

**OPEN ACCESS**

The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at [www.threatenedtaxa.org](http://www.threatenedtaxa.org). All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](#) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

# Journal of Threatened Taxa

Building evidence for conservation globally

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

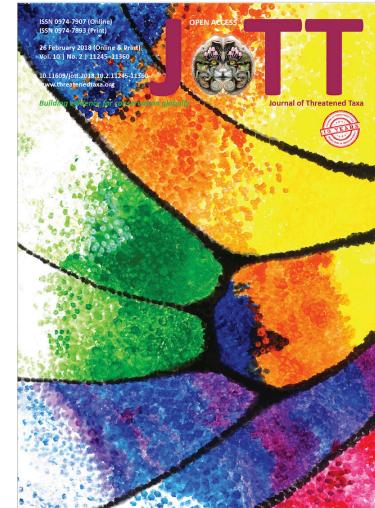
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

## SHORT COMMUNICATION

### A PRELIMINARY STUDY ON THE DUNG BEETLES OF THE NORTHERN WESTERN GHATS, MAHARASHTRA, INDIA

Aparna Sureshchandra Kalawate

26 February 2018 | Vol. 10 | No. 2 | Pages: 11316–11331  
10.11609/jott.3844.10.2.11316-11331



Journal of Threatened Taxa



For Focus, Scope, Aims, Policies and Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>

For Article Submission Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>

For Policies against Scientific Misconduct visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>

For reprints contact <info@threatenedtaxa.org>





## A PRELIMINARY STUDY ON THE DUNG BEETLES OF THE NORTHERN WESTERN GHATS, MAHARASHTRA, INDIA

ISSN 0974-7907 (Online)  
ISSN 0974-7893 (Print)

Aparna Sureshchandra Kalawate

### OPEN ACCESS



**Abstract:** The present study documented 50 species represented by 25 genera, 17 tribes, seven subfamilies belonging to Hybosoridae, Geotrupidae and Scarabaeidae of the superfamily Scarabaeoidea from the northern Western Ghats of Maharashtra. The identified specimens are deposited at the National Zoological Collection, Zoological Survey of India, Western Regional Centre, Pune, Maharashtra, India. This is the preliminary study and a first report on the dung beetle fauna of this region covering almost the entire northern Western Ghats of Maharashtra.

**Keywords:** Dung beetles, Scarabaeidae, Geotrupidae, Hybosoridae, Dung beetles.

Beetles belonging to the Scarabaeidae family are commonly called dung beetles. Scarabaeidae comprises about 27,800 species worldwide (Ratcliffe 2002). It includes Laprosticti and Pleurosticti beetles. The Laprosticti includes dung feeders while the Pleurosticti is phytophagous. They are cosmopolitan, and their diversity is high in tropical forests (Hanski & Cambefort 1991). Dung beetles are important decomposers, involved in nutrient recycling, seed dispersal and the control of vertebrate parasites (dung breeding dipteran pests) and are therefore an important component of tropical forest systems (Hanski & Krikken 1991). The phytophagous

dung beetles feed on many important agricultural crops causing economic losses amounting millions of rupees affecting the GDP of the country. The damage caused by scarab is severe in economic crops like sugarcane, groundnut, cereals, millets, pulses, vegetables and plantation crops. As per Kulkarni et al. (2007) incidence of scarab beetle, *Schizonycha ruficollis* in teak (*Tectona grandis*) lead to 14–52 % of damage to seedlings in the nursery beds itself. A species diversity study is vital for planning the pest management practices. Geographical variations with cropping pattern differences contribute to the composition of species complex of a region (Sreedevi et al. 2017). Hence, a diversity study of dung beetles would be helpful to the concerned authority in pest management options.

A few studies reported that the local distribution of dung beetles is strongly influenced by vegetation cover and soil type (Nealis 1977; Doube 1983; Janzen 1983). They are ideal bio-indicators for investigating impacts of anthropogenic disturbances to ecosystems. They have been used in several studies to investigate the effects of environmental disturbance on forest diversity and structure (Howden & Nealis 1975; Klein 1989;

DOI: <http://doi.org/10.11609/jott.3844.10.2.11316-11331> | ZooBank: urn:lsid:zoobank.org:pub:28749554-41FD-4470-B8E8-8FBDEFCA51A8

**Editor:** P.P. Bhattacharjee, Tripura University, Tripura, India.

**Date of publication:** 26 February 2018 (online & print)

**Manuscript details:** Ms # 3844 | Received 13 October 2017 | Final received 02 January 2018 | Finally accepted 21 January 2018

**Citation:** Kalawate, A.S. (2018). A preliminary study on the dung beetles of the northern Western Ghats, Maharashtra, India. *Journal of Threatened Taxa* 10(2): 11316–11331; <http://doi.org/10.11609/jott.3844.10.2.11316-11331>

**Copyright:** © Kalawate 2018. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

**Funding:** None.

**Competing interests:** The author declares no competing interests.

**Acknowledgements:** I am grateful to Dr. Kailash Chandra, Director, Zoological Survey of India, Kolkata and Dr. P.S. Bhatnagar, Scientist-D & Officer-in-Charge, Zoological Survey of India, Western Regional Centre, Pune for providing facilities. I wish to extend my thanks to Shri. Sreejith S. Kumar, Senior Zoological Assistant, Zoological Survey of India, Western Regional Centre, Pune for preparing map of the survey localities. The author is grateful to the reviewer's and the subject editor for their valuable comments that improved the manuscript.

Nummelin & Hanski 1989; Davis & Sutton 1998; Davis 2000). Biodiversity surveys are important in providing information needed for conservation planning, and development of management plans, the rich biodiversity of the dung beetles are to be conserved and protected to maintain the ecological balance.

The Fauna of British India on Scarabaeid beetles was published in three volumes by Arrow (1910, 1917 and 1931) describing 1,300 species from British India. The *Fauna of Maharashtra Part-II: State Fauna series*, listed 89 species in 32 genera belonging to six subfamilies under Scarabaeidae from Maharashtra (Jadhav & Sharma 2012). A total of 87 species in seven tribes, 13 genera of dung beetles was reported by Priyadarsanan (2006) from Biligiri Rangasamy Temple Wildlife Sanctuary, a part of the Western Ghats. Veenakumari & Veeresh (1997) reported 61 species of Scarabaeinae from Bangalore, Karnataka, India. Sathiandran et al. (2015) studied 36 species of dung beetles from Periyar Tiger Reserve in southern Western Ghats. On perusal of literature, it was found that a comprehensive study on dung beetles with their distribution is lacking from northern Western

Ghats of Maharashtra. Hence, an attempt was made to assess the diversity of dung beetles of this region. The present study on scarabaeid beetles was preliminary and covered the entire Western Ghats of Maharashtra for the first time with their distribution and different collection localities.

## MATERIALS AND METHODS

The surveys were undertaken from 2015–2017 covering 13 districts of Western Ghats of Maharashtra, viz.: Thane, Satara, Sangli, Raigad, Ratnagiri, Nandurbar, Palghar, Sindhudurg, Dhule, Pune, Kolhapur, Nasik, and Ahmednagar. Also, specimens lying in unidentified collections of the Western Regional Centre, Zoological Survey of India, Pune were studied. Detailed survey localities are mentioned under material examined and shown in Fig. 1. The beetles were collected using light traps and by handpicking from the dung present in the field. The light traps were operated from 19:00 hrs to 24:00 hrs and were installed at the collection sites for two nights in each survey locality. The specimens were killed using ethyl acetate vapors and preserved dry. The

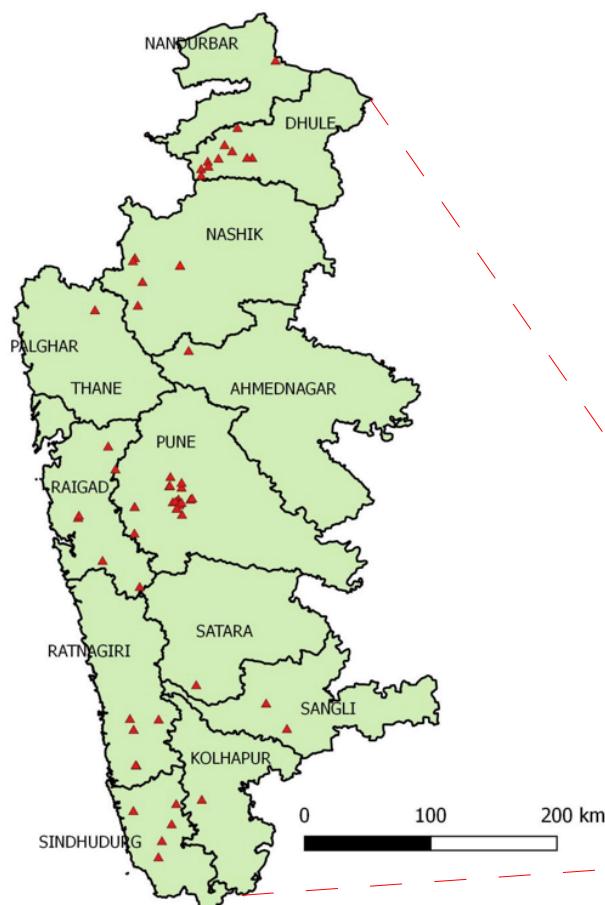
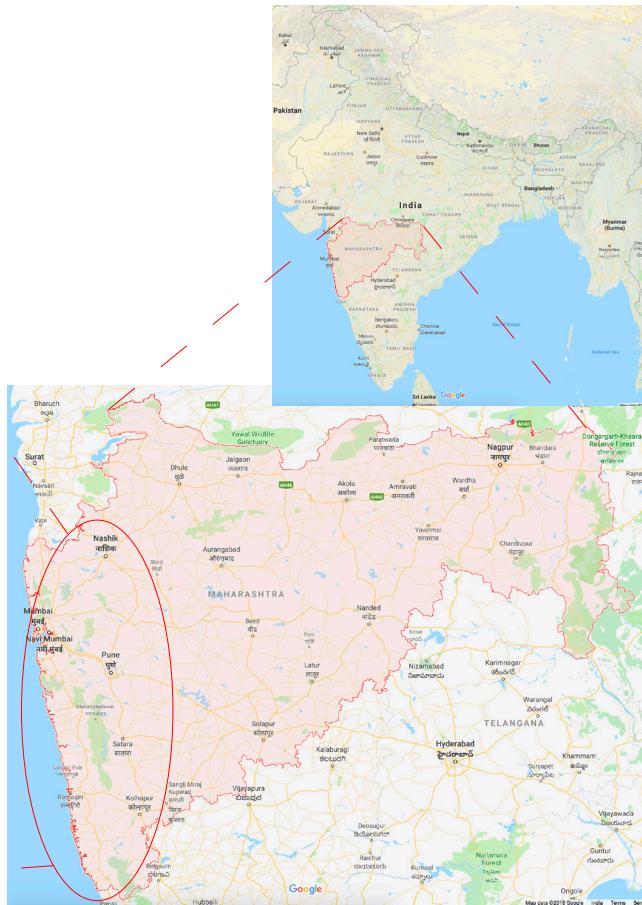
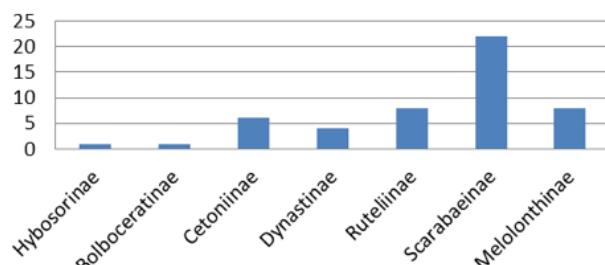


Figure 1. The survey localities from the study area.





**Figure 2.** Number of species recorded from the subfamilies from the Western Ghats of Maharashtra.

collected beetles were relaxed, pinned and preserved in the laboratory for further studies. The specimens were studied under Leica EZ 4 HD stereozoom microscope. All identified specimens were labeled, duly registered and deposited at National Zoological Collection, Zoological Survey of India, Western Regional Centre, Pune, Maharashtra, India (ZSI-WRC). The specimens were identified with the help of available literature, i.e., Arrow (1910, 1917, 1931), Balthasar (1963a,b, 1964), Kuijten(1983), and Krikken (2013). The classification of Scarabaeoidea presented in the present paper is as per Arrow (1910, 1917, 1931), Balthasar (1963a,b, 1964) and Kuijten(1983); modifications have been incorporated as per Lobl & Smetana (2006) and Smith (2006).

## RESULTS AND DISCUSSION

Order Coleoptera Linnaeus, 1758

Suborder Polyphaga Emery, 1886

Superfamily Scarabaeoidea Latreille, 1802

(I) Family Hybosoridae Erichson, 1847

A) Subfamily Hybosorinae Erichson, 1847

### 1. *Hybosorus orientalis* Westwood, 1845 (Image 1)

Trans. Ent. Soc. Lond., 6 : 159.

Material examined: ZSI-WRC-ENT-1/2639, 26.i.2017, 03 ex., Valkhed, Dindori, Nashik, V.D. Hegde & Party (20.22329°N & 73.8369°E, elevation 614m); ZSI-WRC-ENT-1/2635, 02.viii.2016, 03 ex., Kondaibari, Sakri, S.S. Patole (approximate location: 21.0839515°N & 74.1540902°E, elevation 705m); ZSI-WRC-ENT-1/2612, 20.ix.1973, 01 ex., Trayambakeshwar, Nashik, M.B. Rao (20.10714°N & 73.56923°E, elevation 734m).

Distribution: Afghanistan, China, India (Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Myanmar, Nepal, Pakistan, Tibet.

(II) Family Geotrupidae Latreille, 1802

(B) Subfamily Bolboceratiniae Mulsant, 1842

Tribe Bolboceratini Mulsant, 1842

### 2. *Bolboceras nigricans* Westwood, 1848 (Image 2)

Proceed. Linn. Soc. London, 1: 384–387.

Material examined: ZSI-WRC-ENT-1/2895, 29.ix.1968, 02 ex., Babdevghat, Pune, B.S. Lamba & Party (approximate location: 18.3113°N & 73.5124°E).

Distribution: India (Andhra Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Pondicherry), Myanmar, Tanzania.

(III) Family Scarabaeidae Latreille, 1802

(C) Subfamily Cetoniinae Leach, 1819

Tribe Cetoniini Leach, 1815

### 3. *Anatona stillata* (Newman, 1838) (Image 3)

*Cetonia stillata* Newman, 1838; Ent. Mag., V : 169.

*Anatona stillata*: Arrow, 1910; Faun. Brit. India, I: 114.

Material examined: ZSI-WRC-ENT-1/1924, 17.x.1962, 01 ex., Sinhagad fort, Pune, S.M. Ketkar & Party (approximate location: 18.4886513°N & 73.8131617°E, elevation 572m); ZSI-WRC-ENT-1/2889, 24.ix.1971, 01 ex., Bhosari, Pune, K.R. Rao & Party (approximate location: 18.638529°N & 73.847787°E, elevation 597m).

Distribution: India (Himachal Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal).

Remark: Endemic to India.

### 4. *Chiloloba acuta* (Wiedemann, 1823) (Image 4)

*Cetonia acuta* Wied., 1823; Zool. Mag., 2(1) : 87.

*Chiloloba acuta*: Arrow, 1910; Fauna British India, I: 172.

Material examined: ZSI-WRC-ENT-1/2631, 02.x.2016, 01 ex., Kaksevad, Dhule, S.S. Patole (approximate location: 20.9302914°N & 74.0388252°E, elevation 572m).

Distribution: India (Himachal Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Punjab, Sikkim, Uttar Pradesh, West Bengal), Sri Lanka.

Tribe Goliathini

### 5. *Coenochilus brunneus* Saunders, 1842 (Image 5)

Trans. Ent. Soc. Lond. iii, p. 235.

*Coenochilus brunneus*: Arrow, 1910; Fauna British India, Coleoptera, I: 187.

Material examined: ZSI-WRC-ENT-1/2609, 24.vi.1984,

01 ex., Dhuheri Nalla, Kurne, Pali, Ratnagiri, R.H. Kamble & Party (approximate location: 16.9101708°N & 73.506402°E, elevation 108m).

Distribution: India (Bihar, Karnataka, Maharashtra, West Bengal), Bangladesh.

#### **6. *Coenochilus acutipes* Arrow, 1910**

Fauna British India, Coleoptera, I: 210.

Material examined: ZSI-WRC-ENT-1/2603, 01.x.2016, 01 ex., Gaganbwad, Kolhapur, V.D. Hegde & Party (16.55194°N & 73.84611°E, elevation 601m).

Distribution: India (Maharashtra).

Remark: Endemic to India.

#### **7. *Coenochilus nitidus* Arrow, 1910**

Fauna British India, Coleoptera, I: 210.

Material examined: ZSI-WRC-ENT-1/2893, 01 ex., Bhosgaon, Satara, 13.vii.2017, A.S. Kalawate & Party (17.229°N & 73.952°E, elevation 731m).

Distribution: India (Maharashtra, Karnataka).

Remark: Endemic to India.

#### **8. *Gametis versicolor* (Fabricius, 1775) (Image 6)**

*Cetonia versicolor* Fabricius, 1775; Syst. Ent.: 51.

*Oxycetonia versicolor*: Arrow, 1910; Fauna British India, Coleoptera, I: 164.

Material examined: ZSI-WRC-ENT-1/2633, 02.x.2016, 03 ex., Kaksevad, Sakri, Dhule, S.S. Patole (approximate location: 20.9302914°N & 74.0388252°E, elevation



Image 1. *Hybosorus orientalis* Westwood, 1845



Image 2. *Bolboceras nigricans* Westwood, 1848



Image 3. *Anatona stillata* (Newman, 1838)



Image 4. *Chiloloba acuta* (Wiedemann, 1823)



Image 5. *Coenochilus brunneus* Saunders, 1842



Image 6. *Gametis versicolor* (Fabricius, 1775)

572m); ZSI-WRC-ENT-1/1246, 17.x.1962, 07 ex., Sinhagad fort, Pune, S.M. Ketkar & Party (approximate location: 18.4886513°N & 73.8131617°E, elevation 572m).

Distribution: Afghanistan, Bangladesh, Bhutan, India (Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Uttarakhand, West Bengal), Mauritius, Madagascar, Sri Lanka.

(D) Subfamily Dynastinae MacLeay, 1819  
Tribe Oryctini Mulsant, 1842

### **9. *Oryctes rhinoceros* (Linnaeus, 1758) (Image 7)**

*Scarabaeus rhinoceros* Linnaeus, 1758; Syst. Nat.i: 346.

*Oryctes rhinoceros*: Burm., 1847; Randh. Ent. v: 202.

*Oryctes rhinoceros*: Arrow, 1910; Fauna British India, Coleoptera, I: 278.

Material examined: ZSI-WRC-ENT-1/2586, 15.vi.2015, 01 ex., ZSI, WRC, Pune, Alim Sayyed (18.6483113°N & 73.7601424°E, elevation 579m); ZSI-WRC-ENT-1/1396, 06.i.2012, 1 ex., Mulshi, Pune, M.J. Jadhav (18.5010536°N & 73.5137654°E, elevation 642m).

Distribution: India (Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, West Bengal), Myanmar, Sri Lanka.

Tribe Pentodontini Mulsant, 1842

### **10. *Phyllognathus dionysius* (Fabricius, 1792) (Image 8)**

*Scarabaeus dionysius* Fabricius, 1792; Syt. Ent. i, p. 20.

*Phyllognathus dionysius*: Arrow, 1910; Fauna British India, Coleoptera, I: 307.

Material examined: ZSI-WRC-ENT-1/1653, 21.ix.2013, 01 ex., Palus, Sangli, S. Lad (17.097643°N & 74.4496317°E, elevation 593m); ZSI-WRC-ENT-1/1923 06.i.2012, 01 ex., Yerwada, Pune, A.S. Kalawate (18.55293922°N & 73.91123056°E, elevation 562m); ZSI-WRC-ENT-1/2626, 24.vi.2016, 01 ex., Shewali, Sakhri, Dhule, S.S. Patole (approximate location: 20.99245465°N & 74.35096264°E, elevation 429m).

Distribution: China, India (Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh), Nepal, Sri Lanka.

Tribe Dynastini Macleay, 1819

### **11. *Xylotrupes gideon* (Linnaeus, 1767) (Image 9)**

*Scarabaeus gideon* Linnaeus, 1767; Syst. Nat. 12<sup>th</sup> ed., 1(2): 54I.

*Xylotrupes gideon*: Arrow, 1910; Fauna British India, Coleoptera, I: 262.

Material examined: ZSI-WRC-ENT-1/1995, 30.x.2015, 01 ex., Pali, Ratnagiri, A.S. Kalawate & Party (16.98784°N & 73.48011°E, elevation 201m); ZSI-WRC-ENT-1/2645, 29.x.2015, 03 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/1999, 11.ix.2015, 01 ex., Shivadav, Kankawali, Sindhudurg, A.S. Kalawate & Party (16.235239°N & 73.777203°E, elevation 106m); ZSI-WRC-ENT-1/1986, 01.xi.2015, 02 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2534, 30.x.2015, 02 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m).

Distribution: India (Assam, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Sikkim, Tripura, West Bengal), Sri Lanka.

Tribe Phileurini Burmeister, 1847

### **12. *Eophileurus platypterus* (Wiedmann, 1823)**

*Geotrupes platypterus* Wiedmann, 1823; Zool. Mag. ii.1: 5.

*Eophileurus platypterus*: Arrow, 1910; Fauna British India, Coleoptera, I: 289.

Material examined: ZSI-WRC-ENT-1/2890, 26.xii.1968, 01 ex., Pune University Compound, Pune, B.K. Halder & Party (approximate location: 18.554498°N & 73.825732°E, elevation 580m); ZSI-WRC-ENT-1/2891, 02.vii.1977, 01 ex., Kharati Nalla, Pune- Ahmednagar Road, Pune, G.M. Yazdani & Party (approximate location: 18.561974°N & 73.922554°E, elevation 566m).

Distribution: India (Bihar, Chhattisgarh, Haryana, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, West Bengal).

Remark: Endemic to India.

(E) Subfamily Ruteliinae MacLeay, 1819

Tribe Adoretini Burmeister, 1844

### **13. *Adoretus lobiceps* Arrow, 1917**

Fauna British India, II: 303.

Material examined: ZSI-WRC-ENT-1/2632, 19.ix.2016, 01 ex., Ghodade, Sakhri, Dhule, S.S. Patole (approximate location: 21.03964606°N & 74.20783997°E, elevation 497m).

Distribution: India (Madhya Pradesh, Gujarat, Maharashtra).

Tribe Anomalini Streubel, 1839

**14. *Anomala dorsalis* (Fabricius, 1775) (Image 10)**

*Melolontha dorsalis* Fabricius, 1775; Syst. Ent., p. 35.  
*Anomala dorsalis*: Arrow, 1917; Fauna British India, II: 136.

Material examined: ZSI-WRC-ENT-1/1922, 21.vi.1988, 01 ex., ZSI, WRC, Pune, R.H. Kamble & Party (18.6483113°N & 73.7601424°E, elevation 579m); ZSI-WRC-ENT-1/1925, 01.vi.2014, 01 ex., Yerwada, Pune, A.S. Kalawate & Party (18.55293922°N & 73.91123056°E, elevation 562m); ZSI-WRC-ENT-1/2540, 11.ix.2015, 01 ex., Shivadav, Sindhudurg, A.S. Kalawate & Party (16.235239°N & 73.777203°E, elevation 106m).

Distribution: Afghanistan, India (Andaman & Nicobar Island, Assam, Bihar, Chhattisgarh, Haryana, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Pakistan.

**15. *Anomala rugosa* Arrow, 1899 (Image 11)**

Trans. Ent. Soc. Lond.: 263.  
 Material examined: ZSI-WRC-ENT-1/2876, 23.vi.2017, 09 ex., Ambegaon, Pune, A.S. Kalawate & Party (18.445803°N & 73.850728°E, elevation 681m); ZSI-WRC-ENT-1/2712, 06.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: Bhutan, India (Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Nepal.

**16. *Anomala varicolor* (Gyllenthal, 1817)**

*Melolontha varicolor* Gyllenthal, Sehonh. 1817; Syn. Ins., I: 114.

*Anomala varicolor*: Arrow, 1917; Fauna British India, II: 152.

Material examined: ZSI-WRC-ENT-1/2877, 13.vii.2017, 01 ex., Bhosgaon, Satara, A.S. Kalawate & Party (17.229°N & 73.952°E, elevation 731m); ZSI-WRC-ENT-1/2539, 11.ix.2015, 01 ex., Shivadav, Sindhudurg, A.S. Kalawate & Party (16.235239°N & 73.777203°E, elevation 106m); ZSI-WRC-ENT-1/2541, 21.vi.1984, 01 ex., Rajapur, Ratnagiri, R.H. Kamble & Party (16.6571252°N & 73.5211286°E, elevation 88m).

Distribution: Bhutan, China, India (Assam, Bihar, Chhattisgarh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Nepal.

**17. *Anomala bengalensis* Blanchard, 1851**

Cat. Coli. Ent. Mus. Paris: 182.  
*Anomala bengalensis*: Arrow, 1917; Faun. Brit. India, II: 143.

Material examined: ZSI-WRC-ENT-1/1919, 13.ii.1962, 02 ex., Dehu, Pune, R.N. Chopra & Party (18.7150852°N & 73.7683784°E, elevation 584m); ZSI-WRC-ENT-1/2536, 30.x.2015, 05 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2537, 06.ix.2015, 01 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55194°N & 73.84614°E, elevation 601m); ZSI-WRC-ENT-1/2538, 30.x.2015, 01 ex., Pali, Ratnagiri, A.S. Kalawate & Party (16.55194°N & 73.84614°E, elevation 201m); ZSI-WRC-ENT-1/2571, 01 ex., Gaganbawda, Kolhapur, 06.ix.2015, A.S. Kalawate & Party (16.55211°N & 73.5046.61°E, elevation 601m).

Distribution: Bangladesh, Bhutan, India (Andhra Pradesh, Bihar, Haryana, Karnataka, Madhya Pradesh, Tamil Nadu, West Bengal), Myanmar.

**18. *Anomala ruficapilla* Burmeister, 1855**

Handb. Ent., IV, 2: 49.  
*Anomala ruficapilla*: Arrow, 1917; Faun. Brit. India, II: 153.

Material examined: ZSI-WRC-ENT-1/2627, 05.vii.2016, 01 ex., Sakri, Dhule, S.S. Paotle (20.9926045°N & 74.3140742°E, elevation 426m).

Distribution: India (Assam, Bihar, Chhattisgarh, Haryana, Karnataka, Madhya Pradesh (Hoshangabad, Seoni, Balaghat, Jabalpur, Umaria), Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), and Sri Lanka.

**19. *Anomala polita* Blanchard, 1851**

Cat. Coli. Ent. Mus. Paris: 182.  
*Anomala polita*: Arrow, 1917; Faun. Brit. India, II: 146.

Material examined: ZSI-WRC-ENT-1/2894, 23.vi.2017, 06 ex., Ambegaon, Pune, A.S. Kalawate & Party (18.445803°N & 73.850728°E, elevation 681m).

Distribution: India (Assam, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Uttarakhand, Uttar Pradesh, West Bengal).

**20. *Rhinyptia indica* Burmeister, 1844 (Image 12)**

Handb. Ent. iv1 p. 228.  
*Rhinyptia testacea*: Nonfr. 1892; Berl. Ent. Zeits. xxxvi p. 280.

*Rhinyptia indica*: Arrow, 1917; Fauna British India, II: 269.

Material examined: ZSI-WRC-ENT-1/2600,

20.ix.1973, 02 ex., Trayambakeshwar, Nashik, M.B. Rao & Party (19.9373638°N & 73.5363557°E, elevation 710m); ZSI-WRC-ENT-1/2601, 01.x.2016, 02 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.5046.61°E, elevation 618m); ZSI-WRC-ENT-1/2602, 04.x.2016, 04 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55194°N & 73.84614°E, elevation 601m); ZSI-WRC-ENT-1/2646, 03 ex., Sakharpa, Ratnagiri, 29.x.2015, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2647, 24.x.2013, 01 ex., Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2648, 28.x.2015, 01 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2649, 20.x.2013, 02 ex., Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m);

ZSI-WRC-ENT-1/2650, 21.x.2013, 01 ex., Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m); ZSI-WRC-ENT-1/2651, 25.x.2013, 02 ex., Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2652, 02.xi.2015, 01 ex., Nandavi, Mangaon, Raigad, A.S. Kalawate & Party (18.11629°N & 73.285°E, elevation 27m); ZSI-WRC-ENT-1/2653, 10.ix.2015, 01 ex., Oras, Sindhudurg, A.S. Kalawate & Party (16.1159304°N & 73.707834°E, elevation 18m); ZSI-WRC-ENT-1/2701, 31.x.2015, 03 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m).

Distribution: India (Karnataka, Maharashtra, Tamil Nadu).



Image 7. *Oryctes rhinoceros* (Linnaeus, 1758)



Image 8. *Phyllognathus dionysius* (Fabricius, 1792)



Image 9. *Xylotrupes gideon* (Linnaeus, 1767)



Image 10. *Anomala dorsalis* (Fabricius, 1775)



Image 11. *Anomala rugosa* Arrow, 1899



Image 12. *Rhinoptilia indica* Burmeister, 1844

(F) Subfamily: Scarabaeinae Latreille, 1802  
Tribe Onthophagini Burmeister, 1846

### **21. *Digitonthophagus gazella* (Fabricius, 1787)**

*Scarabaeus gazella* Fabricius, 1787; Diff. Speci.  
Emend. Observat., 1: 348.

*Digitonthophagus gazelle*: Génier & Davis, 2017;  
Zootaxa, 4221(4): 497–500.

Material examined: ZSI-WRC-ENT-1/2572, 01.x.1981,  
01 ex., Karjat, Raigad, M.S. Pradhan & Party (18.9323°N  
& 73.3252°E, elevation 49m); ZSI-WRC-ENT-1/2573,  
02.x.1974, 01 ex., Shivaji Nagar, Pune, M.S. Malhotra &  
Party (18.5308225°N & 73.8474647°E, elevation 560m).

Distribution: Africa, Arabia, India (Andhra Pradesh,  
Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh,  
Karnataka, Madhya Pradesh, Maharashtra, Punjab,  
Rajasthan, Tamil Nadu), Madagascar, Pakistan, Sri Lanka.

### **22. *Onthophagus (Colobonthophagus) ramosus* (Wiedemann, 1823) (Image 13)**

*Copris ramosa* Wied., 1823; Zool. Mag. ii, 1: 13.  
*Onthophagus ramosus*: Arrow, 1931; Fauna Brit.  
India, III: 236.

*Onthophagus (Onthophagus) ramosus*, Balthasar,  
1963; Mon. der Scarabaeidae und Aphodiidae  
der Palaeark. und Orientalis. Region (Coleoptera:  
Lamellicornia), Coprinae, II: 497

Material examined: ZSI-WRC-ENT-1/2881,  
13.vii.2017, 02 ex., Bhosgaon, Satara, A.S. Kalawate  
& Party (17.229°N & 73.952°E, elevation 731m); ZSI-  
WRC-ENT-1/1651, 24.vi.1981, 01 ex., Dhuheri Nalla,  
Kurne, Pali, Ratnagiri, R.H. Kamble & Party (approximate  
location: 16.91017°N & 73.506402°E, elevation 108m);  
ZSI-WRC-ENT-1/1652, 02.x.1974, 01 ex., Shivaji  
Nagar, Pune, M.S. Malhotra & Party (18.5308225°N &  
73.8474647°E, elevation 560m); ZSI-WRC-ENT-1/2664,  
25.x.2013, 02 ex., PWD Rest House and around, Jawhar,  
Thane, R. Bano & Party (19.9050038°N & 73.2312946°E,  
elevation 458m).

Distribution: India (Bihar, Chhattisgarh, Himachal  
Pradesh, Jammu and Kashmir, Karnataka, Madhya  
Pradesh, Maharashtra, Odisha, Pondicherry, Punjab,  
Rajasthan and Uttarakhand), Pakistan.

### **23. *Onthophagus (Digitonthophagus) bonasus* (Fabricius, 1775)**

*Scarabeus bonasus* Fabricius, 1775; Syst. Ent. p. 23.  
*Onthophagus (Digitonthophagus) bonasus* Balthasar,  
1963; Monogr. Scarab. Aphod. palaearkt. orient., 1 : 296.

Material examined: ZSI-WRC-ENT-1/2576, 24.vi.1987,  
01 ex., Dhuheri Nalla, Kurne, Pali, Ratnagiri, R.H.

Kamble & Party (approximate location: 16.9101708°N &  
73.506402°E, elevation 108m).

Distribution: India (Bihar, Karnataka, Maharashtra,  
Madhya Pradesh, Tamil Nadu, Uttar Pradesh, West  
Bengal), Pakistan.

### **24. *Onthophagus catta* (Fabricius, 1787)**

*Scarabaeus catta* Fabricius, 1787; Mant. Ins. 1: 12.  
*Onthophagus catta*: Arrow, 1931; Faun. Brit. India, III:  
230.

Material examined: ZSI-WRC-ENT-1/77, 04.viii.1964,  
02 ex., Law College Hill, Pune, S.M. Ketkar & Party  
(approximate location: 18.5142961°N & 73.8287303°E,  
elevation 580m).

Distribution: India (Andhra Pradesh, Bihar, Gujarat,  
Karnataka, Maharashtra, Madhya Pradesh, Odisha,  
Punjab, Tamil Nadu, Tripura, Uttar Pradesh), Pakistan,  
Madagascar, Sri Lanka.

### **25. *Onthophagus (Colobonthophagus) hindu* Arrow, 1931 (Image 14)**

Faun. Brit. India, III: 289.  
*Onthophagus (Colobonthophagus) hindu*, Balthasar,  
1963; Mon. der Scarabaeidae und Aphodiidae  
der Palaeark. und Orientalis. Region (Coleoptera :  
Lamellicornia), Coprinae, II: 381-382.

Material examined: ZSI-WRC-ENT-1/2885,  
13.vii.2017, 03 ex., Bhosgaon, Satara, A.S. Kalawate  
& Party (17.229°N & 73.952°E, elevation 731m); ZSI-  
WRC-ENT-1/2634, 27.viii.2016, 01 ex., Sakhri, Dhule,  
S.S. Patole (approximate location: 21.03964606°N &  
74.20783997°E, elevation 497m).

Distribution: Afghanistan, India (Andhra Pradesh,  
Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra),  
Pakistan.

### **26. *Onthophagus (Colobonthophagus) dama* (Fabricius, 1798) (Image 15)**

*Copris dama* Fabricius, 1798; Ent. Syst. Suppl., p. 32.  
*Onthophagus dama*: d'Orb., 1898; L'Abeille, xxix, p.  
217.

*Onthophagus (Colobothophagus) dama*: Balthasar,  
1963; Mon. der Scarabaeidae and aphodiidae der  
Palaeark. unlepidiod Orientalis. Region (Coleoptera :  
Lamellicornia), Coprinae, II: 277–278.

Material examined: ZSI-WRC-ENT-1/2883,  
13.vii.2017, 01 ex., Bhosgaon, Satara, A.S. Kalawate &  
Party (17.229°N & 73.952°E, elevation 731m); ZSI-WRC-  
ENT-1/1993, 01.x.1981, 02 ex., Karjat rest house and  
around, Raigad, M.S. Pradhan & Party (approximate  
location: 18.9323°N & 73.3252°E, elevation 49m);

ZSI-WRC-ENT-1/2620, 11.ix.2015, 01ex., Shivadav, Sindhudurg, A.S. Kalawate & Party (16.235239°N & 73.777203°E, elevation 106m); ZSI-WRC-ENT-1/2621, 01.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84614°E, elevation 601m); ZSI-WRC-ENT-1/2622, 03.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.5046.61°E, elevation 618m); ZSI-WRC-ENT-1/2694, 05.ix.2015, 02 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84614°E, elevation 618m); ZSI-WRC-ENT-1/2697, 04.ix.2015, 02 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.5046.61°E, elevation 601m).

Distribution: Bhutan, India (Arunachal Pradesh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Nepal, Sri Lanka.

### **27. *Onthophagus unifasciatus* (Schaller, 1783)**

*Scarabaeus unifasciatus* Schaller, 1783; Abh. Hall. Nat. Ges. 1: 240.

*Onthophagus prolixus* Walker, 1858; Ann. Mag. Nat. Hist. (2) iii: 208.

Material examined: ZSI-WRC-ENT-1/2696, 04.ix.2015, 02 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84614°E, elevation 601m).

Distribution: India (Bihar, Haryana, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Punjab, Tamil Nadu, West Bengal), Sri Lanka.

### **28. *Onthophagus agnus* Gillet, 1925**

*Ann. Soc. Brux. XliV:* 233.

*Onthophagus agnus*: Arrow, 1931; Faun. Brit. India, III: 296.

Material examined: ZSI-WRC-ENT-1/2896, 03 ex., Bhosgaon, Satara, 13.vii.2017, A.S. Kalawate & Party (17.229°N & 73.952°E, elevation 731m).

Distribution: India (Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, West Bengal).

Remark: Endemic to India.

Tribe Coprini Leach, 1815

### **29. *Helicocoris bucephalus* (Fabricius, 1775) (Image 16)**

*Scarabaeus bucephalus* Fabricius, 1775; Syst. Ent.: 24.

*Helicocoris bucephalus*: Arrow, 1931; Fauna Brit. India, III: 88.

Material examined: ZSI-WRC-ENT-1/2598, 07.ix.1993, 01 ex., Khandala, Pune, P.D. Rane & Party (approximate

location: 18.7692034°N & 73.3767641°E, elevation 536m); ZSI-WRC-ENT-1/2528, 16.ix.2016, 01 ex., Around Kudal Rest house, Sindhudurg, V.D. Hegde & Party (15.9997805°N & 73.68315697°E, elevation 40m); ZSI-WRC-ENT-1/2529, 20.ix.1973, 01 ex., Trayambakeshwar, Nashik, M.B. Rao & Party (approximate location: 19.9373638°N & 73.5363557°E, elevation 710m); ZSI-WRC-ENT-1/1984, 20.ix.1981, 01 ex., Near Roha Rest House, Raigad, M.S. Pradhan & Party (18.4389511°N & 73.1167514°E, elevation 11m); ZSI-WRC-ENT-1/1985, 01.xi.2015, 02 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/1252, 25.ix.1970, 01 ex., Ambenali, Satara, R.N. Chopra & Party (approximate location: 17.93°N & 73.55°E, elevation 325m); ZSI-WRC-ENT-1/1655, 21.ix.2013, 01 ex., Palus, Sangli, S. Lad & Party (approximate location: 17.097643°N & 74.4496317°E, elevation 593m); ZSI-WRC-ENT-1/2531, 30.ix.2015, 01 ex., GPRA Colony, Pune, A.S. Kalawate (18.651083°N & 73.76469344°E, elevation 586m).

Distribution: Afghanistan, China, India (Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal), Indonesia, Java, Laos, Myanmar, Malay Peninsula, Thailand, Vietnam.

### **30. *Helicocoris gigas* (Linnaeus, 1764) (Image 17)**

*Scarabaeus gigas* Linnaeus, 1764; Mus. Lud. Ulr., p. 16.

*Helicocoris gigas*: Arrow, 1928; Trans. Ent. Soc. Lond., p. 74.

Material examined: ZSI-WRC-ENT-1/2636, 06.v.2016, 01 ex., Chhadvel-Korde, Sakri, Dhule, S.S. Patole (approximate location: 21.20605841°N & 74.24644232°E, elevation 528m).

Distribution: Africa, Egypt, India (Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh), Pakistan.

### **31. *Copris (Copris) repertus* Walker, 1858**

*Ann. Mag. Nat. Hist.*, (3) ii: 208.

*Copris repertus*: Arrow, 1931; Faun. Brit. India, III: 116.

*Copris (Copris) repertus*: Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. Und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, I: 351.

Material examined: ZSI-WRC-ENT-1/2875, 23.vi.2017, 01 ex., Ambegaon, Pune, A.S. Kalawate & Party (18.445803°N & 73.850728°E, elevation 681m); ZSI-WRC-ENT-1/2662, 20.x.2013, 05 ex., Forest Rest

House, Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m); ZSI-WRC-ENT-1/2663, 21.x.2013, 01 ex., Forest Rest House, Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m); ZSI-WRC-ENT-1/1930, 23.x.2013, 04 ex., Forest Rest House, Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m); ZSI-WRC-ENT-1/1929, 25.x.2013, 01 ex., PWD Rest House, Jawhar, Thane, R. Bano & Party (19.9050038 °N & 73.2312946°E, elevation 458m).

Distribution: India (Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh), Myanmar, Sri Lanka.

### 32. *Copris (Paracopris) imitans* Felsche, 1910 (Image 18)

Deutsche Ent. Zeits. p. 347.

*Copris imitans*: Arrow, 1931; Faun. Brit. India, III: 124.

*Copris (Paracopris) imitans*: Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. Und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, I: 367.

Material examined: ZSI-WRC-ENT-1/2874, 23.vi.2017, 03 ex., Ambegaon, Pune, A.S. Kalawate & Party (18.445803°N & 73.850728°E, elevation 681); ZSI-WRC-ENT-1/2888, 13.vii.2017, 01 ex., Bhosgaon, Satara, A.S. Kalawate & Party (17.229°N & 73.952°E, elevation 731m); ZSI-WRC-ENT-1/2605, 04.x.2016, 01 ex., PWD, Rest House, Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84614°E, elevation 601m); ZSI-WRC-ENT-1/2584, 17.x.1962, 08 ex., Sinhagad, Pune, S.M.



Image 13. *Onthophagus (Colobonthophagus) ramosus* (Wiedemann, 1823)

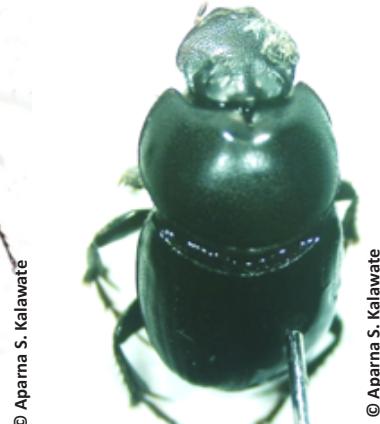


Image 14. *Onthophagus (Colobonthophagus) hindu* Arrow, 1931



Image 15. *Onthophagus (Colobonthophagus) dama* (Fabricius, 1798)



Image 16. *Heliocopris bucephalus* (Fabricius, 1775)



Image 17. *Heliocopris gigas* (Linnaeus, 1764)



Image 18. *Copris (Paracopris) imitans* Felsche, 1910

Ketkar & Party (approximate location 18.4886513°N & 73.8131617°E, elevation 572m).

Distribution: India (Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, West Bengal).

### **33. *Copris (Paracopris) andrewesi* Waterhouse, 1891**

Ann. Mag. Nat. Hist. (6) vii: 621.

*Copris andrewesi*: Arrow, 1931; Fauna Brit. India, III: 127.

*Copris (Paracopris) andrewesi* Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, I: 368.

Material examined: ZSI-WRC-ENT-1/2665, 10.ix.2015, 02 ex., PWD, Rest House, Oras, Sindhudurg, A.S. Kalawate & Party (16.1159304°N & 73.707834°E, elevation 18m); ZSI-WRC-ENT-1/2589, 16.viii.1966, 01 ex., Moshi, Pune, R.N. Chopra & Party (18.6731051°N & 73.8477874°E, elevation 580m).

Distribution: Bhutan, India (Bihar, Karnataka, Maharashtra, Rajasthan, Uttar Pradesh, West Bengal), Nepal.

### **34. *Copris (Copris) sinicus* Hope, 1842**

Proc. Ent. Soc. Lond.: 60.

*Copris (Copris) sinicus*: Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera : Lamellicornia), Coprinae, I: 342.

Material examined: ZSI-WRC-ENT-1/2655, 24.x.2013, 01 ex., PWD, Rest House, Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2615, 01.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: China, India (Maharashtra), Myanmar.

### **35. *Catharsius (Catharsius) pithecius* (Fabricius, 1775) (Image 19)**

*Scarabaeus pithecius* Fabricius, 1775; Syst. Ent.: 21.

*Catharsius pithecius*: Arrow. 1931; Fauna Brit. India, III: 100.

Material examined: ZSI-WRC-ENT-1/2595, 20.ix.1973, 01 ex., Trayambakeshwar, Nashik, M.B. Rao & Party (approximate location: 19.9373638°N & 73.5363557°E, elevation 710m); ZSI-WRC-ENT-1/2628, 05.vii.2016, 01 ex., Ambapur, Sakri, Dhule, S.S. Patole (approximate location: 21.6861748°N & 74.5170319°E, elevation 221m).

Distribution: India (Andhra Pradesh, Bihar,

Chhattisgarh, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh), Sri Lanka.

### **36. *Catharsius (Catharsius) molossus* (Linnaeus, 1758)**

*Scarabaeus molossus* Linnaeus, 1758; Syst. Nat. ed., 10: 347.

*Catharsius molossus*: Arrow, 1931; Fauna Brit. India, III : 95–96.

*Catharsius (Catharsius) molossus*, Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, I: 307–309

Material examined: ZSI-WRC-ENT-1/2597, 01.x.2016, 03 ex., Gaganbawda Rest house and around, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84614°E, elevation 601m); ZSI-WRC-ENT-1/2656, 26.x.2013, 03 ex., PWD Rest House, Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2657, 28.x.2013, 01 ex., PWD Rest House, Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2659, 23.x.2013, 01 ex., Forest Rest House, Peth, Nashik, R. Bano & Party (20.2553°N & 73.50136°E, elevation 694m); ZSI-WRC-ENT-1/2699, 02.x.2016, 01 ex., Gaganbawda Rest house and around, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: India (Andaman & Nicobar Island, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Meghalaya, Odisha, Sikkim, Tripura, Uttar Pradesh, Uttarakhand, West Bengal), Sri Lanka.

### **37. *Catharsius (Catharsius) sagax* (Quenstedt, 1806) (Image 20)**

*Copris sagax* Quenstedt, 1806; Schonh. Sys. Ins. I: 43.

*Catharsius sagax*: Arrow, 1931; Fauna Brit. India, III: 96.

*Catharsius (Catharsius) molossus* : Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera: Lamellicornia), Coprinae, I: 307.

Material examined: ZSI-WRC-ENT-1/1248, 20.ix.1981, 02 ex., Hill near Roha, Raigad, M.S. Pradhan & Party (18.42294185°N & 73.11092377°E, elevation 224m); ZSI-WRC-ENT-1/1249, 01.x.1981, 01 ex., Karjat Rest House and surrounding, Raigad, M.S. Pradhan & Party (approximate location: 18.9323°N & 73.3252°E, elevation 49m); ZSI-WRC-ENT-1/1250, 20.vi.1987, 01 ex., Rest House Rajapur, Ratnagiri, R.H. Kamble & Party (16.65527014°N & 73.52574348°E, elevation

91m); ZSI-WRC-ENT-1/1397, 06.i.2012, 01 ex., Mulshi, Pune, M.J. Jadhav (18.5010536°N & 73.5137654°E, elevation 642m); ZSI-WRC-ENT-1/1698, 04.xi.1981, 03 ex., Kulchiwadi, Varnawati River basin, Fonda ghat, Kankawali, Sindhudurg, Ramakrishna & Party (approximate location: 16.38042666°N & 73.80975723°E, elevation 139m); ZSI-WRC-ENT-1/1699, 18.ii.1980, 01 ex., Hattimahal, Radhanagari WLS, Kolhapur, C.A.N. Rao & Party (approximate location: 16.41056328°N & 73.99180412°E, elevation 566m); ZSI-WRC-ENT-1/1715, 24.ii.1980, 01 ex., Gundu Maharaj Garden, Budhgaon, Sangali, C.A.N. Rao & Party (Approximate location: 16.91625308°N & 74.59819794°E, elevation 568m); ZSI-WRC-ENT-1/1717, 24.vi.1987, 01 ex., Dhuheri Nalla, Kurne, Pali, Ratnagiri, R.H. Kamble & Party (approximate location: 16.9101708°N & 73.506402°E, elevation 108m); ZSI-WRC-ENT-1/1718, 03.x.1974, 01 ex., Shivaji Nagar, Pune, M.S. Malhotra & Party (18.5308225°N & 73.8474647°E, elevation 560m); ZSI-WRC-ENT-1/1720, 19.xi.1961, 01 ex., NDA, Pune, B.K. Tikader & Party (18.5377498°N & 73.8047481°E, elevation 585m); ZSI-WRC-ENT-1/1721, 26.vii.1963, 01 ex., Hanuman tekadi, Pune, S.V. Muley & Party (18.5246354°N & 73.8341872°E, elevation 614m); ZSI-WRC-ENT-1/1977, 01.xi.2015, 02 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2526, 21.vi.1988, 01 ex., ZSI, WRC, Pune, R.H. Kamble & Party (18.6483113°N & 73.7601424°E, elevation 579m); ZSI-WRC-ENT-1/2596, 01 ex., Gaganbawda, Kolhapur, 01.x.2016, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2654, 24.x.2013, 02 ex., PWD Rest House, Jawhar, Thane, R. Bano & Party (19.9050038°N & 73.2312946°E, elevation 458m); ZSI-WRC-ENT-1/2698, 25.x.2016, 01 ex., Oras Rest house and around, Sindhudurg, V.D. Hegde & Party (16.1159304°N & 73.707834°E, elevation 18m).

Distribution: Bhutan, India (Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal), Pakistan, Sri Lanka.

Tribe Oniticellini Kolbe, 1905

### **38. *Oniticellus (Oniticellus) cinctus (Fabricius, 1775)***

*Scarabaeus cinctus* Fabricius, 1775; Syst. Ent.: 30.

*Oniticellus cinctus*: Arrow, 193; Faun. Brit. India, III: 379–380.

*Oniticellus (Oniticellus) cinctus*: Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaearkt. Und Orientalis. Region (Coleoptera: Lamellicornia),

Coprinae II: 77.

Material examined: ZSI-WRC-ENT-1/2637, 04 ex., Navapada, Dhule, 02.ii.2017, V.D. Hegde & Party (20.98709°N & 74.11037°E, elevation 550m); ZSI-WRC-ENT-1/2640, 26.i.2017, 01 ex., Valkhed, Dindori, Nashik, V.D. Hegde & Party (20.22329°N & 73.8369°E, elevation 614m).

Distribution: India (Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal).

Tribe Onitini Laporte, 1840

### **39. *Onitis virens* Lansberge, 1875 (Image 21)**

Ann. Soc. Ent. Belg. xviii: 135.

Material examined: ZSI-WRC-ENT-1/2700, 02.x.2016, 02 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2695, 04.ix.2015, 04 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2692, 05.ix.2015, 03 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2661, 28.x.2015, 01 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.68474°E, elevation 89m); ZSI-WRC-ENT-1/2644, 27.i.2017, 02 ex., Khamble, Peth, Nashik, V.D. Hegde & Party (20.27729N & 73.51582 E, elevation 657m); ZSI-WRC-ENT-1/2643, 20.i.2017, 02 ex., Kombelne, Boprivadi, Akole, Ahmednagar, V.D. Hegde & Party (19.6146°N & 73.89816°E, elevation 962m); ZSI-WRC-ENT-1/2642, 01.ii.2017, 02 ex., Vaki, Sakri, Dhule, V.D. Hegde & Party (20.96533°N & 74.03453°E, elevation 589m); ZSI-WRC-ENT-1/2641, 01.ii.2017, 01 ex., Baripada, Sakri, Dhule, V.D. Hegde & Party (20.86557°N & 73.98845°E, elevation 717m).

Distribution: India (Bihar, Chhattisgarh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttaranchal, West Bengal).

### **40. *Onitis philemon* Fabricius, 1801**

Syst. Eleut., I: 30.

Material examined: ZSI-WRC-ENT-1/2630, 27.viii.2016, 02 ex., Kondaibari, Sakri, S.S. Patole (approximate location: 21.0839515°N & 74.1540902°E, elevation 705m); ZSI-WRC-ENT-1/2619, 03.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party, (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2606, 04.x.2016, 02 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2588, 06.ix.2015, 01 ex., Gaganbawda,

Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2619, 03.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2661, 28.x.2015, 01 ex., Sakharpa, Ratnagiri, A.S. Kalawate & Party (16.983°N & 73.684°E, elevation 89m).

**Distribution:** India (Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam.

Tribe Gymnopleurini Lacordaire, 1856

#### 41. *Gymnopleurus (Gymnopleurus) cyaneus* (Fabricius,

#### 1798) (Image 22)

*Copris cyaneus* Fabricius, 1798; Ent. Syst. Suppl.: 34.

*Gymnopleurus cyaneus*: Arrow, 1931; Faun. Brit. India, III: 49.

*Gymnopleurus (Gymnopleurus) cyaneus*, Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera : Lamellicornia), Coprinae, I: 207

**Material examined:** ZSI-WRC-ENT-1/2570, 07.vii.1961, 01 ex., NCL campus, Pune, S.M. Ketkar & Party (18.5393473°N & 73.8131762°E, elevation 594m); ZSI-WRC-ENT-1/2569, 26.vii.1963, 01 ex., Hanuman Tekadi, Pune, S.V. Mule & Party (18.5246354°N & 73.8341872°E, elevation 614m); ZSI-WRC-ENT-1/2629, 02.x.2016, 01 ex., Varsa, Sakri, Dhule, S.S. Patole (20.91267°N & 73.98691°E, elevation 600m).



Image 19. *Catharsius (Catharsius) pithecius* (Fabricius, 1775)



Image 20. *Catharsius (Catharsius) sagax* (Quenstedt, 1806)



Image 21. *Onitis virens* Lansberge, 1875



Image 22. *Gymnopleurus (Gymnopleurus) cyaneus* (Fabricius, 1798)



Image 23. *Schizonycha ruficollis* (Fabricius, 1781)



Image 24. *Leucopholis lepidophora* Blanchard, 1850

Distribution: Bangladesh, India (Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal), Sri Lanka.

#### **42. *Gymnopleurus (Metagymnopleurus) gemmatus* Harold, 1871**

Col. Hefte., VIII: 118.

*Gymnopleurus gemmatus*: Arrow, 1931; Faun. Brit. India, III: 53.

*Gymnopleurus (Metagymnopleurus) gemmatus*, Balthasar, 1963; Mon. der Scarabaeidae und Aphodiidae der Palaeark. und Orientalis. Region (Coleoptera : Lamellicornia), Coprinae, I: 204-205

Material examined: ZSI-WRC-ENT-1/2581, 26.vii.1963, 01 ex., Hanuman Tekadi, Pune, S.V. Mule & Party (18.5246354°N & 73.8341872°E, elevation 614m).

Distribution: India (Bihar, Haryana, Kerala, Karnataka, Kashmir, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal), Pakistan, Sri Lanka.

(G) Subfamily Melolonthinae MacLeay, 1819

Tribe Schizonychini Burmeister, 1855

#### **43. *Schizonycha ruficollis* (Fabricius, 1781) (Image 23)**

*Melolontha ruficollis* Fabricius, 1781; Spec. Ins., 7: 39.

*Schizonycha xanthodera* Blanchard, 1850; Cat. Col. Ent., 1: 139.

Material examined: ZSI-WRC-ENT-1/2594, 20.ix.1973, 02 ex., Trayambakeshwar, Nashik M.B. Rao & Party (Approximate location: 19.9373638°N & 73.5363557°E, elevation 710m); ZSI-WRC-ENT-1/2693, 05.ix.2015, 02 ex., Gaganbawda, Kolhapur, A.S. Kalawate & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: India (Bihar, Madhya Pradesh, Maharashtra, Odisha, Uttar Pradesh, Uttarakhand, West Bengal).

Remark: Endemic to India.

Tribe Rhizotrogini Burmeister, 1855

#### **44. *Holotrichia serrata* (Fabricius, 1787)**

*Melolontha serrata* Fabricius, 1787; Christ. Gottl. Proft., Hafniae, 1: 1-348.

*Ancylonycha serrata*, Blanchard, 1850; Cat. Col. Ent., 1: 138.

*Holotrichia serrata*, Dallatorre, 1912; Col. Cat., 49: 206.

Material examined: ZSI-WRC-ENT-1/1996, 30.x.2015,

01 ex., PWD, Rest House, Pali, Ratnagiri, A.S. Kalawate & Party (16.98784°N & 73.48011°E, elevation 201m); ZSI-WRC-ENT-1/2583, 11.ix.2015, 01 ex., Shivadav, Sindhudurg, A.S. Kalawate & Party (16.235239°N & 73.777203°E, elevation 106m).

Distribution: India (Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu).

#### **45. *Holotrichia fissa* Brenske, 1894**

Mem. Soc. Entomol. Belg., 2: 71.

Material examined: ZSI-WRC-ENT-1/2617, 01.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m); ZSI-WRC-ENT-1/2624, 20.ix.1973, 01 ex., Trayambakeshwar, Nashik, M.B. Rao & Party (approximate location: 19.9373638°N & 73.5363557°E, elevation 710m).

Distribution: India (Andhra Pradesh, Karnataka, Kerala, Maharashtra, Uttar Pradesh).

Remark: Endemic to India.

#### **46. *Holotrichia reynaudi* (Blanchard, 1850)**

*Ancylonycha reynaudi* Blanchard, 1850; Cat. Col. Ent., 1: 139.

*Holotrichia insularis*, Brenske, 1894; Mem. Soc. Entomol. Belg., 2: 67.

*Holotrichia reynaudi*, Dallatorre; 1912, Col. Cat., 49: 206.

Material examined: ZSI-WRC-ENT-1/2618, 01.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: India (Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu).

#### **47. *Leucopholis lepidophora* Blanchard, 1850 (Image 24)**

Cat. Coll. Ent., 1: 158.

Material examined: ZSI-WRC-ENT-1/2886, 13.vii.2017, 01 ex., Bhosgaon, Satara, A.S. Kalawate & Party (17.229°N & 73.952°E, elevation 731m); ZSI-WRC-ENT-1/2611, 04.x.2016, 01 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party (16.55211°N & 73.84611°E, elevation 601m).

Distribution: India (Karnataka, Maharashtra, Tamil Nadu).

Tribe Sericini

#### **48. *Maladera amboliensis* Ahrens & Fabrizi, 2016**

Bonn zoological Bulletin, 65 (1 & 2): 1-355.

Material examined: ZSI-WRC-ENT-1/2607, 03.x.2016, 06 ex., Gaganbawda, Kolhapur, V.D. Hegde & Party

(16.55211°N & 73.84611°E, elevation 601m).

Distribution: India (Maharashtra).

#### **49. *Maladera alibagensis* Ahrens & Fabrizi, 2016**

Bonn zoological Bulletin, 65(1&2): 1–355.

Material examined: ZSI-WRC-ENT-1/2610, 25.vi.1962, 01 ex., Pashan Lake, Pune, B.K. Haldar & Party (18.5343969°N & 73.7852922°E, elevation 588m).

Distribution: India (Maharashtra).

#### **50. *Maladera hauseri* (Brenske, 1898)**

*Autoserica hauseri* Brenske, 1898; Berliner Entomologische Zeitschrift, 43: 240.

*Maladera hauseri*: Krajcik, 2012; Animma, X, supplement, 5:154.

Material examined: ZSI-WRC-ENT-1/2625, 20.ix.1973, 01 ex., Trayambakeshwar, Nashik, M.B. Rao & Party (Approximate location: 19.9373638°N & 73.5363557°E, elevation 710m).

Distribution: India (Maharashtra, Madhya Pradesh).

A total of 50 species represented by 25 genera, 17 tribes, seven subfamilies belonging to Hybosoridae, Geotrupidae and Scarabaeidae were documented from the surveyed areas. As shown in Fig. 2, among the studied specimens the subfamily Scarabaeinae emerged as the dominant subfamily with 22 species followed by Melolonthinae (8 species), Rutelinae (8 species), Cetoniinae (6 species), Dynastinae (4 species), and Hybosorinae and Geotrupidae with one species each.

A total of seven species endemic to India—*Anatona stillata*, *Coenochilus acutipes*, *Coenochilus nitidus*, *Eophileurus platypterus*, *Onthophagus agnus*, *Schizonycha ruficollis*, *Holotrichia fissa*—were a part of the studied specimens. The species of the genus; *Gymnopleurus* are rollers while *Helicocoris*, *Catharsius*, *Copris*, *Onitis* and *Onthophagus* are tunnellers. The species in the subfamilies i.e. Rutelinae, Melolonthinae, Dynastinae and Cetoniinae are phytophagous. The beetles belonging to family Geotrupidae are earth borers.

The dominant subfamily Scarabaeinae was represented by four tribes, i.e., Onthophagini, Coprini, Oniticellini, Onitini and Gymnopleurini. The subfamilies viz., Melolonthinae and Rutelinae were represented by three (Schizonychini, Rhizotrogini, Sericini) and two (Adoretini, Anomalini); Dynastinae by four (Tribe Oryctini, Pentodontini, Dynastini and Phileurini) and Cetoniinae by two tribes (Cetoniini and Goliathini). From the studied specimens the most diverse genus was *Onthophagus* with seven species. These results are

consistent with the findings of Chandra & Gupta (2013). In their study on diversity of Scarabaeid beetles of Barnawapara Wildlife Sanctuary *Onthophagus* was the most diverse genus.

Among the phytophagous group, *Anomala* presenting six species followed by *Holotrichia* (3 species), *Coenochilus* (3 species), *Gametis*, *Rhinyptia*, *Oryctes*, *Philognathus*, *Xylotrupes*, *Eophileurus*, *Anatona*, *Chiloloba*, *Schizonycha* and *Leucopholis* representing one species each were recorded. The dominance of *Anomala* and *Holotrichia* and other phytophagous scarab may be due to cropping pattern as these are mainly associated with sugarcane, potato, groundnut, jowar and maize. The species predominance is directly correlated with the cropping pattern of that area and season. Similar results were also found by Sreedevi et. al. (2017) who reported the dominant species *Holotrichia nagpurensis*, *H. consanguinea*, *H. serrata*, *A. dimidiata* and *Lepidiota mansueta* (Burmeister) in Uttar Pradesh associated with sugarcane.

As mentioned earlier, dung beetles are important decomposers and involved in nutrient recycling. If they are extirpated, the Earth would pile up with manure and dung everywhere.

#### **REFERENCES**

- Arrow, G.J. (1910). *The Fauna of British India Sri Lanka and Burma, Coleoptera, Lamellicornia (Cetoniinae and Dynastinae) - I.* Taylor and Francis, London, 322pp.
- Arrow, G.J. (1917). *The Fauna of British India Sri Lanka and Burma, Coleoptera, Lamellicornia (Ruteliinae, Desmonymicinae & Euchirinae) - II.* Taylor and Francis, London, 387pp.
- Arrow, G.J. (1931). *The Fauna of British India including Ceylon and Burma, Coleoptera: Lamellicornia (Coprinae) - III.* Taylor and Francis, London, 428pp.
- Balthasar, V. (1963a). Monographie der Scarabaeidae und Aphodiidae der Paläarktischen und Orientalischen Region. (Coleoptera: Lamellicornia). *Verlag der Tschechoslowakischen Akademie der Wissenschaften Prag I:* 1–391.
- Balthasar, V. (1963b). Monographie der Scarabaeidae und Aphodiidae der Paläarktischen und Orientalischen Region. (Coleoptera: Lamellicornia). *Verlag der Tschechoslowakischen Akademie der Wissenschaften Prag II:* 1–627.
- Balthasar, V. (1964). Monographie der Scarabaeidae und Aphodiidae der Paläarktischen und Orientalischen Region. (Coleoptera: Lamellicornia). *Verlag der Tschechoslowakischen Akademie der Wissenschaften Prag III:* 1–652.
- Chandra, K. & D. Gupta (2013). Scarab beetles (Coleoptera: Scarabaeoidea) of Barnawapara Wildlife Sanctuary, Chhattisgarh, India. *Journal of Threatened Taxa* 5(12): 4660–4671; <http://doi.org/10.11609/JoTT.o3251.4660-71>
- Davis, A.J. (2000). Does reduced-impact logging help preserve biodiversity in tropical rainforests? A case study from Borneo using dung beetles as indicators. *Environmental Entomology* 29: 467–475; <http://doi.org/10.1603/0046-225X-29.3.467>
- Davis, A.J. & S.L. Sutton (1998). The effects of rainforest canopy loss on arboreal dung beetles in Borneo: implications for the measurement of biodiversity in derived tropical ecosystems. *Diversity and*

- Distributions** 4: 167–173; <http://doi.org/10.1046/j.1472-4642.1998.00017.x>
- Doube, B.M. (1983).** The habitat preference of some bovine dung beetles (Coleoptera: Scarabaeidae) in Hluhluwe Game Reserve, South Africa. *Bulletin of Entomological Research* 73: 357–371.
- Hanski, I. & Y. Cambefort (1991).** Species richness, pp. 350– 365. Hanski, I. & Y. Cambefort (eds.). *Dung Beetle Ecology*. Princeton University Press, Princeton, NJ.
- Hanski, I. & J. Krikken (1991).** Dung beetles in tropical forests in South-East Asia, pp. 179–197. Hanski, I. & Y. Cambefort (eds.). *Dung Beetle Ecology*. Princeton University Press, Princeton, NJ.
- Howden, H.F. & V.G. Nealis (1975).** Effects of clearing in a tropical rain forest on the composition of the coprophagous scarab beetle fauna (Coleoptera). *Biotropica* 7: 77–83.
- Jadhav, M.J. & R.M. Sharma (2012).** Insecta: Coleoptera: Scarabaeidae: Scarabaeid beetles. *Fauna of Maharashtra, State Fauna Series 20 (Part-2)*: 489–494.
- Janzen, D.H. (1983).** Insects at carrion and dung, pp. 640–642. Janzen, D.H. (ed.). *Costa Rican Natural History*. University of Chicago Press, Chicago, IL.
- Klein, B.C. (1989).** Effects of forest fragmentation on dung and carrion beetle communities in central Amazonia. *Ecology* 70: 1715–1725.
- Kuijten, P.J. (1983).** Revision of the genus *Hybosorus* Macleay (Coleoptera: Scarabaeidae, Hybosorinae). *Zoologische Verhandelingen* 201: 1–49.
- Kulkarni, N., K. Chandra, P.N. Wagh, K.C. Joshi & R.B. Singh (2007).** Incidence and management of white grub, *Schizonycha ruficollis* on seedlings of teak (*Tectona grandis* Linn. f.). *Insect science* 4(5): 411–418; <http://doi.org/10.1111/j.1744-7917.2007.00168.x>
- Krikken, J. (2013).** Oriental Bolboceras: introduction to the genus and taxonomy of the nigricans group of species (Coleoptera: Geotrupidae: Bolboceratinae). *Tijdschrift voor Entomologie* 156: 35–56; <http://doi.org/10.1163/22119434-00002018>
- Lobl, I. & I. Smetana (2006).** Catalogue of Palaearctic Coleoptera. Apollo Books, Stenstrup, 690pp.
- Nealis, V.G. (1977).** Habitat associations and community analysis of south Texas dung beetles (Coleoptera: Scarabaeinae). *Canadian Journal of Zoology* 55: 138–147.
- Nummelin, M. & I. Hanski (1989).** Dung beetles of the Kibale Forest, Uganda: comparison between virgin and managed forests. *Journal of Tropical Ecology* 5: 349–352.
- Priyadarsanan, D.R. (2006).** Insecta: Coleoptera: Scarabaeoidea: Scarabaeidae (Dung Beetles), pp. 91–135. Thirumalai, G. & E. Krishnan (eds.). *Fauna of Biligiri Rangaswamy Temple Wildlife Sanctuary, Conservation Area Series 27*. Zoological Survey of India, 263pp.
- Ratcliffe, B.C. (2002).** A checklist of the Scarabaeoidea (Coleoptera) of Panama. *Zootaxa* 32: 1–48.
- Sathiandran, N., S.K. Thomas & A.T. Flemming (2015).** An illustrated checklist of dung beetles (Coleoptera: Scarabaeinae) from the Periyar Tiger Reserve, Kerala, India. *Journal of Threatened Taxa* 7(15): 8250–8258 <http://doi.org/10.11609/jott.2466.7.15.8250-8258>
- Smith, A.B.T. (2006).** A review of the family-group names for the superfamily Scarabaeoidea with corrections to nomenclature and a current classification. *Coleopterists Society Monograph* 5: 144–204.
- Sreedevi, K., S. Tyagi & V. Sharma (2017).** Species diversity of white grubs (Coleoptera: Scarabaeidae) in the sub-Himalayan and northern plains of India. *Current Science* 113(2): 322–329; <http://doi.org/10.18520/cs/v113/i02/322-329>
- Veenakumari, K. & G.K. Veeresh (1997).** Dung beetle (Coleoptera: Scarabaeidae: Scarabaeinae) fauna of Bangalore, Karnataka. *Journal of the Bombay Natural History Society* 94(1): 171–173.





## OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at [www.threatenedtaxa.org](http://www.threatenedtaxa.org). All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](#) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

February 2018 | Vol. 10 | No. 2 | Pages: 11245–11360

Date of Publication: 26 February 2018 (Online & Print)

DOI: 10.11609/jott.2018.10.2.11245-11360

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

### Communications

#### Observations of occurrence and daily activity patterns of ungulates in the Endau Rompin Landscape, peninsular Malaysia

-- Win Sim Tan, Norazmi bin Amir Hamzah, Salman Saaban, Nurul Aida Zawakhir, Yugees Rao, Norolhuda Jamaluddin, Francis Cheong, Norhidayati binti Khalid, Nur Iadiyah Mohd Saat, Eka Nadia binti Zaidee Ee, Azwan bin Hamdan, Mei Mei Chow, Chee Pheng Low, Mufeng Voon, Song Horng Liang, Martin Tyson & Melvin Gumal, Pp. 11245–11253

#### Records of the Indian Pangolin (Mammalia: Pholidota: Manidae: *Manis crassicaudata*) from Mansehra District, Pakistan

-- Tariq Mahmood, Konish Kanwal & Iftikhar-Uz-Zaman, Pp. 11254–11261

#### Rapid assessment of sacred groves: a biodiversity assessment tool for ground level practitioners

-- Shivam Trivedi, Erach Bharucha & Rahul Mungikar, Pp. 11262–11270

#### Vascular plant assemblage of cliffs in northern Western Ghats, India

-- Mandar N. Datar & Aparna V. Watve, Pp. 11271–11284

### Short Communications

#### Hunted species and hunting equipment used by rainforest poachers in Ghana

-- Edward Debrah Wiafe, Pp. 11285–11289

#### Status and conservation issues of wetland birds in Komaranahalli Lake, Davanagere District, Karnataka, India

-- M.N. Harisha & B.B. Hosetti, Pp. 11290–11294

#### An annotated checklist of the herpetofauna of the Rashtrapati Bhawan Estates, New Delhi, India

-- Vishal Kumar Prasad, Anjali Verma & Ghazala Shahabuddin, Pp. 11295–11302

#### Records of new larval host plants of some common butterflies of Bangladesh

-- Tahsinur Rahman Shihan, Pp. 11303–11311

#### Two new reports of thrips (Thysanoptera: Thripidae) from India

-- R.R. Rachana & R. Varatharajan, Pp. 11312–11315

#### A preliminary study on the dung beetles of the northern Western Ghats, Maharashtra, India

-- Aparna Sureshchandra Kalawate, Pp. 11316–11331



### A taxonomic study on trachypenaeid prawns with special reference to Indian records

-- Angsuman Chanda, Pp. 11332–11338

### Pollination ecology of *Merremia tridentata* (L.) Hallier f. (Convolvulaceae)

-- G. Lakshminarayana & A.J. Solomon Raju, Pp. 11339–11347

### Notes

#### A record of Blue Posy *Drupadia scaeva cyara* (Hewitson, 1878) (Lycaenidae: Theclinae: Theclini) from Dibang Valley, Arunachal Pradesh, India

-- Gaurab Nandi Das, Subrata Gayen & Rohit Kumar Jaiswal, Pp. 11348–11350

#### Conserving the newly recorded Hill Areca Nut Palm *Bentinckia condapanna* Berry ex Roxb (Arecaceae) population outside the natural forest as wildlife corridor

-- M. Divin Murukesh & Ajith Ashokan, Pp. 11351–11353

#### First report of rust fungi *Puccinia duthiae* on *Dichanthium foveolatum* from India

-- S.D. Pawar, S.V. Thite, A.S. Kadam & B.A. Kore, Pp. 11354–11355

### Response & Reply

#### Non-Inverse J - shaped population distribution: Peculiarity of Red Sanders forests

-- S. Suresh Ramanan & T.K. Kunhamu, Pp. 11356–11357

#### Reply to Response: Non-Inverse J - shaped population distribution

-- Chenchu Ankalaiah, Thondaladinne Mastan & Mullangi Sridhar Reddy, Pp. 11357–11358

### Book Review

#### Addition to the Documentation of Lepidoptera Fauna of Himalaya

-

#### A Book review of "Butterflies of Uttarakhand"

-- K.A. Subramanian, Pp. 11359–11360

### Miscellaneous

#### National Biodiversity Authority