








Article

New Data on the Occurrence of Scarabaeoid Beetles (Coleoptera: Scarabaeoidea) in Serbia

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Abstract: The Serbian fauna of the superfamily Scarabaeoidea is relatively well-known compared to the neighbouring countries. Many common species known from Serbia's neighbouring countries are not recorded in Serbia, despite the richness of the country's habitats, such as high-mountain meadows, pastures, deep gorges, riverbanks (including the exceptionally valuable sandy banks of the Danube) and old forests. Therefore, we aim to supplement the current information on the distribution of the species of the Serbian scarabaeoid beetles. The presented scarabaeoid beetles were caught during seven expeditions in 2013, 2017, 2018, 2019 (two expeditions), 2021, and 2022. As a result, 2031 beetles belonging to 120 species and five families of the superfamily Scarabaeoidea (Geotrupidae, Trogidae, Lucanidae, Glaphyridae, Scarabaeidae) were observed. In less than two months of the faunistic study, the authors confirmed the occurrence in Serbia of 49.5% of the scarabaeoid species previously known from this country and added 13 new species that had not been previously recorded: *Eulasia pareyssei* (Brullé, 1832), *Pygopleurus apicalis* (Brullé, 1832), *Melinopterus reyi* (Reitter, 1892), *Nimbus johnsoni* (Baraud, 1976), *Planolinoides borealis* (Gyllenhal, 1827), *Copris hispanus* Linnaeus, 1764, *C. umbilicatus* Abeille de Perrin, 1901, *Cheironitis furcifer* (P. Rossi, 1792), *Onthophagus dellacasai* Pittino & Mariani, 1981, *O. similis* (Scriba, 1790), *Chaetonyx schatzmayri* Mariani, 1946, *Holochelus costulatus* (Fivaldszky, 1835), and *Omaloplia corcyrae* (Baraud, 1965). Eight species and one subspecies typical for the Balkan Peninsula were also found: *Jekelius punctulatus* (Jekel, 1866), *Pygopleurus apicalis*, *P. chrysonotus* (Brullé, 1832), *Onthophagus dellacasai*, *Chaetonyx robustus robustus* Schaum, 1862, *Ch. schatzmayri*, *Omaloplia corcyrae*, *O. illyrica* (Baraud, 1965), and *Triodontella dalmatica* (Baraud, 1962). Thus, the number of currently known scarabaeoid species in Serbia has increased to 229. Our results indicate insufficient knowledge of the Scarabaeoidea of Serbia. Therefore, further research and new expeditions to Serbia are highly desirable. High-mountain and Danubian communities of dung beetles are priceless and deserve protection. Twenty-one species of scarabaeoid beetles are illustrated.

Keywords: Geotrupidae; Glaphyridae; Lucanidae; Scarabaeidae; Trogidae; biodiversity; distribution; nature conservation; new records; Serbia

1. Introduction

The Scarabaeoidea (scarabaeoid beetles) are represented in Europe by eight families, 208 genera, and about 1250 species [1,2]. A dominant trophic group among scarabaeoid beetles is the coprophagous Scarabaeoidea (dung beetles). Coprolite evidence clearly indicates that dung beetles were associated with dinosaurs [3]. Dung beetles can be endo-, para- or telecoprid [4]. Endocoprid species lay their eggs directly into the dung on the soil surface. Paracoprid species dig tunnels beneath or nearby the dung, which end in brood chambers. Telecoprid species separate a portion of dung and transport it far from the original dung source, where the beetles bury the faeces in tunnels of various lengths [5]. Diverse methods of dung transporting and foraging result in greater diversity of ecological processes such as nutrient recycling, soil aeration, plant seed dispersal, and reduction of parasite numbers [6]. Among the scarabaeoid beetles, there are also saproxylo-, necro-, phyllo-, and rhizophagous species.

Taxonomic and faunistic works allow us to understand the behaviour of scarabaeoid beetles. Such works lead to descriptions of new taxa and classify the organisms, as well as show their distribution, diversity, and habitat requirements. They provide the basis for further research, such as on the relationships in dung beetles communities and their role in nature [2].

The Serbian fauna of the superfamily Scarabaeoidea is relatively well known. The most comprehensive research on scarabaeoid beetles from Serbia was conducted by Mikšić [7–13]. The first of them, “Fauna Insectorum Balcanica—Scarabaeoidea”, contained information on the occurrence of 145 species of this superfamily in Serbia [7]. In the first appendix published by the same author, there are 159 species [8]. In the second appendix, Mikšić [10] lists another fourteen species new to the fauna of Serbia, but also removes the three species mentioned in the first appendix. As a result, the number of recorded scarabaeoid beetle species from Serbia increased to 170. From the last of the works presented above “Katalog der Lamellicornia Jugoslaviens (Insecta-Coleoptera)” [13] the number of scarabaeoid beetle species known from Serbia was 180. Another list of the family Scarabaeidae of Serbia (and thus most of the superfamily Scarabaeoidea of Serbia) was published after 40 years by Gavrilović and Ćurčić [14]. In this work, the authors record 178 species of scarabaeoid beetles in Serbia. The Catalogue of Palaearctic Coleoptera [1] contains 212 scarabaeoid species (Geotrupidae—7 species, Trogidae—4, Glaresidae—1, Lucanidae—5, Ochodaeidae—3, Hybosoridae—1, Glaphyridae—1 and Scarabaeidae—190) from Serbia. There are 112 species of dung beetles among the Scarabaeoidea of Serbia.

Most of the works on the Scarabaeoidea of Serbia were published in the previous century and cover a much larger area than the present territory of Serbia (commonly the territory of the former Yugoslavia). With the present study, we aim to supplement previous data about the distribution of species of the superfamily Scarabaeoidea in Serbia. We also give guidance on the protection of valuable scarabaeoid beetle communities.

2. Materials and Methods

The presented data are the result of seven entomological expeditions. The collecting of scarabaeoid beetles was done between 14 and 17 July 2013, next 2 June 2017, next between 3 and 12 May 2018, next between 29 April and 2 May, next between 18 and 28 July 2019, next between 24 and 28 May 2021, and finally between 22 May and 10 June 2022. We collected material in 50 localities (Table 1 and Figure 1) located in sixteen districts: Bor (4 localities), Braničevo (1), Central Banat (1), Jablanica (1), Nišava (3), North Bačka (1), North Banat (3), Pčinja (9), Pirot (5), Rasina (1), Raška (1), South Bačka (1), South Banat (5), Srem (4), Zaječar (3), and Zlatibor (7).

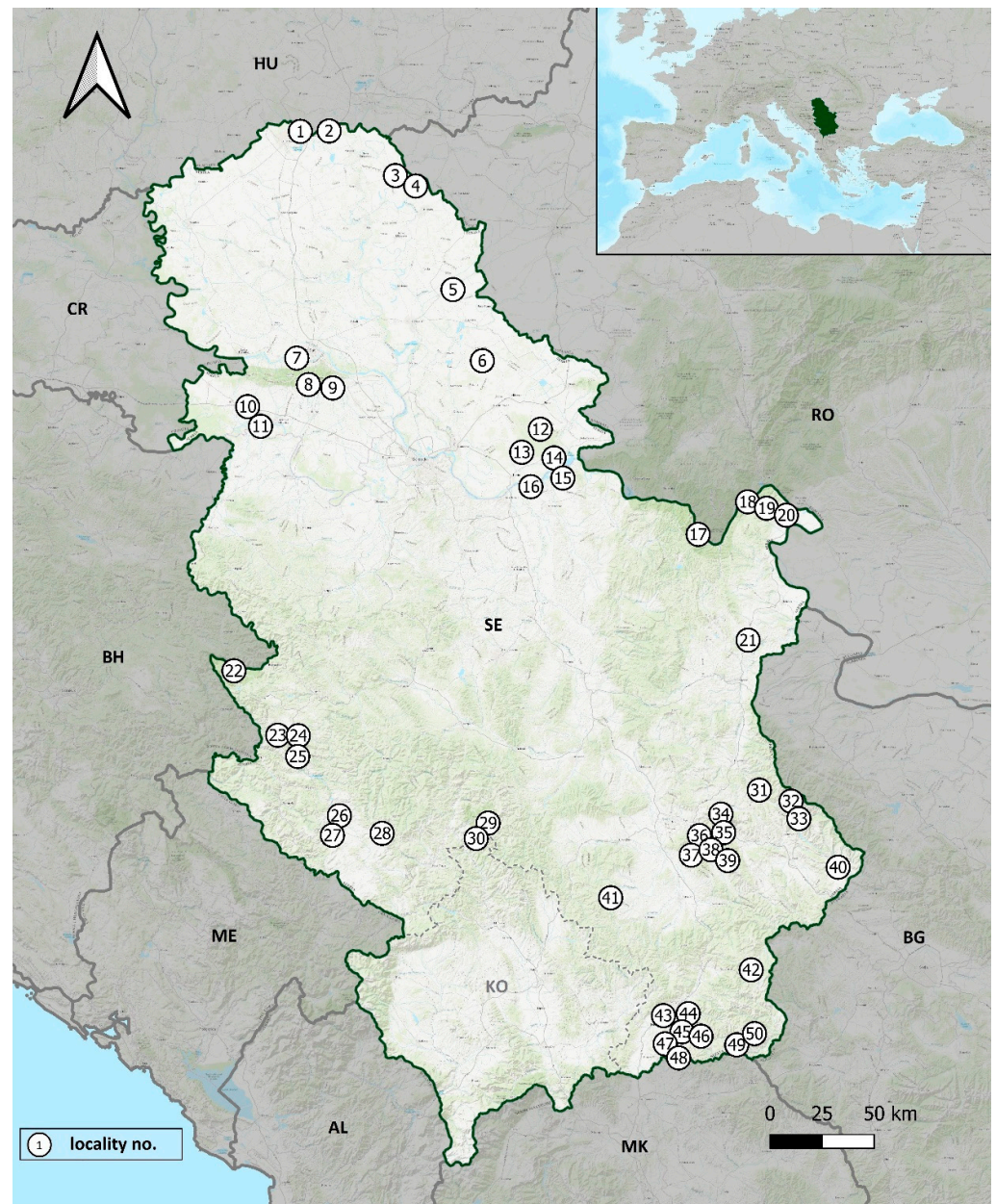


Figure 1. Collection localities of the scarabaeoid beetles in Serbia (2013, 2017–2019, 2021, 2022) (locality numbers correspond to those in Table 1).

Table 1. Collection localities of the scarabaeoid beetles in Serbia (2013, 2017–2019, 2021, 2022).

No.	Locality	Geographical Coordinates	Altitude [m a.s.l.]	Date of Collection
1.	Palić at Subotica (Figure 2A)	46°08′45″ N 19°45′13″ E	115	22 May 2022
2.	Horgoš at Kanjiža	46°08′51″ N 19°55′10″ E	90	22 May 2022
3.	Crna Bara at Čoka	45°58′09″ N 20°18′08″ E	75	22 May 2022
4.	Mokrin at Kikinda	45°55′38″ N 20°25′08″ E	75	22–23 May 2022

Table 1. Cont.

No.	Locality	Geographical Coordinates	Altitude [m a.s.l.]	Date of Collection
5.	Torak at Žitište	45°30'37" N 20°38'02" E	75	23 May 2022
6.	Samoš at Kovačica	45°13'19" N 20°48'11" E	80	23 May 2022
7.	Futog at Novi Sad	45°13'58" N 19°43'59" E	70	10 June 2022
8.	Vrdnik at Irig (Figure 2B)	45°07'31" N 19°48'01" E	235	8–9 June 2022
9.	Krušedol Selo at Irig	45°06'41" N 19°56'27" E	190	9 June 2022
10.	Martinci at Sremska Mitrovica	45°02'08" N 19°26'58" E	80	3 May 2018
11.	Zasavica at Sremska Mitrovica	44°57'19" N 19°31'27" E	75	8 June 2022
12.	Šušara at Vršac (Figure 2C)	44°56'35" N 21°08'18" E	175	23–24 May 2022
13.	Deliblato at Kovin (Figure 2D)	44°50'57" N 21°01'50" E	100	24 May 2022
14.	Dubovac at Kovin (Figure 2E)	44°47'46" N 21°14'48" E	75	25 May 2022
15.	Selo Kostolac at Kostolac	44°47'01" N 21°16'40" E	75	15 July 2013
16.	Malo Bavanište at Kovin (Figure 2F)	44°43'42" N 21°04'38" E	65	25 May 2022
17.	Boletin at Majdanpek	44°30'45" N 22°02'54" E	165	14 July 2013
18.	Tekija at Kladovo	44°39'22" N 22°20'00" E	340	26 May 2022
19.	Petrovo Selo at Kladovo	44°37'51" N 22°25'22" E	450	25–26 May 2022
20.	Podvrška at Kladovo	44°36'05" N 22°31'37" E	155	25 May 2022
21.	Mala Jasikova at Zaječar (Figure 2G)	44°04'34" N 22°20'11" E	260	27 May 2022
22.	Aluga at Bajina Bašta	43°56'56" N 19°22'14" E	825	6–7 June 2022
23.	Jablanica at Čajetina (Figure 2H)	43°40'51" N 19°37'59" E	1025	23–28 July 2019
24.	Ljubiš at Čajetina	43°40'45" N 19°42'06" E	1115	5 June 2022
25.	Dobroselica at Čajetina	43°37'56" N 19°42'30" E	1120	4–5 June 2022
26.	Druzinice at Sjenica	43°20'41" N 19°58'44" E	1035	18–22 July 2019
27.	Mašoviće at Sjenica	43°17'32" N 19°56'19" E	1045	4 June 2022
28.	Sušica at Sjenica	43°16'53" N 20°13'31" E	1260	4 June 2022
29.	Brzeće at Brus (Figure 3A)	43°18'49" N 20°50'12" E	1750	2–3 June 2022
30.	Kopaonik at Raška (Figure 3B)	43°16'44" N 20°48'29" E	1800	3 June 2022
31.	Papratna at Knjaževac	43°27'06" N 22°24'03" E	345	27 May 2022
32.	Crni Vrh at Knjaževac	43°24'20" N 22°35'03" E	785	28 May 2022
33.	Zaskovci at Pirot (Figure 3C,D)	43°21'43" N 22°35'57" E	1655	28–29 May 2022
34.	Gradište at Bela Palanka	43°19'16" N 22°10'46" E	445	1 May 2019
35.	Dolac at Bela Palanka	43°18'49" N 22°11'43" E	355	7 May 2018
36.	Čukljenik at Niška Banja (Figure 3E)	43°16'53" N 22°03'56" E	415	2 June 2017, 11 May 2018, 2 May 2019, 24 May 2021
37.	Marina Kutina at Gadžin Han	43°12'32" N 22°01'05" E	315	12 May 2018, 30 April 2019, 28 May 2021
38.	Gornja Studena at Niška Banja	43°13'18" N 22°06'42" E	865	3 May 2019
39.	Kosmovac at Bela Palanka	43°10'34" N 22°11'19" E	1595	8 May 2018, 3 May 2019
40.	Slavinja at Pirot	43°08'53" N 22°51'19" E	760	27 May 2021
41.	Ivanje at Bojnik (Figure 3F)	42°59'57" N 21°32'37" E	905	10 May 2018
42.	Damnjančevići at Surdulica (Figure 3G)	42°41'41" N 22°21'15" E	1255	17 July 2013
43.	Ristovac at Vranje	42°28'14" N 21°50'52" E	390	2 June 2022
44.	Barbarušince at Vranje	42°28'44" N 21°59'27" E	865	30 May 2022
45.	Vladovce at Trgovište (Figure 3H)	42°23'30" N 21°57'17" E	735	1 June 2022
46.	Donja Trnica at Trgovište (Figure 4A)	42°22'58" N 22°03'16" E	600	29 April 2019, 1 June 2022
47.	Starac at Bujanovac (1) (Figure 4B,C)	42°20'25" N 21°53'17" E	690	29 April 2019, 1 June 2022
48.	Starac at Bujanovac (2) (Figure 4D,E)	42°19'50" N 21°53'44" E	440	29 April 2019
49.	Prolesje at Trgovište (Figure 4F,G)	42°22'34" N 22°16'14" E	1250	31 May–1 June 2022
50.	Crnoštica at Bosilegrad (Figure 4H)	42°25'26" N 22°22'23" E	1595	1 June 2022

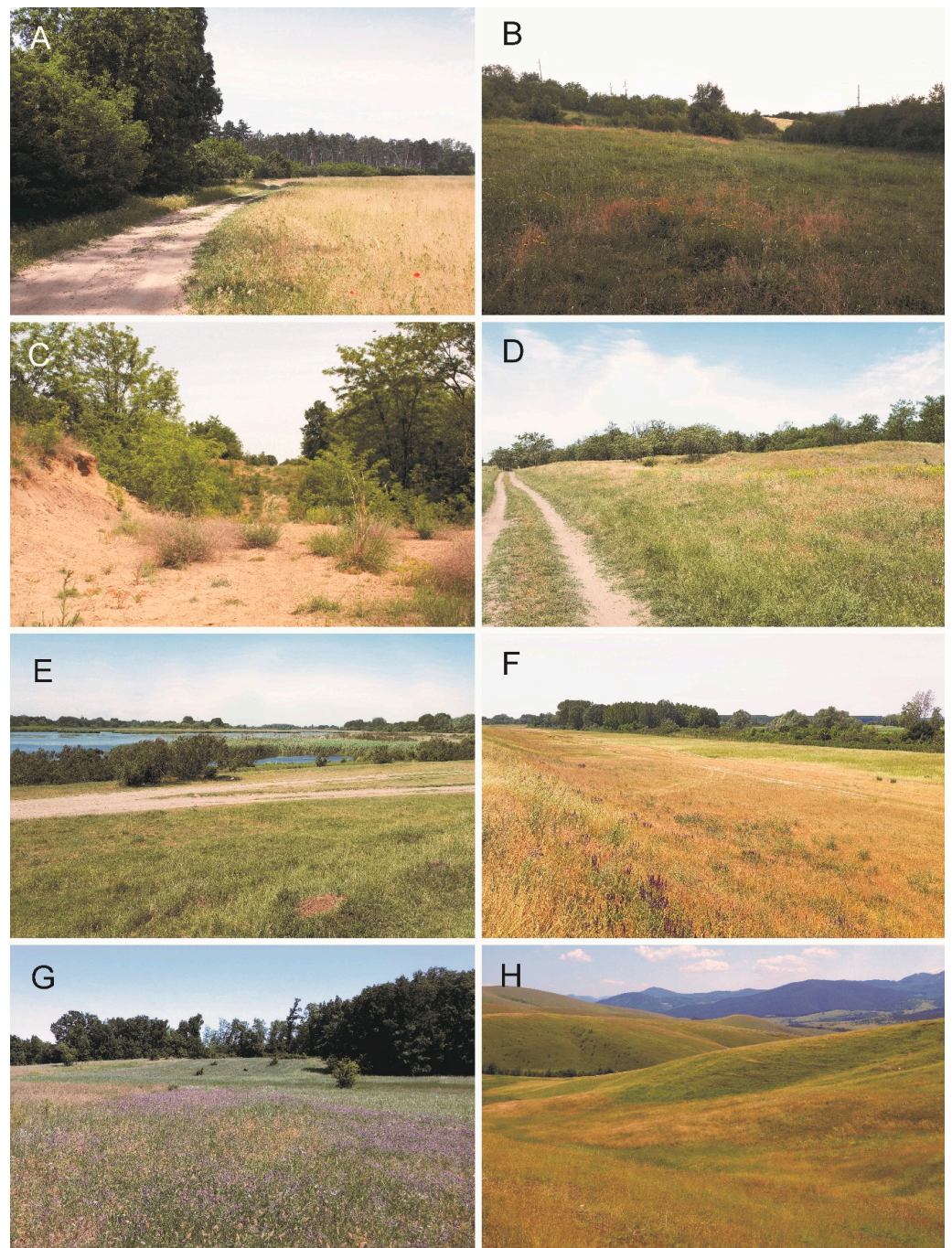


Figure 2. Collection localities of the scarabaeoid beetles in Serbia (2013, 2017–2019, 2021, 2022): (A)—Palić at Subotica, (B)—Vrdnik at Irig, (C)—Šušara at Vršac, (D)—Deliblato at Kovin, (E)—Dubovac at Kovin, (F)—Malo Bavanište at Kovin, (G)—Mala Jasikova at Zaječar, (H)—Jablanica at Čajetina (Photos: (A,C,G)—Tomasz Gazurek, (B,D,E)—Adam Byk, (F)—Sebastian Tylkowski and (H)—Dawid Marczak).

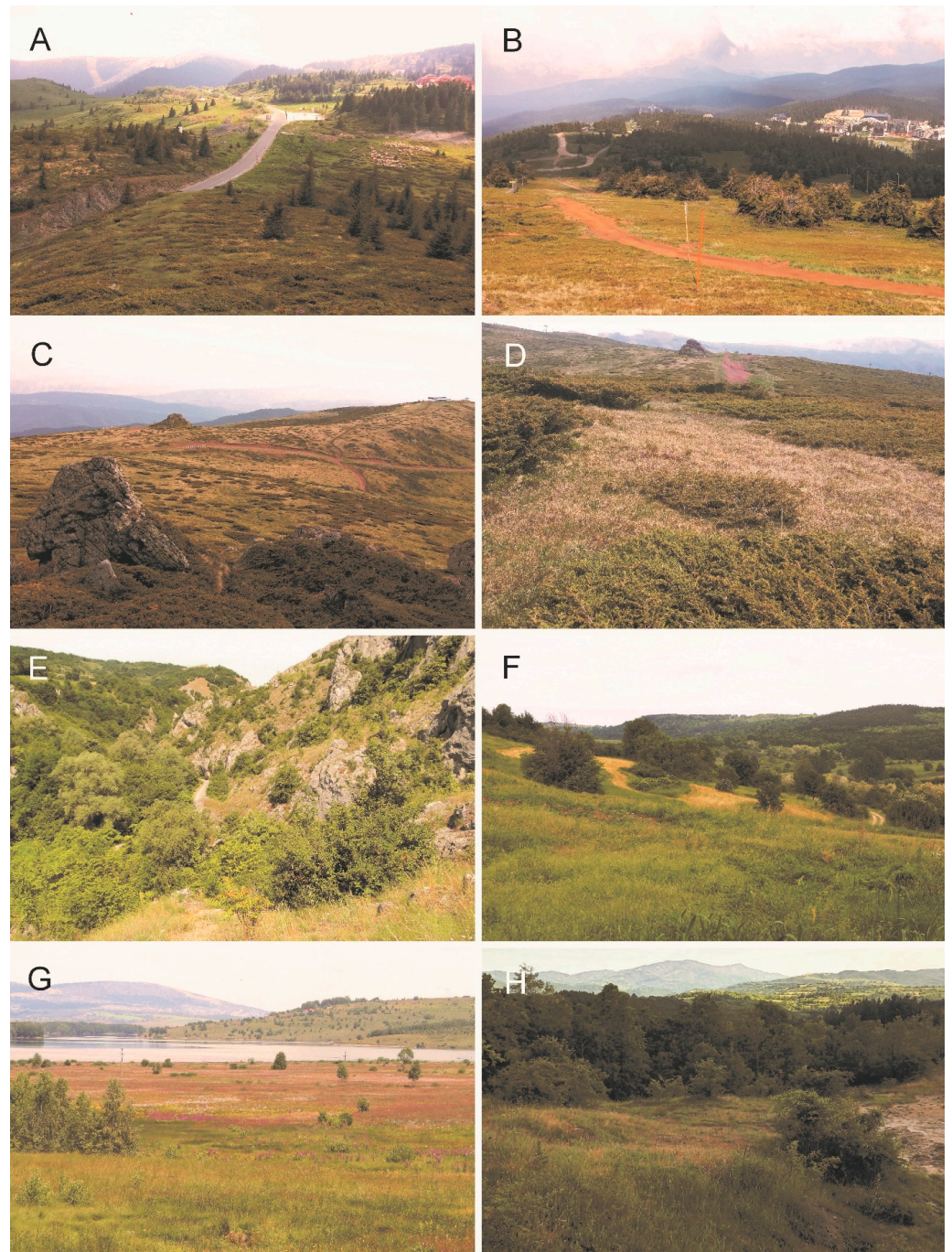


Figure 3. Collection localities of the scarabaeoid beetles in Serbia (2013, 2017–2019, 2021, 2022): (A)—Brzeće at Brus, (B)—Kopaonik at Raška, (C,D)—Zaskovci at Pirot, (E)—Čukljenik at Niška Banja, (F)—Ivanje at Bojnik, (G)—Damnjaničovi at Surdulica, (H)—Vladovce at Irgovište (Photos: (A–D)—Tomasz Gazurek, (E–G)—Dawid Marczak and (H)—Marek Bidas).

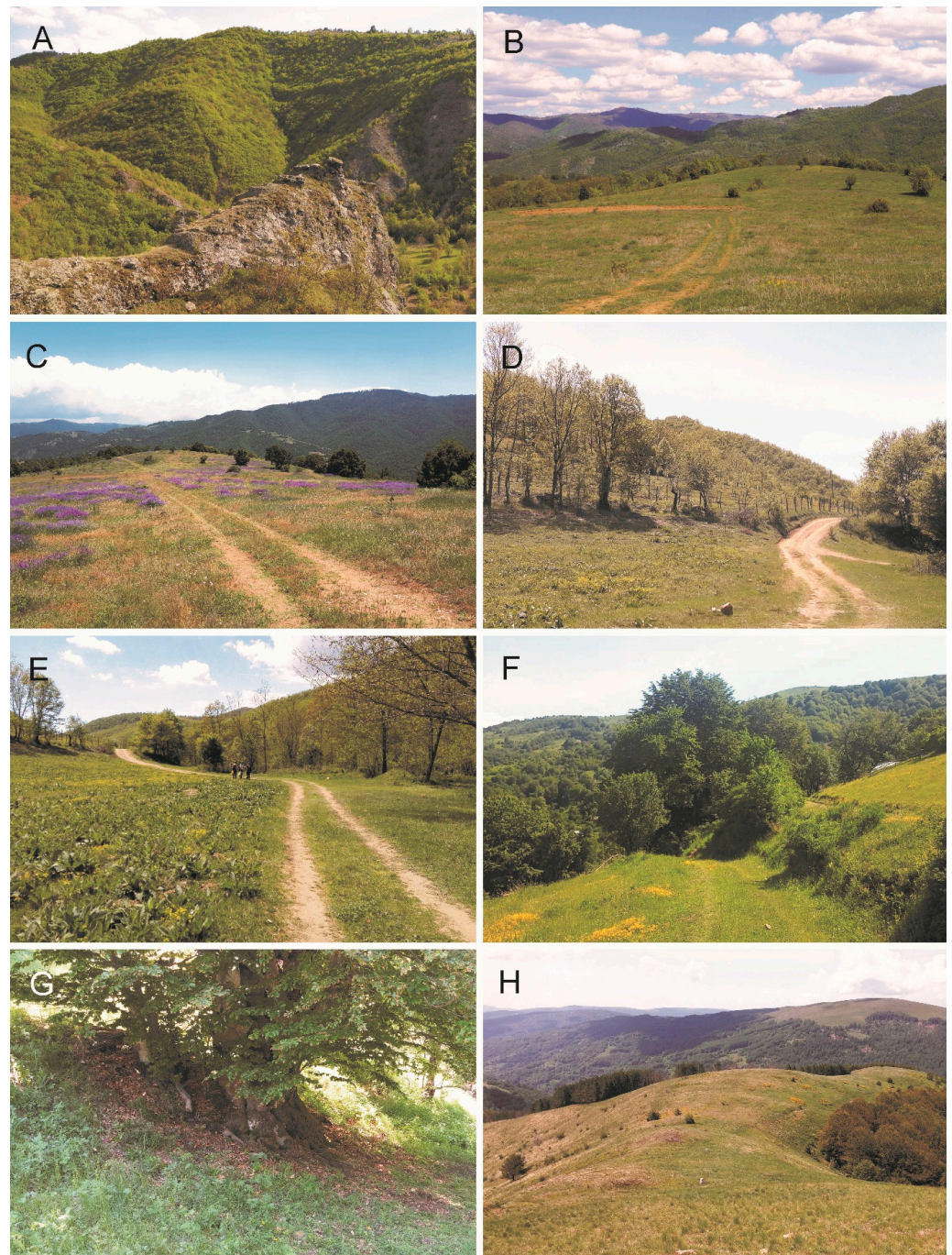


Figure 4. Collection localities of the scarabaeoid beetles in Serbia (2013, 2017–2019, 2021, 2022): (A)—Donja Trnica at Trgovište, (B,C)—Starac at Bujanovac (1), (D,E)—Starac at Bujanovac (2), (F,G)—Prolesje at Trgovište, (H)—Crnoštica at Bosilegrad (Photos: (A,B,D)—Dawid Marczak, (C)—Adam Byk, (E)—Radosław Mroczyński, (F)—Marek Bidas and (G,H)—Tomasz Gazurek).

Research areas were established in environments attractive to species from the superfamily Scarabaeoidea. When selecting them, the diversity of environments occurring in Serbia was also considered. A survey of literature records was carried out, which has indicated the species occurrence in adjacent territories, but not in Serbia. While field studies, a variety of environments were searched, and collecting methods were used. We searched for them on flowers, tree leaves, and grasses, on the trunks of dead trees and in their hollows, in wood dust, litter, the upper layer of soil, as well as in remnants of dead animals, and the faeces of domestic and wild animals (e.g., cows, horses, donkeys, sheep, goats, pigs,

wild boar, small predatory mammal). We caught imagoes in insect nets, insect sweep nets, and insect beating sheets. For psammophilous species, we sifted sand on riverbanks and examined pieces of wood and stones. We also sifted sand at the entrance to the burrows of small mammals to collect scarabaeoid beetles. Additionally, at night, we attracted insects to UV-illuminated screens and searched the grass, flowers, trunks of trees, and their leaves using LED lights.

All the specimens listed below were collected or observed by Marek Bidas [MB], Adam Byk [AB], Tomasz Gazurek [TG], Adam Kwiatkowski [AK], Dawid Marczak [DM], Radosław Mroczynski [RM], Danuta Pełowska-Marczak [DPM], Saša S. Stanković [SSS], Sebastian Tylkowski [ST], and Vladimir Žikić [VŽ]. Taxa were identified by Marek Bidas [MB], Adam Byk [AB], and Łukasz Minkina [LM]. Several species were identified or verified by other researchers. Their names are given directly in the list of species below. The specimens are preserved in the entomological collection of the Department of Forest Protection of Warsaw University of Life Sciences, while single specimens are included into private collections of MB, AB, TG, DM, and RM. When a specimen is in a private collection, it is clearly stated in the text.

Specimens were examined with Nikon SMZ-U and C-PS stereomicroscopes. Photographs of the specimens were taken with Canon EOS 5D Mark III connected with Canon MP-E 65 mm macro lens. Photographs were edited in Helicon Focus and Adobe Photoshop Elements 2018.

The systematic arrangement and nomenclature were adopted from the Catalogue of Palaearctic Coleoptera [1]. Based on the publication of Nikolajev [15], the names of subgenera in the genus *Trox* Fabricius, 1775 were adopted. The authorship of the name of the species *Anoplotrupes stercorosus* (Hartmann in Scriba, 1791) has been changed based on the publication of Ziani et al. [16]. The changes proposed by Bollino et al. [17] and Rössner and Hillert [18,19] were also included.

3. Results

As a result of this study, 2031 beetles belonging to 120 species in five families of the superfamily Scarabaeoidea were collected or observed: Geotrupidae (7 spp.), Trogidae (2 spp.), Lucanidae (4 spp.), Glaphyridae (3 spp.), and Scarabaeidae (104 spp.): including Aphodiinae (38 spp.), Scarabaeinae (31 spp.), Orphninae (2 spp.), Melolonthinae (15 spp.), Rutelinae (6 spp.), Dynastinae (1 sp.), and Cetoniinae (11 spp.). Among them, 69 species are dung beetles.

The most abundant species of scarabaeoid beetles were: *Triodontella dalmatica* (Baraud, 1962) (90 exx.), *Hoplia argentea* (Poda von Neuhaus, 1761) (87 exx.), *Chaetopteroptia segetum* (Herbst, 1783) (87 exx.), *Anisoplia lata* Erichson, 1847 (77 exx.), *Holochelus verus* (Germar, 1824) (74 exx.), *Odonteus armiger* (Scopoli, 1772) (66 exx.), *Onthophagus ruficapillus* Brullé, 1832 (55 exx.), and *Aphodius pedellus* (De Geer, 1774) (50 exx.).

The most commonly observed species of pleurostict scarabaeoid beetles were: *Tropinota hirta* (Poda von Neuhaus, 1761) (19 localities), *Oxythyrea funesta* (Poda von Neuhaus, 1761) (12 localities), *Chaetopteroptia segetum* with *Cetonia aurata* (Linnaeus, 1758) (11 localities), and *Protaetia cuprea* (Fabricius, 1775) (10 localities). Mostly observed species of laparostict scarabaeoid beetles were: *Aphodius pedellus* (15 localities), *Euoniticellus fulvus* (Goeze, 1777) (14 localities), *Copris lunaris* (Linnaeus, 1758) (13 localities), *Caccobius schreberi* (Linnaeus, 1767) with *Onthophagus taurus* (Schreber, 1759) (11 localities), and *O. fracticornis* (Preyßler, 1790) with *O. illyricus* (Scopoli, 1763) (10 localities). Forty-three species were found only in a single locality.

Thirteen species are here presented as new records for Serbia. The list of the recorded species, along with their new localities, is presented below. Species new to the fauna of Serbia are marked with an asterisk (*).

List of Taxa

Superfamily SCARABAEOIDEA (Latreille, 1802)

Family GEOTRUPIDAE (Latreille, 1802)

Subfamily BOLBOCERATINAE (Mulsant, 1842)

Tribe BOLBELASMINI (Nikolajev, 1996)

Bolbelasmus unicornis (Schrank, 1789)

Locality. Vrdnik at Irig, 8–9 June 2022, 5 exx. [MB, AB, ST].

The species has been found in 19 countries: Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Moldova, Poland, Romania, Serbia, Slovakia, Slovenia, Switzerland, European and Asian Türkiye, and Ukraine. Adults spend most of their time underground and activity above-ground is limited to short flight periods after sunset [20]. Ćurčić et al. [21] found one specimen of this species under a hazel shrub together with sporocarps of *Tuber* sp. Adults were observed near a deciduous forest on a small pasture with tree strips (Figure 2B). They flew low for a short period of time (between 9 p.m. and 10 p.m.) in the early night together with *Odonteus armiger*.

Tribe ODONTEINI Shokhin, 2007

Odonteus armiger (Scopoli, 1772)

Localities. Vrdnik at Irig, 8–9 June 2022, 3 exx. [MB], 6 exx. [AB, ST], 3 exx. [TG]; Martinci at Sremska Mitrovica, 3 May 2018, 2 exx. [DM, DPM]; Tekija at Kladovo, 26 May 2022, 5 exx. [AB, ST], 3 exx. [TG]; Petrovo Selo at Kladovo, 25–26 May 2022, 11 exx. [MB], 20 exx. [AB, ST], 6 exx. [TG]; Podvrška at Kladovo, 25 May 2022, 1 ex. [ST]; Aluga at Bajina Bašta, 6–7 June 2022, 2 exx. [MB], 3 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 1 ex. [ST].

Subfamily GEOTRUPINAE Latreille, 1802

Anoplotrupes stercorosus (Hartmann in Scriba, 1791)

Localities. Tekija at Kladovo, 26 May 2022, 3 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [AB]; Aluga at Bajina Bašta, 6–7 June 2022, 3 exx. [AB, ST]; Brzeće at Brus, 2–3 June 2022, 1 ex. [AB]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [AB], 1 ex. [TG]; Prolesje at Trgovište, 31 May–1 June 2022, 2 exx. [AB, ST].

Geotrupes mutator (Marsham, 1802)

Locality. Zaskovci at Pirot, 28–29 May 2022, 1 ex. [AB].

Jekelius punctulatus (Jekel, 1866) (Figure 5A)

Locality. Crnoštica at Bosilegrad, 1 June 2022, 2 exx. [TG] coll. TG.

Remarks. The potential distribution area of *J. punctulatus* according to the topoclimatic variables shows that it is possible to find suitable conditions across the Balkan mountain areas. The mean altitude of the observed occurrences is about 1150 m above sea level, collected in areas with precipitation throughout the year and monthly sub-zero temperatures [22]. This species has only been reported from the Balkan Peninsula (Albania, Bulgaria, Bosnia Herzegovina, Greece, Kosovo, North Macedonia, Serbia) [22,23]. Both individuals were caught on a high mountain meadow (1595 m a.s.l.) (Figure 4H). They were walking on the grass at midday.

Trypocopris vernalis vernalis (Linnaeus, 1758)

Localities. Vrdnik at Irig, 8–9 June 2022, 1 ex. [ST]; Tekija at Kladovo, 26 May 2022, 1 ex. [AB]; Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [ST]; Ljubiš at Čajetina, 5 June 2022, 1 ex. [MB], 1 ex. [AB]; Dobroselica at Čajetina, 4–5 June 2022, 5 exx. [AB, ST]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [MB], 1 ex. [AB]; Gradište at Bela Palanka, 1 May 2019, 1 ex. [RM]; Čukljenik at Niška Banja, 2 May 2019, 1 ex. [SSS]; Gornja Studena at Niška Banja, 3 May 2019, 1 ex. [RM].

Subfamily LETHRINAE Oken, 1843

Lethrus apterus (Laxmann, 1770)

Locality. Krušedol Selo at Irig, 9 June 2022, 1 ex. [MB] coll. MB.

Family TROGIDAE W.S. Macleay, 1819

Trox (Granulitrox) niger P. Rossi, 1792

Locality. Jablanica at Čajetina, 23–28 July 2019, 1 ex [DM].

Trox (Trox) sabulosus sabulosus (Linnaeus, 1758)

Locality. Selo Kostolac at Kostolac, 15 July 2013, 2 exx. [DM, DPM].

Family LUCANIDAE Latreille, 1804

Subfamily LUCANINAE Latreille, 1804

Tribe DORCINI Parry, 1864

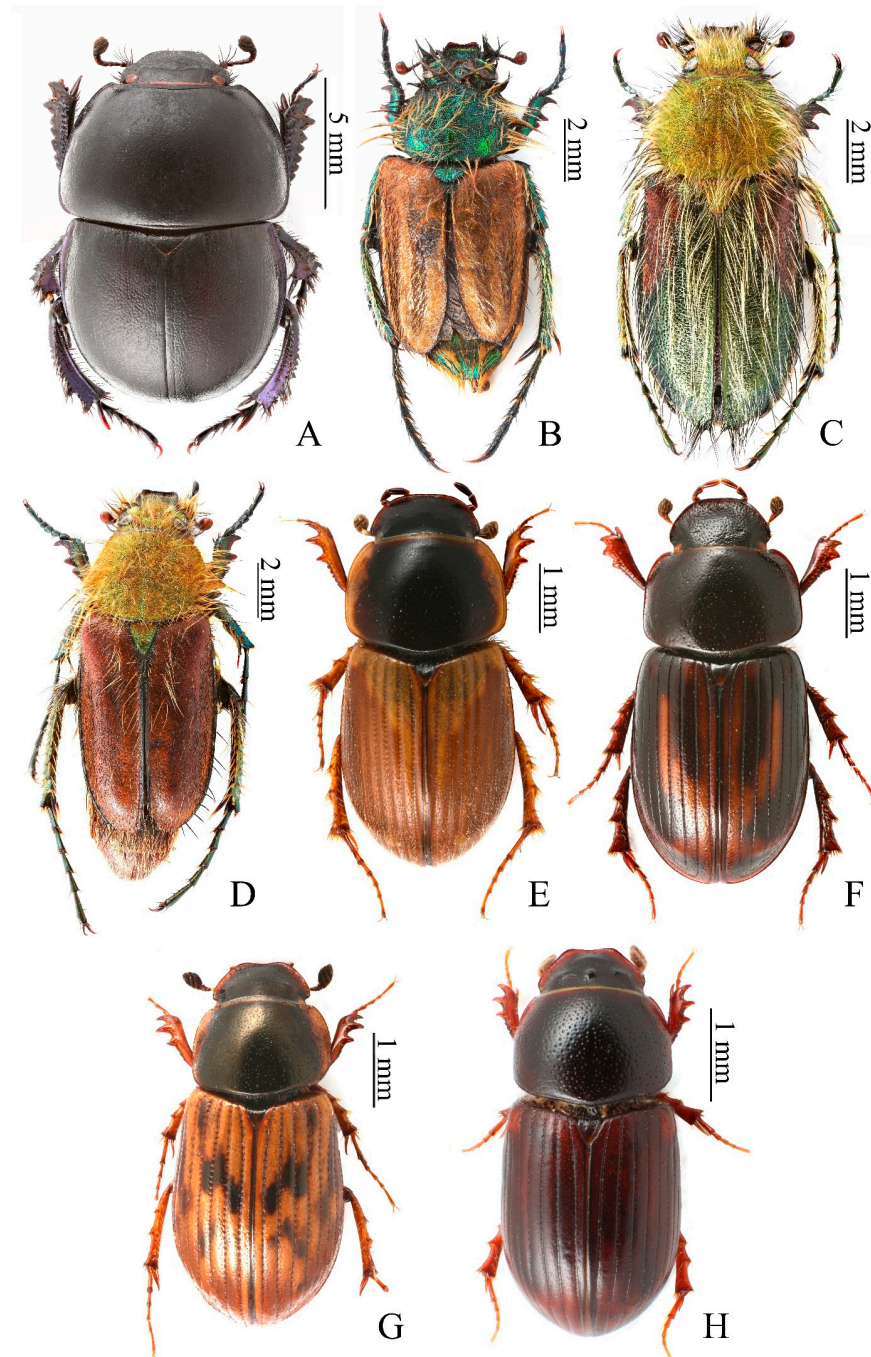
Dorcus parallelipipedus (Linnaeus, 1758)

Figure 5. Rare and new species for the fauna of Serbia recorded in the course of this study: (A)—*Jekelius punctulatus* (Jekel, 1866), (B)—**Eulasia pareyssei* (Brullé, 1832), (C)—**Pygopleurus apicalis* (Brullé, 1832), (D)—*P. chrysonotus* (Brullé, 1832), (E)—**Melinopterus reyi* (Reitter, 1892), (F)—*Neagolius bilimeckii* (Seidlitz, 1891), (G)—**Nimbus johnsoni* (Baraud, 1976), (H)—**Planolinoides borealis* (Gyllenhal, 1827) (Photos: Łukasz Minkina).

Localities. Vrdnik at Irig, 8–9 June 2022, 2 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST], 1 ex. [TG]; Petrovo Selo at Kladovo, 25–26 May 2022, 2 exx. [AB, ST]; Podvrška at Kladovo, 25 May 2022, 4 exx. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 4 exx. [AB, ST]; Marina Kutina at Gadžin Han, 28 May 2021, 1 ex. [AK].

Tribe LUCANINI Latreille, 1804

Lucanus cervus cervus (Linnaeus, 1758)

Localities. Vrdnik at Irig, 8–9 June 2022, 2 exx. [AB, TG]; Tekija at Kladovo, 26 May 2022, 2 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [MB]; Podvrška at Kladovo, 25 May 2022, 1 ex. [ST]; Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [ST]; Marina Kutina at Gadžin Han, 12 May 2018, 3 exx. [DM, DPM], 28 May 2021, 2 exx. [AK, DM].

Tribe PLATYCERINI Mulsant, 1842

Platycerus caraboides (Linnaeus, 1758)

Localities. Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [TG]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [AB]; Marina Kutina at Gadžin Han, 12 May 2018, 1 ex. [DM]; Gornja Studena at Niška Banja, 3 May 2019, 1 ex. [RM]; Slavinja at Pirot, 27 May 2021, 1 ex. [AK].

Subfamily SYNDESINAE W.S. Macleay, 1819

Sinodendron cylindricum (Linnaeus, 1758)

Localities. Crni Vrh at Knjaževac, 28 May 2022, 1 ex. [ST]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [ST]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [TG].

Family GLAPHYRIDAE W.S. Macleay, 1819

***Eulasia pareyssei (Brullé, 1832) (Figure 5B)**

Locality. Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DPM].

Remarks. This species was only reported from five countries: Albania, Bulgaria, Greece, North Macedonia, as well as from European and Asian part of Türkiye [24]. Adults are attracted mainly by white flowers. One individual of this species was caught on a mountain meadow (1255 m a.s.l.) (Figure 4G) using an insect sweep net.

***Pygopleurus apicalis (Brullé, 1832) (Figure 5C)**

Localities. Starac at Bujanovac (1), 29 April 2019, 1 ex. [DM]; Starac at Bujanovac (2), 29 April 2019, 2 exx. [DM, RM] coll. RM and coll. AB.

Remarks. This species is present in Macedonia, South-Western Bulgaria, Greece (including the Peloponnese) [17]. Adults are mostly attracted to yellow, less white, and purple flowers. All individuals of this species were caught in the flowery meadows (Figure 4B,D) using an insect sweep net. The localities of this species presented above are northmost of all known localities.

Pygopleurus chrysonotus (Brullé, 1832) (Figure 5D)

Locality. Starac at Bujanovac (1), 1 June 2022, 5 exx. [MB], 6 exx. [AB, ST].

Remarks. The species is widely distributed in Greece (except its most north-eastern area). It is also recorded for the Ionian and the Aegean Islands. Northwards, it reaches Macedonia, Albania, Kosovo/Southern Serbia (Erenik [River]), and south-western Bulgaria. This species is removed from the synonymy with *P. anemoninus* (Brullé, 1832) and treated as a senior synonym of *P. diffusus* (Petrovitz, 1958). The species is observed on a wide range of flowers [17]. All individuals of this species were found in a flowery meadow (Figure 4C) inside poppy flowers.

Family SCARABAEIDAE Latreille, 1802

Subfamily APHODIINAE Leach, 1815

Tribe APHODIINI Leach, 1815

Acanthobodilus immundus (Creutzer, 1799)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB]; 4 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [MB], 6 exx. [AB, ST]; Ljubiš at Čajetina, 5 June 2022, 1 ex. [MB], 6 exx. [AB, ST].

Acrossus depressus (Kugelann, 1792)

Localities. Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [TG]; Brzeće at Brus, 2–3 June 2022, 5 exx. [AB, ST]; Zaskovci at Piroć, 28–29 May 2022, 3 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 2 exx. [AB, ST].

Acrossus luridus (Fabricius, 1775)

Localities. Crna Bara at Čoka, 22 May 2022, 2 exx. [AB, ST]; Torak at Žitište, 23 May 2022, 2 exx. [AB, ST]; Samoš at Kovačica, 23 May 2022, 3 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 6 exx. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 2 exx. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB], 2 exx. [AB, ST]; Mašoviće at Sjenica, 4 June 2022, 3 exx. [AB, ST]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM].

Agrilinus convexus (Erichson, 1848)

Localities. Brzeće at Brus, 2–3 June 2022, 13 exx. [MB], 23 exx. [AB, ST]; Kosmovac at Bela Palanka, 3 May 2019, 1 ex. [RM].

Amidorus obscurus obscurus (Fabricius, 1792)

Locality. Brzeće at Brus, 2–3 June 2022, 11 exx. [MB], 18 exx. [AB, ST].

Ammoecius brevis (Erichson, 1848)

Locality. Ljubiš at Čajetina, 5 June 2022, 9 exx. [MB] coll. MB.

Aphodius foetidus (Herbst, 1783)

Locality. Šušara at Vršac, 23–24 May 2022, 1 ex. [MB], 2 exx. [AB, ST].

Aphodius pedellus (De Geer, 1774)

Localities. Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 3 exx. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [ST]; Jablanica at Čajetina, 23–28 July 2019, 3 exx. [DM]; Ljubiš at Čajetina, 5 June 2022, 1 ex. [AB]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [MB]; Sušica at Sjenica, 4 June 2022, 3 exx. [AB, ST]; Brzeće at Brus, 2–3 June 2022, 1 ex. [MB]; Zaskovci at Piroć, 28–29 May 2022, 1 ex. [MB], 3 exx. [AB, ST]; Gornja Studena at Niška Banja, 3 May 2019, 22 exx. [RM]; Vladovce at Trgovište, 1 June 2022, 3 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 2 exx. [RM]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM]; Crnoštica at Bosilegrad, 1 June 2022, 1 ex. [TG].

Bodilopsis rufa (Moll, 1782)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [AB]; Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [MB]; Ljubiš at Čajetina, 5 June 2022, 1 ex. [ST]; Mašoviće at Sjenica, 4 June 2022, 2 exx. [AB, ST].

Calamosternus granarius (Linnaeus, 1767)

Localities. Crna Bara at Čoka, 22 May 2022, 12 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 2 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 1 ex. [MB]; Boletin at Majdanpek, 14 April 2013, 1 ex. [DM]; Druzinice at Sjenica, 18–22 July 2019, 1 ex. [DM]; Zaskovci at Piroć, 28–29 May 2022, 1 ex. [MB]; Marina Kutina at Gadžin Han, 12 May 2018, 4 exx. [DM].

Chilothorax distinctus (O.F. Müller, 1776)

Locality. Horgoš at Kanjiža, 22 May 2022, 2 exx. [AB, ST].

Chilothorax lineolatus (Illiger, 1803)

Locality. Jablanica at Čajetina, 23–28 July 2019, 3 exx. [DM].

Colobopterus erraticus (Linnaeus, 1758)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB], 2 exx. [AB, ST]; Samoš at Kovačica, 23 May 2022, 2 exx. [AB, ST]; Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [MB], 7 exx. [AB, ST]; Boletin at Majdanpek, 14 April 2013, 1 ex. [DM]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [MB], 3 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 6 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [AB, ST].

Coprimorphus scrutator (Herbst, 1789)

Localities. Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Ljubiš at Čajetina, 5 June 2022, 2 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 2 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 7 exx. [AB, ST].

***Esymus pusillus pusillus* (Herbst, 1789)**

Localities. Aluga at Bajina Bašta, 6–7 June 2022, 5 exx. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB], 11 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 7 exx. [AB, ST].

***Eudolus quadriguttatus* (Herbst, 1783)**

Localities. Druzinice at Sjenica, 18–22 July 2019, 2 exx. [DM]; Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DM].

***Euorodalus paracoenosus* (Balthasar & Hrubant, 1960)**

Localities. Samoš at Kovačica, 23 May 2022, 1 ex. [AB]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 8 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 2 exx. [RM]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM].

***Liothorax kraatzi* (Harold, 1868)**

Locality. Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DM].

***Melinopterus consputus* (Creutzer, 1799)**

Localities. Druzinice at Sjenica, 18–22 July 2019, 1 ex. [DPM]; Marina Kutina at Gadžin Han, 12 May 2018, 5 exx. [DM].

***Melinopterus prodromus* (Brahm, 1790)**

Locality. Mašoviće at Sjenica, 4 June 2022, 7 exx. [AB, ST].

****Melinopterus reyi* (Reitter, 1892) (Figure 5E)**

Locality. Starac at Bujanovac (2), 29 April 2019, 23 exx. [RM].

Remarks. This species is widely distributed in Europe and reported from Austria, Azerbaijan, Bosnia Herzegovina, Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Italy, Luxembourg, The Netherlands, Poland, Romania, the southern part of the European territory of Russia, Slovakia, Spain, Switzerland, European and Asian parts of Türkiye and Ukraine [25–27]. Recently found in Montenegro [2]. Adults of this species were caught in cow faeces lying on the road near a small river (Figure 4E).

***Melinopterus sphaclatus* (Panzer, 1798)**

Locality. Mašoviće at Sjenica, 4 June 2022, 2 exx. [AB, ST].

***Neagolius bilimeckii* (Seidlitz, 1891) (Figure 5F)**

Localities. Brzeće at Brus, 2–3 June 2022, 1 ex. [MB], 1 ex. [AB]; Kopaonik at Raška, 3 June 2022, 4 exx. [MB, TG], 9 exx. [AB, ST].

Remarks. A species considered as a relict [28] inhabits the Alps and the Carpathians (Jeseníky). Reported from Albania, Austria, Bosnia Herzegovina, Croatia, Czech Republic, Germany, Greece, Italy, Liechtenstein, Montenegro, North Macedonia, Slovenia, and Switzerland [25,29]. Its species larvae are bound to topsoil layers where they feed on decaying fine roots of graminaceous plants [30]. All individuals were found in high mountain meadows (1750 m a.s.l. (Figure 3A), 1800 m a.s.l. (Figure 3B)). They were sitting down in the sunny afternoon on a narrow strip of grass between ruts on field paths.

***Nialus varians* (Duftschmidt, 1805)**

Localities. Crna Bara at Čoka, 22 May 2022, 3 exx. [AB, ST]; Samoš at Kovačica, 23 May 2022, 1 ex. [MB]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 2 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 3 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [MB]; Brzeće at Brus, 2–3 June 2022, 1 ex. [AB]; Marina Kutina at Gadžin Han, 12 May 2018, 2 exx. [DM]; Gornja Studena at Niška Banja, 3 May 2019, 1 ex. [RM].

****Nimbus johnsoni* (Baraud, 1976) (Figure 5G)**

Locality. Jablanica at Čajetina, 23–28 July 2019, 4 exx. [DM, DPM].

Remarks. The species is known in eight European countries (Albania, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Italy, Montenegro, Slovenia) and the Asian part of Türkiye [25,31]. All individuals were found in sheep droppings in a mountain pasture (1025 m a.s.l.) (Figure 2H).

***Othophorus haemorrhoidalis* (Linnaeus, 1758)**

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB].

Oxyomus sylvestris (Scopoli, 1763)

Locality. Ljubiš at Čajetina, 5 June 2022, 1 ex. [TG].

Phalacrothothus biguttatus (Germar, 1824)

Localities. Samoš at Kovačica, 23 May 2022, 3 exx. [MB], 14 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 exx. [MB], 6 exx. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB]; Crnoštica at Bosilegrad, 1 June 2022, 1 ex. [TG].

***Planolinoidea borealis (Gyllenhal, 1827) (Figure 5H)**

Locality. Boletin at Majdanpek, 14 April 2013, 1 ex. [DM].

Remarks. Recorded from most countries of Europe (including those neighbouring Serbia: Bosnia Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, North Macedonia, Romania), Siberia and Far East of Russia, as well as Central and Eastern Asia; introduced to Nearctic Region [25]. One individual of this species was found in decaying plant debris on a wooded riverbank.

Subrinus sturmi (Harold, 1870)

Locality. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB] coll. MB.

Teuchestes fossor (Linnaeus, 1758)

Localities. Ljubiš at Čajetina, 5 June 2022, 1 ex. [MB]; Zaskovci at Pirot, 28–29 May 2022, 2 exx. [AB, ST].

Trichonotulus scrofa (Fabricius, 1787)

Localities. Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [MB]; Šušara at Vršac, 23–24 May 2022, 8 exx. [AB, ST].

Volinus sticticus (Panzer, 1798)

Localities. Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 3 exx. [AB, ST]; Mašoviće at Sjenica, 4 June 2022, 4 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 4 exx. [AB, ST]; Zaskovci at Pirot, 28–29 May 2022, 7 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 1 ex. [RM]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [MB], 6 exx. [AB, ST].

Tribe PSAMMODIINI Mulsant, 1842

Subtribe PSAMMODIINA Mulsant, 1842

Diastictus vulneratus (Sturm, 1805)

Locality. Šušara at Vršac, 23–24 May 2022, 13 exx. [MB], 8 exx. [AB, ST].

Psammodius asper (Fabricius, 1775)

Localities. Horgoš at Kanjiža, 22 May 2022, 6 exx. [MB]; 2 exx. [TG]; 1 ex. [ST]; Futog at Novi Sad, 10 June 2022, 3 exx. [AB, ST].

Psammodius laevipennis A. Costa, 1844

Locality. Futog at Novi Sad, 10 June 2022, 1 ex. [TG] coll. TG.

Subtribe RHYSEMINA Pittino & Mariani, 1986

Pleurophorus caesus (Panzer, 1796)

Locality. Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST].

Rhysemus germanus (Linnaeus, 1767)

Localities. Futog at Novi Sad, 10 June 2022, 19 exx. [MB], 12 exx. [AB, ST], 9 exx. [TG]; Šušara at Vršac, 23–24 May 2022, 1 ex. [MB], 1 ex. [ST].

Subfamily SCARABAEINAE Latreille, 1802

Tribe COPRINI Leach, 1815

***Coprhis hispanus cavolinii (V. Petagna, 1792) (Figure 6A)**

Localities. Jablanica at Čajetina, 23–28 July 2019, 1 ex. [DM]; Vladovce at Trgovište, 1 June 2022, 1 ex. [AB].

Remarks. *C. hispanus cavolinii* is one of the two described subspecies of the widely distributed species *C. hispanus*. This species inhabits Europe, Africa and Asia. Nominotypical *C. hispanus hispanus* inhabits France, Italy (Sardegna, Pantelleria) Portugal and Spain, as well as Algeria, Egypt, Libya, Morocco and Tunisia; introduced to Afrotropical Region. While *C. hispanus cavolinii* inhabits Azerbaijan, Albania, Armenia, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Italy, Montenegro, North Macedonia, south of European part of Russia and Ukraine, as well as Afghanistan, Cyprus, Iran, Israel, Jordan,

Kyrgyzstan, Asian part of Kazakhstan, Pakistan, Syria, Tajikistan, Turkmenistan, Asian part of Türkiye and Uzbekistan [32]. One individual of this subspecies was caught in the grass of a mountain pasture (1025 m a.s.l.) (Figure 2H), and the other individual in cow dung in a pasture with single oaks (Figure 3H).

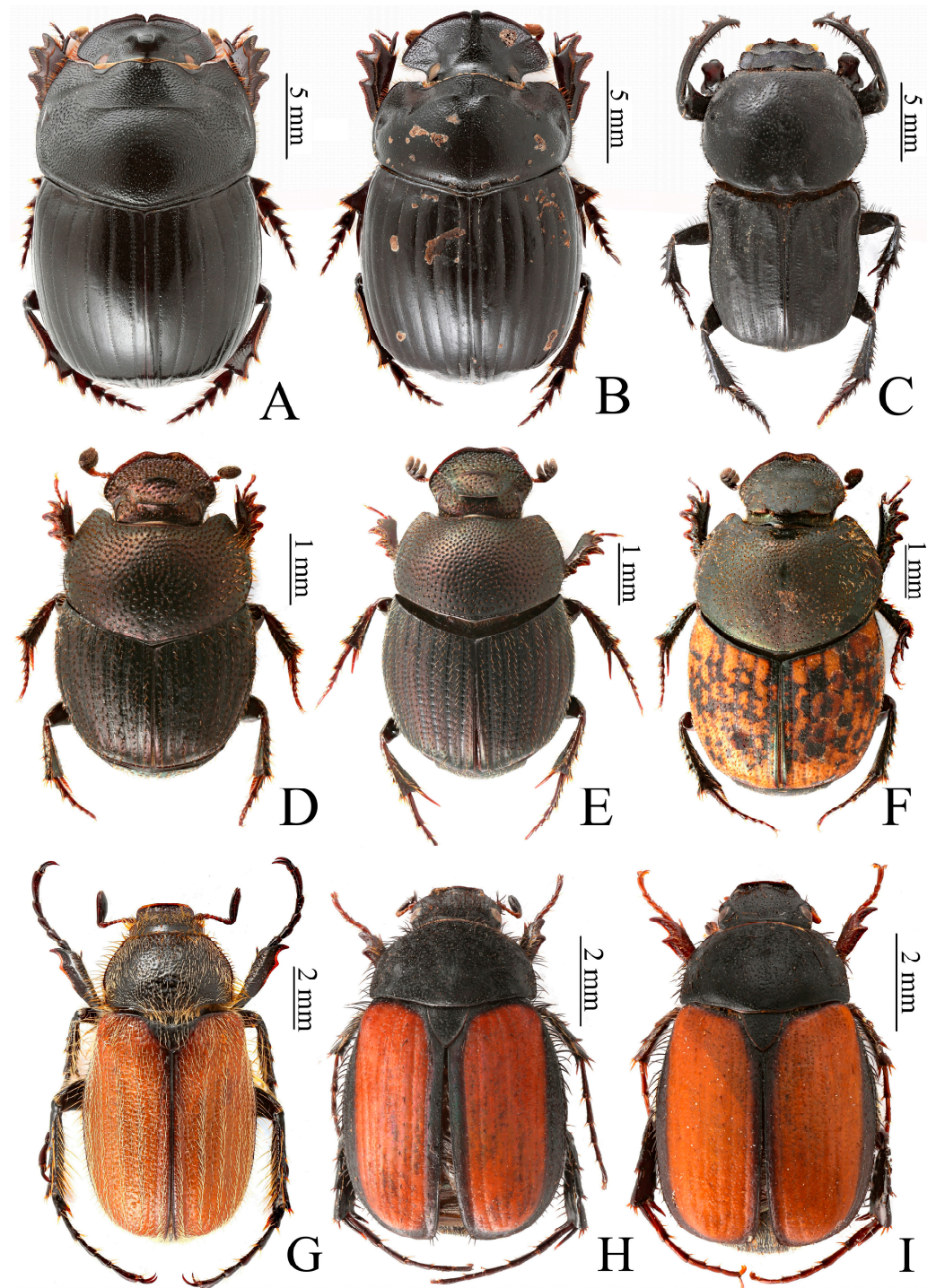


Figure 6. Rare and new species for the fauna of Serbia recorded in the course of this study: (A)—**Copris hispanus cavolinii* (V. Petagna, 1792), (B)—**C. umbilicatus* Abeille de Perrin, 1901, (C)—**Cheironitis furcifer* (P. Rossi, 1792), (D)—*Onthophagus angorensis* Petrovitz, 1963, (E)—**O. dellacasai* Pittino & Mariani, 1981, (F)—**O. similis* (Scriba, 1790), (G)—**Holochelus costulatus* (Frivaldszky, 1835), (H)—**Omaloplia corcyrae* (Baraud, 1965), (I)—*O. illyrica* (Baraud, 1965) (Photos: Łukasz Minkina).

Copris lunaris (Linnaeus, 1758)

Localities. Vrdnik at Irig, 8–9 June 2022, 3 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 1 ex. [ST]; Deliblato at Kovin, 24 May 2022, 2 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 1 ex. [ST]; Tekija at Kladovo, 26 May 2022, 1 ex. [AB]; Jablanica at Čajetina, 23–28 July 2019, 1 ex. [DM]; Ljubiš at Čajetina, 5 June 2022, 2 exx. [AB, ST]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [AB]; Sušica at Sjenica, 4 June 2022, 2 exx. [AB, ST]; Barbarušince at Vranje, 30 May 2022, 1 ex. [ST]; Vladovce at Trgovište, 1 June 2022, 1 ex. [MB], 4 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [ST].

***Copris umbilicatus Abeille de Perrin, 1901 (Figure 6B)**

Locality. Jablanica at Čajetina, 23–28 July 2019, 1 ex. [DM] coll. AB.

Remarks. The species is known in nine European countries (Albania, Bulgaria, Croatia, France, Greece, Hungary, Italy, Romania and Slovakia) [32] and Asian part of Türkiye [33]. Imago was caught on the mountain pasture (1025 m a.s.l.) (Figure 2H). At noon it walked on the grass.

Tribe GYMNOPLURINI Lacordaire, 1856

Gymnopleurus geoffroyi (Fuessly, 1775)

Localities. Vladovce at Trgovište, 1 June 2022, 6 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 6 exx. [RM]; Starac at Bujanovac (1), 1 June 2022, 1 ex. [MB].

Gymnopleurus sturmii (W.S. McAleay, 1821)

Locality. Jablanica at Čajetina, 23–28 July 2019, 3 exx. [DM] coll. DM and coll. AB.

Tribe ONITICELLINI H.J. Kolbe, 1905.

Euoniticellus fulvus (Goeze, 1777)

Localities. Crna Bara at Čoka, 22 May 2022, 4 exx. [AB, ST]; Futog at Novi Sad, 10 June 2022, 4 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 3 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 4 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 2 exx. [AB, ST]; Selo Kostolac at Kostolac, 15 July 2013, 1 ex. [DPM]; Ljubiš at Čajetina, 5 June 2022, 1 ex. [ST]; Mašoviće at Sjenica, 4 June 2022, 2 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 2 exx. [AB, ST]; Barbarušince at Vranje, 30 May 2022, 1 ex. [ST]; Vladovce at Trgovište, 1 June 2022, 1 ex. [AB]; Donja Trnica at Trgovište, 29 April 2019, 4 exx. [RM], 1 June 2022, 2 exx. [AB, ST]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM], 1 June 2022, 2 exx. [AB, ST].

Euoniticellus pallipes (Fabricius, 1781)

Locality. Marina Kutina at Gadžin Han, 12 May 2018, 1 ex. [DM].

Tribe ONITINI Laporte, 1840

***Cheironitis furcifer (P. Rossi, 1792) (Figure 6C)**

Localities. Damnjančovi at Surdulica, 17 July 2013, 2 exx. [DM]; Vladovce at Trgovište, 1 June 2022, 1 ex. [MB].

Remarks. This species was reported from most Mediterranean countries (Albania, Algeria, Bosnia Herzegovina, Croatia, Egypt, Greece, Israel, Italy, Libya, Morocco, Spain, Israel, Tunisia, Türkiye) and recorded also from Bulgaria and North Macedonia [34]. Two individuals of this species were caught in a mountain meadow (1255 m a.s.l.) (Figure 3G) and one individual was in a pasture with single oaks (Figure 3H). All individuals were found in cow faeces.

Cheironitis ungaricus (Herbst, 1789)

Locality. Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DM].

Tribe ONTHOPHAGINI Burmeister, 1846

Caccobius schreberi (Linnaeus, 1767)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB]; Samoš at Kovačica, 23 May 2022, 2 exx. [MB], 7 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 4 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 2 exx. [AB, ST]; Selo Kostolac at Kostolac, 15 July 2013, 1 ex. [DPM]; Ljubiš at Čajetina, 5 June 2022, 3 exx. [AB, ST];

Druzinice at Sjenica, 18–22 July 2019, 2 exx. [DM]; Barbarušince at Vranje, 30 May 2022, 2 exx. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 3 exx. [AB, ST].

***Euonthophagus amyntas alces* (Fabricius, 1792)**

Localities. Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST].

***Euonthophagus gibbosus* (Scriba, 1790)**

Locality. Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DM].

***Onthophagus* (*Furconthophagus*) *furcatus* (Fabricius, 1781)**

Localities. Horgoš at Kanjiža, 22 May 2022, 6 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 5 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 5 exx. [AB, ST]; Selo Kostolac at Kostolac, 15 July 2013, 1 ex. [DM]; Damnjančovi at Surdulica, 17 July 2013, 1 ex. [DM]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 11 exx. [RM], 1 June 2022, 3 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [AB, ST].

***Onthophagus* (*Onthophagus*) *illyricus* (Scopoli, 1763)**

Localities. Krušedol Selo at Irig, 9 June 2022, 3 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [ST]; Aluga at Bajina Bašta, 6–7 June 2022, 3 exx. [AB, ST]; Ljubiš at Čajetina, 5 June 2022, 2 exx. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 2 exx. [AB, ST]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [MB]; Sušica at Sjenica, 4 June 2022, 1 ex. [AB]; Zaskovci at Pirot, 28–29 May 2022, 2 exx. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM], 1 June 2022, 3 exx. [AB, ST].

***Onthophagus* (*Onthophagus*) *taurus* (Schreber, 1759)**

Localities. Samoš at Kovačica, 23 May 2022, 1 ex. [ST]; Futog at Novi Sad, 10 June 2022, 3 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 4 exx. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 4 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST]; Dubovac at Kovin, 25 May 2022, 3 exx. [AB, ST]; Ljubiš at Čajetina, 5 June 2022, 2 exx. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [MB], 2 exx. [AB, ST]; Sušica at Sjenica, 4 June 2022, 2 exx. [AB, ST]; Donja Trnica at Trgovište, 1 June 2022, 2 exx. [AB, ST].

***Onthophagus* (*Palaeonthophagus*) *angorensis* Petrovitz, 1963 (Figure 6D)**

Localities. Šušara at Vršac, 23–24 May 2022, 1 ex. [ST]; Marina Kutina at Gadžin Han, 30 April 2019, 7 exx. [RM] ver. A. Matusiak.

Remarks. This species is known in Europe and Asia. In Europe, reported from Bulgaria, Albania, Greece, Hungary, North Macedonia, Romania, Serbia, Türkiye, Armenia, Azerbaijan, and Georgia. In Asia, it is found in Iran, Israel, Lebanon, Syria, Turkmenistan, and Türkiye [35–37]; recorded from burrows or nests of small mammals [38,39]. Between 8 and 11 April, 2022, the three authors of this work—Marek Bidas, Adam Byk, Łukasz Minkina—observed individuals of this species in Northern Greece in the burrows of sousliks (*Sotiras* at Amyntaio) and mole-rats (*Kleidi* at Amyntaio). In Serbia, adults were caught in two locations: one pasture inhabited by sousliks, and another one inhabited by mole-rats. A single individual was found in the vestibule of the souslik burrow while the rest were found in predatory mammal faeces.

***Onthophagus* (*Palaeonthophagus*) *coenobita* (Herbst, 1783)**

Localities. Torak at Žitište, 23 May 2022, 4 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 2 exx. [AB, ST]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [AB]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 3 exx. [RM].

****Onthophagus* (*Palaeonthophagus*) *dellacasai* Pittino & Mariani, 1981 (Figure 6E)**

Locality. Donja Trnica at Trgovište, 29 April 2019, 5 exx. [RM] ver. A. Matusiak.

Remarks. A species known only from the Balkan Peninsula: Albania, Bulgaria, Greece, North Macedonia, and the European part of Türkiye [35,37]. Collected from fresh horse faeces on the sunny pasture (Figure 4A).

Onthophagus (Palaeonthophagus) fracticornis (Preysslner, 1790)

Localities. Krušedol Selo at Irig, 9 June 2022, 2 ex. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 3 ex. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [ST]; Ljubuš at Čajetina, 5 June 2022, 2 ex. [MB], 1 ex. [AB]; Mašoviće at Sjenica, 4 June 2022, 2 ex. [AB, ST]; Sušica at Sjenica, 4 June 2022, 1 ex. [ST]; Zaskovci at Pirot, 28–29 May 2022, 5 ex. [AB, ST]; Gornja Studena at Niška Banja, 3 May 2019, 10 ex. [RM]; Donja Trnica at Trgovište, 29 April 2019, 2 ex. [RM]; Crnoštica at Bosilegrad, 1 June 2022, 2 ex. [TG].

Onthophagus (Palaeonthophagus) grossepunctatus Reitter, 1905

Localities. Šušara at Vršac, 23–24 May 2022, 2 ex. [MB]; Aluga at Bajina Bašta, 6–7 June 2022, 2 ex. [AB, ST]; Gradište at Bela Palanka, 1 May 2019, 1 ex. [RM]; Vladovce at Trgovište, 1 June 2022, 4 ex. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 11 ex. [RM], 1 June 2022, 1 ex. [MB].

Onthophagus (Palaeonthophagus) lemur (Fabricius, 1781)

Localities. Krušedol Selo at Irig, 9 June 2022, 2 ex. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 7 ex. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 2 ex. [MB], 5 ex. [AB, ST]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [AB]; Gornja Studena at Niška Banja, 3 May 2019, 1 ex. [RM]; Damnjaničovi at Surdulica, 17 July 2013, 1 ex. [DM]; Vladovce at Trgovište, 1 June 2022, 2 ex. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 10 ex. [RM].

Onthophagus (Palaeonthophagus) medius (Kugelann, 1792)

Localities. Crna Bara at Čoka, 22 May 2022, 3 ex. [AB, ST]; Samoš at Kovačica, 23 May 2022, 3 ex. [MB], 1 ex. [AB]; Zasavica at Sremska Mitrovica, 8 June 2022, 7 ex. [AB, ST].

Onthophagus (Palaeonthophagus) ovatus (Linnaeus, 1767)

Localities. Horgoš at Kanjiža, 22 May 2022, 1 ex. [AB]; Torak at Žitište, 23 May 2022, 2 ex. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 1 ex. [ST]; Mašoviće at Sjenica, 4 June 2022, 4 ex. [AB, ST]; Sušica at Sjenica, 4 June 2022, 1 ex. [MB], 1 ex. [AB]; Zaskovci at Pirot, 28–29 May 2022, 3 ex. [AB, ST]; Marina Kutina at Gadžin Han, 30 April 2019, 5 ex. [RM]; Prolesje at Trgovište, 31 May–1 June 2022, 2 ex. [MB].

Onthophagus (Palaeonthophagus) ruficapillus Brullé, 1832

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB], 13 ex. [AB, ST]; Samoš at Kovačica, 23 May 2022, 2 ex. [MB], 6 ex. [AB, ST]; Futog at Novi Sad, 10 June 2022, 3 ex. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 6 ex. [AB, ST]; Zasavica at Sremska Mitrovica, 8 June 2022, 4 ex. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 ex. [AB, ST]; Aluga at Bajina Bašta, 6–7 June 2022, 3 ex. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 14 ex. [MB], 1 ex. [ST].

****Onthophagus (Palaeonthophagus) similis (Scriba, 1790) (Figure 6F)***

Locality. Donja Trnica at Trgovište, 1 June 2022, 1 ex. [AB].

Remarks. Recorded from most European countries (including those neighbouring Serbia: Bosnia Herzegovina, Bulgaria, Hungary, Montenegro, North Macedonia, Romania), as well as Eastern Asia and North Africa [37]. Collected from fresh sheep droppings on the sunny pasture (Figure 4A).

Onthophagus (Palaeonthophagus) vacca (Linnaeus, 1767)

Localities. Krušedol Selo at Irig, 9 June 2022, 2 ex. [AB, ST]; Jablanica at Čajetina, 23–28 July 2019, 6 ex. [DM, DPM]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [ST]; Sušica at Sjenica, 4 June 2022, 1 ex. [AB]; Donja Trnica at Trgovište, 1 June 2022, 1 ex. [ST].

Onthophagus (Palaeonthophagus) verticicornis (Laicharting, 1781)

Localities. Krušedol Selo at Irig, 9 June 2022, 2 ex. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [MB]; Aluga at Bajina Bašta, 6–7 June 2022, 4 ex. [AB, ST]; Dobroselica at Čajetina, 4–5 June 2022, 1 ex. [MB], 3 ex. [AB, ST]; Mašoviće at Sjenica, 4 June 2022, 1 ex. [AB]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [MB], 9 ex. [AB, ST]; Gradište at Bela Palanka, 1 May 2019, 4 ex. [RM]; Gornja Studena at Niška Banja, 3 May 2019, 3 ex. [RM]; Vladovce at Trgovište, 1 June 2022, 3 ex. [AB, ST].

Onthophagus (Palaeonthophagus) vitulus (Fabricius, 1777)

Localities. Crna Bara at Čoka, 22 May 2022, 3 ex. [MB], 1 ex. [ST]; Deliblato at Kovin, 24 May 2022, 2 ex. [MB].

Tribe SCARABAEINI Latreille, 1802

Scarabaeus pius (Illiger, 1803)

Locality. Šušara at Vršac, 23–24 May 2022, 6 ex. [MB, AB, TG, ST].

Scarabaeus typhon (Fischer von Waldheim, 1823)

Locality. Šušara at Vršac, 23–24 May 2022, 1 ex. [TG].

Tribe SISYPHINI Mulsant, 1842

Sisyphus schaefferi schaefferi (Linnaeus, 1758)

Localities. Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [AB]; Jablanica at Čajetina, 23–28 July 2019, 1 ex. [DM]; Zaskovci at Pirot, 28–29 May 2022, 1 ex. [MB], 1 ex. [ST]; Gradište at Bela Palanka, 1 May 2019, 5 ex. [RM]; Dolac at Bela Palanka, 7 May 2018, 2 ex. [DPM]; Vladovce at Trgovište, 1 June 2022, 2 ex. [AB, ST]; Donja Trnica at Trgovište, 29 April 2019, 1 ex. [RM].

Subfamily ORPHNINAE Erichson, 1847

Chaetonyx robustus robustus Schaum, 1862 (Figure 7A,B)

Locality. Zaskovci at Pirot, 28–29 May 2022, 10 ex. [MB], 16 ex. [AB, ST], 7 ex. [TG].

Remarks. *Ch. robustus robustus* is one of the three described subspecies of *Ch. robustus* that inhabits the Balkan Peninsula and Italy. Two subspecies: *Ch. robustus italicus* Mariani, 1946 and *Ch. robustus liguricus* Mariani, 1946 inhabit Italy. The third one *Ch. robustus robustus* inhabits Albania, Bulgaria, Greece, Romania, Serbia, and the European part of Türkiye [40–42]. This geobiont species has been found in the alluvial soils of sparse river valley forests, mainly from the mountain areas (500–700 m a.s.l.) [40]. In the Rila Mountains, it was found in a pasture at 1700 m above sea level [40,43]. Larvae, adults, and pupae were found up to 50 cm deep with most specimens inhabiting the upper soil layer from 0 to 20 cm deep [40]. Adults and larvae were observed in a high mountain meadow (Figure 3C,D), in soil up to 20 cm deep.

***Chaetonyx schatzmayri Mariani, 1946 (Figure 7C,D)**

Locality. Prolesje at Trgovište, 31 May–1 June 2022, 9 ex. [MB], 16 ex. [AB, ST] ver. Jean-Bernard Huchet, 15 ex. [TG].

Remarks. This species is only known from two countries in the Balkan Peninsula—Bulgaria and North Macedonia [41]. Adults and their larvae were found near a small river under an old beech in soil up to 20 cm deep (Figure 4F,G).

Subfamily MELOLONTHINAE Leach, 1819

Tribe HOPLIINI Latreille, 1829

Hoplia argentea (Poda von Neuhaus, 1761)

Localities. Aluga at Bajina Bašta, 6–7 June 2022, 20 ex. [MB], 21 ex. [AB, ST], 16 ex. [TG]; Jablanica at Čajetina, 23–28 July 2019, 1 ex. [DM]; Druzinice at Sjenica, 18–22 July 2019, 14 ex. [DM, DPM]; Sušica at Sjenica, 4 June 2022, 1 ex. [MB], 1 ex. [ST]; Slavinja at Pirot, 27 May 2021, 3 ex. [DM]; Barbarušince at Vranje, 30 May 2022, 1 ex. [MB], 4 ex. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 1 ex. [MB], 2 ex. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 2 ex. [MB].

Tribe MELOLONTHINI Leach, 1819

Melolontha hippocastani hippocastani Fabricius, 1801

Locality. Kosmovac at Bela Palanka, 8 May 2018, 1 ex. [SSS].

Melolontha melolontha (Linnaeus, 1758)

Localities. Šušara at Vršac, 23–24 May 2022, 1 ex. [MB]; Dolac at Bela Palanka, 7 May 2018, 1 ex. [DM]; Marina Kutina at Gadžin Han, 30 April 2019, 1 ex. [RM].

Melolontha pectoralis pectoralis Megerle von Mühlfeld, 1812

Localities. Tekija at Kladovo, 26 May 2022, 1 ex. [AB]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [MB], 1 ex. [AB].

Tribe RHIZOTROGINI Burmeister, 1855

Amphimallon assimile (Herbst, 1790)

Locality. Slavinja at Pirot, 27 May 2021, 2 exx. [DM].

Amphimallon solstitiale solstitiale (Linnaeus, 1758)

Localities. Vrdnik at Irig, 8–9 June 2022, 5 exx. [MB], 11 exx. [AB, ST] ver. Eckehard Rössner; Jablanica at Čajetina, 23–28 July 2019, 4 exx. [DM].

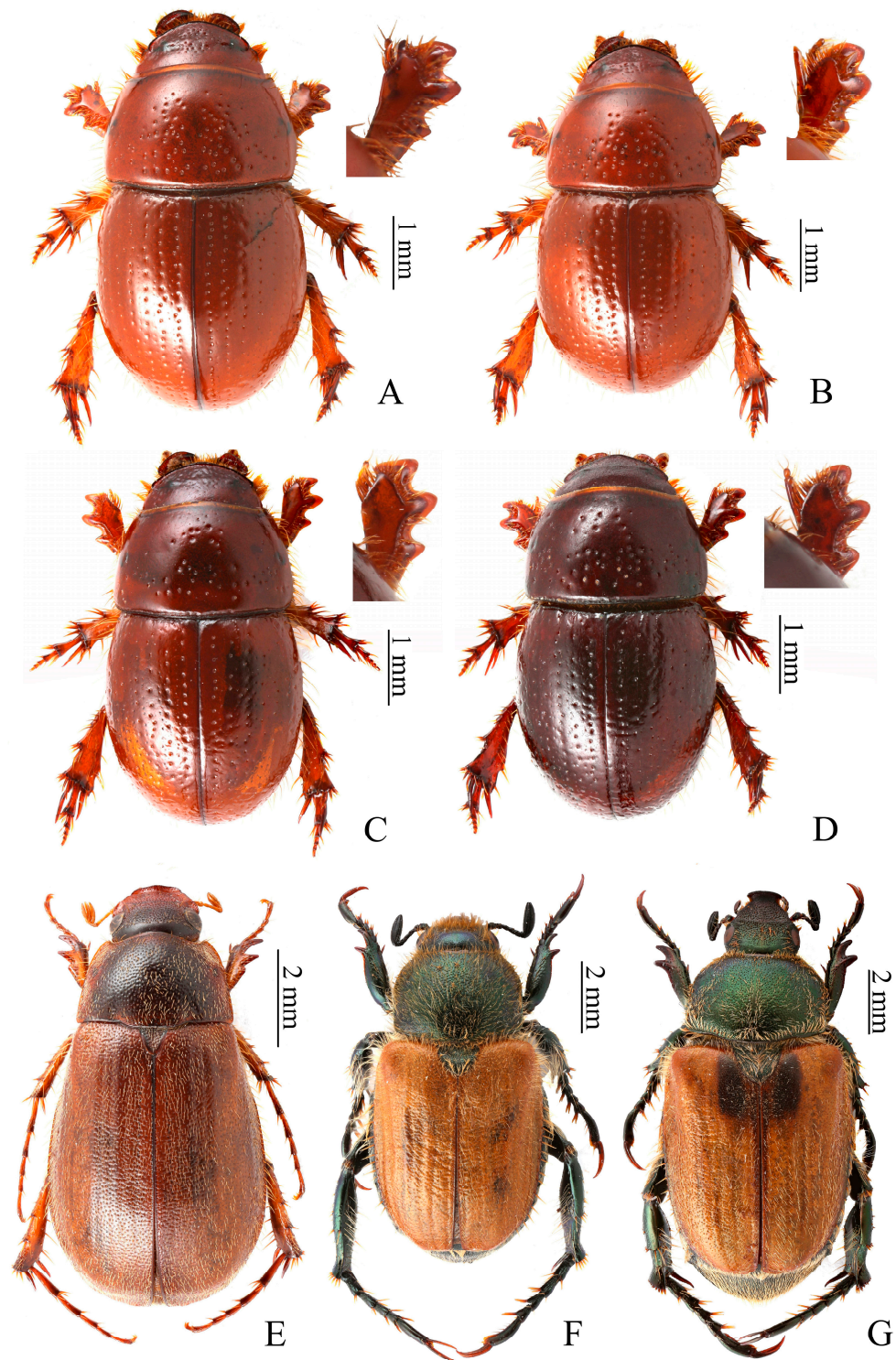


Figure 7. Rare and new species for the fauna of Serbia recorded in the course of this study: (A,B)—*Chaetonyx robustus robustus* Schaum, 1862, (C,D)—*Chaetonyx schatzmayri* Mariani, 1946, (E)—*Triodontella dalmatica* (Baraud, 1962), (F,G)—*Chaetopteroelia segetum straminea* (Brullé, 1832) (Photos: Łukasz Minkina).

****Holochelus (Holochelus) costulatus (Frivaldszky, 1835)*** (Figure 6G)

Locality. Starac at Bujanovac (1), 29 April 2019, 4 exx. [DM, RM].

Remarks. This species was reported from only five countries: Bulgaria, Greece, North Macedonia, and also from the European and Asian parts of Türkiye [44]. All individuals of this species were caught in a meadow with single shrubs (Figure 4B) with an insect sweep net. Adults were observed in the afternoon on deciduous shrubs.

Holochelus (Miltotrogus) vernus (Germar, 1824)

Localities. Vrdnik at Irig, 8–9 June 2022, 1 ex. [MB]; Tekija at Kladovo, 26 May 2022, 21 exx. [MB], 33 exx. [AB, ST], 10 exx. [TG]; Aluga at Bajina Bašta, 6–7 June 2022, 3 exx. [MB], 4 exx. [AB, ST], 1 ex. [TG]; Čukljenik at Niška Banja, 11 May 2018, 1 ex. [VŽ].

Rhizotrogus aestivus (A.G. Olivier, 1789)

Localities. Tekija at Kladovo, 26 May 2022, 2 exx. [MB], Kosmovac at Bela Palanka, 8 May 2018, 1 ex. [DPM]; Prolesje at Trgovište, 31 May–1 June 2022, 3 exx. [MB], 3 exx. [AB, ST].

Tribe SERICINI Kirby, 1837

Maladera holosericea (Scopoli, 1772)

Locality. Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST], 1 ex. [TG].

****Omalopecta corcyrae (Baraud, 1965)*** (Figure 6H)

Localities. Čukljenik at Niška Banja, 2 June 2017, 1 ex. [DPM]; Vladovce at Trgovište, 1 June 2022, 3 exx. [MB] ver. Eckehard Rössner, 1 ex. [AB].

Remarks. This species was found only on the Balkan Peninsula (Albania, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, and Romania) [45,46]. All individuals of this species were caught in the afternoon on the ears of grass (Figure 3E,H).

Omalopecta erythroptera I. Frivaldszky, 1835

Localities. Ristovac at Vranje, 2 June 2022, 1 ex. [MB]; Donja Trnica at Trgovište, 1 June 2022, 1 ex. [ST]; Starac at Bujanovac (1), 1 June 2022, 3 exx. [MB], 2 exx. [AB, ST].

Omalopecta illyrica (Baraud, 1965) (Figure 6I)

Localities. Mala Jasikova at Zaječar, 27 May 2022, 2 exx. [MB], 4 exx. [AB, ST]; Ivanje at Bojnik, 10 May 2018, 1 ex. [SSS]; Starac at Bujanovac (1), 1 June 2022, 1 ex. [MB], 2 exx. [AB, ST].

Remarks. This species was found only on the Balkan Peninsula (Albania, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, Romania, Serbia) [43,46]. All individuals of this species were caught in the afternoon on the ears of grass and rose flowers (Figures 2G, 3F and 4C).

Omalopecta ruricola ruricola (Fabricius, 1775)

Locality. Krušedol Selo at Irig, 9 June 2022, 25 exx. [MB], 21 exx. [AB, ST].

Triodontella dalmatica (Baraud, 1962) (Figure 7E)

Locality. Šušara at Vršac, 23–24 May 2022, 22 exx. [MB], 37 exx. [AB, ST], 31 exx. [TG].

Remarks. This species was found only on the Balkan Peninsula (Albania, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, Romania, Serbia, and the European part of Türkiye) [46,47]. All specimens were caught at night. A copulating couple of this species were spotted on low-lying black locust flowers and leaves (Figure 2C). All of them were caught on an insect-beating sheet.

Subfamily RUTELINAE W.S. Macleay, 1819

Tribe ANOMALINI Streubel, 1839

Subtribe ANISOPLIINA Burmeister, 1844

Anisoplia (Anisoplia) agricola (Poda von Neuhaus, 1761)

Localities. Vrdnik at Irig, 8–9 June 2022, 1 ex. [MB]; Krušedol Selo at Irig, 9 June 2022, 12 exx. [MB], 10 exx. [AB, ST]; Jablanica at Čajetina, 23–28 July 2019, 5 exx. [DM, DPM]; Vladovce at Trgovište, 1 June 2022, 12 exx. [MB], 12 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [AB, ST].

Anisoplia (Anisoplia) lata lata Erichson, 1847

Localities. Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 17 exx. [MB], 15 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 1 ex. [MB], 3 exx. [AB, ST]; Deliblato at Kovin, 24 May 2022, 17 exx. [MB], 18 exx. [AB, ST]; Malo Bavanište at Kovin, 25 May 2022, 4 exx. [AB, ST].

Anisoplia (Anisoplia) tempestiva Erichson, 1847

Locality. Slavinja at Pirot, 27 May 2021, 2 exx. [AK, DM].

Anisoplia (Autanisoplia) austriaca austriaca (Herbst, 1783)

Localities. Krušedol Selo at Irig, 9 June 2022, 3 exx. [AB, ST]; Čukljenik at Niška Banja, 2 May 2019, 1 ex. [VŽ].

Chaetopteropia segetum straminea (Brullé, 1832) (Figure 7F,G)

Localities. Palić at Subotica, 22 May 2022, 6 exx. [MB], 14 exx. [AB, ST] det. Eckehard Rössner; Horgoš at Kanjiža, 22 May 2022, 8 exx. [AB, ST], 2 exx. [TG]; Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 4 exx. [MB], 7 exx. [AB, ST]; Deliblato at Kovin, 24 May 2022, 1 ex. [MB], 4 exx. [AB, ST] det. Eckehard Rössner; Dubovac at Kovin, 25 May 2022, 5 exx. [AB, ST]; Malo Bavanište at Kovin, 25 May 2022, 3 exx. [AB, ST]; Papratna at Knjaževac, 27 May 2022, 1 ex. [ST]; Ristovac at Vranje, 2 June 2022, 1 ex. [MB], 5 exx. [AB, ST], 1 ex. [TG]; Donja Trnica at Trgovište, 1 June 2022, 3 exx. [MB], 5 exx. [AB, ST] det. Eckehard Rössner; Starac at Bujanovac (1), 1 June 2022, 8 exx. [MB], 7 exx. [AB, ST] det. Eckehard Rössner.

Remarks. *Ch. segetum straminea* is one of the four described subspecies of the widely distributed species *Ch. segetum* (Herbst, 1783). Species inhabiting Europe and Asia. Subspecies *Ch. segetum segetum* inhabits Bulgaria, Germany, Poland, Romania, the south of the European part of Russia, and Ukraine. Subspecies *Ch. segetum straminea* inhabits Albania, Austria, Bulgaria, Czech Republic, Germany, Greece, Hungary, Montenegro, North Macedonia, Romania, Serbia, Slovakia, and Slovenia. Subspecies *Ch. segetum velutina* (Erichson, 1847) inhabits Armenia, Greece (Ägäis), and the Asian part of Türkiye. Subspecies *Ch. segetum zoubkovii* (Krynicky, 1832) inhabits Azerbaijan, European and Asian parts of Kazakhstan, the south of the European part of Russia, and Ukraine [19]. The range of occurrence of *Ch. segetum segetum* presented by Rössner and Hillert [19] shows that all information on the presence of *Ch. segetum segetum* in Serbia actually refers to *Ch. segetum straminea*. All specimens of this subspecies were observed in the afternoon on the grass ears (Figure 2A,C–F and Figure 4A,C).

Subtribe ANOMALINA Streubel, 1839

Blitopertha lineolata lineolata (Fischer von Waldheim, 1824)

Localities. Boletin at Majdanpek, 14 April 2013, 2 exx. [DPM]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [ST]; Mala Jasikova at Zaječar, 27 May 2022, 4 exx. [AB, ST]; Ivanje at Bojnik, 10 May 2018, 1 ex. [VŽ]; Damnjaničovi at Surdulica, 17 July 2013, 1 ex. [DPM]; Barbarušince at Vranje, 30 May 2022, 11 exx. [AB, ST]; Vladovce at Trgovište, 1 June 2022, 1 ex. [AB]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [MB], 6 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 2 exx. [MB], 5 exx. [AB, ST].

Subfamily DYNASTINAE W.S. Macleay, 1819

Pentodon idiota idiota (Herbst, 1789)

Localities. Mokrin at Kikinda, 22–23 May 2022, 1 ex. [MB]; Samoš at Kovačica, 23 May 2022, 1 ex. [ST]; Futog at Novi Sad, 10 June 2022, 1 ex. [AB]; Vrdnik at Irig, 8–9 June 2022, 1 ex. [AB], 1 ex. [TG]; Šušara at Vršac, 23–24 May 2022, 1 ex. [MB], 2 exx. [AB, ST].

Subfamily CETONIINAE Leach, 1819

Tribe CETONIINI Leach, 1819

Subtribe CETONIINA Leach, 1819

Cetonia aurata aurata (Linnaeus, 1758)

Localities. Crna Bara at Čoka, 22 May 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 3 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 4 exx. [AB, ST], 1 ex. [TG]; Mala Jasikova at Zaječar, 27 May 2022, 2 exx. [AB, ST]; Aluga at Bajina Bašta,

6–7 June 2022, 2 exx. [AB, ST]; Papratna at Knjaževac, 27 May 2022, 1 ex. [ST]; Čukljenik at Niška Banja, 11 May 2018, 1 ex. [VŽ]; Slavinja at Pirot, 27 May 2021, 1 ex. [AK]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 3 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [ST].

Protoetia (Eupotosia) affinis affinis (Andersch, 1797)

Localities. Vrdnik at Irig, 8–9 June 2022, 1 ex. [AB]; Krušedol Selo at Irig, 9 June 2022, 1 ex. [MB].

Protoetia (Philhelena) ungarica ungarica (Herbst, 1790)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [MB], 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 4 exx. [AB, ST]; Druzinice at Sjenica, 18–22 July 2019, 3 exx. [DM].

Protoetia (Potosia) cuprea obscura (Andersch, 1797)

Localities. Crna Bara at Čoka, 22 May 2022, 1 ex. [ST]; Futog at Novi Sad, 10 June 2022, 1 ex. [TG]; Petrovo Selo at Kladovo, 25–26 May 2022, 2 exx. [MB], 5 exx. [AB, ST]; Crni Vrh at Knjaževac, 28 May 2022, 1 ex. [AB]; Gradište at Bela Palanka, 1 May 2019, 1 ex. [DM]; Čukljenik at Niška Banja, 2 May 2019, 1 ex. [SSS]; Slavinja at Pirot, 27 May 2021, 1 ex. [AK]; Vladovce at Trgovište, 1 June 2022, 3 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 2 exx. [AB, ST].

Tropinota hirta hirta (Poda von Neuhaus, 1761)

Localities. Crna Bara at Čoka, 22 May 2022, 2 exx. [AB, ST]; Mokrin at Kikinda, 22–23 May 2022, 1 ex. [ST]; Vrdnik at Irig, 8–9 June 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 3 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 1 ex. [AB]; Deliblato at Kovin, 24 May 2022, 3 exx. [AB, ST]; Malo Bavanište at Kovin, 25 May 2022, 5 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [ST]; Mala Jasikova at Zaječar, 27 May 2022, 4 exx. [AB, ST]; Čukljenik at Niška Banja, 24 May 2021, 1 ex. [AK]; Marina Kutina at Gadžin Han, 30 April 2019, 3 exx. [RM]; Gornja Studena at Niška Banja, 3 May 2019, 2 exx. [RM]; Slavinja at Pirot, 27 May 2021, 2 exx. [DM]; Ristovac at Vranje, 2 June 2022, 3 exx. [AB, ST]; Barbarušince at Vranje, 30 May 2022, 1 ex. [ST]; Vladovce at Trgovište, 1 June 2022, 2 exx. [AB, ST]; Starac at Bujanovac (1), 29 April 2019, 1 ex. [RM], 1 June 2022, 3 exx. [AB, ST]; Starac at Bujanovac (2), 29 April 2019, 2 exx. [RM]; Prolesje at Trgovište, 31 May–1 June 2022, 5 exx. [AB, ST].

Subtribe LEUCOCELINAKraatz, 1882

Oxythyrea cinctella (Schaum, 1841)

Localities. Papratna at Knjaževac, 27 May 2022, 1 ex. [MB], 4 exx. [AB, ST]; Damnjaničovi at Surdulica, 17 July 2013, 1 ex. [DM].

Oxythyrea funesta (Poda von Neuhaus, 1761)

Localities. Palić at Subotica, 22 May 2022, 2 exx. [AB, ST]; Crna Bara at Čoka, 22 May 2022, 2 exx. [AB, ST]; Futog at Novi Sad, 10 June 2022, 2 exx. [AB, ST]; Krušedol Selo at Irig, 9 June 2022, 3 exx. [AB, ST]; Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST]; Mala Jasikova at Zaječar, 27 May 2022, 3 exx. [AB, ST]; Jablanica at Čajetina, 23–28 July 2019, 2 exx. [DM]; Crni Vrh at Knjaževac, 28 May 2022, 3 exx. [AB, ST]; Marina Kutina at Gadžin Han, 12 May 2018, 1 ex. [DPM]; Vladovce at Trgovište, 1 June 2022, 3 exx. [AB, ST]; Starac at Bujanovac (1), 1 June 2022, 2 exx. [AB, ST]; Prolesje at Trgovište, 31 May–1 June 2022, 3 exx. [AB, ST].

Tribe TRICHIINI Fleming, 1821

Gnorimus nobilis nobilis (Linnaeus, 1758)

Localities. Petrovo Selo at Kladovo, 25–26 May 2022, 1 ex. [MB]; Aluga at Bajina Bašta, 6–7 June 2022, 1 ex. [ST]; Slavinja at Pirot, 27 May 2021, 1 ex. [AK]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [AB].

Gnorimus variabilis (Linnaeus, 1758)

Locality. Slavinja at Pirot, 27 May 2021, 1 ex. [AK].

Trichius sexualis Bedel, 1906

Localities. Mokrin at Kikinda, 22–23 May 2022, 1 ex. [ST]; Vrdnik at Irig, 8–9 June 2022, 1 ex. [MB]; Šušara at Vršac, 23–24 May 2022, 2 exx. [TG]; Druzinice at Sjenica, 18–22 July 2019, 5 exx. [DM, DPM]; Aluga at Bajina Bašta, 6–7 June 2022, 4 exx. [MB], 2 exx. [AB, ST],

3 exx. [TG]; Čukljenik at Niška Banja, 2 June 2017, 1 ex. [DPM], 2 May 2019, 1 ex. [DM]; Ristovac at Vranje, 2 June 2022, 1 ex. [MB].

Tribe VALGINI Mulsant 1842

Valgus hemipterus hemipterus (Linnaeus, 1758)

Localities. Šušara at Vršac, 23–24 May 2022, 2 exx. [AB, ST]; Petrovo Selo at Kladovo, 25–26 May 2022, 3 exx. [AB, ST]; Crni Vrh at Knjaževac, 28 May 2022, 5 exx. [AB, ST]; Gradište at Bela Palanka, 1 May 2019, 3 exx. [RM]; Prolesje at Trgovište, 31 May–1 June 2022, 1 ex. [ST].

4. Discussion

The “Catalogue of Palaearctic Coleoptera” [1] lists 212 scarabaeoid species from Serbia. The occurrence of four species in Serbia—*Bolbelasmus unicornis* [20,21,48], *Pygopleurus chrysonotus* [13,17], *Psammodytes asper* [7,8,13,14], *Onthophagus angorensis* [35]—were omitted from the second edition of the “Catalogue of Palaearctic Coleoptera” [1]. In contrast, *Pygopleurus vulpes* (Fabricius, 1781) and *Omaloplia spiraeae* (Pallas, 1773) recorded in this catalogue are unlikely to occur in Serbia [12,13,17,45,49]. *Anomala errans* (Fabricius, 1775) was reported from Serbia by Endrödi in 1957 [50]. There are no new records for this species from that country. Taking into account the general distribution of this species, the authors have not included it in the Serbian fauna. Ziani et al. [51] supplemented the list of Serbian scarabaeoids with one more species—*Glaresis rufa* Erichson, 1848. *Dorcus parallelipipedus* has been reported from floodplain forests along the Tisa and Begej rivers [52]. Thus, as many as 216 species of Scarabaeoidea have been identified in Serbia.

In less than two months of faunistic study resulted in confirming the occurrence in Serbia of 49.5% of the scarabaeoid species hitherto known from this country and added 13 species that had not been previously recorded: *Eulasia pareyssei*, *Pygopleurus apicalis*, *Melinopterus reyi*, *Nimbus johnsoni*, *Planolinoides borealis*, *Copris hispanus*, *C. umbilicatus*, *Cheironitis furcifer*, *Onthophagus dellacasai*, *O. similis*, *Chaetonyx schatzmayri*, *Holochelus costulatus*, and *Omaloplia corcyrae*. Thus, the number of currently known scarabaeoid species in Serbia has increased to 229. Eight species and one subspecies were also found that are typical of the Balkan Peninsula region: *Jekelius punctulatus*, *Pygopleurus apicalis*, *P. chrysonotus*, *Onthophagus dellacasai*, *Chaetonyx robustus robustus*, *Ch. schatzmayri*, *Triodontella dalmatica*, *Omaloplia corcyrae*, and *O. illyrica*. The first seven of these species were observed at single localities. *Omaloplia corcyrae* was recorded in two and *O. illyrica* in three localities.

The diversity of scarabaeoid fauna in the Balkan Peninsula suggests that the current number occurring in Serbia is increased. Kulundžić et al. [53] estimated that more than 400 scarabaeoid species occur in Croatia, while Guéorguiev et al. [54] estimated the number of scarabaeoid species in Bulgaria at 335–345. As for neighbouring countries, 273 scarabaeoid species are currently known from Bulgaria, 240 each from Croatia and Romania [1], 207 from North Macedonia [55], 204 from Bosnia Herzegovina, 198 from Hungary [1] and 201 from Albania [56]. The first edition of the “Catalogue of Palaearctic Coleoptera” [57] listed 156 scarabaeoid species from Albania. The second edition [1] already mentioned 181 species, and three years later, the number of species reached 201 [56]. In the latest edition of this catalogue [1], 163 scarabaeoid species from Montenegro were listed, and ten years later the number has risen to 181 [2].

The richness of the scarabaeoid fauna, the terrain, and the habitat diversity of Serbia suggest the possibility of finding further more species of scarabaeoid beetles, especially near the borders with neighbouring countries, where numerous other taxa have been reported. So far, from the territory of Serbia, the following species have been never recorded: *Platycerus caprea* (De Geer, 1774) [58], *Aphodius fimetarius* (Linnaeus, 1758), *Euheptaulacus porcellus* (J. Frivaldszky, 1879), *Melinopterus pubescens* (Sturm, 1800), *Nobius serotinus* (Panzer, 1799), *Parammoecius corvinus* (Erichson, 1848) [25], *Pleurophorus pannonicus* Petrovitz, 1961 [59], *Bubas bison* (Linnaeus, 1767) [34], *Onthophagus opacicollis* Reitter, 1892, *O. sericatus* Reitter, 1892 [37], *Ateuchetus variolosus* (Fabricius, 1787) [60], *Omaloplia*

lonae (Schatzmayr, 1923) [46], *Pentodon bidens* (Pallas, 1771), *Phyllognathus excavatus* (Forster, 1771) [61], and *Protaetia angustata* (Germar, 1817) [62]. All these species are known from at least five countries neighbouring Serbia. Some of them are common species and suitable habitats exist for them in Serbia.

Only one new species of scarabaeoid beetles has been recorded from Serbia in the last ten years. Ziani et al. [51] reported *Glaresis rufa* Erichson, 1848. Moreover, rare species of scarabaeoid beetles are reported from neighbouring countries, e.g., *Trox perrisii* Fairmaire, 1868 from Croatia [51,63], Bulgaria [64], and Greece [65], *Rhysothorax rufus* (Fabricius, 1792) from Bulgaria and Romania [66] or the Albanian endemic *Ahermodontus bischoffi* Všetečka, 1939 [67]. At least the first two species mentioned may occur in Serbia.

The Scarabaeoidea are a group of beetles that inhabit very diverse habitats and microenvironments. Most species are relatively large and their search in the field is not problematic. However, there is considerably a numerous group of highly specialized species that could have been used as indicators of climatic change, especially when their localities and distribution would be known. In previous studies, Serbian Scarabaeoidea fauna has been scarcely analysed in the terms of population abundance. As we have insufficient data for such analyses, we have to base it on the community structure of scarabaeoid beetles for now. However, in recent years, some examples of studies have indicated an increasing number of localities where Scarabaeoidea species have occurred. One of the examples can be *O. armiger*—observed by us at many localities—or *B. unicornis*, more frequently reported by other researchers from Serbia [20]. Both species are associated with subterranean fungi that have been documented more and more frequently due to climate change [68]. Additionally, a tribe that seems to be sensitive to climate change is *Cetoniini*, compared in [69–71].

Serbia is a relatively non-urbanized country. Low human impact, unpolluted air, water, or land, the traditional system of pastures with grazing domestic animals, rivers with natural channels, and highly diverse natural and semi-natural habitats, all these factors make Serbia a good reference when compare it to other European countries.

5. Conclusions

The discovery of 14 species new to Serbia in less than two months of fieldwork points to the insufficient state of knowledge of its scarabaeoid fauna and the need to continue faunistic studies, particularly in the hitherto less explored areas. Among the 120 species of scarabaeoid beetles observed during our field studies, 69 of them are coprophagous. Serbia is a country where, due to the traditional form of grazing, dung beetle communities are characterised by considerable species richness and the presence of rare species. The dung beetle communities found in high mountain pastures and along the Danube are of exceptional value. The results of this work point out important aspects for the conservation of dung beetle diversity, such as the protection of the traditional form of grazing by domestic animals, the protection of well-preserved pastures, and the active protection of rare species. The last of the above-mentioned aspects is also important for preserving beetle communities inhabiting the sandy banks of the Danube. In mountain pastures, it is recommended to protect dung beetles by maintaining and introducing small herds of goats and sheep or possibly individual cows and horses. Subsequently, the protection of psammophilous scarabaeoid beetles should include keeping rivers and their banks clean, and preventing shrubs from overgrowing in these habitats. Equally important is the opportunity to conduct further research into the structure of these communities. The dung beetles are able to transfer all deposited herbivore dung into the soil within hours after deposition [72–74]. Continuity of grazing is of overriding importance for dung beetle diversity. Decades, even centuries, are needed for the full development of the dung beetle communities. Rare species of dung beetles are very sensitive to the size of the grazing area [75]. Hence, large and long-lived pastures that still occur in Serbia are priceless.

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