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New and Interesting Data on the Ground Beetles (Coleoptera: Carabidae) from Bulgaria

Teodora M. Teofilova[1*], Borislav V. Guéorguiev[2] & Nikolay D. Kodzhabashev[3]

[1] Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria; E-mail: oberon_zoo@abv.bg
[2] National Museum of Natural History, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria; E-mail: bobivg@yahoo.com
[3] Department of Hunting and Game Management, Faculty of Forestry, Forestry University, 10 Kliment Ohridski Blvd., 1756 Sofia, Bulgaria; E-mail: ndkodjak@abv.bg

Abstract: The study provides new information and new records on twelve ground beetle species from Bulgaria. *Amblystomus rectangulus* Reitter, 1883 is recorded for the first time from the country. The first detailed records from Bulgaria of *Leistus piceus* Frölich, 1799 and *Anthracus insignis* Reitter, 1884 are discussed. The following species are reported for the second time from the country: *Acupalpus dubius* Schilsky, 1888, *Laemostenus euxinicus* Nitzu, 1998 and *Licinus graecus* Apfelbeck, 1901. *Ophonus convexicollis* Ménétriés, 1832 is noted by its second precise locality from Bulgaria. Other rare species in the country are also listed with new localities: *Bembidion nigropiceum* (Marsham, 1802), *Bembidion cordicolle* Jacquelin Du Val, 1852, *Bembidion decolor* Apfelbeck, 1911, *Harpalus taciturnus* Dejean, 1829 and *Platynus scrobiculatus purkynei* Obenberger, 1917.

Key words: carabids, rare species, new country records.

Introduction

Ground beetles (Coleoptera, Carabidae) represent one of the largest beetle families with cosmopolitan distribution and with key importance for the functioning of ecosystems. The ground beetle fauna of Bulgaria is one of the best studied among the countries of the Balkan Peninsula. Guéorguiev & Guéorguiev (1995) summarised the available information on 754 species and subspecies occurring in the country (the number of the species proper was 720).

In the last edition of the Palaearctic catalogue of the ground beetles, 722 species of the family Carabidae are listed for Bulgaria (Löbl & Löbl 2017). According to our estimation, there are further 36 species, which have not been included in the last catalogue. In addition, we consider 14 species listed in Löbl & Löbl (2017) as either not occurring in the country or with doubtful records. Therefore, the total number of the species currently recorded from Bulgaria is 744 (Teofilova & Guéorguiev in preparation).

The present report aims to add new faunistic data about several carabid species seeming rare for the Bulgarian fauna. We also provide new ecological information for the considered species and report

*Corresponding author: oberon_zoo@abv.bg

the firs record of one species (*Amblystomus rectangulus*) in Bulgaria.

Materials and Methods

The present study was based on materials collected during fieldwork carried out by two of us (TT and NK) in various localities in Bulgaria in 2006–2018. This material was collected using different sampling methods in various habitats mentioned separately for each species in the results. The only exception was *Leistus piceus*, which treatment was a consequence of a re-identification of a published record (Vasilev & Necheva 1989). All specimens are stored in the collection of the first author at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER–BAS).

Results

Tribe Nebriini Laporte, 1834

***Leistus* (*Leistus*) *piceus* Frölich, 1799**

Material examined: One female specimen (Fig. 1), labelled as follows: "Bulg. Vitoscha 27.07.83. 1600 m V. Gusseva" [front side] & "beneath Aleko Hut under stones" [back side, text in Cyrillic] / "*Leistus niger* Froel. [sic!] Kryzhanovskij det. 1985", 1 f. (IBER–BAS).

World distribution: Europe, without the northern ant southernmost parts (Kataev 2018). Belgium, Croatia, the Czech Republic, France, Germany, Italy, Latvia, Moldova, Poland, Romania, Serbia, Slovakia, Slovenia, Switzerland, Ukraine, Serbia and Montenegro (Farkač 2017). *Distribution in Bulgaria:* Vitosha Mts. (Vasilev & Necheva 1989, Krusteva et al. 1995). Altitude: about 1600 m a.s.l.

Habitat: Moist and mesophilous deciduous montane forests, mostly beech woods as well as in deeper valleys of creeks and streams, between and under stones (Tallósi 2008, Kataev 2018).

Status: Rare. In Russia considered vulnerable, due to the limited suitable habitats (deciduous forests) and unfavourable climatic conditions (Kataev 2018).

Notes: The only specimen included in this study was previously discussed by Vasilev & Necheva (1989: 50) as *L. niger* Gebler, 1847. Later, this taxon was excluded from the list of the Bulgarian ground beetles (Guéorguiev & Guéorguiev 1995: 243). We believe that the identifier O.L. Kryzhanovskij has correctly identified this specimen having in mind *L. piceus* Frölich but erroneously wrote down the species name as *niger* (see "Material examined"). As a result, Vasilev & Necheva (1989) had published it as *L. niger*, associating the binomen correctly with its author's name (i.e. Gebler). *Leistus piceus* was first reported for Bulgaria by Krusteva et al. (1995) without mentioning the locality. We cannot state for sure whether we are dealing with the same material mentioned by Krusteva et al. (1995).

Tribe Bembidiini Stephens, 1827

***Bembidion* (*Lymnaeum*) *nigropiceum* (Marsham, 1802)**

Material examined: One female specimen (Fig. 2) was collected on the beach near the Evksinograd Residence (Fig. 3), 8 m a.s.l., N 43°13'03", E 27°59'34", habitat code 1210 and 2110, hand collection, 19.IV.2016, leg. M. Naumova & E. Chehlarov.

World distribution: Western and Southern Europe (excluding the Iberian Peninsula), Crimea. Bulgaria, Croatia, France, Great Britain, Greece, Italy, Great Britain (Marggi et al. 2017). Introduced in North America, near Massachusetts (Davidson & Rykken 2011). *Distribution in Bulgaria:* So far from the region of the Black Sea coast (Pomorie, Vlas) by Muche (1965) and Hieke & Wrase (1988) and for South Dobrudzha (Teofilova 2019, Teofilova & Guéorguiev in prep.). Neri & Magrini (2010) reported the species from Tuzlata near Balchik and Vlas near Nesebar. Altitude: up to 50 m a.s.l.

Habitat: Halobiont. This species "prefers an environment directly in contact with the sea water, as the predominantly stony intertidal areas (at least in the Mediterranean Sea) as well as recent artificial environments, in any case in direct contact with the salt water" (Neri & Magrini 2010). Mostly on gravel beaches; confined to the tidal zone and the mound of gravel between the high tide line and the dry upper beach (Davidson & Rykken 2011). *Bembidion nigropiceum* seems to be well adapted to marine conditions, surely survives in saline habitats and supposedly can survive longer periods of submersion by seawater; it is found in shingle and coarse sand (Teofilova 2019) as well as among rubble at the base of cliffs and near salt marshes (Desender 2005).

Status: The species has an extremely narrow range (Davidson & Rykken 2011, Davidson et al. 2011). It is considered a specialist in intertidal habitats (Maddison & Maruyama 2019). It is relatively rare (in collections) with very spotty distribution even in Europe (Davidson & Rykken 2011). Considered invasive in North America (Davidson et al. 2011).

***Bembidion* (*Peryphus*) *cordicolle* Jacquelin Du Val, 1852**

Material examined: One female and three male specimens were collected with a light trap at the Srebarna Wetland Nature Reserve, 11–14.VI.2010, leg. M. Jocqué (Jocqué et al. 2016).

World distribution: Bulgaria, Greece (Crete) and Turkey (Toledano & Rébl 2006). Greece (Kárpathos, Kríti, Ródhos) and Turkey (Marggi et al. 2017). *Distribution in Bulgaria:* Only from the Southern Bulgarian Black Sea coast: Vlas (Hieke & Wrase 1988, Teofilova & Guéorguiev in prep.), Akhtopol (Toledano & Rébl 2006). Later, it was reported for South Dobrudzha (Jocqué et al. 2016). Recently Neri & Toledano (2018) recorded this species for Bulgaria (without an exact locality). Altitude: up to 20 m a.s.l.

Habitat: Poorly studied. Probably affiliated to the riparian mesophilous and swamped forests. We captured it (flying at light) near the Srebarna Lake.

Status: Balkan endemic. Rare.

Fig. 1. Habitus of *Leistus piceus* Frölich, Vitosha Mts. Scale-bar: 1 mm.

Fig. 2. Habitus of *Bembidion nigropiceum* (Marsham), beach near the Evksinograd Palace. Scale-bar: 1 mm.

Notes: The ecology of *B. cordicolle* is still not studied. Light trapping is the most valuable method to collect highly agile ground beetle species, inhabiting littoral regions and peatlands. *Bembidion cordicolle* seems to be a species with southern Ponto-Mediterranean type of distribution. The recent finding in north Bulgaria, at the Srebarna Lake (Jocqué et al. 2016), could be a result of a contemporary species migration northwards due to the global climate changes. Since *B. cordicolle* is a winged, intrazonal species and one with nocturnal activity, this hypothesis appears probable. This species has not been listed for Bulgaria in the last edition of the Catalogue of the Palaearctic Carabidae (Marggi et al. 2017).

***Bembidion* (*Philochthus*) *decolor* Apfelbeck, 1911**

Material examined: One male specimen was captured with a pitfall trap on the territory of the Balabana Reserve, Tundzha River valley, near the town of Elhovo, 110 m a.s.l., N 42°08'55", E 26°32'28", 8.V–3.IX.2014, leg. N. Kodzhabashev & T. Teofilova.

World distribution: Europe (Albania, Bosnia Herzegovina, Bulgaria, Croatia, Greece, Montenegro, Serbia), part of Asia (Cyprus, Iran, Israel, Kyrgyzstan, Lebanon, Turkey) (Marggi et al. 2017). *Distribution in Bulgaria:* Only for the region of the Southern Black sea coast (Pomorie; Hieke & Wrase 1988). Recently, its range in the country was extended to the Sakar-Tundza Region (Teofilova 2017). Altitude: up to 110 m a.s.l.

Habitat: Halotolerant riparian species. In Balabana Reserve we found it in a mesophilous oak forest along the Tundzha River (Fig. 4), on soils with increased salinity, due to the modified inundation regime, resulting from the destruction of the river bed of the adjacent Popovska River in the end of the 20th century. A similar effect has been observed in many places in Bulgaria, including the Srebarna Lake.

Status: Poorly studied.

Tribe Harpalini Bonelli, 1810

***Amblystomus rectangulus* Reitter, 1883**

Material examined: One female specimen (Fig.

Fig. 3. Collecting site near Evksinograd Palace: general view of the habitat, where *Bembidion nigropiceum* (Marsham) was captured. Photo: S. Zidarova.

Fig. 4. Mesophilous oak forest along the river of Tundzha: general view of the habitat, where *Bembidion decolor* Apfelbeck was captured. Photo: T. Teofilova.

5) was collected in the period 19.IV–15.V.2018 in a pitfall trap, near the village of Zelenikovo, at the foot of the Sarnena Sredna Gora Mts. (Central Bulgaria), N 42°22'45'', E 25°04'48'', leg. T. Teofilova.

World distribution: Mediterranean-Middle East. According to Wrase & Magrini (2012) and Wrase (2017), its range includes Europe (Azerbaijan, Croatia, Greece mainland, Italy) and the northern Levant (Cyprus, Israel, Jordan, Syria, Turkey). *Distribution in Bulgaria:* This is the first record of *A. rectangulus* in Bulgaria. Altitude: 288 m a.s.l.

Habitat: The specimen was captured in a flowering oilseed rape (*Brassica napus* L.) field on the southern slopes of the Sarnena Sredna Gora Mts., bordering with the Thracian Lowland (Fig. 6). It seems the species is frequent in agroecosystems, since it has been also found in a cultivation and experimental plant for the production of truffles in Italy (Degiovanni 2015). Humidity preferences are not quite clear. It may be possible that *A. rectangulus* prefers damp habitats, since the rape field

Fig. 5. Habitus of *Amblystomus rectangulus* Reitter, near the village of Zelenikovo. Scale-bar: 1 mm.

near Zelenikovo was irrigated during the time of trap placement, and it was caught in a pool of water in Italy (Degiovanni 2015).

Status: No data.

Notes: Probably *A. rectangulus* has migrated from south to north along the valleys of the left tributaries of the Maritsa and Tundzha Rivers, since they constitute an original meridional corridor for the penetration of southern and thermophilic faunistic elements.

***Acupalpus* (*Acupalpus*) *dubius* Schilsky, 1888**

Material examined: One female specimen was collected at light, in a house yard in Hrishteni Village, Sarnena Sredna Gora Mts., 230 m a.s.l., N 42°27'12.7'', E 25°42›18.9››, 9.VI.2018, leg. D. Georgiev.

World distribution: European-West Mediterranean species, which lives in North Africa (Algeria and Morocco) and large part of Europe. In Europe, it inhabits the whole north, west and central part of the continent: to the east reaches Latvia, Lithuania, Silesia and Moldova; to the south is noted only for Portugal, Spain and Italy (Olberg 2008, Jaeger & Kataev 2017). *Distribution in Bulgaria:* Firstly collected with light trap at the Srebarna Wetland Nature Reserve near the Danube River (Dobrudzha, NE Bulgaria), in June 2010 by M. Jocqué (Jocqué et al. 2016). Sarnena Sredna Gora appears to be the second certain locality proven for this species. Altitude: about 20 – 230 m a.s.l.

Fig. 6. Collecting site of *Amblystomus rectangulus* Reitter near the village of Zelenikovo: general view of the habitat. Photo: T. Teofilova.

Habitat: Litter, moss and tussocks near freshwater; sparsely vegetated ground on clay, sand or peat close to small water bodies in coastal areas. In Sweden, it is usually found on open pastured grasslands close to the seashore (Olberg 2008) or in coastal meadows with short grass vegetation on vegetation-poor soil at the edge of small stagnant water, on both clay-, sand- and peat-base and open, moist, nutrient-poor heather and peat bogs (Lindroth 1986). In Ireland, it is recorded both from warm, humid, marshy sites beside ponds and pools on the coast, often in partially saline conditions and from Sphagnum on acid, peaty lakeshores (Anderson et al. 2005).

Status: Endangered by deterioration of the biotopes due to the change of the regimes of use of the pastures (Olberg 2008).

Notes: This species has not been listed for Bulgaria in the last edition of the Catalogue of the Palaearctic Carabidae (Jaeger & Kataev 2017). It seems that this species penetrates in Bulgaria through the main stream of the Danube River.

***Anthracus insignis* Reitter, 1884**

Material examined: One female specimen was collected with a light trap (between 11.30 and 12.30 pm) in the Srebarna Reserve, 15.VI.2010, leg. M. Jocqué (Jocqué et al. 2016).

World distribution: Previously only from Greece and Montenegro (Jaeger & Kataev 2017, Jaeger et al. 2016). *Distribution in Bulgaria:* Eastern Danube River Plain, Srebarna Reserve (Jocqué et al. 2016). Altitude: about 20 m a.s.l.

Habitat: Very little is known about its habitat preferences. We captured it (flying at light) near the Srebarna Lake.

Status: Balkan endemic. Rare.

Notes: The ecology of this species is still not studied. Light trapping is most valuable to detect highly vagile species inhabiting littoral regions and peatlands. The locality near the Srebarna Lake significantly extends the known species range to northeast. Most probably, *A. insignis* is a coastal stenobiont with nocturnal activity.

Fig. 7. Habitus of *Harpalus taciturnus* Dejean, southwest of the town of Balchik. Scale-bar: 1 mm.

***Harpalus* (*Harpalus*) *taciturnus* Dejean, 1829**

Material examined: One male specimen (Fig. 7) was collected with a Malaise trap along the Northern Bulgarian Black Sea coast, SW Balchik, 215 m a.s.l., N 43°23'44'', E 28°06'04'', 11.V.2018, leg. T. Ljubomirov.

World distribution: South-Eastern Europe. Albania, Bosnia Herzegovina, Croatia, Greece, R. N. Macedonia, Montenegro, Serbia, Turkey (Kataev & Wrase 2017). *Distribution in Bulgaria:* Forebalkan, Eastern Stara Planina Mts., Sredna Gora Mts., West Bulgaria and Sandanski-Petrich Valley (Hieke & Wrase 1988, Guéorguiev & Guéorguiev 1995, Teofilova & Guéorguiev in prep.). Altitude: 500 – 1000 m a.s.l.

Habitat: Found in agroecosystems in Serbia and Croatia: oilseed rape fields and winter wheat fields (Gotlin Čuljak et al. 2016, Sivčev et al. 2014, Sivčev et al. 2018). Our finding was on a steep rocky slope facing west (Fig. 8).

Status: Rare. The last published data about this species in Bulgaria are from 1995 (Teofilova & Guéorguiev in prep.).

Notes: This species has not been listed for Bulgaria in the last edition of the Catalogue of the Palaearctic Carabidae (Kataev & Wrase 2017).

***Ophonus* (*Hesperophonus*) *convexicollis* Ménétriés, 1832**

Material examined: One male specimen was cap-

Fig. 8. Collecting site south-west of the town of Balchik: general view of the habitat, where the rare species *Laemostenus euxinicus* Nitzu and *Harpalus taciturnus* Dejean were captured. Photo: T. Ljubomirov.

Fig. 9. Collecting site at the Zlatiya Plateau: general view of the habitat, where *Ophonus convexicollis* Ménétriés was captured. Photo: N. Kodzhabashev.

tured in the period March – July 2008 with a pitfall trap in an open steppe-like loess habitat near the Shishmanov Val Reservoir, at about 100 m a.s.l., N 43°44'27'', E 23°36'53'', leg. N. Kodzhabashev.

World distribution: With Turanian-East Mediterranean range. It is typical for the steppe zones in Ukraine (including Crimea), south Russia and north-eastern Azerbaijan (Petrusenko & Petrusenko 1968, Rybka 2007, Abdurakhmanov & Klicheva 2010a; Abdurakhmanov & Klicheva 2010b, Klicheva et al. 2010). It occurs also in the steppe and semidesert zones of Middle Asia (Kataev et al. 2003). According to Kataev & Wrase (2017), its distributional range includes Europe (Azerbaijan, Armenia, Bulgaria, Georgia, Moldavia, South European territory of Russia, Ukraine) and part of Asia (Iran, Kyrgyzstan, Kazakhstan, Syria, Turkmenistan, Turkey, Uzbekistan). *Distribution in Bulgaria:* According to Kataev et al. (2003) and Kataev & Wrase (2017), *O. convexicollis* is present in Bulgaria. The first and only reliable reference about its presence in Bulgaria was given by Wrase (2005) with location near the village of General Toshevo, in the Eastern Danube River Plain (1♀, collected in 1987). The present study provides the second exact data about the distribution of *O. convexicollis* in Bulgaria.

Fig. 10. Collecting site near the village of Potochnitsa, Eastern Rhodopes: general view of the habitat, where *Licinus graecus* Apfelbeck was captured. Photo: N. Kodzhabashev

Altitude: about 100 and 230 m a.s.l.

Habitat: Mixophytophagous stratohortobiont (Klicheva et al. 2010). It is considered xerophilous and was found in Submediterranean habitats in Yalta Mountain-forest Nature Reserve (Rybka 2008) and in the region of the Southern coast of Crimea (Rybka 2007). The locality near Shishmanov Val Reservoir is situated on a hilly loess base and represents an abandoned pasture (Fig. 9). At the time of the study, there was a grassy xeromesotrophic phytocoenosis with a pronounced gradient of moisture from the shores of the reservoir to the hill.

Status: No data.

Tribe Licinini Bonelli, 1810

***Licinus* (*Licinus*) *graecus* Apfelbeck, 1901**

Material examined: One male specimen was captured with a pitfall trap in the Eastern Rhodope Mts., near the Potochnitsa Village, 395 m a.s.l., N 41°35'52'', E 25°38'32'', in the period November 2005 – April 2006, leg. N. Kodzhabashev.

World distribution: Balkan endemic, distributed in Albania, Bulgaria and Greece (Huber & Marggi 2017). *Distribution in Bulgaria:* Firstly reported for Bulgaria from the region of Eastern Stara Planina Mts. (Sliven) and Eastern Rhodope Mts. (Dzhanka Village) by Guéorguiev (2011). Altitude: about 200 – 350 m a.s.l.

Habitat: We found it in small rocky gorge covered superficially by limestone, on a slope facing north. At the border between dry oak forest and stony xeromorphic habitat of sparse shrubs and grasses, dominated by lilac (*Syringa vulgaris* L.) (Fig. 10). Habitat with higher vegetation diversity, relatively constant environmental conditions and moderate productivity.

Status: Balkan endemic of local Mediterranean origin. An extrazonal, thermophilic and xerophilic species.

Tribe Platynini Bonelli, 1810

***Platynus scrobiculatus purkynei* Obenberger, 1917**

Material examined: One female specimen was captured in the Eastern Rhodope Mts., near the town of

Madzharovo, along the valley of the Arda River, 328 m a.s.l., N 41°36'50'', E 25°52'40'', in the period June – August 2006, leg. N. Kodzhabashev.

World distribution: East Balkan subendemic subspecies, distributed in Bulgaria, Greece and Turkey (Schmidt 2017). *Distribution in Bulgaria:* Western and Eastern Rhodope Mts. (Guéorguiev & Muilwijk 2001, Guéorguiev 2004, Guéorguiev & Lobo 2006). Altitude: 700 – 2000 m a.s.l.

Habitat: Mesophilous forests and subalpine habitats. It was found in old black pine (*Pinus nigra* Arn.) forest and in a rock niche in the Western Rhodopes (Guéorguiev & Lobo 2006). In Romania, the species was found in a beech forest (Kutasi & Szel 2016). In the Western Balkans, it was recorded in a mixed Dinaric beech-fir forest (Pospišil 2016), as well in *Chrysanthemo macrophylli-Aceretum pseudoplatani*, *Festuco drymeiae-Abietetum* and *Blechno-Abietetum* forest types in Mount Medvednica in Croatia (Jelaska & Durbešič 2009). Usual under foliage near shady, particularly stony forest waters (Lompe 2017). Occasionally as a trogloxene (Nitzu et al. 2011). The new locality represents a very old mixed mesophilous deciduous forest with rather old Turkish hazel trees (*Corylus colurna* L.).

Status: A rare subspecies, which on the Balkans lives only in the Rhodope Mts. Regional endemic, restricted to mountain habitats. Species of a world, or at least, of European conservation importance with sparse populations and limited location (Guéorguiev 2004). Local and rare montane species (Lompe 2017).

Note: *Platynus scrobiculatus purkynei* is a subendemic with a disjunctive range, as its greatest known population is in the Rhodope Mts. (Guéorguiev 2004).

Tribe Sphodrini Laporte, 1834

***Laemostenus* (*Pristonychus*) *euxinicus* Nitzu, 1998**

Material examined: One female specimen was collected with a pitfall trap along the Northern Bulgarian Black Sea coast, SW Balchik, 218 m a.s.l., N 43°23'49'', E 28°06'06'', 10.V–11.VI.2018, leg. T. Ljubomirov.

World distribution: Described from Southern Romanian Dobrudzha (Mangalia District) (Nitzu 1998). Distributed in Romania (Casale 2017) and Bulgaria (Chehlarov et al. 2016). *Distribution in Bulgaria:* Northern Bulgarian Black Sea coast. So far, *L. euxinucus* is found only west of Balgarevo Village. (Chehlarov et al. 2016). The finding near Balchik is the second certain report for it from Bulgaria. Altitude: 90 and 218 m a.s.l.

Habitat: Superficial subterranean environment – cleitric mesovoid shallow substratum from the karst area in Dobrogea (Nitzu et al. 2010). Semi-steppe habitat, limestone terrain (Chehlarov et al. 2016). Our finding was on a steep rocky slope facing west (Fig. 8).

Status: Balkan regional endemic (Southern Dobrudzha, both in Romania and Bulgaria).

Notes: Initially, *L. euxinicus* was captured in a microcave excavated in lumashelic and oolitic limestone at 6 m deep. In these conditions, many arboreal species primarily adapted at moist habitats, could survive only in the physical refuge offered by the dense net of cracks from limestone (Nitzu 1998).

Discussion

The present study contains data on 12 carabid species, which are either new fauna of this country or rare in Bulgaria. We report the first record of *Amblystomus rectangulus* Reitter, 1883 in Bulgaria. The first detailed record from Bulgaria of *Leistus piceus* Frölich, 1799 is presented; it has been mentioned for the country by Krusteva et al. (1995) but without mentioning the exact locality. Details are also presented about the locality of *Anthracus insignis* Reitter, 1884 in Bulgaria. The following three species are reported for the second time from the country, thus confirming their occurrence in Bulgaria: *Acupalpus dubius* Schilsky, 1888, *Laemostenus euxinicus* Nitzu, 1998 and *Licinus graecus* Apfelbeck, 1901. *Ophonus convexicollis* Ménétriés, 1832 is recorded by presenting its second precise locality from Bulgaria. Other rare species in the country are also listed with new localities: *Bembidion nigropiceum* (Marsham, 1802), *B. cordicolle* Jacquelin Du Val, 1852, *B. decolor* Apfelbeck, 1911, *Harpalus taciturnus* Dejean, 1829 and *Platynus scrobiculatus purkynei* Obenberger, 1917. In summary, these are one new record for the country, two species represented by first detailed records from Bulgaria, four species reported for the second time from the country and five rare species listed with new localities.

Although the ground beetle fauna of Bulgaria is relatively well studied, there are some regions representing "white spots" in relation to the knowledge about their carabid species composition and community structure. The more complete knowledge of the diversity of this group in the country could be revealed only after carrying out further studies in these poorly-examined regions.

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References

Abdurakhmanov G. M. & Klicheva S. M. 2010a. General characteristics, specific composition and geographic distribution of ground beetles (Carabidae, Coleoptera) of the Steppe areas of Southern Russia and Northeast of Azerbaijan. The South of Russia: Ecology, Development. Geoecology 1: 53–62. (In Russian).

Abdurakhmanov G. M. & Klicheva S. M. 2010b. Zoogeographical characteristics of Coleoptera, Carabidae of the Steppe areas of the Southeast of Russia and Northeast of Azerbaijan. The South of Russia: Ecology, Development. Geoecology 1: 63–75. (In Russian).

Anderson R., Nash R. & O'Connor J. P. 2005. Checklist of Irish Coleoptera. Invertebrate Ireland Online, Ulster Museum, Belfast and National Museum of Ireland, Dublin. http://www.habitas.org.uk/ groundbeetles/species.asp?item=7435.

Casale A. 2017. Sphodrina. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 773–790.

Chehlarov E., Guéorguiev B., Hristovski S., Fancello L., Cvetkovska-Gorgievska A. & Prelić D. 2016. New country records and rare and interesting species of Coleoptera from the Balkan Peninsula. Acta Zoologica Bulgarica 68 (3): 331–338.

Davidson R. L. & Rykken J. 2011. Rediscovery of *Bembidion (Lymnaeum) nigropiceum* (Marsham) (= *puritanum* Hayward) in Massachusetts, with remarks on biology and habitat (Coleoptera, Carabidae, Bembidiini). In: Erwin T. (Ed): Proceedings of a symposium honoring the careers of Ross and Joyce Bell and their contributions to scientific work. Burlington, Vermont, 12–15 June 2010. ZooKeys 147: 487–496.

Davidson R. L., Rykken J. & Farrell B. 2011. Carabid beetle diversity and distribution in Boston Harbor Islands national park area (Coleoptera, Carabidae). In: Erwin T. (Ed.): Proceedings of a symposium honoring the careers of Ross and Joyce Bell and their contributions to scientific work. Burlington, Vermont, 12–15 June 2010. ZooKeys 147: 497–526.

Degiovanni A. 2015. I Coleotteri Carabidi del Fondo Maglio (Bubano, Bologna) (Insecta Coleoptera Carabidae). Quaderno di Studi e Notizie di Storia Naturale della Romagna 42: 49–61.

Desender K. 2005. A wingless intertidal ground beetle, new to the Belgian fauna, in the river IJzer estuary nature restoration site: *Bembidion nigropiceum* Marsham, 1802. Belgian Journal of Zoology 135 (1): 95–96.

Farkač J. 2017. *Leistus*. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 33–41.

Gotlin Čuljak T., Büchs W., Prescher S., Schmidt L., Sivčev I. & Juran I. 2016. Ground beetle diversity (Coleoptera: Carabidae) in winter oilseed rape and winter wheat fields in North-Western Croatia. Agriculturae Conspectus Scientificus 81 (1): 21–26.

Guéorguiev B. V. 2004. Adephagous beetles and some staphyliniform beetles (Insecta: Coleoptera) in the Eastern Rhodopes (Bulgaria and Greece). In: Beron P. & Popov A. (Eds.): Biodiversity of Bulgaria. 2. Biodiversity of Eastern Rhodopes (Bulgaria and Greece). Sofia: Pensoft & Nat. Mus. Natur. Hist. pp. 379–411.

Guéorguiev B. V. 2011. New and interesting records of carabid beetles from South-East Europe, South-West and Central Asia, with taxonomic notes on Pterostichini and Zabrini (Coleoptera, Carabidae). Linzer Biologische Beiträge 43 (1): 501–547.

Guéorguiev B. V. & Lobo J. M. 2006. Adephagous beetles (Insecta: Coleoptera: Adephaga) in the Western Rhodopes (Bulgaria and Greece). In: Beron P. (Ed.): Biodiversity of Bulgaria. 3. Biodiversity of Western Rhodopes (Bulgaria and Greece) I. Sofia: Pensoft & Nat. Mus. Natur. Hist., pp. 283–346.

Guéorguiev V. & Guéorguiev B. 1995. Catalogue of the ground-beetles of Bulgaria (Coleoptera: Carabidae). Sofia-Moscow: Pensoft Publishers, Series Faunistica No 2, 279 p.

Guéorguiev B. V. & Muilwijk J. 2001. Contribution to the Bulgarian ground-beetles fauna (Coleoptera: Carabidae). II. Historia Naturalis Bulgarica 13: 111–122.

Hieke F. & Wrase W. 1988. Faunistik der Laufkäfer Bulgariens (Coleoptera, Carabidae). Deutsche Entomologische Zeitschrift, N. F. 35 (1-3): 1–171.

Huber C. & Marggi W. 2017. Licinini. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 621–577.

Jaeger B. & Kataev B. M. 2017. Stenolophina. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 562–631.

Jaeger B., Kataev B. M. & Wrase D. W. 2016 New synonyms, and first and interesting records of certain species of the subtribe Stenolophina from the Palaearctic, Oriental and Afrotropical regions (Coleoptera, Carabidae, Harpalini, Stenolophina). Linzer Biologische Beiträge 48 (2): 1255–1294.

Jelaska L. & Durbešič P. 2009. Comparison of the body size and wing form of carabid species (Coleoptera: Carabidae) between isolated and continuous forest habitats. Annales de la Société entomologique de France (n.s.) 4 5(3): 327–338.

Jocqué M., Teofilova T. & Kodzhabashev N. 2016. Light trapping as a valuable rapid assessment method for ground beetles (Carabidae) in a Bulgarian wetland. Acta Zoologica Bulgarica 68 (4): 529–534.

Kataev B. M. 2018. *Leistus piceus* Frölich, 1799. In: Geltman D. V. (Ed.) et al.: Red Data Book of St. Petersburg (568 p.). St. Petersburg: Diton, p. 341. (In Russian).

Kataev B. M., Wrase D. W. & Ito N. 2003. Harpalina. In: Löbl L. & Smetana A. (Eds.): Catalogue of Palaearctic Coleoptera. Volume 1. Archostemata – Myxophaga – Adephaga. Stenstrup: Apollo Books, pp. 367–397.

Kataev B. M. & Wrase D. W. 2017. Harpalina. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 515–562.

Klicheva S. M., Nahibasheva G. M., Elderhanova Z. M. & Magomedova S. T. 2010. Analysis of the life forms of the imago of carabids from the steppe regions of South Russia and North-East Azerbaijan. The South of Russia: Ecology,

Development. Ecology of Animals 2: 92–102. (In Russian).

Krusteva I., Popov V. & Sakalian V. 1995. Indirect gradient analysis of carabid (Coleoptera, Carabidae) spatial pattern on Vitosha Mountain (West Bulgaria). Proceedings of the Third National Scientific Entomology Conference, 18-20. IX.1995, Sofia, pp. 55–59.

Kutasi C. & Szél G. 2016. Ground beetles from Salaj County (Romania) (Coleoptera: Carabidae). Studia Universitatis "Vasile Goldis", Seria Stiintele Vietii, Vol. 26, supplement 1, pp. 81–107.

Lindroth C. H. 1986. The Carabidae (Coleoptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica. Volume 15, Part II. Leiden: Scandinavian Science Press, Ltd., 274 p.

Löbl I. & Löbl D. (Eds.) 2017. Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, 1443 p.

Lompe A. 2017. Käfer Europas. Gattung *Platynus* Bonelli, 1810 (http://coleonet.de/coleo/texte/platynus.htm).

Maddison D. R. & Maruyama M. 2019. Phylogenetic relationships and convergent evolution of ocean-shore ground beetles (Coleoptera: Carabidae: Trechinae: Bembidion and relatives). Systematic Entomology 44: 39–60.

Marggi W., Toledano L. & Neri P. 2017. Bembidiina. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 294–342.

Muche W. H. 1965. Carabidae von Nessebar (Bulgarien). Entomologische Abhandlungen Staatliches Museum für Tierkunde Dresden 31 (1): 72–78.

Neri P. & Magrini P. 2010. Note concernenti i *Bembidion appartenenti* al sottogenere *Lymnaeum* Stephens, 1828 (Insecta Coleoptera Carabidae). Quaderno di Studi e Notizie di Storia Naturale della Romagna 31: 135–154.

Neri P. & Toledano L. 2018. *Bembidion (Peryphus) tricuspis* n. sp. from Iran (Coleoptera, Carabidae, Bembidiini). Entomologische Blätter und Coleoptera 114: 309–312.

Nitzu E. 1998. *Laemostenus (Pristonychus) euxinicus* n. sp. (Coleoptera: Carabidae) in the subterranean habitat from Southern Dobrogea, Romania. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 40: 337–346.

Nitzu E., Nae A., Giurginca A. & Popa I. 2010 Invertebrate communities from the mesovoid shallow substratum of the Carpatho-Euxinic area: eco-faunistic and zoogeographic analysis. Travaux de l'Institut de Spéologie "Emile Racovitza", Bucarest 49: 41–79.

Nitzu E., Popa I., Giurginca A. 2011. Invertebrate fauna (Coleoptera, Collembola, Diplopoda, Isopoda) collected in the karst areas of the Aninei – Locvei Mountains. Travaux de l'Institut de Spéologie "Emile Racovitza", Bucarest L: 15−35.

Olberg S. 2008. *Acupalpus dubius* Schilsky, 1888 (Carabidae, Coleoptera) in Norway. Norwegian Journal of Entomology 55 (1): 86.

Petrusenko A. A. & Petrusenko S. V. 1968. The Mediterranean elements in the Carabidae (Coleoptera) fauna of the Ukraine. Vestnik Zoologii 6: 49–52. (In Russian).

Pospišil M. 2016. Forest edge and carabid beetle diversity (Coloptera, Carabidae) in a Dinaric beech-fir forest. Graduation thesis. University of Zagreb, Faculty of Science, 50 p.

Rybka T. C. 2007. Peculiarities of entomocomplex forming in montane-forest ecosystems in the SW region of the southern coast of the Crimea. Uchenye zapiski Tavricheskogo nacional'nogo universiteta im. V.I. Vernadskogo. Serija "*Biologija*, himija" 20 (59): 74–81. (In Russian).

Rybka T. S. 2008. Peculiarities of entomocomplex forming in ecosystems of Yalta mountain-forest Nature Reserve. Visnyk of Dnipropetrovsk University. Biology. Ecology 16 (2): 141–146.

Sivčev L. I., Büchs B. G., Prescher S., Graora D. Đ., Ćurčić S. B., Sivčev I. L., Schmidt L., Tomić V. T., Dudić B. D. & Gotlin-Čuljak T. 2014 Contribution to the knowledge of the ground beetle fauna from Serbia (Coleoptera: Carabidae). Acta Entomologica Serbica 19 (1/2): 13–23.

Sivčev L., Sivčev I., Graora D., Tomić V. & Dudić B. 2018. Ground beetle assemblages affected by oilseed rape management practice. Acta Zoologica Bulgarica 70 (3): 367–376.

Schmidt J. 2017. Platynini. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 642–675.

Tallósi B. 2008. Population-level baseline surveying and preparative investigations for the monitoring of carabid beetles (Coleoptera, Carabidae) in areas along the Drava river and in Baranja (Croatia). In: Purger J. J. (Ed.): Biodiversity studies along the Drava River. Hungary: University of Pécs, pp. 165–220.

Teofilova T.M. 2019. Ground beetles (Coleoptera: Carabidae) from sparsely vegetated lands in Bulgaria. North-Western Journal of Zoology 15 (1): 30–41.

Teofilova T. 2017. Ground beetles (Coleoptera: Carabidae) and some other invertebrates from the managed nature reserves "Dolna Topchiya" and "Balabana" (Lower valley of the river of Tundzha, Bulgaria). Ecologia Balkanica 9 (1): 63–77.

Teofilova T. M. & Guéorguiev B.V. (in prep.): Updated annotated checklist of the Bulgarian ground beetles (Coleoptera: Carabidae).

Toledano L. & Rébl K. 2006. A new species of *Bembidion* Latreille from Nemrut Da, Turkey (Coleoptera: Carabidae). Koleopterologische Rundschau 76: 7–13.

Vasilev I. & Necheva V. 1985. Investigation on the carabid's fauna (Carabidae, Coleoptera) from Bulgaria. Annuaire de l'Universite de Sofia "St. Kliment Ohridski", Faculte de Biologie 79 (1): 49–52. (In Bulgarian, English summary).

Wrase D. W. 2005. Nomenclatorial, taxonomic and faunistic notes on some Palaearctic genera and species of ground-beetles (Coleoptera, Carabidae: Apotomini, Chlaeniini, Cyclosomini, Harpalini, Lebiini, Licinini, Platynini, Siagonini, Sphodrini). Linzer biologische Beiträge 37 (1): 815–874.

Wrase D. W. 2017. Amblystomina. In: Löbl I. & Löbl D. (Eds.): Catalogue of Palaearctic Coleoptera. Archostemata – Myxophaga – Adephaga. Vol. 1. Revised and Updated Edition. Leiden: Koninklijke Brill NV, pp. 502–503.

Wrase D. W. & Magrini P. 2012. Taxonomic Revision of the Mediterranean species of genus *Amblystomus* Erichson, 1837, with description of a new species (Coleoptera, Carabidae, Harpalini, Amblystomina). Estratto dagli Annali del Museo Civico di Storia Naturale "G. Doria", Genova 104: 1–77.

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