Annals of Agrarian Science

Journal homepage: http://journals.org.ge/index.php

Checklist of carrion beetle (Coleoptera, Silphidae) from Sakartvelo (Georgia)

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Received: 25 May 2021; Accepted: 20 June 2021

ABSTRACT

A checklist of Carrion beetles of Sakartvelo (Georgian) contains 26 species, which are represented by nine genera (*Ablattaria* Reitter, *Aclypea* Reitter, *Dendroxena* Motschulsky, *Necrodes* Leach, *Nicrophorus* Fabricius, *Oiceoptoma* Leach, *Phosphuga* Leach, *Silpha* Linnaeus, *Thanatophilus* Leach) and two subfamilies Nicrophorinae and Silphinae. Distribution records are given by using available literature, web databases and collections. The pictures of few specimens are provided and species with doubtful records in Georgia are not included on the list but are given separately.

Keywords: Carrion beetles, Silphidae, Coleoptera, Distribution, Caucasus, Georgia.

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Introduction

Carrion beetles (Coleoptera, Silphidae) are a small family of beetles: fewer than 200 species have been described worldwide, however they have global distribution [1].

They play an important role in ecosystem as recycles of organic matter. While most of the carrion beetles are necrophagous, some of the members of Silphidae family are predaceous (*Ablattaria* Reitter, *Dendroxena* Motschulsky, *Phosphuga* Leach) or phytophagous (*Aclypea* Reitter). Larvae of most species feed on vertebrate carrions [1, 2].

Carrion beetles in Georgia (in Georgian: Sakartvelo) are poorly studied: one of the first list of Caucasian beetle was published in 1899 by Radde [3], later Zaitsev provided list of Carrion beetles for Caucasus region [4, 5], Kobakhidze indicated three species of Family Silphidae for Lagodekhi region [6], Jambazishvili provided carrion beetles from Akhaltsikhe and Akhalkalaki region [7], Qubaiová et al. provied lockations for Genus *Ablattaria* (Reitter, 1884), in their work [8], V. Pushkin provided data for Georgia for several species in his papers [2, 9]

Aim of this paper is to summarize all known records of carrion beetles in Sakartvelo (Georgia).

Material and Methods

Literature review was performed according published sources, which was provided by Institute of Entomology in Agricultural University of Georgia and National Scientific Library - Georgia and based on by using Google-Scholar and Researchgate web databases, using Keywords: “Carrion beetles”, “Silphidae”, “Distribution”, “Caucasus”, “Georgia” and combination of those keywords. Locations were looked in GBD (Georgian Biodiversity Database) [10], GBIF [11 - 18] (Global Biodiversity Information Facility) and collections listed in abbreviations were studied.

All species are listed alphabetically by subfamilies. Nomenclature and classification according to

Catalogue of Palaearctic Coleoptera [19]. For species with no exact locations, "Georgia, Exact location is unknown" was used in Distribution.

Pictures were taken by using a Canon EOS 550D camera with Canon EF 100mm f/2.8 Macro USM lens and Raynox DCR-250 Super Macro Snap-On Lens attached on it. Digital images were prepared using Zerene Stacker image stacking software and Adobe Photoshop CS6.

Abbreviation:

EG - East Georgia.

WG - West Georgia.

GCG - collection of Dr. Giorgi Chaladze, Sakartvelo (Georgia).

ZIISU - collection of Zoological Institute, Ilia State University, Sakartvelo (Georgia).

IEAUG - collection of Institute of Entomology, Agricultural University of Georgia.

CaBOLISU - collection of CaBOL (Caucasus Barcode of Life), Ilia State University, Sakartvelo (Georgia).

Results

Family Silphidae
Subfamily *Nicrophorinae* Kirby, 1837
Genus *Nicrophorus* Fabricius, 1775

1 *N. antennatus* (Reitter, 1885)

Distribution: Georgia, Exect location is unknown [19].

2 *N. germanicus* (Linnaeus, 1758)

Distribution: Georgia, Exact location is unknown [2, 19].

3 *N. humator* (Gleditsch, 1767)

Distribution: EG: Borjomi [4], Borjom-Kharagauli National park (IEAUG), Tbilisi [4].

4 *N. interruptus* Stephens, 1830

(= *N. fossor* (Erichson, 1837)) [2]

Distribution: EG: Lagodekhi [6], Village Khevsha [10], WG: Bzyb ridge [2], Swaneti [3], Iprali [13].

5 *N. investigator* Zetterstedt, 1824

(= *N. funeror* (Reitter, 1884)) [23]

Distribution: EG: Lagodekhi [4], Bakuriani [4], Dighomi Village [10], WG: Swaneti [3, 23].

6 *N. nigricornis* Faldermann, 1835

Distribution: EG: Lagodekhi [4], Tskra-tskaro [4], WG: Swaneti [3, 4].

7 *N. sepultor* (Charpentier, 1825)

(= *N. confusus* Portevin, 1924) [20]

Distribution: EG: Tbatani [4], Tsalka [15], Chivtkilisa [22 as *N. confusus*], Akhalsheni (previously known as Kariaki) [22 as *N. confusus*], Tetri-tsqaro [22 as *N. confusus*], Akhaltsikhe region [22 as *N. confusus*], Akhalkalaki region [22 as *N. confusus*].

8 *N. vespillo* (Linnaeus, 1758)

Distribution: EG: Village Khevsha (GCG), Bakuriani forest (GCG), Bakuriani [4], Mountain likhi (GCG), Akhaltsikhe region [7], Akhalkalaki region [7], Ketrisi (ZIISU) WG: kintrishi Protected Areas (CaBOLISU), Chakvistavi [11] , Kobuleti [12].

9 *N. vespilloides* Herbst, 1783

Distribution: WG: Bzyb range [2].

10 *N. vestigator* Herschel, 1807

Distribution: Georgia, Exect location is unknown [19].

Subfamily *Silphinae* Latreille, 1807
Genus *Ablattaria* Reitter, 1884

11 *A. arenaria* (Kraatz, 1876)

Distribution: WG: Sukhumi [2].

12 *A. cribrata* (Menetries, 1832)

Distribution: EG: Kaspi (GCG), Sioni [8], Lagodekhi [8], Didgori [10] Borjomi [3, 4], Borjom-Kharagauli, 2 km East Quabiskhevi [8], Chankaani, near Dedophliswyaro (CaBOLISU).

13 *A. laevigata* (Fabricius, 1775)

Distribution: EG: Bakuriani [4, 8], WG: Gagra [8], Kutaisi [8].

Genus *Aclypea* Reitter, 1884

14 *A. opaca* (Linnaeus, 1758)

Distribution: EG: Tsodoreti-Paravani [10].

15 *A. undata* (O.F Müller, 1776)

Distribution: WG: Avadkhara [9], EG: Samachablo (South Ossetia) [2], Surami [3], Kasbegi [3], Telavi [4], Tbilisi [17], Saghamo lake (CaBOLISU).

Genus *Dendroxena* Motschulsky, 1858

16 *D. quadrimaculata* (Scopoli, 1771)

(= *Xylodrepa quadrimaculata* (Schreber, 1759)) [3, 4]

Distribution: EG: Turtle lake, (Bulbulebis chala) [10].

Genus *Necrodes* Leach, 1815

17 *N. littoralis* (Linnaeus, 1758)

Distribution: EG: Likani [10], Samachablo (South Ossetia) [2], Akhaltsikhe region [7], Akhalkalaki region [7], WG: Avadhara, Akhalsheni, Sukhumi Region valley River Gumista [2].

Genus *Oiceoptoma* Leach, 1815

18 *O. thoracicum* (Linnaeus, 1758)

Distribution: EG: Samachablo (South Ossetia) [2], Bakuriani [2], Mt. Lomismta (IEAUG), Surami [3, 4], Kojori [4], WG: Avadkhara [2], Akhalsheni [2], Pskhu [4], Kodori [4], Shovi (ZIISU).

Genus *Phosphuga* Leach, 1817

19 *P. atrata* (Linnaeus, 1758)

Distribution: EG: Didgori (GCG), Bakuriani [4], Telavi [4], Manglisi [4], National park of Borjom-Kharagauli [10], WG: Lezgara (Church Tekhish Jgrag) (CaBOLISU), Zeskho (ZIISU), Gagra [4].

20 *P. ruzickai* Khachikov, 2011

Distribution: WG: Lake Ritsa [19, 21].

Genus *Silpha* Linnaeus, 1758

21 *S. carinata* Herbst, 1783

(= *S. armeniaca* Kolenati, 1846) [4]

Distribution: EG: Passanaur [4], Tsalka [4], Telavi [4], Lagodekhi [4], Mt. Lomismta (IEAUG), WG: Mt. Taginauri [2].

22 *S. obscura* Linnaeus 1758

Distribution: EG: Turtle lake (GCG), Khevsha village (GCG), Tskra-tskaro pass (GCG), Passanauri [16], Surami [3], Tashiskari [10], David Gareja [10], Akhaltsikhe region [7], Akhalkalaki region [7], Zemo Tmogvi (CaBOLISU) WG: Adjara [3], Mt. Taginauri [2], Kintrishi (Khinu) (GCG), Swantei [3], Gagra[14], Near Shkhara (CaBOLISU).

23 *S. tristis* Illiger, 1798

Distribution: Georgia, Exect location is unknown [19].

Genus *Thanatophilus* Leach, 1815

24 *T. rugosus* (Linnaeus, 1758)

Distribution: EG: Samachablo (South Ossetia) [2], Teliani [4], Bakuriani [4], Mt. Lomismta [4], Mtskheta [3, 4], Tbilisi; Vakis park (GCG), Akhaltsikhe region [7], Akhalkalaki region [7], Rustavi (GCG), WG: Akhalsheni, Avadhara, Sukhumi Region valley River Gumista [2].

25 *T. sinuatus* (Fabricius, 1775)

Distribution: EG: Khevsha village (GCG), Lisi [4], Borjom [4], Bakuriani [4], Akhaltsikhe region [7], Akhalkalaki region [7], WG: Akhalsheni, Sukhumi Region valley River Gumista [2].

26 *T. terminatus* (Hummel, 1825)

Distribution: EG: Lisi [4].

Doubtful species which was not included in the list

1 *Thanatophilus dispar* (Herbst, 1793)

Distribution: EG: Tskra-tskaro [4], Borjomi [18]

Comment: According to Pushkin [2], Notes for the Caucasus (Transcaucasia) is wrong. According to Zaitsev [5], this species must be crossed out from the list of Caucasians Species due to misidentification.

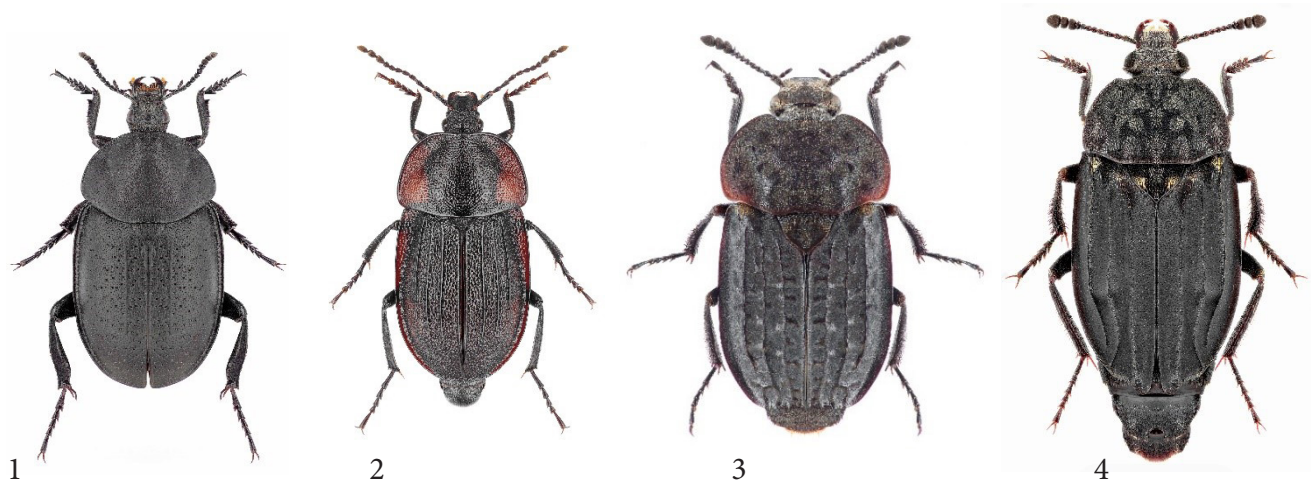

Fig. 1. *Silphidae of Sakartvelo: 1. Ablattaria cribrata, male. 2. Phosphuga atrata, male. 3. Thanatophilus rugosus, male. 4. Thanatophilus sinuatus, female.*

5 6 7 8

Fig. 2. *Silphidae of Sakartvelo: 5. Necrodes littoralis, female. 6. Nicrophorus interruptus, male. 7. Nicrophorus investigator, female. 8. Nicrophorus vespillo, male.*

Conclusion

In total, 26 species have been represented, from nine genera, the genus *Nicrophorus* Fabricius is the most diverse, with ten species occurred in Georgia. It is fair to say that the distribution of carrion beetles in Georgia is very diverse.

Acknowledgements

I would like to thank Dr. Giorgi Chaladze (Institute of Ecology, Ilia State University, Tbilisi, Georgia.), Dr. George Japoshvili (Institute of Entomology, Agricultural University of Georgia, Tbilisi, Georgia), Dr. Edisher Tskhadaia (Institute of Zoology, Ilia State University, Tbilisi, Georgia.) for access to entomological collections, Entomological team of CaBOL in Ilia State University for helping my find burying beetles in Malaise traps, Armen Seropian for taking pictures of specimens. My gratitude to Dr. Jan Růžička for providing valuable suggestions.

References

[1] D. S. Sikes, Carrion Beetles (Coleoptera: Silphidae). In: Capinera, J. L., (Ed.), Encyclopedia of Entomology 2nd Edition. Springer, Dordrecht, 2008, pp. 749-757.

[2] S. V. Pushkin, Carrion beetles (Coleoptera, Silphidae) of Russia: Atlas and identification Key, Directmedia, (2015) (in Russian).

[3] G. Radde, Coleoptera Caucasica. Museum Caucasicum, Tiflisi, I, 1899, pp. 339-403.

[4] F. A. Zaitsev, On the distribution of subfamily Silphini Ganglb in the Caucasus, Proceedings of Caucasian Museum. Tiflis, 8, 1914, pp. 151-164 (in Russian).

[5] F. A. Zaitsev, A Notes on the Coleoptera of the Caucasus and Neighboring Countries, Proceedings of the Caucasian Museum. Tiflis, 3-4, 1916, pp. 250-253 (in Russian, Latin title).

[6] D. Kobakhidze, Materials to study entomofauna of Lagodekhi state reserve. Proceedings of Institute of Zoology, 14, 1956, pp. 189-214 (in Georgian).

[7] I. S. Jambazishvili, On the use of bait pits with animal carcasses for collecting beetles, Bulletin of the Academy of Sciences of the Georgian SSR, 40. No 1 (1965), 183-186 (in Georgian).

[8] J. Qubaiová, J. Růžička, & H. Šípková, Taxonomic revision of genus Ablattaria Reitter (Coleoptera, Silphidae) using geometric morphometrics. ZooKeys, 477, 2015, pp. 79-142.

[9] S. V. Pushkin, S. I. Sigida, Overview of Genus Aclypea Reitter, 1884 (Coleoptera, Silphidae) of South Russia and Caucasus, in Vestnik stavropolskava gosudarstvenogo universiteta, Nauka (42) (2005) pp. 51-59 (in Russian).

[10] D. Tarkhnishvili, G. Chaladze (Editors), Georgian biodiversity database, 2013 http://www.biodiversity-georgia.net/, Downloaded on: 24 February 2021

[11] de Vries H., Lemmens M., Observation.org, Nature data from around the World, Observation.org. Occurrence dataset https://doi.org/10.15468/5nilie accessed via GBIF.org on 2020-12-01. https://www.gbif.org/occurrence/2837648326

[12] de Vries H., Lemmens M., Observation.org, Nature data from around the World. Observation.org. Occurrence dataset https://doi.org/10.15468/5nilie accessed via GBIF.org on 2020-12-01. https://www.gbif.org/occurrence/2837384485

[13] Kurina O., Estonian University of Life Sciences Institute of Agricultural and Environmental Sciences Entomological Collection. Estonian University of Life Sciences. Occurrence dataset https://doi.org/10.15468/qn6223 accessed via GBIF.org on 2021-04-07. https://www.gbif.org/occurrence/3023346865

[14] Soon V., University of Tartu Natural History Museum and Botanical Garden Zooloogical Collections. University of Tartu, Natural History Museum and Botanical Garden, Occurrence dataset https://doi.org/10.15468/6hfnux accessed via GBIF.org on 2021-04-07. https://www.gbif.org/occurrence/3017597525

[15] Grant S., Webbink K., Turcatel M., Shuman R., Field Museum of Natural History (Zoology) Insect, Arachnid and Myriapod Collection. Version 12.29. Field Museum,2020 Occurrence dataset https://doi.org/10.15468/0ywfpc accessed via GBIF.org on 2020-12-01. https://www.gbif.org/occurrence/1142361194

[16] Grant S., Webbink K., Turcatel M., Shuman R, Field Museum of Natural History (Zoology) Insect, Arachnid and Myriapod Collection. Version 12.31. Field Museum. Occurrence dataset https://doi.org/10.15468/0ywfpc accessed via GBIF.org on 2020-12-14, https://www.gbif.org/occurrence/11 42359048

[17] Grant S., Webbink K, Turcatel M, Shuman R (2020). Field Museum of Natural History (Zoology) Insect, Arachnid and Myriapod Collection. Version 12.31. Field Museum. Occurrence dataset https://doi.org/10.15468/0ywfpc accessed via GBIF.org on 2021-04-06, https://www.gbif.org/occurrence/1587045697

[18] Vorst O, Creuwels J (2021). Naturalis Biodiversity Center (NL) - Coleoptera. Naturalis Biodiversity Center. Occurrence dataset https://doi.org/10.15468/jrjojf accessed via GBIF.org on 2021-04-07. https://www.gbif.org/occurrence/2443100666

[19] J. Růžička, Silphidae, In: I. Löbl, & D. Löbl (Eds.), Catalogue of Palaearctic Coleoptera: Hydrophiloidea - Staphylinoidea (Revised and Updated Edition). Vol. 2/1, (2015) pp.5 + 291-304.

[20] D. S. Sikes, S. M. Vamosi, S. T. Trumbo, M. Ricketts & C. Venables, Molecular systematics and biogeography of Nicrophorus in part—The investigator species group (Coleoptera: Silphidae) using mixture model MCMC. Molecular Phylogenetics and Evolution, 48, (2008), 646-666.

[21] E. A. Khachikov, *A new species of the genus Phosphuga Leach, 1817 (Coleoptera: Silphidae) from the North-Western Caucasus,* Caucasian Entomological Bulletin (CEB), Vol 7, No. 1 (2011), 39-40 (in Russian).

[22] V. O. Kozminykh, Information about a little known species Nicrophorus confusus Portevin, 1924 (Coleoptera, Silphidae)], Izvestia Chelabinskogo Nauchnovo Centra, Vip. 2 (28) (2005), 100-104 (in Russian).

[23] D. S. Sikes, R. B. Madge, A. F. Newton, A catalog of the Nicrophorinae (Coleoptera: Silphidae) of the world- Zootaxa 65 (1), (2002) 1-304.