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Preliminary Assessment of Arthropod Diversity of the Rock-Cut Caves of Satara District, Maharashtra, India

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Abstract

Palpeshwar caves are located near Lohare village,Wai in Satara district. These caves are situated in the Northern Western Ghat's, Maharashtra. These are rock-cut caves and never been explored for their assessment of biodiversity, particularly arthropod fauna. Today, the need of the hour is to document the cave fauna before its extinction due to anthropogenic pressure. Consequently, an attempt has been made to document the preliminary arthropod diversity of the Lohare, Palpeshwar cave. The two exploratory surveys were conducted for two months to investigate arthropod diversity in the study area. The results of the two surveys revealed that a total of six different orders representing 21 species of the phylum Arthropoda were recorded in different microhabitats of rock-cut cave. Among these orders, Lepidoptera shows its dominance over other species of arthropodan fauna. For a proper assessment of the arthropod diversity of the cave, more extensive surveys will be undertaken seasonally.

Keywords: Palpeshwar, Rock-cut caves, Arthropods, Diversity, Satara.

Introduction

Palpeshwar caves are the oldest caves, located near Lohare village and situated five Kilometers from Wai, Satara. Wai was an important village in ancient India, also known as Dakshin Kashi, as it is situated next to the banks of the Krishna River. These caves are important for local people due to the presence of the Shiva Lingam there. Thousands of devotees from the surrounding villages visit this cave, especially during *Shravan* month, an auspicious month for the Shiva devotees, and it thus faces anthropogenic pressure. These caves are the true example of marvelous rock engineering in ancient India. Caves are natural or man-made subterranean cavities that can also be formed in front of cliffs or slopes. (Derek and Williams, 2007; Sail, *et al.*, 2021). Rock-cut Caves form a varied number of habitats with cracks, crevices, a ground floor, and a roof. Few studies have been carried out on Arthropodan diversity in India (Kemp and Chopra 1924; Harries *et al.* 2008; Biswas, 2009; Syiemiong and Paul, 2016; Dhamorikar *et al.* 2020; Harries *et al.* 2021; Sail *et al.*, 2021 and Kawalkar *et al.*, 2022). Some caves have been transformed into ecotourism sites, facing immense anthropological pressure. On perusal of literature, it was found that the systematic document on the arthropod diversity of the caves is generally lacking in Maharashtra and is particularly lacking in the Satara district of Maharashtra. Hence, the present study was undertaken to document the diversity of the Arthropod fauna of the Palpeshwar rock-cut caves of Satara district, Maharashtra.

Material and Methods

Palpeshwar caves are located at 17.99 N and 73.91 E coordinates. Elevation ranges from 700m to 1000m (Figure 1 and Figure 3). The rapid survey of Arthropodan faunal diversity was carried out twice for two months, from January 2023 to February 2023 in short period of time to document preliminary data. These are ancient caves which have Chaitya hall and stupa and due to this it has compartments and provides different microhabitats like a ground floor, cracks

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and crevices, a cave roof, a platform, small passages and walls (Figure3). We have divided these rock-cut caves according to compartments to assess the arthropod fauna. During survey we observed remains of moth wings left after eating the abdomen by predators. We collected those remains of wings and used them for the identification of moths (Figure 5).

Results and Discussion

The data on the diversity of arthropod in the cave is presented here based on two preliminary surveys. A total of six different orders of Phylum Arthropoda, like Araneae, Lepidoptera, Coleoptera, Hemiptera, Phasmatodea and Orthoptera have been recorded during the study. Among them, Lepidoptera shows its dominance over other orders (Figure2). We have documented 21 species of Phylum Arthropoda, such as 10 species from Order Lepidoptera, 7 species from Order Araneae, 1 species from Order Hemiptera, 1 species from Order Coleoptera, 1 species from Order Orthoptera, and 1 from Order Phasmatodea (Table 1, Figure 4 and Figure 5).

Kulkarni and Ghate (2016) recorded the first thread-legged assassin bug, *Myiophanes greeni* Distant, 1903 (Heteroptera: Reduviidae: Emesinae) from a cave located at Chalkewadi Road near Sajjangad Fort, Satara. Kharkongor and Saikia (2018) studied the cave arthropod fauna from Krem Lawkhlieng and observed the predominance of terrestrial arthropod species, mainly insects: orthoptera (cave crickets), coleoptera (cave beetles), lepidoptera, diptera, fungus gnats, springtails, cockroaches, and other Arthropods such as woodlice, millipedes, harvestmen, and spiders. All these studies are in accordance with our study. Hence, according to the available literature, there is no detailed study on the arthropodan cave fauna in Satara, Maharashtra. This preliminary study is the first of its kind, from this region, and provides information on the diversity of arthropod fauna in Palpeshwar caves.

Table No.1 Preliminary checklist of Arthropod diversity of Rock-cut caves, Palpeshwar, Satara.

Sr.No	Order	Family	Scientific Name
1	Lepidoptera	Erebidae	*Eudocima materna* (Linnaeus, 1767)
2		Erebidae	*Eudocima* sp.
3		Erebidae	*Erebus hieroglyphica* (Drury, 1773)
4		Erebidae	*Digama* sp.
5		Eupterotidae	*Eupterote* sp.
6		Noctuidae	*Condica* sp.
7		Spingidae	*Nephele hespera* (Fabricius, 1775)
8		Geometridae	*Scardamia* sp.
9		Crambidae	*Agrotera scissalis* (Walker, 1866)
10		Hesperiidae	*Celaenorrhinus ambareesa*(Moore, 1865)
11	Coleoptera	Hybosoridae	*Hybosorus* sp.
12	Hemiptera	Gerridae	*Gerris* sp.
13	Phasmatodea	Diapheromeridae	*Pseudosermyle* sp.
14	Orthoptera	Gryllidae	*Gryllus* sp.
15	Araneae	Sicariidae	*Loxosceles* sp. 1
16		Sicariidae	*Loxosceles* sp. 2
17		Uloboridae	*Zosis* sp. 1
18		Uloboridae	*Zosis* sp. 2
19		Sparassidae	*Heteropoda* sp.
20		Lycosidae	*Hippasa* sp.
21		Salticidae	*Hasarius* sp.

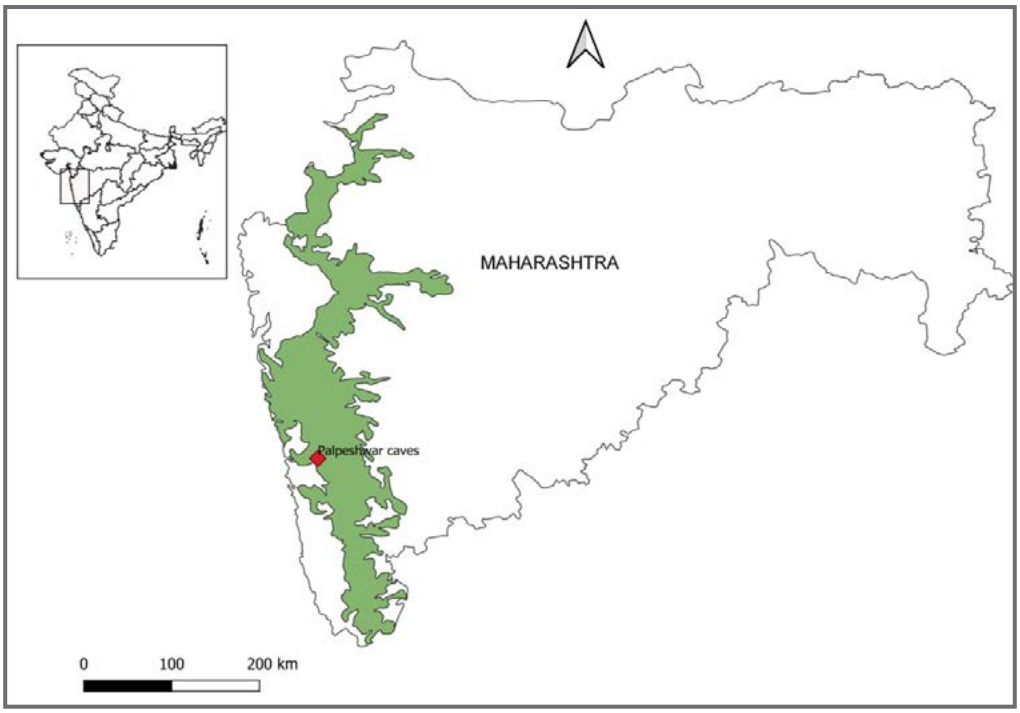

Figure 1 Study area location Palpeshwar rock-cut caves, Wai, Satara.

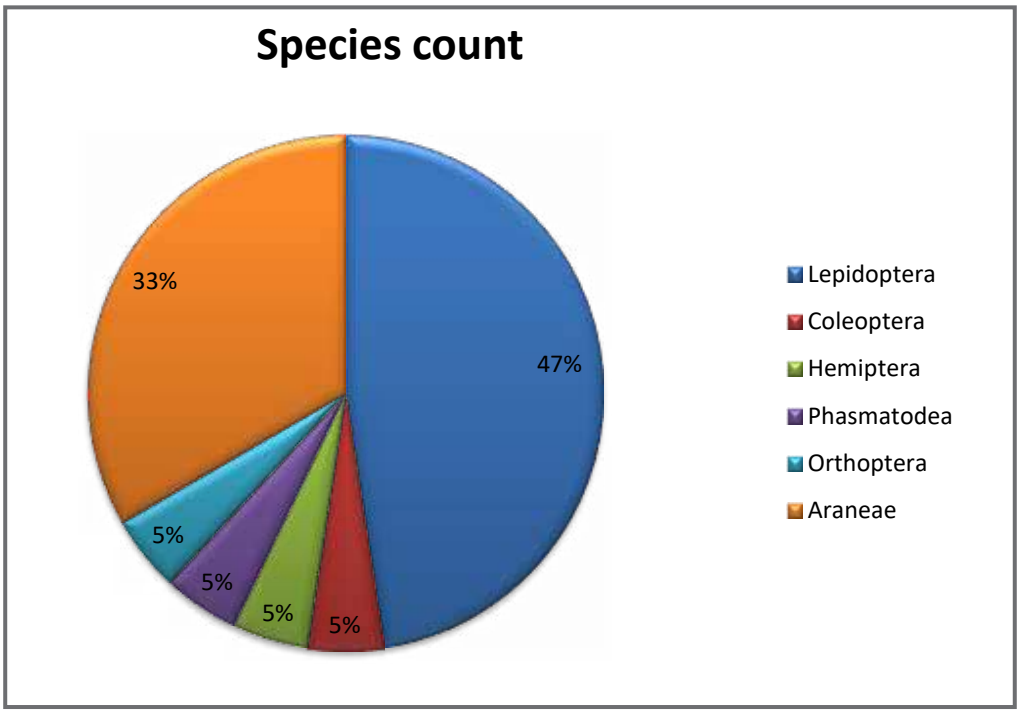

Figure 2 Pie chart showing diversity of Arthropods in Rock- cut caves Palpeshwar, Satara

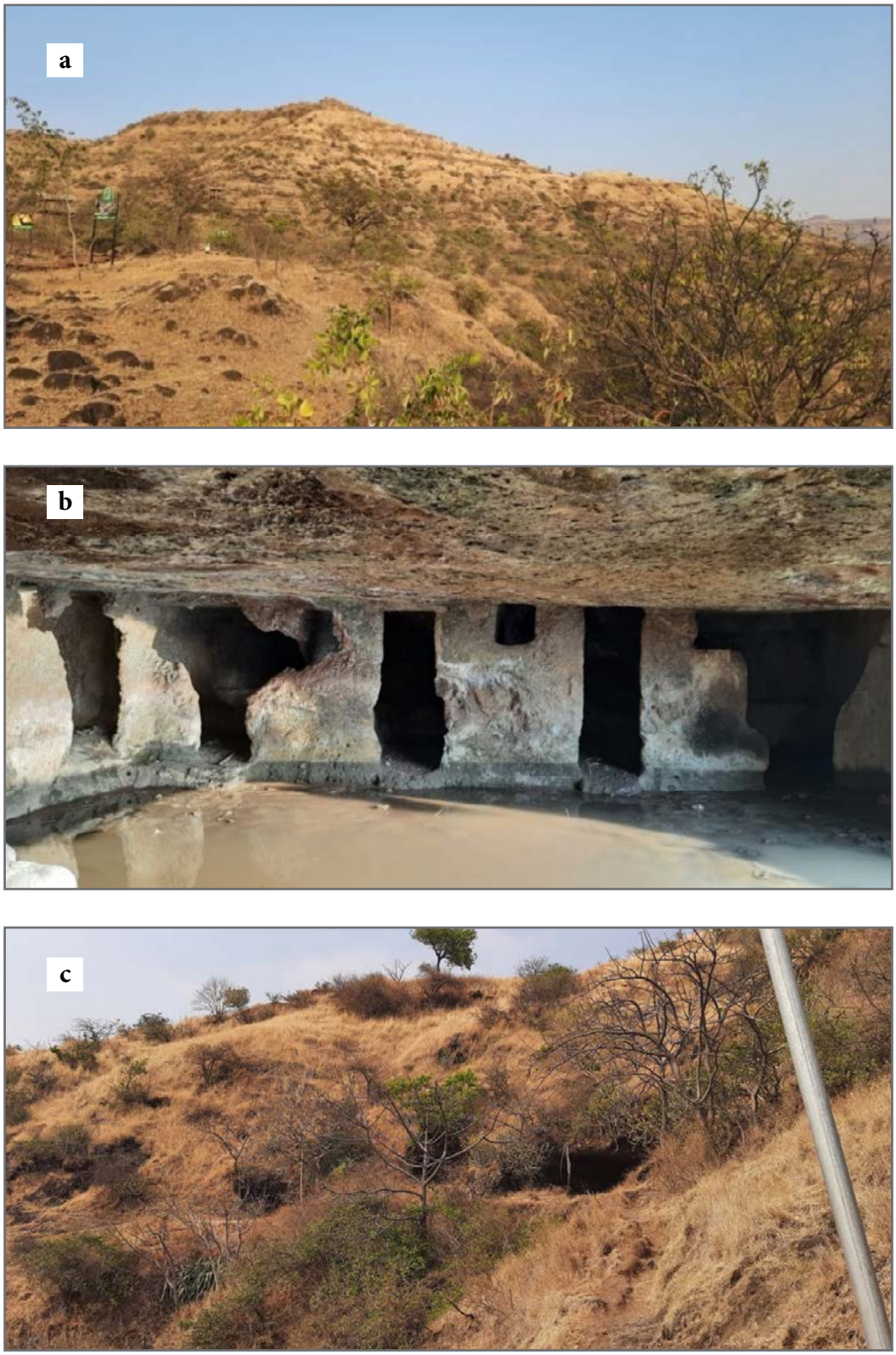

Figure 3 Palpeshwar caves: a. General view, b. Inside view and c. Outside view.

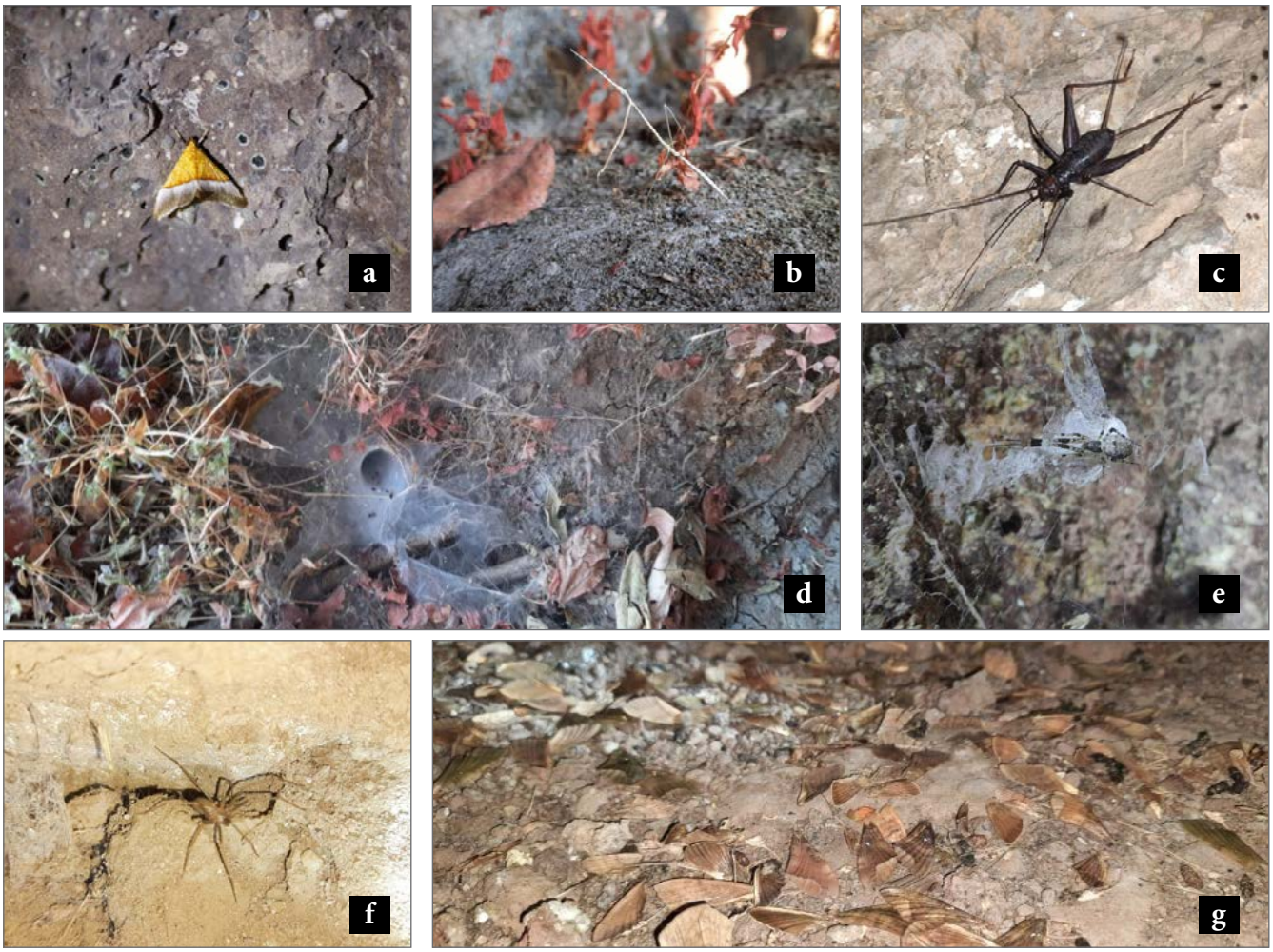

Figure 4 Arthropod diversity in Palpeshwar cave: a) *Agrotera scissalis,* b) *Pseudosermyle* sp. c) Cricket d) *Hippasa* sp. e) *Zosis* sp. f) *Loxosceles* sp g) Moth wings

Figure 5 Moth wings remains after abdomen eaten by predators

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