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Article

Rare and protected species of Caraboidea (Coleoptera) of the Steppe zone of Ukraine

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Abstract
New data on the distribution, occurrence and ecology of 19 rare and little-known species of Caraboidea from 12 genera were obtained in the result of research at Steppe zone of Ukraine. Herein, *Parophonus hirsutulus* is given for the fauna of Ukraine for the first time, while *Cicindela sylvatica* and *Carabus coriaceus* are recorded for the first time in the Steppe zone. The species *Poecilus nitens*, *Carterus angustipennis lutschniki* and *Eucarterus sparsutus* are registered for the first time in mainland Ukraine, and *Acinopus ammophilus* is newly found at the steppe of Left-bank Ukraine. The distribution of six rare species in the Steppe zone of Ukraine is specified, namely *Calathus mollis*, *Ophonus minimus*, *Parophonus planicollis*, *Ditomus calidonius oriens*, *Masoreus wetterhallii*, and *Mastax thermarum*. The seasonal occurrence of subspecies *Cephalota deserticola sivashensis* and *Carabus sibiricus errans* in biotopes is analyzed. New data on four species of ground beetles protected by the Red Data Book of Ukraine (*Cephalota besseri*, *Carabus hungaricus*, *Parazuphium chevrolatii*, *Carterus dama*) is provided.

Key words: ground beetles, rare species, Red Book, Ukraine, Steppe zone.

Introduction

The areals' boundaries of coleopteran species, among which the ground beetles (Caraboidea) are one of the dominant groups, are constantly specified. This is particularly important for compiling the faunistic catalogues and Red Data Books of different geographical territories. At the same time, the registrations of rare, little-known and protected species may be new for some regions and contribute to the information on their distribution and ecology.

The carabid fauna of Ukraine is rather well investigated. Nevertheless, a number of new records for some ground beetles in separate geographic zones or subzones have been published over the past decades. Some of these species were not given for Ukraine both in some checklists (Kryzhanovskij et al., 1995; Putchkov, 2018) and in the Catalogue of the suborder Adephaga of the Palearctic (Catalogue..., 2017). Moreover, these works did not avoid containing inaccuracies on the distribution of some Caraboidea species in Ukraine, and especially in its southern regions. The records of rare species were often given hypothetically, based on data of general areals, but without specifying the exact localities. Thus, in the Catalogue of Palaearctic Coleoptera (2017), about 40 species of Caraboidea from 26 genera were not given for Ukraine, although all of them were reliably registered here (Aleksandrowicz et al., 2016; Putchkov, 2018). Obviously, the authors of Catalogue that worked on Caraboidea lacked some literature, especially those published as small regional summaries on ground beetles (abstracts, for example).

This paper is aimed to clarify the distribution of rare, little-known and protected species of ground beetles in the steppe of Ukraine, and contains additions to the data on their ecology.

Material and methods

Most part of material for this work was collected by the authors in period from May to August of 2018–2020 within the southern subzone of Steppe zone of Ukraine. The beetles were collected by standard method of pitfall traps, as well as by hand under shelters (in litter, in different sediments near basin, under stones and other shelters). Moreover, the Caraboidea collection of the I.I. Schmalhausen Institute of Zoology of NAS of Ukraine was used to obtain additional faunistic information. At the same time, as far as possible, the label data for some records from the Collection were specified and supplemented with geographic coordinates. Part of the data provided in the contribution was uploaded as dataset on biodiversity on GBIF (Martynov & Putchkov, 2021).

Herein, the characteristics of the species are given according to the scheme: species name, material (only new records are given) and comments. The classification of taxa is given according to the Catalogue of Palaearctic Coleoptera (2017).

Results and discussion

New data on the distribution, occurrence and ecology of 18 ground beetles from 12 genera were obtained: most of them are rare, little-known or new for the fauna of certain regions of the Steppe zone of Ukraine. New localities are found for three species protected by the Red Book of Ukraine (2009).

Cicindela (s.str.) *sylvatica* Linnaeus, 1758
Material: one imago (male), Ukraine, Donetsk Region, Krasnolymansk district, vicinity of Torske village, N48.973592 E037.985916, 4.vi.2011, A. Martynov leg.

Comments. The species is usual in the Forest zone of Ukraine and in the Carpathians.

A few specimens were recorded in the Forest steppe zone (northern regions), at forest sandy and loam areas with sparse grass, sometimes in copses (usually pine copses). The southern distributional border of *C. sylvatica* in Ukraine had been previously known as passing along the line: Carpathians – Podolia – Dnieper Uplandy – Poltava – Kharkiv. But now this species is recorded in the Steppe zone of Ukraine, at the northern part of Donetsk Region, where the forests areas penetrate into the steppe areas along the basin of the Siverskyi Donets River: thus, the species' areal is expanded for almost 100 km southwards. Apparently, *C. sylvatica* is an autochthonous (possibly relict) species in the forest biotopes of Steppe zone. The species is perspective to be found within the highest part of Donetsk Elevated area.

Cephalota (*Taenidia*) *besseri* (Dejean, 1826) (Fig. 1A, B)
Material: 1 imago (male), Ukraine, Dnipro Region, Pavlograd district, vicinity of Bulakhivka village, solonchaks near Bulakhivskyy Lyman Lake, N48.6249 E035.6510, 1.vi.1993, Yu. Tretyakov leg.; numerous imagoes, ibid, 10–20.vi.1996, A. Putchkov leg.; ibid, N48.626109 E035.659306, 20–25.vi.2012, A. Putchkov and A. Martynov leg.; Ukraine, Crimea, vicinity of Koktebel, solonchaks, N44.977693 E035.239621, end of June–July 2018; several imagoes, Ukraine, Crimea, vicinity of Kerch, N45.265789

E036.387143, 7.iv.2002; Ukraine, Crimea, territory of Sevastopol city, N44.658410 E033.555251, 17.vi.2002; Ukraine, Crimea, Kerch Peninsula, 6.vi.1983.

Comments. This species is listed in the Red Data Book of Ukraine (Putchkov, 2009a). In Ukraine, it was recorded sporadically in some regions of the Steppe zone, but in the discovered habitats it turns to be a common species. *Cephalota besseri* prefers salt marshes and solonchaks with sparse halophytic vegetation. Ecologically close and sympatric species *C.* (*Taenidia*) *elegans* (Fischer von Waldheim, 1823) is related to bare saline areas, instead.

Cephalota (*Taenidia*) *deserticola sivashensis* Danilevskyi, 2001

Material: numerous imagoes, Ukraine, Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, solonchaks on bank of Syvash Gulf, N46.255293 E033.782710, 10–15.vii.2020, A. Putchkov and A. Martynov leg.; numerous imagoes, Ukraine, Kherson Region, Chaplynka district, vicinity of Vasylivka village, solonchaks on bank of Syvash Gulf, N46.184607 E033.994019, 10–15.vii.2020, A. Putchkov and A. Martynov leg.; numerous imagoes, Ukraine, Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, solonchaks on bank of Syvash Gulf, N46.233448 E033.816540, 10–15.vii.2020, A. Putchkov and A. Martynov leg.; numerous imagoes, Ukraine, Kherson Region, Henichesk district, vicinity of Chonhar village, solonchaks on bank of Syvash Gulf, N45.986265 E034.543147, 6–10.vi.2012, A. Putchkov leg.; several imagoes, Ukraine, Kherson Region, Henichesk district, Kuyuk-Tuk Island, N46.1160 E034.4462, 10–14.06.1999, B. Vasko leg.

Comments. Endemic of Ukraine. This subspecies was described relatively recently from vicinities of Henichesk town (Southern Ukraine, Kherson Region, environs of the Syvaske (= Sivashskoe) village), but without additional data on distribution and ecology (Danilevskyi, 2001). According to our information, *C. deserticola sivashensis* is a common subspecies at typical bare saline lands of Sivash gulf (mainland Ukraine), but it has not yet been found in similar habitats of Black Sea and Sea of Azov coasts and in the Crimea. It is sympatric with the ecologically related subspecies *Cephalota* (*Taenidia*) *elegans stigmatophora* (Fischer von Waldheim, 1828). However, these subspecies have different dates of appearance and activity of adults. Imago of *C. d. sivashensis* appear from the beginning of May, and become numerous (activity peak) from the mid-May til the beginning of June. Few specimens of *C. elegans stigmatophora* can be recorded from the end of May, while numerous beetles are registered from mid-June to the first half of July. Thus, these two subspecies of the genus *Cephalota* demonstrate spatial and temporal replacement one by another.

Figure 1. *Cephalota besseri* (Dejean, 1826) and its habitat: **A** – total view of imago of the species; **B**. – solonchaks near Bulakhivskyy Lyman Lake (June 2012).

Carabus (*Trachycarabus*) *sibiricus errans* Fischer von Waldheim, 1823

Material: numerous imagoes, Ukraine, Donetsk Region, Mariupol district, Kamyani Mohyly Nature Reserve, steppe area, N47.3046 E037.0921, June-August 2002, E. Savchenko leg.; several imagoes, Ukraine, Donetsk Region, Boikivske district, Khomutovskyi Steppe Nature Reserve, N47.2937 E038.1862, 18–20.vi.2001, steppe, V. Martynov leg.; numerous imagoes, Ukraine, Donetsk Region, vicinity of Mariupol city, Turkova Balka gully, N47.20155 E037.48644, May–June 2020, R. Nerush leg.

Comments. Endemic of Ukraine. Until to beginning of XXI century, it was considered as rare subspecies because of lack of data on distribution and biotopic characteristics. At present, it is registered as a common inhabitant in extreme south of the Steppe zone of Ukraine. This subspecies is sometimes sympatric with the ecologically related *Carabus perrini* Dejean, 1831, but differs in phenology and biotopic preferences. Thus, at the Kamyani Mohyly Nature Reserve adults of *C. sibiricus errans* prevailed from July to September, while *C. perrini* prevailed in the spring-summer period (from beginning of May until the end of June). In biotopes where *C. perrini* was absent (for example, in the steppe biotopes of the Kalchikovskii district, Turkova balka, vicinities of Mariupol city), *C. sibiricus errans* have been becoming numerous at the end of May, with maximum abundance in June. Thus, spatial and temporal replacement of species is observed. Similar replacement was recorded in Crimea for *C. sibiricus bosphoranus* Fischer, 1823 and *C. perrini perrini* Dejean, 1831. The adults of *C. sibiricus bosphoranus* were recorded only at yaila (subalpine zone of Crimean Mountains), but *C. perrini perrini* was found at the foothills and in the steppe areas. Distributional features of other subspecies of *C. sibiricus* were discussed previously (Putchkov, 2018).

Carabus (*Pachystus*) *hungaricus* Fabricius, 1792 (Fig. 2A, B)

Material: Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, steppe areas along Syvash Gulf, N46.23547 E033.81802 (1 male), N46.24899 E033.79784 (several imagoes), 20–24.v.2019, A. Putchkov and A. Martynov leg.; ibid, N46.24875 E033.79821 (5 imagoes – 3 females, 2 males), N46.24299 E033.80791 (7 imagoes – 3 females, 4 males); N46.23547 E033.81802 (12 imagoes – 6 females, 6 males), N46.24005 E033.81210 (11 imagoes – 6 females, 5 males), N46.24899 E033.79784 (several imagoes); N46.24875, E033.79821 (9 imagoes – 5 females, 4 males), 8–12.ix.2019, A. Putchkov and A. Martynov leg.; ibid, N46.24299 E033.80791 (1 imago (male), two larvae of instars III), N46.24216 E033.80915 (1 imago (female)), N46.24005 E033.81210 (3 imagoes (female and 2 males), 15–18.iv.2020, A. Putchkov and A. Martynov leg.; ibid, N46.22098 E033.95855 (1 imago (female)); N46.24899 E033.79784 (one imago), N46.24875 E033.79821 (4 imagoes – 2 females, 2 males); N46.24216 E033.80915 (3 imagoes – 2 females, 1 male), N46.24005 E33.81210 (1 imago (female)), N46.23549 E033.82729, (2 imagoes (females)), 10–16.ix.2020, A. Putchkov and A. Martynov leg.; ibid, N46.235 E033.827 (1 imago, 1 larva), N46.26009° E033.75775° (2 imagoes), 30.iv–6.v.2021, A. Martynov leg.; ibid, N46.235 E033.827 (1 imago), N46.240 E033.812 (3 imagoes), A. Martynov leg.; 8–14.vii.2021; ibid, N46.235 E033.827 (12 imagoes), N46.23578 E033.81765 (2 imagoes), N46.240 E033.812 (7 imagoes), N46.24233 E033.80749 (1 imago), N46.25884 E033.75774 (4 imagoes), 6–12.ix.2021, A. Martynov leg.

Comments. The species is included in the Red Data Books of Ukraine and Dnipropetrovsk Region (Putchkov, 2009b; Putchkov & Brygadyrenko, 2011), as well as in the Red Data Books of Hungary, Moldova, Russia and Bern Convention (Appendix II). The subspecies *C. hungaricus scythus* Motschulsky, 1847 is common at natural undamaged biotopes of the southern Ukraine. All records of the species form Sivash Gulf given herein are new. The number of adults of *C. hungaricus* in summer period sometimes reached 1.2–1.5 specimens for 10 trap-days, which is one of the highest rates registered within mainland Ukraine.

Carabus (*Procrustes*) *coriaceus* Linnaeus, 1758

Material: one imago (male), Ukraine, Donetsk Region, Sloviansk district, vicinity of Bohorodychne village, National Nature Park «Sviati Hory», N49.0242 E037.5333, 11.viii.2012, V. Martynov junior leg.

Comments. The species is common in the Forest and Forest steppe zones of Ukraine (especially in the western areas), as well as in the Carpathians. Now it is registered in the Steppe zone of Ukraine for the first time (from deciduous floodplain forests in the northern part of Donetsk Region). This may indicate both a possible expansion of natural distribution of *C. coriaceus* (as well as for the forest species *Cicindela sylvatica* discussed above) through forestry areas of Siverskyi Donets River basin and its autochthonous existence in the forests.

Poecilus nitens Chaudoir, 1850

Material: 1 imago (male), Ukraine, Donetsk Region, vicinity of Staryi Krym village, N47.1783 E037.5027, 16.vi.1998, Vdovenko leg.

Comments. This species is registered in the Steppe zone of mainland Ukraine for the first time. Previously, it was (presumably) recorded for the Kerch Peninsula (Eastern Crimea) (Putchkov, 2018).

Poecilus nitens was not given as known from Ukraine in the Catalogue of Palearctic Coleoptera (Catalogue..., 2017).

Calathus (*Neocalathus*) *mollis* (Marsham, 1802) (Fig. 2B)
Material: one imago (male), Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, steppe areas along Syvash Gulf, N46.23547 E033.81802, 8–12.ix.2019, A. Putchkov and A. Martynov leg.; 2 imagoes (female and male), Kherson Region, Chaplynka district, vicinity of Strohanivka village, pasture near Sivash Gulf, N46.238278 E033.886321, 8–12.ix.2019, A. Putchkov and A. Martynov leg.; one imago (male), ibid, N46.23549 E033.82729, 11-16.ix.2020, A. Putchkov and A. Martynov leg.; 3 imagoes (male and 2 females), Kherson Region, Chaplynka district, Askania-Nova Biosphere Reserve, steppe area, N46.4808 E033.8504, 14.ix.1988, Dogadina leg.; one imago (female), Ukraine, Mykolaiv Region, Bashtanka district, vicinity of Marivka village, Marivske Protected Area, meadow, N47.155906 E032.227251, 15.iii.1978, A. Putchkov leg.

Comments. All previous records of *C. mollis* from the Southern Ukraine need to be checked and clarified because this species is mixed with ecologically and habitually similar *C. cinctus* (Motschulsky, 1850) and *C. melanocephalus* (Linnaeus, 1758). Currently, in Ukraine, *C. mollis* has been reliably recorded only in the southern part of Steppe zone (in Mykolaiv and Kherson Regions, and south of Donetsk Region), as well as in Crimean Mountains (Putchkov & Aleksandrowicz, 2020). The registrations from other regions of Ukraine are not expected, and records for the Forest zone (Putchkov, 2018) are erroneous.

Acinopus (*Osimus*) *ammophilus* (Dejean, 1829)
Material: one imago (female), Ukraine, Kherson Region, Chaplynka district, vicinity of Strohanivka village, pasture near Sivash Gulf, N46.238278 E033.886321, 20–24.v.2019, A. Putchkov and A. Martynov leg.; one imago (male), Ukraine, Kherson Region, Chaplynka district, vicinity of Strohanivka village, N46.233268 E033.900073, steppe area, 15–20.07.2019, A. Putchkov and A. Martynov leg.; 3 imagoes (female and 2 males), Ukraine, Kherson Region, Chaplynka district, vicinity of Hryhorivka village, steppe area, N46.24337 E033.71780, 10–15.07.2020, A. Putchkov and A. Martynov leg.

Comments. The species is registered in the Steppe zone of the Left-bank Ukraine for the first time. Previously it was known from the steppe and foothill of Crimea only. Records of the species from Odesa Region (S Ukraine) require confirmation (Putchkov, 2018).

Ophonus (*Hesperophonus*) *minimus* (Motschulsky, 1845)
Material: one imago (male), Ukraine, Kherson Region, Chaplynka district, Askania-Nova Biosphere Reserve, steppe area, N46.48 E033.84, 6.ix.1988, Dogadina leg.; two imagoes (males), Ukraine, Zaporizhzhya Region, Yakymivka district, vicinity of Yur'ivka village, steppe area, N46.61000 E035.15496, 26.06–5.07.2019, Martynov A.V. leg.

Comments. A rare species of the Ukrainian fauna. It is fragmentarily distributed within almost entire Steppe (except for Crimea) and south-eastern part of Forest steppe zone (Kharkiv Region) (Kataev, 2000). This species is recorded in the south of the Zaporizhzhya Region for the first time.

Parophonus (s. str.) *planicollis* (Dejean, 1829)
Material: one imago (male), Ukraine, Crimea, Krasnogvardeisk district, vicinity of Kalinine village, irrigated agrocenosis, 4.v.1996, A. Putchkov leg.; two imagoes (male and female), Ukraine, Crimea, Tarkhankut Peninsula, vicinity of Olenivka village, dirt and litter on coast of Black Sea, N45.341353 E032.521881, 2–5.v.2012, A. Putchkov leg.; one imago (female), Ukraine, Crimea, Yevpatoriya district, vicinity of Suvorovske village, steppe area, N45.2599 E033.3693, 29.v.2001, A. Putchkov leg.

Comments. The species is rare for the Ukrainian fauna. Our records clarify its distribution, especially within the Steppe of Crimea.

Parophonus (*Ophonomimus*) *hirsutulus* (Dejean, 1829) (Fig. 2A, C)
Material: two imagoes (male and female), Ukraine, Kherson region, Chaplynka district, vicinity of Strohanivka village, steppe areas along Sivash Gulf, N46.241 E033.808, 20–25.v.2019, A. Putchkov and A. Martynov leg.; one imago, Zaporizhzhia Region, Yakymivka district, vicinity of Mala Ternivka village, tall and dense forest belt (mainly *Ulmus* sp.), N46.59100 E035.24329, 18–25.vi.2019, A. Martynov leg.; one imago (female), Ukraine, Kherson Region, Skadovsk district, vicinity of Zaliznyi Port village,

Chornomorskyi Biosphere Reserve, N46.1254 E032.2586, dirt and plant litter on coast of sea, 2–8.vii.2016, A. Putchkov leg.; two imagoes (female and male), Ukraine, Kherson Region, Skadovsk district, vicinity of Zaliznyi Port village, Chornomorskyi Biosphere Reserve, N46.134225 E032.271557, 2–8.vii.2016, steppe area, A. Putchkov and T. Markina leg.

Comments. Rare species. It is reliably registered in Ukraine (south of the Steppe zone) for the first time.

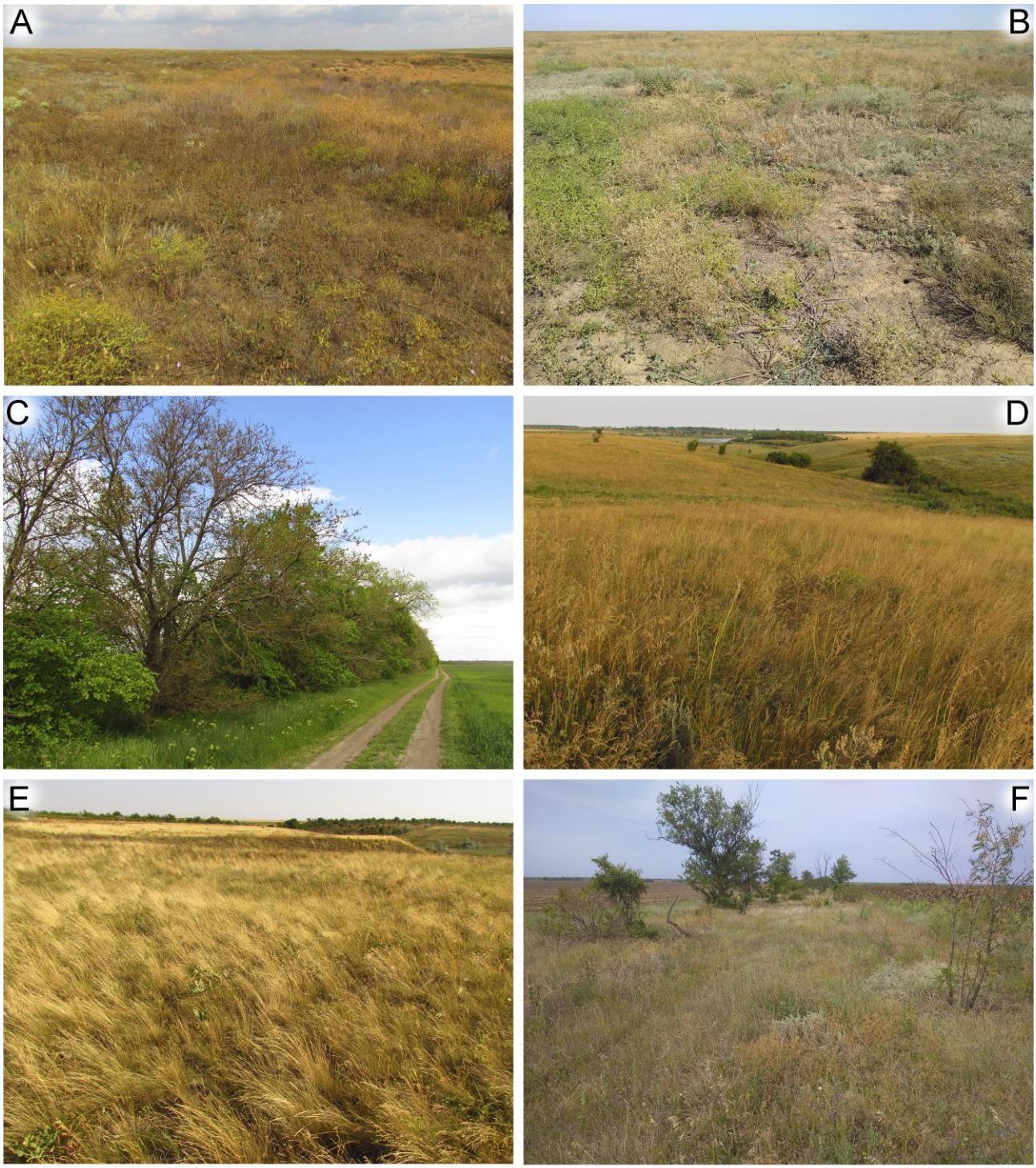

Figure 2. Some habitats of rare Caraboidea species recorded within Steppe zone of Ukraine: **A, B** – steppe areas along Sivash Gulf (Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village; **A** – July 2019, **B** – September 2019); **C** – forest belt overgrown with *Ulmus* sp. mainly in the vicinity of Mala Ternivka village (Zaporizhzhia Region, Yakymivka district, May 2019); **D , E** – steppe areas in the vicinity of Shelyuhy village (Ukraine, Zaporizhzhia Region, Yakymivka district, June 2019); **F** – sparse forest belt used as pasture, vicinity of Myrne village (Zaporizhzhia Region, Yakymivka district, August 2019).

Carterus (Cartetus) dama (Rossi, 1792)
Material: 7 imagoes, Ukraine, Donetsk Region, territory of Mariupol city, garden, on flowering *Anethum graveolens* L., N47.157223 E037.628609, vii.2017, Martynov V.A. leg.

Comments. Rare xerophilic species. Known for Ukraine from Steppe zone of its continental part and Crimea by old records mainly. Species is listed in Red Data Book of Ukraine (Putchkov, 2009c).

Carterus (*Pristocarterus*) *angustipennis lutschniki* Zamotailov, 1988
Material: 2 imagoes (males), Ukraine, Zaporizhzhya Region, Yakymivka district, vicinity of Yur'ivka village, steppe area, N46.61000 E035.15496, 26.06–5.07.2019, Martynov A.V. leg.

Comments. This is a very rare subspecies, described relatively recently from the Krasnodar Region (Southern Russia), were it was found in some agrocenoses (Zamotailov, 1988; Zamotailov et al., 2012). Now, it is reliably recorded at south of the Steppe zone of mainland Ukraine for the first time. According to unverified data, it was previously recorded earlier for the Eastern Crimea, Kerch Peninsula, only (Catalogue..., 2017; Putchkov, 2018).

Ditomus calydonius oriens Dvořák, 1993 (Fig. 2D, E)
Material: one specimen, Ukraine, Zaporizhzhia Region, Yakymivka district, vicinity of Shelyuhy village, steppe area, N46.53059 E035.19047, 17–23.vi.2019, A. Martynov leg.; 3 imagoes (female and 2 males), Ukraine, Zaporizhzhia Region, Yakymivka district, vicinity of Shelyuhy village, steppe area, N46.56781 E035.19518, 18–27.vi.2019, A. Martynov leg.; one imago, ibid, 21–26.viii.2019, A. Martynov leg.; one imago (female), Ukraine, Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, steppe areas along Sivash Gulf, N46.235 E033.827, 6–12.ix.2021, A. Martynov leg.; one imago (female), ibid, N46.240 E033.811, 6–12.ix.2021, A. Martynov leg.

Comments. Very rare subspecies for the East European fauna. It is known at southern Ukraine only based on a few specimens with incomplete labels from old collections.

Eucarterus sparsutus (Reitter, 1898) (Fig. 2F)
Material: 10 imagoes (4 females, 6 males), Ukraine, Crimea, Saki env., 12.vii.2009, steppe, S. Mosyakin leg.; one imago (female), Ukraine, Kherson Region, Skadovsk district, vicinity of Zaliznyi Port village, Chornomorskyi Biosphere Reserve, coast of sea, N46.1254 E032.2586, 2–8.vii.2016, A. Putchkov and T. Markina leg.; two imagoes (female and male), Ukraine, Kherson Region, Chaplynka district, vicinity of Novovolodymyrivka village, damaged steppe area near Syvash Gulf, N46.24907 E033.79881, 10–16.vii.2020, A. Putchkov and A. Martynov leg.; one imago (male), ibid, N46.24886 E033.79803, 10–16.09.2020, A. Putchkov and A. Martynov leg.; 7 specimens, Ukraine, Zaporizhzhia Region, Yakymivka district, vicinity of Myrne village, forest belt with sparse trees (used as pasture), N46.70408 E035.23666, 25–30.vi. 2019, A. Martynov leg.; several specimen, ibid, 22–26.viii.2019, A. Martynov leg.; one specimen, Ukraine, Zaporizhzhia Region, Yakymivka district, vicinity of Davydivka village, steppe area on bank of Utlukskyi Estuary, N46.51753 E035.18525, 18–24.viii.2019, A. Martynov leg.; one specimen, Ukraine, Zaporizhzhia Region, Yakymivka district, vicinity of Kyrylivka village, field that is not cultivated for one year, N46.38903 E035.27522, 17–23.viii.2019, A. Martynov leg.; 2 imagoes, Ukraine, Zaporizhzhya Region, vicinity of Shelyuhy village, forest belt near field and fallow, N46.54832 E035.18648, Martynov A.V. et Martynov K.V. leg., 21.06.2019.

Comments. A rare species at the South of Eastern Europe. In Ukraine, it was previously known by old labels only from Crimea (Kryzhanovskij et al., 1995). Later, it was found at mainland part of Southern Ukraine (Putchkov, 2018).

Masoreus wetterhallii (Gyllenhal, 1813)
Material: one specimen, Ukraine, Kherson Region, Chaplynka district, vicinity of Strohanivka village, pasture near Sivash Gulf, N46.23955 E033.88649, 12.ix.2019, A. Putchkov and A. Martynov leg.; 7 imagoes (3 females, 4 males), Ukraine, Kharkiv city, Saltovka, Botanic Garden of KhNP University, N50.0197 E036.3198, 4.vi–4.vii.2018 and 17–28.viii.2018, leg. N. Komaromi.

Comments. This widespread species is rare in Ukraine. It is herein recorded in the southern Steppe subzone of mainland Ukraine for first time. Moreover, its records from the east of Forest steppe zone (Kharkiv city) are confirmed. This species is included in the Red Data Book of Dnipropetrovsk Region (Putchkov & Brigadirenko, 2011).

Parazuphium chevrolatii Castelnau, 1833
Material: Ukraine, Kherson Region, Chaplynka district, Askania-Nova Biosphere Reserve, steppe area, N46.48 E033.84, 15.vi.1981, Dogadina leg.; Ukraine, Odesa Region, coast of Kuyalnik estuary, 17.vi.2004. A. Gontarenko leg.

Comments. An extremely rare species in Ukraine. It is included in the Red Data Book of Ukraine, (Putchkov, 2009d). *Parazuphium chevrolatii* is known based on old labels, from Steppe Crimea mainly. It is not given as known from Ukraine in the Catalogue of the Palaearctic Coleoptera (2017), but was expected for the south of the Steppe zone (Putchkov, 2018).

Mastax thermarum (Steven, 1806)
Material: Ukraine, Kherson Region, Skadovsk district, 3 km E Heroiske village, Chornomorskyi Biosphere Reserve, Solenoozernyi plot, aspen grove, 10.vi.1980, A. Petrenko leg.; ibid, lowering of the meadow steppe, 7.vi.1980, A. Petrenko leg.; ibid, N46.493690 E031.906516, 2.06.1988, A. Putchkov leg.; Ukraine, Odesa Region, Kiliya district, vicinity of Danube estuary, vi.1986, A. Putchkov leg.; Ukraine, Dnipro Region, vicinity of Kryvyi Rih city, mine dumps [quarry], N47.8623 E033.2875, 28.v.2005, Lapin leg.

Comments. This species is rare in Eastern Europe, but common in Central Asia. In Ukraine, it is known based on a few specimens from the extreme south of the Steppe zone, and is extremely rare in the northern Steppe subzone. Apparently, *Mastax thermarum* is sporadically distributed within the south of Eastern Europe. It is listed in the Red Data Book of the Dnipropetrovsk region (Putchkov & Brigadirenko, 2011, 2018).

Conclusions

In the result of our investigations, *Parophonus hirsutulus* is given as new species for the fauna of Ukraine, and *Cicindela sylvatica* and *Carabus coriaceus* are recorded for the first time in Steppe zone. *Poecilus nitens*, *Carterus angustipennis lutschniki*, and *Eucarterus sparsutus* are recorded for the first time in mainland Ukraine, and *Acinopus ammophilus* is newly given for the Left-bank Ukraine. The data on the distribution of six rare species in the Steppe zone were emended (*Calathus mollis*, *Ophonus minimus*, *Parophonus planicollis*, *Ditomus calidonius oriens*, *Masoreus wetterhallii*, and *Mastax thermarum*). The subspecies *Cephalota deserticola sivashensis* and *Carabus sibiricus errans* have got new data on the seasonal occurrence in biotopes. The information on four protected species of ground beetles included in the Red Book of Ukraine (*Cephalota besseri*, *Carabus hungaricus*, *Parazuphium chevrolatii*, *Carterus dama*) was significantly supplemented.

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