

ORIGINAL ARTICLE

Scarabaeinae (Coleoptera: Scarabaeidae) from Hong Kong

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Abstract Scarabaeinae is a globally distributed coprophagous coleopteran group with southeast Asia and Africa as the key areas of distribution. Located in the southern part of China, Hong Kong has subtropical climate and diverse habitats supporting a high diversity of scarabaeines. This paper gives a detailed review on Scarabaeinae from Hong Kong, including the new records to Hong Kong, photographic records of type specimens from Hong Kong, and identification keys to genera and species. A total of 13 genera and 51 species of scarabaeines were recorded in Hong Kong. Among them, 14 species were new records to Hong Kong found in the authors' recent surveys, viz. *Caccobius* (*Caccophilus*) *brevis* Waterhouse, 1875, *Copris* (*s. str.*) *punctatus* Gillet, 1910, *C. (s. str.) szechouanicus* Balthasar, 1958, *Microcopris propinquus* Felsche, 1910, *Onitis excavatus* Arrow, 1931, *Oni. intermedius* Frivaldszky, 1892, *Oni. subopacus* Arrow, 1931, *Onthophagus brutus* Arrow, 1931, *Ont. tricolor* Boucomont, 1914, *Ont. (Matashia) lenzi* Harold, 1874, *Ont. (s. str.) roubali* Balthasar, 1935, *Ont. (Parascatonomus) horni* Balthasar, 1935, *Scarabaeus (Kheper) erichsoni* Harold, 1867 and *Sisyphus (s. str.) indicus* Hope, 1831. *Onthophagus (Paraphanaeomorphus) trituber jacobsoni* Kabakov, 2006 was found to be a new synonym of the nominate subspecies. *Catharsius davidis* Deyrolle & Fairmaire, 1878 and *Copris davidis* (Deyrolle & Fairmaire, 1878) were found to be the new synonyms of *Catharsius molossus* (Linnaeus, 1758). Hong Kong was also the only locality where *Liatongus pugionatus* and *Onthophagus convexicollis* were recorded over the world.

Key words Biodiversity, dung beetle, scarabaeines, systematics, type locality, type specimen.

1 Introduction

Scarabaeinae (Coleoptera: Scarabaeidae) is a globally distributed coprophagous coleopteran group. This subfamily was established by Latreille (1802) with *Scarabaeus* Linnaeus, 1758 as the type genus. To date, 235 genera and 5700 species of this subfamily are known to the world with southeast Asia and Africa as the key areas of distribution (Bai, M. 2008. Ph.D. Thesis, The Chinese Academy of Sciences, Beijing). Located in the southern part of China, Hong Kong (22°08'–22°35'N, 113°49'–114°31'E) has a subtropical climate and diverse habitats supporting a high diversity of scarabaeines (Aston, 2008a–d). A detailed review on Scarabaeinae from Hong Kong, including the new records to Hong Kong, photographic records of type specimens from Hong Kong deposited in museums of different countries, and identification keys to genera and species, is given in this paper.

2 Materials and methods

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As a preliminary to field surveys, literature was searched and reviewed for reference on scarabaeines described or cited from Hong Kong. Field surveys for species of Scarabaeinae, as well as other coprophagous scarabs, were conducted in Hong Kong by the authors between 2010 and 2017. In addition to active search, pitfall, flight interception and Malaise traps were also used to survey the scarabs. The specimens examined in this paper were assembled through the authors' collections and loans from different museums. Depositories of all specimens examined were as follows:

AFCD—Agriculture, Fisheries and Conservation Department, Hong Kong SAR, China;
 ANLW—Amt Der Niederosterreichischen Landsregierung, Wien (Vienna), Austria;
 BMNH—The Natural History Museum, London, United Kingdom;
 HNHM—Hungarian Natural History Museum, Budapest, Hungary;
 ISNB—Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;
 IZAS—Institute of Zoology, Chinese Academy of Sciences, Beijing, China;
 LSLC—Linnean Society of London, Linnaean Collections, London, United Kingdom;
 MCSN—Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy;
 MNHN—Museum National d’Histoire Naturelle, Paris, France;
 NHRS—Naturhistoriska riksmuseet, Stockholm, Sweden;
 NMPC—National Museum (Natural History), The Department of Entomology, Prague, Czech Republic;
 NMW—Naturhistorisches Museum Wien, Wien, Austria;
 NSMT—The National Science Museum, NSZ Collection, Tokyo, Japan;
 SMTD—Staatliches Museum fur Tierkunde, Dresden, Germany;
 TOCO—Personal Collection of Mr. Teruo Ochi (Kohudai 5-21-6, Toyono-cho, Toyono-gun, 563-0104), Osaka, Japan;
 UMO—University Museum, Hope Entomological Collections, Oxford, United Kingdom;
 UZIU—Uppsala University, Uppsala, Sweden;
 ZIN—Russian Academy of Sciences, Zoological Institute, St. Petersburg, Russia;
 ZMUC—University of Copenhagen, Zoological Museum, Kobenhavn [= Copenhagen], Denmark;
 ZMUH—Universitat von Hamburg, Zoologisches Institut und Zoologisches Museum, Hamburg, Germany;
 ZMUM—Moscow State University, Moscow, Russia.

Photographs of the specimens were taken with digital cameras (Canon EOS 7D, EF 100MM F/2.8 and MP-E 65MM F/2.8 1-5X; and Canon 5D Mark III, MP-E 65MM F/2.8 1-5X) fitted to macro rail (Cognisys). The images were processed by software Helicon Focus 5.1®, followed by Adobe Photoshop CS5® and Adobe Illustrator CS5® for labeling and arrangement in plates. The base maps used were surveyed and produced by Lands Department, Hong Kong SAR Government.

3 Results

3.1 Records of Scarabaeinae from Hong Kong

A total of 13 genera and 51 species of scarabaeines were recorded in Hong Kong from literature and the recent surveys conducted by the authors (Table 1). Amongst them, 14 species were new records to Hong Kong, viz. *Caccobius* (*Caccophilus*) *brevis* Waterhouse, 1875, *Copris* (*s. str.*) *punctatus* Gillet, 1910, *Copris* (*s. str.*) *szechouanicus* Balthasar, 1958, *Microcopris propinquus* Felsche, 1910, *Onitis excavatus* Arrow, 1931, *Onitis subopacus* Arrow, 1931, *Onitis intermedius* Frivaldszky, 1892, *Onthophagus brutus* Arrow, 1931, *Onthophagus tricolor* Boucomont, 1914, *Onthophagus* (*Matashia*) *lenzi* Harold, 1874, *Onthophagus* (*s. str.*) *roubali* Balthasar, 1935, *Onthophagus* (*Parascatonomus*) *horni* Balthasar, 1935, *Scarabaeus* (*Kheper*) *erichsoni* Harold, 1867 and *Sisyphus* (*s. str.*) *indicus* Hope, 1831 (Figs 1–11). Besides, *Onthophagus* (*Paraphanaeomorphus*) *trituber jacobsoni* Kabakov, 2006 was found to be a new synonym of *Onthophagus* (*Paraphanaeomorphus*) *trituber trituber* Wiedemann, 1823. *Catharsius davidis* Deyrolle & Fairmaire, 1878 and *Copris davidis* (Deyrolle & Fairmaire, 1878) were found to be the new synonyms of *Catharsius molossus* (Linnaeus, 1758).

Hong Kong was also the type locality of 11 scarabaeines, including *Liatongus pugionatus* Boheman, 1858, *Liatongus vertagus* Fabricius, 1798, *Onthophagus* (*Colobonthophagus*) *lunatus* Harold, 1868, *Onthophagus convexicollis* Boheman, 1858, *Onthophagus* (*Gibbonthophagus*) *luridipennis* Boheman, 1858, *Onthophagus* (*Gibbonthophagus*) *proletarius* Harold, 1875, *Onthophagus* (*Gibbonthophagus*) *taurinus* White, 1844, *Onthophagus orientalis* Harold, 1868, *Onthophagus* (*Paraphanaeomorphus*) *trituber* Wiedemann, 1823, *Sisyphus* (*Neosisyphus*) *bowringi* White, 1844 and *Tibiodrepanus sinicus* Harold, 1868.



Figures 1–11. Scarabaeinae spp., new record to HK, dorsal view. 1. *Copris* (*s. str.*) *punctatus* Gillet, 1910. 2. *Copris* (*s. str.*) *szechouanicus* Balthasar, 1958. 3. *Microcopris propinquus* Felsche, 1910. 4. *Onitis excavatus* Arrow, 1931. 5. *Onitis intermedius* Frivaldszky, 1892. 6. *Onitis subopacus* Arrow, 1931. 7. *Caccobius* (*Caccophilus*) *brevis* Waterhouse, 1875. 8. *Onthophagus* (*s. str.*) *roubali* Balthasar, 1935. 9. *Onthophagus* (*Matashia*) *lenzi* Harold, 1874. 10. *Onthophagus brutus* Arrow, 1931. 11. *Onthophagus tricolor* Boucomont, 1914. Scale bars: 1–6=1 cm; 7=0.2 cm; 8–11=0.5 cm.

Table 1. List of Scarabaeinae species recorded in Hong Kong.

Species	Bibliography
Tribe Coprini Leach, 1815	
<i>Catharsius molossus</i> Linnaeus, 1758	Yiu (2006)
<i>Copris</i> (<i>s. str.</i>) <i>confucius</i> Harold, 1877	Aston & Yiu (2008d)
<i>Copris</i> (<i>s. str.</i>) <i>punctatus</i> Gillet, 1910 ¹	Present work
<i>Copris</i> (<i>s. str.</i>) <i>sinicus</i> Hope, 1842	Yiu & Yip (2011)
<i>Copris</i> (<i>s. str.</i>) <i>szechouanicus</i> Balthasar, 1958 ¹	Present work
<i>Copris</i> (<i>s. str.</i>) <i>tripartitus</i> Waterhouse, 1875	Aston & Yiu (2008d)
<i>Copris</i> (<i>Sinocopris</i>) <i>ochus</i> Motschulsky, 1860	Aston & Yiu (2008d)
<i>Microcopris propinquus</i> Felsche, 1910 ¹	Present work
<i>Microcopris reflexus</i> Fabricius, 1787	Aston & Yiu (2008d)
<i>Paracopris cariniceps</i> Felsche, 1910	Aston & Yiu (2008d)
Tribe Gymnopleurini Lacordaire, 1856	
<i>Paragymnopleurus melanarius</i> Harold, 1867	Aston & Yiu (2008d)
Tribe Oniticellini Kolbe, 1905	
<i>Liatongus pugionatus</i> Boheman, 1858 ^{2,3}	Aston & Yiu (2008a)
<i>Liatongus vertagus</i> Fabricius, 1798 ²	Aston & Yiu (2008d)
<i>Oniticellus cinctus</i> Fabricius, 1775	Aston & Yiu (2008d)
<i>Tibiodrepanus sinicus</i> Harold, 1868 ²	Aston & Yiu (2008d)
Tribe Ontini Laporte, 1840	
<i>Onitis excavatus</i> Arrow, 1931 ¹	Present work
<i>Onitis falcatus</i> Wulfren, 1786	Aston & Yiu (2008d)
<i>Onitis intermedius</i> Frivaldszky, 1892 ¹	Present work
<i>Onitis subopacus</i> Arrow, 1931 ¹	Present work
Tribe Onthophagini Burmeister, 1846	
<i>Caccobius</i> (<i>Caccophilus</i>) <i>brevis</i> Waterhouse, 1875 ¹	Present work
<i>Caccobius</i> (<i>Caccophilus</i>) <i>unicornis</i> Fabricius, 1798	Aston & Yiu (2008d)
<i>Onthophagus</i> (<i>s. str.</i>) <i>hastifer</i> Lansberge, 1885	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>s. str.</i>) <i>roubali</i> Balthasar, 1935 ¹	Present work
<i>Onthophagus</i> (<i>Colobonthophagus</i>) <i>armatus</i> Blanchard, 1853	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Colobonthophagus</i>) <i>lunatus</i> Harold, 1868 ²	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Colobonthophagus</i>) <i>tragus</i> Fabricius, 1792	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Furconthophagus</i>) <i>dapcauensis</i> Boucomont, 1921	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Gibbonthophagus</i>) <i>luridipennis</i> Boheman, 1858 ²	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Gibbonthophagus</i>) <i>proletarius</i> Harold, 1875 ²	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Gibbonthophagus</i>) <i>rectecornutus</i> Lansberge, 1883	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Gibbonthophagus</i>) <i>taurinus</i> White, 1844 ²	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Matashia</i>) <i>lenzi</i> Harold, 1874 ¹	Present work
<i>Onthophagus</i> (<i>Paraphanaeomorphus</i>) <i>argyropygus</i> Gillet, 1927	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Paraphanaeomorphus</i>) <i>trituber</i> Wiedemann, 1823 ²	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Parascatonomus</i>) <i>anguicorius</i> Boucomont, 1914	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Parascatonomus</i>) <i>horni</i> Balthasar, 1935 ¹	Present work
<i>Onthophagus</i> (<i>Parascatonomus</i>) <i>miyakei</i> Ochi & Araya, 1992	Yiu & Yip (2011)
<i>Onthophagus</i> (<i>Parascatonomus</i>) <i>nitidus</i> Waterhouse, 1875	Aston & Yiu (2008b)
<i>Onthophagus</i> (<i>Parascatonomus</i>) <i>tricornis</i> Wiedemann 1823	Yiu <i>et al.</i> (2014)
<i>Onthophagus</i> (<i>Serrophorus</i>) <i>sagittarius</i> Fabricius, 1775	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Serrophorus</i>) <i>senex</i> Boucomont, 1914	Aston & Yiu (2008c)
<i>Onthophagus</i> (<i>Serrophorus</i>) <i>seniculus</i> Fabricius, 1781	Aston & Yiu (2008c)

Table 1 (continued)

Species	Bibliography
<i>Onthophagus brutus</i> Arrow, 1931 ¹	Present work
<i>Onthophagus convexicollis</i> Boheman, 1858 ^{2, 3}	Aston & Yiu (2008a)
<i>Onthophagus coracinus</i> Boucomont, 1914	Aston & Yiu (2008c)
<i>Onthophagus orientalis</i> Harold, 1868 ²	Aston & Yiu (2008c)
<i>Onthophagus tricolor</i> Boucomont, 1914 ¹	Present work
<i>Onthophagus tritinctus</i> Boucomont, 1914	Aston & Yiu (2008b)
Tribe Scarabaeini Latreille, 1802	
<i>Scarabaeus (Kheper) erichsoni</i> Harold, 1867 ¹	Present work
Tribe Sisyphini Mulsant, 1842	
<i>Sisyphus (Neosisphus) bowringi</i> White, 1844 ²	Aston & Yiu (2008d)
<i>Sisyphus (s. str.) indicus</i> Hope, 1831 ¹	Present work

¹Newly recorded in the authors' recent surveys

²Hong Kong as the type locality

³Recorded only in Hong Kong

3.2 Systematics

Order Coleoptera Linnaeus, 1758

Superfamily Scarabaeoidea Latreille, 1802

Family Scarabaeidae Latreille, 1802

Subfamily Scarabaeinae Latreille, 1802

Scarabaeides Latreille, 1802, *Hist. Nat. Gen. Part. Crust. Ins.*, 3: 144 (Type genus: *Scarabaeus* Linnaeus, 1758).

Description. Body size small to large (1.5–68.0 mm in length); body shape round to oval, mostly robust and convex, though some flattened; body colour black to brown, some with patchy colouration, a few with metallic sheen. Clypeus expanded and fused with the prominences on head, covering the mouthparts. Antenna has 8 or 9 segments, with antennal club consists of 3 segments. Pronotum broad, some with tubercles or carinae. Scutellum hidden in most genera. Elytron often with 7 or 8 striae. Pygidium exposed as a distinctive feature of this subfamily. Abdominal spiracles on pleural membrane, covered by elytra. Middle coxae widely separated. Sexual dimorphism common.

Remarks. Eleven tribes of Scarabaeinae were recorded worldwide, including 9 tribes from China and 7 tribes from Hong Kong.

Key to tribes of Scarabaeinae from Hong Kong.

- 1 Metafemurs strongly elongated, meso- and metatibiae slender, metatibiae often slightly curved, metatarsi weakly triangular with the first segment slightly longer; body flat and broadly oval, sexual dimorphism exists but not easily observable..... 2
 Metafemurs short and strong, meso- and metatibiae short and strongly broaden anteriorly; for Onitini, protibiae without spur; metatarsi almost triangular with the first segment obviously longer and stronger; body strongly convex in most cases, sexual dimorphism conspicuous..... 4
- 2 Mesocoxae slightly separated and oblique, sometimes very close; metasternum strongly narrow anteriorly; body mostly medium to large sized, broadly oval or narrow posteriorly 3
 Mesocoxae strongly separated and parallel; metasternum not strongly narrow anteriorly; body size small, rarely medium
 **Sisyphini**
- 3 Medium to small sized; protarsi visible, all tarsi with two claws; anterior clypeal margin weakly toothed, sometimes obtuse; antennal club brown or dark brown; elytral base curved inward; scutellum not observable..... **Gymnopleurini**
 Large sized; protarsi invisible, meso- and metatarsi short and small with one or two claw(s), but sometimes none; anterior clypeal margin strongly toothed; antennal club yellow; elytral base not curved inward; scutellum very small or not observable
 **Scarabaeini**
- 4 The second segment of labial palpus shorter than the first segment, the third segment always very long; sexual dimorphism conspicuous, head and pronotum with strong prominence, ridge or groove; elytra with one or two lateral carina(e)..... **Coprini**
 The second segment of labial palpus longer than the first segment, the third segment always very short, sometimes absent; sexual dimorphism exists, but not easily observable; elytra without lateral carina 5

- 5 Antenna has 8 segments; ventral side of pronotum without antennal groove; elytra flat **Oniticellini**
 Antenna has 9 segments; ventral side of pronotum with antennal groove; elytra convex 6
- 6 Pronotum with 2 depressions near the base; protarsi lacking in male or both genders; protibial spurs not movable, protibia often slender and curved in male; scutellum visible; body size medium, rarely large..... **Onitini**
 Pronotum without depression near the base; protarsi visible, protibial spurs movable, protibia not slender and curved; scutellum not observable; body size small, rarely medium **Onthophagini**

Tribe Coprini Leach, 1815

Coprides Leach, 1815, *Edinburgh Encyclopaedia*, 9(1): 96 (Type genus: *Copris* Geoffroy, 1762).

Coptodactylini Janssens, 1946, *Mém. Mus. R. Hist. Nat. Belg.*, 22: 13 (original spelling as Coptodactylides, type genus: *Coptodactyla* Burmeister, 1846).

Key to genera of Coprini from Hong Kong.

- 1 Elytra with 2 lateral carinae **Catharsius Hope, 1837**
 Elytra with 1 lateral carina 2
- 2 Small sized, moderately convex, black and shiny, sometimes with weak metallic sheen; sexual dimorphism weak; ventral side of pronotum with deep and marginated antennal groove..... **Microcopris Balthasar, 1958**
 Medium or moderately small sized, strongly convex or flat, shiny or not, without metallic sheen; sexual dimorphism conspicuous; ventral side of pronotum with shallow and non-marginated antennal groove 3
- 3 Body weakly convex, grey, brown or rarely black, not shiny; legs slender; meso- and metatarsi slightly curved; pronotum without horn, longitudinal groove lacking or very weak; outer margin of protibia with 4 teeth; clypeus smooth in the middle.....
 **Paracopris Balthasar, 1939**
 Body strongly convex, black and shiny; legs strong; pronotum with horn(s), longitudinal groove conspicuous; outer margin of protibia with 3 or 4 teeth; clypeus smooth in the middle or with punctures **Copris Geoffroy, 1762**

Genus *Catharsius* Hope, 1837

Catharsius Hope, 1837, *Coleopt. Manual*, 1: 21 (Type species: *Scarabaeus molossus* Linnaeus, 1758, desig. by Hope, 1837, deposited in LSLC).

Subg. *Metacatharsius* Paulian, 1939, *Rev. Fr. Ent.*, 6: 13.

3.2.1 *Catharsius molossus* (Linnaeus, 1758)

Scarabaeus molossus Linnaeus, 1758, *Syst. Nat. (ed. 10)*: 347 (LSLC).

Scarabaeus abbreviatus Herbst, 1789, *Nat. Kafer*, 2: 53, t.8, f.10; Gillet, 1911a, *Col. Catalog. Pars. 38, Scarabaeidae: Coprinae I: 69* (Syn.).

Scarabaeus herbiceus Herbst, 1789, *Nat. Kafer*, 2: 227, t.16, f.1.2; Gillet, 1911a, *Col. Catalog. Pars. 38, Scarabaeidae: Coprinae I: 69* (Syn.).

Catharsius janus Olivier, 1789, *Ent.*, 1(3): 101, t.26, f.227; Gillet, 1911a, *Col. Catalog. Pars. 38, Scarabaeidae: Coprinae I: 69* (Syn.).

Copris ursus Fabricius, 1801, *Syst. Eleuth.*, 1: 43; Castelnau, 1840, *Hist. Nat. Col.*, 2: 77 (Syn.).

Catharsius molossus: Harold, 1877, *Ann. Mus. Civ. Genova*, 10: 44.

Catharsius davidis Deyrolle & Fairmaire, 1878, *Ann. Soc. Ent. Fr.*, 8(5): 95. **Syn. nov.**

Catharsius timorensis Lansberge, 1879, *Com. Séa. Soc. Ent. Belg.*, 22: 148; Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 1: 307 (Syn.).

Catharsius dayacus Lansberge, 1886, *Tijdschr. Entom.*, 29: 6; Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 1: 307 (Syn.); Ochi & Kon, 1994, *Elytra*, 22(2): 283 (removal from Syn.).

Catharsius dubius Paulian, 1936, *Treubia*, 15: 396.

Catharsius borneensis Paulian, 1936, *Treubia*, 15: 396.

Catharsius kangeanus Paulian, 1936, *Treubia*, 15: 395; Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 1: 307 (Syn.).

Copris davidis: Kabakov & Shokhin, 2014, *Cau. Ent. Bull.*, 10(1): 48. **Syn. nov.**

Material examined. [AFCD] China, Hong Kong, Shing Mun, 1♂, 2009.X.7, coll. Y. M. Lee; Grassy Hill, 2♀, 2010.VI.14, coll. unknown; Kwai Chung, 2♂, 2010.VIII.20, coll. K.H. Cheung; Ng Tung Chai, 1♀, 2013.VI.7, coll. unknown; Wu Kau Tang, 1♂1♀, 2015.VI.16, coll. M.H. Leung & K.K. Leung; Tsui Hang, 1♀, 2015.VII.10, coll. T.H. Fung; Lai Chi Wo, 1♂, 2015.XI.19, coll. M.H. Leung; Grassy Hill, 1♂1♀, 2016.IV.27, coll. M.H. Leung; Wu Kau Tang, 1♀, 2016.VI.15, coll. T.H. Fung; Tai Lam, 1♂, 2016.XII.30, coll. K.C. Wong.

[IZAS] China, Beijing, Xiangshan, Badachu, 1937.VII.2, 1♂, coll. unknown; 1936.IV.30, 1♀, coll. unknown; Shanghai Zoo, 1950.IV.12, 6♂3♀, coll. Linyao Wang; Hebei, Baoding, Yi County, Western Qing Tombs, 1972.VI.13–14, 1♂, coll.

unknown; Hebei, Zhangjiakou, Chongli, 1981.V.30, 1♀, coll. Shibo Tian; Henan, Anyang, 1957.VII.29, 1♂, coll. Yunfa Han; Henan, Lin County, 1983.VI.1, 1♀, coll. unknown.

[BMNH] Chinese Thery, 1♂1♀ (Type of *Catharsius davidis* Deyrolle & Fairmaire, 1878); China, Formosa, 5♂; Java, Horsfield, 1♂; China, Foochow, 1935.VI, 1♂, coll. M.S. Yang; China, Formosa, Horisha, 1918.VIII.5, 1♂, coll. H. Kawamura; Ceylon, 1♂; Ceylon, Kelani Valley, Nr. Colombo, 1♂1♀, coll. W. Braine; Malaysia, Sarawak, foot of Mt. Dulit, junction of rivers, 1932.IX.8, 2♂2♀, coll. Tinjar & Lejok; China, Hong Kong, 2♂2♀, Walker Coll., 93-58; China, Foochow, 3♂2♀, coll. C.R. Kellogg; China, Formosa, 2♂, 84-10.

[MNHN] 1♂, Chine, Thery, Andrewes Bequest, B. M. 1922-221 (Type of *Catharsius davidis* Deyrolle & Fairmaire, 1878).

Distribution. China (Hong Kong, Beijing, Fujian, Guangdong, Guizhou, Hebei, Henan, Shanghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang), Afghanistan, Cambodia, India, Indonesia, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.

Remarks. Type specimens of *Scarabaeus molossus* Linnaeus, 1758 were not found in any of the museums and were more likely to be lost. Kabakov & Shokhin (2014) did not examine the type specimen of *Catharsius davidis* Deyrolle & Fairmaire, 1878, and transferred the species to *Copris* only based on the determined specimens. We examined the type specimens of *Catharsius davidis* Deyrolle & Fairmaire, 1878 and considered that this species should be stay in *Catharsius*. Furthermore, after a detailed comparison, we think *Catharsius davidis* Deyrolle & Fairmaire, 1878 and *Copris davidis* (Deyrolle & Fairmaire, 1878) should be the new synonyms of *Catharsius molossus* (Linnaeus, 1758).

Genus *Copris* Geoffroy, 1762

Copris Geoffroy, 1762, *Ins. Des Envir. De Paris*, 1: 87 (Type species: *Scarabaeus lunaris* Linnaeus, 1758, by original designation, deposited in UZIU).

Key to species of *Copris* from Hong Kong.

- 1 Male pronotum with developed horn(s), female pronotum ridged anteriorly..... 2
Male pronotum without developed horn or weakly convex anteriorly, female pronotum simple or weakly ridged anteriorly..... 5
- 2 Clypeus with narrow triangular notch in the middle of the anterior margin, male pronotum with two horns..... 3
Clypeus with broad and shallow notch in the middle of the anterior margin, male pronotum with six horns..... 4
- 3 Shiny elytra, pronotum with shallow ditches around the horns..... *Copris* (*s. str.*) *sinicus* Hope, 1842
Dark but not shiny elytra, pronotum with deep ditches around the horns *Copris* (*Sinocopris*) *ochus* Motschulsky, 1860
- 4 Weak lateral carinae on pronotum, not obviously protruding towards the front *Copris* (*s. str.*) *punctatus* Gillet, 1910
Strong lateral carinae on pronotum, obviously protruding towards the front *Copris* (*s. str.*) *tripartitus* Waterhouse, 1875
- 5 Male pronotum with a weak horn anteriorly *Copris* (*s. str.*) *szechouanicus* Balthasar, 1958
Male pronotum simple, without horn *Copris* (*s. str.*) *confucius* Harold, 1877

3.2.2 *Copris* (*s. str.*) *confucius* Harold, 1877

Copris confucius Harold, 1877, *Ann. Mus. Civ. Genova*, 10: 48, nota (MNHN).

Material examined. [AFCD] China, Hong Kong, Cheung Sheung, 1 ex., 2010.III.17, coll. K.H. Cheung; Tai Mo Shan, 3 ex., 2010.V.13, coll. K.H. Cheung; Grassy Hill, 5 ex., 2010.VIII.27, coll. K.H. Cheung; Shing Mun, 2 ex., 2011.IX.1, K.H. Cheung; Cheung Sheung, 2 ex., 2012.IV.23, coll. M. Bai; Ma On Shan, 1 ex., 2012.IV.23, coll. M. Bai; Chek Keng, 1 ex., 2015.VIII.25, coll. M.H. Leung; Tai Mo Shan. 2 ex., 2015.IX.17, coll. M.H. Leung; Lai Chi Wo, 4♂6♀, 2016.IV.7, coll. M.H. Leung; Wu Kau Tang, 2♂4♀, 2016.VIII.25, coll. M.H. Leung.

[IZAS] China, Hainan, Yinggen, 1964.IV.19, 1♂, coll. Sikong Liu; Yunnan, Cheli, 620 m, 1957.IV.20, 1♂1♀, coll. Lingchao Zang.

[BMNH] China, 1♂, 92-87; Indo-China, Haut Mekong, Ban Quang, 1918.IV.24, 1♂1♀, coll. R.V. de Salvaza; Laos, Park Lay, 1918.IX.2, 2♀, coll. R.V. de Salvaza; Laos, Park Lay, 1918.VIII.2, 1♂, coll. R. V. de Salvaza; China, Kiang, 1♂2♀, Nevinson Coll., 1918-14; Nimrod SD.(II), 1♀, Walker Coll., 92-87.

[NMPC] China, Fukien, Kwangtseh, 1♂, 1937.VIII.21, coll. J. Klapperich; China, Fukien, Shaowu, 500 m, 1♂, 1937.X.11, coll. J. Klapperich.

Distribution. China (Hong Kong, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Yunnan), India, Laos, Myanmar, Thailand.

3.2.3 *Copris* (*s. str.*) *punctatus* Gillet, 1910

Copris punctatus Gillet, 1910, *Notes Leyden Mus.*, 32: 4 (ISNB).

Copris punctatus formosanus Gillet, 1921, *Bull. Ann. Soc. Ent. Brux.*, 1921: 126.

Material examined. [AFCD] China, Hong Kong, Tai Mo Shan, 1♀, 2010.V.13, coll. K.H. Cheung.

[ISNB] Carin Cheba, 900–1100m, 1888.V.12, 2♂, coll. L. Fea (Lectotype and paralectotype, designated by Masumoto, 2004).

[BMNH] Burma, Kanpetlet, Pakokku Hill Tracts, 6000ft, 1♂, 1922.VI, coll. B. Fischer; Luang Prabang, Ban Thiou, 1♂, 1918.III.18, coll. R.V. de Salvaza; Haut Mekong, Nam Mia, 1♀, 1918.V.1, coll. R.V. de Salvaza.

[NMPC] China, Szechuan, Tatsienlu, Nitou, 2♂2♀, coll. Reitter; Mussoorie, Ringal Gad, 1♀, 1922.IV.15, coll. Cameron.

Distribution. China (Hong Kong, Fujian, Sichuan, Taiwan), Myanmar.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.4 *Copris (s. str.) sinicus* Hope, 1842

Copris sinicus Hope, 1842, *Proc. Ent. Soc. Lond.*, 1842: 60 (BMNH).

Copris sulcicollis Lansberge, 1886, *Tijdschr. V. Entom.*, 29: 10; Gillet, 1911a, *Col. Catalog. Pars. 38, Scarabaeidae: Coprinae I*: 78 (syn.).

Material examined. [AFCD] China, Hong Kong, Tsing Fai Tong, 1♂1♀, 2015.IV.21, coll. M.H. Leung; Kat O, 1♀, 2015.X.29, coll. M.H. Leung; Lai Chi Wo, 1♂, 2016.IV.7, coll. M.H. Leung.

[IZAS] China, Jiangxi, Nanchang, 3♂4♀, 1978.V.11, coll. Youwei Zhang; Guangdong, Lian County, Dadongshan, 1♂, 1993.IV.15; Yunnan, Xishuangbanna Xiaomengyang, 850m, 1♂, 1957.VI.15, coll. Lingchao Zang; Yunnan, Xishuangbanna Yiwu, 800–1300m, 6♂8♀, 1959.V.14, coll. Zhenfu Li. Vietnam, Tokin, Hoa-Binh, 1♂, coll. A. De Cooman.

[BMNH] China, 1♂, (Type); Siam, Setul, 1♂1♀, H. N. Ridley Coll., 1910-264; China, Foochow, 6♂28♀, M.S. Yang Coll., 1936-37; China, Fukien, Amoy, 2♀, 1922, coll. S. F. Light; Java, Horsfield, 1♀, 60-15; India, 1♀; Burma, Maymyo, 1♀, H.L. Andrewes Coll., 1922-221; Burma, Prome, 1♂; Kolaw, S. Shan States, 4000ft, 1♀, 1916.IV, F. M. Mackwood Coll., 1916-205; Bengal, Sarda, 1♀, H. G. Champion Coll., 1953-156; Siam, Tennasserim Border, 1♂, K. G. Gairdner Coll., 1914-400.

[NMPC] Malang, S.E. Java, Slg. R. Oberthur (coll. C. Martin), Eing. Nr. 4, 1956, 1♂; Environa de MAHE, (Cote de Malabar), Chasseur indigenes, 2 semestre 1902, 1♀; China, Fukien, Shaowu, 500m, J. Klapperich, 1♂1♀, 1937.X.30–VI.3.

Distribution. China (Hong Kong, Fujian, Guangdong, Hubei, Jiangxi, Shanghai, Sichuan, Yunnan), Bangladesh, India, Indonesia, Myanmar, Thailand, Vietnam.

3.2.5 *Copris (s. str.) szechouanicus* Balthasar, 1958

Copris szechouanicus Balthasar, 1958, *Acta Ent. Mus. Nat. Pragae*, 32: 479 (NMPC).

Material examined. [AFCD] China, Hong Kong, Wu Kau Tang, 2 ex., 2015.III.31, coll. M.H. Leung; Tai Mo Shan, 1 ex., 2015.VII.13, coll. M.H. Leung; Wu Kau Tang, 1 ex., 2016.IV.18, coll. T.H. Fung.

[IZAS] China, Hubei, Xingshan Xiaohokou, 700m, 1♀, 1994.V.11, coll. Jian Yao; Sichuan, Fengdou Shiping, 610m, 1♂, 1994.X.6, coll. Jian Yao; Sichuan, Fengdou Shiping, 1♂, 1994.VI.3, coll. Youwei Zhang.

[NMPC] China, Fukien, Kuantun, 1♂, 1946.VI.15, coll. Tschung Sen (Holotype); China, Szechuan, Giufu Shan, 1♀, 1500–2000m, coll. E. Reitter (Allotype); China, Kwangtseh-Fukien, 2♂, 1937.X.8, coll. L. Klapperich (Paratype); 1♀, same data as holotype (Paratype); China, Fukien, Kuantun, 2300m, 27.40n, Br., 117.40 ö. L., 1♂, 1938.V.1, coll. L. Klapperich (Paratype); China, Fukien, Kuantun, 2300m, 27.40n, Br., 117.40 ö. L., 1♂, 1938.V.15, coll. L. Klapperich (Paratype); China, Kwanhsien, Nordl. Szechuan, 1♂, coll. Reitter (Paratype); China, Szechuan, Yulmg Sud., Tatsienlu, 1♂ (Paratype); China, Szechuan, Tatsienlu Tsendse, 1♂ (Paratype).

Distribution. China (Hong Kong, Fujian, Guizhou, Hubei, Hunan, Sichuan, Zhejiang).

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.6 *Copris (s. str.) tripartitus* Waterhouse, 1875

Copris tripartitus Waterhouse, 1875, *Trans. Ent. Soc. London*, 1: 74 (BMNH).

Material examined. [IZAS] China, Shandong, Taian, 4♂4♀, 1990.VIII.7, coll. Jingke Li; Sichuan, Emeishan Qingyinge, 800–1000m, 1♂, 1957.VI.30, coll. Keren Huang.

[BMNH] Japan, 1♂, (Type); Japan, 2♂2♀; Japan, 1♂, G. Lewis Coll., 1910-320; Korea, Chemulpo, 1♂, Nevins Coll., 1918-14.

[NMPC] China, Szechuan, Tatsienlu, Nitou, 3♂2♀, coll. Reitter; China, Szechuan, Giufu-Shan, 2♂2♀, coll. Balthasar.

Distribution. China (Hong Kong, Fujian, Shandong, Sichuan, Taiwan, Yunnan), North Korea, Japan.

3.2.7 *Copris (Sinocopris) ochus* (Motschulsky, 1860)

Catharsius ochus Motschulsky, 1860, *Etud. Ent.*, 8: 13 (ZMUM, ZIN).

Copris ochus: Waterhouse, 1875, *Trans. Ent. Soc. London*, 1: 73.

Material examined. [IZAS] China, Heilongjiang, Harbin etc 192, 2♂1♀, coll. V.J. Tolmachov; Heilongjiang, Harbin, 1♂, 1954.VI.6; Liaoning, Zhanggutai, 2♂2♀, 1958.VIII.4; 1♂, 1958.IX.22; Liaoning, Qianshan, 2♂1♀, 1991.VI.3; Inner Mongolia, Zhaomeng, 1♂, 1959.VII; Beijing, Sanbao, 1♂, 1964.VII.21; Beijing, Baihuashan, 1200 m, 1♂, 1973.VI.1; Tianjin, Liangwangzhuang, 1♂, 1973; Tientsin, 1♂, 1949.IX; Hebei, Wulingshan, Zhongguling, 810m, 2♀, 1981.V.26, coll. Shibo Tian; Fujian, Foochow, Gushan, 2♂.

[ZIN] 1♂ (Type of *Catharsius ochus*).

[BMNH] Japan, Nikko, 3♂2♀, 1910.VIII.18, G. Lewis Coll., 1910-320; China, Kinchu, 1♀, 1927, coll. S. Manchuria; Korea, 1♀, coll. Hon. E. Scarlett; Japan, 21♂19♀.

[NMPC] Mandschuria mer., Fengjen, Kintchou, 100 m, Juli, 1♂; Mandschurel, Charbin, 1♂; China, Pecili, 1♀.

Distribution. China (Hong Kong, Beijing, Fujian, Guangdong, Hebei, Heilongjiang, Henan, Inner Mongolia, Jiangsu, Jilin, Liaoning, Inner Mongolia, Shandong, Shanxi, Tianjin, Zhejiang), Japan, North Korea, South Korea, Russia.

Genus *Microcopris* Balthasar, 1958

Microcopris Balthasar, 1958, *Acta Ent. Mus. Nat. Pragae*, 32: 474. (Type species: *Scarabaeus reflexus* Fabricius, 1787, by original designation, deposited in BMNH).

Key to species of *Microcopris* from Hong Kong.

- 1 Body with metallic sheen, clypeal front margin with a deep concave and two obtuse teeth *Microcopris reflexus* (Fabricius, 1787)
 Body without metallic sheen, clypeal front margin with a shallow concave and two sharp teeth *Microcopris propinquus* (Felsche, 1910)

3.2.8 *Microcopris propinquus* (Felsche, 1910)

Copris propinquus Felsche, 1910, *Deut. Ent. Zeitschr.*: 347 (SMTD).

Microcopris propinquus Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 1: 377.

Copris minutissimus Kryzhanovskij & Medvedev, 1966, *Ent. Obozr.*, 45: 392; Kabakov & Napolov, 1999, *Latv. Ent.*, 37: 68. (removal from Syn.); Kabakov & Shokhin, 2014, *Cau. Ent. Bull.*, 10(1): 49 (Syn.).

Material examined. [AFCD] China, Hong Kong, Mau Ping, 1ong, 2015.III.23, coll. C.Y. Luk & M.H. Leung; Mui Tsz Lam, 1♂, 2015.VIII.18, coll. C.Y. Luk; Chek Keng, 2♂, 2016.II.17, coll. M.H. Leung; Cheung Sheung, 2♂5♀, 2016.XII.6, coll. M.H. Leung.

[IZAS] China, Zhejiang, West Mt. Tianmushan, Sanmuping, 1♂, 1998.VII.21, coll. Wu Hong.

[BMNH] China, Szechuan, Chungking, 1♂, 1931-358; China, Szechuan, Kinfushan, 1♀, IV-V-29, coll. H. Becker; China, nr Nong-po, Da-laen-saen, 1♂, Walker Coll., 93-18; nr Entrance Is Chusah Arch, 1♂, Walker Coll., 93-18; China, Foochow, 1♀, M.S. Yang Coll., 1937-38; China, 1♀.

[MNHN] China, Formosa, Hoozan, 1♂, coll. H. Sauter.

[NMPC] China, Szetschwan, Omisien, Exp. Stotsmer, 1♂; China, Szechuan, Nitou Tatsienlu, 3♂2♀; China, Szechuan, Yulig Sud, Tatsienlu, 1♂; China, Formosa, Kuram, 1♂, 1927.V.11, coll. K. Kamiya.

Distribution. China (Hong Kong, Fujian, Sichuan, Taiwan, Zhejiang, Yunnan), Laos.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.9 *Microcopris reflexus* (Fabricius, 1787)

Scarabaeus reflexus Fabricius, 1787, *Mant. Ins.*, 1: 16 (BMNH).

Scarabaeus oryctes Herbst, 1789, *Nat. Kaf.*, 2: 215; Lansberge, 1886, *Tijdschr. V. Ent.*, 29: 22 (Syn.).

Copris reflexus: Gillet, 1911a, *Col. Catalog. Pars. 38, Scarabaeidae: Coprinae I*: 77.

Microcopris reflexus Balthasar, 1958, *Acta Ent. Mus. Nat. Pragae*, 32: 474.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 10 ex., 2010.IV.28, coll. unknown; Tai Mo Shan, 11 ex., 2010.V.13, coll. K.H. Cheung; Shing Mun, 1 ex., 2011.IX.1, coll. K.H. Cheung; Cheung Sheung, 3 ex., 2012.IV.22, coll. M.

Bai; Tsing Fai Tong, 1 ex., 2015.IV.21, coll. M.H. Leung; Grassy Hill, 2 ex., 2015.VII.15, coll. M.H. Leung; Kat O, 5 ex., 2015.X.29, coll. M.H. Leung; Lai Chi Wo, 1♂, 2016.IV.7, coll. M.H. Leung; Chek Keng, 1 ex., 2016.IX.5, coll. M.H. Leung.

[IZAS] China, Zhejiang, Xitianmushan, Xianrending, 1500 m, 1♀, 1998.VIII.16, coll. Mingshui Zhao; Zhejiang, Xitianmushan Sanmuping, 1♂, 1998.VII.21, coll. Hong Wu; Hubei, Zigui Maoping, 170 m, 1♀, 1994.IV.28, coll. Youwei Zhang; Guangxi, Longzhou Nonggang, 330 m, 2♂4♀, 2000.VI.15, coll. Wenzhu Li; Guangxi, Jingxi Diding, 1000–1700 m, 2♂2♀, 2000.VI.23, coll. Wenzhu Li; Guangxi, Chongzuo Nalong, 290 m, 1♂1♀, 1998.III.20, coll. Wenzhu Li; Guangxi, Shangsi, Nanbingxiang, 350 m, 2♂, 2000.VI.10, coll. Chaodong Zhu; Guangxi, Pingxiang, Daqingshan, 300 m, 2♂, 1998.IV.24, coll. Haisheng Zhou; Sichuan, Changshou, Nanmuyuan, 450 m, 1♂, 1994.VI.9, coll. Youwei Zhang.

[BMNH] Java, Horsfield, 2♂4♀; Laos, Haut Mekong, Nam Long, 13♂11♀, 1918.IV.26, coll. R. V. de Salvaza; Laos, Pak Lay, 7♂14♀, 1918.VIII.2, coll. R. V. de Salvaza; Haut Mekong, Ban Quang, 6♂14♀, 1918.IV.24, coll. R. V. de Salvaza; B. N. Borneo, Kiau, Mt. Kinabalu, 3000 ft, 5♂3♀, 1929.IV.5; Catchment Area, Nr. Jitra, Kedah, Malay Penin, 1♂, 1928.IV.10; Siam, Penin, Patalung Trang, 2♂2♀, 1929.IV.22, coll. I.H.N. Evans; Tonkin, Montes Manson, 1♂3♀; China, Foochow, 4♂3♀, coll. M.S. Yang; Burma, Tharrawaddy, 2♂3♀, coll. G.Q. Corbett; Lr. Burma, Prome, 1♀; W. Sumatra, Fort de Kock, 1♂, coll. E. Jacobson; China, Hong Kong, 1♀, coll. Walker; Tenasserim, Victoria Point, 1♂, coll. E.T. Atkinson.

[MNHN] Malaysia, Sabah, Poring Hot Springs, 500 m, 1♂, 1987.V.8, coll. Burckhardt-Lobl.

[NMPC] China, Fukien, Shaowu, 500 m, 2♂3♀, 1937.X.30, coll. J. Klapperich; Nov. Dez., Phuc-Son, Annam, 2♂1♀, coll. H. Fruhstorfer; Java, Buitenzorg, 1♂2♀; S.E. Java, Malang, 1♂1♀.

Distribution. China (Hong Kong, Fujian, Guangxi, Hainan, Hubei, Sichuan, Taiwan, Yunnan, Zhejiang), India, Indonesia, Malaysia, Myanmar, Thailand, Vietnam.

Genus *Paracopris* Balthasar, 1939

Paracopris Balthasar, 1939a, *Redia*, 25: 2. (Type species: *Copris punctulatus* Wiedemann, 1823, by original designation, deposited in ZMUH).

3.2.10 *Paracopris cariniceps* (Felsche, 1910)

Copris cariniceps Felsche, 1910, *Deut. Ent. Zeitschr.*: 348 (SMTD).

Paracopris cariniceps Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 1: 371.

Material examined. [AFCD] China, Hong Kong, Ngong Ping, 1♂, 2015.IX.10, coll. T.H. Fung; Tai Mo Shan, 1♀, 2015.IX.14, coll. M.H. Leung; Tai Mo Shan, 2♂2♀, 2015.IX.17, coll. M.H. Leung; Grassy Hill, 1♀, 2016.IV.27, K.C. Tam.

[IZAS] China, Yunnan, Jinping Mengla, 500 m, 1♂, 1956.V.2, coll. Keren Huang *et al.*; Nanxi River, 300 m, 1♀, 1956.VI.8, coll. Panfilov; Jingdong, 1170 m, 1♂, 1956.V.23.

[BMNH] China, nr Nong-po., Da-laen-saen, 1♂1♀, Walker Coll., 93-18; China, Foochow, 4♂4♀, 1935.VI, coll. M.S. Yang; China, Foochow, 1♂3♀, 1935.VIII.18, coll. M.S. Yang; Laos, Luang Prabang, Ban Thiou, 1♀, 1918.III.18, coll. R.V. de Salvaza; nr Entrance Is Chusah Arch, 3♂, Walker Coll., 93-18.

[MNHN] China, Hong Kong, 1♂1♀.

Distribution. China (Hong Kong, Fujian, Jiangxi, Jiangsu, Shanghai, Taiwan, Yunnan, Zhejiang), Laos.

Tribe *Gymnopleurini* Lacordaire, 1856

Gymnopleurini Lacordaire, 1856, *Gen. Col.*, 3: 72 (original spelling as *Gymnopleurides*, type genus: *Gymnopleurus* Illiger, 1803).

Genus *Paragymnopleurus* Shipp, 1897

Paragymnopleurus Shipp, 1897, *Entom.*, 30: 166 (Type species: *Scarabaeus sinuatus* Olivier, 1789, by original designation, deposited in MNHN, BMNH).

Paragymnopleurus Garreta, 1914, *Bull. Soc. Ent. Fr.*: 52.

3.2.11 *Paragymnopleurus melanarius* (Harold, 1867)

Gymnopleurus melanarius Harold, 1867, *Col. Hefte*, 1: 76 (MNHN).

Gymnopleurus aethiops Sharp, 1875a, *Col. Hefte*, 13: 34 (MNHN); Boucomont & Gillet (nec Motschulsky), 1921, *Faune ent. Indoch. Fr.*, 4: 3 (Syn.).

Gymnopleurus ruficornis Boucomont & Gillet (nec Motschulsky), 1921, *Faune ent. Indoch. Fr.*, 4: 3.

Paragymnopleurus melanarius Janssens, 1940, *Mém. Mus. R. Hist. Nat. Belg.*, 16(2): 16, 18.

Material examined. [IZAS] China, Jiangxi, Nanchang, 1♀, 1978.V.11, coll. Youwei Zhang; Guangxi, Napo Beidou,

550 m, 2♂, 2000.VI.22, coll. Wenzhu Li; Guangxi, Guilin, Yanshan, 2♂, 1953.VI.25, coll. unknown.

[BMNH] China, Formosa, Horisha, 1♂, 1918.V–VIII, coll. H. Kawamura; Kanara, S. India, 1♀, Andrewes, Beouest, B. M. Coll., 1922–221; China, Foochow, 2♂1♀, 1936.VII.10–14, coll. M.S. Yang; China, Foochow, 2♂, 1936.VI, coll. M.S. Yang; Ceylon, Kandy, 1♂, 1910.IV.7, coll. E.E. Green; Ceylon, Balangoda, 1♀, 1882.III.13–16, coll. G. Lewis; Thailand, Metah, 7♂1♀, coll. J.D. Hedley, B. M. 1954–571; Burma, N. Chin Hills., 1♂, 94–4; Vitenam, Tonkin, Hoa-Binh., A. de Cooman, B. M. 1934–95; Ceylon, 1♂, Fry Coll., 1905–100.

Distribution. China (Hong Kong, Fujian, Guangxi, Jiangxi, Shanghai, Sichuan, Taiwan, Yunnan), India, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam.

Tribe Oniticellini Kolbe, 1905

Oniticellini Kolbe, 1905, *Zool. Jahrb. Sup.*, 8: 547 (Type genus: *Oniticellus* Dejean, 1821).

Key to genera of Oniticellini from Hong Kong.

- | | | |
|---|---|------------------------------------|
| 1 | Elytral tip with setae | 2 |
| | Elytral tip without setae | <i>Liatongus</i> Reitter, 1892 |
| 2 | Elytra cover the abdomen completely from dorsal view | <i>Tibiodrepanus</i> Krikken, 2009 |
| | Elytra cover the abdomen incompletely, part of the abdomen visible from dorsal view | <i>Oniticellus</i> Dejean, 1821 |

Genus *Liatongus* Reitter, 1892

Liatongus Reitter, 1892, *Verh. Naturforsch. Ver. Brünn*, 24: 166 (Type species: *Onthophagus phanaeoides* Westwood, 1839, by original designation, deposited in UMO).

Key to species of *Liatongus* from Hong Kong.

- | | | |
|---|---|---|
| 1 | Body shiny; head with one long horn | <i>Liatongus vertagus</i> (Fabricius, 1798) |
| | Body not shiny; head with two short horns | <i>Liatongus pugionatus</i> (Boheman, 1858) |

3.2.12 *Liatongus pugionatus* (Boheman, 1858)

Onthophagus pugionatus Boheman, 1858, *Eugenies Resa. Zool.*, 1: 44.

Liatongus pugionatus: Janssens, 1953, *Parc Nat. Upemba, Mission Whitte, Fasc.*, 11: 103.

Material examined. None.

Distribution. China (Hong Kong).

3.2.13 *Liatongus vertagus* (Fabricius, 1798)

Copris vertagus Fabricius, 1798, *Ent. Syst. Suppl.*: 30 (ZMUC).

Oniticellus bifurcates Erichson, 1834, *Nova Acta Leop. Carol.*, 16(2): 235, Tf. 37, Fig. 4.

Oniticellus bifurcalis White, 1844, *Ann. Mag. Nat. Hist.*, 14: 423(BMNH); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371 (Syn.).

Oniticellus dichrous Boheman, 1858, *Eugenies Resa. Zool.*, 1: 43 (NHRS); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371 (Syn.).

Oniticellus pictisternum Fairmaire, 1891, *Bull. Com. Soc. Ent. Belg.*, 35: 193 (MNHN); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371 (Syn.).

Oniticellus scutellaris Reitter, 1892, *Verh. Naturforsch. Ver. Brünn*, 24: 46; Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371 (Syn.).

Oniticellus tonkineus Fairmaire, 1893, *Bull. Soc. Ent. Belg.*, 37: 305 (MNHN); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371 (Syn.).

Oniticellus vertagus: Arrow, 1908, *Ann. Mag. Nat. Hist.*, 8(1): 180.

Liatongus vertagus: Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 371.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 13♂13♀, 2010.IV.28, coll. unknown; Tai Mo Shan, 10♂8♀, 2010.V.13, coll. K.H. Cheung; Grassy Hill, 6♂8♀, 2010.VIII.27, coll. K.H. Cheung; Shui Hau, 2♀, 2010.XI.18, coll. C.H. Shih; Grassy Hill, 1♂, 2010.XII.24, coll. K.H. Cheung; Shing Mun, 4♀, 2011.IX.1, coll. K.H. Cheung; Shing Mun, 3♂3♀, 2011.XI.24, coll. K.H. Cheung; To Kwa Peng, 2♀, 2011.XII.20, coll. K.H. Cheung; Cheung Sheung, 3♀, 2012.IV.22, coll. M. Bai; Ma On Shan, 1♂, 2012.IV.23, coll. M. Bai; Sam A Tsuen, 1♂1♀, 2012.IV.24, coll. M. Bai; Shing Mun, 1♀, 2013.I.3, coll. K.H. Cheung; Tai Mo Shan, 1♂1♀, 2015.VII.13, coll. M.H. Leung; Grassy Hill, 3♀, 2015.VII.15, coll. M.H. Leung; Tong Fuk, 5♀, 2015.VIII.6, coll. K.H. Cheung; Chek Keng, 1♀, 2015.VIII.25, coll. M.H. Leung; Tai Mo Shan, 4♀, 2015.IX.17, coll. M.H. Leung.

[IZAS] China, Hainan, 1♂2♀, 1934.V.4–9, coll. Qi He; Yinggen, 200 m, 1♀, 1960.V.5, coll. Xuezhong Zhang; Tongshen, 340 m, 1♂, 1960.III.22, coll. Zhenfu Li; Jianfengling Tianchi, 100 m, 1♂, 1981.VII.3, coll. Qiuming Guo;

Tongshen, 7♂3♀, 1997.V.26, coll. Wenzhu Li; Wuzhishan, 800 m, 2♀, 1997.V.28–31, coll. Wenzhu Li & Peiyu Yu. Yunnan, Xishuangbanna Xiaomengyang, 850 m, 8♂6♀, 1957.VI.16, coll. Shuyong Wang; Lancang, 1000 m, 1♀, 1957.VI.25, coll. Shuyong Wang; Xishuangbanna Mengsong, 1600 m, 6♂6♀, 1958.IV.24, coll. Shuyong Wang & Chunpei Hong. Xizang, Chayu Yangyu, 1♂, 1973.VII.25, coll. Fusheng Huang. Vietnam, Ha Giang, 100 m, 3♂12♀, 2000.XII.9, coll. Wenzhu Li; Cao Bang, 400 m, 1♂37♀, 2000.XII.17, coll. Wenzhu Li; Lang Son, 100 m, 3♂3♀, 2000.XII.20, coll. Wenzhu Li; Laboratory of Hanoi University, 20 m, 9♂18♀, 2000.XII.23, coll. Wenzhu Li.

[BMNH] Mong Jiong, 1♂ (Type of *Oniticellus bifurcalis* White, 1844); Laos, Xieng Khouang, Muong Pek, 16♂19♀, 1918.XII.15, coll. R.V. de Salvaza; Laos, Xieng Khouang, Ban Sai, 2♂3♀, 1918.XII.16, coll. R.V. de Salvaza; Luang Prabang, Muong Hai, 12♂14♀, 1918.IV.2, coll. R.V. de Salvaza; Laos, Ban Houei Soui, 11♂10♀, 1918.I.30, coll. R.V. de Salvaza; Luang Prabang, Ban Samang, 7♂9♀, 1918.XI.20, coll. R.V. de Salvaza; Tonkin, Hoa Binh, 1♀; Haut Mekong, Nam Long, 16♂19♀, 1918.IV.26, coll. R.V. de Salvaza.

[MNHN] China, Yunnan, 3♂, 1913, coll. L.N. Comby; Mou-pin, 1870, coll. A. David.

Distribution. China (Hong Kong, Fujian, Guangdong, Guizhou, Hainan, Shanghai, Taiwan, Xizang, Yunnan), India, Laos, Myanmar, Vietnam.

Genus *Oniticellus* Dejean, 1821

Oniticellus Dejean, 1821, *Cat. Col. Baron Dejean*: 53. (Type species: *Scarabaeus cinctus* Fabricius, 1775, by original designation, deposited in UMO).

Oniticellus Le Peletier de St. Fargeau & Audinet-Serville, 1828, *Encycl. Meth.*, 10: 356 (Type species: *Scarabaeus cinctus* Fabricius, 1775, UMO). [HN.]

Tragiscus Klug, 1855, *Monatsb. Berl. Akad.*: 651.

Tiniocellus Péringuey, 1901, *Trans. S. Afr. Phil. Soc.*, 12: 116.

Pseudoniticellus Kraatz, 1895, *Deut. Ent. Zeitschr.*: 143. (Type species: *Oniticellus planatus* Laporte, 1840).

3.2.14 *Oniticellus cinctus* (Fabricius, 1775)

Scarabaeus cinctus Fabricius, 1775, *Syst. Ent.*: 30 (UMO).

Scarabaeus serratipes Drury, 1770, *Ill. Exot. Ins.*, 1: 79.

Onitis diadema Wiedemann, 1819, *Zool. Mag.*, 1(3): 159.

Oniticellus cinctus var. *diadema* Wiedemann, 1819, *Zool. Mag.*, 1(3): 159.

Oniticellus cinctus: Janssens, 1953, *Parc Nat. Upemba, Mission Witte, Fasc.*, 11: 107, 110.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 1♂2♀, 2010.IV.28, coll. unknown; Grassy Hill, 2♀, 2010.XII.24, coll. K.H. Cheung; Cheung Sheung, 1♀, 2012.IV.22, coll. M. Bai; Tap Mun, 1♀, 2016.II.29, coll. M.H. Leung; Lai Chi Wo, 1♀, 2016.IV.7, coll. M.H. Leung; Chek Keng, 1♂1♀, 2016.IX.5, coll. M.H. Leung.

[IZAS] China, Hainan, Tongshen, 3♂2♀, 1997.V.26, coll. Wenzhu Li; Wu Zhi Shan, 800 m, 1♀, 1997.V.30, coll. Wenzhu Li. Vietnam, Cao Bang, 400 m, 3♂4♀, 2000.XII.17, coll. Wenzhu Li; Ha Giang, 100 m, 6♂4♀, 2000.XII.9, coll. Wenzhu Li.

[BMNH] S. Bomlay, 1♂1♀; Malaya, N. Semlulan, 1♂, 1928.?.?.; Nepal, Phewa-Tal, Pokhara, 85.059'E, 28.014'N, 2500 ft, 1♂, 1954.V.8–10, coll. K.H. Hyatt; Penang, Lamb, 1♂1♀, 93-60; Laos, Muong Va, 11♂7♀, 1918.XI.4, coll. R.V. de Salvaza; Sikkim, Kalimpong, 4000 ft., 2♂3♀, 1924.III.27, coll. R.W.G. Hingston; China, Hong Kong, 1♂1♀, coll. F.W. Terry; Singla, Darjiling, Bengal, 1500 ft, 1♂1♀, 1930.VI.

[MNHN] Laos, Muong You, 1♂1♀; Chine, Kiang-Yen, 1♂1♀, Callery Coll., 59-47.

Distribution. China (Hong Kong, Fujian, Hainan, Taiwan, Yunnan), Bangladesh, India, Malaysia, Myanmar, Nepal, Thailand, Vietnam.

Genus *Tibiodrepanus* Krikken, 2009

Tibiodrepanus Krikken, 2009, *Haroldius*, 4: 16 (Type species: *Copris setosus* Wiedemann, 1823, by original designation).

3.2.15 *Tibiodrepanus sinicus* (Harold, 1868)

Drepanocerus setosus Boheman, 1858, *Eugenies Resa. Zool.*, 1: 50 (HN, preoccupied with *Drepanocerus setosus* Wiedemann, 1823).

Drepanocerus sinicus Harold, 1868a, *Col. Hefte*, 4: 104 (NHRS) (new name for *Drepanocerus setosus* Boheman, 1858).

Tibiodrepanus sinicus: Krikken, 2009, *Haroldius*, 4: 21.

Material examined. [IZAS] China, Zhejiang, Yongkang, 1♀, 1988.I.24, coll. Junrui Zhi. Hainan, 1♂, 1989.II.2, coll. C. Mnjzlan. Guangxi, Jingxi, 840 m, 1♀, 1998.IV.1, coll. Gexia Qiao; Beidou, Napo, 550 m, 1♂, 1998-IV-10, coll. Gexia Qiao.

Vietnam, Lang Son, 100 m, 1♂1♀, 2000.XII.20, coll. Wenzhu Li; Cao Bang, 400 m, 1♀, 2000.XII.17, coll. Wenzhu Li; Tonkin, Hoa-Binh, 4♂5♀, coll. A de Cooman.

[BMNH] China, Hong Kong, 1♂1♀, coll. J.J. Walker; China, 1♂1♀.

[NMPC] China, Fukien, Shaowu, 500 m, 4♂2♀, 1937.X.30, coll. L. Klapperich; China, Fukien, Shaowu, 500 m, 1♀, 1937.X.29, coll. L. Klapperich.

Distribution. China (Hong Kong, Fujian, Guangxi, Guizhou, Hainan, Zhejiang), India, Laos, Myanmar, Thailand, Vietnam.

Tribe Onitini Laporte, 1840

Onitini Laporte, 1840, *Hist. Nat. Col.*, 2: 88 (original spelling as Onitides, type genus: *Onitis* Fabricius, 1798).

Genus *Onitis* Fabricius, 1798

Onitis Fabricius, 1798, *Ent. Syst. Suppl.*: 2 (Type species: *Scarabaeus inuus* Fabricius 1781).

Key to species of *Onitis* from Hong Kong.

- | | | |
|---|--|---|
| 1 | Pronotum very feebly punctate | 2 |
| | Pronotum clearly punctate..... | 3 |
| 2 | Metasternum transversely excavated in the middle, male genitalia in a total length of 6.6 mm | <i>Onitis excavatus</i> Arrow, 1931 |
| | Metasternum not transversely excavated in the middle, male genitalia in a total length of 5.8 mm | <i>Onitis falcatus</i> (Wulfen, 1786) |
| 3 | Metasternum longitudinally grooved | <i>Onitis intermedius</i> Frivaldszky, 1892 |
| | Metasternum flat, not grooved | <i>Onitis subopacus</i> Arrow, 1931 |

3.2.16 *Onitis excavatus* Arrow, 1931

Onitis excavatus Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 391 (BMNH).

Onitis Chiangmaiensis Masumoto, 1995, *Ent. Rev. Jap.*, 50: 91; Hanboonsong & Masumoto, 2000, *Elytra*, 28(1): 109 (Syn.).

Material examined. [AFCD] China, Hong Kong, Tai Mo Shan, 1♂, 2010.VII.2, coll. unknown.

[IZAS] China: Zhejiang, Tian Mu Shan, 1♂, 1998.V.20, coll. Zhiyong Yu. Jiangxi, Yiyang, 1♂, 1979.V.28, coll. Youwei Zhang. Sichuan, Jin He, Yanyuan, 1270 m, 1♂, 1984.VI.29, coll. Shuyong Wang; 1230 m, 1♂, 1984.VII.2, coll. Shuyong Wang. Yunnan, Liu De, Yong Sheng, 2250 m, 1♂, 1984.VII.9, coll. Dajun Liu.

[BMNH] Tenasserim, 1♂, Atkinson, Coll. 92-3 (Lectotype).

Distribution. China (Hong Kong, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Jiangsu, Shanghai, Sichuan, Taiwan, Yunnan, Zhejiang), India, Myanmar, Thailand, Vietnam.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.17 *Onitis falcatus* (Wulfen, 1786)

Scarabaeus falcatus Wulfen, 1786, *Descr. Capens. Ins.*: 14, t.2, f.17.

Onitis sphinx Herbst, 1789, *Nat. Kafer*, 2: 186, t.13, f.8 (nec Fabricius, 1775).

Onitis himalayicus Kollar & Redtenbacher, 1848, *Hügel's Kaschmir*, 4(2): 518 (ANLW).

Onitis falcatus: Lansberge, 1875, *Ann. Soc. Ent. Belg.*, 18: 53, 126.

Onitis kiuchii Masumoto, 1995, *Ent. Rev. Jap.*, 50: 88; Hanboonsong & Masumoto, 2000, *Elytra*, 28(1): 108, illustr. (Syn.).

Material examined. [AFCD] China, Hong Kong, Shing Mun, 1♂, 2016.V.17, coll. M.H. Leung; Sai Wan, 1♂, 2017. IV.19, coll. M.H. Leung.

[IZAS] China, Shanghai, 5♂3♀, 1930.VII.8, coll. unknown. Hubei, Huangpo, 4♂4♀, 1978.V.31, coll. Youwei Zhang; Zigui Jiulingtou, 110 m, 1♂2♀, 1994.IX.7, coll. Jian Yao. Jiangxi, Yeyang, 7♂8♀, 1979.V.29, coll. Youwei Zhang. Hainan, Diaoluoshan, 1♂2♀, 1987.V.28, coll. Wenzhu Li; Jianfengling Tianchi, 1♂2♀, 1982.VI.31, coll. Huanqiang Chen; Diaoluoshan, 2♀, 1984.V.4, coll. unknown; Wuzhishan, 800 m, 1♂1♀, 1987.V.28, coll. Wenzhu Li. Guangxi, Fangcheng Fulong, 200–500 m, 2♂3♀, 1999.V.24, coll. Yanzhou Zhang; Fangcheng Fulong, 200–500 m, 1♂3♀, 1999.V.23, coll. Xin Ke; Fangcheng Dongzhong, 200–500 m, 4♂6♀, 1999.VI.4, coll. Jun Chen; Shangsi Nanping, 200–300 m, 6♂8♀, 1999.VI.10, coll. Wenzhu Li; Longzhou Sanlian, 350 m, 1♂3♀, 1999.VI.13, coll. Wenzhu Li, Jun Chen. Yunnan, Mangshi, 900 m, 1♂1♀, 1955.V.16, coll. Появ; Nujiang, 800 m, 1♂3♀, 1955.V.1; Mangshi Mt. Santai, 1200 m, 1♂3♀, 1955.V.18, coll. Yi Zhao; Xiaomengyi, 850 m, 5♂4♀, 1957.IV.2, coll. Fuji Pu; Jinping County, 500 m, 7♂9♀, 1956.V.2, coll. Keren Huang; Puer, 1500 m, 1♂1♀, 1955.IV.19, coll. Caiyun Zhou; Liku Menghai, 720 m, 1♂, 1957.IV.23, coll. Guangji Hong. Vietnam, Hoa-Binh, 1♂, coll. Cooman; Hanoi, 20 m, 5♂8♀, 2000.XII.23, coll. Wenzhu Li; Mangjie, 2♂1♀, 2000.VII.3, coll. Wenzhu Li.

[BMNH] Sikkim, Rungbong Vall., Gopaldhara, 3♂2♀, H. Stevens Coll., 1916-218; Perak, F. M. S., 1♂, 1907.IX; Bengal, Darjiling, Singla, 1500ft., 1♂, 1930-VI; Mahe, chasseurs indigenes, 1♂, about 1901.

Distribution. China (Hong Kong, Beijing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangxi, Jiangxu, Shandong, Shanghai, Sichuan, Taiwan, Yunnan, Zhejiang), Bangladesh, India, Laos, Malaysia, Myanmar, Thailand, The Philippines, Vietnam.

3.2.18 *Onitis intermedius* Frivaldszky, 1892

Onitis intermedius Frivaldszky, 1892, *Term. Fuzetek*, 15: 122 (HNHM).

Materials examined: [AFCD] China, Hong Kong, Tai Mo Shan, 1♂4♀, 2010.V.13, coll. K.H. Cheung; Grassy Hill, 1♂, 2010.VI.14, coll. K.H. Cheung; Grassy Hill, 1♀, 2010.VIII.27, coll. K.H. Cheung.

[HNHM] China, Shanghai, 1♂, Exp. Szechenyi (Holotype).

Distribution. China (Hong Kong, Shanghai), Vietnam.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.19 *Onitis subopacus* Arrow, 1931

Onitis philemon Lansberge, 1875, *Ann. Soc. Ent. Belg.*, 18: 133 (BMNH (nec Fabricius 1801); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 395 (Junior homonym of *Onitis philemon* Fabricius, 1801).

Onitis subopacus Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 395 (BMNH) (n. name for *Onitis philemon* Lansberge, 1875 preoccupied).

Materials examined: [AFCD] China, Hong Kong, Tai Mo Shan, 1♀, 2015.IX.17, coll. M.H. Leung; Unknown, 1♀, 2010.VII.02, coll. K.H. Cheung.

[IZAS] China, Yunnan, Jingdong, 1200m, 3♂6♀, 1957.III.15; Yunnan, Mengla, Jinping, 500m, 2♂3♀, 1956.V.2, coll. Keren Huang; Yunnan, Cheli, 620m, 3♂4♀, 1957.IV.8, coll. Shuyong Wang; Yunnan, Damengla, 700m, 3♂1♀, 1957.IV.10, coll. Fuji Pu.

[BMNH] Ceylon, Haldummulle, Kalupahani, 1♂, 1904-171 (Type); India, 1916.?.?, 1♂, coll. Pusa; Bengal, Darjiling, Singla, 1500ft., 1♀, 1930.VI.

Distribution. China (Hong Kong, Guangdong, Guangxi, Hainan, Yunnan), Myanmar, India, Malaysia, Nepal, Sri Lanka, Thailand.

Remarks. The species is firstly recorded in Hong Kong, China.

Tribe Onthophagini Burmeister, 1846

Onthophagini Burmeister, 1846, *Genera Quaedam Insectorum*: ? [unnumbered pages] (Original spelling as Onthophagidae, type genus: *Onthophagus* Latreille, 1802).

Alloscelini Janssens, 1946, *Mém. Mus. R. Hist. Nat. Belg.*: 10 (Original spelling as Alloscelides, type genus: *Alloscelus* Boucomont, 1923).

Key to genera of Onthophagini from Hong Kong.

- 1 Front margin of protibia straight and perpendicular to the inner margin; pronotum with marginate antennae concave..... *Caccobius* Thomson, 1863
 The above characteristics not present or not present at the same time *Onthophagus* Latreille, 1802

Genus *Caccobius* Thomson, 1863

Caccobius Thomson, 1863, *Skand. Col.*, 5: 34 (Type species: *Scarabaeus schreberi* Linnaeus, 1767, by original designation, deposited in UZIU).

Onthophagus Raffray, 1877, *Rev. Mag. Zool.*, 40: 321.

Subg. *Caccophilus* Jekel, 1872, *Rev. Mag. Zool.*, 23(2): 410.

Subg. *Cacconemus* Jekel, 1872, *Rev. Mag. Zool.*, 23(2): 418.

Subg. *Tomogonus* D'Orbigny, 1904, *Ann. Mus. Civ. Genova*, 41: 254.

Key to species of *Caccobius* from Hong Kong.

- 1 Body length of 2.5–3.0 mm, male head with one horn *Caccobius (Caccophilus) unicornis* Fabricius, 1798
 Body length of 4.5–5.5 mm, male head without horn *Caccobius (Caccophilus) brevis* Waterhouse, 1875

Subg. *Caccobius (Caccophilus)* Jekel, 1872

Caccophilus Jekel, 1872, *Rev. Mag. Zool.*, 23(2): 410. (Type species: *Caccobius himalayamus* Jekel, 1872, by original designation,

deposited in SMTD).

3.2.20 *Caccobius (Caccophilus) brevis* Waterhouse, 1875

Caccobius brevis Waterhouse, 1875, *Trans. Ent. Soc. London*, 1: 73 (BMNH, MNHN).

Caccobius atomarius Balthasar, 1935a, *Kol. Rundschau*, 21: 185, 192; Kabakov, 1979, *Zhuki Vost. Vos. Sib.*: 70 (Syn.).

Caccobius matsuoii Matsumura, 1937, *Ins. Matsum.*, 11: 120.

Material examined. [AFCD] China, Hong Kong, Pui O, 1 ex., 2010.II.20, coll. C.H. Shih.

[IZAS] China, Shanxi, Yicheng, dahexiang, 1130 m, 1♀, 1982.VII.25, coll. unknown.

[BMNH] Japan, Hiogo, 1♀ (Syntype); Japan, Awornoti, 1♀, 1980.VIII.31, coll. G. Lewis (Syntype).

[MNHN] Lewis, 1♀ (Syntype); Japan, G. Lewis, Museum Paris, 1936, coll. A. Boucomont (Syntype).

[NMPC] Sibiria orient, B. v. Bodemeyer, 1♀ (Type of *Caccobius atomarius* Balthasar, 1935).

Distribution. China (Hong Kong, Beijing, Hebei, Inner Mongolia, Shanxi, Tianjin), Japan, Russia.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.21 *Caccobius (Caccophilus) unicornis* (Fabricius, 1798)

Copris unicornis Fabricius, 1798, *Ent. Syst. Suppl.*: 33 (ZMUC, BMNH).

Onthophagus nitidiceps Fairmaire, 1893, *Ann. Soc. Ent. Belg.*, 37: 304 (MNHN); Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 145 (Syn.).

Onthophagus unicornis: Boucomont, 1914, *Ann. Mus. Civ. Genova*, 46: 236.

Caccobius unicornis: Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 145.

Caccobius yamacuchii Matsumura & Yohena, 1936, *Ins. Matsum.*, 11: 66.

Material examined. [AFCD] China, Hong Kong, Pui O, 1♂, 2017.XII.6, coll. M.H. Leung.

[IZAS] China, Beijing, 1♀, 1981.V.21, coll. Youwei Zhang. Hubei, Ziguimaoping, 60 m, 14♂3♀, 1994.IV.28, coll. Youwei Zhang; Ziguijulingtou, 110 m, 4♂7♀, 1994.IV.30, coll. Xinke Yang. Hainan, Wanning, 10 m, 1♂, 1960.IV.9, coll. Suofu Li; Baoting, 80 m, 1♂, 1960.V.15, coll. Suofu Li; Baoting, 80 m, 1♂, 1960.VII.26, coll. Suofu Li; Tongshen, 1♀, 1980.IV.2, coll. Shuyong Wang. Sichuan, Weiyuan, 1♂, 1986, coll. Chuanjing Chen. Yunnan, Ninglang Prov., 1♂, 2004.VII.13–15, coll. Caixia Yuan & Jingcai Li.

[ZMUC] Unknown, 1♀ (Syntype); Java, 1♂ (Syntype); Tranguebaria, 2♀ (Syntype).

[BMNH] Sikkim, Pedong, 6090 ft., 1♀, 1924.III.28, coll. R. W. G. Hingston (Paralectotype); N. Borneo, Samawang, SR. Sandakan, 2♂4♀, 1927.VI.12; Tientsin, 3♂4♀, 1906.VI.15, coll. F. M. Thomson; N. Borneo, Nr. Sandakan, 4♂6♀, 1927.XII.7.

[MNHN] Saigon, Museum Paris, 1906.?.?. coll. Leon Farimaire (Type of *Onthophagus nitidiceps* Fairmaire, 1893).

Distribution. China (Hong Kong, Beijing, Hainan, Hubei, Sichuan, Taiwan, Tianjin, Yunnan), India, Indonesia, Japan, Laos, Malaysia, Myanmar, North Korea, Sri Lanka, Philippines, Vietnam.

Genus *Onthophagus* Latreille, 1802

Onthophagus Latreille, 1802, *Hist. Nat. Crust. Ins.*, 3: 141 (Type species: *Scarabaeus taurus* Schreber, 1759).

Monapus Erichson, 1847, *Naturg. Ins. Deutschl. Col.*, 3: 763 nota (Type species: *Onthophagus mniszzechi* Harold, 1869).

Psilax Erichson, 1847, *Naturg. Ins. Deutschl. Col.*, 3: 763 nota (Type species: *Onthophagus pronus* Erichson, 1842).

Chalcoderus Erichson, 1847, *Naturg. Ins. Deutschl.*, 3: 763 nota.

Gonocyphus Lansberge, 1885, *Ann. Mus. Civ. Genova*, 22: 382.

Tauronthophagus Shipp, 1895, *Entom.*, 28: 179.

Onthoellus Balthasar, 1959, *Sbornik Ent. Odd. Nár. Mus. Praze*, 33: 466.

Key to subgenera of *Onthophagus* from Hong Kong.

- 1 Antennal scape markedly serrated on the outer margin; protibia not strongly extended and curved in male *Onthophagus (Serrophorus)* Balthasar, 1963
- Antennal scape smooth or weakly serrated on the outer margin; if serrated, protibia strongly extended and curved in male 2
- 2 The base of male pronotum with lobe-like backward projection and convex, the convex with parallel lateral ridges, or with horns at the front, or with triangular or polygonal disc *Onthophagus (Paraphanaeomorphus)* Balthasar, 1959
- The base of male pronotum without lobe-like backward projection and not convex, without ridge, without horn at the front, without triangular or polygonal disc 3
- 3 Black or dark brown, sometimes metallic; elytra with knobs at the base; pygidium marginated at the base; male pronotum complex with base marginated, front margin of protibia straight, spurs of protibia strongly broaden and oblique; female head with two ridges, front ridge fine and long; body length of 7–14 mm *Onthophagus (Colobonthophagus)* Balthasar, 1963

- The above characteristics not present or not present at the same time 4
- 4 Male pronotum with two or more knobs in the central disc, with one longitudinal groove between the knobs; female pronotum simple; dark brown from dorsal view, or elytra in yellow sometimes with black spots; body length of 5–10 mm *Onthophagus (Gibbonthophagus) Balthasar, 1963*
- Male pronotum without two or more knobs in the central disc; female pronotum not simple, usually with horn(s) near the front 5
- 5 The first segment of antennal club greatly developed and cup-like; male clypeus with tooth or T-shape projection on the front margin; head without horn; pygidial base marginated; black from dorsal view, or just head and pronotum with metallic sheen *Onthophagus (Parascatonomus) Paulian, 1932*
- The first segment of antennal club not greatly developed and not cup-like; the rest of the above characteristics not present or not present at the same time 6
- 6 Pronotum with projection near the front disc *Onthophagus (Furconthophagus) Zunino, 1979*
- Pronotum without projection or with more than one projection near the front disc 7
- 7 Pronotum with one concave near front disc *Onthophagus (s. str.) Latreille, 1802*
- Pronotum without concave near front disc *Onthophagus (Matashia) Matsumura, 1938*

Subg. *Onthophagus (s. str.) Latreille, 1802*

Onthophagus Latreille, 1802, *Hist. Nat. Crust. Ins.*, 3: 141 (Type species: *Scarabaeus taurus* Schreber, 1759).

Key to species of *Onthophagus (s. str.)* from Hong Kong.

- 1 Head with one long slender horn in male *Onthophagus (s. str.) hastifer* Lansberge, 1885
- Head with two long slender horns in male *Onthophagus (s. str.) roubali* Balthasar, 1935

3.2.22 *Onthophagus (s. str.) hastifer* Lansberge, 1885

Onthophagus hastifer Lansberge, 1885, *Ann. Mus. Civ. Genova*, 22: 380(♂) (MCSN, BMNH).

Onthophagus turbatus Boucomont & Gillet, 1921, *Faune Ent. Indoch. Fr.*, 4: 38 (nec Walker, 1858).

Onthophagus turmalis Gillet, 1924, *Ann. Soc. Sci. Brux.*, 44: 66.

Onthophagus agilis Matsumura, 1938, *Ins. Matsum.*, 12(2–3): 56.

Onthophagus puetalis Matsumura, 1938, *Ins. Matsum.*, 12(2–3): 61.

Material examined. [MCSN] Minhla, Birmania, 1♂, D. Comotte, 18 (holotype); 1♂3♀, same data as holotype (paratype). [BMNH] China, Taiwan, Tainan, 2♀, 1911.VII, coll. N. Sauter (Cotype); Victoria Point, Tenasserim, 1♀, 1887.VIII; Ceylon, 1♂, G. Lewis Coll., 1910–320; China, 5♂.

[MNHN] 1♂, Indes Orient.

[ZIN] 1♂, Myanmar, Chatthin, 2002.VIII.15–20.

Distribution. China (Hong Kong, Fujian, Guangdong, Hainan, Taiwan), Myanmar, Sri Lanka.

3.2.23 *Onthophagus (s. str.) roubali* Balthasar, 1935

Onthophagus roubali Balthasar, 1935b, *Fol. Zool. Hydrob.*, 8: 316, 337 (NMPC).

Material examined. [AFCD] China, Hong Kong, Ng Tung Chai, 1♂, 2014.XI.12, coll. M.H. Leung.

[NMPC] China, Süd Szechuan, Yüling, Tatsienlu, 1♀ (Holotype).

Distribution. China (Hong Kong, Sichuan, Taiwan).

Remarks. The species is firstly recorded in Hong Kong, China.

Subg. *Onthophagus (Colobonthophagus) Balthasar, 1963*

Onthophagus (Colobonthophagus) Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 2: 164 (Type species: *Scarabaeus tragus* Fabricius, 1792).

Key to species of *Onthophagus (Colobonthophagus)* from Hong Kong.

- 1 Head with long lobe-like horn, the base of the horn greatly broadened; pronotum with strongly developed lobe-like horn pointing forward *Onthophagus (Colobonthophagus) lunatus* Harold, 1868
- Head without horn or with horn in different shapes; pronotum without horn 2
- 2 Head with a straight ridge; horn(s) not strongly developed and connected with the lobe-like ridge *Onthophagus (Colobonthophagus) armatus* Blanchard, 1853
- Head with a curved ridge, horn(s) strongly developed and not connected with the ridge *Onthophagus (Colobonthophagus) tragus* Fabricius, 1792

3.2.24 *Onthophagus (Colobonthophagus) armatus* Blanchard, 1853

Onthophagus armatus Blanchard, 1853, *Voy. Pole Sud.*: 98, Tf. 7, Fig. 9, 10 (MNHN).

Onthophagus luzonicus Lansberge, 1883, *Notes Leyd. Mus.*, 5: 51; Boucomont, 1914b, *Ann. Soc. Ent. Fr.*, 83: 305 (syn.).

Onthophagus pseudoarmatus Balthasar, 1944, *Sbornik Ent. Odd. Nár. Mus. Praze*, 21–22: 93 (NMPC).

Material examined. [AFCD] China, Hong Kong, Chek Keng, 3♂2♀, 2015.VIII.25, coll. M.H. Leung.

[NMPC] China, Kwangtse-Fukien, 1♀, 1937.X.9, coll. L. Klapperich (Type of *Onthophagus pseudoarmatus* Balthasar, 1944); China, Kwangtse-Fukien, 1♂, 1937.X.30, coll. L. Klapperich (Type of *Onthophagus pseudoarmatus* Balthasar, 1944).

[TOCO] China, Taiwan, Lan-yu Is. (Orchid Is.), 1♂1♀, 1986.IV.18–22, coll. M. Ohara.

[BMNH] Java, Buitenzorg, 1♂, 1926–97, coll. V. De Poll; Deccan, Ahmadnagar, 1♂2♀, 1932, coll. J.E.M. Boyd. China, Foochow, 2♂3♀, 1930.VIII.18, coll. M.S. Yang (T. Branco 1988 Det. *Onthophagus pseudoarmatus* Balthasar, 1944). China, Foochow, 4♂5♀; Philipp. Is., Baker, Luzou, Mt. Makiling, 1919–2, 1♂1♀, C.F. Baker (Original Det. *Onthophagus luzonicus* Lansberge, 1883).

[MNHN] Borneo, 1♂ (Lectotype); Borneo, 1♀ (Cotype); Los Banos, 3♂4♀, coll. P.I. Baker; Kiang-Si, 5♂7♀, 1869.?.?. coll. A. David; Tonkin Central Region de Tuyen-Quan, et de Dong-Chau, 1♂2♀, 1901.?.?. coll. A. Weiss.

Distribution. China (Hong Kong, Fujian, Jiangxi, Guangdong, Taiwan), India, Indonesia, Malaysia, Philippines.

3.2.25 *Onthophagus (Colobonthophagus) lunatus* Harold, 1868

Onthophagus lunatus Harold, 1868b, *Col. Hefte*, 4: 84 (MNHN).

Onthophagus laminatus Taschenberg, 1879, *Zeit. Ges. Nat. Wiss.*, 4: 107 [HN].

Onthophagus lamellatus Boucomont, 1924, *Bull. Soc. Ent. Fr.*, 1924: 115 [RN].

Onthophagus taschenbergi Gillet, 1925, *Arkiv Zool.*, 17(7): 10 [RN].

Material examined. [AFCD] China, Hong Kong, Pui O, 3 ex., 2010.VII.20, coll. C.H. Shih; Pui O, 1♂, 2015.VIII.6, coll. K.H. Cheung; Sai Lau Kong, 2♂3♀, 2015.VIII.28, coll. M.H. Leung; Cheung Sha, 1♂, 2015.IX.15, coll. M.H. Leung; Sai Wan, 1♂, 2017.IV.19, coll. M.H. Leung.

[BMNH] China, Amoy, 1♂2♀, 1923; Hong Kong, Lantau Island, 2♀, 1979.IX.11, coll. G.F. Bornemissza.

[MNHN] China, Hong Kong, Ex-Musaeo E. Harold, 1♂ (Cotype); Ex-Musaeo E. Harold, 1♂2♀ (Cotype).

Distribution. China (Hong Kong, Fujian, Guangdong, Hainan, Taiwan).

3.2.26 *Onthophagus (Colobonthophagus) tragus* (Fabricius, 1792)

Scarabaeus tragus Fabricius, 1792, *Ent. Syst.*, 1: 56 (ZMUC).

Onthophagus fulvicornis Motschulsky, 1854, *Etud. Ent.*, 2: 45 (ZMUM).

Onthophagus ibex Motschulsky, 1854, *Etud. Ent.*, 3: 63 (ZMUM) [HN].

Onthophagus mandarinus Harold, 1859, *Berl. Ent. Zeit.*, 3: 224 [RN].

Onthophagus neptunulus Lansberge, 1883, *Not. Leyden Mus.*, 5: 50.

Onthophagus hypertropis Olsoufieff, 1900, *Ann. Mus. Zool. Petersb.*, 5: 269.

Caccobius (Caccophilus) tsunoellus Matsumura, 1938, *Ins. Matsum.*, 12: 55; Ochi & Araya, 1996, *Giorn. Ital. Ent.*, 8(42): 6 (Syn.).

Onthophagus tragus: Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 303.

Material examined. [AFCD] China, Hong Kong, Sai Lau Kong, 3 ex., 2015.VIII.28, coll. M.H. Leung; Cheung Sha, 3 ex., 2015.IX.15, coll. M.H. Leung.

[ZMUC] China, 1♂ (Lectotype); Unknown, 1♂ (Paralectotype).

[BMNH] China, Foochow, 2♂3♀, 1935.VI, coll. M.S. Yang; China, Hong Kong, 2♂2♀; Berhampur, 1♀; Burma, 1♀.

[NMPC] China, Fukien, Shaowu, 500m, 2♂3♀, 1937.X.29–30, coll. J. Klapperich.

Distribution. China (Hong Kong, Fujian, Guangdong, Hebei, Shanxi, Sichuan, Taiwan, Yunnan), South Korea.

Subg. *Onthophagus (Furconthophagus) Zunino, 1979*

Onthophagus (Furconthophagus) Zunino, 1979, *Boll. Mus. Zool. Univ. Tor.*, 1: 10 (Type species: *Scarabaeus furcatus* Fabricius, 1781).

3.2.27 *Onthophagus (Furconthophagus) dapcauensis* Boucomont, 1921

Onthophagus dapcauensis Boucomont, 1921 in Boucomont & Gillet, 1921, *Faune Ent. Indoch. Fr.*, 4: 30 (MNHN).

Material examined. [BMNH] Tonkin, Hoa Binh, 1♂, de Cooman Coll; China, 2♂3♀.

[MNHN] Poulo Condor, Vitalis, 2♂3♀, 1924.?.? (Cotype). Annam, 1♂; Saigon, Vitalis, 1924.?.?, 1♀.
Distribution. China (Hong Kong, Guangdong, Taiwan), Vietnam.

Subg. *Onthophagus (Gibbonthophagus) Balthasar, 1963*

Onthophagus (Gibbonthophagus) Balthasar, 1963, Monogr. Scarab. Aphod. Palaearkt. Orient. Reg., 2: 163 (Type species: *Onthophagus atripennis* Waterhouse, 1875).

Key to species of *Onthophagus (Gibbonthophagus)* from Hong Kong.

- 1 Pronotum with depression or groove the near front 2
Pronotum without depression or groove near the front 3
- 2 Pronotum concave and margined; elytra with dark brown spots in interstriae and striped from dorsal view
..... *Onthophagus (Gibbonthophagus) taurinus* White, 1844
Pronotum concave but not obviously margined; elytra with dark brown spots but scatterly distributed and not striped from dorsal view..... *Onthophagus (Gibbonthophagus) luridipennis* Boheman, 1858
- 3 Pronotum and elytra in similar colour, usually yellow brown with dark spot in irregular pattern; pronotum scattered with big punctures
..... *Onthophagus (Gibbonthophagus) rectecornutus* Lansberge, 1883
Pronotum dark brown to black; elytra in light colour; pronotum without dark spot in irregular pattern; pronotum with dense and fine punctures..... *Onthophagus (Gibbonthophagus) proletarius* Harold, 1875

3.2.28 *Onthophagus (Gibbonthophagus) luridipennis* Boheman, 1858

Onthophagus luridipennis Boheman, 1858, *Eugenies Resa. Zool.*, 1: 45 (NHRS).

Onthophagus fuscopunctulatus Boucomont, 1914b, *Ann. Soc. Ent. Fr.*, 83: 292 [RN].

Onthophagus fuscopunctatus Lansberge (nec Fabricius), 1883, *Not. Leyden, Mus.*, 5: 48 [HN] (MNHN).

Onthophagus (Gibbonthophagus) luridipennis: Kabakov & Yanushev, 1983, *Fauna Eco.Anim. Viet.*: 159, illustr.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 2♂2♀, 2010.IV.28, coll. unknown; Shui Hau, 1, 2010.XI.18, coll. C.H. Shih; Chek Keng, 2♀, 2015.VIII.25, coll. M.H. Leung; Tai Mo Shan, 1♂1♀, 2015.IX.17, coll. M.H. Leung; Kat O, 3♀, 2015.X.29, coll. M.H. Leung; Lai Chi Wo, 1♂, 2016.IV.7, coll. M.H. Leung; Chek Keng, 1♀, 2016.IX.5, coll. M.H. Leung.

[BMNH] Malay, Penang, 3♂2♀, 1915.I.4–9, coll. Dr. M. Cameron; India, Sitapahar, R. Chittagong, 1923.V.5–10, coll. H.T.C.F.C. Beeson; China, 2♂2♀.

[MNHN] Java Occ., Ex-Musaeo, Van Lansberge, M. Salak (Syntype of *Onthophagus fuscopunctatus* Lansberge, 1883); China, Yunnan, Se-Tchuen, Thibet, 2♂, 1909.?.?, coll. P. Cavalerie; Tsekou, 3♂2♀, 1902.?.?, coll. R.P.J. Dubernard; Tonkin Hoa-Binh, Region DR, Boa-Binh, 1♀.

[NMPC] China, Fukien, Shaowu, 500m, 3♂4♀, 1937.X.29–30, coll. J. Klapperich.

[ZIN] W. Himalayas, Nanital Suthkoe, 1200m, 1♂, 2003.XI.8; N. Vietnam, 180km SSW Hanoi, 40km SW Thanh Hoa, Ben En Nat. Park, 50m, 1♂1♀, 1997.VII.23–VIII.7, coll. A. Napolov.

Distribution. China (Hong Kong, Fujian, Taiwan, Yunnan), India, Malaysia, Vietnam.

3.2.29 *Onthophagus (Gibbonthophagus) proletarius* Harold, 1875

Onthophagus proletarius Harold, 1875, *Col. Hefte*, 13: 89 (MNHN).

Onthophagus mendicus Gillet, 1924, *Ann. Soc. Sc. Brux.*, 44: 67 (ISNB).

Onthophagus (Gibbonthophagus) proletarius: Kabakov & Shokhin, 2014, *Cau. Ent. Bull.*, 10(1): 50.

Material examined. [AFCD] China, Hong Kong, Pui O, 2♂1♀, 2010.VII.20, coll. C.H. Shih; Fung Yuen, 7♂9♀, 2014.XI.5, coll. K.H. Cheung; Mui Tsz Lam, 9♂6♀, 2015.VIII.18, coll. M.H. Leung; Shing Mun, 1♀, 2015.VIII.25, coll. M.H. Leung; Lam Tsuen, 1♂, 2017.VIII.22, coll. M.H. Leung.

[ISNB] China, Formosa, Taihorin, 1♂, 1911.VII, coll. H. Sauter (Lectotype of *Onthophagus mendicus*, Design. MAS. *et. al.*, 2005); China, Formosa, Taihorin, 2♀, 1911.VII, coll. H. Sauter (Paralectotype of *Onthophagus mendicus*, Design. MAS. *et. al.*, 2005);

[BMNH] China, Hong Kong, 2♀; Singapore, 1♂2♀, 1915.IX.19, coll. Dr. M. Cameron; Tonkin, 1♀; Ceylon, Dikoya, 3500–4200ft., 1♂, 1881.XII.6–1882.I.16, coll. G. Lewis.

[MNHN] Ex-Musaeo, E. Harold, 1♂ (Lectotype, Design. Zunino, 1976); Ex-Musaeo, E. Harold, 2♀ (Paralectotype, Design. Zunino, 1976).

[NMPC] China, Formosa, Taihorin, 1♂, 1911, coll. H. Sauter.

[ZIN] Laos, Thakhek, Boneng, 1♂, 200m, 1984.X.27, coll. Kabakov.

Distribution. China (Hong Kong, Fujian, Hainan, Taiwan, Yunnan), Laos, Singapore, Sri Lanka, Vietnam.

3.2.30 *Onthophagus (Gibbonthophagus) rectecornutus* Lansberge, 1883

Onthophagus rectecornutus Lansberge, 1883, *Notes Leyden Mus.*, 5: 49(♀) (MNHN); Arrow, 1907, *Ann. Mag. Nat. Hist.*, 19(7): 421(♂).

Onthophagus luridus Paulian, 1933, *Bull. Soc. Zool. Fr.*, 57: 98.

Onthophagus (Gibbonthophagus) rectecornutus: Kabakov & Shokhin, 2014, *Cau. Ent. Bull.*, 10(1): 50.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 7♂, 2010.IV.28, coll. unknown; Shing Mun, 1♀, 2011.IX.1, coll. K.H. Cheung; Cheung Sheung, 1♀, 2012.IV.22, coll. W.G. Liu; Ma On Shan, 1♀, 2012.IV.22, coll. W.G. Liu; Sam A Tsuen, 1♂, 2012.IV.24, coll. W.G. Liu; Shing Mun, 1♀, 2013.I.3, coll. K.H. Cheung; Pui O, 2♀, 2015.VIII.6, coll. K.H. Cheung & M.H. Leung; Chek Keng, 5♂, 2015.VIII.25, coll. M.H. Leung; Kat O, 2♀, 2015.X.29, coll. M.H. Leung.

[IZAS] Vietnam, Laboratory of Hanoi University, 20m, 3♂7♀, 2000.XII.23, coll. Wenzhu Li.

[BMNH] Luang Prabang, Ban Samang, 6♂7♀, 1918.XI.20, coll. R.V. de Salvazza; Haut Mekong, Muong Sing, 3♂8♀, 1918.IV.18, coll. R.V. de Salvazza; Sri Lanka, Undugoda, 1♂, 1979.VI.24, coll. G.F. Bornemissza.

[MNHN] Lombok, Sambalun, 4000 ft, 1♂, 1896.IV, coll. H. Fruhstorfer; Laos, Ban Na Khua, 1♂2♀; Tokin, Sept., Frontiere, de Chine, Ha-Qiang, 1♂, 1901.?.?. coll. A. Weiss.

[ZIN] Vietnam, 1♂, 1962.XI.28.

Distribution. China (Hong Kong, Fujian, Guangdong, Guizhou, Taiwan, Yunnan), Bhutan, India, Laos, Sri Lanka, Vietnam.

3.2.31 *Onthophagus (Gibbonthophagus) taurinus* White, 1844

Onthophagus taurinus White, 1844, *Ann. Mag. Nat. Hist.*, 14: 424 (BMNH).

Onthophagus egurianus Matsumura, 1938, *Ins. Matsum.*, 12: 57.

Matashia mushensis Matsumura, 1938, *Ins. Matsum.*, 12: 62.

Onthophagus (Gibbonthophagus) taurinus: Kabakov & Yanushev, 1983, *Fauna Eco.Anim. Viet.*: 159, illustr.

Material examined. [AFCD] China, Hong Kong, Fung Yuen, 2♀, 2014.XI.5, coll. K.H. Cheung; Kat O, 2♀, 2015.X.29, coll. M.H. Leung; Chek Keng, 1♀, 2015.VIII.25, coll. M.H. Leung; Chek Keng, 1♂, 2016.IX.5, coll. M.H. Leung.

[BMNH] China, Hong Kong, 1♂ (Type); Hong Kong, 2♀, Walker Coll.; 1♀, Doherty, Jeussseum & Javoy; China, Formosa, Morisha, 1♂1♀, 1918.V–VIII; Foo Chow (Fuzhou), 1♂, 77–37.

[TOCO] China, Formosa, Liukuei, 1979.X.6, 1♂, coll. V. Cheng.

[MNHN] Tonkin, 1♂1♀, coll. Thau Moi; Foo Chou, 1♂1♀.

Distribution. China (Hong Kong, Fujian, Hubei, Shanghai, Taiwan), Vietnam.

Subg. *Onthophagus (Matashia) Matsumura, 1938*

Onthophagus (Matashia) Matsumura, 1938, *Ins. Matsum.*, 12: 63 (Type species: *Matashia mushana* Matsumura, 1938).

3.2.32 *Onthophagus (Matashia) lenzi* Harold, 1874

Onthophagus lenzi Harold, 1874, *Abh. Nat. Ver. Bremen*, 4: 290 (MNHN).

Onthophagus marginithorax Vřetečka, 1939, *Cas. Cs. Spol. Ent.*, 36: 44.

Onthophagus basicruentatus Goidanich, 1926, *Boll. Soc. Adr. Sc. Nat.*, 29: 136.

Material examined. [AFCD] China, Hong Kong, Wu Kau Tang, 2♀, 2016.VII.25, coll. M.H. Leung.

[BMNH] N. China, Hopen (Hebei), Peitaiho (Beidaihe), 2♂1♀, 1966.VIII.25, P. M. Hammond Coll.; Japan, 3♂3♀; Kobe, Japan, 2♂2♀; China, 4♂7♀.

[MNHN] 1♂3♀ (Cotype); Chine, Ningpo, 1♂1♀; Pekin, 3♂3♀; Kouy-Tcheou, 2♂3♀, 1910.?.?. coll. P. Cavalerie; Tchao Pin-Io, Chine, 1♂1♀; Kiang-Si, 1♂1♀, 1875.?.?. coll. A. David.

[NMPC] Nitou Tatsienlu, Szechuan, China, 3♂3♀; Schanghai, China, Provinz Kiangsu, 1♂, 1921.VII.5, coll. H. Hone.

Distribution. China (Hong Kong, Beijing, Fujian, Hebei, Heilongjiang, Jiangsu, Jiangxi, Jilin, Liaoning, Sichuan), Japan, North Korea.

Remarks. The species is firstly recorded in Hong Kong, China.

Subg. *Onthophagus (Paraphanaeomorphus) Balthasar, 1959*

Onthophagus (Paraphanaeomorphus) Balthasar, 1959, *Sbornik Ent. Odd. Nár. Mus. Praze*, 33: 465 (Type species: *Onthophagus phanaeicollis* Lansberge, 1883).

Key to species of *Onthophagus (Paraphanaeomorphus)* from Hong Kong.

- 1 Head with one straight horn; head and pronotum in strong metallic green, pronotum with one horn and two depressions; yellow area much bigger than black area on elytra..... *Onthophagus (Paraphanaeomorphus) argyropygus* Gillet, 1927
 Head with one flat horn extended backward; head and pronotum without strong metallic green colour; pronotum with two knobs but without depression; yellow area and black area in similar size on elytra
 *Onthophagus (Paraphanaeomorphus) trituber* (Wiedemann, 1823)

3.2.33 *Onthophagus (Paraphanaeomorphus) argyropygus* Gillet, 1927

Onthophagus argyropygus Gillet, 1927, *Ann. Soc. Ent. Belg.*, 67: 256 (ISNB).

Onthophagus egeus Boucomont, 1929, *Lingnan Sci. Jour.*, 7: 769 (nec Harold, 1877).

Material examined. [BMNH] China, 2♂2♀, 1846.IX.4; China, 1♂, 1852.VII.29.

[NMPC] China, Kanton, 1♀, 1963.XI.1.

[MNHN] China, Hong Kong, 2♂, 1927.X, Museum Paris, J. Duchaine.

[ZIN] Laos, Attopeu, SW Ban May, 1♂, 1986.III.20, coll. Kabakov.

Distribution. China (Hong Kong, Fujian, Taiwan), Japan, Laos.

3.2.34 *Onthophagus (Paraphanaeomorphus) trituber* (Wiedemann, 1823)

Copris trituber Wiedemann, 1823, *Zool. Mag.*, 2(1): 47 (ZMUC).

Onthophagus suturalis White, 1844, *Ann. Mag. Nat. Hist.*, 14: 424 (BMNH).

Onthophagus condorensis Boucomont, 1924, *Bull. Soc. Ent. Fr.*, 1924: 211 (MNHN).

Onthophagus (Paraphanaeomorphus) trituber: Kabakov & Yanushev, 1983, *Fauna Eco.Anim. Viet.*: 158, illustr.

Onthophagus (Paraphanaeomorphus) trituber jacobsoni Kabakov, 2006, *Lamel. Beet. Subf. Scarabaeinae Faun. Rus. Adj. Count.*: 330 (ZIN). **Syn. nov.**

Material examined. [AFCD] China, Hong Kong, Fung Yuen, 1♀, 2014.XI.5, coll. K.H. Cheung; Shing Mun, 1♀, 2015.VIII.26, coll. M.H. Leung.

[ZMUC] Batavia (Indonesia), 1♂1♀, 1815.?? (Syntype of *Copris trituber* Wiedemann, 1823); Java, 1♂1♀, 1815.?? (Syntype of *Copris trituber* Wiedemann, 1823).

[BMNH] China, Hong Kong, 1♂ (Type of *Onthophagus suturalis* White, 1844); Indian Ocean, Christmas Is., 1♀, 1933. I.21, coll. Hinter Haug; Singapore, 2♂5♀, 1921.VII, coll. C. J. Saunders.

[MNHN] Poulo Condor (Con Son Island, Vietnam), Vitalis, 1♂, 1924.?.?, Museum Paris, 1938 Coll. Boucomont (Syntype of *Onthophagus condorensis* Boucomont, 1924); Croisiere du Nirvana, Java, Buitenzorg, de Bearn, E. Cordier, 1♀, 1908.XII.15.

[ZIN] Vietnam, 1♂, 1963.VII.30.

Distribution. China (Hong Kong, Guangdong, Liaoning, Shanghai, Taiwan, Yunnan), India, Indonesia, Japan, Singapore, South Korea, Vietnam.

Discussion. The subspecies *Onthophagus (Paraphanaeomorphus) trituber jacobsoni* Kabakov, 2006 was established based on the characters in colouration, body size and punctures on elytra of five specimens from Liaoning, China. However, these characters are unstable and some even overlap with other “subspecies”. *Onthophagus (Paraphanaeomorphus) trituber jacobsoni* Kabakov, 2006 should thus be treated as an invalid subspecies.

Subg. *Onthophagus (Parascatonomus) Paulian, 1932*

Onthophagus (Parascatonomus) Paulian, 1932a, *Bull. Soc. Ent. Fr.*, 37: 212 (Type species: *Coomanius politus* Paulian, 1932 (= *Onthophagus renaudpauliani* Ochi & Araya, 1996)).

Coomanius Paulian, 1932b, *Bull. Soc. Ent. Fr.*, 37: 205 [HN].

Pseudonthophagus Balthasar, 1959, *Sbornik Ent. Odd. Nár. Mus. Praze*, 33: 466 (Type species: *Onthophagus penicillatus* Harold, 1879).

Key to species of *Onthophagus (Parascatonomus)* from Hong Kong.

- 1 Pronotum with dense and large granulated punctures, front side smooth without or with few punctures 2
 Pronotum with small and finely granulated punctures, front side not smooth..... 3

- 2 Body black *Onthophagus (Parascatonomus) miyakei* Ochi et Araya, 1992
 Body with more than one colours *Onthophagus (Parascatonomus) anguicorius* Boucomont, 1914
- 3 Head with two horns *Onthophagus (Parascatonomus) tricornis* (Wiedemann, 1823)
 Head without horn 4
- 4 Head and pronotum in dark metallic purple, shiny and with fine punctures; the two front teeth of protibia are united
 *Onthophagus (Parascatonomus) horni* Balthasar, 1935
 Head and pronotum not in dark metallic purple, not shiny and with big punctures; the two front teeth of protibia are not united
 *Onthophagus (Parascatonomus) nitidus* Waterhouse, 1875

3.2.35 *Onthophagus (Parascatonomus) anguicorius* Boucomont, 1914

Onthophagus anguicorius Boucomont, 1914a, *Ann. Mus. Civ. Genova*, 46: 210 (MNHN).

Onthophagus midorianus Matsumura, 1938, *Ins. Matsum.*, 12: 59; Nomura, 1973, *Ent. Rev. Jap.*, 25(1–2): 49 (syn.).

Material examined. [AFCD] China, Hong Kong, Pak Tam Au, 1 ex., 2017.VIII.8, coll. M.H. Leung.

[BMNH] China, 1♂1♀, 1849.VII.7; Hong Kong, 1♂1♀; Luang Prabang, 1♂, 1918.VI.28, coll. R.V. de Salvaza.

[MNHN] Laos, 1♂, 1915.V, coll. Salvaza (Paralecotype); Annam, 1♀, 1903, coll. An-Ninh, R.P.M. Maunier.

[NMPC] China, Fukien, Shaowu, 500m, 1♂, 1937.VI.27, coll. J. Klapperich.

[ZIN] Vietnam, 300m, 1♂, 1962.VI.19.

Distribution. China (Hong Kong, Fujian, Guangdong, Hainan, Taiwan), India, Laos, Vietnam.

3.2.36 *Onthophagus (Parascatonomus) horni* Balthasar, 1935

Onthophagus horni Balthasar, 1935b, *Fol. Zool. Hydrob.*, 8: 314–338 (NMPC).

Material examined. [BMNH] China, Hong Kong, 1♀, coll. Walker.

[NMPC] Nitou, Tatsienlu, Szechuan, China, 1♂, coll. Em. Reitter (Holotype); same data as holotype, 1♀ (Paratype).

Distribution. China (Hong Kong, Fujian, Sichuan), Korea.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.37 *Onthophagus (Parascatonomus) miyakei* Ochi & Araya, 1992

Onthophagus miyakei Ochi & Araya, 1992, *Giorn. Ital. Ent.*, 6: 89.

Material examined. [AFCD] China, Hong Kong, Tai Po Kau, 1 ex., 2015.VII.6, coll. M.H. Leung; Shing Mun, 1 ex., 2017.VIII.7, coll. M.H. Leung.

[NSMT] China, C. Formosa, Habon, 1♀, 1978.V.18.

Distribution. China (Hong Kong, Guangxi, Taiwan), Japan.

3.2.38 *Onthophagus (Parascatonomus) nitidus* Waterhouse, 1875

Onthophagus nitidus Waterhouse, 1875, *Trans. Ent. Soc. Lond.*, 1: 78 (BMNH).

Material examined. [BMNH] Japan, 75-15, 1♂ (Type); Japan, Idzu, 1♂1♀, 1910.VI, coll. S. Akiyama; Japan, Nagasaki, 2♂3♀, 1868, coll. G. Lewis.

[ZIN] Japan, Honshu, Sendai, 1♂, 1997.VI.6–13, coll. N. Volnovich.

Distribution. China (Hong Kong, Liaoning, Shanghai, Taiwan), Japan, South Korea.

3.2.39 *Onthophagus (Parascatonomus) tricornis* (Wiedemann, 1823)

Copris tricornis Wiedemann, 1823, *Zool. Mag.*, 2(1): 10 (ZMUC).

Onthophagus crassus Sharp, 1875b, *Col. Hefte*, 14: 51 (MNHN).

Onthophagus rectinicornis Fairmaire, 1878, *Ann. Soc. Ent. Fr.*, 8(5): 96 (MNHN).

Onthophagus (Parascatonomus) tricornis: Paulian, 1932a, *Bull. Soc. Ent. Fr.*, 37: 212.

Material examined. [AFCD] China, Hong Kong, Shing Mun, 2♂, 2017.VI.28, coll. M.H. Leung; Shing Mun, 1♀, 2017.VII.11, coll. M.H. Leung; Shing Mun, 1♀, 2017.VII.28, coll. M.H. Leung; Shing Mun, 3♂2♀, 2017.VIII.07, coll. M.H. Leung.

[IZAS] China, Jiangxi, Yifeng, 1♂.

[ZMUC] Bengal, 1♂ (Holotype).

[BMNH] China, Prov. Hupeh, Mts. Wu-schan, 2♂3♀, B. M. 1931-358; Java, 1♂; China, Haining, 1♂, Walker Coll.,

93-18; Tonkin, 1♂; Chine, Zicawei (Shanghai), 1♂, Nevinson Coll., 1918-14.

[ZIN] Vietnam, 1♂, 1967.VI.10.

[MNHN] China, 1♂, Museum Paris, 1906, coll. Leon Fairmaire (Syntype of *Onthophagus recticornis* Fairmaire, 1878).

Distribution. China (Hong Kong, Fujian, Hubei, Jiangxi, Shanghai, Taiwan, Yunnan, Zhejiang), Bangladesh, Indonesia, Japan, Vietnam.

Subg. *Onthophagus (Serrophorus)* Balthasar, 1963

Onthophagus (Serrophorus) Balthasar, 1963, *Monogr. Scarab. Aphod. Palaearkt. Orient. Reg.*, 2: 160. (Type species: *Scarabaeus seniculus* Fabricius, 1781).

Key to species of *Onthophagus (Serrophorus)* from Hong Kong.

- | | | |
|---|---|--|
| 1 | Head with two horns | 2 |
| | Head without horn or just with one horn..... | <i>Onthophagus (Serrophorus) senex</i> Boucomont, 1914 |
| 2 | Pronotum with two strong horns in right angle | <i>Onthophagus (Serrophorus) seniculus</i> Fabricius, 1781 |
| | Pronotum without horn | <i>Onthophagus (Serrophorus) sagittarius</i> Fabricius, 1775 |

3.2.40 *Onthophagus (Serrophorus) sagittarius* (Fabricius, 1775)

Scarabaeus sagittarius Fabricius, 1775, *Syst. Ent.*: 24 (BMNH).

Scarabaeus oryx Fabricius, 1792, *Ent. Syst.*, 1: 56(♂).

Copris javanus Fabricius, 1801, *Syst. Eleuth.*, 1: 33.

Copris obtusus Wiedeman, 1819, *Zool. Mag.*, 1(3): 158.

Copris erectus Wiedeman, 1819, *Zool. Mag.*, 1(3): 157.

Onthophagus sagittarius: Lansberge, 1883, *Not. Leyden Mus.*, 5: 71.

Material examined: [AFCD] China, Hong Kong, Pui O, 1♀, 2010.VII.20, coll. C.H. Shih; Shui Hau, 1♂, 2010.XI.18, coll. C.H. Shih; Ma On Shan, 1♂, 2012.IV.23, M. Bai; Sam A Tsuen, 1♀, 2012.IV.24, M. Bai; Chek Keng, 4♂3♀, 2015.VIII.25, coll. M.H. Leung; Kat O, 2♂3♀, 2015.X.29, coll. M.H. Leung.

[IZAS] China, Hainan, Qiongzong, 2♂3♀, 1997.V.27, coll. Wenzhu Li.

[BMNH] Indonesia, Sanur Bach., Bali, 2♂3♀, 1979.IX.19, coll. G.F. Bornemissza. (Syntype); Malay, Penang, 3♀, 1915.I.4–9, coll. Dr. M. Camoron; China, Hong Kong, Lantau Island, near Mui Wo, 1♀, 1990.X.15, coll. J.H. Martin; Dilli, Timor, 1♂, 1936.I.20–22, coll. Dr. M. Cameron; Cochinchina, 3♂3♀; Penang, Lamb, 1♀; Tanjong Priok, Batavia, 1♀.

[MNHN] Birmanie, Theinzeik, 1♂, 1913, coll. P. Loizeau; Buitenzorg, 1♀, 1898, coll. Ledrul.

[ZIN] Vietnam, 1♀, 1962.II.11, coll. Kabakov.

Distribution. China (Hong Kong, Fujian, Hainan, Taiwan), India, Indonesia, Malaysia, Myanmar, Vietnam.

3.2.41 *Onthophagus (Serrophorus) senex* Boucomont, 1914

Onthophagus senex Boucomont, 1914a, *Ann. Mus. Civ. Genova*, 46: 212 (MNHN).

Material examined. [BMNH] Haut Mekong, Vieng Vien, 1♂, 1918.VI.2; Lower Burma, Pegu, 1♀, 1900.III, coll. Bingham.

[MNHN] Cochinchine, Tayninh, Vitalis, 3♂1♀, 1924.?.?.

[NMPC] Pegu, India, 1♀; Laos, Tonkin, 1♂.

[ZIN] Laos, Thakhek, Boneng, 200m, 1♂, 1984.X.26, coll. Kabakov.

Distribution. China (Hong Kong, Guangdong), India, Laos, Myanmar, Vietnam.

3.2.42 *Onthophagus (Serrophorus) seniculus* (Fabricius, 1781)

Scarabaeus seniculus Fabricius, 1781, *Spec. Ins.*, 1: 23.

Scarabaeus brevipes Herbst, 1783, *Arch. Insect.*, 4: 10.

Scarabaeus novemmaculatus Gmelin, 1790, *Syst. Nat. Ed. Gmelin*, 1(4): 1544.

Onthophagus cornicollis D'Orbigny, 1902, *Ann. Soc. Ent. Fr.*, 71: 146 (MNHN).

Onthophagus seniculus: Boucomont & Gillet, 1921, *Faune ent. Indoch. Fr.*, 4: 36.

Material examined. [IZAS] China, Hainan, Wanning, 60m, 1♂2♀, 1963.VIII.6, coll. Baolin Zhang; Qiongzong, 2♂3♀, 1997.V.27, coll. Wenzhu Li.

[BMNH] India, 1♂, Fry Coll. 1905-100; China, 3♂3♀; Haut Mekong, Muong Sing, 1♂, 1918.IV.18, coll. R.V. de Salvaza.

[MNHN] Senegal, Museum Paris, coll. H. D'Orbigny 1915 (Syntype of *Onthophagus cornicollis* Orbigny, 1902); Annam, Phuo-Son, Nov. Dez., 2♂2♀, coll. H. Fruhstorfer; Salgon, 1♂1♀, 1924.?.?. coll. Vitalis.

[ZIN] Vietnam, 1♂, 1979.X.19.

Distribution. China (Hong Kong, Guangdong, Hainan, Taiwan, Yunnan), Laos, India.

Species incertae sedis, genus *Onthophagus*

Key to species incertae sedis of *Onthophagus* from Hong Kong.

- | | | |
|---|--|--|
| 1 | Elytra unicolorous, black or dark brown, rarely with red spots on tip or shoulders; head, pronotum and elytra in the same colour or metallic..... | 2 |
| | Elytra not unicolorous, always with light or dark spots; abdomen in light colour; rarely black from dorsal view, if so, then with strong metallic..... | 5 |
| 2 | Pygidium base with margin..... | <i>Onthophagus coracinus</i> Boucomont, 1914 |
| | Pygidium base without margin..... | 3 |
| 3 | The base of head horns without high ridge; pronotum with two blunt knobs..... | <i>Onthophagus brutus</i> Arrow, 1931 |
| | The base of head horns with one high ridge; pronotum simple without blunt knob..... | 4 |
| 4 | Male head with two horns; pronotum with hairs..... | <i>Onthophagus orientalis</i> Harold, 1868 |
| | Male head without horn; pronotum without hairs..... | <i>Onthophagus tricolor</i> Boucomont, 1914 |
| 5 | Head and pronotum in strong metallic colour..... | <i>Onthophagus tritinctus</i> Boucomont, 1914 |
| | Head and pronotum not in strong metallic colour..... | <i>Onthophagus convexicollis</i> Boheman, 1858 |

3.2.43 *Onthophagus brutus* Arrow, 1931

Onthophagus brutus Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 210, 215 (BMNH).

Material examined. [AFCD] China, Hong Kong, Lai Chi Chong, 1 ex., 2012.IV.27, coll. H.J. Xue; Shing Mun, 1 ex., 2015.VIII.26, coll. M.H. Leung.

[BMNH] India, Sarda, Bengal, 1♂, F.W.C.H.G. Champion, B. M. 1931-8 (Lectotype); Carin Cheba, 900–1000m, 1♀, 1888.V–XII, coll. L. Fea (Paralectotype).

[ZIN] Vietnam, 1♂, 1962.IX.27, coll. Kabakov.

Distribution. China (Hong Kong, Yunnan), India, Vietnam.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.44 *Onthophagus convexicollis* Boheman, 1858

Onthophagus convexicollis Boheman, 1858, *Eugenies Resa. Zool.*, 1: 145 (MNHN).

Material examined. [AFCD] China, Hong Kong: Robin's Nest, 1 ex., 2015.XI.03, coll. M.H. Leung.

[MNHN] China, Hong Kong, 1♂ (Holotype); China, 1♂2♀.

Distribution. China (Hong Kong).

3.2.45 *Onthophagus coracinus* Boucomont, 1914

Onthophagus coracinus Boucomont, 1914a, *Ann. Mus. Civ. Genova*, 46: 214 (MCSN).

Material examined. [MCSN] Carin Cheba, 900–1100m, 3♂6♀, 1888.V–XII, coll. L. Fea. (Syntype).

[BMNH] Haut Mekong, Nam Long, 2♂4♀, 1918.IV.26, coll. R.V. de Salvaza.

[MNHN] Carin Cheba, 900–1100m, 1988.V–VII, coll. L. Fea (Syntype).

[NMPC] China, Fukien, Shaowu, 500m, 1♂, 1937.VI.18, coll. L. Klapperich.

Distribution. China (Hong Kong, Fujian, Yunnan), India, Laos.

3.2.46 *Onthophagus orientalis* Harold, 1868

Onthophagus orientalis Harold, 1868b, *Col. Hefte*, 4: 83 (MNHN).

Onthophagus javaecola Balthasar, 1960, *Ent. Blätter*, 55: 194 (NMPC).

Material examined. [IZAS] China, Guangxi, Nanning, 1♂, 1990.?.?. coll. Shidong Tan.

[BMNH] Nepal, Chitwan, Tiger Tops, 150m, 4♂6♀, 1983.X.24, coll. K.K. Gurung; Tonkin, Thai-Nien Banks of Fleuve Rouge, 1♂1♀, 1924, coll. H. Stevens; Haut Mekong, Houei Sai, 1♂, 1918.VI.6–10, coll. R.V. de Salvaza.

[MNHN] Laferte, 5448, 1♂, Ex-Musaeo, D. Sharp 1890 (Cotype); Sing, Wallace, 1♀, Ex-Musaeo, D. Sharp 1890 (Cotype).

Distribution. China (Hong Kong, Fujian, Guangdong, Guangxi, Guizhou, Taiwan, Sichuan, Yunnan), Afghanistan, India, Laos, Nepal, Vietnam.

3.2.47 *Onthophagus tricolor* Boucomont, 1914

Onthophagus tricolor Boucomont, 1914b, *Ann. Soc. Ent. Fr.*, 83: 280, 283 (MNHN, BMNH).

Material examined. [AFCD] China, Hong Kong, Ma On Shan, 1 ex., 2012.IV.23, coll. M. Bai.

[BMNH] Java, 2♂, Boucomont Coll., 1914–163 (Cotype); Bogor, Abchipel Malais, 1♂1♀, coll. V. de Poll (Cotype).

[MNHN] Bogor, Auchipel Malas, 1♂, coll. V. de Poll (Cotype); Java, Buitenzorg, 2♂3♀, coll. V. de Poll. Coll. Boucomont 1938 (Cotype).

[ZIN] S. Vietnam, NNE Hochiminh Cat Tien, 1♂, 1995.VII.15, coll. Napolov.

Distribution. China (Hong Kong, Fujian, Guangdong), Indonesia, Malaysia.

Remarks. The species is firstly recorded in Hong Kong, China.

3.2.48 *Onthophagus tritinctus* Boucomont, 1914

Onthophagus tritinctus Boucomont, 1914a, *Ann. Mus. Civ. Genova*, 46: 217 (MNHN).

Material examined. [BMNH] Nilgiri Hills, 1♂4♀, coll. M. L. Andrewes; India, C. P., Nagpur, 1♂, coll. E. A. D. Abreu, B. M. 1929–550; Ceylon, Mt. Lavinia, 4♀, 08.VI.9, G. Bryant Coll.; S. India, 1♂.

[MNHN] Nilghims, M. Maindron, Coonoun, 1500–2000m, 1881.VII.15–30 (Syntype); Chota Nagpore (Eastern India), Nowatoli, 1897.X, coll. R.P. Cardon.

Distribution. China (Hong Kong), India, Nepal, Sri Lanka.

Tribe Scarabaeini Latreille, 1802

Scarabaeini Latreille, 1802, *Hist. Nat. Gen. Part. Crust. Ins.*, 3: 144 (Original spelling as Scarabæides, type genus: *Scarabaeus* Linnaeus, 1758).

Pachysomatini Ferreira, 1953, *Bol. Soc. Est. Prov. Moc.*, 23: 8 (Original spelling as Pachysomides, type genus: *Pachysoma* MacLeay, 1821).

Actinophorini Ádám, 2003, *Fol. Hist. Nat. Mus. Mat.*, 27: 130 (Type genus: *Actinophorus* Creutzer, 1799).

Genus *Scarabaeus* Linnaeus, 1758

Scarabaeus Linnaeus, 1758, *Syst. Nat. Ed.*, 10: 345 (Type species: *Scarabaeus sacer* Linnaeus, 1758).

Actinophorus Creutzer, 1799, *Ent. Versuche*: 79 (Type species: *Scarabaeus sacer* Linnaeus, 1758); Gillet, 1911a, *Coleopt. Cat., Scaraboidea: Coprinae I, pars 38, 19*: 6 (Syn.).

Ateuchus Weber, 1801, *Observ. Ent.*: 10; Lacordaire, 1856, *Gen. Col.*, 3: 66 (Syn.).

Ateuchus Fabricius, 1801, *Syst. Eleuth.*, 1: 54 (Type species: *Scarabaeus sacer* Linnaeus, 1758).

Heliocantharus MacLeay, 1821, *Horae Ent.*, 1(2): 497 (Type species: *Scarabaeus sacer* Linnaeus, 1758); Gillet, 1911a, *Coleopt. Cat., Scaraboidea: Coprinae I, pars 38, 19*: 6 (Syn.).

Sebasteos Westwood, 1847, *Trans. Ent. Soc. Lond.*, 4: 225 (Type species: *Sebasteos galenus* Westwood, 1847); Péringuey, 1901, *Trans. S. Afr. Phil. Soc.*, 12: 26, 57 (Syn.).

Ateuchetus Bedel, 1892, *Abeille*, 27: 282; Reitter, 1892, *Verh. Naturforsch. Ver. Brünn*, 24: 162 (Syn.).

Parateuchus Shipp, 1895, *Entom.*, 28: 221 (Type species: *Scarabaeus morbillosus* Fabricius, 1792); Gillet, 1911a, *Coleopt. Cat., Scaraboidea: Coprinae I, pars 38, 19*: 6 (Syn.).

Neateuchus Gillet, 1911b, *Ann. Soc. Ent. Belg.*, 55: 309 (Type species: *Ateuchus proboscideus* Guérin-Méneville, 1844).

Neonematiium Janssens, 1938, *Scarabaeini Col. Exp. Parc Nat. Miss. Fasc. 21 Bruxelles*: 71 (Type species: *Scarabaeus sevoistra* Alluaud, 1902).

Drepanopodus Janssens, 1940, *Mém. Mus. R. Hist. Nat. Belg.*, 16(2): 73 (Type species: *Ateuchus costatus* Wiedemann, 1823).

Madateuchus Paulian, 1953, *Mém. Ins. Sci. Mad.*, 3(E): 24 (Type species: *Madateuchus viettei* Paulian, 1953).

3.2.49 *Scarabaeus (Kheper) erichsoni* (Harold, 1867)

Ateuchus erichsoni Harold, 1867, *Col. Hefte*, 2: 94 (M. René Oberthür's Collection, MNHN).

Scarabaeus erichsoni: Arrow, 1931, *Fauna Brit. India, Lamell.*, 3: 45.

Material examined. [BMNH] India, Bangalore, 1♂, 1934.X, coll. R.W.R. Rankin; Kandy, Ceylon, 1♂, 1908.V.26, coll. G.E. Bryant; Bangalore, In clung, 1♀, 1912.IX, coll. C.D. Gregson; Indes Orientales, Mt. Kodeicanel, date unknown, 1♂1♀, coll. J. Castets; Madras, Major Sale, 1♀, coll. unknown, Vigors' Coll. 59-57; Udayagiri, 1♂2♀, 1919.IX.13, coll. unknown; India, Malabar, 1♂1♀; Nilgiri Hills, H. L. Andrewes; China: Hong Kong, 1♂1♀, J. J. Walker Coll., G. C. Champion Coll. B. M. 1927-409.

Distribution. China (Hong Kong, Taiwan), Bangladesh, India, Sri Lanka.

Remarks. The species is firstly recorded in Hong Kong, China.

Tribe Sisyphini Mulsant, 1842

Sisyphini Mulsant, 1842, *Col. France, Lamell.*: 41 (Original spelling as Sisyphaire, type genus: *Sisyphus* Latreille, 1807).

Genus *Sisyphus* Latreille, 1807

Sisyphus Latreille, 1807, *Gen. Crust. Et Ins.*, 2: 79 (Type species: *Scarabaeus schaefferi* Linnaeus, 1758, by original designation, deposited in UZIU, then transferred to LSLC).

Key to species of *Sisyphus* from Hong Kong.

- 1 Pronotum near the base extended outward and with lateral margin*Sisyphus* (*s. str.*) *indicus* Hope, 1831
 Pronotum near the base not extended outward and without lateral margin*Sisyphus* (*Neosisyphus*) *bowringi* White, 1844

Subg. *Sisyphus* (*Neosisyphus*) Müller, 1942

Sisyphus (*Neosisyphus*) Müller, 1942, *Atti Mus. Stor. Nat. Trieste*, 15: 86 (Type species: *Sisyphus atratus* Klug, 1855).

3.2.50 *Sisyphus* (*Neosisyphus*) *bowringi* White, 1844

Sisyphus bowringi White, 1844, *Ann. Mag. Nat. Hist.*, 14: 423 (BMNH).

Material examined. [IZAS] China, Yunnan: Mengla, Xishuangbanna, 600–620 m, 1♀, 1959.VI.2, coll. Yiran Zhang. [BMNH] China, Hong Kong, 116, 48-40, 1♂ (Syntype); China, Hong Kong, 44-121, 1♂ (Syntype); China, 2♂, Fry Coll., 1910-100; China, 2♂3♀; Nyew-tew Id., nr. Shei-pu, 3♀, Walker Coll., 93-18. [NMPC] Skrland, Cina, 1♂.

Distribution. China (Hong Kong, Shanghai, Yunnan).

Subg. *Sisyphus* (*s. str.*) Latreille, 1807

Sisyphus (*Sisyphus*) Latreille, 1807, *Gen. Crust. Et Ins.*, 2: 79 (Type species: *Scarabaeus schaefferi* Linnaeus, 1758, by original designation, deposited in UZIU, then transferred to LSLC).

3.2.51 *Sisyphus* (*s. str.*) *indicus* Hope, 1831

Sisyphus indicus Hope, 1831, *Zool. Misc.*, 1: 22 (BMNH).

Sisyphus kaschmirensis Kollar & Redtenbacher, 1848, *Hügel's Kaschmir*, 4(2): 516 (NMW); Arrow, 1909, *Ann. Mag. Nat. Hist.*, 6(8): 92 (Syn.).

Material examined. [IZAS] China, Xizang, Chayu Xituo, Ciba, 1800–2000 m, 2♂, 1973.VII.9, coll. Fusheng Huang; Chayu, Xiamu, 2♂, 1973.VII.29, coll. Fusheng Huang; Chayu, Muzong, 2300 m, 2♂, 1973.VIII.6, coll. Fusheng Huang; Chayu, Shama, 1600–1700 m, 1♂, 1973.VII.22, coll. Fusheng Huang; Chayu, Bicun, 2040 m, 1♂1♀, 1973.VIII.1, coll. Fusheng Huang; Xiachayu, 1♂, 2002.VIII.8, coll. Mingsheng Zhu; Chayu, Xiachayu, 3♂1♀, 2005.VII.12–13, coll. Aimin Shi.

[BMNH] Nepal, Hardwicke Bequest, 1♀ (Type); India, near Phagu, Simla Hill States, 7600ft., 2♂1♀, 1921.X.4; Ceylon, Kandy, 2♂3♀, 1908.VI, G. E. Bryant; Nilgiri Hills, 2♂4♀, H. L. Andreses Coll.

[NMW] Ind. or Bissalur, Coll. Mus. Vindob., 1♂ (Type of *Sisyphus kaschmirensis* Kollar & Redtenbacher, 1848).

[NMPC] India, Assam, 1♂.

Distribution. China (Hong Kong, Guangdong, Sichuan, Xizang), India, Myanmar, Nepal, Sri Lanka.

Remarks. The species is firstly recorded in Hong Kong, China.

3.3 Geographical distribution

In Hong Kong, the species diversity of *Onthophagus* was the highest, followed by *Copris* and *Onitis*. Some species (e.g. *Liatongus vertagus*, *Catharsius molossus*, *Copris confucius*) were widespread in Hong Kong, while certain species were found only in lowland (e.g. *Onthophagus lunatus*, *Onthophagus sagittarius*) or at higher altitude (e.g. *Onitis intermedius*). Most of the scarabaeines were recorded inside or in close proximity to the country parks, which are areas protected by legislation for nature conservation, education and recreation purposes. The occurrence of scarabaeines was observed to be highly correlated with the presence of feeding grounds of cattle and buffalo on shrubby grassland and lowland marsh, respectively, in Plover Cove, Sai Kung East, Sai Kung West, Ma On Shan, Shing Mun, Tai Mo Shan, Tai Lam and Lantau South Country Parks (Figs 12–14).

All scarabaeines recorded in Hong Kong were Oriental species biogeographically, with 14 out of the 51 species also found in the Palaearctic Region (Table 2). In China, the Oriental Region could be further divided into the Southern, Central and Southwestern sub-regions, and the Palaearctic Region into the Qinghai-Xizang, Mongolia-Xinjiang, Northern and Northeastern sub-regions (Chen, 1997). The majority of scarabaeines from Hong Kong (72.55%) distributed only in the Southern, Central and Southwestern sub-regions, while some species were more widespread and recorded also in the Northern (11.76%), Qinghai-Xizang (1.96%), Mongolia-Xinjiang (1.96%) and Northeastern (1.96%) sub-regions (Table 3). Although most of these scarabaeines have been reported elsewhere in southern China, *Onitis falcatus*, *Onitis intermedius* and *Caccobius brevis* were only previously recorded in provinces at higher latitudes (e.g. Inner Mongolia, Hebei, Beijing, Tianjin, Shanxi and Shanghai). Hong Kong was also the only place with the record of *Onthophagus tritinctus* in China.

It is worthwhile to note that Hong Kong was the most southern locality where the new records of *Copris szechouanicus*, *Caccobius brevis*, *Onthophagus roubali* and *Onthophagus lenzi* were found, and the only locality where *Liatongus pugionatus* and *Onthophagus convexicollis* were recorded over the world.

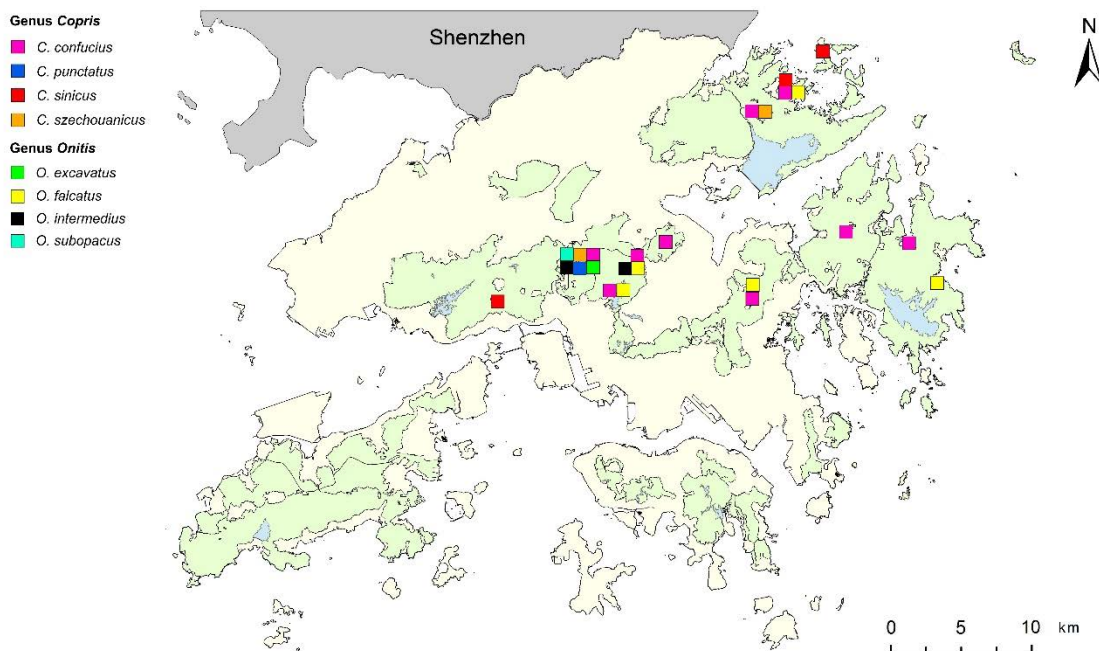


Figure 12. Distribution of *Onthophagus* species in Hong Kong. Country parks and reservoirs are shown in green and blue, respectively.

4 Discussion

Scarabaeines serve important ecological functions, such as nutrient cycling, secondary seed dispersal and parasite suppression, through consumption of faeces and manipulation of soils (Nichols *et al.*, 2008; Lee *et al.*, 2009). They feed mainly on the microorganism-rich liquid components of mammalian faeces and utilise the fibrous materials of faeces to brood their larvae. The distribution and abundance of wild mammals are thus key determinants of the community structure of scarabaeines through a close evolutionary association (Davis *et al.*, 2001; Nichols *et al.*, 2008, 2009; Enari *et al.*, 2013).

Table 2. Occurrence of Scarabaeinae species from Hong Kong in each biogeographical region (world) and sub-region (China).

Species	World		China						
	Palaeartic	Oriental	Northeastern	Northern	Mongolia/Xinjiang	Qinghai/Xizang	Southwestern	Central	Southern
<i>Catharsius molossus</i>	√	√		√		√	√	√	√
<i>Copris confucius</i>		√					√	√	√
<i>Copris punctatus</i>		√						√	√
<i>Copris sinicus</i>		√						√	√
<i>Copris szechouanicus</i>		√						√	√
<i>Copris tripartitus</i>	√	√		√			√	√	√
<i>Copris ochus</i>	√	√	√	√	√			√	√
<i>Microcopris propinquus</i>		√					√	√	√
<i>Microcopris reflexus</i>		√					√	√	√
<i>Paracopris cariniceps</i>		√		√			√	√	√
<i>Paragymnopleurus melanarius</i>		√					√	√	√
<i>Liatongus pugionatus</i>		√							√
<i>Liatongus vertagus</i>		√				√	√	√	√
<i>Oniticellus cinctus</i>		√					√	√	√
<i>Tibiodrepanus sinicus</i>		√						√	√
<i>Onitis excavatus</i>		√		√			√	√	√
<i>Onitis falcatus</i>		√		√			√	√	√
<i>Onitis intermedius</i>		√						√	√
<i>Onitis subopacus</i>		√					√		√
<i>Caccobius brevis</i>	√	√		√	√				√
<i>Caccobius unicornis</i>	√	√		√			√	√	√
<i>Onthophagus hastifer</i>		√							√
<i>Onthophagus roubali</i>		√						√	√
<i>Onthophagus armatus</i>		√							√
<i>Onthophagus lunatus</i>		√							√
<i>Onthophagus tragus</i>	√	√		√			√	√	√
<i>Onthophagus dapcauensis</i>		√							√

Table 2 (continued)

Species	World		China						
	Palearctic	Oriental	Northeastern	Northern	Mongolia/Xinjiang	Qinghai/Xizang	Southwestern	Central	Southern
<i>Onthophagus luridipennis</i>		√					√		√
<i>Onthophagus proletarius</i>		√					√		√
<i>Onthophagus rectecornutus</i>		√					√	√	√
<i>Onthophagus taurinus</i>		√						√	√
<i>Onthophagus lenzi</i>	√	√	√	√				√	√
<i>Onthophagus argyropygus</i>	√	√							√
<i>Onthophagus trituber</i>	√	√	√				√	√	√
<i>Onthophagus anguicorius</i>		√							√
<i>Onthophagus horni</i>	√	√						√	√
<i>Onthophagus miyakei</i>	√	√						√	√
<i>Onthophagus nitidus</i>	√	√	√					√	√
<i>Onthophagus tricornis</i>	√	√					√	√	√
<i>Onthophagus sagittarius</i>		√							√
<i>Onthophagus senex</i>		√							√
<i>Onthophagus seniculus</i>		√					√		√
<i>Onthophagus brutus</i>		√					√		√
<i>Onthophagus convexicollis</i>		√							√
<i>Onthophagus coracinus</i>		√					√		√
<i>Onthophagus orientalis</i>	√	√					√	√	√
<i>Onthophagus tricolor</i>		√							√
<i>Onthophagus tritinctus</i>		√							√
<i>Scarabaeus erichsoni</i>		√							√
<i>Sisyphus bowringi</i>		√						√	√
<i>Sisyphus indicus</i>		√				√		√	√

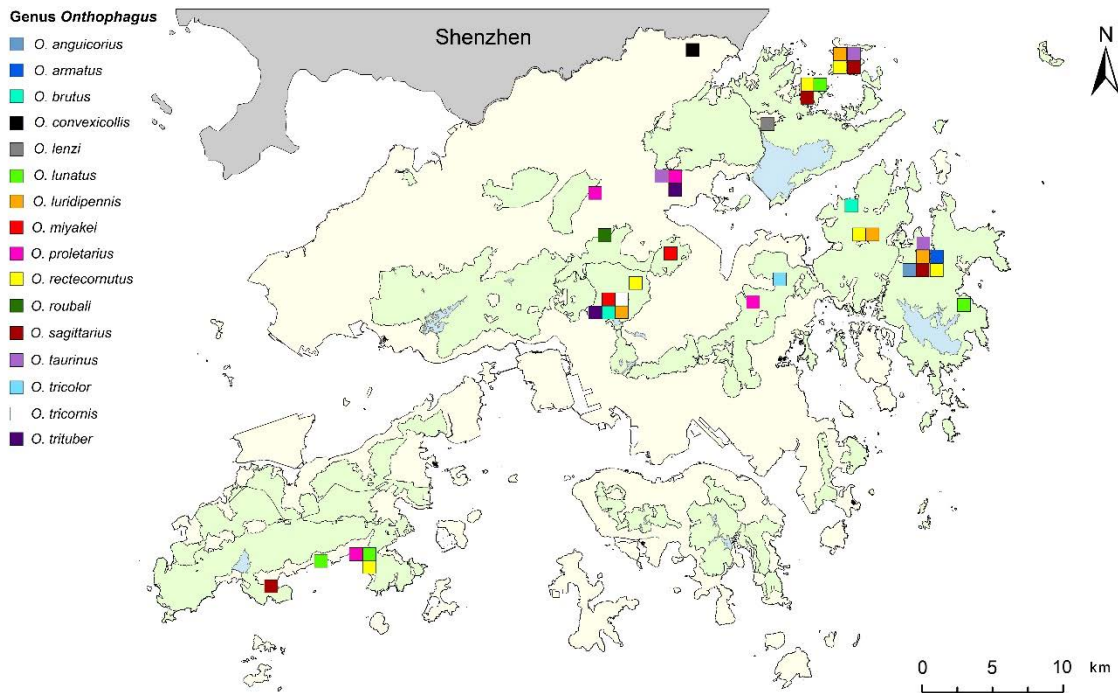


Figure 13. Distribution of *Copris* and *Onitis* species in Hong Kong. Country parks and reservoirs are shown in green and blue, respectively.

Hong Kong is a small (1106 km²) and highly urbanised city; nevertheless, about 40% of its land has been designated as the country parks where diverse habitats and rich biodiversity are conserved. A variety of wild mammals (e.g. cattle, buffalo, wild boar, macaque) inhabit the woodland, shrubland, grassland and marsh and provide dung resources to scarabaeines in the countryside.

Thirteen genera and 51 species of scarabaeines have hitherto been recorded in Hong Kong, representing 40.6% (32 genera) and 14.0% (364 species) of the records in China, respectively. Hong Kong was also the type locality of 11 species, known as *Liatongus pugionatus*, *Liatongus vertagus*, *Tibiodrepanus sinicus*, *Onthophagus lunatus*, *Onthophagus*

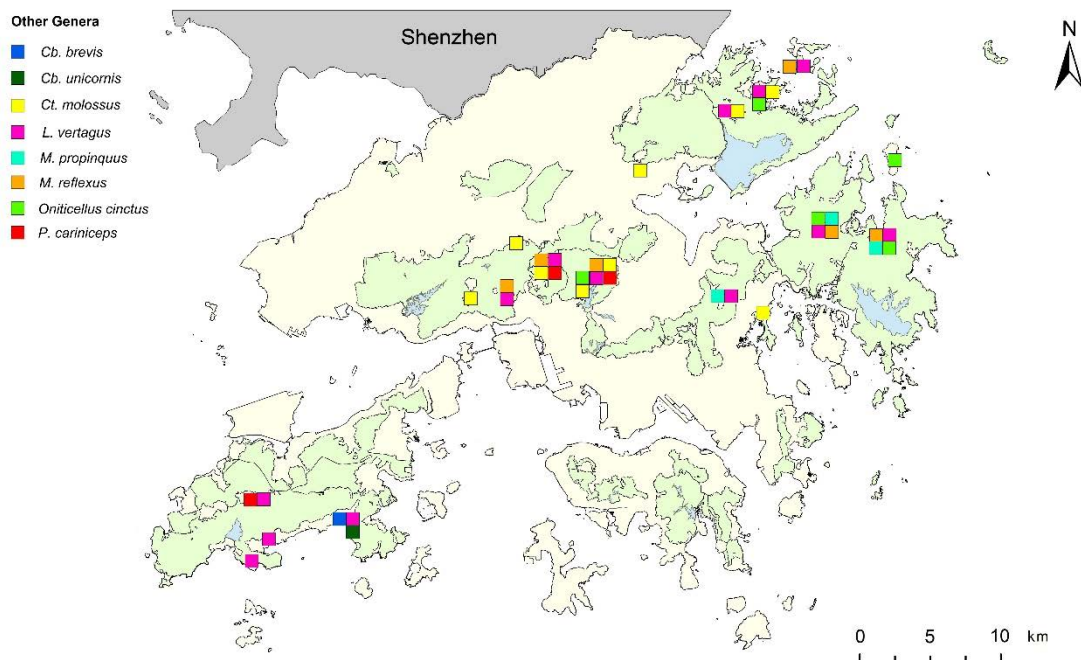


Figure 14. Distribution of scarabaeines species, except *Onthophagus*, *Copris* and *Onitis*, in Hong Kong. Country parks and reservoirs are shown in green and blue, respectively.

convexicollis, *Onthophagus luridipennis*, *Onthophagus proletarius*, *Onthophagus taurinus*, *Onthophagus orientalis*, *Onthophagus trituber* and *Sisyphus bowringi* (Table 1), the southern-most locality where *Copris szechouanicus*, *Caccobius brevis*, *Onthophagus roubali* and *Onthophagus lenzi* were found, and the only locality where *Liatongus pugionatus* and *Onthophagus convexicollis* were recorded over the world.

Although Hong Kong has been an important locality for scarabaeines, site records of individual species were rarely reported and thus knowledge about their geographical distribution was very limited in the past. The findings in this study indicated that the presence of habitats for wild mammals, as the dung sources, was the key determinant of the occurrence of scarabaeines in Hong Kong. Protection of habitats by way of designating specific areas as country parks, or similar means, would therefore be crucial to the conservation of dung beetles and their consequential ecological functions. Along with the new records of 11 scarabaeines species, viz. *Caccobius brevis*, *Copris punctatus*, *Copris szechouanicus*, *Microcopris propinquus*, *Onitis excavatus*, *Onitis subopacus*, *Onitis intermedius*, *Onthophagus brutus*, *Onthophagus tricolor*, *Onthophagus lenzi* and *Onthophagus roubali*, this paper serves as the foundation for future taxonomic and ecological studies of dung beetles and provides insight for formulation of conservation strategies in the southeast Asian region.

Table 3. Occurrence of Scarabaeinae species from Hong Kong in clusters of biogeographic sub-region(s) in China.

Cluster	Biogeographic region(s)	Species (No.)	Percentage (%)
1	Southern	13	25.49
2	Southern-Central	10	19.61
3	Southern-Southwestern	6	11.76
4	Southern-Central-Southwestern	8	15.69
5	Southern-Central-Qinghai/Xizang	1	1.96
6	Southern-Central-Northeastern	1	1.96
7	Southern-Mongolia/Xinjiang-Northern	1	1.96
8	Southern-Central-Southwestern-Qinghai/Xizang	1	1.96
9	Southern-Central-Southwestern-Northern	6	11.76
10	Southern-Central-Southwestern-Northeastern	1	1.96
11	Southern-Central-Northern-Northeastern	1	1.96
12	Southern-Central-Southwestern-Qinghai/Xizang-Northern	1	1.96
13	Southern-Central-Mongolia/Xinjiang-Northern-Northeastern	1	1.96

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