



# Catalog of Georgian Earth-boring dung beetles (Coleoptera: Geotrupidae)

Shota Japarashvili<sup>1</sup>

<sup>1</sup> Institute of Ecology, Ilia State University, Cholokashvili av. 3/5 Tbilisi, 0162, Georgia

<http://zoobank.org/40816A1F-E93D-4252-B9C0-924208D278EB>

Corresponding author: Shota Japarashvili ([shota.japarashvili.1@iliauni.edu.ge](mailto:shota.japarashvili.1@iliauni.edu.ge))

Academic editor: Levan Mumladze ♦ Received: 19 October 2022 ♦ Accepted: 18 March 2023 ♦ Published: 29 May 2023

## Abstract

A summarized list of Georgian earth-boring dung beetles is given, together with Georgian names, distribution data, and suggestions for national red list status according to IUCN Red List categories and criteria.

## Key words

Sakartvelo, South Caucasus, distribution, red list

## Introduction

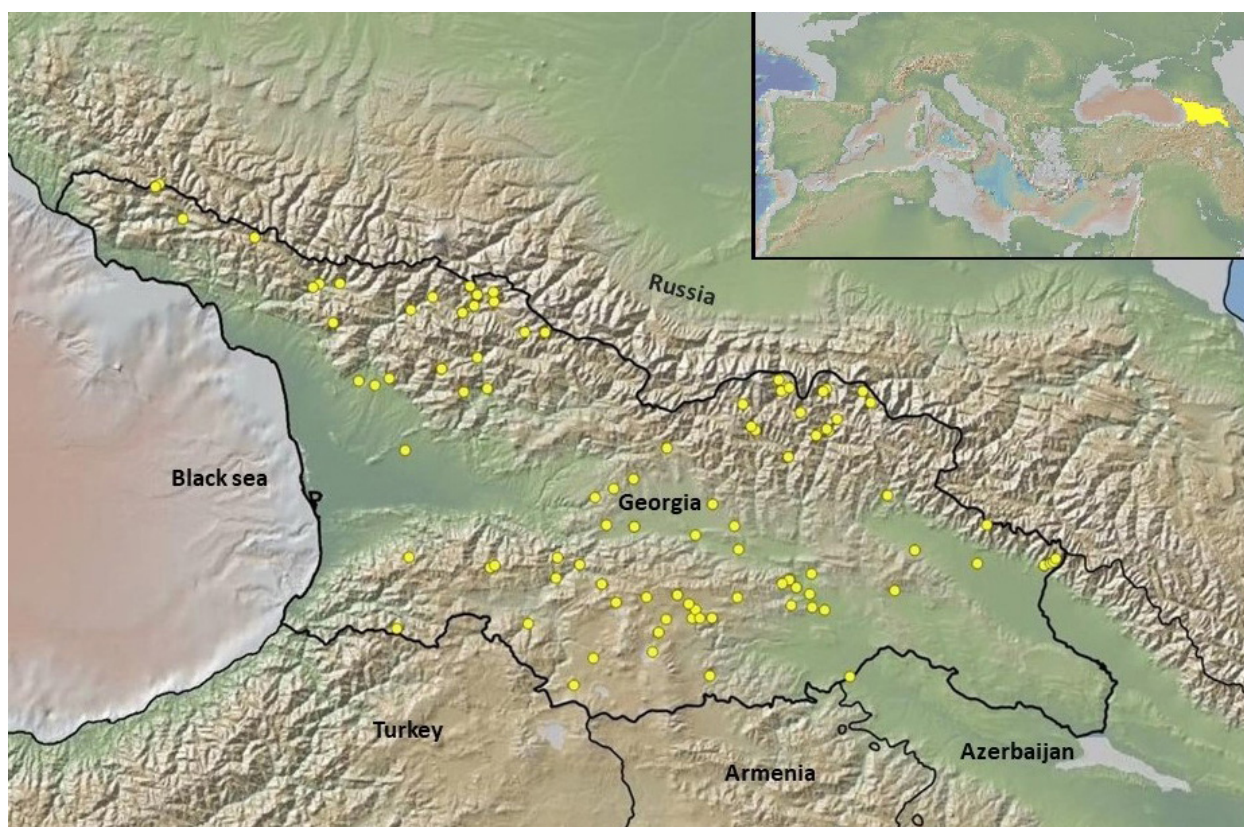
The earth-boring beetles (Coleoptera: Geotrupidae) are part of the order Coleoptera, with an approximate number of 350 species described worldwide (Schoolmeesters 2010). According to current classification, the family is divided into three subfamilies (Cunha et al. 2011; Nikolajev et al. 2016), of which only the Geotrupinaea are represented in Georgia (Dzambazishvili 1979; Nikolajev et al. 2016).

Georgia (69,700 km<sup>2</sup>) is located in the center of the Caucasus biodiversity hotspot and harbors a diverse fauna (Myers et al. 2000). The entomofauna of Georgia has been studied for centuries. As the largest and most diverse order of animals, beetles are relatively well studied in Georgia (Tarkhnishvili et al. 2013; Mumladze et al. 2020). One of the first lists of beetles of the Caucasus was published by Radde (1899). However, the most significant work about Georgian earth-boring dung beetles is done by Yason Dzambazishvili, who provided rather comprehensive data on their distribution (Dzambazishvili 1979; 2000). Since these works, new distributional data have appeared in the public databases (Tarkhnishvili et al. 2013; GBIF 2023), social media (that proved to be a valuable tool for gathering

data for Georgia (Iankoshvili et al. 2021)), collections (see below), and knowledge of the country-scale distribution of earth-boring dung beetles has increased. The aim of this paper is to provide a list of earth-boring beetles, including updated distribution data and maps, and to evaluate the conservation status of Georgian representatives of the family according to IUCN Red List Categories and Criteria (IUCN 2012).

## Materials and methods

The occurrences of Georgian earth-boring beetles were compiled from the papers of Dzambazishvili (1979; 2000) and Japoshvili et al. (2022), web-databases (Georgian Biodiversity Database (GBD) (Tarkhnishvili et al. 2013), Global Biodiversity Information Facility (GBIF) (GBIF Secretariat 2023), Zoological Institute of the Russian Academy of Science (ZIN) (<https://www.zin.ru/Animalia/Coleoptera/eng/geotrupi.htm>) and Ukrainian Biodiversity Information Network (<https://ukrbn.com/>) (UkrBIN 2022) and Dry collections deposited in Agricultural University of Georgia (EI-AUG), Zoological Institute of Ilia State University (ISUZI)



**Figure 1.** Distribution of earth-boring dung beetles (Coleoptera, Geotrupidae) in Georgia. Yellow dots represent surveyed localities of all Geotrupidae species combined.

as well as personal collection of Dr. Giorgi Chaladze (CGC). In addition, previously unpublished original material recently collected within the framework of the Caucasus Barcode of Life (CaBOL; <https://ggbc.eu/>) project was also included. For the occurrence data without exact geographic coordinates (part of the literature data and collection material). I geo-referenced literature-based sampling locations using Google Earth Pro v. 7.3.6, with an estimated precision of 100 m. Guidelines of the International Union for Conservation of Nature (IUCN) were used to evaluate species conservation statuses for Georgia (IUCN 2012, 2019). The area of occupancy (AOO) is given based on a 10 km<sup>2</sup> grid cell count overlaid on the country's territory, and the extent of occurrence (EOO) was estimated for only Georgia. Maps were made in QGIS Desktop 3.16.3. Photos of voucher specimens (Figs. 3 and 4) were taken using a Canon EOS 550D camera with a Canon EF 100mm f/2.8 Macro USM and a Raynox DCR-250 Super Macro Snap-On Lens. Specimens depicted in Figs. 4 and 7 were taken using a Canon EOS 60D camera with a Canon MP-E 65mm f/2.8 1–5x Macro Photo Lens mounted on a Novoflex Castel-L Focusing Rack. Digital images were prepared using Zerene Stacker image stacking software and Adobe Photoshop CS6. As for the rest of the voucher specimens, pictures of Maxim Smirnov (amateur entomologist and photographer, Ivanovo, Russia) were used (Figs. 2, 6, and 7).

The nomenclature is given according to the Catalogue of Palearctic Coleoptera (Nikolajev et al. 2016). Georgian names are proposed by the author.

## Results

### Order Coleoptera Linnaeus, 1758

### Family Geotrupidae Latreille, 1802

#### *Geotrupes (Glyptogeotrupes) molestus* (Faldermann, 1836)

**Georgian name.** აბეზარა (ფრთავლუვა) ფუნაგორია.

**Global distribution.** The species is generally distributed in the Caucasus. Out of Georgia, it is known from Armenia (Baraud 1992) and Turkey (Nikolajev et al. 2016; Rozner and Rozner 2009; Baraud 1992).

**Distribution in Georgia.** • 1♀; Samtskhe-Javakheti region, Zekari pass; N41.81667°, E42.83333°; 1969 m a.s.l.; 14/15 June 2014; Leg. D Fominikh; ZIN (Fig. 2A).

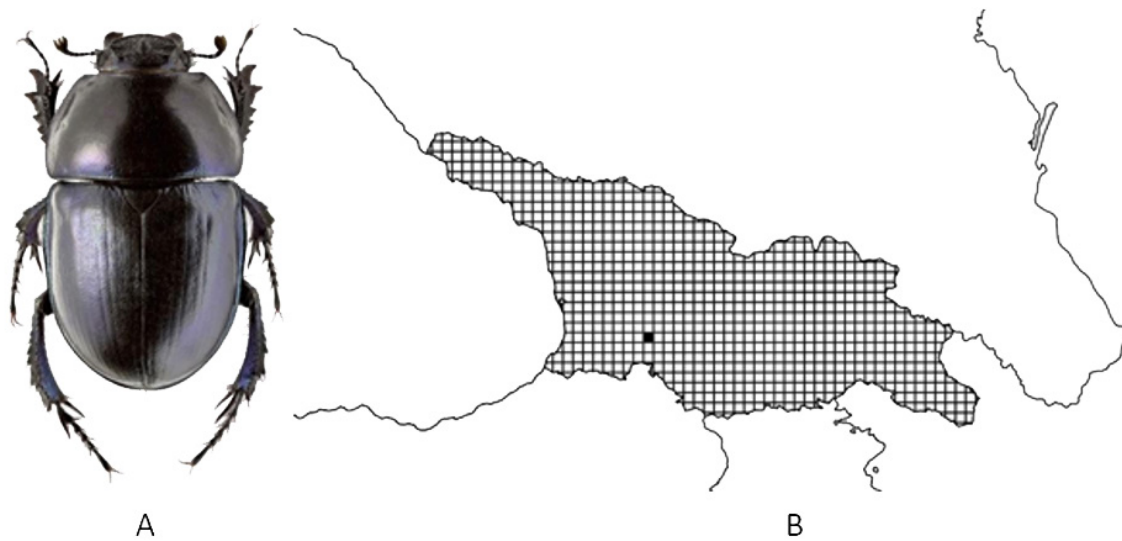
**IUCN red list status.** NE

**National red list status.** DD. The species from Georgia is so far known only from a single locality. Most probably, the species occupies a large area in Georgia; however, at this moment, the data is insufficient to assess its conservation status.

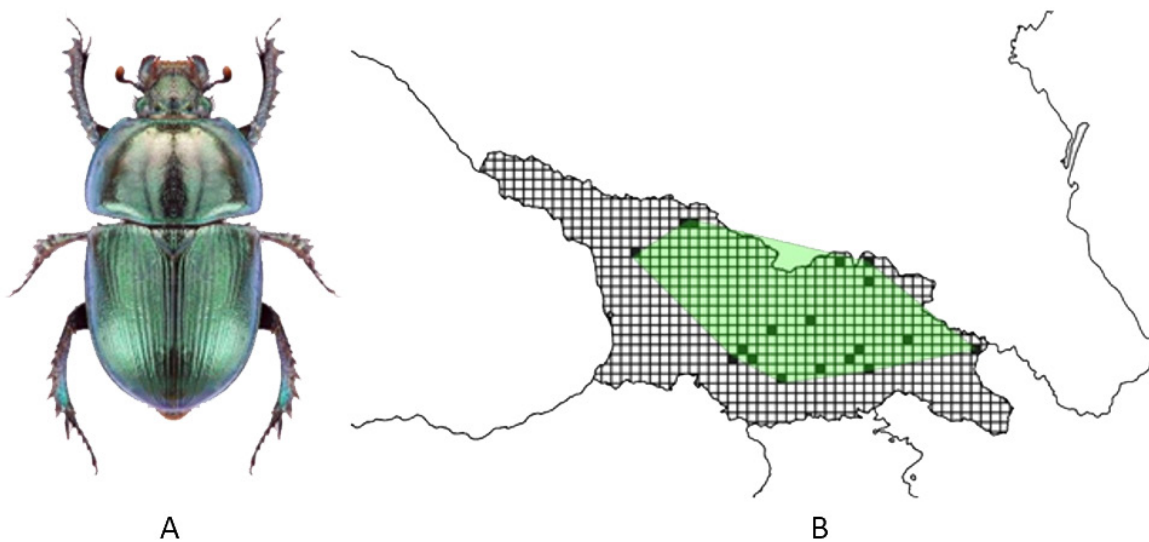
#### *Geotrupes mutator* (Marshall, 1802)

**Georgian name.** მწვანე ცვალეზადი ფუნაგორია.

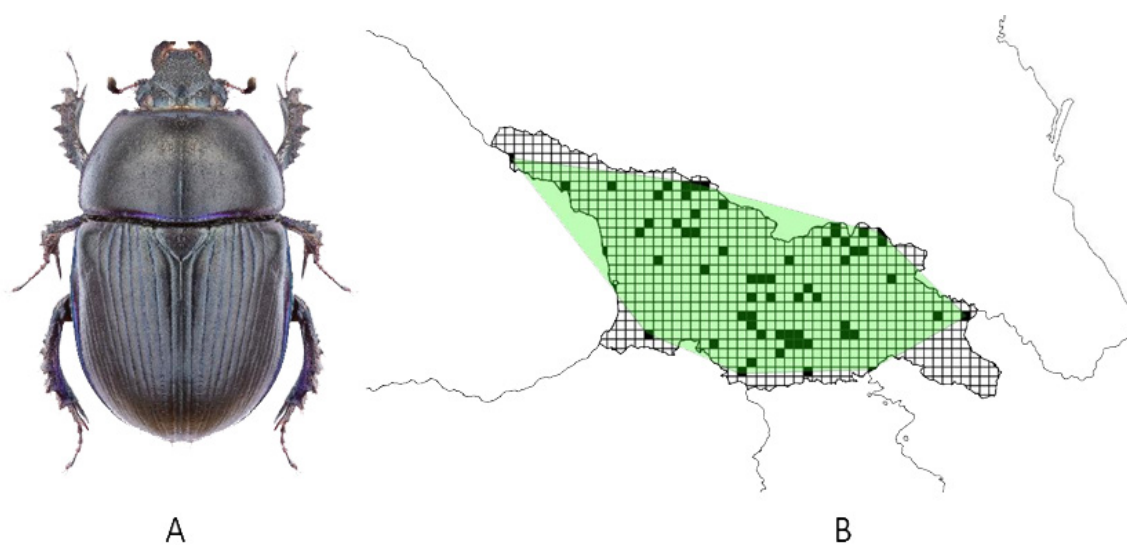
**Global distribution.** North Africa; nearly all of continental Europe and England; the Caucasus; and Asia Minor (Baraud 1992; Shokhin 2007).



**Figure 2.** *Geotrupes molestus*. **A** - Habitus, dorsal side (photo credit to Maxim Smirnov); **B** – Distribution map. Black square represents the area of occupancy (AOO) in Georgia.



**Figure 3.** *Geotrupes mutator*. **A** - Habitus, dorsal side (photo credit to Armen Seropian); **B** - Distribution map. Black squares represent the area of occupancy (AOO) in Georgia, and green polygon shows the extent of occurrence (EOO).



**Figure 4.** *Geotrupes (stercorarius) olgae*. **A** - Habitus, dorsal side (photo credit to Armen Seropian); **B** - Distribution map. Black squares represent the area of occupancy (AOO) in Georgia, and green polygon shows the extent of occurrence (EOO).



**Distribution in Georgia.** • 6 inds; Mtskheta-Mtianeti, Khevsha; N42.400542°, E44.689348°; 1458 m a.s.l.; 17 Septemebri 2004; Leg. G Chaladze; CGC. • Lisi lake; N41.74442°, E44.74013°; Dzambazishvili 1979. • Gldani; N41.8088°, E44.834°; Dzambazishvili 1979. • Soganlug; N41.6398°, E44.9161°; Dzambazishvili 1979. • Manglisi; N41.6966°, E44.3739°; Dzambazishvili 1979. • Mejriskhevi; N42.1299°, E44.2145°; Dzambazishvili 1979. • Kazbegi (Stepantsminda); N42.6600°, E44.6412°; Dzambazishvili 1979. • Roshka; N42.4829°, E44.9285°; Dzambazishvili 1979. • Kobulo; N42.4741°, E44.9421°; Dzambazishvili 1979. • Amga; N42.6695°, E44.9267°; Dzambazishvili 1979. • Gomi; N42.0211°, E43.7268°; Dzambazishvili 1979. • Borjomi; N41.8400°, E43.3908°; Dzambazishvili 1979. • Bakuriani; N41.7512°, E43.5296°; Dzambazishvili 1979. • Kvabiskhevi; N41.7755°, E43.2445°; Dzambazishvili 1979. • Telavi; N41.9169°, E45.4774°; Dzambazishvili 1979. • Lagodekhi; N41.8411°, E46.2834°; Dzambazishvili 1979. • Surroundings of Paravani Lake; N41.5303°, E43.8877°; EIAUG. • Dighomi village; N41.7827°, E44.7012°; Tarkhnishvili et al. 2013 (Fig 3A). • Tskoushi; N42.6665°, E41.9747°; Dzambazishvili 1979. • Mestia; N43.0334°, E42.6897°; Dzambazishvili 1979. • Latali; N43.0000°, E42.6164°; Dzambazishvili 1979.

**IUCN red list status.** NE.

**National red list status.** LC. This species is widespread all over Georgia. AOO is 180 km<sup>2</sup> and EOO is 31,370 km<sup>2</sup> (Fig. 3B). The population trend is not known, and direct threats have not been indicated. Based on its generally large distribution area and dense occurrence, *G. mutator* should be evaluated as "Least Concern".

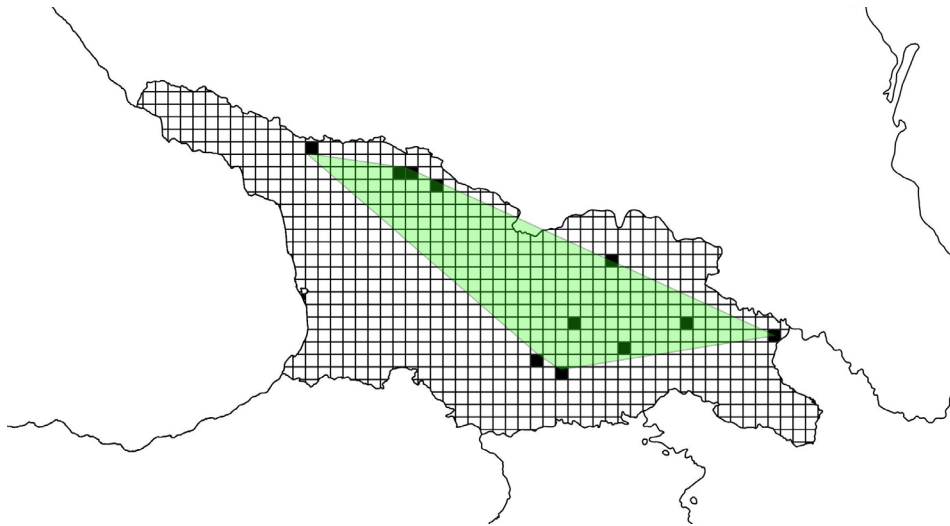
### *Geotrupes (stercorarius) olgae* (Olsoufieff, 1918)

**Georgian name.** ღუგასებრი ფუნაგორია.

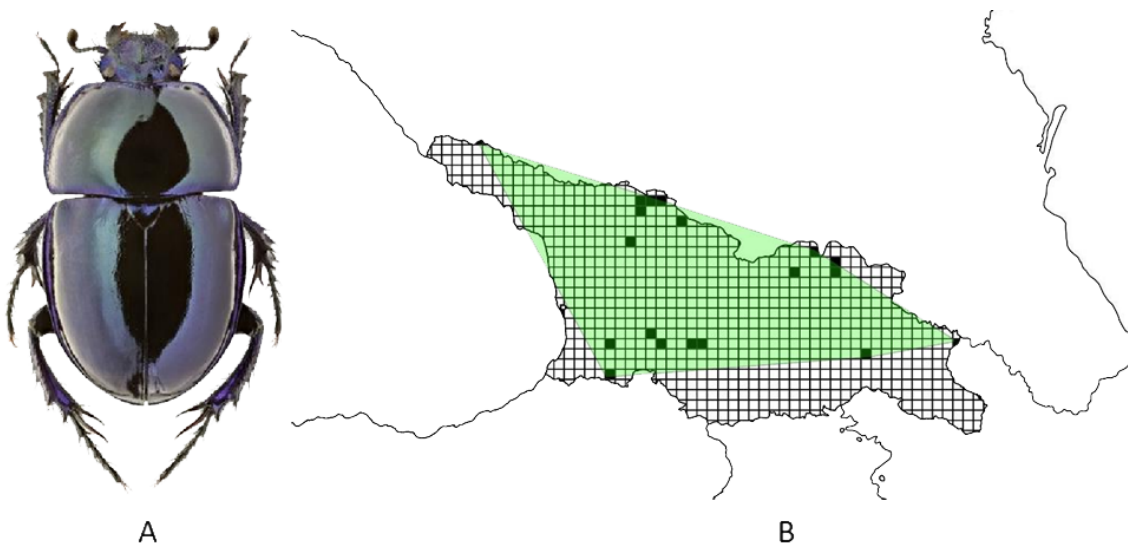
**Global distribution.** In Catalogue of Palaearctic Coleoptera (Nikolajev and Bezděk 2016) *G. olgae* Olsoufieff, 1918 is recorded for Armenia, Georgia, Ukraine (Crimea), the South European territories of Russia, and Iran.

**Distribution in Georgia.** • 1 ind; Racha-Lechkhumi and Kvemo Svaneti, Khotevi; N42.4640°, E43.1385°; 867 m a.s.l.; 25 July 2021; leg. A Sanakoeva; CaBOL-1013022. • 2 inds; Samtskhe-Javakheti, Nedzvi Managed Reserve; N41.880°, E43.519°; 1001 m a.s.l.; 08 October 2021; leg. A Seropian, N Bulbulashvili; CaBOL-1013098, CaBOL-1013099. • 1♂, 1♀; Environs of Tbilisi; N41.816926°, E44.75694°; 568 m a.s.l.; September 2006; leg. G Chaladze; CGC ID: G367, G 370. • 1 ind; Samegrelo-Zemo Svaneti region, Mestia; N43.045868°, E42.733608°; 1406 m a.s.l.; 1 April 2022; Leg. "Iarsonek" (iNaturalist); GBIF ID: 3760191033. • 1 ind; Mtskheta-Mtianeti, Kazbegi (Juta); N42.559805°, E44.762735°; 2461 m a.s.l.; 13 June 2019; Leg. F Riegel (iNaturalist); GBIF ID: 2634248431. • 1 ind; Mtskheta-Mtianeti, Khevsha; N42.400542°, E44.689348°; 1458 m a.s.l.; 5 August 2004; leg. G Chaladze; CGC. • 1 ind; 1.6 km west from Murkmeli; N42.915306°, E42.978846°; 2049 m a.s.l.; 14 June 2022; leg. Jacek Pietruszewski (iNaturalist); GBIF ID:

3859629697. • Surroundings of Paravani Lake; N41.4389°, E43.8512°; Tarkhnishvili et al. 2013. • Kodistskaro; N42.0293°, E44.3523°; Tarkhnishvili et al. 2013. (Fig 4A) • Gori; N41.9848°, E44.1090°; Tarkhnishvili et al. 2013. • Dighomi Village; N41.7799°, E44.6948°; Tarkhnishvili et al. 2013. • Lisi Lake; N41.7444°, E44.7401°; Dzambazishvili 1979. • Tsodreti; N41.7624°, E44.6519°; Dzambazishvili 1979. • Shavnabada; N41.6526°, E44.8386°; Dzambazishvili 1979. • Kojori; N41.6611°, E44.7086°; Dzambazishvili 1979. • Red Bridge; N41.3297°, E45.0727°; Dzambazishvili 1979. • Pasanauri; N42.3526°, E44.6875°; Dzambazishvili 1979. • Roshka; N42.4829°, E44.9285°; Dzambazishvili 1979. • Mt. Sachali; N42.4529°, E44.8617°; Dzambazishvili 1979. • Shatili; N42.6581°, E45.1556°; Dzambazishvili 1979. • Mutso; N42.6056°, E45.2047°; Dzambazishvili 1979. • Akhieli; N42.6576°, E44.9051°; Dzambazishvili 1979. • Kazbegi (Stepantsminda); N42.6600°, E44.6412°; Dzambazishvili 1979. • Ketrisi; N42.5966°, E44.3990°; Dzambazishvili 1979. • Gveleti; N42.7107°, E44.6247°; Dzambazishvili 1979. • Tsalka; N41.5981°, E44.0941°; Dzambazishvili 1979. • Beshtasheni; N41.6381°, E44.1154°; Dzambazishvili 1979. • Kariaki; N41.6646°, E44.0719°; Dzambazishvili 1979. • Kaburi; N41.7055°, E44.0009°; Dzambazishvili 1979. • Khando; N41.6936°, E43.8093°; Dzambazishvili 1979. • Kokhta (Akhalki); N41.5988°, E44.1422°; Dzambazishvili 1979. • Bediani; N41.5999°, E44.2167°; Dzambazishvili 1979. • Sakdrioni (Edikilisa); N41.5919°, E43.9331°; Dzambazishvili 1979. • Dmanisi; N41.3302°, E44.2072°; Dzambazishvili 1979. • Mejriskhevi; N42.1299°, E44.2145°; Dzambazishvili 1979. • Java; N42.3897°, E43.9250°; Dzambazishvili 1979. • Gomi; N42.0211°, E43.7268°; Dzambazishvili 1979. • Surami; N42.0265°, E43.5526°; Dzambazishvili 1979. • Nagutini; N42.2429°, E43.7177°; Dzambazishvili 1979. • Borjomi; N41.8400°, E43.3908°; Dzambazishvili 1979. • Bakuriani; N41.7512°, E43.5296°; Dzambazishvili 1979. • Tabatskuri Lake; N41.6668°, E43.6204°; Dzambazishvili 1979. • Uraveli; N41.5601°, E43.0780°; Dzambazishvili 1979. • Akhalkalaki; N41.4056°, E43.4861°; Dzambazishvili 1979. • Sulda; N41.2781°, E43.3684°; Dzambazishvili 1979. • Lagodekhi; N41.8411°, E46.2834°; Dzambazishvili 1979. • 2 inds; Lagodekhi Protected Areas; N41.8542°, E46.2927°; 17/21 July 2019; leg. Jerzy Borowski and Adam Byk; Japoshvili et al. 2022. • Gavazi; N41.8531°, E45.8671°; Dzambazishvili 1979. • Jokolo; N42.1733°, E45.3088°; Dzambazishvili 1979. • Lichi; N42.1540°, E43.4786°; Dzambazishvili 1979. • Jvari; N42.1963°, E43.5941°; Dzambazishvili 1979. • Kulbaki; N42.6311°, E42.6390°; Dzambazishvili 1979. • Chkhuteli; N42.6501°, E42.7869°; Dzambazishvili 1979. • Bandza; N42.3515°, E42.2813°; Dzambazishvili 1979. • Lebarde; N42.7356°, E42.4951°; Dzambazishvili 1979. • Sachino; N42.6494°, E42.0781°; Dzambazishvili 1979. • Skuri; N42.6833°, E42.1666°; Dzambazishvili 1979. • Lentekhi; N42.7930°, E42.7188°; Dzambazishvili 1979. • Koruldashi; N42.9176°, E43.1432°; Dzambazishvili 1979. • Lakhiri; N43.0547°, E42.8147°; Dzambazishvili 1979. • Ipari; N43.0054°, E42.2892°; Dzambazishvili 1979. • Tavrali; N43.0682°, E42.4250°; Dzambazishvili



**Figure 5.** Distribution map of *Geotrupes spiniger* for Georgia. Black squares represent the area of occupancy (AOO) in Georgia, and the green polygon shows the extent of occurrence (EOO).



**Figure 6.** *Trypocopris (Trypocopris) caspius*. **A** – Habitus, dorsal side (photo credit to Maxim Smirnov); **B** - Distribution map. Black squares represent the area of occupancy (AOO) in Georgia, and the green polygon shows the extent of occurrence (EOO).



**Figure 7.** *Trypocopris inermis*. **A** – Habitus, dorsal side (photo credit to Maxim Smirnov); **B** - Distribution map. Black squares represent the area of occupancy (AOO) in Georgia, and the green polygon shows the extent of occurrence (EOO).

1979. • Latali; N43.0000°, E42.6164°; Dzhambazishvili 1979. • Mt. Ushba; N43.1216°, E42.6598°; Dzhambazishvili 1979. • Mt. Koruldi; N43.0849°, E42.7074°; Dzhambazishvili 1979. • Chkhalta; N43.0939°, E41.6636°; Dzhambazishvili 1979. • Gagra; N43.2808°, E40.2748°; EIAUG. • Sokhumi; N43.0424°, E41.0031°; EIAUG. • Anaklia; N42.3895°, E41.5868°; ISUZI. • Mestia; Mt. Banguriani; N43.0714°, E42.7813°; ISUZI. • Tsutskhvati; N42.2953°, E42.8635°; ISUZI. • Adjara region, Akhaldaba; N41.6502°, E42.1482°; ISUZI.

**IUCN red list status.** NE.

**National red list status.** LC. Species is widespread and common all over Georgia. AOO is 620 km<sup>2</sup> and EOO is 56 893 km<sup>2</sup> (Fig. 4B). The population trend is unknown, and direct threats have not been indicated. Based on its generally large distribution area and continuous occurrence, *G. (S) olgae* should be evaluated as "Least Concern".

### *Geotrupes spiniger* (Marsham, 1802)

**Georgian name.** ცხვირქოლსანა ფუნავორია.

**General distribution.** Europe and Western Asia east to Northern Iran. Fairly common throughout the distribution range (Shokin 2019).

**Distribution in Georgia.** • Tbilisi; N41.7142°, E44.8234°; Dzhambazishvili 1979. • Pasanauri; N42.3526°, E44.6875°; Dzhambazishvili 1979. • Gomi; N41.9203°, E44.3792°; Dzhambazishvili 1979. • Kaburi; N41.7055°, E44.0005°; Dzhambazishvili 1979. • Bediani; N41.6003°, E44.2164°; Dzhambazishvili 1979. • Telavi; N41.9169°, E45.4774°; Dzhambazishvili 1979. • Lagodekhi; N41.8411°, E46.2834°; Dzhambazishvili 1979. • Mestia; N43.0334°, E42.6897°; Dzhambazishvili 1979. • Latali; N43.0000°, E42.6164°; Dzhambazishvili 1979. • Ushguli; N42.9173°, E43.0149°; Dzhambazishvili 1979. • Gulripshi District, Azhara; N43.1106°, E41.7024°; Dzhambazishvili 1979.

**IUCN red list status.** NE.

**National red list status.** DD. Although the global distribution area is large and no threats or population changes have ever been reported, an evaluation of the species status in Georgia is not confidently possible due to a lack of data. Unlike expectation, AOO and EOO in Georgia are 21.175 km<sup>2</sup> and 180 km<sup>2</sup> respectively, and therefore it can be considered "Data Deficient" locally.

### *Trypocopris (Trypocopris) caspius* (Motschulsky, 1845)

Syn: *Geotrupes caucasicus* Weise, 1879 (Djambazishvili 1979).

**Georgian name.** კასპიური ფუნავორია.

**Global distribution.** Central Caucasus. It is recorded from the Greater Caucasus in Azerbaijan, Zakatala State Reserve (Shokin 2019). According to Nikolajev et al. (2016) *Trypocopris caspius* is distributed not only in Georgia but also in the South European Territory of Russia, Iran, and Turkey.

**Distribution in Georgia.** • 1 ind; Guria, Bakhmaro; N41.854648°, E42.326441°; 1961 m a.s.l.; 26 May 2021; leg. G Chaladze; CaBOL-1009607. • 2 inds; Imereti region, 6 km South of Sairme; N41.877933°, E42.769081°; 1460 m a.s.l.; 06 June 2006; leg. A Putschkov; CGC. • 1♂; Adjara, 3.70 km South of Karapeti; N41.520688°, E42.264959°; 2136 m a.s.l.; 20 June 2017; leg. S Svetlov; ZIN (Fig 6A) • 1 ind; Khevsureti, Basin of River Roshka; leg. G Chaladze; CGC. • Borjomi; N41.8400°, E43.3908°; Dzhambazishvili 1979. • Lomis Mta; N41.8706°, E43.2511°; Dzhambazishvili 1979. • Gudauri; N42.4755°, E44.4804°; Dzhambazishvili 1979. • Jvari Pass; N42.4937°, E44.4523°; Dzhambazishvili 1979. • Khakhmati; N42.5290°, E44.9933°; Dzhambazishvili 1979. • Roshka; N42.4829°, E44.9285°; Dzhambazishvili 1979. • Giorgitsminda; N41.7301°, E45.3514°; Dzhambazishvili 1979. • Mt. Zurgidzvala; N42.0325°, E45.9294°; Dzhambazishvili 1979. • Mt. Kochalo; N41.8711°, E46.3564°; Dzhambazishvili 1979. • Zekari Pass; N41.8275°, E42.8618°; Dzhambazishvili 1979. • Lagodekhi; N41.8570°, E46.3416°; EIAUG. • Lebarde; N42.7356°, E42.4951°; Dzhambazishvili 1979. • Ushba; N43.1238°, E42.6600°; Dzhambazishvili 2000. • Koruldashi; N42.9176°, E43.1432°; Dzhambazishvili 2000. • Avadkhara; N43.5279°, E40.6314°; Dzhambazishvili 2000. • Mt. Banguriani; N43.0999°, E42.8095°; Dzhambazishvili 2000. • Latali; N43.0000°, E42.6164°; Dzhambazishvili 2000. • 1 ind; Left slope in Khaldechala River; N42.966393°, E42.982977°; 2242 m a.s.l.; 16 June 2022; leg. "marcelpolling" (iNaturalist); GBIF ID: 3988624470.

**IUCN red list status.** NE.

**National red list status.** LC. This species is distributed all over Georgia, with a large AOO (190 km<sup>2</sup>) and EOO (47.299 km<sup>2</sup>). Since no population decline or threatening factor is known, this species should be considered of "Least Concern" in Georgia.

### *Trypocopris inermis* (Menetries, 1832)

**Georgian name.** უფრთო ფუნავორია (ავხაზური ფუნავორია).

**Global distribution.** Western Caucasus (Shokin 2007), with a type location in Circassia (Baraud 1992). Based on literature data, this species is endemic to the western part of the Caucasus, as it was never recorded for Armenia, Azerbaijan, or Turkey (Iablokov-Khnzorian 1967; Nikolajev et al. 2016; Polat et al. 2018; Shokin 2019).

**Distribution in Georgia.** • 1 ind; Abkhazia, Gagra; N43.327552°, E40.322623°; 1480 m a.s.l.; 07 July 2022; leg. L Androsiuk (iNaturalist); GBIF ID: 125761900. • 1 ind; Abkhazia, Gagra; N43.310319° E40.329340°; 1785 m a.s.l.; 18 July 2008; leg. A Vlasenko (iNaturalist); GBIF ID: 41357015. • 1 ind; Tkvarcheli, Mt. Tsastou; N42.9333°, E41.8000°; 1689 m a.s.l.; 17 July 2011; leg. V Neimorovets; UkrBIN ID: 58398. • Gvandra; N43.11666°, E41.83333°; 997 m a.s.l.; 21 May 1966; GBIF ID: 3023229526; Kurina 2022. • Adanga; N43.313888°, E41.28°; 2318 m a.s.l.; 25 July 1981; GBIF ID: 3023381607; Kurina 2022. • Pskhu; N43.3855°, E40.8162°; Dzhambazishvili 1979. • Chkhalta; N43.0942°, E41.6637°; Dzhambazishvili 1979. • Avadkhara; N43.5412°, E40.6564°; Dzhambazishvili 1979. •



West limbs of Bzybysky Mt. Range, Anashtur Village; ZIN (Fig 7A).

**IUCN red list status.** NE.

**National red list status.** VU. This species is an endemic to western Great Caucasus (Dzhambazishvili 1979). Georgian populations represent the southern margin for the species distribution, with relatively small AOO (70 km<sup>2</sup>) and EOO (3,121 km<sup>2</sup>) (Fig. 7B) in the country. Given the endemic status of the species with marginal populations in Georgia, its national conservation status should be defined as "Vulnerable".

## Discussion

This paper provides a list of all species known so far in Georgia. However, as shown in Fig. 1, many places within Georgian territory remain unobserved for earth-boring beetles. According to Shokhin (2007), *Trypocopris inermis* is distributed in the Western Caucasus, from Krasnodar Krai to Karachay-Cherkessia. Therefore, its presence in the Svaneti region of Georgia can not be excluded, and additional studies are needed to delineate the southern border of its distribution.

Recently, one more earth-boring dung beetle, *Odontesus armiger* (Scopoli 1772), was reported from Lagodekhi Protected Areas (north-eastern Georgia) by Japoshvili et al. (2022). In addition, the species was also reported from south-western Georgia (Makhinjauri) in GBIF based on citizen science data (de Vries and Lemmens 2023). However, both records need to be further confirmed, and given the data, no conservation status can be evaluated at any level of uncertainty.

Additional data is required for *Geotrupes molestus*, as its distribution has not been properly studied. In the literature, only the Caucasus mountains of Armenia (Baraud 1992) and Turkey (Nikolajev et al. 2016) are indicated. In Georgia, this species was found in Zekari Pass; therefore, field data from Goderdzi Pass through the Javakheti Highland to the Armenian border is needed in order to understand the distribution range of *G. molestus* in Georgia.

Three homonyms are known for *Geotrupes caucasicus* (Nikolajev et al. 2016; GBIF 2022). *G. caucasicus* Weise, 1879, was listed for Georgia by Djambazishvili (1979); nowadays, this species is known as *Trypocopris (Trypocopris) caspius* (Motschulsky, 1845). Other two homonyms, *G. caucasicus* Sharp, 1871, which is a synonym of *G. (Glyptogeotrupes) molestus* (Faldermann, 1836), and *Geotrupes caucasicus* Schneider & Leder, 1878 which is a synonym of *Trypocopris vernalis* (Linnaeus, 1758) have never been reported from Georgia.

## Acknowledgements

I would like to thank Armen Seropian and Natalia Bulbulashvili, for providing data and taking pictures of voucher specimens. My deepest gratitude to Dr. George Japoshvili (Head of the institute of entomology in Agricultural University of Georgia, Tbilisi) for giving access to the entomological collections of Agricultural University of

Georgia and to Dr. Zurab Javakhishvili and Dr. Ketevan Batsatsashvili (Institute of Ecology, Ilia State University, Tbilisi, Georgia) for valuable advices in assesment. Deepest gratitude towards Maxim Smirnov for providing pictures and data. Special thanks to unamused reviewers for their valuable advices and to Dr. Levan Mumladze for his extensive editing of the manuscript. The study was supported by the Caucasus Barcode of Life (CaBOL) project financed by Federal Ministry of Education and Research under the grant 01DK20014A.

## References

- Baraud J (1992) Coléoptères Scarabaeoidea d'Europe. Société linnéenne de Lyon, Fédération française des sociétés de sciences naturelles, 837 pp. [in France] <https://doi.org/10.3406/linly.1992.11007>
- Cunha RL, Verdú JR, Lobo JM, Zardoya R (2011) Ancient origin of endemic Iberian earth-boring dung beetles (Geotrupidae). Molecular Phylogenetics and Evolution 59(3): 578–586. <https://doi.org/10.1016/j.ympev.2011.03.028>
- de Vries H, Lemmens M (2023). Observation.org, Nature data from around the World. Observation.org. Occurrence dataset <https://doi.org/10.15468/5nilie> [accessed via GBIF.org on 2023-04-28]
- Dzhambazishvili Y (1979) Lamellicorn beetles of Georgia. Metsniyereba, Tbilisi, 275 pp. [In Russian]
- Dzhambazishvili Y (2000) Checklist of Scarabaeoidea of Georgia (Coleoptera: Scarabidae, Troginae, Geotrupinae, Hybosorinae, Ochodaeinae, Aphodiinae). Proceedings of the Institute of Zoology 20: 123–130. [In Russian]
- GBIF (2023) GBIF Occurrence Download. <https://doi.org/10.15468/dl.cpgpvn>
- Geotrupidae in GBIF Secretariat (2023) GBIF Backbone Taxonomy. Checklist dataset. <https://doi.org/10.15468/39omei> [accessed via GBIF.org on 2023-03-06]
- Japoshvili G, Hilszczański J, Byk A, Jaworski T, Łoś K, Borowski J, Tarwacki G, Piętka J, Plewa R (2022) New records of Coleoptera from Lagodekhi Protected Areas, with new records for Georgia (Sakartvelo). Caucasiana 1: 29–39. <https://doi.org/10.3897/caucasiana.1.e85239>
- Iablokov-Khnzorian S (1967) Insects: Coleoptera, Scarabaeoidea. Academy of Science of Armenian SSR, Yerevan, 226 pp. [In Russian]
- Iankoshvili G, Tarkhishvili D (2021) Distribution of snakes (Reptilia: Serpentes) in Georgia: Social media networks help to improve scientific knowledge. Zoology in the Middle East 67(3): 228–239. <https://doi.org/10.1080/09397140.2021.1957208>
- IUCN (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Committee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>
- IUCN (2012) IUCN Red List Categories and Criteria: Version 3.1 – Second edition. IUCN, Gland and Cambridge, 32 pp.
- Kurina O (2022) Estonian University of Life Sciences Institute of Agricultural and Environmental Sciences Entomological Collection. Estonian University of Life Sciences. <https://doi.org/10.15468/qn6223> [accessed via GBIF.org on 2022-11-30]
- Mumladze L, Japoshvili B, Anderson EP (2020) Faunal biodiversity research in the Republic of Georgia: a short review of trends, gaps, and needs in the Caucasus biodiversity hotspot. Biologia 75(9): 1385–1397. <https://doi.org/10.2478/s11756-019-00398-6>
- Myers N, Mittermier RA, Mittermier CG, da Fonseca GAB, Kent J (2000) Biodiversity hotspots for conservation priorities. Nature 403: 853–858. <https://doi.org/10.1038/35002501>

- Neimorovets V (2011) *Trypocoprins inermis*. Image ID #58398. In: UkrBIN: Ukrainian Biodiversity Information Network. [https://ukrbn.com/show\\_image.php?imageid=58398](https://ukrbn.com/show_image.php?imageid=58398) [Accessed: December 12, 2022]
- Nikolajev DK, Bezděk A (2016) Geotrupidae. In: Löbl I, Löbl D (Eds) Catalogue of Palaearctic Coleoptera – Volume 3: Scarabaeoidea, Scirtoidea. 33–52. [https://doi.org/10.1163/9789004309142\\_003](https://doi.org/10.1163/9789004309142_003)
- Polat A, Ziani S, Yıldırım E (2018) A contribution to the knowledge of the Geotrupidae, Trogidae, and Hybosoridae fauna of Turkey (Coleoptera: Scarabaeoidea). *Entomofauna* 39(2): 591–596.
- Radde R (1899) Geotrupidae In: *Coleoptera Caucasia*. Museum Caucasicum, Tiflisi, I, Zoology, Typographie der Kanzelei des Landescheffs, 339–403. [In German]
- Rozner IS, Rozner GY (2009) Additional data to the Lamellicornia fauna of Turkey (Coleoptera: Lamellicornia). *Natura Somogyiensis* 15: 69–100. <https://doi.org/10.24394/NatSom.2009.15.69>
- Schoolmeesters P (2010) World Scarabaeidae database. In: Bisby FA, Ruggiero MA, Roskov YR, Cachueta-Palacio M, Kimani SW, Kirk PM, Soulier-Perkins A, Hertum JV (Eds) *Species 2000 & ITIS Catalogue of Life: 2006 Annual Checklist*. Species 2000, Reading.
- Shokhin VI (2007) Contribution to the fauna of lamellicorn beetles (Coleoptera, Scarabaeoidea) of Southern Russia, with some nomenclatural changes in the family Scarabaeidae. *Caucasian Entomological Bulletin* 3(2): 105–185. [in Russian] <https://doi.org/10.23885/1814-3326-2007-3-2-105-185>
- Shokhin VI (2019) The fauna of lamellicorn beetles (Coleoptera: Scarabaeoidea) of Azerbaijan. *Caucasian Entomological Bulletin* 15(1): 61–106. [in Russian] <https://doi.org/10.23885/181433262019151-61106>
- Tarkhishvili D, Chaladze G, Gavashelishvili A, Javakhishvili Z, Mumladze L (2013) Georgian Biodiversity Database. <http://www.biodiversity-georgia.net> [Accessed: September 8, 2022]
- UkrBIN (2022) UkrBIN: Ukrainian Biodiversity Information Network [public project & web application]. UkrBIN, Database on Biodiversity Information. <https://www.ukrbn.com> [Accessed: September 8, 2022]