



***Carabus (Tomocarabus) bessarabicus tangra* (Coleoptera: Carabidae): a New Subspecies from the Karst Steppe Refugia of the Chepan Planina and Tri Ushi Mountains in Central-Western Bulgaria**

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Abstract: Ground beetle (Coleoptera: Carabidae) fauna of Bulgaria is relatively well studied, but recent research showed that there are still some unknown distributional patterns or new taxonomical issues to be faced and resolved. In this paper we describe and figure a new subspecies of the rare and protected steppe ground beetle *Carabus (Tomocarabus) bessarabicus* Fischer von Waldheim, 1823, named *tangra*. *Carabus bessarabicus tangra* subsp. n. was collected from the Chepan Planina and Tri Ushi Mountains in Bulgaria, where some preserved steppe refugia and peculiar faunistic complexes seem to exist. The established new steppe stenobiont subspecies is significantly distant and isolated from the modern limits of the species range by more than 1000 km. The significant morphological differences and the range of *C. bessarabicus tangra* suggest that its potential separation as species is very probable and should be confirmed with genetic studies.

Key words: Bulgaria, *Carabus*, ground beetles, new taxon, steppe fauna, taxonomy

Introduction

Ground beetles (Carabidae) represent one of the much studied and widespread families of coleopterans, which specialists around the world have successfully used as a model to demonstrate zoo-geographic, phylogenetic, faunistic and ecological

patterns. Beetles of the genus *Carabus* Linnaeus, 1758, in particular, are of especial interest, often being subjected to various research, conservational actions or used as collection objects. Many species fall under different kinds of legislative protection.

Carabus (Tomocarabus) bessarabicus Fischer von Waldheim, 1823 is a critically endangered spe-

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cies that has a conservation status of European importance. It is included in Annex II of the Bern Convention as “strictly protected”. The species is a rare, typical steppe stenobiont found only in natural and specific steppe habitats of Eastern Europe and Central Asia, threatened and supplanted by agricultural methods, such as ploughing (see Kryzhanovskij 1953, Turin et al. 2003, Puchkov 2009, Tilli & Goreslaccets 2009, Sazhnev 2020, Teofilova & Kodzhabashev 2022). In the mountains it reaches up to 1000 m a.s.l. (Turin et al. 2003). According to Pushkin (2015), *C. bessarabicus* is a bothrobiont, active between April and September and prefers dry steppe gullies. It is a black, unicolourous shiny beetle, 21–25 mm long, with convex stout body and short, obtuse and rounded hind angles of the pronotum. Its elytral sculpture consists of more or less regular rows of small grains (e.g. Kryzhanovskij 1953, Turin et al. 2003).

Carabus bessarabicus occurs in Ukraine, Lower Volga, North Caucasus, SW Siberia, Kazakhstan. It was described from Moldova (Bendery) but the species is probably extinct there (Turin et al. 2003, Baban 2015). Two subspecies are known: *bessarabicus* Fischer von Waldheim, 1823 and *concretus* Fischer von Waldheim, 1823. Subspecies *bessarabicus* has oval elytra with coarser sculpture, with distinct primary foveae. It lives in the steppes of Ukraine, including the Crimea. It is considered extinct from the bigger part of its areal of its former distribution, incl. Moldova (Turin et al. 2003, Březina et al. 2017). Subspecies *concretus* has more elongate elytra with more delicate sculpture, with primary foveae often hardly visible. It lives in Russia (Central European Territory and Southern European Territory) and N Caucasus, Lower Volga, SW Siberia, Kazakhstan (Turin et al. 2003, Březina et al. 2017). Throughout its vast range the species is a stenotopic inhabitant of primary steppes and is considered a threatened and extinct species in many localities. This is one of the very few typical and pure steppe species in Europe.

The species was just recently reported for the first time in Bulgaria and it was stated that there are “all reasons to suggest that in Bulgaria *C. bessarabicus* is represented by different, undescribed subspecies” (Teofilova & Kodzhabashev 2022). Now we have more material and we may claim the separation of the Bulgarian taxon.

Materials and Methods

The main part of the field work was conducted during the period between 25 May 2021 and 10 December 2023, in parallel with a research on the protected species *Carabus (Pachystus) hungaricus* Fabricius,

1792. Pitfall traps were set at three sampling sites (6 traps at each site). They were made out of cut 2-L plastic bottles, buried at the level of the ground surface and filled with 8% formaldehyde.

Initially, one sampling site was set near the top of the Chepan Planina Mt. – under and south of the highest point, Petrov Krast Peak (1206 m a.s.l.). The sampling site represented a dry stony slope with low grasses, European dwarf cherry (*Prunus fruticosa* Pall.), dwarf almond (*Prunus tenella* Batsch = *Amygdalus nana* L.) and scattered lilac (*Syringa vulgaris* L.) tussocks. The first specimen of *C. bessarabicus* was collected in April 2022 in a pitfall trap at this sampling site (Site I); later, in October, a pair of elytra was collected under a stone in a similar habitat, south-west of the Petrov Krast Peak (Teofilova & Kodzhabashev 2022).

In 2023, another sampling site was set in the Chepan Planina, but at a lower altitude (Site II). The habitat was very similar: dry stony slope with scattered lilac and manna-ash (*Fraxinus ornus* L.) bushes and single short black pine (*Pinus nigra* J.F. Arnold) trees. The third sampling site, set in 2022, was located in the Tri Ushi Mt., within a territory with restricted access. It represents a beautiful stony steppe with lots of dwarf almond, lilac, thyme, savory and steppe grasses (Site III). In June 2023, another sampling was conducted by the second author (IR) using glass bottles filled to about 1/10 of their capacity with beer with 10% sucrose. The fourth site (Site IV) was located in the Chepan Planina at 950 – 1050 m a.s.l. in the same environment as site II. The details about the sampling sites (location, sampling periods) and the number of specimens collected in them are given in Table 1. Sites are also presented on Figure 1.

The identification at the subgenus and species level was according to Kryzhanovskij (1953, 1983) and Turin et al. (2003).

The initially collected specimens were pinned or preserved in ethanol and deposited in the collection of the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences (IBER – BAS), Sofia, upgraded in the frames of the project DiSSCo-BG (Distributed System of Scientific Collections–Bulgaria) funded by the National Roadmap for Research Infrastructures, Ministry of Education and Science of the Republic of Bulgaria and supported by the project “MCCATF” (funded by the National Science Fund of Bulgaria under Grant contract number KII-06-H61/6–14.12.2022). All specimens collected by IR were pinned and deposited in the collection of IR, with the exception of one male specimen used as a holotype and now deposited in Sofia in the collection of TT, while one

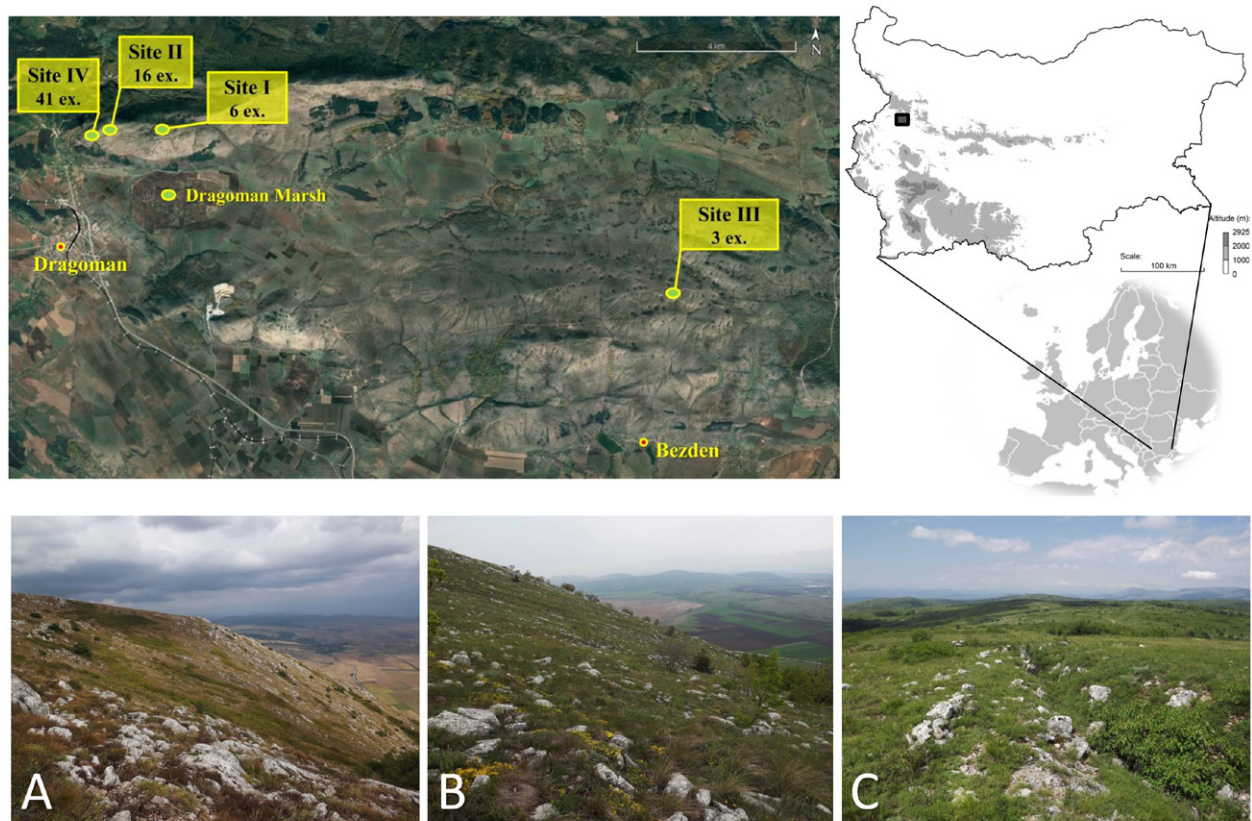


Fig. 1. Location and view of the sampling sites where *Carabus bessarabicus tangra* was collected. A. View from the top of the Chepan Planina (Site I); B: Site II (habitat in Site IV is similar); C: Site III at the Tri Ushi Mt. The satellite picture of the study area was generated with the help of the Google Earth software (Google ©2024 CNES/Airbus).

Table 1. Sampling sites and periods and number of specimens collected.

Site	Region	Location	Coordinates	Average altitude (m a.s.l.)	Periods of sampling	Ex.
I	Chepan Planina Mt. (high)	NE Dragoman	42°56'49"N 22°57'34"E	1180	25.V–15.VIII.2021 15.VIII–20.XI.2021 20.XI.2021–16.IV.2022 16.IV–22.VIII.2022 22.VIII–19.XI.2022 19.XI.2022–13.III.2023 13.III–15.V.2023 15.V–18.VII.2023 18.VII–9.IX.2023 9.IX–10.XII.2023	- - 1♀ - 2♂ - 2♂ - - 1♀
II	Chepan Planina Mt. (low)	NE Dragoman	42°56'47"N 22°56'24"E	1013	13.III–15.V.2023 15.V–18.VII.2023 18.VII–9.IX.2023 9.IX–10.XII.2023	4♀3♂ 5♀2♂ - 1♀1♂
III	Tri Ushi Mt.	N Bezden vill.	42°54'49"N 23°06'52"E	925	14.VI–22.VIII.2022 22.VIII–19.XI.2022 19.XI.2022–10.III.2023 10.III–15.V.2023 15.V–17.VII.2023 17.VII–10.IX.2023 10.IX–9.XII.2023	- 1♂ - 1♀ - 1♂ -
IV	Chepan Mt. (low)	NE Dragoman	42°56'N 22°56'E	1000	5.VI–10.VI.2023	25♀16♂

pair was preserved in the collection of the Museum of Natural History in Geneva.

Abbreviations:

(cIR) collection of Ivan Rapuzzi, Prepotto, Italy
(cMNHG) collection of the Museum of Natural History Geneva, Switzerland
(cTT) collection of Teodora Teofilova, IBER – BAS, Sofia, Bulgaria

The study was based on a total of 68 specimens, of which two represented only body parts and were not included into the morphometric analysis. All whole beetles (38 females and 28 males) were measured, as main morphological characteristics were taken (Fig. 2): LP – length of the pronotum (at the middle), WP – width of the pronotum (at the widest part), LE – length of the elytra (at the suture, from the base of the scutellum to the elytral tip), WE – width of the elytra (at the widest part), LT – total body length.

Results

This study represents a description of one new taxon from the genus *Carabus*, found for the first time in Bulgaria. The new *Carabus* was initially reported for the country in 2022, as *Carabus (Tomocarabus) bessarabicus*, without mentioning of a certain subspecies, but with the notion that most likely that Bulgarian specimens belonged to an entirely separate subspecies (Teofilova & Kodzhabashev 2022). This finding is also the first record of the protected, rare and stenotopic species *C. bessarabicus* in the whole European Union.

Systematics

Tribe: Carabini Latreille, 1802

Genus *Carabus* Linnaeus, 1758

Subgenus *Tomocarabus* Reitter, 1896

Species: *Carabus (Tomocarabus) bessarabicus* Fischer von Waldheim, 1823

Synonyms: *tauricus* Roeschke, 1897 [of ssp. *bessarabicus*]; *melambaphus* Fischer von Waldheim, 1832, *platyscelis* Fischer von Waldheim, 1828, *steppensis* Motschulsky, 1844 [of ssp. *concretus*].

Subspecies: *Carabus (Tomocarabus) bessarabicus tangra* ssp. n.

Etymology

The name of the new subspecies comes directly from the name of the supreme god Tangra, worshipped in the old Proto-Bulgarian, Turkic, Hunnic, Mongolian and Altaic religions, spread in territories covered by the distributional range of the species *C.*

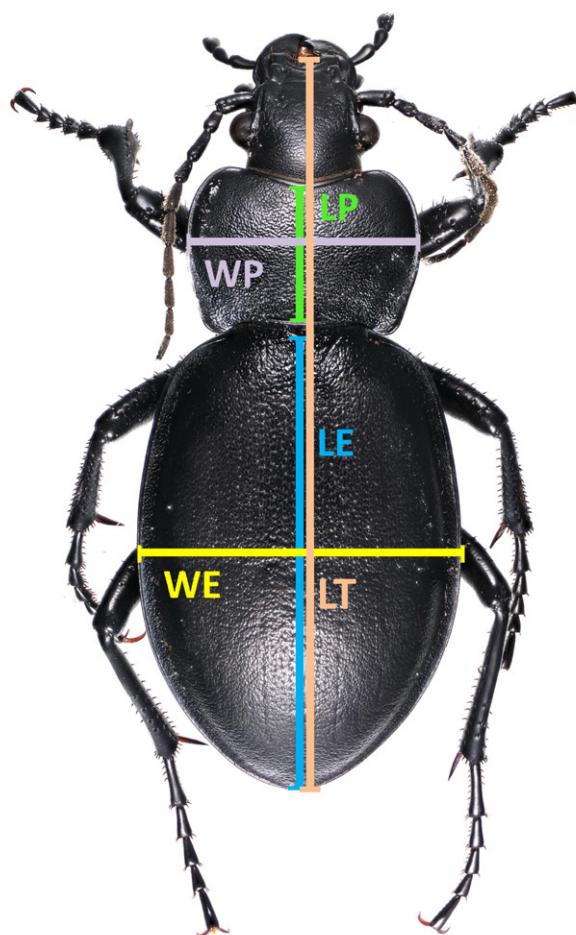


Fig. 2. Main body size measurements (on the first female collected near the top of the Chepan Planina Mt., source: Teofilova & Kodzhabashev 2022): LP – length of the pronotum, WP – width of the pronotum, LE – length of the elytra, WE – width of the elytra, LT – total body length.

bessarabicus.

Type locality

Bulgaria, Chepan Planina Mountain.

Distribution

So far, the new taxon is known from the montane steppes situated in Central-Western Bulgaria, near (north of) the Sofia Basin.

Examined (type) material

Holotype male: Bulgaria, Sofia Province, Dragoman Municipality, Chepan Planina Mountain, 1010 m a.s.l. (Site IV), VI.2023, I. Rapuzzi & L. Caldon leg. The holotype (Fig. 5C) is housed in the Institute of Biodiversity and Ecosystem Research, Sofia (cTT).

Paratypes:

2♀, 4♂: Bulgaria, Sofia Province, Dragoman Municipality, Site I, 20.XI.2021–10.XII.2023, T. Teofilova & N. Kodzhabashev leg. (cTT);

10♀, 6♂: Bulgaria, Sofia Province, Dragoman Municipality, Site II, 13.III.2023–10.XII.2023, TT & NK leg. (cTT); 1 pair of elytra: Site II, 16.X.2022, TT leg. (cTT);

1♀, 2♂: Bulgaria, Sofia Province, Kostinbrod Municipality, Site III, 22.VIII.2022–9.XII.2023, TT & NK leg. (cTT);

25♀, 15♂: same data as Holotype; 1 elytra female: same data as Holotype except 29.V.2023 preserved in cIR and cMNHG.

All specimens were measured for a morphometric analysis of the main body size measurements (Fig. 2). The results of the measures are given in Table 2.

Additional material

In order to properly compare our material with the other two subspecies, we also examined specimens from other parts of the species range.

Carabus bessarabicus bessarabicus Fischer, 1823:

1♂, 1♀: Ukraine, Kherson reg., Golaya Pristan Distr., near Rybaltche Vill., in sands steppe, 2–6.IV.2000, S. N. Vashchenko leg. (cIR);

1♂, 1♀: Ukraine, Kherson, Rybalche Vill., 25.IV.1997 (cIR);

1♂: Ukraine, Lugansk Region, Sverdlovsk Distr., Provalskaya Steppe, 01.VI.2011, S. Glotov leg. (cIR);

1♂: Crimea, Feodosija Distr., Ordzhonikidze Vic., 22.V.2009 (cIR);

17♂, 35♀: Crimea, Feodosija Distr., Ordzhonikidze Vic., Dzhankutaran Mt., 10–19.III.2013, V. Savchuk leg. (cIR);

50♂, 38♀: same locality, 31.III–4.IV.2013, V. Savchuk leg. (cIR);

20♂, 28♀: same locality, 4–10.IV.2013, V. Savchuk leg. (cIR);

19♂, 23♀: Crimea, Feodosija Distr., Ordzhonikidze Vic., Bijuk-Janyshar Ridge, 20–30.III.2015, V. Savchuk leg. (cIR).

Carabus bessarabicus concretus Fischer, 1824:

3♂: Russia, N Caucasus, N Ossetia, Alagir

Env., 20.IV.1990, S. Alexeev leg. (cIR);

1♂, 1♀: Russia, N Caucasus, N Ossetia, Alagir env., 20.IV.1990 (cIR);

1♀: USSR, Ossetien, Kazbegi, 2000 m a.s.l., 6.87, leg. Rous (cIR);

1♀: Russia, SE part, Saratov Reg., Saratov Distr., vic. of Alexandrovka, 11.V.2016, Belik A. G. leg. (cIR);

1♀: Russia, same locality, 7.VI.2017, Belik A. G. leg. (cIR);

1♂, 2♀: Russia, Orenburg Prov., Yashi Distr., Verkhniy Kiembai Env., 325 m a.s.l., 50°54'N – 59°54'E, 1–2.V.2008, A. Shapovalov leg. (cIR);

1♂: Russia, Volgograd Region, Gorodinsky District, VI.2023, Brezov leg. (cIR);

1♂: Kazakhstan, Karaganda region, 30 km SE Zhana-Arna, 2.V.1958 (cIR);

2♂, 2♀: West Kazakhstan, Unege Env., 30.IV.2018, A. Abramov leg. (cIR);

1♂, 1♀: USSR, Kazakhstan, “Dzanybek” (Zhanybek), IX.1983 (cIR);

1♂, 1♀: West Kazakhstan, Aktobe Prov., Mugalzharsk Distr., 20 Km NE from Emba settlement, 275 m a.s.l., 48°55'N 58°18'E, 21–22.IV.2013, A. V. Ivanov leg. (cIR);

1♂: Russie Orient., Chaudoir (cMNHG);

1♀: no data (cMNHG).

Description

Carabus (Tomocarabus) bessarabicus tangra ssp. n. is a medium-sized (19 – 26 mm) representative of the genus *Carabus*. Length of the holotype male 24.7 mm; maximum width of elytra 9.2 mm. Body oval and uniformly black. Upper side quite shiny, but with no metallic sheen. Legs, antennae and palpi black (Fig. 5).

Head of medium size, with big and very protruding eyes; frons and vertex quite convex, surface punctured, wrinkled behind the eyes. Clypeus with a lateral seta, smooth surface; clypeo-frontal sulcus weakly and partially incised. Labrum wide, bilobate, transversally with a very deep excision, almost as wide as the clypeus, with 8 – 16 apical setiferous

Table 2. Main body size measurements of the 66 specimens from Bulgaria: LP – length of the pronotum, WP – width of the pronotum, LE – length of the elytra, WE – width of the elytra, LT – total body length. The measures are in mm, as the first value is the average arithmetic mean, and in the brackets are given the minimum and maximum values, respectively.

Sex	No ex.	LP	WP	LE	WE	LT
♂♂	28	4,57 (4,1–5,2)	7,35 (6,7–8,2)	14,25 (13,0–15,0)	9,69 (8,8–10,7)	23,65 (19,9–25,5)
♀♀	38	4,71 (4,0–5,1)	7,70 (7,1–8,2)	15,11 (13,6–16,0)	10,64 (9,4–11,5)	25,08 (20,6–26,5)
all	66	4,64	7,52	14,68	10,17	24,36

pores. Mandibles short and strong, with a strongly curved and pointed tip just before the apex. Tooth of left mandible with two well-defined, pointed apices. Maxillary and labial palps relatively short, with strongly dilated apical segments, less expanded in females and strongly expanded, axe-like in males. Penultimate segment of labial palps with two setae: one median and one basal. Mentum tooth acute and acuminate, shorter than lateral lobes. Submentum with a lateral seta; strongly wrinkled and slightly swollen transversely. Antennae short, exceeding the base of pronotum with the 2 – 3 apical segments, barely surpass metepisterns; second and third segment incised and depressed above.

Pronotum slightly convex, very wide (1.61 times as broad as long), slightly narrowed anteriorly and posteriorly, with almost rectangular shape; sides not sinuate, regularly arched; the widest part around or just before the middle. Sides finely but fully margined and slightly bent upward. Basal lobes wide and rounded, very slightly protruding over the base of pronotum and bent weakly downwards. Disc of pronotum slightly convex. Upper surface thickly and uniformly punctured and wrinkled, less so in anterior part and more near the base; basal foveae very weak; median sulcus barely visible only in the middle. One basal seta and 1 – 2 (in one male 3 at each side) medians.

Elytra long oval (more oval in females, less oval and more elongate in males), slightly convex and jointly rounded at posterior end, with maximum width about the middle. Shape and proportions of body (mostly elytra) somewhat determine the sexual dimorphism, with males being relatively narrower and longer and females shorter and wider. Shoulders rounded, slightly prominent, lateral margin narrow. Elytral sculpture heptaploid, coarse, of insular rough tubercles, slightly risen but not aligned and therefore very confused, without distinct rows, lacking consistency of arrangement; bottom of elytra densely granular; primary foveae spaced, superficial but salient, usually noticeable to the naked eye. Metepisternum short, slightly longer than wide. Abdominal sterna with sharp, well-developed ventral furrows; VII sterna with a preapical depression strongly wrinkled transversely.

Legs of walking type (ambulatory), quite short, rather strong, with profemora in males slightly thickened. Protarsi in male with four dilated segments, with ventral pad of adhesive soles.

Aedeagus very characteristic. In lateral view (Fig. 3A, 3C), the median lobe is very wide and regularly but strongly arched, with a long and enlarged ostium; the apical lobe is slightly thinned and large-

ly rounded, large plate-shaped, with the apex massive and very broadly rounded. Distal part gradually oblique to the rounded straight and strongly flattened apex in frontal view (Fig. 3B). Endophallus was examined in three specimens (Fig. 4). It has a well-developed, longitudinally elongated osteal lobe at the base of the preputial field. It is strongly arched ventrally, without a pronounced border between basal and apical lobes. Ventrally, basal and apical lobes are barely noticeable; apical lobe with broad, hair-like chitinised field. Ventrally at the apex, the endophallus has well-developed sacellar scales, with broadly chitinised sides. Dorsally, apical and basal lobes well developed. Both dorsal lobes with regularly arranged transverse rows of chitinous denticles. Aggonoporus with well-developed and chitinised sclerites. Lacinia massive and evenly chitinised. Ligula present dorsally, at the base of endophallus.

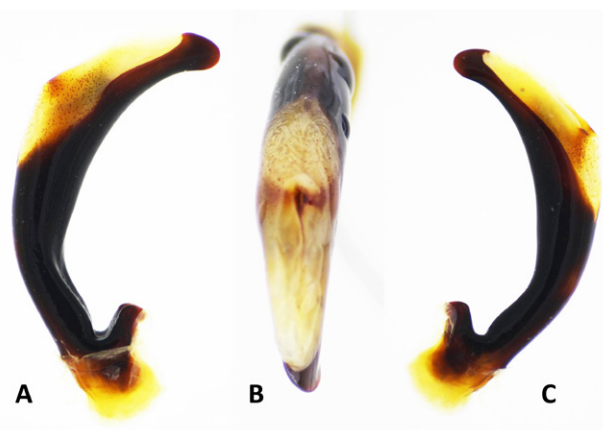


Fig. 3. Left (A), frontal (B) and right (C) position of the aedeagus of *Carabus bessarabicus tangra* n. ssp. from Site I, collected in the period 22.VIII–19.XI.2022.

Variability

The total body length of the new *C. b. tangra* varies in dimensions from 19.9 mm to 25.5 mm in males and from 20.6 mm to 26.5 mm in females. The new taxon also seems variable in elytral sculpture, as in some specimens the structure is notably coarser and primal foveae are more evident in some individuals, unlike in others with more superficial foveae.

Comparison with the related taxa

Several morphological characters distinguish the new subspecies: *C. b. tangra* n. ssp. is somewhat larger and more robust than *C. b. bessarabicus* and *C. b. concretus*; submentum is more strongly wrinkled; last abdominal sterna are with a depressed and

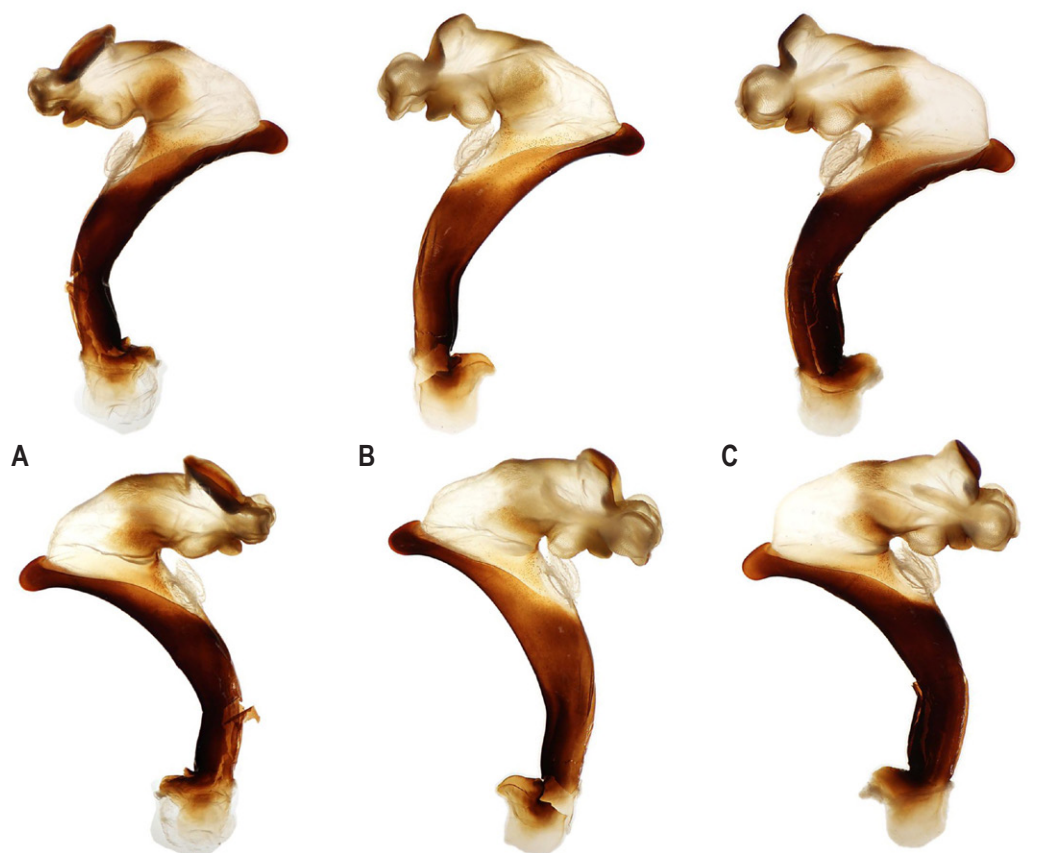


Fig. 4. Left (upper row) and right (lower row) position of the endophallus of three specimens of *Carabus bessarabicus tangra* n. ssp. (scale bar = 1 mm): A and C – from Site I, collected in the period 22.VIII–19.XI.2022; B – from Site III, collected in the period 17.VII–10.IX.2023.

more wrinkled apical area. But in particular, the shape of the aedeagus of *C. b. tangra* presents a totally different morphology (Fig. 5).

The diagnosis is given in the key below.

Key to the subspecies of *Carabus bessarabicus*:

- 1 (4) Elytral sculpture arranged, with more or less distinct regular rows of grains and striae; intervals smoother and more fine-grained. Submentum smooth or slightly wrinkled. Last abdominal sternite without preapical depression strongly wrinkled transversely. Aedeagus relatively slender and longer in profile, curved above the base, with more or less well-developed hook-shaped capitulum. In frontal view, distal lobe sinuous before the apex.
- 2 (3) Elytra short oval; their sculpture coarser, with more or less distinct rows and primary fovea. Aedeagus in profile strongly curved from the middle (almost forming a right angle), clearly enlarged at apex, with a well-defined hook-shaped capitulum. In frontal view, distal lobe gradually oblique, with abrupt, well-developed pointed apex, shifted to the left. *C. b. bessarabicus* Fisch.-W., 1823 (Fig. 5A).
- 3 (2) Elytra long oval; their sculpture smoother, with more or less distinct rows; primary fovea often hardly visible. Aedeagus in profile subrectilinear for about three quarters of its length, then strongly and sharply curved and thinned; apex forming a less developed hook. In frontal view, distal lobe strongly curved, with rounded apex, also shifted to the left. *C. b. concretus* Fisch.-W., 1823 (Fig. 5B).
- 4 (1) Elytral sculpture rough, coarse-grained, confused, without distinct lines; grains vary in size and shape. Primary fovea visible. Elytra long-oval. Submentum roughly wrinkled transversely. Last abdominal sternite with a preapical depression strongly wrinkled transversely. Aedeagus relatively shorter and stouter in profile, evenly and strongly (almost at right angles) curved from base, with massive and straight apical part, and wide and rounded apex with hardly distinct hook. In frontal view, the distal lobe subrectilinear with a regularly rounded apex, without well-developed capitulum. *C. b. tangra* ssp. n. (Fig. 5C).

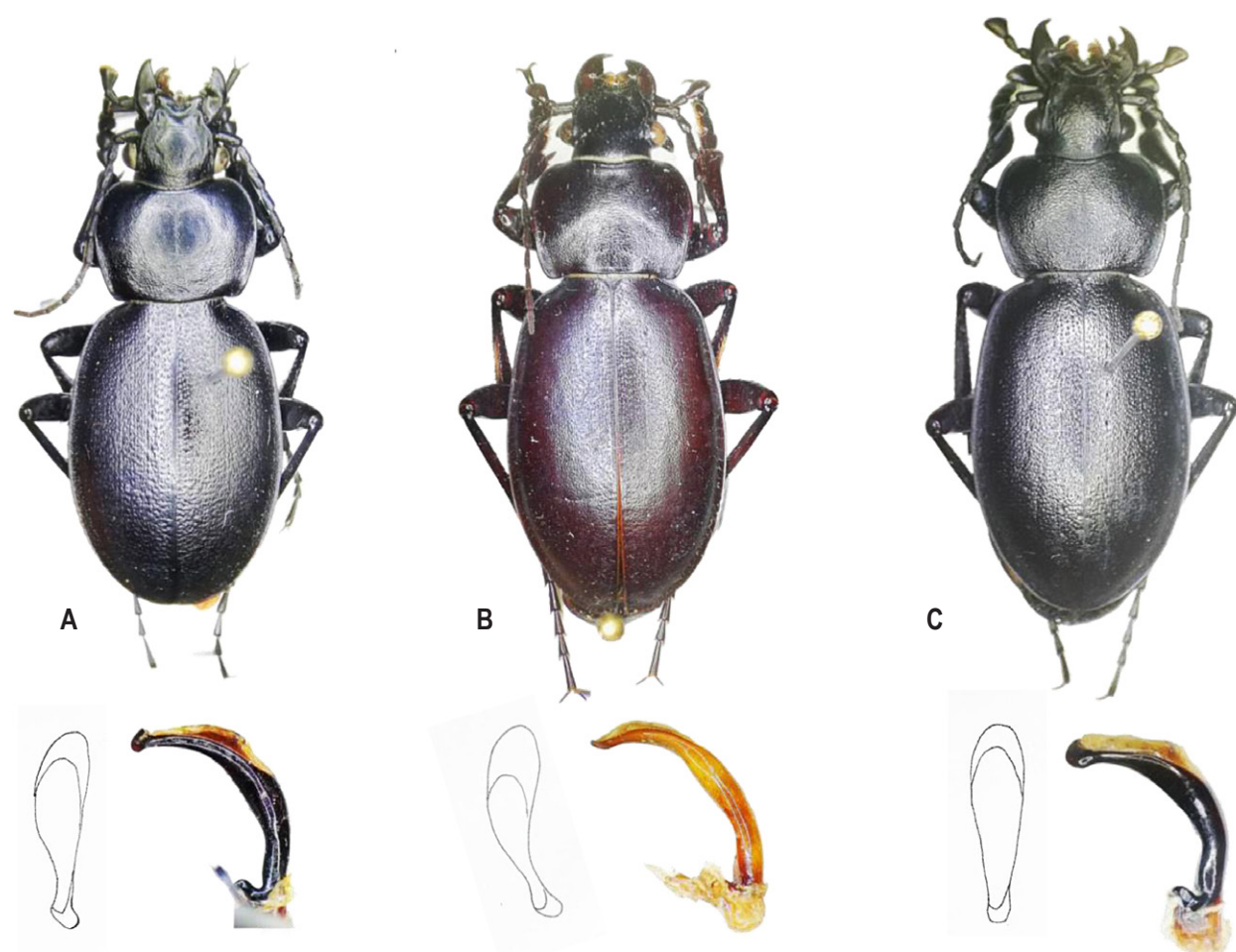


Fig. 5. Comparison of the habitus and shape of the aedeagus (frontal and lateral view) of the three related taxa: A – *Carabus bessarabicus bessarabicus*, B – *C. b. concretus*, C – *C. b. tangra*.

Discussion

The established new steppe stenobiont subspecies is significantly distant and isolated from the modern limits of the species range by more than 1000 km and falls at the southernmost point of the steppe biome in whole Europe. The karst steppes on the southern slopes of the southern “Trans-Balkan” region are a unique remnant of the European steppe biota and are of particular conservation importance for the conservation of the new described taxon and all ancient faunal elements that once had inhabited the entire Danube River Plain and the Forebalkan (Teofilova & Kodzhabashev 2022, Kodzhabashev et al. 2023, 2024, Teofilova 2023, 2024).

The individuals of the scientifically validated subspecies studied in the course of describing of the new taxonomic form showed an extremely high degree of variability, in terms of both morphological characters of the body and the structure of the aedeagus and endophallus. The three major mor-

phological forms, occurring now in distant refugia of the steppe biome (mentioned above in the description of the species range), have long since lost genetic connectivity and the range breaks have led to permanent isolation. This is the reason for the active formation of new genetic and, respectively, taxonomic forms. In areas with contact zones between the subspecies, there is a mixing of characters and an increase in morphological variation and, conversely, in spatially distant parts of the range, characters are differentiated and clearly distinguished. Particularly distinct are the characters of the examined individuals from the Chepan Planina, Crimea and Kazakhstan, while those from the northern and eastern Caucasus seem to have multiple intermediate forms.

In consideration of the range and the significant morphological differences of *C. bessarabicus tangra* from *C. bessarabicus* (including *concretus*), we can conclude that its separation at species level is very probable. In particular, one of the authors (IR) was strongly convinced from the beginning of

the status of a distinct species for *C. tangra*. It is strengthened by the consideration that the location of the new entity is disjoined and separated by over 1000 km from the closest so far known locality of *C. bessarabicus*. To establish the current taxonomic status of the three recognised morphological forms that have arisen after the fragmentation of their former entire range, it is necessary to apply a complex approach involving analysis of the genetic structure, as well as the morphological characters of the body, aedeagus and endophallus, and subsequent cladistic analysis of characters indicating the degree of taxonomic differentiation. We have decided to maintain a cautious attitude and to adopt the status of subspecies for the new form (*tangra*), while waiting to better define the range of the new taxon and to conduct genetic studies after obtaining live specimens.

Conclusion

Carabus bessarabicus is a stenotopic steppe specialist and a seriously endangered species with a conservation status of European importance. Its localities in Bulgaria are situated in the karst steppes of the small mountains around the Sofia Basin. Since they are the southernmost areas from the range of the entire Eurasian steppe biome, the existence of the entire steppe complex in this border refugium is highly vulnerable and dependent on the conservation measures requiring full conservation, which can only be achieved by the designation of strictly protected areas.

Given the significant morphological differences of the newly described here subspecies *C. bessarabicus tangra* with the other two subspecies and the range of the three taxa, we could expect their separation at species level. This, however, is to be confirmed with further solid research on their genetic structure and through cladistic analysis.

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