziphus, Euphorbia, Cassia). The present investigation conducted to document the species composition and taxonomic diversity of terrestrial Heteroptera at Pandavleni Mountain. Also, prepare morphological descriptions, identification keys, and photographic documentation of collected taxa. To estimate diversity using richness, abundance, dominance, and evenness indices.

MATERIALS AND METHODS

Methodology

Study area: Pandavleni caverns, also known as the Trirashmi or Nashik Caves, are a historic collection of twenty-four Buddhist caverns carved out of rock located on Trirashmi Hill, approximately eight kilometers from Nashik. They have sculptures, inscriptions, stupas, cisterns, and viharas and were primarily utilized as monastic homes, meditation areas, and prayer rooms.

Collection, preservation and identification of the Heteropteran bugs

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The collection of these bugs was done by hand picking, net catcher (sweep net). The bugs were picked up by lower foothill vegetation, scrub and grassland zones, rocky slopes and exposed rocky surfaces, vegetation surrounding the caves and visitor pathways, flowering and fruiting plant patches, shaded areas, leaf litter, tree trunks, and loose bark nearby the forest region. The collection was performed in three years from 2022 to 2025, in the morning (8 to 10.30 am) and in the evening (3.45 to 5.20 pm) during monsoon (June-September), post-monsoon (October-December),

winter (January-February), and summer seasons (March-May). The hand collection was taken from the ground, grass, and shrubs, among other places. The insects were transported to the lab, where they were killed in a killing bottle, stored using the dry preservation process, and used for taxonomical research. The bugs were identified with the help of keys available in the fauna of British India, including Ceylon and Burma by Distant (1902 & 1904). Also Dr. H. V. Ghate help in confirming the species name.



1a. Site 1



1b. Site 2

Figure 1. Photos were taken from the Pandavleni mountain of site A and Site B.



Figure 2. Site 3 photo of pandavleni covered by dense trees and shrubs.

RESULTS AND DISCUSSION

A wide variety of plant-feeding and predaceous insects were found during surveys of terrestrial true bugs around regional local sites in Nashik's Pandavleni hill environment from 2022 to 2025 year. Studies revealed that groups recorded 234 individuals belonging to 6 families from Heteropteran bugs, such as Alydidae (38 individuals), Coreidae (32 individuals), Rhopalidae (2 individuals), Lygaeidae (18 individuals), Pentatomidae (100 individuals), and Scutelleridae (31 individuals) were flourished among the rocky foothill flora, grasses, and

shrubs. The recorded species were found to be nineteen species of terrestrial true bugs from pandavleni. Overall terrestrial true bugs were abundant in lower altitudes than the higher altitudes of Pandavleni mountain. The occurrence of four pentatomid species (*Leptocoris acuta*, *Adria Parvula*, *Chrysorcoris perpureus* and *Daladar planiventris*) at Pandavleni indicates that the mountain supports a distinct assemblage of phytophagous terrestrial Heteroptera. The presence of *Plautia crossota*, *Carbula scutellata*, and *Carbula insocia* suggests that the scrub, grass, and herbaceous vegetation of the hill provide suitable resources for shield bugs (Jadhav & Goswami, 2019).

Table 1. Checklist of Species observed during field survey from 2022-2025.

S. No.	Family	Species name	2022	2023	2024	2025	Total
1	Alydidae	<i>Leptocoris acuta</i>	12	15	5	6	38
2	Coreidae	<i>Acanthocoris scabrator</i>	2	3	1	2	8
3	Coreidae	<i>Anoplocnemis phasiana</i>	1	-	1	-	2
4	Coreidae	<i>Brachytes bicolor</i>	1	-	-	1	2
5	Coreidae	<i>Daladar planiventris</i>	5	7	6	2	20
6	Rhopalidae	<i>Leptocoris angur</i>	1	1	-	-	2
7	Lygaeidae	<i>Melanotelus bipunctatus</i>	7	5	4	2	18
8	Pentatomidae	<i>Adria Parvula</i>	7	7	5	7	26
9	Pentatomidae	<i>Aeschrocoris sp.</i>	1	-	-	-	1
10	Pentatomidae	<i>Bagrada Picta</i>	2	2	1	-	5
11	Pentatomidae	<i>Carbula scutellata</i>	3	2	3	3	11
12	Pentatomidae	<i>Carbula insocia</i>	2	-	2	1	5
13	Pentatomidae	<i>Erthesina acuminata</i>	2	2	-	2	6
14	Pentatomidae	<i>Eysarcoris sp.</i>	3	2	4	2	11
15	Pentatomidae	<i>Nezara viridula</i>	5	4	5	6	20
16	Pentatomidae	<i>Menida flavovaria</i>	2	1	-	1	4
17	Pentatomidae	<i>Plautia crossota</i>	4	2	4	5	15
18	Scutelleridae	<i>Alphocoris lixoides</i>	2	3	2	2	9
19	Scutelleridae	<i>Chrysorcoris perpureus</i>	10	8	8	5	31
Total Number of individuals			72	64	51	47	234

Table 2. Representing the species with family distribution in year wise from Pandavleni.

S. No.	Diversity Indices	Values
1	Simpson Index	0.09007
2	Shannon Index	3.754
3	Margalef Richness Index	3.3

Table 3. Diversity indices were calculated for the species of the Pandavleni of Nasik.

YEAR	Family (No. of Specimens)					
	Alydidae	Coreidae	Rhopalidae	Lygaeidae	Pentatomidae	Scutelleridae
2022	12	9	1	7	27	10
2023	15	10	1	5	22	8
2024	5	8		4	24	8
2025	6	5		2	27	5

Table 4. Year wise distribution of species in family of Pandavleni mountain, Nasik.

S. No.	Family	No. of individuals
1	Alydidae	38
2	Coreidae	32
3	Rhopalidae	2
4	Lygaeidae	18
5	Pentatomidae	100
6	Scutelleridae	31
	Total	234

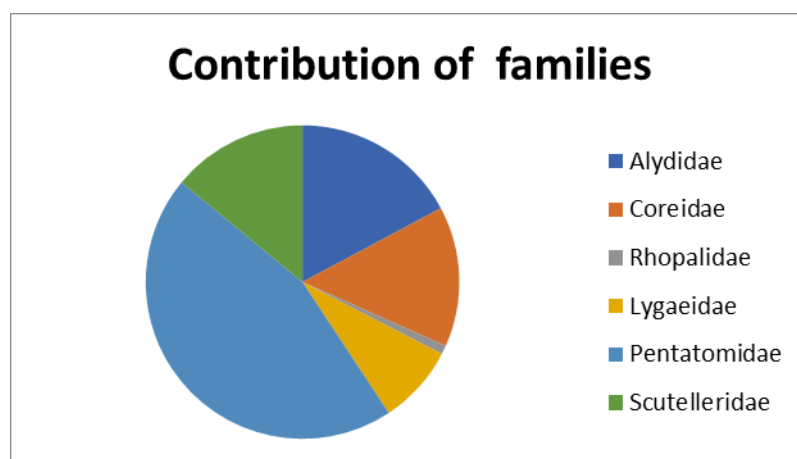


Figure 3. Number of individuals representing the family species richness of Pandavleni.

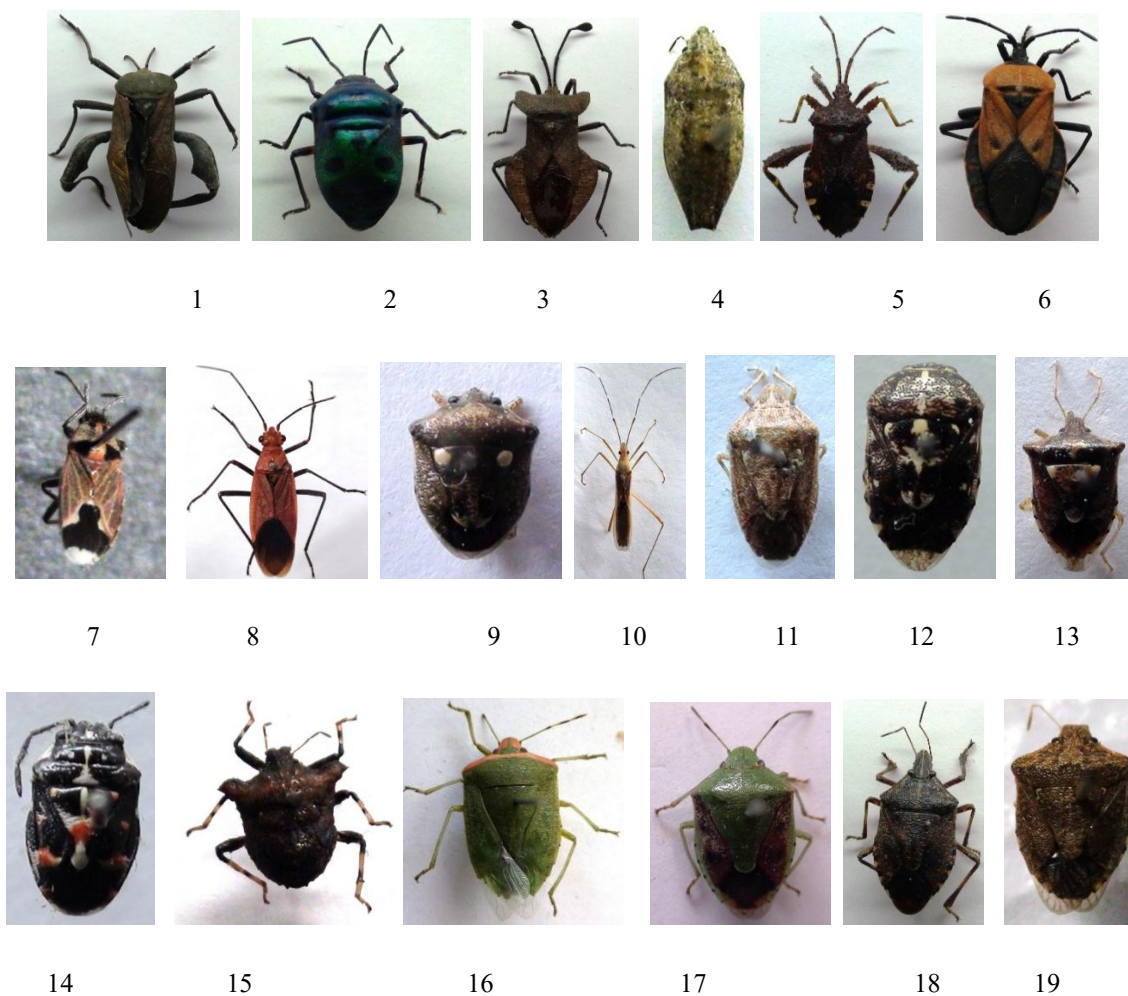


Figure 4. Photo Plate of Diversity of Heteropteran bugs found in field survey sites.

1-*Anoplocnemis phasiana*, 2-*Chrysorcoris perpallidus*, 3-*Daladar planiventris*, 4-*Alphocoris lixoides*, 5-*Acanthocoris scabrator*, 6-*Brachytes bicolor*, 7-*Melanotelus bipunctatus*, 8-*Leptocoris angur*, 9-*Eysarcoris* sp., 10-*Leptocoris acuta*, 11-*Adria Parvula*, 12-*Bagrada Picta*, 13-*Carbula scutellata*, 14-*Menida flavovaria*, 15-*Aeschrocoris* sp., 16-*Nezara viridula*, 17-*Plautia crossota*, 18-*Erthesina acuminata*, 19-*Carbula insocia*.

CONCLUSION

Heteropteran diversity in Pandavleni mountain settings typically peaks at lower to mid-elevations due to diverse variety of trees and shrubs with different grass patterns and decreases toward higher altitudes. Stochastic processes and habitat connectivity affect community assembly, which is controlled by deterministic environmental filtering.

ACKNOWLEDGEMENT

I am grateful to Dr. H.V. Ghate, taxonomic expert at the Modern College, Shivajinagar, Pune for confirming the species through morphological examination.

CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

FUNDING

This study received no specific funding from public, commercial, or not-for-profit funding agencies.

AI TOOL DECLARATION

The authors declare that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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