

DARKLING BEETLES (COLEOPTERA: TENEBRIONIDAE) OF KATEPURNA WILDLIFE SANCTUARY, AKOLA, MAHARASHTRA

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Abstract

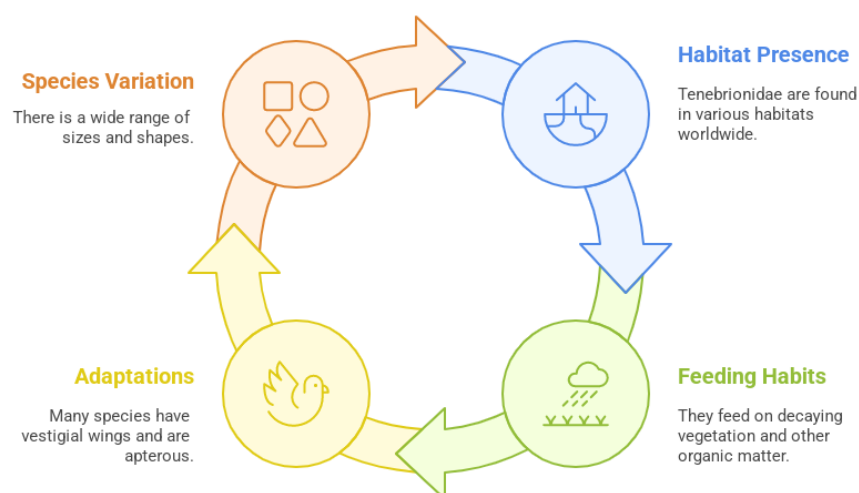
The diversity of darkling beetles at different sites in Katepurna Wildlife Sanctuary was studied from February 2023 to December 2023. The Katepurna Sanctuary is positioned in the Akola district in the Vidarbha region of the state of Maharashtra, the sanctuary lies in close proximity to the catchments area of Katepurna reservoir (Mahan Dam). Its area is geographically located at 20°25'0.54"N 77°10'50.14"E. The sanctuary covers an area of 73.69 square kilometers and takes its name from the Katepurna River, which flows from south to north through the heart of the sanctuary. Total 6 species of darkling beetles belonging to family Tenebrionidae were recorded from the study area. The Tenebrioninae subfamily was the most diverse in terms of species. All the darkling beetle species recorded in the study are new to the Katepurna Wildlife Sanctuary, Maharashtra.

Introduction

Tenebrionids are a diverse family of beetles, including more than 30,000 described species worldwide (Bouchard et al., 2021). Tenebrionidae is the versatile group, found almost all habitats throughout the world. They can be found in decaying wood, beneath bark, stones, and logs, where they feed on decaying plant matter, dung,

seeds, grains, fungi, and roots. These beetles vary in shape and size, ranging from 2 to 35 mm in length, typically appearing smooth and brown or black in color. Many species are either wingless or have reduced wings, with the elytra often immovable. Many of the wood feeding species have ample wings.

Lifecycle and Habitat of Tenebrionidae



Tenebrionidae is the large family which can be distinguished by the following characters like; Body hard, antennal insertion hidden under frons, elytra usually completely covering the abdomen, abdomen with five visible sternites and first three

segments connate, front coxal cavities closed, behind heteromerous tarsi, tarsal segments and claws simple. Comparatively few of its species are pests of stored grain products. Darkling beetles (Tenebrionidae: Coleoptera) are commonly

associated with hot arid lands Worldwide. In southern Africa, the number of species is reported to increase along the east-to-west gradient in aridity (Henschel *et al.*, 2022)

Grazing is a major threat to biodiversity in arid grasslands, and the expansion of solar parks in these areas presents an emerging concern. Tenebrionids, an important group of arthropods, play a vital role in the grasslands of Central Asia. These ecosystems are under pressure from both grazing and the increasing use of land for solar parks. Grazing negatively influenced overall abundance, but did not alter species proportions; by contrast, solar panels had no effect on the average abundance, but reduced the proportion of the most abundant species (Tsafack N. *et al.* 2022). Communities of these beetles integrate factors such as the availability of detritus, plant cover and various soil characteristics, such as moisture, hardness, and grain size composition. These factors differ for different species and for eggs and larvae. We therefore expect tenebrionid to be sensitive indicators of biodiversity change along natural and anthropogenic gradients in dryer parts of southern Africa (Parenzee, 2001). Long-term monitoring of their populations can provide valuable insights into how environmental changes affect organisms Henschel *et al.*, 2003).

Many tenebrionids also secrete a layer of wax that coats the exoskeleton, reflecting some of the sun's radiation and protecting beetles from water loss, abrasion and microorganisms (Chown and Nicolson 2004). Most of these species have extended lifespans of up to six years spent mostly as adults, allowing them time to gather the energy they need to reproduce (M. Seely pers. comm.). These beetles are flightless, having evolved fused wing covers; this may or may not function as an adaptation for water conservation (Duncan 2003), but makes sense for an insect that frequently buries itself in a windswept environment.

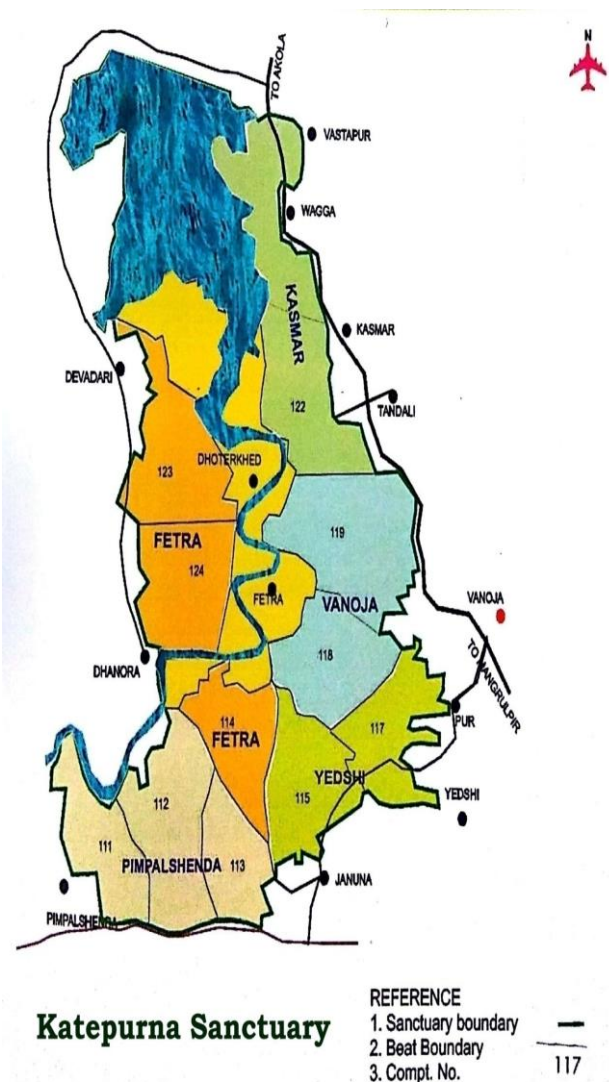
A few adaptations of individual tenebrionid species are particularly striking. *Onymacris unguicularis*, the fog basking beetle, stands on its head, collecting droplets of fog on its body that run down grooves into its mouth (Hamilton and Seely 1976). *Onymacris bicolor* has a partially white exoskeleton, reducing the amount of heat it absorbs from visible light. Both these beetles have evolved especially long legs; when they are overheated, they can temporarily elevate their bodies above the dune surface ("stilting"). In specific wind conditions, a few millimeters of elevation can significantly reduce their body temperature (Chown and Nicolson 2004).

The diversity of darkling beetles at different sites in Melghat Tiger Reserve was studied from February

2009 to December 2010 (Thakare *et al.* 2012) and total 8 species of darkling beetles belonging to family Tenebrionidae were recorded from the study area.

In view of the important role played by darkling beetles in the ecosystem, the present work was conducted to determine the diversity of darkling beetles in Katepurna Wildlife Sanctuary, Maharashtra, India.

Study Area- Map



A study was conducted in 2022 and 2023 in the protected area of the Katepurna Wildlife Sanctuary, Maharashtra. The geographical coordinates of the study area are 20°25'0.54"N 77°10'50.14"E. and It is situated on the right-hand side of Akola Mangrulpir State Highway which is just 37 km from Akola town. It is spread over an area of 73.69 sq. km. and the sanctuary derives its name from the Katepurna River, which flows south to Northward almost through the central part of the sanctuary.

The land vegetation at Katepurna Sanctuary is southern tropical dry deciduous forest.

Methodology

Almost all the habitats were explored in Katepurna Wildlife Sanctuary, Maharashtra in search of tenebrionids and are classified according to Bouchard et al (2005).

Results

In the present work total six species of darkling beetles belonging to family Tenebrionidae were recorded from the study area. All the species have been recorded for the first time from Katepurna Wildlife Sanctuary, Maharashtra. The maximum numbers of darkling beetles were observed in the region of study area. The present study revealed the presence of 6 species from 5 genera of 3 tribes under 2 subfamilies of Tenebrionidae. Details of synonyms, material examined and distribution of studied tenebrionid species are also given.

Systematic Account

1. *Cosyphus (Cosyphus) depressus* Fabricius, 1781

Material examined: Katepurna Wildlife Sanctuary (KWS), Fetra, 25.vi.2023, (2 exs.); 20.4040420°N, 77.1870350°E, alt. 660 m, leg. R.G. Lomte.

Distribution

India: Widely distributed in India including the states of Karnataka, Tamil Nadu, Maharashtra, West Bengal, Uttarakhand, and Uttar Pradesh (Hegde, 2012).

Maharashtra: Melghat Tiger Reserve, Jarida, and Katepurna Wildlife Sanctuary.

Global: China and Nepal.

Remark: This collection represents the first record of this species from Katepurna Wildlife Sanctuary, Maharashtra.

2. *Gonocephalum (Gonocephalum) consobrinum* (Blair, 1923)

Material examined: Katepurna Wildlife Sanctuary (KWS), Kasmar, 20.404098 N, E 77.186970 E, 05.vii.2023, 1 ex., leg. R.G. Lomte.

Distribution:

India: Uttarakhand, West Bengal, and Maharashtra.

Maharashtra: Melghat Tiger Reserve and Katepurna Wildlife Sanctuary.

Global: Afghanistan, Ethiopia, Iran, Iraq, Myanmar, Pakistan, Saudi Arabia, Qatar, and Yemen.

Remark: The collection of this species represents the first record from Katepurna Wildlife Sanctuary, Maharashtra.

3. *Gonocephalum (Gonocephalum) helopioide* (Fairmaire, 1894)

Material examined: Katepurna Wildlife Sanctuary (KWS), Kasmar, 05.vii.2023, 3 exs.,

20.4639150°N, 77.1734110°E, leg. R.G. Lomte.

Distribution:

India: Uttarakhand, Uttar Pradesh, Sikkim, West Bengal, and Maharashtra.

Maharashtra: Melghat Tiger Reserve and Katepurna Wildlife Sanctuary.

Global: Myanmar and Nepal.

Remark: This collection constitutes the first record of this species from Katepurna Wildlife Sanctuary, Maharashtra.

4. *Opatroides vicinus vicinus* (Fairmaire, 1896)

Material examined: Katepurna Wildlife Sanctuary (KWS), Vanoja, 10.ix.2023, 2 exs., 20.4639140°N, 77.17341090°E, leg. R.G. Lomte.

Distribution:

India: West Bengal, Uttarakhand, Chhattisgarh, and Maharashtra.

Maharashtra: Melghat Tiger Reserve and Katepurna Wildlife Sanctuary.

Global: Arab Emirates, Afghanistan, Bahrain, Iran, Kuwait, Nepal, Oman, Pakistan, Qatar, Saudi Arabia, and Yemen.

Remark: This collection constitutes the first record of this species from Katepurna Wildlife Sanctuary, Maharashtra.

5. *Scleron irregulata* Dist.

Material examined: Katepurna Wildlife Sanctuary (KWS), Fetra (Compt. No. 762), Forest Rest House, 11.xi.2023, 2 exs., 20.4431550° N, 77.1841890° E, leg. R.G. Lomte.

Distribution:

India: West Bengal and Maharashtra.

Maharashtra: Melghat Tiger Reserve and Katepurna Wildlife Sanctuary.

Remark: This collection constitutes the first record of this species from Katepurna Wildlife Sanctuary, Maharashtra.

6. *Rhytinota indica* Schaufuss, 1872

Material examined: Katepurna Wildlife Sanctuary (KWS), Kasmar (Compt. No. 868), Forest Rest House, 17.x.2023, 3 ex., 20.443182°N, 77.184215°E, leg. R.G. Lomte.

Distribution

India: Uttar Pradesh and Maharashtra.

Maharashtra: Bombay, Maharashtra, Melghat Tiger Reserve and Katepurna Wildlife Sanctuary.

Remark: This collection constitutes the first record of this species from Katepurna Wildlife Sanctuary, Maharashtra.

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