NOTE

SOME NEW RECORDS OF SCARAB BEETLES OF THE GENUS
*Onthophagus Latreille, 1802* (Coleoptera: Scarabaeidae) FROM
NORTHERN WESTERN GHATS, MAHARASHTRA, WITH A CHECKLIST

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Some new records of scarab beetles of the genus *Onthophagus* Latreille, 1802 (Coleoptera: Scarabaeidae) from northern Western Ghats, Maharashtra, with a checklist

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Latreille in 1802 established the genus *Onthophagus*. It belongs to the tribe Onthophagini of the subfamily Scarabaeinae, and family Scarabaeidae. It is comprised of nearly 2,200 described species (Schoolmeesters 2016) from the world, making it a very diverse genus in the subfamily representing almost 38% of the Scarabaeinae beetles (Rossini et al. 2018) with cosmopolitan distribution (Tarasov & Kabakov 2010). Approximately, 182 species have been reported from Indian mainland (Arrow 1931; Balthasar 1963; Löbl & Smetana 2006; Sathiandran & Sabu 2012). From Maharashtra, nearly 25 species are reported by Arrow (1931) and Jadhav & Sharma (2012).

Beetles from Scarabaeinae are being considered as important biological indicators due to their higher sensitivity to the changing climatic conditions (Rossini et al. 2018). Beetles of the genus *Onthophagus* are coprophagous and some are scavengers (carrion feeders). The main food source of these beetles is the faeces of animals, which they partially decompose (Fischer 2006), and helps in increasing the nutrient content, texture and structure of soil. They are paracoprid nesters (tunnelers) with biparental care, an important phenomenon of the genus *Onthophagus*, wherein the female digs branched tunnel with a brood chamber under the dung pat and males move the portion of dung to the entrance of these tunnels and then, female makes pieces, put it in the brood chamber and lay one egg in each chamber (Sowig 1996).

The Western Ghats is one of the important biodiversity hotspots of the world (Myers 2003), with high level of endemism and species richness. The northern Western Ghats ecoregion is dominated with drier dipterocarp (Sabu et al. 2011), harbouring a vast diverse fauna along with endemic species. The Oriental *Onthophagus* fauna is inadequately studied (Tarasov & Kabakov 2010). Also, Tarasov & Kabakov (2010) and Sathiandran & Sabu (2012) stated that the taxonomic
errors from the Indian subcontinent are high for this genus. Moreover, the major documents like Arrow (1931) and Balthasar (1963) reporting this genus from this region are outdated (Sathiandran & Sabu 2012). Therefore, documenting diversity of this highly diverse genus will play an important role in removing the confusions and errors.

The dung beetle fauna of southern Western Ghats is very well documented (Arrow 1931; Balthasar 1963, 1974; Vinod & Sabu 2007, Sabu et al. 2011; Sathiandran & Sabu 2012; Sathiandran et al. 2015; Latha and Sabu, 2018). Sabu et al. (2011) recorded about 78 species of Onthophagus from moist southern Western Ghats. Of these recorded species, 19 are endemic to the entire Western Ghats, 12 are regional endemics to southern Western Ghats and a single species is a local endemic to the tropical montane cloud forest. On the contrary, very few or scattered publications are available on the diversity of dung beetle fauna from northern Western Ghats, Maharashtra (Arrow 1931; Balthasar 1963, 1974; Jadhav & Sharma 2012; Kalawate 2018). Hence, in the present study, an attempt has been made to prepare an updated checklist of the genus Onthophagus based on the collections from recent surveys, unidentified collections present at ZSI, WRC, Pune and also from the literature (Arrow 1931; Balthasar 1963, 1974; Jadhav & Sharma 2012; Kalawate 2018).

Specimens were collected from different parts of the northern Western Ghats, Maharashtra. They were collected by installing light traps using 160-Watt mercury bulb as a light source as they are attracted to the light in night. Some of the beetles were hand-picked from the dung pats present in the field in day during the field surveys in the northern Western Ghats, Maharashtra. The collected beetles were euthanized by ethyl acetate vapours and brought to the laboratory for further studies. The specimens were relaxed, pinned and stored in the fumigated entomological boxes for further examination. They were examined under Leica EZ4E® with in-built photographic facility. The male genitalia were dissected wherever necessary by carefully removing it from the abdomen. After removal, it was further boiled in 10% KOH for 5–10 minutes to remove the adhered tissues and soft muscles and then rinsed in distilled water. The genitalia were stored in separate vials containing 70% ethanol with same catalogue number as the specimen. The map of the collection locality has been prepared using QGIS software. The beetles were determined as per the available literature viz., Arrow (1931) and Balthasar (1963) and the classification followed is as per Arrow (1931) and Balthasar (1963) with modifications as per Lobl & Smetana (2006). The distribution of the species provided here are taken from Arrow (1931), Balthasar (1963), Chandra & Gupta (2011, 2013), Sabu et al. (2011), and Sathiandran et al. (2015). The checklist of the genus Onthophagus from Maharashtra including northern Western Ghats (Maharashtra) based on the collections from the recent surveys, unidentified collections from ZSI, WRC, Pune and also from the literature, with the record of endemic beetles has been provided.

A total of 36 species in eight subgenera of Onthophagus have been reported based on the recent collection (*) and reports from available literature. Of the recorded species, O. (Onthophagus) madoqua Arrow, 1931 and O. (Gibbonthophagus) duporti Boucomont, 1914 are new records for Maharashtra and northern Western Ghats. The details of new recorded species like material examined, distribution, description, genitalial features, images of adult habitus and genitalia are also given in this paper. Among the studied species, two endemic species namely O. (O) madoqua Arrow, 1931 and O. coeruleicollis Arrow, 1907 are recorded. A checklist of the species from Maharashtra is presented in Table 1. Image 1 represents the new recorded species along with their genitalial figures. The map of collection locality of the recorded species and the new reported species are given in Figures 1 and 2.

As stated earlier, a few literatures are available on this genus from Maharashtra; 21 and 25 species of Onthophagus have been reported from Vidarbha region of Maharashtra by Khadakkar et al. (2018) and entire Maharashtra by Arrow (1931) and Jadhav & Sharma (2012), respectively. Chandra & Gupta (2012) enlisted 34 species under six subgenera of Onthophagus from Madhya Pradesh. This study resulted into enumeration of 36 species under eight subgenera from the genus Onthophagus from the studied area (Table 2).

**Genus Onthophagus Latreille, 1802**

*Onthophagus* Latreille, 1802; Hist. Nat. Crust. Et. Ins. 3: 141.

*Onthophagus*, Arrow, 1931; Fauna of British India including Ceylon and Burma (Coleoptera: Lamellicornia: Coprinae) 3: 159–162.

Type species: *Scarabaeus taurus* Schreber, 1759

1. *Onthophagus* (*Onthophagus*) *madoqua* Arrow, 1931 (Image 1 A–B)

*Onthophagus madoqua* Arrow, 1931; Fauna of British India including Ceylon and Burma (Coleoptera: Lamellicornia: Coprinae), 3 : 258–259.
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Figure 1. Collection locality of *Onthophagus* from northern Western Ghats, Maharashtra.

Figure 2. Collection locality of *O. madoqua* and *O. duporti*.
### Table 1. The checklist of the genus *Onthophagus* Latreille, 1802 from Maharashtra including northern Western Ghats, with distribution and endemic record.

| Order COLEOPTERA Linnaeus, 1758 | Suborder POLYPHAGA Emery, 1886 | Superfamily SCARABAEIOIDEA Latreille, 1802 | Family SCARABAEIDAE Latreille, 1802 | Subfamily: SCARABAEOIDEA Latreille, 1802 | Tribe ONTHOPHAGINI Burmeister, 1846 |
|---------------------------------|---------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|--------------------------------------|
| **Genus Onthophagus** Latreille, 1802 | **Location** | **Reference** | **Remark** |
| **Subgenus Onthophagus** Latreille, 1802 | | | |
| O. unifasciatus (Schaller, 1783) * | BSI, Pune; Gaganbawada | Thakare et al. 2012 | Responsible for Scarabiasis in young children |
| O. abreui Arrow, 1931 | ZSI, BSI, Charholi, Pune | Jadhav & Sharma 2012 | |
| O. fasciatus Boucomont, 1914 | BSI, Pune | Jadhav & Sharma 2012 | New record for Northern Western Ghats, Maharashtra. Endemic to India. |
| O. madoque Arrow, 1931* | ZSI, Pune | Jadhav & Sharma 2012 | |
| O. cervus (Fabricius, 1798) * | ZSI, BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| O. ludio Boucomont, 1914* | ZSI, Pune | Jadhav & Sharma 2012 | |
| O. quadridentatus (Fabricius, 1798) * | ZSI, Pune | Jadhav & Sharma 2012 | |
| O. turbotus Walker, 1858* | Tamhini Ghat | Jadhav & Sharma 2012 | |
| O. orientalis Harold, 1868 | Satara; Karjat; Gaganbawada; BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| O. spinifex (Fabricius, 1798) | Satara; Karjat; Gaganbawada; BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| O. inquitius Boucomont, 1914 | Satara; Karjat; Gaganbawada; BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| O. centricornis (Fabricius, 1798) | Satara; Karjat; Gaganbawada; BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| O. griseosetosus Arrow, 1931 | Charoloi; BSI, Pune | Jadhav & Sharma 2012 | |
| O. abacus Boucomont, 1921 | Charoloi; BSI, Pune | Jadhav & Sharma 2012 | |
| O. malabarensis Boucomont, 1919 | Charoloi; BSI, Pune | Jadhav & Sharma 2012 | |
| **Subgenus Trichonthophagus** Zunino, 1979 | | | |
| O. tarandus Fabricius, 1792 | Satara; Karjat; Gaganbawada; BSI, Tamhini Ghat, Pune | Jadhav & Sharma 2012 | |
| **Subgenus Calobonthophagus** Balthasar, 1935 | | | |
| O. armatus Blanchard, 1853* | Tamhini Ghat | Jadhav & Sharma 2012 | |
| O. oenescen (Wiedemann, 1823) | Tamhini Ghat | Jadhav & Sharma 2012 | |
| O. ramosus (Wiedemann, 1823) | Tamhini Ghat | Jadhav & Sharma 2012 | |
| O. ramosellus (Bates, 1891) | Tamhini Ghat | Jadhav & Sharma 2012 | |
| **Subgenus Micronthophagus** Balthasar, 1963 | | | |
| O. guolo Arrow, 1931 | Tamhini Ghat | Jadhav & Sharma 2012 | |
| **Subgenus Gibbonthophagus** Balthasar, 1963 | | | |
| O. duporti Boucomont, 1914* | BSI, Pune | Jadhav & Sharma 2012 | |
| **Subgenus Eremonthophagus** Zunino, 1979 | | | |
| O. semicincinus Dorbigny, 1897 | Arrow 1931 | Jadhav & Sharma 2012 | |
| **Subgenus Proagoderus** van Lansberge, 1883 | | | |
| O. pactolus (Fabricius, 1787) | Arrow 1931 | Jadhav & Sharma 2012 | |
| **Species incertae sedis** | | | |
| O. coeruleicoloris Arrow, 1907 | Arrow 1931 | Jadhav & Sharma 2012 | |

Species incertae sedis
**Onthophagus (Onthophagus) madoqua**. Balthasar, 1963; Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region (Coleoptera: Lamellicornia), 2: 426.

Specimen examined: ZSI-WRC, ENT-1/3234, 06.xi.2017, 07 ex., Charholi, Pune, Maharashtra, (18.653°N, 73.907°E), coll. A.S. Kalawate; ZSI-WRC, ENT-1/3240, 23.viii.2018, 06 ex., ZSI, WRC, Pune, Maharashtra (18.6482°N & 73.760°E, 580m), coll. B. Mukhopadhyay; ZSI-WRC, ENT-1/3251, 27.viii.2018, 01 ex., BSI, WRC, Pune, Maharashtra (18.540°N & 73.885°E, elevation 556m), coll. B. Mukhopadhyay; ZSI-WRC, ENT-1/3257, 27.viii.2018, 11 ex., ZSI, WRC, Pune, Maharashtra (18.6482°N & 73.760°E, 580m), coll. B. Mukhopadhyay; ZSI-WRC, ENT-1/3265, 28.viii.2018, 12 ex., ZSI, WRC, Pune, Maharashtra (18.6480°N & 73.7600E, 580m), coll. B. Mukhopadhyay.

Description (Image 1A): Length, 4–5 mm., breadth, 3mm. Black, shining, oval and convex. Head coarcted, short and broad; clypeus smooth in front, with its margin strongly reflexed; forehead separated by curved carina; a pair of quite separate, straight, erect and parallel horns at vertex. Pronotum deep golden-green, smooth in front, slopes steeply but not abruptly. Elytra decorated, red patch on each elytron at shoulder and hind margin. Upper surface clothed with erect pale setae.

Male genitalia (Image 1B): Phallobase is almost same in length as parameres, gently curved in laterally view. Parameres funnel shaped, broad at base, minutely constricted in the middle, strongly bent downward, acuminating, tips rounded. Maximum Length, about 1.39mm; maximum width, about 0.504mm.

Known distribution until this study: India (Gujarat, Karnataka, Rajasthan, Tamil Nadu).

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**2. Onthophagus (Gibbonthophagus) duporti**

*Boucomont, 1914 (Image 1–D)*

*Onthophagus duporti* Boucomont, 1914; Annali del Museo civico di storia naturale di Genova, XLVI: 228.

**Onthophagus (Gibbonthophagus) duporti**

Sathiandran et al. 2015; Journal of Threatened Taxa 7(15): 8250–8258.

Specimen examined: ZSI-WRC, ENT-1/3264, 27.viii.2018, 01 ex., ZSI, WRC, Pune, Maharashtra (18.6480°N & 73.760°E, 580m), coll. B. Mukhopadhyay.

Description (Image 1 C): Length, 7mm., width, 4mm. Dark brown, smooth and shining, oval and convex. Clypeus feebly produced, front margin rounded and strongly reflexed, separated from forehead by a short transverse carina. Near inner margin of each eye, a short, erect, blunt, conical horn present. Pronotum with three small tubercle, one just behind the front margin in the middle and a pair positioned between the front and hind margins, the space between these tubercles slightly depressed but not smooth. Elytra testaceous-yellow, with brown-black bands at the inner and outer margins, which usually more or less fused together in the middle line. The pygidium and the femora are yellow,
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Image 1. Onthophagus [Onthophagus] madoqua Arrow, 1931: A—adult | B—genitalia | Onthophagus [Gibbonthophagus] dupoirt Boucomont, 1914: C—adult | D—genitalia. Scale bar = 2mm (A & C); 0.5mm (B & D).

with minute setae.

Male genitalia (Image 1 D): Phallobase larger than the parameres, broader and tubular. Parameres roughly triangular, broad at the base, acuminating towards the tip, rounded tip, curved ventrally. Maximum length, about 2.01 mm; maximum width, about 0.967mm.

Known distribution until this study: India (Arunachal Pradesh, Bihar, Karnataka, Tamil Nadu (Nilgiri Hills), Kerala, West Bengal), China, Indo-China, Laos, Myanmar, Thailand, Tonkin, Vietnam.

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