



Darkling Beetles (Coleoptera: Tenebrionidae) of Melghat Tiger Reserve, Central India

Vaibhao G. Thakare¹, Varsha S. Zade² and Vishwanath D. Hegde³

^{1,2}Government Vidarbha Institute of Science and Humanities, Amravati-444604, Maharashtra

³Zoological Survey of India, M-Block, New Alipore, Kolkata-700053, India

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ABSTRACT

The diversity of darkling beetles at different sites in Melghat Tiger Reserve was studied from February 2009 to December 2010. Melghat Tiger Reserve is located as a southern offshoot of Satpuda hill range in Central India called Gawilgarh hill in the state of Maharashtra. Total 8 species of darkling beetles belonging to family Tenebrionidae were recorded from the study area. Tenebrioninae was the dominant subfamily with respect to species diversity. All these darkling beetle species are new records from Melghat Tiger Reserve, Maharashtra.

Key Words: Darkling Beetles, Tenebrionidae, Melghat Tiger Reserve.

INTRODUCTION

Tenebrionidae is one of the largest family containing more than 18,000 species in the world, which exhibits an extraordinary wide range of superficial dissimilarity: the larvae on the other hand are strikingly uniform in character. Tenebrionidae is the versatile group, found almost all habitats throughout the world. They found in rotten wood, under bark, stones and logs, feeding on decaying vegetation, dung, seeds, cereals, fungi, roots etc. They are varied in shape and size (2-35 mm in length), generally smooth, brown or black. These forms are very often apterous, or have vestigial wings, and the elytra are frequently immovable. Many of the wood feeding species have ample wings.

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.

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

Corresponding author: vaibhaothakare@gmail.com

dune surface ("stilting"). In specific wind conditions, a few millimeters of elevation can significantly reduce their body temperature (Chown and Nicolson 2004).

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 Melghat Tiger Reserve, Amravati, Maharashtra, India.

STUDY AREA

A study was conducted in 2009 and 2010 in the protected area of the Melghat Tiger Reserve (MTR), Vidarbha region, Maharashtra. The geographical coordinates of the study area are 21°29. 96'N, 077°12.338' E. Melghat Tiger Reserve is located at southern off shoot of Satpuda hill range in Central India also called as Gawilgarh hill range in Maharashtra. The forest area of MTR is tropical and dry deciduous in nature dominated with teak trees (*Tectona grandis*).

METHODOLOGY

Almost all the habitats were explored in Melghat tiger Reserve in search of tenebrionids and are classified according to Bouchard et al (2005).

RESULTS

In the present work total eight 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 Melghat Tiger Reserve, Maharashtra. The maximum numbers of darkling beetles were observed in the Semadoh region of study area. The present study revealed the presence of 8 species from 7 genera of 4 tribes under 3 subfamilies of Tenebrionidae. Details of synonyms, material examined and distribution of studied tenebrionid species are also given.

LIST OF DARKLING BEETLES FROM MELGHAT TIGER RESERVE

FAMILY: TENEBRIONIDAE

Subfamily: Lagriinae Latreille, 1802

Tribe: Cossyphini Latreille, 1802

1. *Cossyphus depressus* Fabricius, 1781

Subfamily: Tenebrioninae Latreille, 1802

Tribe: Pedinini Eschscholtz, 1829

2. *Platynotus punctatipennis* Mulsant and Rey, 1853

Tribe: Opatrini Brulle, 1832

1. *Gonocephalum consobrinum* Blair, 1923

2. *Gonocephalum helopioide* (Fairmaire, 1894)

3. *Opatroides vicinus* Fairmaire, 1896

4. *Scleron irregularata* Dist.

Subfamily: Pimelinae Latreille, 1802

Tribe: Tentyriini Eschscholtz, 1831

1. *Rhytinota subfossulata* Solier, 1835.

2. *Rhytinota indica* Schaufuss, 1872

Details of the species examined:

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

Cossyphus (Cossyphus) depressus (Fabricius, 1781): SCUPOLA (2000): 231.

Cossyphus (Cossyphus) planus Fabricius, 1801: SCUPOLA (2000): 231.

Material examined: MTR, Jarida, 06. vii.2009 (2ex.); GPS- 21°39.987'N, 077°029.252' E; Alt. 660m; Coll. V.G. Thakare.

Distribution: Karnataka, Tamil Nadu, West Bengal, Uttarakhand, Uttar Pradesh (Hegde 2012) and Maharashtra- Melghat Tiger Reserve, Jarida.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

2. *Platynotus punctatipennis* Mulsant and Rey 1853

Platynotus punctatipennis Mulsant and Rey, 1853a: 270- Gemminger and de Harold 1870: 1912; Gebien 1910b: 273, 1938b: 293; Kaszab 1975b: 295; Iwan 1997a: 268, 2002:91.

Material examined: MTR, Semadoh (Forest Rest House), 07.vii.2009 (1ex.); GPS- N 21° 29.875' E 077° 18 .881'; Coll. V.G. Thakare

Distribution: India: Maharashtra- Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

3. *Gonocephalum consobrinum* Blair, 1923

1923. *Gonocephalum consobrinum* Blair, *Ent. Month. Mag.* (3) 9: 122.

1952. *Gonocephalum consobrinum* Kaszab. *Entomologische Arbeiten*, 3; 629-630.

Material examined: MTR, Kolkas, 07.vii.2009 (1ex.), GPS- 21°31'.107'N, 077°12.588'; Alt. 1447 ft.; Coll. V.G. Thakare

Distribution: West Bengal- Maldah, Maharashtra, Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from, Melghat Tiger Reserve, but also from Maharashtra state.

4. *Gonocephalum helopioide* (Fairmaire, 1894)

Hopatum helopioide Fairmaire, 1894: 19.

Opatrum helopioides (Fairmaire, 1894): 19. – Champion 1895: 116.

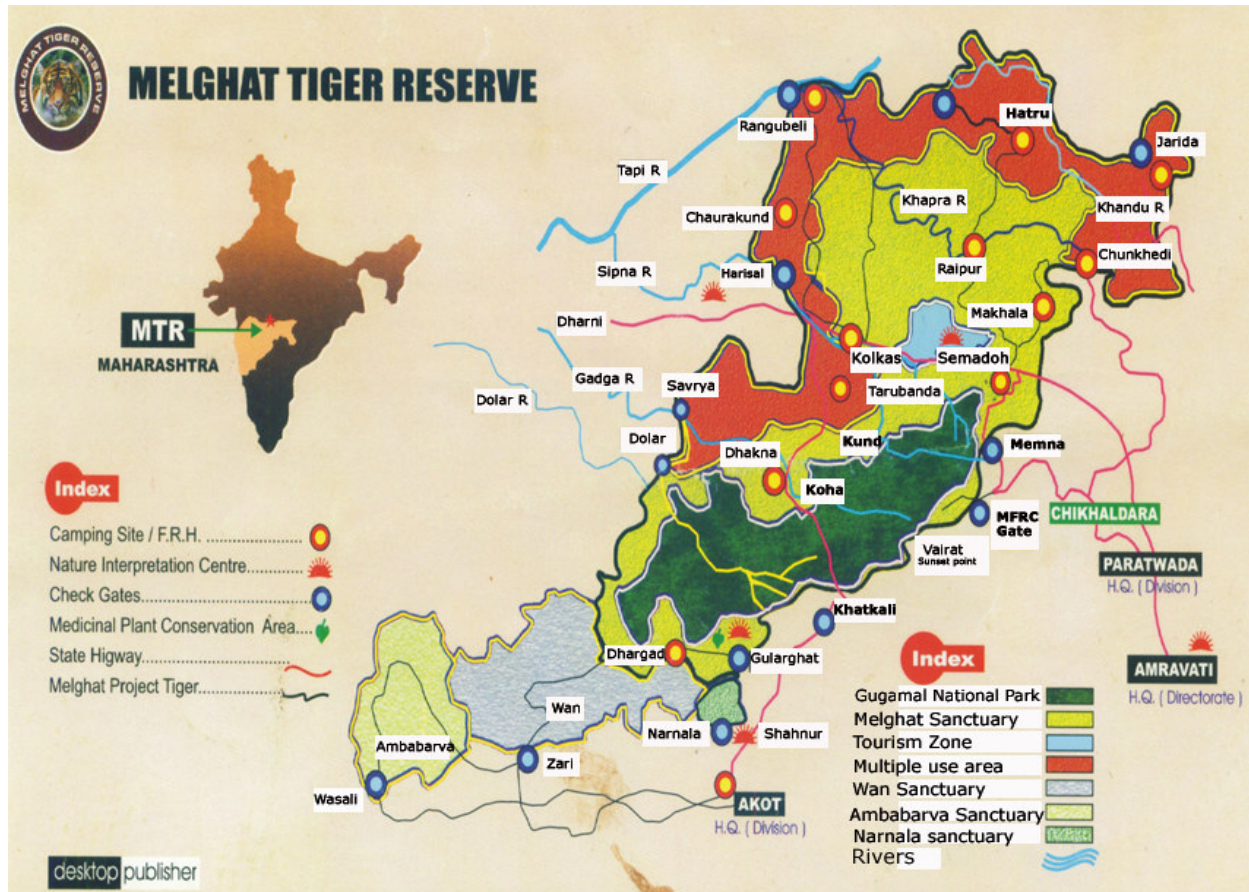


Figure1. Map of study area

Gonocephalum helopioide (Fairmaire, 1894). – Gebien 1910b: 323, 1939: 448; Kaszab 1952a: 574; Schawaller 1997a: 7; Iwan and Löbl 2008: 264.

Material examined: Material examined: MTR, Semadoh, 02. vii.2010 (3ex.); GPS- N 21° 30.119' E 077° 19 .012' Alt. - 1731 ft.; Coll. V.G. Thakare.

Distribution: : India: Uttarakhand- Rajaji National Park, Haridwar, Dehradun, Sikkim, West Bengal- Darjeeling, Maharashtra – Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

5. *Opatroides vicinus* Fairmaire, 1896

1896. *Opatroides vicinus* Fairm. Ann. Soc. Ent. Belg. XL. Kaszab 1930. Ent. Arb. Mus. Frey, 11: 157-159.

Material examined: MTR, Tarubanda (Compt. no.762), 12. X.2010 (2ex.); GPS- N 21° 28' 198' E 077° 10 281'; Alt- 505m.; coll. V.G. Thakare

Distribution: Kolkata (Kidderpore) and Darjiling

(Kalimpong), Uttarakhand- Raipur, Dehradun and Maharashtra – Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

6. *Scleron irregulata* Dist.

Material examined: MTR, Tarubanda (Compt. no. 762), Forest Rest House, 13.x.2010 (2ex.); GPS- 21°27.959'N, 077°09.717'E, Elvⁿ – 501 m; Coll. V.G. Thakare

Distribution: Ostindia (East India) West Bengal - Darjiling (Kalimpong). Maharashtra – Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

7. *Rhytinota indica* Schaufuss, 1872

Indica- Schauf. *Nunq. Otios* II 1872. P.411

Material examined: MTR, Belkund (Compt. no. 868), Forest Rest House, 14.x.2010 (3ex.); GPS- 21^o21.034'N, 077^o06.871'E, Elvⁿ – 512 m; coll. V.G. Thakare.

Distribution: Bombay, Maharashtra – Melghat Tiger Reserve

Remark: Collection of this species constitutes the First record from Melghat Tiger Reserve.

8. *Rhytinota subfossilata* Solier, 1835

Subfossilata Sol. *Ann. Soc. Ent. Fr.* IV 1835- p.369.

Kraatz Revis. 1865. P.172.

Morio Baudi, *Deutsche Ent. Zeitschr* XIX 1878. P.52

Material examined: MTR, Jarida, 06. vii.2009 (2ex.); GPS- 21^o39.987'N, 077^o029.252' E; Alt. 660m; Elvⁿ – 520 m; coll. V.G. Thakare

Distribution: Ostindia (East India). Maharashtra – Melghat Tiger Reserve.

Remark: Collection of this species constitutes the First record not only from Melghat Tiger Reserve, but also from Maharashtra state.

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REFERENCES

- Bouchard P, Lawrence JF, Davies AE, Newton AF. 2005. Synoptic classification of the world Tenebrionidae (Insecta: Coleoptera) with a review of family-group names. *Annales Zoologici* 55:499-530.
- Chown SL, Nicolson SW. 2004. *Insect Physiological Ecology*. Oxford University Press, New York.
- Duncan FD. 2003. The role of the subelytral cavity in respiration in a tenebrionid beetle, *Onymacris multistriata* (Tenebrionidae: Adesmiini). *Journal of Insect Physiology* 49: 339-346.
- Hamilton III WJ, Seely MK. 1976. Fog basking by the Namib Desert beetle, *Onymacris unguicularis*. *Nature* 262: 284-285.
- Henschel JR, Mtuleni V, Pallett J, Seely MK. 2003. The surface-dwelling arthropod fauna of Gobabeb with a description of the long-term pitfall trapping project. *Journal Namibia Scientific Society*, 51: 65-92.
- Parentee I. 2001. Use of Tenebrionid Beetles as Indicators of Habitat Quality, M. Sc. thesis: University of the Witwatersrand, Johannesburg.